Corruption and socially optimal entry ☆

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A B S T R A C T

The paper investigates the effects of corruption in the entry-certifying process on market structure and social welfare for a Cournot industry with linear demand and costs. To gain entry, a firm must pay a bribe-maximizing official a fixed percentage of anticipated profit, in addition to the usual set-up cost. This would lead to a monopoly, but only in markets without pre-existing or shadow-economy firms. A benevolent social planner may preempt the harmful effects of corruption by either manipulating the number of pre-existing firms in the market, or by setting up two independent (corrupt) licensing authorities. A socially optimal number of firms in the market may be reached by choosing the right number of pre-existing firms or by having exactly two licensing authorities. These mechanisms may be seen as restoring second-best efficiency in settings characterized by two major sources of distortion: Imperfect competition and corruption. We also show in an extension that the basic insights carry over in a qualitative sense to a model with quadratic costs and first best entry regulation.

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1. Introduction

Pervasive throughout human history, corruption is a complex phenomenon that raises a myriad of challenges for the social sciences and beyond. For economists, the importance of corruption has been noted in multiple areas of research, giving rise to various strands of literature (Tullock, 1967; Rose-Ackerman, 1978; Aidt, 2003; Jain, 2001; Burguet and Chwe 2004). However, in its predominantly normative outlook, much of traditional economic analysis has tended to ignore the corruption dimension. Yet a positive perspective in economics often must integrate the distortive effects of corruption to be able to capture some essential features of economic activity, whenever actors other than pure market forces are present. In particular, corruption has the potential to emerge as a critical component whenever it can have a direct

effect on important dimensions of market outcomes. One of these is undeniably market structure. This paper is an attempt to investigate the effects of corruption in the entry-certifying process on the endogenous market structure of a given industry. As such, the present paper is closest in spirit to the pioneering work of Bliss and Di Tella (1997), which considers firms that are asymmetric in production costs and engage in perfect competition upon entry. The paper joins a small but growing literature that restricts attention to the effects of corruption on market outcomes, and thus defines corruption as the sale by bureaucrats of public property for purely private gains. The prototypical papers in this strand also include Shleifer and Vishny (1993), Acemoglu and Verdier (2000), Choi and Thum (2003) and Emerson (2006).

In contrast to Bliss and Di Tella (1997), we adopt as appropriate baseline the standard two stage entry game commonly used in industrial organization, to allow for strategic behavior on the part of firms (as in Emerson (2006)). In the first stage, a large number of identical firms decide whether or not to enter a market, with entry requiring a fixed set-up cost. Upon entry, in the second stage, the firms compete in outputs, in an industry with a homogeneous good. For tractability, we consider the usual specification of linear demand and cost functions for the main part of the paper. Corruption is introduced by positing that a corrupt official charges a bribe to each firm in order to issue the

requisite license for industry entry. The official is fully corrupt in that his goal is to maximize the expected total revenue collected from these bribes, taking into account that he may be detected and punished with some exogenous probability. In addition, as in Acemoglu and Verdier (2000), the bribes are taken to be an exogenously fixed percentage of each firm's final equilibrium profit. This bribe-setting rule may be justified on multiple grounds. First, there is anecdotal evidence that corrupt officials tend to set their fees in this manner, often in line with historical practice in a given industry. Second, motivated by a natural desire to lay low so as to be able to operate over the long run, a sophisticated corrupt official might well understand at some level that this simple pricing rule actually minimizes the distortionary consequences of his actions on firms' behavior, by simple analogy to ad valorem taxes.

It is quite intuitive that, under this benchmark, the corrupt official would allow just one firm into the industry, since his objective is to maximize (a fixed proportion of) industry profit. The starting point for this paper is the observation that this drastic curtailment of competition in an industry is possible only in cases where the corrupt official begins his tenure in the entry-certifying office prior to the launch time of the industry at hand. Otherwise, in cases where the official inherits an ongoing industry, there will be incumbent firms that typically no longer require a license, and are thus beyond the reach of the official in terms of bribe extraction. The same holds for firms operating in the shadow economy (Choi and Thum, 2005). In such cases, the official will still maximize personal revenue but only from bribes extracted from new non-shadow entrants. It turns out that this can dramatically curtail his ability to limit competition. Indeed, instead of letting in one firm only, the official will actually find it in his personal interest to allow multiple entrants in (as many as the number of existing firms in the industry plus one, when entry costs are zero and under the present specification). Intuitively, this is because by allowing one more firm in, he captures a percentage of a higher market share accruing to the new firms together, but at the same time a lower bribe from each firm due to the increased competition. Balancing these conflicting effects will generally give rise to more than one new firm entering the market.

