Product-Market Competition
and Managerial Autonomy

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Abstract

This paper proposes a theory of the impact of product-market competition on managerial decision-making autonomy based on managers’ concern about keeping their incumbency rents (that competition puts at risk), and on the idea that changes in market conditions affect the congruence between the interests of the different hierarchical levels. The main focus of my analysis is on how changes in market conditions affect the compatibility or congruence between the interests of the principal and the manager, and thus the trade-off between loss of control and better information under delegation. To this end, I build a model of authority within the firm, in which the degree of conflict between the parties is endogenous. My main result is that higher degrees of managerial autonomy are more likely for intermediate levels of competition. Increased competition may induce a manager, who risks having his rents reduced if performance is poor, to make decisions (which affect not only the expected returns of the firm, but also their riskiness) more in line with the interests of the organization—but further increases in competitive forces might as well lead him to take excessive risks. With an intermediate level of competition, the threat on incumbency rents is just enough to align the manager’s interests with those of the organization without pushing him to take value-reducing risks.

JEL Codes: D23, L22, M12, M21

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1 Introduction

A central concern for organizational economics and industrial organization lies with the structure of organizations and the behavior of organizational participants, and particularly with the need to identify ways in which environmental factors constrain both. Dill (1958) argued long time ago that the delegation of authority (“the autonomy of managerial personnel”) is influenced by the structure of the firm’s environment. For instance, it has been suggested that increasing competition in the markets is forcing firms to adopt leaner structures, delegate authority and responsibility down the hierarchy, empower their employees, and so on. Interestingly, the relationship between competition and delegation (or autonomy) has not received much attention from the theoretical literature, and when it has, the conclusions have not been clear-cut.

This paper proposes a theory of the impact of product-market competition on managerial decision-making autonomy based on managers’ concern about keeping their incumbency rents (that competition puts at risk), and on the idea that competition affects the congruence between the objectives of the different hierarchical levels within the firm. In the study of the relationship between competition and delegation of authority, the literature has provided us with conflicting predictions and evidence: some authors reason that autonomy should increase with competition, while others argue to the contrary—and the empirical evidence seems to give support to both views. The model developed here can generate both predictions within the same framework, and shows under which conditions a positive or a negative relationship between competition and autonomy is more likely to arise.

The main focus of the analysis is on how changes in market conditions affect the compatibility or congruence between the interests of the principal and the manager, and thus the trade-off between loss of control and better information under delegation.1 To this end, I build a model of authority within the firm, in which the degree of conflict between the parties is endogenous. My main result is that higher degrees of managerial autonomy in

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1Recent models that emphasize this trade-off include de Bijl (1994), Aghion and Tirole (1997), Baker et al. (1999), and Dessein (2002).
decision making are more likely for intermediate levels of competition. Increased competition may induce a manager who risks having his private benefits reduced if performance is poor, to make decisions (which affect not only the expected returns of the firm, but also their riskiness) more in line with the interests of the organization—but further increases in competitive forces might as well lead him to take excessive risks. With an intermediate level of competition, the threat on incumbency rents is just enough to align the manager’s interests with those of the organization without pushing him to take value-reducing risks.

Theoretical predictions on the sign of the relationship between competition and delegation (or autonomy) can go in either direction. Caves (1980), for instance, presents arguments in favor of a negative relationship due to the tighter coordination required by a more competitive environment. Acemoglu et al. (2006) conjecture that increased competition may induce the manager to take better decisions, thus reducing the conflict of interest between principal and manager. They also advance the idea that competition may also increase the value of the manager’s information. Both mechanisms point to increased delegation of decision-making powers to the manager. Rajan and Wulf’s (2006) work suggests one possible mechanism through which growing competition may foster delegation of authority. They argue that firms may be becoming more human-capital-intensive in response to increased competition, and that this in turn is leading to flatter organizations. The authors provide evidence that the observed flattening of firms’ hierarchies goes hand in hand with delegation of authority further down the hierarchy.

Papers that address this question more formally include Grossman and Helpman (2002), de Bijl (1995), and Marin and Verdier (2007). In Grossman and Helpman (2002), the decision to delegate or not (i.e., to outsource or integrate) strikes a balance between the extra

\footnote{For instance, if quick decisions have to be made, the manager’s local information becomes more important. See Bloom et al. (2007), and Guadalupe and Wulf (2007).}

\footnote{Guadalupe and Wulf’s (2007) empirical investigation establishes a causal effect from increased foreign competition to flatter firms. They also provide additional results that they interpret as evidence in favor of greater decision-making authority being granted to division managers in more competitive markets to foster quick adaptation to local conditions.}
governance costs implied by a vertically integrated structure and the transaction costs associated with searching for a business partner and dealing with incomplete contracts. If one identifies outsourcing with a certain type of delegation of formal authority to the manager, the authors show that there are cases where outsourcing can emerge in equilibrium only for intermediate values of competition (as measured by the degree of substitutability between the industry’s final goods). de Bijl (1995) also looks at the connections between competition and delegation, although he emphasizes how the extent of an agent’s real authority can be chosen strategically to influence the market strategy and actions of the firm.

Closest to my paper is the work of Marin and Verdier (2007). These authors develop a theory in which the firm responds to changes in its market environment through changes in the allocation of formal decision-making power within the firm. As in my paper, they find that there is more delegation of authority to lower levels in the hierarchy at intermediate levels of competition. Contrary to their paper, my focus is on real decision-making authority (autonomy), and the mechanism leading to the result is also different. Marin and Verdier also endogenize both the principal’s profits and the degree of conflict between principal and agent—in particular, both are affected by the intensity of competition in the market. As competition strengthens, the conflict of interests between the principal and the agent worsens, i.e., competition reduces congruence. Thus, the principal intervenes more in decision making because the cost of the loss of control is larger. However, increased monitoring reduces the initiative of the agent. When competition is intermediate, it might be in the interest of the principal to delegate formal authority to the agent to preserve the latter’s initiative, rather than keeping control and extracting only minimum effort from him.

Although there is much informal discussion about how increasing competition is driving corporate change, empirical evidence on the relationship between competition and delegation does not abound—and is far from conclusive. To my knowledge, Caroli and van Reenen (2001), Acemoglu et al. (2006), Marin and Verdier (2006), and Bloom et al. (2007) are the only papers (in the economics literature4) that test for the effect of product-market com-

4In the management literature, Khandwalla (1973) finds no correlation between delegation and price
petition on delegation practices within the firm, although competition is used as a control rather than being the subject of their investigations in the first two studies. Acemoglu et al. (2006) use three different indicators of delegation: whether the firm is organized into profit centers, the extent of delayering, and questionnaire-based measures of managerial autonomy over decisions. As a proxy for product-market competition, the authors use the (inverse of the) Lerner index. They document a robust positive relationship between competition and delegation, thus measured. Bloom et al. (2007) find that decentralization (a questionnaire-based measure of plant manager autonomy) is positively linked with stronger product market competition (proxied by the industry-country specific inverse of the Lerner index). Caroli and van Reenen (2001) use several measures of product-market competition to examine its impact on organizational change (as characterized by delegation of responsibility and delayering). They find basically no evidence of a relationship between the two, although there is some weak indication that falling prices stimulated decentralization in the UK in the 80s (during a major recession). Marin and Verdier (2006) use a questionnaire-based measure of the number of competitors faced by the firm as a proxy for competition. To measure delegation, the authors employ a questionnaire-based measure of what hierarchical level decides over several corporate issues. They report some evidence from Germany and Austria that firms are more likely to centralize decision-making powers when competition strengthens.

The paper is organized as follows: Section 2 presents a simple model to analyze the delegation problem within the firm. In Section 3 I look for the optimal organizational response to changes in the strength of competitive forces facing the firm. Section 4 concludes.

competition, and between delegation and overall competition, but documents a positive correlation between delegation and product competition (differentiation). His work underlines the importance of clarifying the type of competition firms are facing when analyzing the effect of competition on delegation practices. He also finds that delegation is more likely in more profitable firms.

Guadalupe and Wulf (2007) show that increased foreign competition leads to flatter firms and increased performance-based pay, which they collectively interpret as a positive relationship between competition and delegation of decision-making authority.
2 A simple model of the determinants of managerial autonomy

We begin in this section with a very simple model of delegation that emphasizes the organizational problem faced by a firm. To fix ideas, we focus on an organization that produces a good (or service) to be sold in a (final) product market. To stress the delegation problem, I do not model market interaction here, but represent its outcome by a reduced-form profit function $\pi(\theta)$, where $\theta$ is a competition parameter, like the number of competitors in the product market (see more below).

The firm I consider is a simple hierarchy composed of a principal (‘she’) and an agent (the manager; ‘he’). The manager is in charge of running the firm. Managing the firm involves “figuring out what to do” and “doing it” (Radner, 1992); that is, the managerial task comprises two different activities: planning and implementation. Planning refers to the acquisition of information; implementation refers to its use (Demski and Sappington, 1987).

