Spurious Middlemen in Corrupt Transactions

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Abstract

To solve the corruption problem, its root causes should first be diagnosed and factors supporting it should be determined. One of the important facilitators of corrupt transactions are intermediaries, who make corrupt dealings less risky, thereby increasing corruption. Even worse, there are 'spurious' intermediaries who obtain bribes from public services by pretending they can ensure a service is completed even though they have no such influence over the issue. This deception may continue even if the officer providing the public service in question is honest. The simple game theoretical model formulated in this article tries to capture the mechanisms behind such a deception. From the solutions of the model, some policy recommendations to prevent such a process from occurring are derived.

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1. Introduction

While corruption has occurred in all eras and in nearly all societies, its social and economic costs have attracted increasing attention, especially in the last decade. Efforts at solving this problem have increased in many countries, and it is now almost universally accepted that corruption causes much harm. The corruption of public officers discourages entrepreneurs, causes inefficiencies and the waste of resources, distorts income distribution, and harms democracy and ethics.

To be able to cure a problem, the root causes of it should be analyzed extensively. One of the most frequently cited causes of corruption is excessive red tape coupled with the discretion of public officers over the public service given. Studies done by Jain and Tırtıroğlu (2000) (cited in Jain, 2001), Buscaglia (2001) and Kaufmann (1997) (cited in Ricjkeghem and Weder, 2001) show that there is a positive relationship between corruption and excessive bureaucratic procedures or excessive regulatory discretion of public officers.

Information problems also encourage corruption. Manion (1996) examines how a fertile environment of bribe exchange for the licensing requirements of businesses in China is created by numerous detailed, complex rules, a gap between formal and informal operating standards, and inaccessibility of information about the rules. She also models how the expectations of clients about the honesty or corruptness of officers, and the clients' imperfect knowledge about whether their application is acceptable or not, both affect the frequency of corrupt transactions.

Because it is illegal, corruption is a risky transaction. Consequently, long-term reputation-based relationships between the briber and the bribee become important to decrease such risks. Intermediaries are specialized connection builders, who decrease the costs involved in building connections by making an initial connection-building investment, thereby benefiting individual clients in return for some 'commission'. The ways that these intermediaries can increase corruption is examined in Manion (1996), Bayar (2005), Hasker and Ökten (2008) and Mogiliansky et al. (2009).

Even worse, intermediaries sometimes try to create perceptions of corruption to obtain private benefit, even in the absence of any corrupt demands by officers. That is, these intermediaries are able to earn more money by telling clients that bureaucrats must be bribed, even in cases where there is no corruption. The intermediary then pockets the bribe he obtains from the client.

Oldenburg (1987) examined the Indian Land Consolidation Program and found that, to maximize their benefits, middlemen try to spread the rumor that procedures are mysterious, that real decisions are made behind scenes, and that "nothing gets done without bribing the officials". Such middlemen try to give the impression that only they can reach the officials, get the job done, and know the subtle hints and techniques for passing bribes. Thus, the administration is perceived rather corrupt, even though the real level of corruption is much lower.

The simple game theoretical model formulated in this article tries to capture the mechanisms behind a deception process like the one mentioned in Oldenburg (1987). The model examines the case of people obtaining bribes from the public service given by pretending that they get the job done although they have no such influence over the issue. This deception process may continue even if the officer providing the public service in question is honest. A client's lack of information about the honesty of the officials, and their uncertainty about whether their application is acceptable, may cause them to believe these spurious middlemen.

The strange thing in all these procedures is that whereas 'normal' middlemen give a 'service' to the client in dealing with corrupt officers by decreasing the risks involved, spurious middlemen engage in pure deception, which harms all parties other than the middlemen.

Using game theoretical modeling we can derive some policy recommendations to prevent such corruption from occurring. To our knowledge, there are as yet no game theoretical models studying the case of spurious middlemen in the literature.

The next part of the article establishes the model and gives the solution. In the third part, extentions to the current model are suggested, while the fourth part comments on the results, makes policy recommendations and concludes the study.

2. The Model

The aim of the model is to describe a type of corruption similar to that discussed in Oldenburg (1987): a case of people taking bribes from the jobs officials do by pretending that they have influence over the delivery of the service in question. These spurious middlemen allege that they can mediate the bribing of officials for the public service to be delivered, when in fact they have no such role.

The model is a Bayesian game with two players: the spurious middleman (SM) and the client (C). The client wants to get a public service that is valuable for her. Clients have different valuations of this service; their type is a random draw from a uniform distribution UN[0,1], represented by σ. Clients of type σ have a valuation σZ for the service, where Z is the valuation parameter of the most eager client.

The person in charge of the service is the bureaucrat. The bureaucrat can be an honest person who does her job without demanding a bribe and rejects applications only if they are against the rules. However, there is also the probability that the bureaucrat may be a corrupt one who expects a bribe from the client. If the application is acceptable but the client does not bribe, a corrupt bureaucrat accepts the application but processes it slowly and increases red tape. If the application is unacceptable and the client does not bribe, the corrupt bureaucrat rejects the application. We assume for simplicity that the client is so afraid of being prosecuted that he does not directly offer a bribe to the officers.

We also assume that rules and regulations are not transparent. The client thinks that her application will be acceptable with probability t, and that, if an honest bureaucrat processes it, she will get the service with probability t. The assumption that t<1 may be realistic even under more transparent regulations if the service given by the bureaucrat is contestable. For example, think of a case where everybody can apply for a licence but only a limited number will be awarded to the best applicants according to some criteria. In such a case, even if the client knows the criteria, since he does not know the quality of other applicants, he cannot know whether his demand is acceptable or not. He can only make a guess about his winning probability.

If the incumbent officer is corrupt, the client thinks her application will be rejected if it is unacceptable. However, the client also believes that, even if her application is acceptable, it will be processed slowly with heavy application of red tape. We represent the expected costs of this with Φ, the costs the client expects to incur if the bureaucrat is corrupt and his

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application is acceptable (Φ may be generalized to include the probability that the client's application may be rejected by the corrupt bureaucrat even if the application is acceptable just by setting $\Phi \geq \sigma Z$). The client makes her application to the public office without knowing which bureaucrat be responsible for processing her application. Therefore, she expects *ex-ante* that the bureaucrat in charge is honest with probability (p) or corrupt with probability (1-p). These types are selected by nature at the beginning of the game with the probabilities depending on the general image of the public office in the eyes of the citizens.

