Favoritism and allocative efficiency: a game theoretic approach

Moe Farida* and Fredoun Z. Ahmadi-Esfahani†

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Favoritism and allocative efficiency: a game theoretic approach‡

* Moe Farida (m.farida@usyd.edu.au) is a PhD candidate, Discipline of Agricultural and Resource Economics, the University of Sydney, NSW 2006.
† Fredoun Z. Ahmadi-Esfahani (f.ahmadi-esfahani@usyd.edu.au) is an Associate Professor, Discipline of Agricultural and Resource Economics, the University of Sydney, NSW 2006.
Moe Farida and Fredoun Z. Ahmadi-Esfahani

Abstract

This paper seeks to investigate the interaction between favoritism and allocative efficiency. The issue of whether corruption distorts allocative efficiency in a bribery game under a pre-existing environment of alleged favoritism is considered. It is demonstrated that if there is no unambiguous favoritism, observed favoritism in bribery game may disrupt allocative efficiency. A bribery game under corruption and favoritism is developed. The model and some possible equilibria are discussed. A simple numerical example from Lebanon is also presented.

Keywords: favoritism, allocative efficiency, bribery game.

1. Introduction

Unlike the free market system, bureaucratic allocation of resources gives rise to an important social cost. It is therefore not surprising that bureaucratic corruption often arises, in the form of bribe-taking by bureaucrats. The presence of bureaucratic

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§ Moe Farida (m.farida@usyd.edu.au) is a PhD candidate and Fredoun Z. Ahmadi-Esfahani (f.ahmadi-esfahani@usyd.edu.au) is an Associate Professor in Agricultural Economics at the University of Sydney, NSW 2006, Australia.
corruption in the form of bribery has important efficiency and public policy implications which have been greatly discussed and debated in the corruption literature, but have not yet been analyzed systematically and comprehensively. The main proposition of these works is that corruption attains allocative efficiency through a competitive bribery process. This paper seeks to investigate the interaction between corruption, favoritism and allocative efficiency. The issue of whether corruption interrupts allocative efficiency and competition in a bribery game under a pre-existing environment of alleged favoritism is considered. It is demonstrated how even if there were no unambiguous favoritism, observed favoritism in bribery game would distort allocative efficiency. Following a brief review of the literature, a bribery game under corruption and suspected favoritism is developed. The model and the possible equilibria are presented. Extensions of the model and the theoretical findings are also discussed. A simple numerical example from Lebanon is then presented prior to some concluding comments.

2. Corruption and favoritism

The prevalence of corruption in developing nations in the last decades stimulated debates over the effects of corruption upon economic performance, and resulted in two conflicting arguments spelled out in, among others, McMullan (1961), Leys (1965), Nye (1967), Heidenheimer (1970), Scott (1972) and Beck and Maher (1986). Moralists maintain that corruption is detrimental, while reformists argue that corruption provides benefits which in some cases may exceed the costs. The recent theoretical works on corruption and bribery games (for example, Lui 1985; Lien 1986; Beck 1989) demonstrate that even when corruption exists, so long as all firms are free to offer bribes, the most efficient will possibly win the contract. The theoretical basis for this argument is that the most efficient firms can afford the highest bribes and hence will obtain the contract. Lien (1987) considers bribery games under both symmetric and asymmetric information, and shows that even if one firm does not know the cost levels of other firms, the highest bribe will be offered by this firm. Since the corrupt official determines the winner by the amount of the bribe and the lowest cost firm can afford the largest bribe, it is this firm that will be ultimately awarded. As a consequence, no allocative inefficiency
is incurred. Hence, the main conclusion of these works is that corruption attains allocative efficiency through a competitive bribery process.

