

Competition and Organizational Change*

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First draft: March 2011 (preliminary)

This draft: August 2011 (still preliminary)

Abstract

We develop a model in which competitive pressure is a catalyst for organizational change. In our model, commitment to a narrow business strategy is valuable because workers need to coordinate their efforts to build a strategy-specific capability. We show that a monopolist may not be able to commit to a focused business strategy. However, introducing competition can make commitment credible, thus leading to organizational change and greater operating efficiency. Our model sheds light on a number of questions in the intersection between the strategic management literature and the organizational economics literature, including the importance of leadership styles, the existence of X-inefficiencies, and the interactions between strategic positioning and organizational capabilities.

Keywords: Business Strategy, Competition, Capabilities, Organizational Change.

*We would like to thank Ramon Casadesus-Masanell, Joshua Gans, Francisco Ruiz-Aliseda, Harborne (Gus) Stuart and participants of the 2011 CRES Foundations of Business Strategy Conference at Washington University for helpful comments and suggestions.

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1. Introduction

Economic theories of business strategy often emphasize the importance of commitment. Commitment is important not only because of its competitive and entry-deterrence effects (e.g. Ghemawat, 1991), but also because it affects a firm's organizational belief (i.e. the prevailing belief among employees about its future business) and internal incentive structures (e.g. Rotemberg and Saloner, 1994). By committing to a specific strategy, a firm may be able to coordinate the efforts of their employees and thus operate more efficiently. Employees have incentives to coordinate and undertake strategy-specific investments only if they can be sufficiently optimistic about these investments to be aligned with (future) business strategy and focus (i.e. if the organizational belief is aligned with future strategy). Such an optimistic belief about strategic alignment can be achieved if either commitment to the future strategy is credible or top-management is sufficiently flexible and employees form optimistic beliefs by inferring future focus from the firm's competitive situation. Natural questions are then: What makes business strategies credible? How do changes in a firm's competitive situation impact on its ability to commit, its organizational belief and its ability to build specific capabilities and ultimately on optimal business strategy?

There is a small but growing literature in economics that is concerned with the first question. A common element in this literature is the focus on personal characteristics of leaders as a means to give credibility to proposed business strategies. Managers who are biased towards certain strategies, perhaps because of their preferences, vision, overconfidence, or opinions, are often seen as necessary for conferring credibility to strategies (Rotemberg and Saloner, 2000; Van den Steen, 2005; Blanes-i-Vidal and Möller, 2007; Bolton, Brunnermeier, and Veldkamp, 2008; Hart and Holmström, 2010). Alternatively, career concerns may also explain why leaders can commit to a strategy even when it is ex post desirable to change it (Ferreira and Rezende, 2007). Those papers consider the firm in a quasi-monopolistic situation; they do not model the competitive environment in which the firm operates and implements its strategy. Quite naturally then, they do not consider the impact of competition

on the credibility of business strategies and the formation of organizational beliefs.

This paper is concerned with the interactions between competition, organizational belief, organizational structure and corporate focus. We develop a model in which competitive pressure can trigger organizational change. In a nutshell, our model shows that an increase in competitive pressure can either provide credibility to a firm's proposed strategy or render it obsolete. In the former case, once commitment to a specific strategy is achieved, employees coordinate their efforts and implement changes to the organizational structure. These changes improve the firm's profitability by reducing costs and also by improving the firm's ability to compete. In the latter case, a firm's business strategy cannot be sustained, thus is anticipated by its employees and ultimately organizational change will prepare the ground for a change in business strategy and in the firm's scope.

The logic behind our model is as follows. Consider a firm that is an incumbent monopolist (or more generally, a firm with a competitive advantage) in markets A and B or in only one market, A . At some date in the future, the incumbent has to decide whether to (retain) focus and operate only in A , a market in which it can develop a new (or enhance the existing) specific capability, or to diversify and operate in both A and B . Employees only coordinate their actions and the firm only builds (enhances) a specific capability in A (for example to reduce costs) if the organizational belief that the firm focuses on A is sufficiently large. If the firm is unable to commit to either strategy, employees do not coordinate their actions; they do not undertake strategy-specific investments if their actions cannot be contracted upon. Thus the firm will not operate at its efficient frontier: despite its monopoly rents, the firm forgoes some profits due to its inability to commit to a focused strategy.

Suppose now that we introduce competition by allowing for potential entry in markets A and/or B (or more generally, a diminishing competitive advantage in A and/or B). Potential entry has two important effects. First, the threat of entry reduces/ eliminates a competitive advantage in market B , making the diversified strategy less attractive for the incumbent. Second, the threat of entry provides the incumbent with additional entry-deterrence incen-

tives to focus on A . Both effects increase the likelihood that the incumbent will choose the focused strategy (that is, A). Thus, employees realize that, once A is chosen, the firm may be stuck with that strategy. Employees then rationally choose to coordinate their actions around A . Because this coordination creates/ enhances specific capabilities, the firm has a better chance of preventing entry in market A .

Though our (stylized) model is not based on any particular company, its ingredients and many of the conclusions can be motivated by and are consistent with the case of Intel Corporation and the strategic situation it faced in 1984/85 (see Burgelman, 1994).¹ Before its exit from the dynamic random access memory (DRAM) business in 1985, Intel was an active player in both, the market for DRAMs and microprocessors. Intel pioneered both products and even though the production of each required similar competencies (e.g. competencies in line-width reduction), there were also differences. DRAMs required relatively more expertise in manufacturing (low cost production) and less expertise in product design (mastering design complexity) than microprocessors. By the early 80s DRAMs had become a commodity and it turned out to be increasingly difficult for Intel to maintain a competitive advantage over its Japanese competitors. The situation was very different for microprocessors, which was also the newer product. There, it was possible to create specific capabilities and gain competitive advantage in product design. By 1985 there was a clear discrepancy between Intel's business strategy to continue to support DRAMs (as expressed by its CEO Gordon Moore) and actions of middle-level managers. Those had already started to change practices, to refocus and to acquire new expertise useful for microprocessor production. According to Burgelman (1994) Andy Grove (at the time Intel's COO) recalled that: "By mid-1984, some middle-level managers had made the decision to adopt new process technology which inherently favored logic [microprocessor] rather than memory advances,...". As a consequence of this adoption of