The spurious middleman (SM) works inside the public office, say as a civil servant in charge of document receipt and dispatch, who can observe the application and evaluation process. He therefore knows who is in charge of the client's application and also has private insider information about whether this bureaucrat is corrupt or honest. We assume that the SM is a low level civil servant with no connections to influence either type of bureaucrat (corrupt or honest) in processing applications in any way. While corrupt bureaucrats may be using some genuine intermediaries, the SM is not one of them. The corrupt bureaucrat can decide an application is acceptable even if it is unaccceptable. However, accepting an unacceptable application is a strictly dominated strategy for him when the client applies through the SM rather than through his geniune intermediary. In fact, the bureaucrat does not even know that the SM is mediating in the process. Thus, SM cannot make any type of bureaucrat accept an unacceptable application. If the client applies through a geniune intermediary, the corrupt bureaucrat may receive a bribe from the client in order to pass an unacceptable application, but this is a different process outside the main model of this study.

In order to obtain a bribe from the clients, the SM tries to guess and change the prior probability p attached by the client to the chance of facing an honest bureaucrat, and the probability t perceived by the client about the probability that her demand is acceptable. The SM plays after observing which bureaucrat is given the job by the superiors. He has insider information about whether the application is acceptable and whether the bureaucrat to whom the job is given is corrupt or honest. The SM therefore has to determine how much bribe to demand in four possible cases: honest bureaucrat/acceptable application, corrupt bureaucrat/acceptable application, honest bureaucrat/unacceptable application, and corrupt bureaucrat/unacceptable application. The strategy space of the SM is therefore defined as $S_{SM} = T_1 x T_2 \rightarrow R_+$, where T_1 is the type space of the bureaucrats and T_2 is the type space of the application.

The client, without observing the type of his application and the type of the bureaucrat, but after observing the SM's claims and bribe demand, decides whether to accept or reject the offer. Accordingly, the strategy space of the client (C) is defined as $S_C = R_+ \rightarrow \{Accept, Reject\}$.

The game is a dynamic game of incomplete information composed of four stages. In the first stage, nature plays and draws the type of the incumbent bureaucrat.[1] In the second stage, nature determines the type of the application. In the third stage, the SM observes the types of both bureaucrat and application and determines the bribe to demand, β. The SM lies to client about the type of bureaucrat and/or the type of her application, trying to make her change her initial expectations in a way that is most profitable to the SM. In the fourth stage, the client, after hearing the SM's lie, updates her prior probabilities of facing an honest officer and her prior probability of whether his application being acceptable or not. The client also observes the amount of the bribe demanded by the SM, and decides whether to pay the bribe or not. We assume that client only pays the SM the bribe after she gets the service in order to exclude the possibility of the SM reneging. The utility function of the client can be defined as below:

$$
V_{CL}{}^{\sigma} = \begin{cases} P\left(honest\,\&\,acceptable \middle| SM's\ claim\right)(\sigma Z) + P\left(corrupt\,\&\,acceptable \middle| SM's\ claim\right)(\sigma Z\text{-}\Phi) + \\ +P\left(unacceptable \middle| SM's\ claim\right)0 & \text{if} \quad s_{cL} = R \\ \sigma Z\text{-}\beta & \text{if} \quad s_{cL} = A \end{cases}
$$

(1)

The client thinks that he will get the job done for sure if he uses SM, in return for a bribe, because he makes the payment after getting the service. On the other hand, if he rejects the SM's bribe demand, he forms an expectation about the probabilities of the four cases, given the SM's claims. That is, if the client rejects the SM's bribe demand, she can get σZ if the bureaucrat is honest and can get $\sigma Z - \Phi$ if the bureaucrat is corrupt and the demand is acceptable. If her demand is unacceptable, both the honest and corrupt bureaucrats reject the application. The utility function of the SM can be defined as follows:

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[1] In fact, in the first stage, nature determines the type of each bureaucrat, and then the chief of the office gives the job randomly to one of the bureaucrats without observing the decision of nature. Thus, if the client thinks that the probability of facing an honest client is p, he also expects that the bureaucrat processing his application is honest with probability p, since the chief distributes jobs randomly. Thus we can represent the process with a single move of nature.

$$V_{SM}(\beta, \sigma, Z, T_1, T_2) = \begin{cases} (1-\xi)\beta - \xi F & \text{if} \quad s_{cL} = A \\ 0 & \text{if} \quad s_{cL} = R \end{cases} \qquad (2)$$

where ξ is the probability of the SM being caught while demanding the bribe or while disseminating the image that he gets the job done, while F is the penalty that the SM will get if he gets caught.

Lemma 1: SM can only demand a bribe from the clients in two cases: honest bureaucrat/acceptable application, corrupt bureaucrat/acceptable application.

Proof : If the application is unacceptable, the SM cannot demand a bribe from the client because, since he has no connection with the bureaucrats, he has no ability to ensure any bureaucrat accepts any type of application. However, he knows that, if the incumbent bureaucrat is honest and the application is acceptable according to the law, then the application will be accepted and the client will receive the service without facing any problem. Similarly, if the application is acceptable but the bureaucrat is corrupt, he knows that this application will also be accepted, but with red tape costs Φ; SM can also guess Φ since has private knowledge about the bureaucrats. In such cases, the SM has the possibility of taking advantage of the informational deficiency of the client by telling the client that the incumbent bureaucrat is corrupt and/or the application is unacceptable in order to pretend that he can get the job done in return for some money.□

Lemma 2: the SM determines different bribes for the two possible cases when the incumbent bureaucrat (IB) is honest and when the IB is corrupt (that is, $\beta^C \neq \beta^H$). In all cases, the SM tells the client the lie that the incumbent bureaucrat is corrupt and that if she gives a bribe of β, he can get the job done. In the case of an honest bureaucrat/acceptable application, SM tells the client the truth about the acceptability of the application, but, in the case with corrupt bureaucrat/acceptable application, lies to the client by saying that her application is unacceptable.

Proof : If the SM says that the IB is honest, the dominant strategy of the client is to reject, s_{cL}=R. In that case, the SM cannot get any bribe. Thus, saying that the IB is honest is a weakly dominated strategy for SM so he tells the client that the incumbent bureaucrat is corrupt in both cases.