Concerning information, I will assume that the manager has specific knowledge “that in practice is too costly to communicate to others in the firm [...] and is often the reason why managers are entrusted with decisions in the first place” (Raith, 2005). To be concrete, we will think of this specific knowledge as concerning the routine way of running the firm’s operations, and stemming from the manager’s being in charge of day-to-day management of the company. I place all the manager’s routine actions under the header ‘status quo’—the existence of specific knowledge implies that the manager can always resort to the status quo even if he exerts no further planning effort.

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6I refer to a firm for the sake of concreteness, but the analysis can also be applied to a division, a plant, a subsidiary, or generally, to any independent profit center.


8Colombo and Delmastro (2004) show evidence that the information advantage of the manager is actually a key determinant of delegation.

9In other words, the planning task is only important for nonroutine activities. The idea of the status quo has some parallel with Demsiki and Sappington’s (1987) null information structure, which is costless for the manager to access.
To keep things simple, there are three possible profit levels, \( \pi_H(\theta) > \pi_M(\theta) > \pi_L(\theta) \), for every \( \theta \),\(^{10}\) and expected profits under the status quo are

\[
E_{sq}[\pi] = \frac{1}{3}\pi_H + \frac{1}{3}\pi_M + \frac{1}{3}\pi_L
\]

where \( E[\cdot] \) is the expectation operator, and the subindex \( sq \) stands for ‘status quo’.

The principal is unaware of the status quo—she may learn about it through her monitoring effort, as we explain below. These assumptions are meant to capture the idea that the principal is somewhat removed from day-to-day management and that managers are often much better informed about current operations than their superiors. Several examples come to mind: shareholders/CEO (Shleifer and Vishny, 1997, argue that managers normally get the residual control rights when they have more expertise than shareholders and contracts are incomplete, and that this fact may lead to poor choices -from the point of view of the shareholders), CEO/division manager (Jennergren, 1981, for instance, claims that “in a divisionally decentralized firm, divisions are largely independent in day-to-day operations”), headquarters/local office (Newman and Novoselov, 2005, state that such an organizational structure is descriptive of firms whose local offices, especially in remote locations, enjoy considerable autonomy and discretion over decisions), production manager/plant manager, or any other situation in which the principal is, to some extent, not privy to day-to-day operations of the firm.

**Strategies.** Through his planning effort, the manager can figure out changes to the way things are done. These changes will be summarized in what I will call a ‘strategy’: a set of actions that, if implemented, lead to a new probability distribution on profits. ‘Strategy’ should be interpreted in a broad sense, to include actions that affect not only the expected value of the firm’s profits, but also their riskiness.\(^{11}\) The manager’s control over the idiosyncratic risks of the firm may come under many guises: doing more or less preventive

\(^{10}\)At least three levels are necessary for strategies to be noncomparable in terms of first-order stochastic dominance, so as to be able to analyze risk-taking behavior within the model (see, for instance, Lambert, 1986). In what follows, I omit the dependence of \( \pi \) on \( \theta \) when there is no risk of confusion.

\(^{11}\)See, for instance, Lambert (1986).
maintenance of the productive equipment, expanding production capacity or relocating production plants, outsourcing activities or carrying them out in-house, diversifying into other business lines or concentrating on core activities, adopting a hard or a soft stance at wage negotiations, increasing or decreasing other risk-related activities. All these actions differ in their observability. I focus here on the kind of controls over risk that are difficult to observe, \(^{12}\) and simplify things by assuming there are different strategies available to the manager, which modify the risk-return characteristics of the firm’s operations in a way summarized by the induced probability distributions.

The firm faces \(n \geq 3\) ex ante identical strategies that could be potentially implemented, but strategies cannot be described in advance and put into an enforceable contract. I will further assume that there are just two relevant strategies: one “aggressive” and one “conservative”. Every other strategy yields a disastrous (i.e., sufficiently negative) payoff to both parties.

Being aggressive amounts to choosing a riskier strategy, whereby the probability of high profits is increased by \(\alpha\) and that of low profits by \(\beta\), and the probability of an intermediate level of profits is reduced by \(\alpha + \beta\). Adopting an aggressive strategy reduces expected profits, namely

\[
E_{ag}[\pi] < E_{sq}[\pi] \iff \Delta(\theta) \equiv (\alpha + \beta) \pi_M - (\alpha \pi_H + \beta \pi_L) > 0. \tag{1}
\]

In other words, I assume that taking risk results in a probability distribution that is second-order stochastically dominated by the status quo. \(^{13}\)

On the other hand, if the manager chooses the conservative strategy, the probability of high profits is decreased by \(\alpha\) and that of low profits by \(\beta\), and the probability of a medium level of profits is increased by \(\alpha + \beta\). Notice that the above condition implies also that expected profits are highest under the conservative strategy, i.e., \(E_{co}[\pi] > E_{sq}[\pi] > E_{ag}[\pi]\).


\(^{13}\)Choosing an aggressive strategy would be akin to an unfair gamble in the sense of Diamond (1998), although he considers financial gambles that take place after the real returns are observed. The idea that risk taking reduces values is common in the analysis of risk-shifting problems and is consistent with empirical evidence on the matter (see Biais and Casamatta, 1999, and the references therein).
and that
\[
\Delta (\theta) = E_{co} [\pi] - E_{sq} [\pi] \\
= E_{sq} [\pi] - E_{ag} [\pi].
\]

**Planning.** Ex ante, all the above strategies look alike. Planning allows the manager to tell them apart. At date 1, the manager exerts noncontractible planning effort to find out available strategies and associated payoffs. If the manager exerts effort level \(e\), at personal cost \(\psi_m (e)\) he is perfectly able to discern strategies with probability \(e\). With probability \(1 - e\), he remains uninformed. Effort can be thought of as time and resources devoted to gathering and processing information.\(^{14}\)

Also at date 1, the principal can constrain the manager through monitoring of his activities. To this end, she simultaneously chooses noncontractible monitoring (or control) effort \(c\): with probability \(c\), she is informed about the possible strategies, including the status quo. This effort is costly to the principal: her cost-of-effort function is \(\psi_p (c)\). For \(j = m, p\), I assume that \(\psi_j\) is increasing and strictly convex, and satisfies \(\psi_j (0) = \psi'_j (0) = 0\), and \(\psi'_j (1) = +\infty\).\(^{15}\)

The principal’s monitoring effort can be interpreted as the time and resources devoted to establishing a management control system (MCS), for it is her way of trying to ensure that the manager will do what is best for the organization. Having \(\psi'_p (1) = +\infty\) just reflects that perfect control is rarely cost-effective (Merchant, 1998).

Planning, if successful, generates a set of possible strategies from which the manager must choose one (and only one) at the implementation stage. Contrary to planning, implementation is costless—for instance, all strategies may require roughly the same level of implementation effort (normalized to zero) from the manager.\(^{16}\) Which strategy is imple-
mented depends on the authority relationship, as well as on the preferences of both parties.

**Implementation.** The organization must implement one and only one strategy (maybe the status quo). Given that I treat the firm as an ongoing business, doing nothing (i.e., implementing no strategy) is not an option.\(^\text{17}\) Hence, something has to be done. As stated above, effort generates a set of alternatives (i.e., of possible distributions of profits), and the manager is then free to (costlessly) choose any element of the set at date 2,\(^\text{18}\) unless otherwise directed by an informed principal (see below). Since the manager already knows the status quo, he can stick to it if nothing new obtains from his effort in information gathering, i.e., the manager can always resort to the routine way of doing things if he cannot devise new alternatives. The disastrous-payoff assumption guarantees that an uninformed manager will always stick to the status quo (if that choice is his to make).

Strategy choice is observable only to an informed party, but it is unverifiable. This means that strategy selection cannot be made part of a contract, and that an uninformed principal will, out of necessity, delegate this choice to the manager (who, at the very least, is informed about the status quo, and can thus avoid very negative outcomes).\(^\text{19}\) If the principal is uninformed, ordering the manager to “maintain the status quo” is meaningless, since an uninformed principal cannot tell whether the status quo stands just by looking at what the manager is doing. Given that something has to be done, picking at random when uninformed might result in a disastrous alternative being implemented. The principal might then rubberstamp a suboptimal strategy choice when uninformed by fear of picking a worse alternative.

The only way for the principal to be able to effectively direct the manager’s actions is

\(^\text{17}\)That is, the status quo is not the outcome of inaction. Newman and Novoselov (2005) adopt a similar approach. This is contrary to Aghion and Tirole’s (1997) assumption that the organization can always decide to do nothing and realize a zero-payoff for both parties.

