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Beaten by Bribery:
Why not Blow the Whistle?

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1 Introduction

Several studies describe corruption as an obstacle to local welfare-effects from business and industry (Bardhan, 1997; Kaufmann et al., 2005; Shleifer and Vishny, 1993). This problem has triggered debates about the responsibility of multinationals to refrain from corruption-related temptations in their interaction with local markets and governments (Rose-Ackerman, 2002; Seubert, 2005; Bray, 2005). Several measures have also been taken to strengthen international anti-bribery regulations (OECD, 2005).

The presence of business-corruption implies that firms lose contracts because competitors offer bribes. An interesting aspect of this corruption thus relates to the responses of the victimized firms: What is the common reaction if a contract is lost because a competitor has offered a bribe? Firms that lose contracts because competitors offer bribes are often the best placed to perceive instances of corruption. The potential impact on the business climate if firms were to react against each others' bribery is significant. This suggests that multinationals may have a broader responsibility in respect of combatting corruption than simply adopting a passive "we-do not-pay-bribes-ourselves" stance.

In practice, reactions against competitors who offer bribes rarely take place. Firms prefer to stay silent about this form of corporate offense even when they have lost important business opportunities and wasted significant amounts in tender expenses as a result. They rarely lodge complaints against the tender procedures, they do not seek legal redress by initiating a court action, and they seldom ask their home country to intervene at a diplomatic level. Furthermore, they do not make liability claims for lost tender expenses, and they do not make their suspicions public in other ways.

These preferences were revealed in a recent business survey (Søreide, 2006). The survey was conducted in cooperation with the Confederation of Norwegian Enterprise (NHO), the largest business organization in Norway, and the respondents were Norwegian exporters. Two thirds of the responding firms believed that they had lost important contracts because competitors had offered bribes. Even so, a clear majority of these firms would never make a whistle-blower reaction against competitors who engaged in corrupt practices.

A lack of proof was the reason cited for inaction by 12 percent of the respondents. The explanation most frequently cited, though, was a concern about "future business cooperation", which was referred to by 31 percent of

the firms. Curiously, firms that had never cooperated formally with other firms in the industry were just as concerned about the adverse impact of any whistle-blowing on future business cooperation as those which had this kind of cooperation. The concern about business cooperation was significantly stronger among highly profitable firms, whereas firms that operated under a stronger degree of price pressure where more concerned about how customers would consider a whistle-blower reaction about corruption.

These findings on business cooperation and market power do not necessarily point at issues related to collusion between firms. They do, however, reveal a strong link between profitability, relations with other firms in the market, and a low propensity to react proactively against corruption.

However, the quality of local institutions also appeared important. Firms were significantly more prepared to react proactively to perceived instances of corruption in a country where the level of corruption is perceived to be low than in a country where corruption is perceived to be widespread.

This connection between the propensity to speak out and the perceived level of corruption was not further explored in the survey. One possible interpretation is that firms will not react against bribery unless they expect local judicial institutions to respond to a complaint with proper investigation of the facts. The level of corruption referred to by the survey-respondents at this issue could also relate to other arenas. For instance, firms may not wish to react against cases of bribery if local politicians benefit from this corruption.

The present article builds on data generated by the business survey and aims at explaining some of the survey results with the help of economic theory. It is thus an attempt to shed light on the way in which industry structure and institutional quality may affect a company's incentive to react against corruption.

Connections between industry structure and corruption-related decision-making have not been much explored. Svensson (2000) describes the level of bribes as a function of profits and sunk cost. Ades and Di Tella (1999) found corruption to be more widespread in countries where companies obtain high rents, where antitrust regulation function poorly, and where domestic firms are sheltered from foreign competition. Evidence for a similar connection is provided by the World Bank's investment climate studies, in which a number of business climate qualities have been estimated. According to these data, published by Batra, Kaufmann and Stone (2003), there is a strong correlation between the function of antitrust institutions in a given country and the firms'

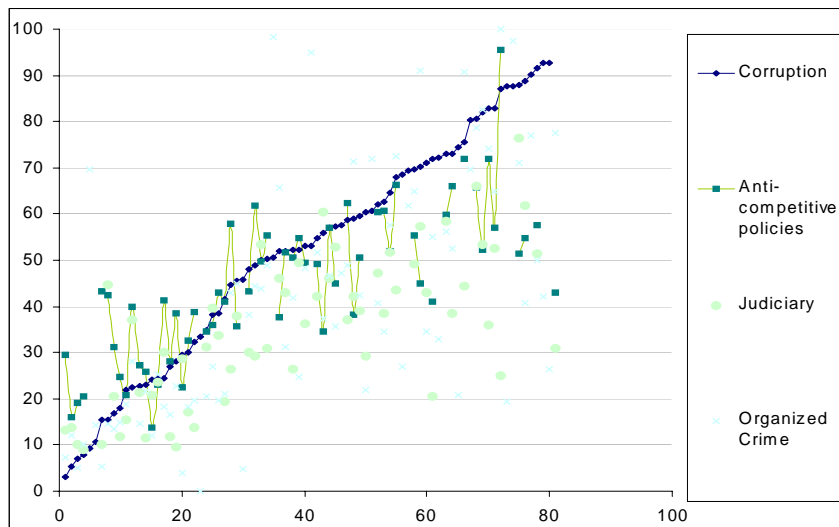reported problems related to corruption, as is illustrated in Table 1.[1]

Table 1. Percentages of business people in various countries who consider the level of corruption and local antitrust policies, respectively, as obstacles to business. The quality of the judiciary and the level of organized crime are included with weak colours.