Corruption typically exists when an official is prone to accepting bribes before awarding contracts to competing firms. Favoritism, however, occurs when an official has a favored firm and will only accept bribes from that firm or will accept other forms of kickback that cannot be arranged by its competitors. In other words, favoritism corresponds to favors issued only to a limited group of people, even if bribes are involved. The most apparent effect of corruption is that prices are distorted because government officials take advantage of their monopoly positions. When the government official is selfish, his favors will be sold for a price and, since he acts as a monopolist, allocation may be inefficient. This occurs, for example, when politicians take kickbacks in exchange for contracts. Corrupt officials are often accused of accepting bribes and awarding contracts to firms offering the highest bribes. There are, however, many instances of inefficient (high cost) firms winning large contracts and a large set of anecdotal evidence, accusing officials of favoritism along with corruption. This is equivalent to an inflation of the bribe from the favored firm. Hence, the lowest cost firm may not necessarily be the award winner. Thus, together with other harmful effects, corruption is thought to disrupt allocative efficiency in the presence of favoritism, since efficiency in government contracts allocation is achieved only when the contract is awarded to the lowest cost firm offering the highest bribe, according to French’s (1977) definition of allocative efficiency.

Several scholars have analysed how corruption may violate allocative efficiency. However, previous studies usually consider special regulatory restrictions (Lien 1990), or asymmetric equilibria where one firm has to commit to a bribe first. Thus, a bribery game under a pre-existing environment of alleged favoritism where players initially suspect that the official has a favored firm is developed to show that even if there is no definite favoritism, strategic behaviour by firms could result in equilibrium in a bribery game that exhibits favoritism. In this equilibrium, although favoritism is observed, the official may accept bribes from the same firm in every period. Once other firms confirm their belief
that favoritism may exist, they do not attempt to secure contracts by offering bribes. If the favourite firm of the official happens to be inefficient, then corruption (along with suspicion of favoritism) disrupts allocative efficiency.

3. The model

For simplicity, consider a two-person competitive bribery game with incomplete information on the part of either player and with suspected favoritism on the part of the corrupt official for two periods. Assume that there are two types of firms (efficient and inefficient) that negotiate privately with a corrupt government official for a government contract where the official does not know about the efficiency of the firms. The initial approval of the government official is necessary but not sufficient for a firm to obtain the contract. Although the official is corrupt and willing to accept bribes, there is no certainty that a firm offering a bribe will win the contract. Firms may offer a high bribe \( b_h \) or a low bribe \( b_l \). Offering a \( b_h \) only increases the probability of securing a contract. When the contract is awarded, the firm will make high profits \( \pi_h \) if it is efficient, and low profits \( \pi_l \) if it is inefficient (exclusive of any bribes paid). If a contract is not awarded, the firm makes zero profit and loses any bribes it may have offered.

In period one, there is only one firm (firm A) offering a bribe to a corrupt official. Firm A could be either an efficient or inefficient firm. The probability of winning the contract depends only on the amount of the bribe offered. Denote by \( p_h \) (respectively by \( p_l \)) the probability that a firm offering a high (respectively, low) bribe will be awarded a contract in this period. A bribe is offered and a contract is possibly awarded in this period.

In period two, an efficient firm (firm B), which has a prior probability \( r_0 \) that the favoritism exists, observes if firm A has received the contract in period one and whether firm A is efficient or inefficient. If firm B observes firm A (efficient) obtaining the contract (or not), then it does not suspect any favoritism. However, if firm B observes
firm A (inefficient) to have obtained the contract, then it forms the belief more strongly that favoritism exists and revises its prior probability to \( r_1 \). In this period, both firms (A and B) may offer bribes and the contract is awarded.

It should be noted that the probabilities “\( r \)” reflect the subjective probability of the firm B that favoritism does not exist. Thus, the probabilities of it securing a contract in period two depends on its subjective probability, its bribe and the bribe offered by firm A. It is also noteworthy that if favoritism exists, then the probability of firm B to obtain a contract is zero.