\(^\text{18}\)As expressed by Diamond (1998), “managers are called on to make choices as well as to make efforts”.

by being herself informed of strategies. That is, authority has to be enforced.\textsuperscript{20} In the event that both parties are informed, the principal prevails—for instance, because she has the formal authority to do so.\textsuperscript{21} What I have in mind is that, although endowed with decision or control rights, the principal only has effective control or real authority when she has enough incentives to exercise those rights.\textsuperscript{22} Else, she can decide to grant autonomy in decision making to the manager. Think of the principal as being the dispersed stockholders: they can monitor and give instructions to the manager, but only if they organize themselves and collect relevant information, which is costly.\textsuperscript{23,24}

At date 3, profits are realized according to the probability distribution induced by the implemented strategy. I represent the outcome of market interaction by the following reduced-

\textsuperscript{20}Van den Brink and Gilles (2003) also assume that authority must be enforced at a cost, although they focus on the cost of monitoring the subordinates’ access to the firm’s assets.

\textsuperscript{21}As our main interest is in managerial autonomy (i.e., the extent of real authority enjoyed by managers), we do not analyze the possibility of giving the manager formal authority over decisions. The transfer of formal authority looks very much like splitting up the firm, which is not a main concern in this study. Furthermore, in our setup, it can be shown that full delegation of formal authority is actually dominated. Matter-of-factly, the principal normally keeps the right to overrule the manager, as she can always fire him (see Colombo and Delmastro, 2004).

\textsuperscript{22}Shleifer and Vishny (1997) also present this idea that there is a cost of exercising a control right. In Hart and Moore (1999), owners have all decision rights (formal authority), but lack the time to exercise them all and hence must delegate some to managers (real authority). As they have put it, “a senior individual has formal authority while a junior individual has real authority if he has an idea and his boss does not”.

\textsuperscript{23}See Burkart, Gromb, and Panunzi (1997), and Shleifer and Vishny (1997) for related ideas.

\textsuperscript{24}One can also think of the assumptions regarding the exercise of authority as picturing an intermediate allocation of formal authority. Authority is delegated to the subordinate, but the superior can reestablish his authority at a cost—the cost of monitoring the subordinate. Aghion and Tirole (1997) discuss such an allocation, but authority is reestablished by an ex post performance evaluation in their paper.
form gross profit function\textsuperscript{25}

\[ \pi = \pi (\theta). \] (2)

Profits depend on an exogenous parameter \( \theta \in \Theta = [0, \theta] \) that measures the strength of competition (e.g., \( \theta \) could be the number of competitors in the product market, the degree of substitutability between products, a measure of barriers to entry, and so on), and is known to both parties at the outset. I make the natural assumption that competition destroys profits, that is,

\[ \theta > \theta' \implies \pi (\theta) < \pi (\theta') \quad \forall \pi \in \{\pi_H, \pi_M, \pi_L\}. \] (3)

I also assume that

\[ \pi_H (\theta) > \pi_M (\theta) > \pi_L (\theta) \quad \forall \theta. \]

Realized profits \( \pi (\theta) \) can be negative—assumption (3) implies that stronger competition makes this event more likely. To make this notion more precise, assume that there exists a \( \theta \) such that \( \pi_L (\theta) = 0 \). This implies that for every \( \theta \in \Theta \equiv [0, \theta] \), we have \( \pi_H > \pi_M > \pi_L \geq 0 \). Analogously, define \( \theta \) by \( \pi_M (\theta) = 0 \), and \( \theta \) by \( \pi_H (\theta) = 0 \). Then, for all \( \theta \in \Theta \equiv (\theta, \theta] \), we have \( \pi_H > \pi_M \geq 0 > \pi_L \), and for \( \theta \in \Theta \equiv [\theta, \theta) \), we know \( \pi_H \geq 0 > \pi_M > \pi_L \). It is clear that \( \theta < \theta < \Theta \), and that \( \Theta, \Theta, \Theta \) form a partition of \( \Theta \).

To sum up,

\[
\begin{array}{|c|c|c|}
\hline
\pi_H (\theta) & \pi_M (\theta) & \pi_L (\theta) \\
\hline
\theta \in \Theta & > 0 & > 0 & \geq 0 \\
\theta \in \Theta & > 0 & \geq 0 & < 0 \\
\theta \in \Theta & \geq 0 & < 0 & < 0 \\
\hline
\end{array}
\] (4)

In what follows, we will say that competition is weak whenever \( \theta \in \Theta \). Similarly, intermediate competition will make reference to cases where \( \theta \in \Theta \), and when \( \theta \in \Theta \) we will speak of intense competition.

\textsuperscript{25}I implicitly assume there is a unique equilibrium in the ensuing market game. See, for instance, Schmidt (1997) for a similar approach. Appendix B considers the case of a firm that runs a constant marginal cost technology, and must incur a sunk cost before entering the market. In this appendix, I explicitly model the market game, and consider the cases in which the manager’s actions determine the fixed cost and the marginal cost, in turn.
Preferences. The principal is risk-neutral and her utility is given by expected profits $E_k [\pi (\theta)]$. Expectations are taken over the probability distribution induced by the chosen strategy: status quo, aggressive, conservative (i.e., $k = sq, ag, co$). To ensure participation, we assume expected profits are always nonnegative, i.e., $E_k [\pi (\theta)] \geq 0$ for all $\theta \in \Theta$ and all $k$.

The manager, on the other hand, does not respond to monetary incentives (for instance, because he is infinitely averse to income risk) and thus receives a constant wage normalized to zero.\textsuperscript{26,27} He also receives private benefits $B$ from job tenure. These may take many forms, like perquisites on the job, prestige and power associated with the position, acquisition of human capital and work experience, job satisfaction, or career concerns. The existence and magnitude of these benefits have been extensively documented (see Zingales, 1995, and the references cited therein).

As already stated, realized profits can be negative. To capture the fact that poor performance has costs for managers,\textsuperscript{28} I assume that a situation of negative profits implies a utility loss $L$ for the manager.\textsuperscript{29} Poor performance might trigger the firing of the manager, the liquidation or shut down of his profit center, or, more generally, lead the organization

\textsuperscript{26}This extreme assumption is typical in models that study optimal delegation decisions (de Bijl, 1995; Aghion and Tirole, 1997; and Burkart et al., 1997) and allows me to stress the role of incumbency rents, as in Fudenberg and Tirole (1995). Equivalently, if profits are noncontractible and the agent is protected by limited liability, a constant wage also results, as in Mello and Ruckes (2006). Leonard (1990) shows that contingent pay is more common in high-level positions, whereas fixed wages are the norm for lower levels (see also Friebel and Raith, 2004).

\textsuperscript{27}All the qualitative results of this paper go through if the manager responds to monetary incentives, as long as he cares relatively more about his private benefits. The proof is available from the author upon request. This is a common feature in this kind of models: see also Aghion and Tirole (1997) and de Bijl (1995). Burkart et al. (1997) discuss how both monetary incentives and private benefits can coexist in an optimal arrangement, and show that the former normally does not render monitoring redundant.

\textsuperscript{28}See, for example, the evidence on managers’ personal costs from financial distress in Gilson (1989, 1990).

\textsuperscript{29}I assume that distress does not imply a utility loss for the principal. See, for instance, Schmidt (1997) for similar assumptions. Of course, $L$ is taken to be sufficiently low to satisfy the manager’s participation constraint.
to intervene in the operations in such a way that reduces the manager’s incumency rents\textsuperscript{30} (i.e., from $B$ to $B - L$). I will not model the particulars of this intervention—I just assume it can happen and has costs for managers.\textsuperscript{31} For simplicity, we will refer to such a situation, where $\pi < 0$, as ‘distress’.