The results of the study reported in Table 1, in combination with the survey results (Søreide, 2006), suggest that: (i) industrial structure is an important factor in understanding corruption-related decisions; (ii) the opportunity for firms to collude is higher in markets where corruption is common. These suggestions are not controversial. The pertinent question is whether industrial structure and the opportunity for collusion can explain the absence of whistle-blowing reactions against perceived cases of corruption. I will explore this issue by drawing on standard theories of industrial organization. From this perspective, I will consider the importance of heterogeneity among firms, the quality of local institutions and the presence of political corruption.

Although the empirical evidence shows a link between corruption and collusion, there are few theoretical models on this topic. Corruption is, for instance, not an issue in Levenstein and Suslow's (2004) extensive review of the literature on cartel stability and success. An important contribution is made by Lambert and Sonin (2003), however, who apply game theory to explain

[1]Own estimates based on data in Batra et al (2003). The correlation is significant at the 1% level, with a correlation coefficient of 0.48.

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why corruption stabilizes collusion in public procurement tenders. They find corruption and collusion to be "strategic complements", a statement that may apply for other situations than public procurement. Corruption can, intuitively, function as a barrier to entry in so far as clients can be bribed by the cartel. Corruption may also have a stabilizing function because it can be difficult for colluders to withdraw from the cartel if they have been involved in corruption.

A firm's potential profit if a cartel can be established, as compared to competitive market structures, is an important part of the present study. One relevant background paper is therefore Schmalensee's (1987) study of the trade-off between collusion and Cournot-competition in the case of heterogenous firms. Friedman and Thisse (1994) analyze the stability of a given cartel in a symmetric oligopolistic market with homogenous firms and where it is difficult to prevent entry. They describe how entrants who are disliked by a local cartel may end up as cartel members with profits that gradually become equal to the incumbent firms. Like this present paper, they too point to connections between profits and incentives to blow the whistle on corporate crime. The present paper differs from the Friedman-Thisse study by concentrating on corruption, heterogeneity between firms, a political environment and judicial institutions. A good overview of the economics of collusion is provided by Ivaldi et al. (2003).

This paper builds on this body of work and continues by describing a simple theory about the importance of and connection between elements that may prevent a firm from reacting to a case of corruption. Under which circumstances will a company react actively against the bribery conducted by competitors?

It begins by considering the issue of market structures and the potential benefits from collusion. A firm with ambitions about some form of cooperation with competitors will usually be cautious in its interactions with its competitors, and I assume that firms in this position will not take action against their competitors' corporate crime. The point of this exercise is to sort out firms that may consider themselves inhibited by market incentives from speaking out about corruption.

Secondly, the paper examines the role of local judicial institutions. The perceived ability of these institutions to respond effectively to an allegation of corruption is demonstrated to exert considerable influence over a firm's decision to take anticorruption action or not.

The third aspect considered is political corruption. Politicians in key

positions may respond to information about a case of business corruption, by encouraging or preventing the investigation of the facts. The final question thus regards the extent to which political corruption will prevent a firm from reacting against a case of bribery.

The conclusion draws together the propositions described in the paper into a general model of why firms rarely take action against corruption.

2 Why not react?

A firm is convinced that it has just lost an important business project because a competitor has offered a bribe. Whether it decides to reveal its grievance or stay silent about it depends on its assessment of the expected costs and benefits. Although there are several options in this situation, this analysis concentrates on the choice between (1) blowing the whistle about the corruption and (2) remaining silent about it. For simplicity I will assume that the firm is able to prove that an incident of corruption has taken place. However, the effects in many cases would be similar if the firm was only able to reveal suspicions of corruption.

There are four main reasons why a firm may decide to react proactively against the offense. First, it may be motivated by a desire for revenge; the bribery has cost it an important contract. Secondly, it may be the prospect of undertaking a liability claims. International law has made it possible for companies to sue for compensation in respect of lost tender expenses in cases of bribery, which can amount to huge numbers. Thirdly, by reacting against the bribery, the firm may want to signal its anti-corruption practices to the market; this can improve its market image both overseas and back home. Fourthly, the firm is driven by principles; its ability to prove the offence presents it with a specific opportunity to improve the local business climate.

In this paper I will not consider the morality, the connection to the given country, or, in other ways, the background of the potential whistle-blower. The focus is rather on describing the costs and benefits of whistle-blowing on corruption for a firm that is operating in a market as one of several competitors, while also being subject to political conditions.

As a possible cost, executives are worried that speaking out about corruption will mean that in the future they will be unable to establish a profitable cooperation with their competitors, some form of a cartel. They will not reveal the bribery conducted by competitors if they wish to keep an oppor-

tunity to collude with the same competitors.[2] The relevance of calculating on collusion when considering a reaction against a case of bribery follows directly from the correlation illustrated in Table 1: antitrust institutions function poorly when corruption is part of the business climate. This implies that the opportunity to obtain cartel profits is higher than elsewhere.

One possible benefit of whistle-blowing for the whistle-blower is the chance of eliminating one or more competitors, while emerging from the incident with its own reputation for clean and honest business practice enhanced. This incentive to react against corruption corresponds to the third category of motive, the signal-effect.

However, the business survey revealed a common worry that reacting against corruption might lead to undesired consequences, such as jeopardizing different forms of future business cooperation. These can be official forms of cooperation, like consortial agreements, i.e. they do not have to resemble collusion. And during interviews, which were conducted as part of the survey project, several executives said that they preferred not to make any fuss about competitors' corruption although it had cost them contracts. I will therefore assume that firms will react against corruption only if they expect some benefit.