Let the probabilities of a firm obtaining a contract in period two (if favoritism does not exist) be given by the following:

- \( P_{hh} \): probability of securing the contract when B offers \( b_h \) and A offers \( b_h \)
- \( P_{hl} \): probability of securing the contract when B offers \( b_h \) and A offers \( b_l \)
- \( P_{lh} \): probability of securing the contract when B offers \( b_l \) and A offers \( b_h \)
- \( P_{ll} \): probability of securing the contract when B offers \( b_l \) and A offers \( b_l \)

Therefore, firm B’s probabilities of winning the contract in period two are given by \( r_0 \, P_{hh} + r_0 \, P_{hl} + r_0 \, P_{lh} + r_0 \, P_{ll} \) if:

- Firm A has not received the contract in period one; or
- Firm A (Efficient) has obtained the contract in period one.

On the other hand, if firm B observes firm A (inefficient) to have secured a contract in period one, then the revised probabilities of the firm B’s securing a contract in period
two are given by \( r_i \, p_{hh}, r_i \, p_{hl}, r_i \, p_{lh}, \) and \( r_i \, p_{ll} \). These revised probabilities are lower. That is,

\[
\begin{align*}
  r_i \, p_{hh} &< r_0 \, p_{hh}, \quad r_i \, p_{hl} < r_0 \, p_{hl}, \quad r_i \, p_{lh} < r_0 \, p_{lh}, \quad r_i \, p_{ll} < r_0 \, p_{ll} \\
\end{align*}
\]  

This model aims at formalising the relationship between bureaucrats who assign government contracts and firms which bid on these contracts. This micro approach helps in understanding the behaviour of bureaucrats and firms, and yields some insights into the notion of allocative efficiency and competition within an environment of alleged favoritism. The underlying proposition is that allocative efficiency may be disrupted not only when there is unambiguous favoritism, but also when favoritism is suspected to exist. It will be demonstrated that this result holds in several different forms of bribery games.

4. The equilibria

There are two types of sequential equilibria in this game. The first is when firm A offers \( b_h \) in both periods, and the second when firm A offers \( b_l \) in both periods.

4.1 First sequential equilibrium

The nature of equilibrium depends on whether it is worthwhile for firm A (efficient) to offer \( b_h \) even when there is no strategic behavior involved. If firm A (efficient) wins the contract, then firm B in the second period will not revise its probability that favoritism exists. Thus, for firm A (efficient), only the first period matters. Thus, it will offer \( b_h \) in period one if:

\[
p_h \pi_h - b_h > 0 \quad \text{and if} \quad p_h \pi_h - b_h > p_l \pi_h - b_l
\]

Assuming (6.2) holds, there are two possible equilibria for this game:
4.1.1 Equilibrium 1

Firm A (efficient) offers $b_h$ in both periods.

Firm A (inefficient) offers $b_h$ in period one and offers $b_l$ in period two whether or not it wins the contract in period one.

If firm B observes firm A (efficient) obtaining the contract in period one, it offers $b_h$ in period two. However, if firm B observes firm A (inefficient) win the contract in period one, it does not offer any bribes at all in period two. If neither is awarded the contract in period one, then firm B offers $b_h$ in period two.

If the following set of conditions is satisfied, the set will constitute a sequential equilibrium for this game. The only signalling that occurs here is that firm B becomes discouraged about its success if it observes that firm A (inefficient) has won the contract in period one. The set of strategies for this equilibrium is as follows:

Firstly, firm A (efficient) offers $b_h$ in period two if offering $b_l$ gives a lower profit. That is,

$$ p_{hh} \pi_h - b_h \geq p_{lh} \pi_h - b_l $$

(3)

It is noteworthy that firm A (efficient) does not behave strategically, because its action in period one does not affect its payoff directly or indirectly in period two.