The utility loss $L$ can be caused by career concerns considerations (e.g., the market interpreting poor performance as a signal of bad quality\textsuperscript{32}) or arise from (unmodeled) actions that the manager must take in case of distress and that he does not like (as downsizing). If distress triggers the removal of the manager, $L$ could represent “possible losses in income and firm-specific human capital, and in any power, prestige, and other non-pecuniary benefits [the manager] derived from managing” the firm (Gilson, 1989). Even if there is no turnover, the manager may suffer from reductions in his compensation or decision-making authority.\textsuperscript{33}

It is clear that poor performance jeopardizes the manager’s position—the direct consequence of my assumptions is that all the manager cares about is avoiding such a situation.\textsuperscript{34} The likelihood of distress will depend, of course, on the probability distribution of profits that results from the planning and implementation activities, but also on the strength of competition. Let us call this likelihood $d^k(\theta)$. We can easily compute it from table (4) above. To simplify notation, let $d^k(\theta) \equiv d^k$, $k = co, sq, ag$, denote the probability that realized profits are negative when competition is weak and the manager implements strategy $k$. All other probabilities in the table below are defined accordingly. Then:

<table>
<thead>
<tr>
<th>$\theta \in \Theta$</th>
<th>conservative</th>
<th>status quo</th>
<th>aggressive</th>
</tr>
</thead>
<tbody>
<tr>
<td>$d^{co}$ = 0</td>
<td>$d^{sq} = 0$</td>
<td>$d^{ag} = 0$</td>
<td></td>
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<tr>
<td>$\hat{d}^{co} = \frac{1}{3} - \beta$</td>
<td>$\hat{d}^{sq} = \frac{1}{3}$</td>
<td>$\hat{d}^{ag} = \frac{1}{3} + \beta$</td>
<td></td>
</tr>
<tr>
<td>$\hat{d}^{co} = \frac{2}{3} + \alpha$</td>
<td>$\hat{d}^{sq} = \frac{2}{3}$</td>
<td>$\hat{d}^{ag} = \frac{2}{3} - \alpha$</td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{30}Fudenberg and Tirole (1995).
\textsuperscript{31}In Appendix A, I present an extension in which this intervention takes the form of a firing decision that results from the firm’s optimizing behavior.
\textsuperscript{32}See, for instance, Hirshleifer and Thakor (1992).
\textsuperscript{33}He might even face losses in terms of reduced self-esteem. Even though extreme as an example, Gilson (1989) has a case of suicide among his sample of managers in financially-distressed firms.
\textsuperscript{34}Like the conservative managers in Hart (1983), Fudenberg and Tirole (1995), or Aghion et al. (1999).
For instance, if competition is intermediate and the organization implements the conservative strategy, the probability of entering a distress situation in this case ($b_{co}$) is equal to the probability of $\pi_L$, i.e., $\frac{1}{3} - \beta$. Quite naturally, stronger competition increases the likelihood of distress.\(^{35}\)

## 3 Optimal degree of autonomy granted to the manager

In this section, I look for the optimal organizational response to changes in the firm’s environment—that is, I analyze the optimal choices of planning and monitoring efforts as a function of the strength of competitive forces.

Condition (1) implies that the principal would always prefer to implement a conservative strategy, regardless of the level of competition. The manager’s preferred strategy, on the other hand, is the one that minimizes the likelihood of distress, and thus it changes with $\theta$. Simple inspection of table (5) shows that: the manager is indifferent between strategies when competition is weak,\(^{36}\) strictly prefers being conservative when competition is intermediate, and strictly prefers taking risk when competition is intense. This is the basic conflict of interests between principal and manager. It does not arise from different risk preferences (as in, e.g., Lambert, 1986), but from different goals—maximization of expected profits v. minimization of the likelihood of distress.\(^{37}\)

The case of weak competition ($\theta \in \Theta$) is straightforward to analyze: since the firm can

\(^{35}\)I have assumed that the probability of distress is zero when competition is weak. This is no more than a simplifying assumption—the essential feature is that the probability of distress is higher for a low-profit firm than for a high-profit one.

\(^{36}\)It is natural to assume that when he is indifferent, the manager chooses the principal’s preferred strategy, i.e., “conservative”, if he is informed. Anyway, the manager will never be informed in equilibrium when competition is weak (see below).

\(^{37}\)Notice that condition (1) implies that there is no trade-off between risk and return (more risk implies ever lower returns). As we have discussed, the choice of strategy is clear for the principal, as it is dictated by standard risk-return considerations. The manager, on the contrary, does not care about returns or even their riskiness—he just minds the probability of distress— and his choices follow different considerations.
never go into distress when competition is weak, the principal cannot expect the manager to exert any costly effort to find ways to do things better for the organization—the manager just puts in minimal effort (i.e., his optimal choice is $e = 0$). The principal has, nevertheless, an incentive to get herself involved in daily operations and exert some effort in order to be able to instruct the manager to implement the conservative strategy rather than the status quo. If she exerts effort $c$, her preferred strategy is implemented with probability $c$; otherwise, the manager just sticks to the routine.

Let $\pi^k (\theta) \equiv E_k [\pi (\theta)]$, $k = sq, ag, co$. The objective function of the principal in the case $\theta \in \Theta$ can be written as

$$u_p = c \cdot \pi^{co} (\theta) + (1 - c) \cdot \pi^{eq} (\theta) - \psi_p (m).$$

The principal chooses the monitoring effort $c$ that maximizes this expression. It satisfies the following first-order condition:

$$\Delta (\theta) = \psi'_p (c).$$

Since $\Delta (\theta) > 0$ by (1), $\psi'_p (0) = 0$ and $\psi''_p > 0$, we have $c > 0$. The principal just puts effort up to the point where the marginal benefit given by the increase in expected profits if informed, $\Delta$, equals the marginal cost of monitoring.

When competition is intermediate ($\theta \in \hat{\Theta}$), the manager’s position is no longer secure: there is a chance that things turn out bad (i.e., that profits are low), an event in which distress will occur and he will bear the utility loss $L$. Competition then provides a wedge between the manager’s utility in case of effort and no effort, and thus provides him with incentives to work harder and show more initiative, much as in a typical moral hazard problem. The manager maximizes

$$\hat{u}_m = c \left[ (1 - \hat{d}^{co}) \cdot B + \hat{d}^{co} \cdot (B - L) \right]$$

$$+ (1 - c) \cdot e \cdot \left[ (1 - \hat{d}^{co}) \cdot B + \hat{d}^{co} \cdot (B - L) \right]$$

$$+ (1 - c) \cdot (1 - e) \cdot \left[ (1 - \hat{d}^{eq}) \cdot B + \hat{d}^{eq} \cdot (B - L) \right] - \psi_m (e).$$

To understand this expression, notice that with probability $c$, the principal is informed and imposes her preferred conservative strategy, and distress occurs with probability $\hat{d}^{co}$.
With probability $1 - c$, the principal is uninformed and the manager is granted autonomy in strategy selection: if he is informed, the manager chooses his preferred strategy, which in this case coincides with the principal’s; if he remains uninformed, he sticks to the status quo. Rearranging, we arrive at

$$\hat{u}_m = B - \left\{ \left[ c + (1 - c) \cdot e \right] \cdot \hat{d}^o + (1 - c) \cdot (1 - e) \cdot \hat{d}^q \right\} \cdot L - \psi_m (e).$$

(6)

The objective function of the principal becomes

$$\hat{u}_p = c \cdot \pi^c (\theta) + (1 - c) \cdot e \cdot \pi^c (\theta) + (1 - c) \cdot (1 - e) \cdot \pi^q (\theta) - \psi_p (c),$$

or

$$\hat{u}_p = [c + (1 - c) \cdot e] \cdot \pi^c + (1 - c) \cdot (1 - e) \cdot \pi^q - \psi_p (c).$$

(7)

Let $\hat{e}$ and $\hat{c}$ denote the optimal choices of efforts. A Nash equilibrium\(^{38}\) is given by the solution to

$$\begin{align*}
(1 - \hat{e}) \cdot \Delta (\theta) &= \psi'_p (\hat{c}) \\
(1 - \hat{e}) \cdot \beta \cdot L &= \psi'_m (\hat{c}).
\end{align*}$$

(8) \hspace{1cm} (9)

We see immediately that $\hat{e} > \underline{e} = 0$. By increasing his planning effort, the manager is more likely to implement his preferred strategy when the principal is uninformed,\(^{39}\) thus reducing the probability of distress by $\beta$ and saving $\beta L$ in expectation. Since the principal’s reaction function (8) is downward sloping, we can infer that $\hat{e} < \underline{e}$. Effort only benefits the principal (she gains $\Delta (\theta)$ in expected profits) if the manager is uninformed (which happens with probability $1 - \hat{e}$), since if the manager is informed he nevertheless implements the principal’s preferred strategy.

When competition is intermediate, an informed manager chooses strategies in line with the principal’s interests. The goals of both parties are aligned, and hence the principal need

\(^{38}\)I assume that the stability condition is satisfied, i.e., if $\psi''_p \psi''_m \geq \Delta \beta L$.

\(^{39}\)Learning payoffs can only benefit the manager when the principal is uninformed—which happens with probability $(1 - \hat{e})$. 

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not monitor as much as in the previous situation, but can rely more on her manager—the latter’s autonomy (measured as $1 - c$) thus increases. Likewise, the manager knows that his principal will interfere less and hence is more willing to show initiative and go about new ways of doing things. Competition here leads to employee empowerment and makes the company more entrepreneurial and innovative.

The prediction that increased competition reduces the conflict of interest between principal and manager, because it induces the latter to make better decisions, is in line with a conjecture in Acemoglu et al. (2006) and consistent with the evidence presented in their paper. I will argue shortly that things may be different if competition increases even further.