2.1 Market incentives

Consider an exogenously given number, $N > 1$, of heterogenous firms that meet regularly in the same oligopolistic markets. They each produce the quantity of $q_i \in [0, \infty)$ at the variable cost of $c_i q_i$, and thus a marginal cost of $c_i < 1$. The firms produce a homogenous output, the demand for which is given by the inverse linear demand function, $p(Q) = 1 - Q$, where $Q = \Sigma_{i=1}^{N} q_i$. Cournot competition implies the following profit for each firm:

$$\max_{q_i} \pi_i^C(q_i, q_{\neg i}) = q_i \left[1 - q_i - \left(\underset{j \neq i}{\overset{N}{\Sigma q_j}} \right) - c_i \right] \qquad (1)$$

We do not need information about the distribution of costs in an oligopoly to determine price and quantities since the equilibrium can be found by the

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[2]This assumption is independent of the possible benefits of competitors in the market, which in many cases would suggest an opening for collusion. The business-survey suggests a concern in these situations, which according to basic profitmaximization is unfounded. If there already is a cartel in the market, the theory and the results would be similar.

sum of marginal costs across the producers (Bergstrom and Varian, 1985). Using the average marginal cost, $\bar{c} = \Sigma_{i=1}^{N} c / N$, we can derive from (1) that $p^C = \frac{1+N\bar{c}}{N+1}$ and $q_i^C = \bar{c} - c_i + \frac{1-\bar{c}}{N+1}$, which leads to the following profit function of each firm:[3]

$$\pi_i^C = \left(\bar{c} - c_i + \frac{1 - \bar{c}}{N + 1} \right) \left[\frac{1 + N\bar{c}}{N + 1} - c_i \right] \tag{2}$$
$$= \frac{[N(c_i - \bar{c}) + c_i - 1]^2}{(N + 1)^2}$$

The potential cooperation between the firms would imply some form of cartel profit that represents potential revenues that are higher than Cournot-competition, given by a joint profit maximization:

$$\max \ \Pi^m = Q p^m - \overset{N}{\underset{i=1}{\Sigma}} q_i c_i \tag{3}$$

The efficiency of a considered cartel, in terms of production shares according to production costs, is not given. From the theory of collusion we know that a completely efficient cartel of heterogenous producers will seldom occur (see, for instance, Ivaldi et al., 2003) and a firm would rarely make such an assumption. We can assume that efficient firms consider collusion only if they expect at least as large a market share as other firms in the cartel. Less efficient firms, with higher than average marginal costs, will always benefit from collusion. In the given context, where the firms only consider the opportunities to get a higher profit than in Cournot-competition, we can thus make the simplifying assumption that potential cartel members will get the same market share. The revenues of a cartel member will still depend on their own efficiency.[4]

Optimization over the average marginal cost, $\bar{c} = \Sigma_i^N c_i / N$, leads to the symmetric output of $q^m = \frac{1-\bar{c}}{2N}$, the price $p^m = \frac{1+\bar{c}}{2}$ and the total production of $Q = Nq = \frac{1-\bar{c}}{2}$. Each firm would thus expect at least the following profit if a cartel is established:

$$\pi_i^m = \frac{(1 - c_i)^2}{4N} \tag{4}$$

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[3]The result is found by solving for the aggregate production level. The first-order condition will then lead to: $q_i = 1 - Q^c - c_i$, and $Q = \frac{N(1-\bar{c})}{N+1}$, which is substituted into the q_i- expression and rewritten.

[4]See the appendix for the case of heterogenous quantities and increasing marginal cost.

The firm's decision on whether or not to react to a case of corruption depends on its comparison of a potential cartel profit, in (4), with its present Cournot-profit. The profit under both circumstances obviously depends on the number of firms in the market, N, as well as the firm's relative productivity. Solving for $\pi_i^C > \pi_i^m$, we find how large the marginal cost advantage would have to be to make a firm consider a whistle-blower reaction, without the risk of giving up higher profits.

$$\overline{c} - c_i > \frac{(1 - c_i)(2N + N^{\frac{3}{2}} + \sqrt{N})}{2N^2} \tag{5}$$

Proposition 1 *The greater the cost advantage and the higher the number of firms in the market, the less likely is the firm to be prevented from whistle-blowing by market incentives.*

Proof. The argument about cost advantage is given by (2), (4) and (5). The derivative of (5) with respect to N is negative:

$$\frac{\partial}{\partial N} \frac{(1 - c_i)(2N + N^{\frac{3}{2}} + \sqrt{N})}{2N^2} = \frac{c_i - 1 \left(4\sqrt{N} + N + 3\right)}{4N^{\frac{5}{2}}} < 0.$$

■

The more efficient the cartel is expected to become, the more productive the firm would have to be to put its potential cartel profit at risk. The greater the number of firms in the market, the lower the cartel profit will be, and the less there is to lose if a reaction against bribery makes it difficult to collude.[5]

Thus far, the analysis applies common terms to describe why a firm's tolerance or intolerance of bribery conducted by a competitor may depend on the possibilities to obtain cartel profits, its own efficiency, and the number of firms in the market. This provides us with the features of firms that would be unlikely to be deterred from a reaction against corruption by their own profit-incentives. Whether these firms will actually reveal incidents of corruption is a secondary issue, which depends on their assessments of other consequences of such an action.