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As explained in Lemma 1, the SM only demands a bribe from clients with acceptable applications. Since the client with an acceptable application will have to wait longer if the application is processed by a corrupt bureaucrat, the SM tells the client that his application is unacceptable (to justify waiting), and that, if the client gives a bribe, he can make the IB accept it although he must wait a bit. If the IB is honest and the application is acceptable, the SM tells the client that his application is acceptable but the IB is corrupt.

If the SM tells clients with acceptable applications that their application is acceptable in both the honest bureaucrat and corrupt bureaucrat cases, he cannot explain the difference in waiting time between the corrupt and honest bureaucrat cases and may lose credibility. If, on the other hand, the SM tells clients that their application is unacceptable in the both corrupt and honest bureaucat cases, he can miss out on the extra profit opportunities he can derive from the rapidly processed case of an acceptable application/honest bureaucrat. □

Lemma 3: In the acceptable application/corrupt bureaucrat case, the SM chooses a waiting time equal to the red tape applied by the corrupt bureaucrat to all acceptable applications, Φ.

Proof: Since by assumption, the SM lacks the power to affect the decisions of the bureaucrats in any way, he cannot choose any waiting time smaller than the waiting time set by the corrupt bureaucrat; that is, $\Phi^* < \Phi$ is impossible. Usually, as a lower level civil servant, SM also lacks the power to delay delivery of the finished decision to the clients . Even if he had sufficient power to make clients wait more than Φ, he would not want to do this anyway, since this would decrease clients' willingness to pay a bribe to the SM, which would decrease his profit opportunities. □

Assumption : The client, after hearing the SM's claims, changes her prior beliefs, p, about the honesty of the bureaucrat and the acceptability of her application, t.

After listening to the SM's claim that the incumbent bureaucrat is corrupt, the client adjusts her belief of facing an honest officer to some probability different to her initial beliefs; i.e she calculates P (IB is honest|SM says IB is corrupt) = $\delta < p$ where δ decreases with the increasing persuasiveness of SM. The client also updates her initial belief (t) about whether her application is acceptable or not after hearing the SM's claims to calculate P (application is

acceptable|SM says unacceptable) = m<t and P (application is acceptable|SM says acceptable) = k>t.

We assume that the SM can guess all the posterior probabilities of the clients. This may seem to be a major assumption, because the SM under these conditions has a significant informational advantage over all other parties. However, since the SM is always in touch with clients, we can assume that he may develop a nearly correct idea about the behavior of an average client. That is, the SM can read from the reactions of the clients how much they believe his words. The posterior probabilities therefore, to a very large extent, depend on the SM's persuasive abilities; in fact, the model and its results depend on posterior beliefs.

If the SM is very sure of his persuasive abilities then, whatever the client's initial expectations, the SM can take the probabilities close to $\delta=0$, $m=0$ and $k=1$. The possibility that the SM may not be correctly guessing the expectations of the client can be easily included in the model by taking the expectations of the SM about δ, m and k as δ', m' and k' for example. However, the main results of our model do not change in this case. The SM's revenues increase as he more correctly guesses the expected probabilities of the clients. This option is not included in the model since it unecessarily complicates the analysis.

To be able to find the Perfect Bayesian Equilibrium of the game, we begin solving the game from the last information sets.

2.1 Solution of the Last Stage

2.1.1. Case #1: Acceptable Application / Honest Bureaucrat

In case #1, the actual situation is that the application is acceptable and the bureaucrat is honest, but the SM tells the client that, although her application is acceptable, the bureaucrat is corrupt so that if she pays a bribe, the SM can make the IB accept the application without any red tape. The client thinks that she will certainly obtain the service if she accepts the SM's bribe demand because she will only pay the bribe after getting the service, whereas if she rejects SM, she thinks that with δ probability she will face an honest bureaucrat and with k probability that her application is acceptable so that she gets the service. Conversely, she thinks that with (1- δ) probability the incumbent bureaucrat will be corrupt and if her application is acceptable, the corrupt politician will increase red tape and thus the client will incur red tape cost (Φ) or with (1-k) probability that her application is unacceptable so that

she will not get the service whether the IB is honest or corrupt. The expected payoff function $(V_{CL}{}^\sigma)$ of the client is defined below.

$$V_{CL}{}^\sigma(\beta,\sigma,Z,T_1,T_2) = \begin{cases} \delta k(\sigma Z) + (1-\delta)k(\sigma Z - \Phi) + (1-\delta)(1-k)0 + \delta(1-k)0 & \text{if} \quad s_{cL} = R \\ \sigma Z - \beta & \text{if} \quad s_{cL} = A \end{cases} \qquad (3)$$

The SM can only take a bribe if the client decides to accept his bribe demand in the third stage. Thus, the expected payoff function of the SM (V_{SM}) as given in equation (2):

$$V_{SM}(\beta,\sigma,Z,T_1,T_2) = \begin{cases} (1-\xi)\beta - \xi F & \text{if} \quad s_{cL} = A \\ 0 & \text{if} \quad s_{cL} = R \end{cases} \qquad (4)$$

The Perfect Bayesian Equilibrium of the game can be calculated by beginning to solve from the last information sets.

Proposition 1: In the case with acceptable application/honest bureaucrat, at the last stage of the game, the clients whose valuations exceed the critical number, $\sigma > \dfrac{\beta + (\delta - 1)\Phi k}{(1-k)Z}$, accept the SM's bribe demand and get the service by paying the bribe while the others reject it and directly apply to the bureaucrat.

Proof : It is apparent that the client prefers to accept the SM's bribe demand so long as her expected utility from doing so is greater than the expected utility from rejecting the offer. Thus, in the fourth stage, the client accepts the SM's bribe demand so long as

$$\delta k(\sigma Z) + (1-\delta)k(\sigma Z - \Phi) + (1-\delta)(1-k)0 + \delta(1-k)0 < (\sigma Z - \beta) \qquad (5)$$

This can be simplified as:

$$\sigma > \frac{\beta + (\delta - 1)\Phi k}{(1-k)Z} \qquad (6)$$

which means that clients whose valuations exceed critical σ accept the SM's bribe demand.