When competition is intense ($\theta \in \Theta$), the manager’s objective function becomes

$$\pi_m = B - \left\{ c \cdot \bar{d}^c + (1 - c) \cdot e \cdot \bar{d}^a + (1 - c) \cdot (1 - e) \cdot \bar{d}^{sq} \right\} \cdot L - \psi'_m (e). \quad (10)$$

As before, an informed principal will instruct the manager to implement the conservative strategy. If, on the other hand, the manager is granted autonomy in decision making, he will choose the aggressive strategy if informed (since it is the one that minimizes the likelihood of distress in this case) or stick to the status quo if uninformed.

The principal chooses $c$ to maximize

$$\pi_p = c \cdot \pi^c (\theta) + (1 - c) \cdot e \cdot \pi^a (\theta) + (1 - c) \cdot (1 - e) \cdot \pi^{sq} (\theta) - \psi'_p (c). \quad (11)$$

Let $\tau$ and $\bar{\tau}$ denote the optimal choices of efforts. A Nash equilibrium is given by the solution to

$$ (1 + \tau) \cdot \Delta (\theta) = \psi'_p (\bar{\tau}) \quad (12)$$

$$ (1 - \tau) \cdot \alpha \cdot L = \psi'_m (\bar{\tau}). \quad (13)$$

We see immediately that both $\tau$ and $\bar{\tau}$ are strictly positive.

When times are bad (competition is tough, profits are low), the nature of the relationship between principal and manager itself changes: the principal’s reaction function (12)
becomes upward sloping. The principal wants to minimize the likelihood of her manager being informed when she herself is uninformed, to prevent him from implementing a bad strategy. She achieves this by increasing control and granting less autonomy—thus, $\bar{e} > e^c$. This incentive is all the more powerful the higher the manager’s own effort; hence the upward slope. The principal develops a tendency to “step in” during bad times, since she can no longer afford letting the manager take the wrong actions (from the organization’s perspective). In fact, she monitors even more than when competition was weak, since now she has to compensate for the manager’s effort—that is, $\bar{e} > e^c$.

For the manager, the basic trade-off remains the same, since the closer the principal monitors him, the more likely it is that he will be overruled, and the less it pays to him to exert costly effort (his reaction function is downward sloping). We see immediately that $\bar{e} > e^c$. Whether the manager exerts more or less effort than in the case of intermediate competition depends on the relative values of $\alpha$ and $\beta$. When the probabilities of the extreme states of nature are affected in roughly the same way (if $\alpha \approx \beta$), the manager reduces effort as competition becomes intense—we know that $\bar{e} \leq \hat{e}$ since $\bar{e} \geq \hat{e}$ and the manager’s reaction function is downward sloping. The same is true when the manager’s actions affect relatively more the likelihood of low profits (if $\alpha < \beta$). If $\alpha = \frac{1}{3} > \beta = 0$ (their extreme values), it is clear that $\bar{e} > \hat{e} = 0$. Hence, by continuity, there is an $\alpha'$ such that for all $\alpha$ satisfying $\alpha' > \alpha > \beta$, then $\bar{e} < \hat{e}$, and for all $\alpha$ such that $\alpha > \alpha' > \beta$, $\bar{e} > \hat{e}$. Hence, if the manager’s actions have a much larger impact on the probability of high profits, he exerts more effort when competition is intense than when it is intermediate, because implementing the aggressive strategy has a high payoff when $\alpha$ is relatively large.

The prediction that increased competition leads to less autonomy when competition is intense fits well with the empirical evidence reported in Nickell et al. (2001) that when firms are doing badly, centralization of the decision-making process is favored (cf. also Marin and Verdier, 2006). With the aid of a sample of medium-size British manufacturing plants, these authors investigate whether firms enduring bad times are more likely to move towards best practice (which includes decentralization). They relate 1991-1994 improvements in the
way things are done in these plants\textsuperscript{41} to 1988-91 performance (measured as real profit per employee), and find that prior worsening performance leads firms to move closer to the best practice frontier, with the notable exception that firms tend to become more centralized in these situations.

Although current best practice in management calls for decentralization of the decision making process,\textsuperscript{42} the evidence gathered by Nickell et al. (2001) indicates that prior worsening performance leads management to do exactly the opposite. The model we have outlined here suggests a possible explanation for this finding: when times are bad, managers concerned with their survival or reputation would tend to take excessive risks if left unchecked—hence, the principal intervenes more and grants them less autonomy.

Nickell et al. (2001) reason that “bad times mean a higher probability of bankruptcy and an increased threat to jobs. Almost inevitably, the response of both managers and employees will be to try and lower this threat by reducing the chances of the firm going bankrupt”. This line of reasoning assumes that managers initiate (and workers accept) operational changes that raise the level of effort and lead eventually to improved productivity. Focusing on managers’ effort does not account for the behavior observed in their sample.

My framework underlines the importance of looking not just at the effort exerted by the manager, but also at his choices. The usual reasoning that an increased threat of distress brought about by more intense competition will make the manager choose more in line with the principal’s interests also has its limits, however, as our theoretical results and the empirical evidence in Nickell et al. (2001) point out. When competition is very strong, other forces are at work that point in the direction of reduced congruence and, hence, reduced autonomy.

The result that autonomy decreases at high levels of competition is also consistent with the case study reported in Dill (1958). This paper presents a comparative study of environ-

\textsuperscript{41}These improvements are: (1) changes in organizational structure towards a leaner organization; (2) increases in decentralization; (3) the adoption of new human resource management practices; (4) changes in industrial relations; (5) the introduction of new JIT practices.

\textsuperscript{42}See, for example, Drucker (2007), Powell (1995), Spencer (1994), and Youndt et al. (1996).
mental influences on two Norwegian firms’ top-management groups. After recording sharp differences in the degree of autonomy of first-rank managers with respect to their common superior, the owner-manager, in both firms, the author contrasts the environments in which the two groups operated, and notes that, in the two firms under analysis, “autonomy seemed to decrease whenever environmental inputs [i.e., \( \theta \)], were perceived as signs of impending conflict”. A more important finding (to our purpose) is that, even though both firms were facing increased competition in their product markets, the firm with the lowest degree of autonomy granted to top management was the worst performer and belonged to the industry that was closest to “a period of zero profits, empty prospects for new business, and intense competition”.43

A nice illustration of this last prediction is given by the example of Tandem Computers, Inc.44 Tandem’s monopoly of fault-tolerant computers was questioned by rivals in the 1980s. At the same time, the U.S. economy was in recession, and Tandem begun experiencing shrinking sales. In 1982, “overly aggressive sales practices”? were discovered by management—practices that led to a sales figures revision, and to charges of fraud after an investigation by the Securities and Exchange Commission. This kind of practices was countered through centralization of decision making in top management in order to improve control.46 As we have stressed, bad times tilt the balance towards tighter control from the principal. In the case of Tandem, James Treybig, the president at the time, began issuing

43 In Dill’s (1958) paper, however, there is no causal mechanism relating increased competition and bad performance to autonomy. Here I have suggested one—Marin and Verdier (2007) propose yet another (see the Introduction).

44 Other examples are Procter&Gamble, Gibson Greetings, Piper Jaffray, Mettallgesellschaft, and Orange County California, all companies that have centralized risk management activities in response to multimillion losses on risky derivatives. These stories and others appear in Merchant (1998). All the details of the Tandem case below come from http://www.answers.com/topic/tandem-1?cat=biz-fin, where the original sources can be found.

45 For example, some shipments had been recorded that were not actually completed until after midnight of the last day of the year.

orders, created an audit team, added a layer of management to centralize the control of man-
ufacturing and marketing, and implemented other actions that can be collectively interpreted
as a more conservative strategy—like cutting back on overhead and research spending, and
moving the company into new lines of business, trying to broaden the firm’s base.

To sum up, let us recall the optimal choice of monitoring effort (and hence, the optimal
level of autonomy granted to the manager) as a function of the strength of competition:

\[
c(\theta) = \begin{cases} 
  c & \text{if } \theta \in \Theta \\
  \hat{c} & \text{if } \theta \in \hat{\Theta} \\
  \bar{c} & \text{if } \theta \in \bar{\Theta} 
\end{cases}
\]  

(14)

We have seen that

\[
\bar{c} \geq c \geq \hat{c}.
\]  

(15)

The following proposition records the main finding of this paper:

**Proposition 1** Higher degrees of managerial autonomy in decision making are more likely
for intermediate levels of competitive pressures.

Notice that the reasons that induce the principal to grant little autonomy to her manager
are very different depending on whether competition is weak or intense. In the first case,
there is no loss of manager’s initiative from retaining control, as the manager cannot be
induced to exert any effort in any case. Hence, the degree of control chosen by the principal
hinges only on the profit gains to be had from choosing a better way of doing things. In
a situation of intense competition, granting autonomy to the manager is costly because his
interests become so antinomic in this case. Trusting the manager with limited autonomy
reduces his initiative, but when competition is intense, the cost of the control loss takes the
ascendancy over that of reduced planning effort. With an intermediate level of competition,
the threat of a potential distress is just enough to align the manager’s interests with those
of the organization without pushing him to take value-reducing risks.