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[5]The correlation in Table 1 suggests that this potential cartel profit may depend on the level of corruption. If cartel efficiency decreases in the quality of antitrust institutions, the firm will expect higher cartel profits the higher the levels of corruption. Its incentive to collude, rather than blow the whistle about corruption, increases accordingly.

2.2 Local judicial institutions

The term "whistle-blower" usually refers to individuals who speak out about some form of misconduct carried out by other actors in his or her own environment. The offenders will always dislike the whistle-blowing, and they might wish to react against the whistle-blower in some way. This aspect can also be present in interactions between corporations.

Executives will seldom speak out about competitors' involvement in corruption, unless they expect local institutions to respond to their allegations in a constructive way, i.e. with an impartial and thorough investigation of the allegation and subsequent prosecution of the alleged offender(s). Expectations about the likelihood of a successful prosecution of a firm or firms that have been involved in corruption are therefore relevant to the decision taken by a potential whistle-blower.

It follows directly from the given analysis that a legal sanction that is severe enough to provide the potential whistle-blower with a cost advantage, could influence the firm's decision if it changes the sign of $E(\pi_i^C) - E(\pi_i^m)$. However, a legal sanction against bribery will not usually imply an increase in the sanctioned firm's marginal production costs. The typical sanction is debarment from future tenders or a penalty in the form of a fine. It will not influence the optimal Cournot-competition production quantities, q_i^C, but it may lead the firm whose bribery has been detected to leave the market.

To cover the possibility that more than one competitor is involved in the corruption, let $n \geq 0$ denote the expected number of firms that will exit the market. The expectation of n depends on the potential whistle-blower's assumptions about the quality of local judicial institutions. The expected profit in a more competitive market is now described as a function of n:

$$\pi_i^C = \frac{\left[(N-n)(c_i - \overline{c}) + c_i - 1\right]^2}{(N-n+1)^2} \tag{6}$$

The expression in (6) is illustrated in Figure 1 with profits on the vertical axis and the number of firms on the horizontal axis. The weaker curves describe the case of Cournot-competition when $n = 1$ and $n = 3$, respectively. The dashed curve is the competitive outcome when no firm leaves the market. The potential for cartel profits is still considered, and is represented by the solid curve. The potential whistle-blower is an "ordinary producer" in this
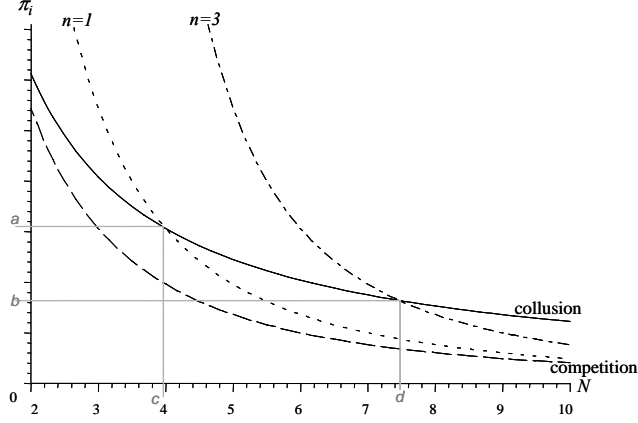
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picture, no more than average efficient, $c_i = \overline{c}$.[6]

Figure 1: Collusion versus Cournot profits. Collusion is the solid curve.

The size of a penalty, θ, required to make an average firm exit the market, would have to be equal to this firm's Cournot-profit.[7] And, if $\theta = \overline{\pi}_j^C$ we have the following result:

Proposition 2 *For a given penalty, a firm's incentive to react against an incident of bribery decreases in the offender's efficiency.*

Proof.

$$
\begin{aligned}
c_j &< \overline{c} \Rightarrow \pi^C - \theta > 0 \Rightarrow n = 0 \\
c_j &> \overline{c} \Rightarrow \pi^C - \theta < 0 \Rightarrow n > 0
\end{aligned}
\tag{7}
$$

and $\partial \pi_i^C / \partial n > 0$ (in 6). ■

The prosecution and sanction of a producer that has been involved in corruption will, accordingly, be more beneficial to the potential whistle-blower if the producer is relatively inefficient.

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[6]The average marginal cost is not adjusted to changes in N for the two dotted lines in Figure 1. The point is only that the entrant does not need to have a cost-advantage compared to the incumbent firms to benefit from the Cournot-situation.

[7]This size of such a penalty is not unrealistic. US penalties for corruption can amount to ten times the profits from the given contract. Besides, the size of π_j^C could be close to zero for the least efficient producers.

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This is perhaps an unexpected result as most firms would prefer to eliminate efficient competitors. What it describes is that the chances of reducing the number of competitors is higher when the offender is an inefficient producer. The expected benefit in continued Cournot competition is thus expected to be higher when the offender is inefficient, given that any penalty imposed is independent of the offender's productivity. The benefit of a potential cooperation with competitors, and the "cost" of speaking out about the bribery, both decrease in the offender's inefficiency. In this respect, the analysis underscores the importance of efficient penalties.

A firm's decision will depend on its expectations about the outcomes of a possible prosecution, i.e. the efficiency of local judicial institutions, which could include an economic crime unit. The higher the perceived level of corruption in a country, the less efficient are these institutions expected to be: The more frequent the corruption, the weaker public institutions will be, in general, and the easier it will be for an offender to bribe its way out of the mess.[8] The potential whistle-blower's incentive to react pro-actively decreases accordingly.