¹For a much more detailed account of Intel's situation see Burgelman, 1994, on which this example is based. We here present a much condensed version of the issues related to Intel's decision to exit the market for DRAMs in order to highlight the main points of that case relevant to our model. Naturally, not all details of the Intel case can be replicated in our stylized model which concentrates on the main strategic decisions of the players involved and in particular abstracts from some of the dynamic issues highlighted in Burgelman (1994).

new practices and processes (and probably the fact that acquiring a competitive advantage in DRAMs would be too costly) Intel's management decided to exit the DRAM business altogether and implement organizational change (called "internal creative destruction" by Grove). Ultimately, the competitive situation in DRAMs (tough competition, high costs of sustaining competitive advantage) and microprocessors (soft competition, growing market, possibility to build and sustain specific capabilities in process design), the actions (and beliefs) of its employees and the associated possibility for organizational change lead Intel's top-management to align business strategy with organizational belief and decided to change the company and concentrate on microprocessors.

Some of the key ingredients of our model and some of its main implications are consistent with this case. First, expectations about competition (or to be more precise, the own competitive advantage) and (expectations) about future business as expressed by actions of employees (here middle-level managers) are not necessarily aligned with corporate strategy but with (expected) future business focus. In particular, actions of middle-level management that diverge from official corporate strategy may signal changes in business focus (corporate strategy).² Second, competition can act as a catalyst for organizational change, if top-management does not hamper development of new practices (even if inconsistent with current corporate strategy). Third, future business strategy depends on whether new practices have been build and new capabilities created by enough employees (as this makes organizational change an attractive option).³ Fourth, organizational inertia (the companies propensity to change) exists (e.g. internal expenditures on R&D were in favour of DRAM technology development even in 1985) and hampers (in Intel's case delays) organizational change. Fifth, top-management's leadership style must allow for organizational change. Intel's top management allowed middle-management to develop and adapt to new practices

²This point is very similar to Proposition 2 in Burgelman (1994),

³Referring to the fact that middle-level managers had made the decision to adopt process technology that favored microprocessors Grove said that: "The faction representing the microprocessors business won the debate even though the 80386 [microprocessor] had not yet become the big revenue generator that it would eventually become." (see Burgelman 1994)

and proved itself flexible enough to give up a formerly promoted strategy (diversify to both markets) in the light of the evidence (newly created practices, diminished competitiveness in DRAMs) and eventually refocused business to microprocessors.⁴ Sixth, organizational change requires sufficient adaptation of new practices. Intel's production capacity had already shifted towards microprocessors by 1985, but the tipping point for real organizational change (and the exit from DRAMs) came after middle-level managers adopted new processes. As in our model, sufficient adoption of new practices (or practices specific to the production of microprocessors) and associated coordination lead the way for organizational change and change in corporate strategy.⁵

Beyond explaining this case, our model is useful for a more systematic analysis of the link between competition, creation of specific capabilities and organizational change (and corporate focus). It also provides new theoretical insights relevant for business strategy and the link between a firm's production efficiency and its competitive situation. Here the main findings are:

(1) *Strategic positioning and investment in organizational capabilities are complements. They are both fostered by competition.* In our model, commitment to a focused strategy leads to more investment in strategy-specific capabilities, which in turn strengthens the firm's strategic position. More intense competition—in the sense of potential entry by competitors—reinforces the credibility of a firm's strategic position and creates incentives for investments in capabilities.

(2) *Monopolies do not necessarily operate at the efficiency frontier of production possibilities. Competition can increase (production) efficiency.* In neoclassical economics, monopolies

⁴This flexibility was characteristic for Andy Grove's management style. According to Grove: "A corporation is a living organism; it has to continue to shed its skin. Methods have to change. Focus has to change. Values have to change. The sum total of those changes is transformation." (from *Esquire Magazine*, May 2000)

⁵For some of our results we also require that adopting new practices and associated coordination among employees creates inefficiencies. While this sounds like a plausible assumption, we do not have direct evidence for such inefficiencies or even the precise nature of these frictions in the Intel case. It should be noted that many of our findings do not require the assumption of frictions anyway.

are inefficient only because they produce too little; they still operate at their efficient technological frontier and thus minimize costs. However, monopolies in the real world are often perceived as inefficient, bureaucratic structures. The failure to minimize costs for a given level of output is often referred to as "X-inefficiencies" (Leibenstein, 1966).

(3) *Incumbent's profits may increase with the threat of entry in the industry.* This seemingly counter-intuitive result is easily understood once one considers the commitment effect of competition. More competition can eventually solve the dynamic inconsistency problem associated with the choice of business strategies. When it does, the firm is better off due to the positive effects of competition on capabilities building and entry prevention.

While competition in DRAMs eventually helped Intel to focus business, we can only speculate about the relationship between competition and profits and production efficiency in Intel's case. Nevertheless, managers and economists have expressed the belief that competition can be good for profits though it remains unclear how this mechanism could work. In particular in light of the discussion following Leibenstein's work (for a more detailed discussion, see Section 5.1), it has been questioned whether X-inefficiencies can really exist. We add to this discussion and propose a possible mechanism that generates X-inefficiencies endogenously, without resorting to usual explanations such as private benefit consumption by managers, bounded rationality, or social norms. In our model, monopolies may not minimize costs due to their inability to commit to a focused strategy, which then creates coordination frictions.

We also use our model to analyze the importance of different leadership styles. The economic literature on business leadership often defines leadership as the ability to commit to a strategy [for a good survey of the most recent literature, see Bolton, Brunnermeier, and Veldkamp (2010)]. In line with some previous work, we consider the choice between a flexible (or ex post profit-maximizing) and a committed (or visionary) CEO. We find that committed CEOs are necessary to implement focused strategies that are promising but risky. We also show that ability to commit is a less important managerial trait in more competitive

environments. This is a straightforward consequence of our model. While committed leaders are crucial when the threat of competition is low and the value of organizational change is high, they are less so when competition forces firms to stick to their chosen strategies.

A long tradition in the strategic management literature focuses on the roles of organizational capabilities and of competition in shaping business strategy. Nevertheless, the analysis of interactions between capabilities, competition, strategy, and performance is still an under-studied topic in the strategic management literature (see e.g. Henderson and Mitchell (1997)), and even less so in the organizational economics literature (see Gibbons (2010) for a recent survey of the literature). In our model, the firm's choice of position affects its ability to create a unique capability, which in turn reinforces its competitive position. Thus, organizational capabilities and the choice of business strategy are both endogenously determined.