Since $\sigma \sim UN[0,1]$, $P(\sigma > \dfrac{\beta + (\delta - 1)\Phi k}{(1-k)Z}) = 1 - \dfrac{\beta + (\delta - 1)\Phi k}{(1-k)Z} \qquad (7)$

is the proportion of the clients who prefer to accept the SM's bribe demand given the amount of bribe demanded by SM, $\beta.\square$

2.1.2. Case #2: Acceptable Application / Corrupt Bureaucrat

The reality in the second case is that the application is acceptable and the bureaucrat is corrupt, but the SM lies to the client that her application is unacceptable and the bureaucrat is corrupt, and that he can make the IB accept it, but with some delay. The client thinks that, if she accepts the SM's bribe demand, she will surely get the service by paying the bribe cost and waiting for a while. However, if she does not accept, she thinks that with δ probability she is faced with an honest incumbent bureaucrat and that with m probability her application is acceptable, in which case she will get the service anyway. Conversely, she thinks that with (1-δ)m probability the incumbent bureaucrat will be corrupt so that, even if her application is acceptable, she will only get the service by incurring red tape costs. She also thinks that with (1-m) probability her application is unacceptable so she will not get the service whether the IB is honest or corrupt. The expected payoff function of the client ($V_{CL}{}^\sigma$) in this case is defined below.

$$V_{CL}{}^\sigma(\beta,\sigma,Z,T_1,T_2) = \begin{cases} \delta m(\sigma Z) + (1\text{-}\delta)m(\sigma Z\text{-}\Phi) + (1\text{-}\delta)(1\text{-}m)0 + \delta(1\text{-}m)0 & \text{if} \quad s_{cL} = R \\ \sigma Z\text{-}\beta\text{-}\Phi & \text{if} \quad s_{cL} = A \end{cases}$$

(8)

As before, the SM can only take a bribe if the client decides to accept his bribe demand in the third stage. So the expected payoff function of the SM can be defined as:

$$V_{SM}(\beta,\sigma,Z,T_1,T_2) = \begin{cases} (1\text{-}\xi)\beta\text{-}\xi F & \text{if} \quad s_{cL} = A \\ 0 & \text{if} \quad s_{cL} = R \end{cases}$$

(9)

Again, the "Perfect Bayesian Equilibrium" of the game can be calculated beginning from the last information sets.

Proposition 2: In the case with acceptable application/corrupt bureaucrat, at the last stage of the game, the clients whose valuations exceed the critical number, $\sigma > \dfrac{\beta + \Phi + (\delta - 1)\Phi m}{(1 - m)Z}$ accept the SM's bribe demand and get the service by paying the bribe, while the others reject it and directly apply to the bureaucrat.

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<u>Proof :</u> The client prefers to accept the bribe demand of the SM so long as her expected utility from doing so is greater than the expected utility from rejecting the offer. Thus, in the fourth stage, the client accepts the SM's bribe demand so long as

$$\delta m(\sigma Z) + (1 - \delta)m(\sigma Z - \Phi) + (1 - \delta)(1 - m)0 + \delta(1 - m)0 < (\sigma Z - \beta - \Phi) \qquad (10)$$

This can be simplified as:

$$\sigma > \frac{\beta + \Phi + (\delta - 1)\Phi m}{(1 - m)Z} \qquad (11)$$

Thus, clients whose valuations exceed critical σ accept the SM's bribe demand

since σ~UN[0,1], $P(\sigma > \frac{\beta + \Phi + (\delta - 1)\Phi m}{(1 - m)Z}) = 1 - \frac{\beta + \Phi + (\delta - 1)\Phi m}{(1 - m)Z}$ $\qquad (12)$

is the proportion of the clients who prefer to accept the SM's bribe demand, given the amount demanded by SM, β.□

2.2. Solution of the Third Stage

Predicting what will happen in the last stage, in the third stage, the SM calculates his expected payoff. The SM can win a bribe as long as the expected utility of the client from rejecting the bribe and waiting for the IB to process the job is smaller than that of paying SM. The SM demands a bribe as long as $V_{SM} > 0$ (which is the participation constraint of the SM). The probability of being caught while demanding the bribe (or while disseminating the image that he can get the job done) is represented by ξ. The SM takes the probability of being caught as given. If caught, it is assumed that he suffers a penalty of amount F. For simplicity, the probability of being caught, ξ, is assumed to be independent of β; this is not too unrealistic an assumption considering current money transfer technologies through which bank accounts can be used for payments and even large amounts of money be secretly transferred. In addition, even when β is excessively high, usually the clients do not think of whistle-blowing since, at this stage, they do not know who is processing the application and how high in the hierarchy the bribe links reach. Thus, they perceive whistle-blowing as risky[2].

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[2] Concerning the risks of whistle-blowing, see Bennett (1997).

As explained in Lemma 1 and Lemma 2, the SM demands a bribe in two different situations: acceptable application/honest IB and acceptable application/corrupt IB. In each case, the SM says different things to the clients and charges different prices. In the acceptable application/honest IB case, the SM tells the client that her application is acceptable but that the IB is corrupt. In the acceptable application/corrupt IB case, the SM tells the client that her application is unacceptable and that the IB is corrupt.[3] The SM determines two different bribe levels for two different cases, as shown below.

2.2.1. Strategy of the SM in the Acceptable Application/Honest Bureaucrat Case

<u>Proposition 3</u>: In the acceptable application/honest IB case, the SM demands a bribe of amount $\beta* = \dfrac{(1-k)Z + (1-\delta)\Phi k}{2}$ from the clients. Clients whose valuations exceed $\sigma > \dfrac{(1-k)Z - (1-\delta)\Phi k}{2(1-k)Z}$ accept the bribe demand while others reject it and go through the normal procedure.