This intuition corresponds to the reported survey result, that a firm's propensity to react to an incident of corruption is higher, the lower the perceived level of corruption in the given country. Note also that this connection suggests that firms involved in corruption have strong incentives to try to convince their competitors that corruption is more widespread in the local context than it really is.

Homogenous firms In the case of homogenous producers there is no marginal cost variation, and the expected response of local judicial institutions becomes critical to whistle-blowing decisions. A firm would always protect a potential for collusion, and never react against corruption, unless it expects a prosecution to lead some competitors to exit. Let $c_i = \overline{c}$ and $n > 0$, and (6) can be simplified as follows:

$$\pi_i^{C_H} = \frac{(1 - c)^2}{(N - n + 1)^2} \tag{8}$$

To find the expected number of firms, n, that would have to go out of this business in order for a firm to undertake an anti-corruption reaction,

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[8]See Andvig and Moene (1989) for a multiple equilibria model of corruption levels, and where this argument is described.

compare (8) and (4). Apply $r = (N - n)/N$ to determine $\pi_i^{C_H} > \pi_i^m$. If so, we find that $r = \frac{1}{N} \pm \frac{2}{\sqrt{N}}$, and thus the given condition on n:[9]

$$n > 1 + N - 2\sqrt{N} \tag{9}$$

A firm would consider speaking out about the bribery only for certain combinations of N and $n > 0$. When the firm's executives have little or no confidence in local judicial institutions, and think that a whistle-blowing reaction would be unlikely to trigger investigation by the authorities, they will assume $n = 0$, and will always keep the opportunities for a cartel solution, regardless of N. The case of homogeneity demonstrates one way in which the efficiency of local judicial institutions influences those who are best placed to uncover corruption, namely, the firms competing to tender, to speak out about these offences. The more identical the producers, the more critical is the quality of local judicial institutions in this setting.

2.3   Political corruption

I will now consider how the presence of political corruption can also influence a firm's incentive to react against a case of bribery. We know that political interests and commercial interests are often closely entangled in many of the countries where corruption presents a significant challenge. Some politicians strive to advance their personal interests, to the benefit of particular firms, while officially proclaiming welfare improvement to be their one and only aim.[10] This is well described by Shleifer and Vishny (1993, 1994) and more recently by Kaufmann and Vicente (2005).

Greedy politicians will obviously have a greater opportunity to obtain bribes when the firms get some form of cartel profits rather than compete, and they will have greater opportunities to get away with bribe-taking when corruption is common. Political corruption therefore suggests further opportunities for the firms to collude and obtain higher profits. This adds to the pragmatic issues that a potential whistle-blower will consider.

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[9]Applying r to determine $\pi_i^{C'} > \pi_i^m$ leads to $(rN + 1)^2 < 4N \Rightarrow N^2 r^2 + 2rN + (1 - 4N) < 0$

$\Rightarrow r = \frac{-2N \pm \sqrt{4N^2 - 4N^2(1-4N)}}{2N^2} = -\frac{1}{N} \pm \frac{\sqrt{16N^3}}{2N^2} = \frac{1}{N} \pm \frac{2}{\sqrt{N}}$

[10]Bjorvatn and Søreide (2005) demonstrate the implication of this trade-off between political and personal interests in cases of privatization.

As noted, I assume that a firm will react against a case of business corruption only if it expects some consequence. The possible consequences were described in the previous section, i.e. some form of legal sanction against the firms that offers bribes. This sanction is now assumed to depend on the attitude of politicians in key positions. I will assume that politicians have some choice in how they react when someone speaks out about corruption. They can try to silence the complaint by ignoring it, hinder judicial investigations and prevent prosecution of the case by direct or indirect strategies. Or, they can consider the whistle-blower act as an opportunity to clamp down on the corruption. Perhaps they have been aware of the problem, though found it difficult to attack legally without a certain case.[11]

In the cases where local politicians would support a whistle-blower the consequences of an expected investigation will often be unpredictable. An eventual sanction may lead the offender to leave the market, but obviously, this is not known to the whistle-blower when it blows the whistle. The important question for the potential whistle-blower relates to the political response. It will indeed make a difference if there is some reason to expect investigations, as follows by political support ($n \geq 0$), rather than no response at all, $n = 0$. Expectations of no responses could imply politically impeded investigations, but also opportunities for a potential whistle-blower to rather obtain cartel profits if keeping quiet. Whether the politicians give their support to the prosecution of a case of corruption depends on how they value possible personal benefits versus public obligations and welfare.

The presence of political corruption is independent of the given competition in the market. I will assume, however, that the size of the bribes they can obtain increases with the market profit, i.e. the politicians have some bargaining power when negotiating on the size of the bribes and can demand higher bribes when the firms' revenues are higher.[12]

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[11]Note, a response to a whistle-blower reaction would improve the reputation of corrupt politicians and judicial institutions. Thus, corrupt politicians can have incentives to support a specific anti-corruption reaction. Politicians in key positions are treated here as one group. The view of politicians in opposition are not considered, although it can be highly relevant.

[12]The bribes are of course paid in exchange for some benefit, for instance, the opportunity to operate as a cartel, the grant of contracts or tax advantages. The specific "product" in the corrupt transaction is not described in the model. Whether the politicians were involved in the specific case, is not determined. To retain the focus of analysis on the behaviour of competing firms, I will assume that the politicians' own involvement in the corruption will not be investigated.

Corrupt politicians will thus prefer as few firms as possible if there is Cournot-competition in the market. A whistle-blower reaction about corruption will then be supported only in so far as the potential offender can be forced to exit the market, and only in cases where the politicians will have no risk of having their own corruption uncovered.