Secondly, given the strategy and the belief of firm B, firm A (inefficient) observes that firm B refrains from offering a bribe in period two, if firm A (inefficient) wins the contract in period one. Assuming both firms have the common discount factor $\beta$, firm A (inefficient) will offer $b_h$ in period one and $b_l$ in period two if offering $b_l$ in period one
results in lower profits. If firm A (inefficient) does not win the contract in period one, it will offer \( b_l \) in period two. This implies that:

\[
p_h \pi_i - b_h + \beta p_h (p_i \pi_i - b_i) + \beta (1 - p_h) (p_{ih} \pi_i - b_i) \geq p_i \pi_i - b_i + \\
\beta p_i (p_i \pi_i - b_i) + \beta (1 - p_i) (p_{ih} \pi_i - b_i)
\]

(4)

Thirdly, given the strategy and the belief of firm B, firm A (inefficient) offers \( b_l \) in period two instead of \( b_h \) or zero regardless of whether or not it wins the contract. This implies that when firm A (inefficient) wins the contract, the following will be satisfied:

\[
(p_i \pi_i - b_i) \geq (p_h \pi_i - b_h) \quad \text{and} \quad (p_i \pi_i - b_i) \geq 0
\]

(5)

If firm A (inefficient) does not win the contract in period one, then firm B’s strategy is to offer \( b_h \) in period two. Thus, firm A (inefficient) will offer \( b_l \) in period two if:

\[
(p_{ih} \pi_i - b_i) \geq (p_{hh} \pi_i - b_h) \quad \text{and} \quad (p_{ih} \pi_i - b_i) \geq 0
\]

(6)

Fourthly, if firm A (efficient) wins the contract in period one, firm B will offer \( b_h \) in period two if its expected profit from offering \( b_h \) is higher than its expected profit from offering \( b_l \). The initial belief of favoritism is retained if it observes firm A (efficient) win the contract in period one. This implies that:

\[
(r_0 p_{hh} \pi_h - b_h) \geq (r_0 p_{ih} \pi_h - b_i)
\]

(7)

Finally, if firm A (inefficient) wins the contract in period one, firm B will refrain from offering a bribe in period two, since according to its belief and given the strategy of firm A (inefficient), firm B’s profits are negative if it offers \( b_h \) or \( b_l \) in period two. This implies that:

\[
r_1 p_{h1} \pi_h - b_h < 0 \quad \text{and} \quad r_1 p_{l1} \pi_h - b_l < 0
\]

(8)
In this equilibrium, if firm A (inefficient) wins the contract, favoritism is suspected and maintained during period two as the new firm B does not offer a bribe. Further, both firm A (efficient) and firm A (inefficient) offer $b_h$ in period one, so allocative efficiency does not hold.

4.1.2 Equilibrium 2

Firm A (efficient) offers $b_h$ in both periods.

Firm A (inefficient) offers $b_l$ in period one and offers $b_h$ in period two whether or not it wins the contract in period one.

If firm B observes firm A (efficient) obtain the contract in period one, it offers $b_h$ in period two. However, if firm B observes firm A (inefficient) win the contract in period one, it does not offer any bribes at all in period two. If neither is awarded the contract in period one, then firm B offers $b_h$ in period two.

The conditions under which equilibrium B holds are the same as when equilibrium A holds except the condition (6.4) which is replaced by the condition (6.9) because firm A (inefficient) in equilibrium B does not find it profitable to offer $b_h$ in period one.

\[p_h \pi_i - b_h + \beta p_h (p_i \pi_i - b_l) + \beta (1 - p_h)(p_{ih} \pi_i - b_l) \leq p_i \pi_i - b_l + \beta p_i (p_i \pi_i - b_l) + \beta (1 - p_i)(p_{ih} \pi_i - b_l) \tag{9}\]

It is clear that if either equilibrium 1 or equilibrium 2 holds in a bribery game, equilibrium 1 is the pooling equilibrium and equilibrium 2 is the separating equilibrium. In both cases, if firm A (inefficient) is observed to win the contract in period one, then firm B would refrain from offering bribes in period two as its suspicion that favoritism exists increases. Thus, allocative efficiency is disrupted. On the other hand, if equilibrium
1 occurs in period one, both firm A (efficient) and firm A (inefficient) offer the same bribes; hence, allocative efficiency is disrupted. This result is different from the usual results in bribery games under complete information where efficient firms offer higher bribes than inefficient firms resulting in efficient allocation.