<u>Proof:</u> In the acceptable application/honest IB case, the expected utility of the SM can be defined as:

$$V_{SM}(\sigma, \beta, Z, T_1, T_2) = (1-\xi) P(\sigma > \frac{\beta + (\delta - 1)\Phi k}{(1-k)Z})\beta - \xi F =$$

$$= (1-\xi)(1 - \frac{\beta + (\delta - 1)\Phi k}{(1-k)Z})\beta - \xi F \tag{13}$$

SM tries to maximize his utility function by using β:

$$\frac{\partial V_{SM}}{\partial \beta} = (1-\xi)\left[1 - (\frac{\beta + (\delta - 1)\Phi k}{(1-k)Z}) - (\frac{\beta}{(1-k)Z})\right] = 0 \tag{14}$$

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[3] In the case with acceptable application/corrupt bureaucrat, if corrupt bureaucrat applies red tape of amount $\Phi \geq \sigma Z$ (which is equivalent to rejecting the application), the SM cannot demand a bribe; under that conditions he can exploit clients only if the case is acceptable application, honest bureaucrat.

$$\beta^* = \frac{(1-k)Z + (1-\delta)\Phi k}{2} \tag{15}$$

The optimum amount of bribe the SM demands increases with the client's increasing valuation of the service. The amount of bribe also increases as clients attach higher posterior probability to encountering a corrupt IB and a lower probability to their demand being acceptable according to the law. The SM can increase the bribe collected if he can better persuade clients that the bureaucrats are corrupt. Thus, he has the incentive to spread rumors that the office is corrupt and that nothing is done if a bribe is not given to officers. As k increases, β^* decreases; thus, increasing transparency of the public office decreases the bribe demands of spurious middlemen. The more a client is certain that her application is acceptable according to the law, the less she is willing to pay in a bribe. As the red tape applied by the corrupt IB increases, the SM's bribe demand increases.

The SM demands the following amount of bribe so long as his participation constraint holds:

$$V_{SM} = (1-\xi)(1 - \frac{\beta + (\delta - 1)\Phi k}{(1-k)Z})\beta - \xi F = (1-\xi)\frac{((1-k)Z + (1-\delta)\Phi k)^2}{4(1-k)Z} - \xi F > 0 \tag{16}$$

Increasing valuations of the clients, increasing red tape applied by the corrupt IB, decreasing expectations about the application being acceptable and/or the IB being honest, all make the participation constraint of the SM more likely to hold. The SM's participation constraint is also more likely to hold as fines get smaller. Thus, increasing fines, or increasing detection probabilities can make the participation constraint of the SM fail, thereby preventing this type of corruption.

Inserting the optimum bribe demand of the SM into the condition for the client to accept the bribe demand, we get

$$\delta k(\sigma Z) + (1-\delta)k(\sigma Z - \Phi) < \sigma Z - \frac{(1-k)Z + (1-\delta)\Phi k}{2} \tag{17}$$

This gives $\sigma > \dfrac{(1-k)Z - (1-\delta)\Phi k}{2(1-k)Z}$ (18)

Thus, in the Perfect Bayesian Nash Equilibrium, the SM demands a bribe of $\beta^* = \dfrac{(1-k)Z + (1-\delta)\Phi k}{2}$ and clients whose valuations exceed $\sigma > \dfrac{(1-k)Z - (1-\delta)\Phi k}{2(1-k)Z}$ accept the SM's bribe demand while others reject it and go through the normal procedure.

2.2.2. Strategy of the SM in the AcceptableApplication/Corrupt IB Case

Proposition 4: In the acceptable application/corrupt IB case, the SM demands a bribe of amount $\beta^* = \dfrac{(1-m)Z + (1-\delta)\Phi m - \Phi}{2}$ from the clients. Clients whose valuations exceed $\sigma > \dfrac{(1-m)Z - (1-\delta)\Phi m + \Phi}{2Z(1-m)}$ accept the demand while others reject it and go through the normal procedure.

Proof: In the acceptable application/corrupt IB case, again, the SM can get a bribe if he is not caught and if the clients accept his bribe demand. So, the SM's expected utility can be defined as:

$$V_{SM}(\sigma, \beta, Z, T_1, T_2) = (1-\xi)P(\sigma > \frac{\beta + \Phi + (\delta-1)\Phi m}{(1-m)Z})\beta - \xi F =$$

$$= (1-\xi)(1 - \frac{\beta + \Phi + (\delta-1)\Phi m}{(1-m)Z})\beta - \xi F \tag{19}$$

SM tries to maximize his utility function by using β:

$$\frac{\partial V_{SM}}{\partial \beta} = (1-\xi)\left[1 - (\frac{\beta + \Phi + (\delta-1)\Phi m}{(1-m)Z}) - (\frac{\beta}{(1-m)Z})\right] = 0 \tag{20}$$

$$\beta^* = \frac{(1-m)Z + (1-\delta)\Phi m - \Phi}{2} \tag{21}$$

As in the acceptable application/honest bureaucrat case, the optimum amount of bribe the SM demands increases with the clients' increasing valuation of the service. The amount of bribe also increases as clients attach higher posterior probability to encountering a corrupt IB and a lower probability to their demand being acceptable according to the law. Again, the SM

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can increase the bribe collected if he can better persuade clients that the bureaucrats are corrupt. The main difference from the first case is that, this time, the size of bribe demanded by the SM decreases as the red tape the corrupt IB applies increases. In addition, notice that, given the SM's persuasiveness, β^*, the amount of bribe demanded is higher in the cases with honest bureaucrats.

The SM demands this amount of bribe as long as his participation constraint holds:

$$V_{SM} = (1-\xi)(1-\frac{\beta+\Phi+(\delta-1)\Phi m}{(1-m)Z})\beta - \xi F = (1-\xi)\frac{((1-m)Z+(1-\delta)\Phi m-\Phi))^2}{4(1-m)Z} - \xi F > 0$$

(22)

Increasing valuation of the clients, decreasing expectations about the application being acceptable and/or the IB being honest, all make the participation constraint of the SM more likely to hold. Conversely, increasing red tape makes the participation constraint of the SM less likely to hold. This is an interesting result since increasing red tape makes the use of genuine intermediaries more likely (Bayar, 2005). Again, increasing fines, or increasing detection probabilities can make the participation constraint of the SM fail.

Inserting the optimum bribe demand of the SM into the condition for the client to accept the bribe demand of the SM, we get

$$\delta m(\sigma Z) + (1-\delta)m(\sigma Z - \Phi) < \sigma Z - \frac{(1-m)Z+(1-\delta)\Phi m - \Phi}{2} - \Phi$$

(23)

which gives $\sigma > \dfrac{(1-m)Z-(1-\delta)\Phi m+\Phi}{2Z(1-m)}$

(24)

Thus, in the Perfect Bayesian Nash Equilibrium, the SM demands a bribe $\beta^* = \dfrac{(1-m)Z+(1-\delta)\Phi m-\Phi}{2}$ and clients whose valuations exceed $\sigma > \dfrac{(1-m)Z-(1-\delta)\Phi m+\Phi}{2Z(1-m)}$ accept the demand while others reject it and go through the normal procedure$\square$.