Our paper also proposes a new framework for modeling organizational inertia. Here we follow Kaplan and Henderson's (2005) insights that inertia may arise due to difficulties in changing implicit contracts with employees. According to Kaplan and Henderson (2005), the creation of organizational routines requires an understanding about "what should be rewarded" and "what should be done." They argue that the often poor performance of "ambidextrous" organizations may be due to the difficulties in managing multiple sets of competencies or routines within the same firm. Accordingly, in our model we assume that, in order to build a superior organizational capability, the firm must be focused. It is the firm's temptation to diversify and enter new markets that makes workers reluctant to support organizational changes, which would otherwise be beneficial to all. If workers invest in creating an organizational capability, but later the firm chooses not to exploit it fully, they do not benefit from their initial investments.

A recent paper by Dow and Perotti (2010) develops an alternative model of organizational inertia. In that model, employees resist to (potentially Pareto improving) changes because the process of change creates winners and losers, and contractual incompleteness prevents full

compensation of losses. Our model has a similar flavor, but it focuses instead on coordination issues.

Finally, our model also offers a framework for thinking about firm heterogeneity. There is a substantial amount of evidence that seemingly similar firms display persistent differences in performance (for recent surveys, see Bloom and Van Reenen (2010) and Gibbons (2010)). In our model, small variations in the strength of the organizational status quo can have drastic consequences for performance. Absent competition, these performance differences may be persistent. Recent empirical evidence by Bloom, Sadun, and Van Reenen (2010) suggests that competition triggers organizational change. Our model provides a coherent account for all these intriguing empirical facts.

2. Model

2.1. Setup

A company is currently an incumbent monopolist in market A and market B (or alternatively only in market A).⁶ At some date in the future, the market environment might have changed and the incumbent has to decide on whether to focus and operate only in A or to diversify and operate in both A and B . In short, it is a choice between a narrow (focused) business strategy and a corporate diversification strategy.⁷ The profitability of each market (and hence the optimal business strategy) will depend on consumer demand, organizational configuration (which determines production costs), and potential entry of competitors. We will model these factors and discuss the accompanying assumptions successively.

Consumer demand. We assume that A and B represent markets for substitute products, i.e. shifts to their demand functions are negatively correlated. There is ex ante uncertainty

⁶We could also allow for the incumbent monopolist to be only active in B , but as we will assume that the specific capability can only be created in A this does not seem a plausible scenario.

⁷Here we speak of two different markets but we could also interpret A and B as being two different strategies or business models. Thus, the model can also easily accommodate the case in which strategies A and B are mutually exclusive.

regarding which of these two products will have higher demand. Define a random variable $d \in \{A, B\}$, the *demand shock*, and let ρ denote the probability that $d = A$. We interpret the parameter ρ as the probability that A has higher demand than B .⁸ Consumers are heterogeneous, thus a niche market for each of the two products always exists and, in each market, strictly positive monopoly profits are possible.

Organizational configuration and diversification. The incumbent's single production factor is human capital. Specifically, production requires a CEO and a continuum (of mass 1) of workers. CEO and workers are risk neutral. Efficiency (i.e. the cost) of production depends on the incumbent's organizational configuration, in particular on the specificity of practices and routines adopted by its workforce. Initially, the incumbent is in the *status quo* organizational configuration: a set of known practices and routines adopted by its workers, which are "generally accepted methods for doing things." Similarities in the production technologies of the products allow the incumbent to operate in both markets. Under the status quo, the incumbent's (constant) marginal cost of producing in either market (A and B) is \bar{c} .⁹

The incumbent's workers can coordinate and develop and adapt to a new set of practices and routines in order to become more efficient in the production for one of the markets (without loss on generality this market is A). If that happens the incumbent develops a *unique capability* in market A . When this unique capability is exploited, the organizational configuration changes (organizational change happens) and the marginal cost of production for A falls to \underline{c} , $\bar{c} > \underline{c} > 0$. However, the incumbent can exploit this unique capability only if it focuses on A ; the new set of practices and routines does not generate efficiency gains if the incumbent chooses to diversify and produce for both, A and B . The idea here is that the new capability is specific to A and cannot be adapted to producing both A and B . It is inefficient for workers to use two different sets of practices and routines, hence they do not

⁸The assumption of product substitutability is not essential; our qualitative results remain unchanged as long as demand shocks in the two markets are not perfectly positively correlated.

⁹The assumption that under the status quo production costs are equal in both markets simplifies notation and exposition without losing any of the qualitative insights we derive.

exploit the unique capability if they have to produce B as well. Such assumptions are meant to capture the idea that unique capabilities can be a source of competitive advantage, but that it is hard to develop generic capabilities that can be leveraged across many different markets. We hard-wire an intuitive trade-off in our model: generic capabilities generate lower profits than market-specific capabilities but they can be applied to multiple markets simultaneously. Moreover, specific capabilities are of no use if the incumbent decides to diversify. This is intuitive if the production of two different goods is interdependent, e.g. if it requires the same human capital.¹⁰ Whether the incumbent diversifies or focuses on A is decided by the CEO.

Potential entry. There is one (potential) competitor (the entrant), who may enter either in one market, in both markets simultaneously or in none of the markets.¹¹ We take a closed-form approach and abstain from micro-modelling the market interaction of firms.¹² To streamline the exposition, we also assume that the incumbent's profit as a monopolist in a specific market (A or B) depends only on its costs and the demand shock. In particular we denote the profit of the incumbent who is a monopolist in market X by $\bar{\Pi}(c)$ if X has higher demand ($d = X$) and the incumbent has marginal costs of c . Similarly $\underline{\Pi}(c)$, with $\underline{\Pi}(c) < \bar{\Pi}(c)$, denotes the incumbent's monopoly profit in X if its marginal cost is $c \in \{\underline{c}, \bar{c}\}$ and market X has lower demand.