Simple comparative statics show that autonomy \((1 - c)\) is decreasing in \(\Delta\), i.e., the
principal centralizes decision making more when the stakes are higher. Autonomy does
not depend on $L$ when competition is weak, but is positively (resp. negatively) related to the manager’s utility loss when competition is intermediate (resp. intense). The reason is simple: a larger $L$ gives an increased incentive to the manager’s planning effort—when his interests are aligned with those of the organization, the principal grants more autonomy; when interests are in conflict, more control is the optimal organizational response.

Similarly, larger $\alpha$ or $\beta$ may imply larger expected private benefits for the manager. When competition is intense, a larger $\alpha$ has two opposite effects: on the one hand, it decreases the principal’s expected profit gain $\Delta$, and hence her monitoring effort; on the other hand, an increase in $\alpha$ implies larger expected private benefits for the manager, and thus increased planning effort on his side—this, in turn, provides incentives for lower autonomy given the upward slope of the principal’s reaction function. With $\beta$, the second effect is no longer present, and the first effect reverses sign: an increase in $\beta$ increases the principal’s stake. Therefore, a larger $\beta$ points unambiguously in the direction of reduced autonomy for the manager.

When competition is intermediate, a larger $\beta$ increases both the principal’s and the manager’s expected gains, and the effect of an increase in $\beta$ on autonomy cannot be signed a priori. The manager’s expected utility loss is not affected by $\alpha$ when competition is intermediate, but the principal’s expected profits depend negatively on this parameter. An increased $\alpha$ then leads to an unambiguous increase in the degree of autonomy granted to the manager in this case.

Finally, the degree of autonomy granted to the manager depends also on the level of competition within each interval of $\Theta$. Notice that, in all cases, $\text{sign} \left( \frac{\partial c}{\partial \theta} \right) = \text{sign} \left( \frac{\partial \Delta}{\partial \theta} \right)$, and that this sign is ambiguous. In Appendix B, I provide two examples where an unambiguous prediction obtains.

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47 Check condition (1).
4 Concluding remarks

In this paper, I have built a model where changes in product-market competition affect the degree of decision-making autonomy granted to managers within the firm. In the study of this relationship, the literature has provided us with conflicting predictions, and the empirical evidence seems to give support both to those who argue that autonomy should increase with competition, and those who argue to the contrary (see the references in the Introduction and in Section 3).

The model developed here can generate both predictions within the same framework and show under which conditions a positive or a negative relationship between competition and autonomy is more likely to arise. The channel I have proposed is that competition might affect the congruence of interests between the manager and the organization through a reduction in profits and the associated threat to the manager’s incumbency rents.

A basic insight of the delegation literature is that delegation increases with congruence among the parties’ objectives—i.e., more congruence leads to more autonomy for the manager. By making congruence endogenous, I have been able to show that the relationship between the strength of competitive forces and congruence need not be monotonic, even though there is a monotonic relationship between congruence and delegation. At low levels of competition, an increase in competitive forces may increase congruence and thus lead to more autonomy—because the manager faces costs from poor performance, which becomes more likely, he might take decisions more in line with the interests of the firm. At higher levels of competition, a further increase in competition may decrease congruence (and hence autonomy) if the manager is led to gamble to avoid bad performance and the concomitant loss of private benefits—when the likelihood of distress is high, the manager has little else to lose by choosing such a behavior. Therefore, I have concluded that higher degrees of manager autonomy in decision making were more likely for intermediate levels of competition.

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48 See, for instance, Aghion and Tirole (1997).
49 As Merchant (1998) noticed, in this case “controls are necessary to guard against the possibilities that people will do something the organization does not want them to do or fail to do something they should”.

23
An argument that comes up repeatedly in the literature (e.g., Acemoglu et al., 2006) is that competition, by posing a more severe threat to the firm’s survival, would lead to more congruent decision making, and hence to more delegation. This paper challenges this view by showing that the threat posed by competition can lead to reduced congruence of interests. I have chosen particularly extreme assumptions for the parties preferences in order to stress the role of incumbency rents. The manager cannot be motivated (i.e., does not care about profits per se), and just cares about private benefits; the principal, on the other hand, is a risk-neutral residual claimant and does not enjoy any private benefit. Naturally, the manager could care somewhat about profits if he responded to monetary incentives, and the principal could care about distress somewhat if he incurred a utility loss in this case (or if there were, say, bankruptcy costs)—the only thing that truly matters is that the manager cares relatively more than the principal about the occurrence of distress. In other words, the key is that the threat to incumbency rents posed by increased competition has different impacts on different hierarchical levels.

50 Schmidt (1997) and Aghion et al. (1999) work on the idea that increased competition increases the likelihood of liquidation, and that this might induce the agent to work harder. When the agent’s actions improve cash flows in the sense of first-order stochastic dominance (FOSD), these authors show that this effort is normally valuable for the principal. As we have discussed here, the argument does not necessarily carry over to the case of actions whose effect on cash flows cannot be ranked according to FOSD.

51 As in Fudenberg and Tirole (1995).

52 Nickell et al. (1997) state: “For the manager, bankruptcy is a serious threat because of the loss of her job and its associated (quasi-) rents as well as the threat to her reputation. In the presence of limited liability, bankruptcy per se poses a much lesser threat to the owners of the company”.

53 For instance, if performance pay is more prominent in higher levels (cf. footnote 26), in the sense that it constitutes a larger fraction of total compensation, then the threat to rents should matter more at lower levels. The following quote from Merchant (1989, p.30) illustrates the point: “The manager’s loss of credibility and the concomitant intervention following a missed budget target tend to be more important that the reduction in bonuses” (quoted in Fudenberg and Tirole, 1995).

54 A justification in the example of a multidivisional firm might be that a manager whose division is shut down loses everything, whereas the CEO still has many other divisions under his supervision. It would be interesting to explicitly incorporate more divisions, and, for example, think of comparative statics on the number of divisions or the correlation of divisions’ profits.
One intended contribution of the paper has been to propose a theoretical mechanism through which changes in product-market competition affect the degree of autonomy granted to managers within the firm. The practical relevance of this mechanism, on the other hand, should be the subject of empirical investigations. First there is the question of whether competition and delegation are related in the way predicted by the theory. Only then comes the more difficult matter of distinguishing between different observationally-equivalent explanations (e.g., ours and Marin and Verdier’s, 2007). As discussed in the Introduction, the empirical evidence on the relationship between competition and delegation is scarce. Much more attention appears to have been paid to the impact of product market competition on productivity performance. A rigorous empirical study of the former is warranted, and I hope to undertake it in the near future.

My results seem to suggest that one needs to control for financial position and performance in regressions of delegation on competition. Marin and Verdier (2006) find that firms in more profitable markets (as measured by firms’ cash flows) are more likely to delegate authority when faced with tougher competition. In his case study of two Norwegian firms, Dill (1958) documents that the more centralized one was the firm facing more competition and performing poorly.

There is still work to be done concerning the specification of the market game. Raith (2003) underscores the importance of treating market structure as endogenous and analyzing firms’ incentive provisions within an explicit model of market interaction. Extension of this concern to the present case of firms’ delegation decisions warrants future research.

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55 It is straightforward to extend the present analysis to anything that destroys profitability or jeopardizes the subordinate’s position.

56 See, for example, Nickell (1996). Check Ahn (2002) for a recent survey of this literature.

57 Cf. also Nickell et al. (2001) and Khandwalla (1973). Similarly, there should be enough variability in the competition measure—for if, e.g., there are no observations where competition leads to such a deterioration in profits that gambling becomes a concern, only a positive relationship may appear.

58 See de Bijl (1995) and Marin and Verdier (2006, 2007) for promising starts along these lines.
Appendix A

Assume there are two players, the principal and the manager, and two periods. The manager does not respond to monetary incentives, and the principal cannot make any commitments concerning the manager’s tenure—i.e., once period 1 is over, she will keep the incumbent manager if and only if this raises expected profits.\footnote{This extension is inspired by Fudenberg and Tirole (1995).}

In period 1, everything is as in the main text. The manager chooses his planning effort, and the principal decides how closely to monitor him. Given the outcome of these efforts, a strategy is implemented that yields profits $\pi_1$ at the end of period 1. These profits can take three values:

$$\pi_1 = \begin{cases} 
\pi_H \\
\pi_M \\
\pi_L 
\end{cases}$$

where $\pi_H > \pi_M > \pi_L$. The probabilities of each value are given by the strategy that is implemented by the organization.