3. Extensions

An important question concerns what happens over time to this deception process. How long can the SM abuse the information deficiencies of people without being caught or before losing all of his clients?

The same client may interact with the same public office many times or that clients may talk to each other. Over time, therefore, the players' perceptions of the game, the other players and the perceived probabilities all change. In particular, clients who reject the SM's bribe demand will face the bureaucrats and experience the real situation.

Assuming that, with probability μ, clients applying to the public office this term also apply in the next term and that the total number of clients applying does not change between the periods, we can examine how the base game changes.

Apparently, any clients who rejected the SM's bribe demand and applied directly to the public officer in the previous period, will have learned about the SM's deception so they will not apply through the SM in the current period. On the other hand, for those who previously accepted the SM's bribe demand, it is even more optimal to accept SM's bribe demand in the current period, since client's previous experience will have given her the impression that, when the SM promises, he really gets the job done! Thus, we can safely assume that a player who accepted the SM's bribe demand in the first period will believe whatever SM says if they again play in the second period.

As calculated in the sections above, in the case with acceptable application/honest bureaucrat, in the Perfect Bayesian Nash Equilibrium, clients whose valuations exceed $\sigma > \dfrac{(1-k)Z - (1-\delta)\Phi k}{2(1-k)Z}$ accept the bribe demand while others reject it and go through the normal procedure. This means that $P(\sigma < \dfrac{(1-k)Z - (1-\delta)\Phi k}{2(1-k)Z}) = \dfrac{(1-k)Z - (1-\delta)\Phi k}{2(1-k)Z}$ proportion of clients go directly to the public office and learn that their job can be done without any red tape or bribe.

Similarly, in the case with acceptable application/corrupt bureaucrat, in the Perfect Bayesian Nash Equilibrium, clients whose valuations exceed $\sigma > \dfrac{(1-m)Z - (1-\delta)\Phi m + \Phi}{2Z(1-m)}$ accept the SM's bribe demand while others reject it and go through the normal procedure. Thus, a proportion of those clients,

$P(\sigma < \dfrac{(1-m)Z-(1-\delta)\Phi m+\Phi}{2Z(1-m)}) = \dfrac{(1-m)Z-(1-\delta)\Phi m+\Phi}{2Z(1-m)}$, will see that their application is

acceptable and done with Φ amount of red tape, but without any bribe. Thus, both types learn about the SM's deceit.

Let's name the proportion of clients that went to the bureaucrat directly in the previous period in the case with acceptable application/honest bureaucrat as $\eta_{AH} = \dfrac{(1-k)Z-(1-\delta)\Phi k}{2(1-k)Z}$ and in the case with acceptable application/corrupt bureaucrat as $\eta_{AC} = \dfrac{(1-m)Z-(1-\delta)\Phi m+\Phi}{2Z(1-m)}$. Thus, we can define R as the proportion of clients who, having refused to use the SM's 'service' in the previous period, thereby learning about the SM's deceit, applied to the public office once again in the current period.

$$R = \mu p t \eta_{AH} + \mu(1-p)t\eta_{AC}$$

3.1. Strategy of the SM in the Acceptable Application/Honest Bureaucrat Case for the New Comers

<u>Proposition 5</u>: In the case of acceptable application/honest bureaucrat, the SM cannot continue to deceive new comers in the long run if

$$\mu > \frac{((1-k)Z+(1-\delta)\Phi k)^2(1-\xi)-4\xi F(1-k)Z}{2((1-k)Z+(1-\delta)\Phi k)^2(1-\xi)-4\xi F(1-k)Z} \qquad (25)$$

<u>Proof</u> : The game is the same as before except that now the clients are decreased to a proportion (1-R). Moreover, since the SM will apply a different price to the repeat users of his 'services', we can also deduce the proportion of clients who acccepted the bribe demand in the previous period and applied again to the public office. (We will examine the case of repeated users in the sub-sections below.) Thus, the SM's strategy in the acceptable application/honest bureaucrat case turns out to be his decision for the new comers. In that case, all the results remain the same, except the utility of the SM decreases by a proportion of (1-μ):

$$V_{SM} = (1-\xi)(1-\mu)(1-\frac{\beta+(\delta-1)\Phi k}{(1-k)Z}))\beta - \xi F \tag{26}$$

$$\frac{\partial V_{SM}}{\partial \beta} = (1-\xi)(1-\mu)\left[1-(\frac{\beta+(\delta-1)\Phi k}{(1-k)Z})-(\frac{\beta}{(1-k)Z})\right]=0 \tag{27}$$

$$\beta^* = \frac{(1-k)Z+(1-\delta)\Phi k}{2} \tag{28}$$

The SM's utility is decreased by (1-μ) :

$$V_{SM} = (1-\xi)(1-\mu)(1-\frac{\beta+(\delta-1)\Phi k}{(1-k)Z})\beta - \xi F = (1-\xi)(1-\mu)\frac{((1-k)Z+(1-\delta)\Phi k)^2}{4(1-k)Z} - \xi F > 0 \tag{29}$$

What happens to the SM's participation constraint over time?

$$V_{SM} = (1-\xi)(1-\mu-\mu^2...)\frac{((1-k)Z+(1-\delta)\Phi k)^2}{4(1-k)Z} - \xi F > 0 \tag{30}$$

$$V_{SM} = (1-\xi)(1-\mu-\mu^2...)\frac{((1-k)Z+(1-\delta)\Phi k)^2}{4(1-k)Z} - \xi F > 0 \tag{31}$$

as t→∞

$$V_{SM} = (1-\xi)(1-\frac{\mu}{1-\mu})\frac{((1-k)Z+(1-\delta)\Phi k)^2}{4(1-k)Z} - \xi F > 0 \tag{32}$$

Thus, the SM's participation constraint holds so long as

$$\mu < \frac{((1-k)Z+(1-\delta)\Phi k)^2(1-\xi)-4\xi F(1-k)Z}{2((1-k)Z+(1-\delta)\Phi k)^2(1-\xi)-4\xi F(1-k)Z} \tag{33}$$