In this sequential equilibrium, it is shown that allocative efficiency is disrupted when firm A (inefficient) offers a high bribe and when both firm A (efficient) and firm A (inefficient) offer the same bribe. It should be noted that in both equilibria (1 and 2), firm A (efficient) offers $b_h$ in both periods.

**4.2 Second sequential equilibrium**

Consider the situation where condition (6.2) does not hold. That is,

$$p_h \pi_h - b_h > 0,$$

and if

$$p_h \pi_h - b_h < p_l \pi_h - b_l \quad (10)$$

In this case, firm A (efficient) offers $b_l$ in period one. In the absence of strategic behaviour, firm A (inefficient) will offer $b_l$ in period one as well. There are two possible equilibria for this game, namely equilibrium 3 (separating equilibrium) and equilibrium 4 (pooling equilibrium). In both of these equilibria, firm A (efficient) offers $b_l$ in both periods; however, in equilibrium 3, firm A (inefficient) offers $b_h$ in period one and $b_l$ in period two, while in equilibrium 4, firm A (inefficient) offers $b_l$ in both periods. It will be demonstrated how allocative efficiency is disrupted in the following equilibria.

**4.2.1 Equilibrium 3**

Firm A (efficient) offers $b_l$ in both periods.

Firm A (inefficient) offers $b_h$ in period one and $b_l$ in period two whether or not it wins the contract in period one.
If firm B observes firm A (efficient) obtain the contract in period one, it will offer \( b_i \) in period two. However, if firm B observes firm A (inefficient) win the contract in period one, it will not offer any bribes at all in period two. If neither is awarded the contract in period one, then firm B offers \( b_i \) in period two.

If the following set of conditions is satisfied, the set will constitute a sequential equilibrium for this game. The conditions are as follows:

Firstly, firm A (efficient) offers \( b_i \) in period one if offering \( b_i \) gives higher profits. That is,

\[
p_i \pi_h - b_i > 0 \text{, and if } p_i \pi_h - b_h < p_i \pi_h - b_i
\]  

(11)

Secondly, firm A (efficient) offers \( b_i \) in period two if offering \( b_i \) gives higher profits. That is,

\[
p_{ii} \pi_h - b_i \geq p_{hi} \pi_h - b_h
\]  

(12)

Thirdly, given the strategy and the belief of firm B, firm A (inefficient) knows that firm B will refrain from offering a bribe in period two if firm A (inefficient) wins the contract in period one. Assuming that both firm have the same common discount factor \( \beta \), firm A (efficient) will offer \( b_h \) in period one and \( b_i \) in period two if offering \( b_i \) in period one results in lower profits. If firm A (inefficient) does not win the contract in period one, it will offer \( b_i \) in period two. This implies:

\[
p_h \pi_i - b_h + \beta p_h (p_i \pi_i - b_i) + \beta (1 - p_h)(p_{ii} \pi_i - b_i) \geq p_i \pi_i - b_i + \beta p_i (p_i \pi_i - b_i) + \beta (1 - p_i)(p_{ii} \pi_i - b_i)
\]  

(13)

Further, given the strategy and the belief of firm B, firm A (inefficient) will offer \( b_i \) in period two instead of \( b_h \) or zero regardless of whether or not it wins the contract in
period one. This implies that when firm A (inefficient) wins the contract in period one, the following will be satisfied:

\[(p_i \pi_i - b_i) \geq (p_h \pi_i - b_h) \text{ and } (p_i \pi_i - b_i) \geq 0\]  \hspace{1cm} (14)

If firm A (inefficient) does not win the contract in period one, then firm B’s strategy is to offer \(b_j\) in period two. Thus, firm A (inefficient) will offer \(b_j\) in period two if:

\[(p_{II} \pi_i - b_j) \geq (p_{hi} \pi_i - b_h) \text{ and } (p_{II} \pi_i - b_j) \geq 0\]  \hspace{1cm} (15)