Let $R_2$ denote the expected second-period profit if the firm keeps the incumbent manager at the end of period 1. $R_2$ is taken to be an increasing function of $\pi_1$. The implicit assumption here is that there is no strategy selection in period 2. Once implemented, a given strategy remains in place for the two periods. Assume also that $\pi_2 = 0$ is the firm’s certain profit in period 2 if it shuts down and fires the manager.

Define $\pi_1^*$ by $R_2(\pi_1^*) = 0$. Given that the firm can observe $\pi_1$ once it is realized, the manager is fired if and only if $\pi_1 < \pi_1^*$. With a slight abuse of notation, let $\hat{\theta}$ be defined by $\pi_L(\hat{\theta}) = \pi_1^*$, $\hat{\theta}$ by $\pi_M(\hat{\theta}) = \pi_1^*$, and $\bar{\theta}$ by $\pi_H(\bar{\theta}) = \pi_1^*$. It is clear that $\underline{\theta} < \hat{\theta} < \bar{\theta}$. We have

$$\theta \in \Theta \equiv [0, \underline{\theta}] : \pi_1^* \leq \pi_L < \pi_M < \pi_H$$

$$\theta \in \hat{\Theta} \equiv \left( \underline{\theta}, \hat{\theta} \right] : \pi_L < \pi_1^* \leq \pi_M < \pi_H$$

$$\theta \in \bar{\Theta} \equiv \left( \hat{\theta}, \bar{\theta} \right] : \pi_L < \pi_M < \pi_1^* \leq \pi_H$$

and $d^k(\theta)$ is exactly as in the main text. The analysis then carries on along the same lines.
Appendix B

In this appendix, I elaborate a bit more on the sources of uncertainty on profits, and explicitly model market games that yield reduced-form profit functions consistent with (2) and (3). Results are, of course, consistent with Proposition 1. Although I have given it the interpretation of ‘competition’, \( \theta \) is, strictly speaking, a parameter that could represent anything that has a negative effect on profitability in the basic model. By making the market game explicit, we will be able to ascribe a more precise meaning to \( \theta \).

For the purposes of this appendix, assume that the firm runs a constant marginal cost technology, and must incur a sunk cost before entering the market. Additionally, the manager’s actions determine a cost parameter \( C \in \{C_L, C_M, C_H\} \), with \( C_L < C_M < C_H \), that is independent of the level of competition \( \theta \). The strategy that is implemented determines the probabilities of each cost level as in section 2—for example, if the firm implemented the conservative strategy, we would have

\[
\text{Pr}(C = C_L) = \frac{1}{3} - \alpha, \quad \text{Pr}(C = C_M) = \frac{1}{3} + \alpha + \beta, \quad \text{and} \quad \text{Pr}(C = C_H) = \frac{1}{3} - \beta.
\]

Uncertainty on fixed cost

We begin by considering the case in which the manager’s actions determine a fixed cost that the firm has to incur prior to participating in the market. This implies that the firm’s profit function is additively separable in \( C \) and \( \theta \), and can now be expressed as

\[
\pi(C, \theta) = R(\theta) - C,
\]

where \( R \) denotes the profits from participating in the product market, \( C \) is the (realized) fixed cost, and \( \theta \in \Theta = [0, \bar{\theta}] \) is a parameter measuring the degree of competition in the
product market.\textsuperscript{60} I assume again that competition destroys profits, that is, $\partial R/\partial \theta < 0$. Notice that there are many market games that yield a reduced-form profit function like $R(\theta)$; consider the following examples, that also allow attaching a more precise meaning to the idea of “more competition”. Once the cost parameter is realized at date 3, the principal takes all pricing and quantity decisions at date 4. In all the examples, firm 1 is like the one analyzed in the main text.

\textbf{Example 1 (Hermalin, 1992)} Assume that firms compete à la Cournot in a duopoly with linear demand:


Firm 1 has known marginal costs $\kappa$. Firm 2 is manager-owned and its known marginal cost is $\frac{1}{\theta}$; hence, a higher $\theta$ implies a more competitive rival—one that has lower marginal costs. The profit of firm 1 is

$$\pi(C, \theta) = R(\theta) - C = \frac{(A - 2\kappa + 1/\theta)^2}{9} - C.$$  

It is easily verified that $\partial R/\partial \theta < 0$, as claimed.

\textbf{Example 2} Consider the following Dixit-Stiglitz-Spence model of monopolistic competition with a large number of firms. Firms in the market produce each a differentiated good with a marginal cost $\kappa$. The demand function facing firm 1 is approximately (Tirole, 1988)

$$q_1 = A \cdot p_1^{-1/(1-\theta)}$$  

where $\theta \in [0, 1]$ measures the degree of substitutability between the products. If $\theta$ is close to one, the goods are nearly perfect substitutes, which implies that the market is highly competitive. If it is close to zero, products are regarded as very different, and hence each firm enjoys a high monopoly power. Profits of firm 1 are given by

$$\pi(C, \theta) = R(\theta) - C = (1 - \theta) \cdot \theta^{\theta/(1-\theta)} \cdot A \cdot \kappa^{-\theta/(1-\theta)} - C.$$  

\textsuperscript{60}Notice that $R$ is independent of actions, and $C$ is independent of competition. $R$ could also denote revenues, as in Stennek (2000), and $C$ the total cost of a fixed-size project.
One can check that for $\kappa \geq 1$, $R(\theta)$ satisfies $\partial R/\partial \theta < 0$.

**Example 3 (Schmidt, 1997)** Assume market structure is one of Cournot oligopoly with an exogenous number of $\theta$ competitors. Higher $\theta$ implies more competition in the sense of an increased number of rivals. Demand is once again linear:


All firms have the same constant marginal cost technology, with cost parameter $\kappa$. The profits of firm 1 are

$$\pi(C, \theta) = R(\theta) - C = \left(\frac{A - \kappa}{1 + \theta}\right)^2 - C.$$ 

It is straightforward to verify that $\partial R/\partial \theta < 0$.

Strategies are now to be broadly interpreted as sets of actions that, if implemented, lead to a certain probability distribution of costs. Under each of the alternatives, expected costs are given by

$$E_{sq}[C] = \frac{1}{3}C_L + \frac{1}{3}C_M + \frac{1}{3}C_H,$$

$$E_{co}[C] = \left(\frac{1}{3} - \alpha\right)C_L + \left(\frac{1}{3} + \alpha + \beta\right)C_M + \left(\frac{1}{3} - \beta\right)C_H,$$

$$E_{ag}[C] = \left(\frac{1}{3} + \alpha\right)C_L + \left(\frac{1}{3} - \alpha - \beta\right)C_M + \left(\frac{1}{3} + \beta\right)C_H.$$

The strategy that maximizes expected profits minimizes expected costs. Let $\pi_H \equiv \pi(C_L, \theta)$, $\pi_M \equiv \pi(C_M, \theta)$, and $\pi_L \equiv \pi(C_H, \theta)$. Plugging (16) into (1), $\Delta(\theta)$ turns out to be independent of the competition parameter:

$$\Delta(\theta) = (\alpha + \beta)\pi_M - (\alpha\pi_H + \beta\pi_L)$$

$$= (\alpha + \beta) (R(\theta) - C_M) - (\alpha (R(\theta) - C_L) + \beta (R(\theta) - C_H))$$

$$= \alpha C_L + \beta C_H - (\alpha + \beta) C_M$$

$$= \delta.$$
Given (1), $\delta$ is strictly positive—the ranking of strategies in terms of second-order stochastic dominance is unchanged. Expected costs are lowest under the conservative strategy, and this is then the principal’s preferred course of action.

The assumption that competition destroys profits implies that stronger competition makes distress more likely for a given fixed cost $C$. Notice that our previous partition of $\Theta$ is still valid:

$$\pi_L (\theta) = 0 \iff R (\theta) = C_H$$
$$\pi_M (\theta) = 0 \iff R (\theta) = C_M$$
$$\pi_H (\theta) = 0 \iff R (\theta) = C_L$$

Now we have that for every $\theta \in \Theta$, $\pi (C_L, \theta) > \pi (C_M, \theta) > \pi (C_H, \theta) \geq 0$; for all $\theta \in \hat{\Theta}$, $\pi (C_L, \theta) > \pi (C_M, \theta) \geq 0 > \pi (C_H, \theta)$; and for every $\theta \in \overline{\Theta}$, $\pi (C_L, \theta) \geq 0 > \pi (C_M, \theta) > \pi (C_H, \theta)$. As in the main text, we will say that competition is weak whenever $\theta \in \Theta$; intermediate, when $\theta \in \hat{\Theta}$; and intense, when $\theta \in \overline{\Theta}$. I compute the likelihood of distress for every level of competition as before:

<table>
<thead>
<tr>
<th>conservative</th>
<th>status quo</th>
<th>aggressive</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\theta \in \Theta$</td>
<td>$d^{co} = 0$</td>
<td>$d^{sq} = 0$</td>
</tr>
<tr>
<td>$\theta \in \hat{\Theta}$</td>
<td>$\hat{d}^{co} = \frac{1}{3} - \beta$</td>
<td>$\hat{d}^{sq} = \frac{1}{3}$</td>
</tr>
<tr>
<td>$\theta \in \overline{\Theta}$</td>
<td>$\overline{d}^{co} = \frac{3}{3} + \alpha$</td>
<td>$\overline{d}^{sq} = \frac{3}{3}$</td>
</tr>
</tbody>
</table>

Recall that $d^{sq}$ denotes the probability that realized profits are negative when competition is weak and the status quo prevails, and that all other probabilities in the table are defined accordingly. The strategy that minimizes the likelihood of distress is the same as in the more general case of Section 3, and the manager will choose in the same manner if granted autonomy.