The second part of the paper proposes another policy response aimed at avoiding corruption-induced monopoly in new industries. Instead of delegating the entry process to a single official, the government could put in place multiple independent officials, each fully empowered to certify entry. We assume that all officials would charge the same percentage of each firm's profit as bribe for entry, or some variant thereof, so that the underlying competition among officials is not played out in terms of fees but rather in the numbers of firms allowed in. Under this mechanism, the firms allowed in by one official might be seen as playing the role of the existing firms in the previous discussion for the other officials. While it is intuitive then that this set up will give rise to more competition in the industry, the surprising result is that, with exactly two officials, it will actually lead to the second-best socially optimal number of firms, as defined in Mankiw and Whinston (1986) or Suzumura and Kiyono (1987).

The intuition for this provocative result comes from the theory of Cournot mergers (Salant et al., 1983) and divisionalization (Baye et al., 1996).[1] Each official foresees that by letting one more firm into the market, he lowers the profits of the other firms he has already let in ("his firms"), but he increases the market share of his firms relative to other officials' firms. It turns out that these two conflicting effects balance each other out for the case of two officials and induce a socially optimal outcome.

The conclusions of this paper reveal an interesting new finding with no existing counterparts in this literature: That the number of existing firms along with the shadow firms in the same industry turns out to be an important determinant of the (endogenous) market structure in corrupt environments. One consequence is that with such firms, the socially optimal number of officials is either two or one, depending on the number of existing firms (including those in the shadow economy). This result sets welcome limits on the benefits of inter-official competition in curtailing the negative consequences of corruption, thus making the idea more realistically applicable. The fact that a "monopoly official" will often emerge as the socially optimal solution is rather counterintuitive, and goes against what has emerged as the conventional view on the benefits of inter-official competition in corrupt environments (e.g., Rose-Ackerman, 1978 and Shleifer and Vishny, 1993).

The importance of the number of existing firms opens up some important policy options. To formulate these, we assume throughout this paper that, while the relevant officials are always corrupt, the government in place is benevolent, and aware of the presence and extent of corruption, though unable to implement any effective eradication strategies (despite setting up a random auditing scheme). This dichotomy is commonly postulated in the closely related literature although Bliss and Di Tella (1997), Shleifer and Vishny (1993) and Dhillon and Rigolini (2011) posit that corruption operates with full impunity. The first of the policy options is to always rely on two independent entry-certifying officials for new industry launches. Another policy option is to issue a suitable number of initial "special" licenses to enter a new industry through some other (special) authority before placing that industry under the authority of a single corrupt officer. This would clearly undermine the ability of the official(s) to curtail the level of competition in the industry, in light of the aforementioned results. These points will be discussed in more detail later on.

Since the conclusions described so far were obtained in the context of oligopoly with linear demand and costs, it is natural to raise the issue of robustness of the analysis. To address this issue, in the third part of the paper, we consider two inter-related extensions for the model without pre-existing firms, a quadratic cost function and a first best planning criterion (while keeping a linear demand function). This allows us to compare free entry, first best entry, second best entry and entry under multiple corrupt officials. The main conclusion of this part of the paper is that the basic insights of the paper essentially carry over in a qualitative sense. More precisely, we show that (i) instituting competition in entry certification will increase entry and welfare, and (ii) second best and first best numbers of firms may respectively be reached by suitably tailoring the number of competing officials to the strength of diseconomies of scale. However, the first best welfare level cannot be replicated under corrupt entry, unless the diseconomies of scale are sufficiently strong. In the latter case, an unexpected result of independent interest for the normative theory of entry is that first best and second best entry regulation actually yield nearly identical outcomes.

While the institutional arrangement of introducing "competition in corruption" appears a priori to be of a normative nature, it may also be construed as a policy measure that has been previously applied in some real world settings. This issue figures prominently in Shleifer and Vishny (1993), as one possible scenario of interest in the "industrial organization" of corruption. These authors emphasize the importance of the latter in determining key market outcomes and the actual level of corruption. However, in contrast to the present paper, the underlying mechanism in their perspective is simple Bertrand-style competition among officials, which drives bribes down to zero, thus increasing consumer surplus in the relevant markets. In their terminology, one might rephrase the motivation of the present paper as being concerned with the social efficiency effects of conducting some (discrete-type) comparative statics of varying the industrial organization of corruption in an exogenous manner. As such, the approach taken in this paper could also be construed as fitting the general theme of mechanism design as it is commonly invoked in such fields as public and regulation economics. The idea is indeed that the hidden principal (or benevolent government leader) embeds the self-interested behavior of corrupt officials within a suitably designed larger game to induce them to collectively take actions that mimic those of an honest social planner in terms of the relevant outcome of interest: The emerging market structure. There

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[1] The mathematical structures of the models used in the present papers are formally equivalent to models of divisionalization, even though the economic settings are drastically different.