Fourthly, if firm A (efficient) wins the contract in period one, firm B will offer \(b_j\) in period two if its expected profit from offering \(b_j\) is higher than its expected profit from offering \(b_h\). The initial belief of favoritism is retained if it observes firm A (efficient) win the contract in period one. This implies that:

\[(r_0 p_{II} \pi_i - b_j) \geq (r_0 p_{hi} \pi_i - b_h)\]  \hspace{1cm} (16)

Finally, if firm A (inefficient) wins the contract in period one, firm B will refrain from offering a bribe in period two, since according to its belief and, given the strategy of firm A (inefficient), firm B’s profits will be negative if it offers \(b_h\) or \(b_j\) in period two. This implies that:

\[r_i p_{hi} \pi_i - b_h < 0 \text{ and } r_i p_{II} \pi_i - b_j < 0\]  \hspace{1cm} (17)

In this equilibrium, firm A (inefficient) offers a higher bribe than firm A (efficient) in period one. If it wins the contract in period one, this would induce a stronger belief on the part of firm B that favoritism exists, and will offer \(b_j\) in period two. Similar to previous conclusions, allocative efficiency is disrupted here as firm A (inefficient) offers a higher bribe than firm A (efficient).
4.2.2 Equilibrium 4

Both types of firm A (efficient and inefficient) offer $h$ in both periods.

If firm B observes firm A (efficient) obtain the contract in period one, it offers $h$ in period two. However, if firm B observes firm A (inefficient) win the contract in period one, it does not offer any bribes at all in period two. If neither is awarded the contract in period one, then firm B will offer $h$ in period two.

The conditions required for this equilibrium can be derived by similar arguments as in equilibria 1, 2 and 3. In each of these equilibria, firm B does not offer any bribes in period two if it observes firm A (inefficient) to have previously obtained the contract. However, in equilibria 1 and 3, firm A (inefficient) increases its probability of winning the contract by exploiting the pre-existing suspicion of favoritism. Firm A (inefficient) offers a bribe higher than what it will offer in a one-period game to increase the probability of securing the contract so that it can induce firm B’s suspicion of favoritism in the following period. Moreover, in equilibrium 3, firm A (inefficient) will offer a higher bribe than firm A (efficient). Therefore, allocative efficiency is disrupted by the strategic behaviour of firm A (inefficient).

In a number of the equilibria, allocative efficiency is disrupted when firm A (inefficient) offers a bribe greater than or equal to that offered by firm A (efficient). The behaviour of firm A (inefficient) induces the suspicion that favoritism exists and discourages firm B from offering a bribe. Therefore, even if there were no unambiguous favoritism, pre-existing suspicion of it would induce behaviour by firms that is observationally equivalent to favoritism. This might also lead to a gradual elimination of competition. Such a state may result in an epidemic favoritism, which can have ruinous effects on the economy. Figure 1 below demonstrates the extensive form of the two-period bribery game with alleged favoritism. The arrows correspond to the four equilibria discussed earlier. H and L in the firm’s strategies correspond to the high and low bribe respectively. N corresponds to the no bribe strategy of firm B.
Figure 1 Extensive form of the bribery game with alleged favoritism
5. Model extensions

The model presented above is designed to investigate how corruption and alleged favoritism may disrupt allocative efficiency and competition. It captures the interaction between representative firms (efficient and inefficient) and a government bureaucrat in obtaining government contracts. However, the model ignores other potential characteristics of the firms, the bureaucrat, and the bribes offered. Hence, some possible extensions to this analysis to capture these aspects are provided below.