However, politicians who benefit from bribes from the firms in a market will benefit even more if the firms collude. Cartel profits will quickly exceed the revenues in Cournot competition when the number of firms increases. Besides, when negotiating on the bribes, the politicians' bargaining power will probably increase if the firms cooperate in a way that is illegal.[13]

A distinction between collusion and competition is thus clearly relevant also in this setting: The more profit in the market the more likely corrupt politicians will be to protect the firms in the market. Hence, the more profit in the market, the more hazardous it will be for the potential whistle-blower to speak out about a case of corruption when political corruption is a common problem.

Assume for now that the firms in the market are homogenous producers. The potential for bribes depend on the total market profit, $N\pi_i$. The degree of political corruption will depend on how much weight, $\gamma \in [0,1]$, politicians place on the potential for personal benefits, at the expense of local consumer surplus, CS. The politicians' utility function follows:

$$U_p = \gamma \left[\Sigma_{i=1}^N \pi_i \right] + (1-\gamma) \left[CS \right] \tag{10}$$

The consumer surplus depends on the market structure. Following the conventional term, $(1-p)Q(p)/2$:

$$
\begin{aligned}
CS^C &= (1 - (\frac{1+Nc}{N+1})(\frac{N(1-c)}{N+1}))/2 = \frac{N^2(1-c)^2}{2(N+1)^2} \\
CS^m &= \frac{(1-(1+c)/2)}{2}(\frac{1-c}{2}) = \frac{(1-c)^2}{8} \ .
\end{aligned}
\tag{11}
$$

Equations (4) and (8) determine the size of $\Sigma_{i=1}^N \pi_i$, and thus the politicians' utility, in (10), in case of collusion, U_p^m, and Cournot-competition, U_p^C, respectively:

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[13] The stronger bargaining power if firms take part in collusion is only a comment, and an aspect that is not part of the analysis. See the appendix for the case of ties between politicians and only one of the firms in the market.

$$U_p^m = \gamma\left(\frac{N(1-c)^2}{4N}\right) + (1-\gamma)\,\frac{(1-c)^2}{8} \tag{12}$$

$$U_p^C = \gamma\left(\frac{N(1-c)^2}{(N+1)^2}\right) + (1-\gamma)\frac{N^2(c-1)^2}{2(N+1)^2} \tag{13}$$

Note, the attitude of corrupt versus benevolent politicians in their inclination, γ, to let personal benefits influence the choices they make in public duty, is independent of the (homogenous) firms' production costs. Let $U_p^m = U_p^C$ and solve for γ, to get the critical value, $\gamma^* \in [0,1]$, for which the politicians would be indifferent to supporting prosecution or encouraging corruption and collusion.

$$\gamma^* = \frac{3N+1}{5N-1} \tag{14}$$

The utility functions are illustrated in Figure 2, with the utility, (12) and (13), on the vertical axis, and the number of firms, N, on the horizontal axis. The politicians' utility in case of collusion is independent of the number of firms in the market.[14]
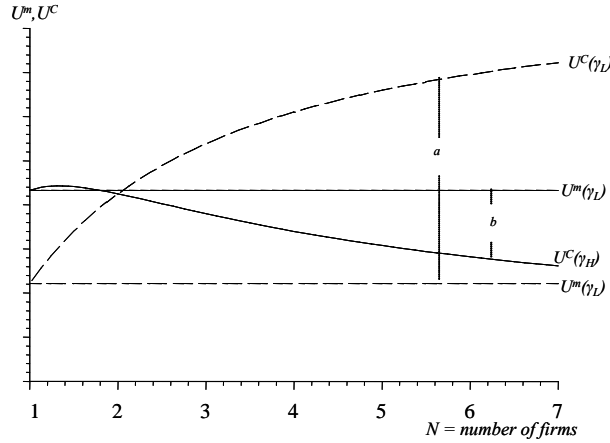

Figure 2: The politicians' expected utility

[14] The firms are identical and their monopoly-price is independent of their number.

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In this figure $U^C(\gamma_L)$ and $U^m(\gamma_L)$, the dashed curves, denote the utility of benevolent politicians (when γ is low), in the two cases of competition and collusion, respectively. The politicians are less interested in the potential sizes of bribes from firms in the given market. They are more concerned about consumer surplus. The relative utility of these benevolent politicians obviously increases in the number of firms, when compared with a potential situation of collusion.[15] This is illustrated with the a in Figure 2. Firms in the given market will not be "protected" if someone speaks out about their offenses. A whistle-blower is more likely to be heard, a reaction about corruption may trigger investigations and sanctions.

The situation with high levels of political corruption, by contrast, is denoted with $U^C(\gamma_L)$ and $U^m(\gamma_L)$, the solid curve in Figure 2. The politicians are far less concerned about the consumer surplus. These politicians' utility increases if the firms are able to offer higher bribes. The benefit of collusion, compared to the case of competition, is described by b in Figure 2. Also this relative benefit increases with the the number of firms.