3.2. Strategy of the SM in the AcceptableApplication/Corrupt IB Case for the New Comers

Proposition 6:In the case of acceptable application/corrupt bureaucrat, the SM cannot continue to deceive new comers in the long run if

$$\mu > \frac{((1-m)Z+(1-\delta)\Phi m-\Phi))^2(1-\xi)-4\xi F(1-m)Z}{2((1-m)Z+(1-\delta)\Phi m-\Phi))^2(1-\xi)-4\xi F(1-m)Z} \tag{34}$$

Proof : The game is again the same as before except that now the clients decrease by a proportion (1-μ).

$$V_{SM} = (1-\xi)(1-\mu)(1-\frac{\beta+\Phi+(\delta-1)\Phi m}{(1-m)Z})\beta - \xi F \tag{35}$$

$$\frac{\partial V_{SM}}{\partial \beta} = (1-\xi)(1-\mu)\left[1-\left(\frac{\beta+\Phi+(\delta-1)\Phi m}{(1-m)Z}\right)-\left(\frac{\beta}{(1-m)Z}\right)\right]=0 \tag{36}$$

$$\beta^* = \frac{(1-m)Z+(1-\delta)\Phi m - \Phi}{2} \tag{37}$$

Again, the SM's utility is decreased by (1-μ):

$$V_{SM} = (1-\xi)(1-\mu)(1-\frac{\beta+\Phi+(\delta-1)\Phi m}{(1-m)Z})\beta - \xi F = (1-\xi)(1-\mu)\frac{((1-m)Z+(1-\delta)\Phi m - \Phi))^2}{4(1-m)Z} - \xi F > 0 \tag{38}$$

What happens to the SM's participation constraint over time?

$$V_{SM} = (1-\xi)(1-\mu-\mu^2-...)\frac{((1-m)Z+(1-\delta)\Phi m - \Phi))^2}{4(1-m)Z} - \xi F > 0 \tag{39}$$

as t→∞

$$V_{SM} = (1-\xi)(1-\frac{\mu}{1-\mu})\frac{((1-m)Z+(1-\delta)\Phi m - \Phi))^2}{4(1-m)Z} - \xi F > 0 \tag{40}$$

The SM's participation constraint holds so long as

$$\mu < \frac{((1-m)Z+(1-\delta)\Phi m - \Phi))^2(1-\xi)-4\xi F(1-m)Z}{2((1-m)Z+(1-\delta)\Phi m - \Phi))^2(1-\xi)-4\xi F(1-m)Z} \tag{41}$$

3.3. Strategy of the SM in the AcceptableApplication/Honest IB Case-with repeat dealings-SM says the case is AcceptableApplication/Corrupt IB, client believes

<u>Proposition 7</u>: In the case with acceptable application/honest bureaucrat, when faced with repeat users of his 'services', for the SM to be able to continue the deception in the long run, μ must exceed the number

$$\mu > \frac{4\xi F}{z(1-pt\eta_{AH}-(1-p)t\eta_{AC})(1-\xi)+4\xi F} \tag{42}$$

<u>Proof</u>: $V_{CL}{}^\sigma(\beta,\sigma,Z,T_1,T_2) = \begin{cases} \sigma Z\text{-}\Phi & \text{if} & s_{cL}=R \\ \sigma Z\text{-}\beta & \text{if} & s_{cL}=A \end{cases}$

Thus, in the fourth stage, the client accepts the SM's bribe demand so long as $(\sigma Z - \Phi) \leq (\sigma Z - \beta) \rightarrow \beta \leq \Phi$ and as long as accepting the bribe demand gives positive utility, $(\sigma Z - \beta) \geq 0$ $\sigma \geq \beta / Z$. Thus, it is optimal for the SM set β as

$$V_{SM} = (1-\xi)(\mu - R)(1-(\frac{\beta}{Z}))\beta - \xi F$$

$$\frac{\partial V_{SM}}{\partial \beta} = (1-\xi)(\mu - R)\left(1 - \frac{2\beta}{Z}\right) = 0 \quad \Rightarrow \quad \beta = \frac{Z}{2} \tag{43}$$

$$V_{SM} = (1-\xi)(\mu - R)\frac{Z}{4} - \xi F$$

where R is the proportion of clients who in the previous period rejected the SM's bribe demand thus learned about the real case: $R = \mu p t \eta_{AH} + \mu(1-p)t\eta_{AC}$

What happens to the SM's participation constraint over time? In repeated dealings, increasing μ improves the SM's utility, thereby making the participation constraint more likely to hold.

Fehler! Es ist nicht möglich, durch die Bearbeitung von Feldfunktionen Objekte zu erstellen.

$$\tag{44}$$

$$V_{SM} = (1-\xi)(\frac{\mu}{1-\mu})\frac{Z}{4} - \xi F > 0 \Rightarrow \mu > \frac{4\xi F}{zG(1-\xi)+4\xi F} = \frac{4\xi F}{z(1-pt\eta_{AH}-(1-p)t\eta_{AC})(1-\xi)+4\xi F}$$

$$\tag{45}$$

3.4. Strategy of the SM in the AcceptableApplication/Corrupt IB Case-with repeat dealings-SM says the case is UnacceptableApplication/Corrupt IB, client believes

Proposition 8: In the case of acceptable application/corrupt bureaucrat, when faced with repeat users, for the SM to be able to continue the deception in the long run, μ must exceed the number

$$\mu > \frac{4\xi F Z}{(1-pt\eta_{AH}-(1-p)t\eta_{AC})(1-\xi)(Z-\Phi)^2+4\xi F Z} \tag{46}$$

<u>Proof:</u> $V_{CL}^{\sigma}(\beta,\sigma,Z,T_1,T_2) = \begin{cases} 0 & \text{if} & s_{cL} = R \\ \sigma Z-\beta-\Phi & \text{if} & s_{cL} = A \end{cases}$