- If economies of scale exist, there is more of an incentive for firm A (inefficient) to offer a higher bribe. This is because winning contracts twice is more beneficial to inefficient firms.
- If the corrupt official is aware of the nature of this game, he may only accept high bribes. Nevertheless, one could have equilibrium similar to equilibrium 1 or 3, where firm A (inefficient) offers bribe that is at least as high as that offered by firm A (efficient).
- If any amount of bribes can be offered and not only two possible levels of bribes, the probability of securing a contract would be given by a non-decreasing function of bribes offered $p = p(b)$. Then, there exists $b^*_h$ and $b^*_l$ ($b^*_h > b^*_l$) such that firm A (efficient) offers a bribe of $b^*_h$ and firm A (inefficient) offers a bribe of $b^*_l$ in a Bayesian Nash Equilibrium. However, if firm A (inefficient) can induce a stronger suspicion of favoritism by offering a higher bribe, then the equilibrium bribe offered could be higher than $b^*_h$ which is similar to equilibrium 1 or 3.

The propositions arising out of the model extensions confirm the theoretical arguments articulated before. Changes in the characteristics of the firm, the nature of the bureaucracy and the amount of bribes offered revealed similar conclusions to those in a number of the equilibria. To further substantiate the preceding theoretical arguments, empirical evidence is provided in a simple numerical example further below.
6. Discussion

It was shown that in an environment where favoritism is believed to exist, and when contracts awarded to inefficient firms would make this suspicion even stronger, the equilibria in bribery games may turn out to be different. In specific cases, a special result, which is different from the usual result in bribery games, shows that the inefficient firm may offer higher bribes than the efficient one even if all firms’ costs are common knowledge. In many of the equilibria, the inefficient firm offers as much bribe as the efficient firm in period one. In one case, the inefficient firm offers a higher bribe than the efficient firm. This behaviour is caused by the additional incentive that an inefficient firm has to procure a contract and discourage competition from other firms in the future. Thus, the inefficient firm may offer higher bribes just to induce the suspicion that favoritism exists and discourage the efficient firm from offering a bribe. Therefore, even when there is no real favoritism, pre-existing suspicion of it could induce behaviour by firms that will be observationally equivalent to favoritism; hence, disrupting allocative efficiency. It should be noted that in a dynamic game, this scenario may give rise to a gradual purging of competition over time as high levels of alleged favoritism might deter firms from trying to win a government contract. This will be equivalent to rampant favoritism that might instigate devastating impacts on the economy. Further work may be necessary to specify the conditions under which an initial suspicion of favoritism may lead to a stable equilibrium with a favourite firm.

When accusations of favoritism are observed, it could be that illegal or private kickbacks may be prevalent or some covert relation exists between the corrupt official and the winning firm. However, this analysis provides an alternative explanation. When favoritism is suspected, it may be because an inefficient firm is offering the highest bribe, thereby convincing others that it may have some covert connections for winning the contract. This holds only if other contenders for the contract can observe that an inefficient firm is winning contracts, but one can not observe the actual amount of the bribes offered. These conclusions raise doubts about the accusations of favoritism. Where favoritism certainly exists in many situations, if one observes a single firm believed to be
the benefactor of favoritism, one should not preclude the possibility that the allegedly favourite firm is merely offering higher bribes to induce a stronger suspicion of favoritism among its rivals. Thus, in an environment where favoritism is believed to exist, and the firms’ behaviour reinforces this belief, the outcome appears similar to unambiguous favoritism. However, this analysis suggests that the observed outcomes do not necessarily resemble actual favoritism, although the effects on allocative efficiency and competition are similar to those of definite favoritism. In other words, securing a government contract may not be due to some covert connections between the firm and the bureaucrat. The theoretical findings are consistent with the conventional wisdom in the literature. However, empirical verification of favoritism is difficult. Yet, a numerical example to illustrate the propositions of the theoretical model is provided. More specifically, a simple empirical model can be applied to test for the theoretical arguments of the model within the Lebanese context, using the available data from various sources.