With probability τ_X the entrant is competitive in X , i.e. it can profitably compete with a high-cost incumbent in X . The entrant enters market A if and only if it is competitive in A and does not face an incumbent that exploits a specific capability for A . The entrant enters market B if and only if it is competitive in B .¹³ Whenever the entrant enters a market,

¹⁰Even if the production of the two goods is not interdependent one could justify this assumption if new workers need to be hired and trained. If the old workforce is split in order to train the new workers and if acquiring the new practices for A is (at least initially) impossible or very costly for newly hired workers, then there might not be enough workers with knowledge of new practices left in order to be able to change the status quo.

¹¹Our setup is equivalent to a model with two competitors, in which one can only enter market A and the other market B .

¹²A formulation of (Bertrand-style) market games that are consistent with profits as defined below can be found in an earlier version of the paper.

¹³Such entry strategies can be part of a subgame perfect equilibrium in a sequential entry game where

the incumbent's profit in that market is zero (a normalization). Thus the competitiveness of the entrant is given by a random variable $C = (C_A, C_B) \in \{co, nc\}^2$, where $C_X = co$ if the entrant is competitive in market X . For simplicity only, we assume that C_A and C_B are independently distributed.¹⁴

Adaptation to new practices and routines cannot take place as a response to entry; the according investments have to be made prior to the realization of the entrant's competitiveness. This reflects the idea that organizational change is a time consuming process and necessary investments have to occur long before new capabilities can be exploited.

The timing of events is as follows:

At period 0, the incumbent firm, consisting of a CEO and a continuum (of mass 1) of workers, is active in market A (or in A and B).

At period 1, the incumbent develops a unique capability in A or not.¹⁵ This becomes common knowledge.

At period 2, before making entry decisions, the CEO of the incumbent firm and the CEO of the entrant observe the incumbent's costs, whether the entrant is competitive and the realization of d .¹⁶

At period 3, profits are realized.

2.2. Organizational Change

Changing the status quo requires a coordinated effort by a large number of workers. Coordination is required because the tasks performed by workers are complementary, while effort

the entrant's marginal costs are random and first the incumbent's CEO makes an irreversible decision of whether or not to focus on one of the markets, and the entrant follows by choosing whether to enter in each market. See an earlier version of the paper for a market game where the assumed entry strategies are part of a SPNE and resulting profits have the properties assumed here.

¹⁴Our interpretation is that some technological innovation developed by outsiders allows them to enter these markets at a lower marginal cost. We abstract from the costs of innovation; allowing for such costs is straightforward and creates no difficulties for the model.

¹⁵The details of this transition and how it depends on workers' individual decisions are laid out in Section 2.2.

¹⁶Due to frictions in the contracting environment, the CEO may not be able to commit to a given strategy before the realizations of costs and d and is thus subject to potential dynamic inconsistency problems.

is required because workers need to develop and learn more efficient practices and routines. We abstract from compensation costs and normalize a worker's payoff to zero if he does not adapt to new routines. Development of and adaptation to new routines is costly for workers. We assume that to adapt herself to a new regime, a worker pays a non-pecuniary cost $e \in (0, 1)$ (*effort*).¹⁷ Individual investment in the new methods is non-observable private information; only whether the status quo is abandoned or not can be publicly observed. If the status quo is abandoned, the workers who chose to conform to the new regime by investing e reap higher benefits than those who did not adjust: workers receive a non-pecuniary benefit¹⁸ that is normalized to 1 only if they invest e and the status quo is abandoned.¹⁹ The strength of the status quo is measured by a real number θ . The status quo is abandoned in favor of a more efficient set of practices and routines if and only if a fraction of workers $y \geq \theta$ choose to learn these new practices and the incumbent decides not to diversify. Thus, θ can be seen as a measure of organizational inertia, in the sense that abandoning the status quo is more difficult the larger θ is. As diversification decisions are made by the CEO after knowing whether or not $y \geq \theta$, workers must have beliefs about the likelihood of organizational change. Assume that conditional on $y \geq \theta$, workers believe that the status quo will be abandoned with probability $b \in [0, 1]$.

If $b > e$, the unconstrained first best requires all workers to invest as long as $\theta \leq 1$. However, the first best may not be attained in equilibrium. If all workers know the strength of the status quo (i.e. θ is common knowledge), there are two equilibria in this game: either everyone invests or no one invests. Thus, the organization could be stuck in an inferior equilibrium. To obtain a unique equilibrium with intuitive features, we consider the limiting

¹⁷These costs can be thought of as the mental costs of identifying, exploring and/or coordinating ideas for new practices. More generally they stand for a person's general reluctance to change and explore new ways of doing things.

¹⁸In Section 5 we relax this assumption and allow for pecuniary incentives paid by the incumbent.

¹⁹The important assumption here is that the CEO cannot (at least not fully) incentivize workers to change the status quo. One can think of the benefits of investment as increased job satisfaction (e.g. due to more respect and appreciation of fellow workers), higher chances of being promoted or better outside options (e.g. due to higher visibility and/or higher productivity if these routines become the norm in other industries) in the long run. Clearly such benefits only accrue if the status quo changes and the new capabilities are of some use.

case of a model with heterogeneous information about θ . Specifically, we assume that²⁰ $\theta \sim N(0,1)$ and each worker receives a signal $x_i = \theta + \varepsilon_i$, with $\varepsilon_i \sim N(0, \sigma^2)$ that is i.i.d. across workers and independent from θ .²¹ As workers choose whether or not to invest simultaneously, worker $i \in [0, 1]$ invests if and only if

$$b \Pr(y \geq \theta \mid x_i) - e \geq 0,$$

where $\Pr(y \geq \theta \mid x_i)$ denotes the probability that worker i assigns to the outcome that workers coordinate and abandon the status quo. We consider the limiting case in which the uncertainty about θ becomes arbitrarily small, i.e. when $\sigma^2 \rightarrow 0$. We have the following result:

Lemma 1 *Assume that workers' belief that the CEO abandons the status quo is given by b . If $\sigma^2 \rightarrow 0$, in the unique equilibrium we have that the mass of workers who change routines is given by:*

$$y^*(b) = \begin{cases} 1 & \text{if } b \geq \frac{e}{1-\theta} \\ 0 & \text{if } b < \frac{e}{1-\theta} \end{cases} \quad \text{if } \theta \in (0, 1), \quad (1)$$

$y^*(b) = 1$ if $\theta \leq 0$ and $b > e$ and $y^*(b) = 0$ otherwise.