The result of this exercise can summarized in the following proposition:

Proposition 3 *The higher the number of firms, N, (i) the more likely the politicians are to support the whistle-blower if $\gamma < \widetilde{\gamma}$, and (ii) the more likely they are to dislike it if $\gamma > \gamma^*$.*

Figure 3 illustrates γ^* as a function of N.
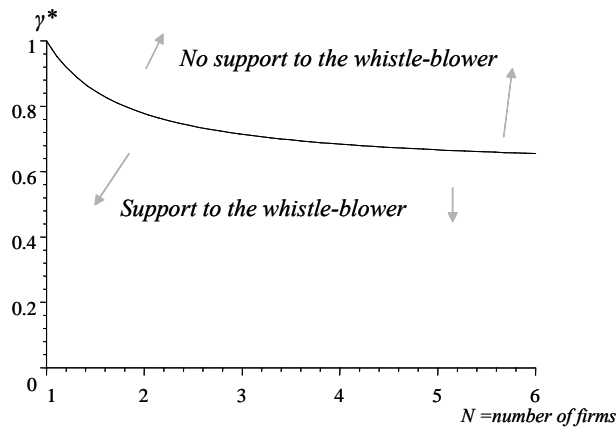
Indifference to the whistle-blower, γ^*, as a function of the number of firms in the market, N.

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[15]Of course, the benevolence of these politicians may just reflect a well-functioning democracy, and a wish for re-election.

When the parameter $\gamma \to 0$, the politicians are concerned about the consumer surplus only, which increases in the number of Cournot-competing firms. When $\gamma \to 0$, by contrast, the politicians will mind only about profits, which obviously falls in the number of Cournot-competing firms.

3 Conclusion

The situation in many markets is that firms that offer bribes will seldom need to worry about reactions from those most able to uncover the practice, namely, their competitors. Survey results presented in the introduction and data collected by the World Bank suggest a strong connection between profitability, relations with other firms in the market, and the propensity to react against corruption.

Questioned about the absence of whistle-blowing reactions, executives in the business survey tended to explain that firms do not react because there is no point in doing so, or because they lack proof that corruption has taken place. This paper has explored the motivation to keep quiet more thoroughly, by detailing costs and benefits, and has suggested additional details in the explanation.

The results suggested, first, that firms will not react against a case of business corruption if that may disturb their opportunities to obtain cartel profits. The strong empirical correlation between corruption and the opportunities to operate as a cartel supports this theory. And, second, the more efficient the offender of the crime, the lower is the motivation for a potential whistle-blower to react. The penalty is then likely to have lower or no impact on the offender's role as a competitor in the market. Besides, as a third aspect, a whistle-blower reaction on corruption can cause other obstacles if there are connections between local politicians and firms in the given market. The presence of such connections, however, can imply opportunities for cartel profits, and the potential whistle-blower's incentives to speak out may decrease.

When these different aspects have been examined the preconditions for a whistle-blower reaction appear as follows: (i) A firm will not speak out about corruption unless it is a relatively efficient producer. (ii) A firm is less likely to speak out about corruption if the offender is an efficient producer. (iii) A firm will not speak out if local politicians in key positions benefit personally from the given market.

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The theories described in this article are able to explain the conclusions of the business survey: Firms will not engage in whistle-blowing against corruption-related challenges in the local business climate unless local levels of corruption are considered to be low. The theories also suggest a possible explanation to the correlation between corruption and the function of antitrust institutions shown in Table 1: The possibilities to collude may influence firms' incentive to react against incidents of corporate crime. The greater or better the possibilities for collusion, the lower is the incentive to react against corruption.

Note, however, the preconditions for reaction are not absolute, they are suggested by these exercises as mechanisms that are likely to explain an aspect of business practices. There are obviously important reasons why firms should expose corruption, also when these conditions are not present. Respondents to the business survey described the worry of having competitors who offer bribes as the most important underlying motivation behind bribery (Søreide, 2006). This suggests that firms are induced to offer bribes themselves only by the thought that competitors are offering bribes. The signal-effect of reacting against a case of corruption can thus have an important influence on the business climate.

If the level of corruption is high, or the effectiveness of local judicial institutions is low, there are still benefits to be gained by reacting against the problem. Anti-corruption efforts are part of public politics in most countries today. A high level of corruption does not imply that all public officials are corrupt; there will usually be some investigators or politicians who are both able and willing to respond to allegations of corruption and to prosecute the case.

Penalties and debarment of firms will usually require proof, which in many cases can be difficult to supply. However, a lack of proof was not described by the survey respondents as the most important reason for keeping quiet about bribery. Indeed, there are several alternative channels for responding to this form of corporate crime, and they do not all require proof. Firms can follow formal procedures, and lodge an appeal to the client or tender authorities. In this case, they will only have to draw attention to the existence of other bids that offered better price-quality combinations than the winning bid. They can encourage local authorities to take a closer look at the deal; they do not have to identify the firm(s) suspected of offering bribes.

Other forms of redress include making representations through intelligence services, embassies, journalists or anti-corruption groups, such as anti-

corruption offices established by the local government or chapters of Transparency International. Alternatively, a company may submit a letter of complaint to the firm that has paid a bribe. According to the business survey, none of these channels are much applied by Norwegian firms, although the problem of corruption appeared to them as a significant challenge.

The policy implications of this study are obvious. The findings emphasize the value of considering business climate improvements in the light of the incentives for firms to react against corruption. The study also demonstrates the value of local judicial institutions. Where the quality of these institutions is high, this has a direct impact on the incentives of firms to react against an unfavourable business climate rather than take part.

However, there are indeed directions in which this research should be continued. This present analysis assumes, for instance, that firms only consider the profitability of alternative strategies when deciding how to respond to corruption; the paper does not explore cases when firms are inherently honest or very risk averse. Technicalities such as quantity limitations and discount rates are important aspects of commercial decision-making, and are not considered here. And, although the findings help to explain the correlation between corruption and collusion, the study does not identify the further implications of this correlation, for instance, on polarization of business climates. Moreover, the paper describes, but does not solve, the problem that only firms with above average profitability can act responsibly, that is, more responsibly than firms with low to average profitability. Overcoming this obstacle to ethical business practice constitutes a major challenge in so far as consumer surplus and welfare obviously depend on competitive market structures.