To obtain explicit solutions for the planning and monitoring efforts, assume that $\psi_j (x) = \frac{x^2}{2}$ and that parameter values are such that we have interior solutions.\(^{61}\) Given the assumptions, all the expressions for $u_p$ and $u_m$, and the first-order conditions, that I have derived in the general case continue to be valid when I replace $\pi^k (\theta)$ with $E_k [\pi (C, \theta)] = R (\theta) - E_k [C]$, \(^{61}\)Essentially, $\delta < 1$, $\alpha L < 1$, and $\beta L < 1$. 30
\( k = sq, co, ag, \) and \( \Delta(\theta) \) with \( \delta \). We thus obtain the following:\(^62\)

\[
\theta \in \Theta \left\{ \begin{array}{l}
\theta^F = \delta \\
\theta^F = 0
\end{array} \right.
\]

\[
\theta \in \hat{\Theta} \left\{ \begin{array}{l}
\hat{\theta}^F = \frac{(1-\beta L)}{1-\delta \beta L} \delta \\
\hat{\theta}^F = \frac{(1-\beta L)}{1-\delta \beta L}
\end{array} \right.
\]

\[
\theta \in \bar{\Theta} \left\{ \begin{array}{l}
\bar{\theta}^F = \frac{(1+\alpha L)}{1+\delta \alpha L} \delta \\
\bar{\theta}^F = \frac{(1-\delta \alpha L)}{1-\delta \alpha L}
\end{array} \right.
\]

Simple computations show that

\[
\bar{\theta}^F > \hat{\theta}^F > \theta^F,
\]

and

\[
\bar{\theta} > \hat{\theta} > \theta \iff \alpha > \beta
\]

\[
\hat{\theta} > \bar{\theta} > \theta \iff \alpha < \beta,
\]

just as in section 3. Notice that, within intervals, efforts do not depend on competition (see, however, the following subsection).

**Uncertainty on marginal costs**

Assume, as in the preceding subsection, that the firm runs a constant marginal cost technology, and must incur a sunk cost \( f \) before entering the market, but now \( f \) is certain and the implemented strategy results in a probability distribution on marginal cost \( C \). Once the marginal cost \( C \) is realized and observed by all (including the competitors), the principal takes all product-market decisions. For the sake of concreteness, let us use the simple setup of Example 2 (a Cournot duopoly with linear demand).\(^63\) The rival’s marginal cost is \( \frac{1}{\theta} \) (remember that it is manager-owned or entrepreneurial\(^64\)). Profits of the firm are given by

\[
\pi(C, \theta) = \frac{(A - 2C + 1/\theta)^2}{9} - f.
\]

\(^62\) The superscript \( F \) indicates that we are in the case in which the manager’s actions affect the fixed cost.

\(^63\) Notice that \( \pi(C, \theta) \) could come from a different market game as long as firms are allowed to have different marginal costs.

\(^64\) In the sense of Hart (1983).
Notice that this profit function is no longer separable in \( C \) and \( \theta \). Expected profits are

\[
E[\pi(C, \theta)] = \Pr(C = C_L) \cdot \pi(C_L, \theta) + \Pr(C = C_M) \cdot \pi(C_M, \theta) + \Pr(C = C_H) \cdot \pi(C_H, \theta).
\]

To simplify notation, let \( \pi_H(\theta) \equiv \pi(C_L, \theta) \), \( \pi_M(\theta) \equiv \pi(C_M, \theta) \), and \( \pi_L(\theta) \equiv \pi(C_H, \theta) \). It is clear that \( \pi_H(\theta) > \pi_M(\theta) > \pi_L(\theta) \), for all \( \theta \), as assumed. Let also \( \pi^k(\theta) \equiv E_k[\pi(C, \theta)] \), \( k = sq, ag, co \). Expected profits under each of the alternative strategies are

\[
\begin{align*}
\pi^{sq}(\theta) &= \frac{1}{3}\pi_H(\theta) + \frac{1}{3}\pi_M(\theta) + \frac{1}{3}\pi_L(\theta), \\
\pi^{co}(\theta) &= \left(\frac{1}{3} - \alpha\right)\pi_H(\theta) + \left(\frac{1}{3} + \alpha + \beta\right)\pi_M(\theta) + \left(\frac{1}{3} - \beta\right)\pi_L(\theta), \\
\pi^{ag}(\theta) &= \left(\frac{1}{3} + \alpha\right)\pi_H(\theta) + \left(\frac{1}{3} - \alpha - \beta\right)\pi_M(\theta) + \left(\frac{1}{3} + \beta\right)\pi_L(\theta).
\end{align*}
\]

\( \Delta(\theta) \) is defined as before,\(^{65}\) and I continue to assume it is positive—therefore, the principal’s preferred strategy is ‘conservative’. We can partition the support of \( \theta \) in the same way as we did in Section 2 to find that the manager’s preferred strategy is the same as before for every level of competition.

Using \( \psi_j(x) = \frac{x^2}{2} \) and assuming once again interior solutions, we can plug (17), (18), and (19) into the first-order conditions derived in Section 3 to compute the optimal levels of planning and monitoring efforts (and hence, of autonomy granted to the manager) for each level of competition. These are given by\(^{66}\)

\[
\theta \in \Theta \left\{ \begin{array}{c}
\underline{c}^{M} = \Delta(\theta) = \frac{4}{9} \left[ (\alpha + \beta) C_M^2 - (\alpha C_L^2 + \beta C_H^2) + (A + 1/\delta) \right] \\
\overline{c}^{M} = 0
\end{array} \right\}
\]

\[
\begin{align*}
\theta &\in \hat{\Theta} \left\{ \begin{array}{c}
\underline{c}^{M} = \frac{(1-\beta L)}{1-\beta L \Delta(\theta)} \Delta(\theta) \\
\overline{c}^{M} = \frac{(1-\Delta(\theta))\beta L}{1-\beta L \Delta(\theta)}
\end{array} \right\}
\end{align*}
\]

\[
\begin{align*}
\theta &\in \overline{\Theta} \left\{ \begin{array}{c}
\underline{c}^{M} = \frac{(1+\alpha L)}{1+\alpha L \Delta(\theta)} \Delta(\theta) \\
\overline{c}^{M} = \frac{(1-\Delta(\theta))\alpha L}{1-\alpha L \Delta(\theta)}
\end{array} \right\}
\end{align*}
\]

\(^{65}\)Notice that \( \Delta(\theta) \) is no longer equal to \( \delta \equiv \alpha C_L + \beta C_H - (\alpha + \beta) C_M \).

\(^{66}\)The superscript \( M \) indicates that we are in the case in which the manager’s actions affect the marginal cost.
Contrary to the case in which the strategy chosen determined the fixed cost, in the present situation the degree of autonomy granted to the manager depends on the level of competition within each interval of $\Theta$. Indeed, using the implicit function theorem on the system of first-order conditions we find that

\[
\frac{\partial c}{\partial \Theta} = \frac{\partial \Delta/\partial \Theta}{\psi_p}
\]

\[
\frac{\partial c}{\partial \Theta} = \frac{\psi_m'(1-p)}{\psi_p \psi_m - \beta \Delta} \frac{\partial \Delta}{\partial \Theta}
\]

\[
\frac{\partial c}{\partial \Theta} = \frac{\psi_m'(1+p)}{\psi_p \psi_m + \alpha \Delta} \frac{\partial \Delta}{\partial \Theta}
\]

Notice that, in all cases, $\text{sign} \left( \frac{\partial c}{\partial \Theta} \right) = \text{sign} \left( \frac{\partial \Delta}{\partial \Theta} \right).$ Computing the right-hand side derivative, $\frac{\partial \Delta}{\partial \Theta} = -\frac{4}{g} \frac{\delta}{\sigma^2} < 0$. Therefore, autonomy (as measured by $1 - c$) increases with competition within intervals.

**References**


Hierarchical Organizations”, *Tinbergen Institute Discussion Paper* TI 2003-102/1, Tinbergen Institute, December.