We omit the proof of this result as this is a special case of the regime change model. For example, this lemma can be seen as a corollary of Proposition 1 in Angeletos et al. (2007) or Proposition 1 in Dasgupta (2006). To streamline the exposition we restrict attention to realizations of θ in the interval $[0, 1 - e]$:²²

Assumption A1: $\theta \in [0, 1 - e]$

²⁰We can more generally assume that θ is normally distributed with mean μ and variance $\tilde{\sigma}^2 > 0$; all results would go through (see Angeletos et al., 2007, for details).

²¹This setup is borrowed from the literature on global games; specifically, here we follow closely the benchmark "regime change" model as described by Angeletos, Hellwig, and Pavan (2007).

²²In what follows the case $\theta < 0$ is equivalent to the case $\theta = 0$ and the case $\theta > 1 - e$ is equivalent to the case $\theta = 1 - e$.

Here we note that the equilibrium has intuitive properties. First, coordination (on new practices and routines) is more likely to occur under more optimistic beliefs, i.e. if b is high. This is key in our analysis; b is endogenously determined in equilibrium and is affected by competition and leadership styles (see Section 3). Second, coordination is more likely when the investment cost e is low. Finally, coordination is more likely when θ , which is a direct measure of how difficult coordination is, is low.

Another important observation is that in an equilibrium where all workers change routines each worker's expected benefit is strictly larger than his expenses ($b > e$). In order to be sufficiently incentivized to invest in adapting to new routines, a worker has to be paid a *coordination rent* of at least $\frac{e}{1-\theta} - e = \frac{\theta}{1-\theta}e$. The coordination rent can be thought of as compensation for the possibility that coordination could fail and investments in new routines can be lost. Even though uncertainty (about θ) becomes arbitrarily small, workers behave as if coordination failed with probability θ . This is similar and related to the concept of risk-dominance equilibrium in a two player coordination game, where, even though coordination (or no coordination) is common knowledge in a pure strategy Nash-equilibrium, in the risk dominant equilibrium each player selects her strategy as if there was uncertainty about the other player's action.²³ This coordination rent becomes particularly relevant if incentives for coordination are pecuniary and direct transfers from the incumbent to its workers (a situation that we address in Section 5).

Our stylized model is rich in scope. An *organizational's propensity to change* can be fully described by a triplet (θ, e, b) where θ is the strength of the status quo, e is the individual

²³This analogy to risk-dominant equilibria becomes clearer if one modifies the coordination game as follows. Assume that there are only two workers and each can either adopt new routines ("a") or abstain from doing so ("na"). Adopting new routines comes at a cost of e and results in a benefit of b if both players play "a". In this standard coordination game there are two (pure strategy) equilibria (a,a) and (na,na). The risk-dominant equilibrium is (a,a) if and only if $b \geq 2e$, i.e. in the risk-dominant equilibrium a player only plays "a" if coordination results in a benefit that is strictly larger than the cost of choosing "a". It is known from the literature on global games (see e.g. Carlsson and van Damme, 1993) that if one introduces uncertainty about payoffs (under certain conditions) only one of the two strategy combinations (a,a) and (na,na) will be played in equilibrium as private uncertainty about payoffs becomes small. Furthermore, as private uncertainty becomes small, workers will choose the strategy combination that constitutes the risk-dominant equilibrium of the game with complete information.

cost of organizational change, and b is a measure of the credibility of organizational change. Management choices, technological change, and market forces can affect the parameters that define an organization. Either process innovation or the adoption of new management practices can make coordination easier or more difficult to achieve, i.e. they may reduce or increase θ . Compensation practices and workplace norms can reduce or increase the cost of investing in coordination e . Our focus in this paper is instead on b , which is a measure of *organizational beliefs*. A higher b means that workers trust managers more not to deviate from A once coordination is achieved. We thus consider the role of management styles and market forces in shaping beliefs b .

3. Competition, business strategy and coordination

In stage 2 the incumbent's CEO can choose between two strategies $s \in \{A, AB\}$, where A is the focused strategy and AB is the diversification strategy. The incumbent's profit and choice of strategy is contingent on the entrant's competitiveness C , which is known when the incumbent's CEO decides on s . Denote the incumbent's total profits by $\Pi(s, d, y, C)$ where $s \in \{A, AB\}$ is the strategy chosen by the CEO, $d \in \{A, B\}$ denotes the demand shock and $y \in [0, 1]$ the fraction of workers who coordinate on new routines. Then the CEO's optimal strategy is a function $s^*(d, y, C) : \{A, B\} \times [0, 1] \times \{co, nc\}^2 \rightarrow \{A, AB\}$ with

$$s^*(d, y, C) \in \arg \max_{s \in \{A, AB\}} \Pi(s, d, y, C) \quad (2)$$

$$\text{for } (d, y, C) \in \{A, B\} \times [0, 1] \times \{co, nc\}^2$$

In equilibrium we require workers to make the optimal decision given their equilibrium belief b^* and the equilibrium mass of workers y^* as given by (1). Furthermore, the belief has to be consistent with the CEO's optimal strategy conditional on organizational change. To be more precise we define the following:

Definition 1 An equilibrium of the game is given by a tuple (b^*, y^*) where

1. the belief b^* is correct, i.e.

$$b^* = \rho \Pr(s^*(A, 1, C) = A) + (1 - \rho) \Pr(s^*(B, 1, C) = A),$$

2. the mass y^* of workers who change routines is given by optimal worker behavior:

$$y^* = \begin{cases} 1 & \text{if } b^* \geq \frac{\epsilon}{1-\theta} \\ 0 & \text{if } b^* < \frac{\epsilon}{1-\theta}. \end{cases} \quad (3)$$

We refrain from incorporating the CEO's strategy $s^*(d, y, C)$ (as defined by (2)) in the notation for equilibrium to keep the exposition simple. If $\bar{\Pi}(\bar{c}) + \underline{\Pi}(\bar{c}) \leq \underline{\Pi}(\underline{c})$ it is easy to see that in equilibrium it is always optimal to focus on market A and independently of the competitiveness of the entrant, we have that $b^* = 1$ and $y^* = 1$. If $\bar{\Pi}(\bar{c}) + \underline{\Pi}(\bar{c}) > \underline{\Pi}(\underline{c})$ the CEO optimally focuses on A (conditional on workers having created a specific capability) if competition (in A or B) is sufficiently intense. We here restrict attention to the most interesting case where all important trade-offs are present, i.e. we assume $\bar{\Pi}(\bar{c}) + \underline{\Pi}(\bar{c}) \in (\underline{\Pi}(\underline{c}), \bar{\Pi}(\underline{c})]$.