7. A numerical illustration

A significant number of serious cases of favoritism have been widely publicised in Lebanon. Abdelnour (2001) claims that only 2.4% of the $6 billion worth of projects contracted by various government bodies was awarded with proper competitive bidding. High ranking members of the Lebanese government are accused of taking kick-backs and funnelling lucrative contracts to companies in which they or their families have a personal interest. The most important cases are concerned with Sukleen, Libancell, Cellis, Ogero, Ilisar, the duty-free zone at Beirut International Airport and most of the infrastructure construction contracts (Wakim 2006). The theoretical model indicates that allocative efficiency is disrupted as inefficient firms might discourage efficient firms from trying to win government contracts by increasing suspicions that favoritism exists. However, inefficient allocations may be chosen by the corrupt official in the presence of favoritism. The possibility of inefficient allocations increases with an increasing level of suspected favoritism. The development of these suspicions might gradually eliminate competition among firms trying to secure government projects. In general, these results confirm the conventional wisdom. However, empirical verification is not that easy given
the difficulties in obtaining data on favoritism. Nonetheless, the analysis implies a couple of hypotheses that can be tested using a model of imperfect knowledge on the part of the bribers with respect to the corrupt nature of the government official.

- \( H_0 \) Inefficient firms are more likely to win a government contract in an environment of suspected favoritism.
- \( H_0 \) Firms accused of being favored by government officials are less likely to win a government contract.

The theoretical model contains variables for firm’s efficiency and suspected favoritism. To proxy these variables, several sources are used. The firm’s capital (CA), derived from the Council for Development and Reconstruction (CDR) data, will be used as a proxy for the firm’s efficiency, assuming that efficient firms have higher levels of capital and lower production costs. It should be noted that the CDR data represent all the construction firms that were operating in Lebanon during 1990 (in terms of their capital) and identifies those who have secured government projects during that period. In addition, a dummy variable \( F \) is used to proxy for the suspected favoritism \( (F=1 \text{ when the firm is accused of being favored and, } F=0 \text{ otherwise}) \). The dummy variable is derived from the list of all the construction firms operating in Lebanon in 1990 which were owned by a government official or one of his/her immediate family members that MP Wakim (2006) provides. The empirical model of a government contract winning process can then be estimated, using a binary choice probit model. The probability of winning a government contract is hypothesised to depend on the efficiency of the firm and the suspicious connections with government officials (favoritism). Thus, the estimation equation is:

\[
Y_i = 2.36 C_i - 3.97 A_i - 0.45 F_i
\]

(P-value) (0.14) (0.002) (0.73)

where \( Y \) is the probability of the firm (i) to win the government contract.
Results indicate that the coefficient of CA is significant, suggesting a negative relationship between the firm’s capital and the probability of winning the government contract. This means that firms with less capital are more likely to win the contract. Capital is used here as a proxy for the firm’s efficiency. Thus, the first null hypothesis can not be rejected implying that inefficient firms are more likely to win the government contract. On the other hand, there is no sufficient evidence to accept the second null hypothesis as the coefficient of F turns out to be insignificant. This indicates that the accusation of being favoured by government officials has no effect on the probability of winning the government contract. These findings confirm the intuitions underlying the theoretical model. Observing an inefficient firm winning a government contract does not necessarily indicate that this firm is favored by the government official, but rather it is behaving in a way to induce this suspicion and prevent other firms from obtaining government contracts in the future.

8. Conclusion

In this paper, a bribery game under a pre-existing environment of alleged favoritism is presented. It appears that even if there is no unambiguous favoritism, the economy may suffer allocation inefficiency whenever there is some degree of suspected favoritism. Pre-existing suspicion of favoritism induces conduct by firms that will be observationally equivalent to favoritism which may lead to a gradual elimination of competition. When the subjective suspicion of favoritism increases, the possibility that the efficient firm is defeated by the less efficient rival firm also increases. The competitive bribery procedure, consequently, may more frequently lead to allocative inefficiency. Corruption appears to place a wedge between the efficient and distorted allocations, resulting in deadweight loss. It is, therefore, apparent that corruption and alleged favoritism distort allocative efficiency and competition.
References