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5 Appendix

The potential cartel optimizes over quantities at heterogenous and increasing marginal costs The setting is as given in Section 2.1. The firms produce a homogenous output, the demand for which is given by the inverse linear demand function, $p(Q) = 1 - Q$, where $Q = \Sigma_{i=1}^N q_i$. Assume sunk fixed cost and the variable cost of $\frac{c_i q_i^2}{2}$.

$$\max \ \Pi^m = Q \left[p^m - \sum_{i=1}^N \frac{c_i q_i^2}{2} \right] \tag{15}$$

Marginal cost, MC, is thus $c_i q_i$, while average MC is $\Sigma_i^N c_i q_i / N$. If average production is $q = Q/N$ while c represents the average "technology" applied by the cartel, the colluders' average marginal cost is $MC = cq = c(Q/N)$. Each cartel member's output depends on its relative marginal costs. For the average participant,

$$MC_i = MC \Rightarrow c_i q_i = c(Q/N) \Rightarrow q_i = \frac{cQ}{c_i N}$$

Applying the average variable cost, $VC = cq^2/2 = c\frac{(Q/N)^2}{2}$, in (15), implies:

$$\Pi^m = p^m Q - N(VC) = (1 - Q)Q - \frac{cQ^2}{2N}$$

The first order condition of this expression leads to the optimal total quantity, $Q^m = \frac{N}{2N+c}$, which provides us with a total cartel profit of $\Pi^m = \frac{N}{2(2N+c)}$. The individual firm's quantity is thus

$$q_i = \frac{cQ}{c_i N} = \frac{c\left(\frac{N}{2N+c}\right)}{c_i N} = \frac{c}{(2N+c)c_i}$$

and its profit:

$$\pi_i^m = \frac{c}{2(2N+c)c_i} \tag{16}$$

Cournot-competition under the same assumptions imply $Q^C = \frac{N}{1+N+c}$ and $q_i = \frac{1+c}{(1+N+c)(2+c_i)}$), which leads to:

$$\pi_i^C = \frac{1}{2} \frac{(1+c)^2}{(1+N+c)^2 (2+c_i)^2} \tag{17}$$

$\pi_i^m > \pi_i^C$ is true for all values of c_i, and the potential whistle-blower will always prefer collusion, and never speak out about cases of business-corruption if this could harm the wished for cooperation. The assumptions of increasing marginal costs and optimization across q_i implies that the benefit of relative efficiency is larger in collusion compared to Cournot-competition. A firm would never react against corruption under these assumptions. The expected efficiency of the considered cartel is thus important in a firm's propensity to confront a competitor that is responsible for corporate crime. If higher levels of corruption imply opportunities for more efficient forms of collusion, no firm would speak out about bribery given the negative influence this could have on its cooperation with its "competitors".

Political corruption: Ties between politicians and only one of the firms Consider the case when politicians in key positions obtain personal benefits from only one of the local firms, benefits which take the form of either illegal bribes or legal ownership shares. Although the politicians maximize the same utility function, (10), the significance of the difference in the situation follows directly from the analysis in Section 2. The politicians' benefits depend directly on the profit of "their" specific firm. The calculation of this profit and the trade-off underpinning the politicians' choice are identical to the calculations involved in the potential whistle-blower's decision about revealing corruption or not. However, the perspective differs if we now consider the benefits of another firm with political ties. By help of (4) and (2) we consider the revenues and marginal costs of the firm, j, and not the potential whistle-blower, firm i. Firm i, will influence firm j's profit by raising or reducing the average marginal cost, $\overline{c}$.

Following this line of argument we hypothesize that a potential whistle-blower would not be supported by corrupt politicians with personal benefits in one of the firms in the market unless: (i) the potential whistle-blower is an inefficient producer, and (ii), the firm offering bribes, or other benefits to the given politicians, is relatively efficient. It follows from (2) that $\partial \pi_j^C / \partial \overline{c} > 0$: The firm with political ties would benefit under Cournot-competition if the whistle-blower is relatively inefficient since this would raise the average marginal cost in the industry. But, from (5) we know that a local producer will keep to the cartel solution, unless this firm has a certain marginal cost advantage. Only an inefficient firm could increase the briber's relative marginal cost advantage, as specified by (5), so that the Cournot alternative becomes

the more profitable solution, $\partial \pi_j^C > \partial \pi_j^m$. According to (4) and (2), however, the firm would always try to establish some form of collusion if operating with lower than average marginal costs, and in this case there would be no whistle-blower for the politicians to support.

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SUMMARY

A recent business survey in Norway reveals that firms rarely react to corruption, even when they have lost important contracts as a result. This disinclination to take action is explored in the light of market structures, business efficiency, judicial institutions and political corruption. The paper develops a theory about how these four variables deter firms from reacting against corruption, and, in particular, how the potential for collusion reinforces the incentives to remain silent. Considered separately, each of the factors are unable to explain the low frequency of anti-corruption reactions between firms. Considered in combination, however, the various impediments suggest a more complete explanation: When conditions in market structure suggest that the best response would be to take action, political conditions may favour inaction. When a potential whistle-blower expects support from local politicians or legal institutions, the given offender may be impervious to sanctions; its role in the market will not be altered by the given case. The sum of precondition for action suggests that firms rarely react against corruption.