Assumption A2 $\bar{\Pi}(\bar{c}) + \underline{\Pi}(\bar{c}) \in (\underline{\Pi}(\underline{c}), \bar{\Pi}(\underline{c})]$.

The following Proposition characterizes the equilibrium

Proposition 1 For any set of parameters e, ρ and under assumptions A1 and A2, a unique equilibrium exists. This is fully characterized by (1) and

1. $b^* = \rho + (1 - \rho) \tau_B$ if $\bar{\Pi}(\bar{c}) > \underline{\Pi}(\underline{c})$.
2. $b^* = \rho + (1 - \rho) (\tau_B + (1 - \tau_B) \tau_A)$ if $\bar{\Pi}(\bar{c}) \leq \underline{\Pi}(\underline{c})$.

Proof. See the Appendix. ■

Compared with the first best, there could be too little coordination if the intensity of competition is low. For example, if $\tau_A = \tau_B = 0$ for values of $\rho \in [e, \frac{e}{1-\theta})$, organizational change is not possible ($y^* = 0$).²⁴ If $\tau_A = \tau_B = 0$ and a specific capability exists, ex post the CEO diversifies if and only if B is the industry with higher demand, so commitment is not possible. If switching is very likely (low ρ) or coordination is very costly or difficult (high e and θ), there is no coordination and specific capabilities are not created. Profits could be higher and workers would be better off if they could coordinate and invest in reducing costs for A .²⁵ There is too little investment in reducing costs and too much diversification in equilibrium. Thus, high marginal costs and excessive diversification go hand in hand.

As competition intensifies (as τ_A or τ_B increase) diversification (i.e. playing $s = AB$) becomes less attractive ex post for two reasons. First, markets are less attractive if contested, and second, being focused (and consequently becoming more efficient) is necessary to deter entry. Because competition reduces the attractiveness of diversification, workers are more confident that they will be rewarded if they invest in A -specific routines. Whereas the first *direct competition effect* is present for any parameter values, the second *indirect competition effect* is only present if being a monopolist in market A (in the more efficient organizational configuration) is more profitable than being a monopolist only in market B , even if that has higher demand (i.e. we are in case 2 of Proposition 1).²⁶

Corollary 1 *Tougher competition (i.e. an increase in τ_A or τ_B) improves corporate focus and coordination inside the firm (i.e. it increases b^* and the set of θ for which coordination*

²⁴This results in an expected loss in profits of $\rho (\bar{\Pi}(\underline{c}) - \bar{\Pi}(\bar{c}) + \underline{\Pi}(\bar{c}))$ as compared to the situation where a specific capability for A exists.

²⁵Here, coordination is free for the CEO, hence it always increases profits. In section 5 we consider the situation where the CEO can pay workers to encourage coordination, there we also show that also from a total welfare perspective there might be too little coordination.

²⁶The situation of Intel Corp. in the motivating example of the introduction can best be described as one where the incumbent (Intel) is active in markets B (DRAMs) and A (microprocessors). In market B it possibly faces tough competition in the future. An alternative strategy to producing for A and B is to focus business activity to a single market (A). It is impossible to create a specific capability for B and the incumbent cannot fend-off potential entry in B . The situation is different for market A . A specific capability for A can be created and with it Intel can gain market dominance.

is achieved). Tougher competition reduces marginal costs by improving coordination inside the firm (i.e. it weakly increases y^*).

Proof. Follows immediately from the effect of τ_A and τ_B on b^* . ■

We also have that competition can have a positive effect on the firm's profit if it acts as catalyst for organizational change. To be more precise, an increase in competition leads to a discontinuous increase in coordination on new practices and thus a discontinuous drop in marginal costs if it changes b^* from just below $\frac{e}{1-\theta}$ to just above $\frac{e}{1-\theta}$. It is even possible, that under sufficiently intense competition profits are larger than without any competition (i.e. with $\tau_A = \tau_B = 0$).

Corollary 2 *Tougher competition may increase the incumbent's profits. If $\bar{\Pi}(\underline{c}) > \bar{\Pi}(\bar{c}) + \underline{\Pi}(\bar{c})$ there exists e and $\rho < \frac{e}{1-\theta}$ such that monopoly profits are smaller than profits under competition (i.e. than profits for some strictly positive τ_B).*

Proof. Assume $\bar{\Pi}(\bar{c}) > \underline{\Pi}(\underline{c})$ (a very similar argument can be made for the case $\bar{\Pi}(\bar{c}) \leq \underline{\Pi}(\underline{c})$). We first consider the case $b^* > \frac{e}{1-\theta}$, i.e. $y^* = 1$. If $d = A$ (which happens with probability ρ) it is always optimal for the incumbent to concentrate on market A only (which gives a profit of $\bar{\Pi}(\underline{c})$). If $d = B$ it is optimal to either diversify (if $C_B = nc$) or to focus on A (if $C_B = co$). In the latter case the payoff is $\underline{\Pi}(\underline{c})$ in the former depending on whether $C_A = nc$ or $C_A = co$ it is $\underline{\Pi}(\bar{c}) + \bar{\Pi}(\bar{c})$ and $\bar{\Pi}(\bar{c})$ respectively. Thus the incumbent's expected profit is

$$\pi^* = \rho \bar{\Pi}(\underline{c}) + (1 - \rho) \tau_B \underline{\Pi}(\underline{c}) + (1 - \rho) (1 - \tau_B) [(1 - \tau_A) \underline{\Pi}(\bar{c}) + \bar{\Pi}(\bar{c})]. \quad (4)$$

If $b^* < \frac{e}{1-\theta}$ (i.e. $y^* = 0$) we have

$$\begin{aligned} \pi^* &= \rho [(1 - \tau_A) \bar{\Pi}(\bar{c}) + (1 - \tau_B) \underline{\Pi}(\bar{c})] \\ &\quad + (1 - \rho) [(1 - \tau_A) \underline{\Pi}(\bar{c}) + (1 - \tau_B) \bar{\Pi}(\bar{c})]. \end{aligned} \quad (5)$$

As (4) > (5) we have that π^* is increasing (it jumps upwards) at values τ_A for which $b^* = \rho + (1 - \rho)\tau_B = \frac{e}{1-\theta}$.