Thus, in the fourth stage, the client accepts the SM's bribe demand so long as

$(\sigma Z-\beta- \Phi) \geq 0 \quad \rightarrow \sigma \geq (\beta+\Phi)/Z$ Thus, it is optimal for the SM set β as

$$V_{SM} = (1-\xi)(\mu - R)(1-(\frac{\beta+\Phi}{Z}))\beta - \xi F$$

$$\frac{\partial V_{SM}}{\partial \beta} = (1-\xi)(\mu - R)\left(1 - \frac{2\beta+\Phi}{Z}\right) = 0 \quad \Rightarrow \quad \beta = \frac{Z-\Phi}{2} \tag{47}$$

$$\Rightarrow V_{SM} = (1-\xi)(\mu - R)\frac{(Z-\Phi)^2}{4Z} - \xi F$$

What happens to the SM's participation constraint over time? With repeated dealings, increasing µ improves the SM's utility, thereby making the participation constraint more likely to hold.

$$V_{SM} = (1-\xi)(G(\mu + \mu^2 ...)\frac{(Z-\Phi)^2}{4Z} - \xi F > 0 \quad where \quad G = (1 - pt\eta_{AH} - (1-p)t\eta_{AC})$$

$$\Rightarrow \mu > \frac{4\xi FZ}{G(1-\xi)(Z-\Phi)^2 + 4\xi FZ} = \frac{4\xi FZ}{(1 - pt\eta_{AH} - (1-p)t\eta_{AC})(1-\xi)(Z-\Phi)^2 + 4\xi FZ}$$

$$\tag{48}$$

The results of the analysis show that, as the proportion of clients, µ, who apply to the public office more than once increases, it becomes more diffficult to obtain a bribe from new comers. However, it becomes easier to obtain a bribe from clients who apply more than once, provided that they used the SM in the previous period. It seems that, in either case, the SM can abuse at least one group of clients. The only policy tool that can prevent the SM's participation constraints in all cases seems to be increasing the size of penalties and the probability of being caught by the authorities.

Corollary: If, some proportion of clients who directly apply to the bureaucracy in the first period, η_{AH} and η_{AC}, are whistle-blowers, who complain about the SM to the law enforcement acencies then the probability of the SM being caught increases. This makes it more likely for the SM's participation constraints to fail in all cases.

Another factor is that the IBs may also gradually learn about what the SM does. Since both corrupt and honest bureaucrats and the public office itself are harmed by the SM's activities, it can be expected that the bureaucrats, if they figure out the situation, will try to stop the SM by complaining about him to their superiors or to law enforcement agencies. This may as well be included in the model as an addition to the SM's probability of being caught (ξ). However, there may be other factors making this discovery and complaint process slower, for example if the SM's corruption does not impose direct monetary costs on the honest bureaucrats but merely disturbs them by harming the office's reputation. Some people are

either apathetic to what happens around them or do not want to have problems with anyone around themselves, and so may not take preventive action.

Unlike an honest bureaucrat, for a corrupt bureaucrat, the SM's behavior imposes direct monetary costs, since his activities decreases the bureaucrat's own bribe-taking opportunities. At the same time, however, the corrupt officer may be afraid to complain about the SM to his superiors or law enforcement agencies because he is also corrupt and may fear that his complaints might increase the likelihood that he could also be investigated.

Another possibility is that, even if a complaint is made about the SM to higher level superiors or law enforcement agencies by whistle-blower clients or bureaucrats, some of the superiors or law enforcers may have some form of interest relation with the SM, monetary or otherwise, and thus may protect him. For example, the SM may share some of his profits to persuade the law enforcers to ignore his deceptive and corrupt activities. All these factors make the prevention of SMs more difficult.

4. Results and Conclusions

The model presented here examines a strange type of intermediation process: a person inside a public office, who has no role in the jobs done, but who can observe the process, can obtain a bribe from a client by taking advantage of her informational deficiencies about the honesty of the public office and whether her application is acceptable or not.

An interesting conclusion of the model is that this spurious middleman gains a bribe even from jobs done by honest bureaucrats for acceptable applications. Thus, the SM gets bribes from clients whose jobs would have been done anyway. This is a completely deceitful process that harms all parties other than the SM: clients make extra payments for a service they would have received anyway costlessly the image of the office is damaged; and citizens begin to perceive the office as more corrupt than it actually is.

In cases where some proportion of clients apply to the public office more than once, for some critical proportion of re-applying clients, the SM's participation constraint may cease to hold for new comers; however, in that case, he may continue to benefit from those clients who used his 'services' in the previous period. If the SM is not caught, or the clients who learned about the truth do not whistle-blow, the process can feed itself. SM gets more persuasive, public office is perceived to be more corrupt, more people accept the bribe demands of the SM, and the SM begins to build an image that he gets everything done: if you accept his bribe demand, your job is always done! In a vicious circle, the SM thus obtains more bribes and the public office is perceived as yet more corrupt.

The model's results also show that the SM's activities in the public office causes a paradox. Namely, the SM can get more bribe from the clients if the application is processed by an honest bureaucrat. Honest, idealistic bureaucrats who try to serve the clients with integrity through fast and efficient services can, without realizing, help the SM exploit the clients more easily.

What policy proposals can prevent such a vicious circle from developing? The model results show that the increasing posterior probability of a corrupt public office or clients' increasing uncertainty about whether their application is acceptable according to the law are two of the most important factors that feed the process. Therefore, to prevent this, rules and regulations must be clear and understandable for the clients. All steps of the processing of the applications must be transparent. Each client should be able to learn easily whether and why her application is acceptable or not. Although a clean image of the public office is also important, the office's endeavors to present such an honest image may be rendered ineffective if the SM can effectively persuade people to the contrary. Thus, even if the proportion of honest bureaucrats increases in the office but this increase somehow cannot be made known to the public, clients' expectations will not change so the increase in the proportion of honest officers just results in more gains for the SM.

The model results also show that increasing penalties and increasing the probabilities of being caught are among the most important factors that discourage the SM, under all conditions. A transparent public office with a well-established, dependable complaint-processing system that protects whistleblowers is an important factor in decreasing the clients' willingness to bribe the SM due to fear that they cannot otherwise get the service they need.

The development of e-government, increasing today in many countries, can also offer good results. Automation of procedures ensures simplicity and clarity of rules, and predictability of results. When clients make their applications over the internet, they follow standardized procedures and do not need to engage with public officers or intermediaries (either internal or external).

This indicates that a useful subject for further study would be to analyze the effects of e-government efforts, transparency of the evaluation processes and protection of whistle-blowers against corruption with or without spurious or genuine intermediaries.

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