If $\tau_A = \tau_B = 0$ and $b^* = \rho < \frac{e}{1-\theta}$ we have that $\pi^* = \bar{\Pi}(\bar{c}) + \underline{\Pi}(\bar{c})$. We can find e, θ, ρ and τ_B such that $\rho < \frac{e}{1-\theta}$ and ρ is sufficiently close to 1, $\tau_B > 0$ and $\rho + (1 - \rho)\tau_B = \frac{e}{1-\theta}$ such that the incumbent's profit $\pi^* = \rho\bar{\Pi}(\underline{c}) + (1 - \rho)\tau_B\underline{\Pi}(\underline{c}) + (1 - \rho)(1 - \tau_B)[(1 - \tau_A)\underline{\Pi}(\bar{c}) + \bar{\Pi}(\bar{c})]$ is sufficiently close to $\bar{\Pi}(\underline{c}) > \bar{\Pi}(\bar{c}) + \underline{\Pi}(\bar{c})$. ■

This seemingly counter-intuitive result is explained by the positive effect of competition on efficient coordination and thus on marginal costs and profits. An increase in competition leads to a discontinuous increase in coordination and thus a discontinuous drop in marginal costs if it changes b^* from just below $\frac{e}{1-\theta}$ to just above $\frac{e}{1-\theta}$. More intuitively, an increase in competition can eliminate the negative effect of the CEO's commitment problem and induce investments in a more efficient organizational configuration. Competition reduces expected profits everywhere but at $b^* = \frac{e}{1-\theta}$, where profits jump upwards due to the elimination of inefficiencies.

4. Optimal Leadership Styles

In this section we ask how a CEO's "leadership style" affects organizational configuration and profits in the presence of competition. We assume that there are two possible types of CEOs, each one with a different leadership style: a CEO can be either *flexible* (type f) or *visionary/committed* (type v). A flexible CEO always selects the strategy that maximizes expected profits in a fully rational manner without any bias towards either A or AB (as in the previous sections). Her strategy $s \in \{A, AB\}$ maximizes firm value at the time it is chosen. Thus, a flexible leader cannot credibly commit to either A or AB and may be subject to a dynamic inconsistency problem. A committed CEO on the other hand credibly commits to make the decision $s = A$, independently of the realizations of d, C_A and C_B , either because she has biased preferences towards a specific strategy or because her beliefs

about the profitability of a given strategy differ from market beliefs (Rotemberg and Saloner, 2000; Van den Steen, 2005).²⁷

We keep assumptions A1 and A2 and we concentrate on the more interesting and complicated case $\bar{\Pi}(\bar{c}) \leq \underline{\Pi}(\underline{c})$ where both the direct and the indirect competition effects are present (see Proposition 1).²⁸ If $l = v$, then $b^* = 1$ and expected profit under a committed type who always chooses $s = A$ (and where workers can coordinate to create a specific capability on A) is

$$\pi_v = \rho \bar{\Pi}(\underline{c}) + (1 - \rho) \underline{\Pi}(\underline{c}).$$

In particular, competition has no effect on profits under a committed CEO; if the CEO credibly commits to A , no entry in A occurs. Furthermore, the CEO never diversifies and thus the strength of competition outside its focus is not relevant.

The optimal (i.e. profit maximizing) leadership style depends on ρ . If ρ is sufficiently large, such that coordination of workers is always achieved (i.e. if $b^* \geq \frac{e}{1-\theta}$), it is always beneficial to have a flexible CEO. As ρ becomes smaller, the positive value of commitment arising from more efficient production is outweighed by the negative effect of the inflexibility to adopt to possible new favorable market conditions in market B .

Proposition 2 *Assume $\bar{\Pi}(\bar{c}) \leq \underline{\Pi}(\underline{c})$. The optimal choice of leadership style $l^* \in \{f, v\}$ is given by*

$$l^* = \begin{cases} f & \text{if } \rho \geq \rho^h \text{ or } \rho \leq \rho^l \\ v & \text{if } \rho \in (\rho^l, \rho^h), \end{cases}$$

with

$$\rho^h \equiv \frac{e + (1 - \theta)(\tau_A \tau_B - \tau_A - \tau_B)}{(1 - \theta)(1 + \tau_A \tau_B - \tau_A - \tau_B)}$$

and

²⁷In our framework commitment power is only valuable if it leads to organizational change. In particular this requires the committed leader to be focused on the market for which a specific capability can or needs to be build (in order to be profitable). Of course, for reasons outside the scope of our formal model, it is possible that a visionary CEO propagates a diversification strategy and/or to concentrate on a market for which no specific capability can be acquired.

²⁸The case $\bar{\Pi}(\bar{c}) > \underline{\Pi}(\underline{c})$ leads to the same qualitative insights.

$$\rho^l = \frac{(1 - \tau_B) \bar{\Pi}(\bar{c}) + (1 - \tau_A) \underline{\Pi}(\bar{c}) - \underline{\Pi}(\underline{c})}{\bar{\Pi}(\underline{c}) - \underline{\Pi}(\underline{c}) - (\tau_B - \tau_A) [\bar{\Pi}(\bar{c}) - \underline{\Pi}(\bar{c})]}.$$

Proof. If $b^* = \rho + (1 - \rho)(\tau_A + \tau_B - \tau_A\tau_B) \geq \frac{\epsilon}{1-\theta}$ a flexible leader gives higher expected profits; this condition defines the threshold ρ^h .

If $b^* < \frac{\epsilon}{1-\theta}$ we directly compare π_v with the expected profits under a flexible leader:

$$\begin{aligned} \pi_f &= \rho [(1 - \tau_B) \underline{\Pi}(\bar{c}) + (1 - \tau_A) \bar{\Pi}(\bar{c})] \\ &\quad + (1 - \rho) [(1 - \tau_B) \bar{\Pi}(\bar{c}) + (1 - \tau_A) \underline{\Pi}(\bar{c})]. \end{aligned}$$

This comparison shows that $\pi_f \geq \pi_v$ if and only if $\rho \leq \rho^l$. ■

The flexible leadership style is optimal for either sufficiently high or sufficiently low values of ρ , while the committed style is optimal for intermediate values of ρ (provided that $\rho^l < \rho^h$). Proposition 3 provides an intuitive summary of the trade-off between commitment and flexibility and its implications for the optimality of leadership styles. Visionary leaders offer commitment. Commitment is desirable only when (i) coordination cannot be achieved without commitment and (ii) the value of ex post adaptation is low.

Proposition 3 shows that there are three relevant cases.

Case 1: Coordination can be achieved without commitment. If the probability that a focused strategy is optimal is sufficiently high ($\rho \geq \rho^h$), workers feel confident that the CEO will not change direction in the future and choose to coordinate and invest in new practices and routines. Thus, visionary leaders are not needed; they are to be avoided due to insufficient adaptation ex post.

Case 2: Diversification is more valuable than coordination. If ρ is low enough ($\rho \leq \rho^l$), the expected value of diversification is higher than the expected gains from coordination. Intuitively, the likelihood of strategy A being successful is so low that the incumbent prefers to keep the option to switch strategies even at the cost of not developing a unique capability for A . Thus, it is optimal to choose a flexible leader.

Case 3: Commitment is necessary for coordination, which is more valuable than diversification. When confidence in the success of a focused strategy is low enough so that workers do not choose to invest, a visionary/committed leader is needed to give credibility to a focused business strategy. A visionary CEO solves the commitment problem, but at the price of a sub-optimal focus on A with probability $(1 - \rho)(1 - \tau_A)(1 - \tau_B)$.²⁹ Unless ρ is too low, the gains from coordination are offset by the ex post costs of concentrating on the less profitable market.

In sum, visionary/ committed CEOs are necessary to implement focused strategies when they are *promising* (ρ not too low) but *risky* (ρ not too high). For undertaking focused strategies that are either too risky (so that the real option to switch is too valuable) or "home runs" (everyone believes that there is a high probability of success), a flexible CEO performs better than a visionary CEO. The main message here is that strong vision (commitment) is more valuable when coordination is more valuable and more difficult to achieve. This result mimics the previous literature. Vision, commitment or overconfidence are desirable leadership traits when coordination is otherwise difficult to achieve ($\rho < \rho^h$) and the cost of too little flexibility and hence sub-optimal decision making ex post are offset by the benefits of commitment from visionary leadership ($\rho \leq \rho^l$) (see Bolton, Brunnermeier, and Veldkamp, 2008).

The optimal choice of leadership style also depends on competition (as measured by τ_A and τ_B). Whenever

$$\tau_A + \tau_B - \tau_A\tau_B \geq \tau^h(\rho) \equiv \frac{1}{1 - \rho} \left[\frac{e}{1 - \theta} - \rho \right],$$

the optimal leadership style is flexible ($l = f$). We have that $\tau^h(\rho)$ is decreasing in ρ . Substitutability of ρ and τ_B is intuitive; both increase the (ex-ante) attractiveness of A as compared to B . In contrast, substitutability of ρ and τ_A is less intuitive, as it relies on

²⁹A committed CEO only selects the sub-optimal market if $d = B$, $C_A = nc$ and $C_B = nc$. If $\bar{\Pi}(\bar{c}) > \underline{\Pi}(\underline{c})$ a committed CEO makes the wrong decision with probability $(1 - \rho)(1 - \tau_B)$ (i.e. if $d = B$ and $C_B = nc$).

the indirect competition effect: increased competition in A can make it more important to defend A even if demand goes to B .

Expected profits under a flexible CEO are decreasing in τ_A, τ_B as long as $\tau_A + \tau_B - \tau_A \tau_B$ does not cross $\tau^h(\rho)$. If $\tau_A + \tau_B - \tau_A \tau_B < \tau^h(\rho)$. In particular, if the value of commitment is high, it is possible that the optimal leadership style is $l = v$ for all levels of competition τ_A, τ_B with $\tau_A + \tau_B - \tau_A \tau_B < \tau^h(\rho)$.³⁰ It is also possible that the value of flexibility becomes so small that a flexible CEO outperforms a visionary CEO. This is Case 2 from above and it arises under the same conditions, i.e. if $\rho < \rho^l$.

Whenever the value of organizational change is large (i.e. $\bar{\Pi}(\bar{c}) \leq \underline{\Pi}(\underline{c})$) a visionary CEO can only be optimal if both markets are relatively uncontested ($\tau_A + \tau_B - \tau_A \tau_B < \tau^h(\rho)$).

5. Endogenous incentives for coordination

In this section we assume that the (CEO of the) incumbent firm can make direct payments to its workers in order to incentivize their coordinated investments in developing and learning new practices and routines. As we show below such coordinated investments (and the resulting specific capability) can increase the incumbent's profits by more than the associated costs of providing the necessary incentives.

We modify the model of Section 3 and allow the incumbent to set a bonus payment of w (which is common knowledge) before workers decide whether to develop and learn new practices and routines (at $t = 0$). Each worker i who adapts to new practices and routines receives a bonus $w_i = w$ (at $t = 2$) if organizational change happens (i.e. if the incumbent develops a specific capability and the CEO chooses a focused business strategy).³¹ Total bonus payments are given by $\int_0^1 w_i di = w$. Similarly, the total effort by all workers if each worker i exerts effort $e_i = e$ is given by $\int_0^1 e_i di = e$.

³⁰A sufficient condition for this to hold is $\frac{\underline{\Pi}(\bar{c}) + \bar{\Pi}(\bar{c}) - \underline{\Pi}(\underline{c})}{\bar{\Pi}(\underline{c}) - \underline{\Pi}(\underline{c})} < \rho$.

³¹A reason for this contractual incompleteness could be that effort to adopt new practices and routines is only verifiable if organizational change happens. This is similar to a standard assumption in principal-agent models that effort is not contractible but output is.

To streamline the exposition, we here assume that $\rho = 0$ and $\tau_A = 0$, i.e. all (non-strategic) uncertainty with respect to the optimal business strategy arises from uncertainty about competition in B . We also assume A1 and A2.

If $y = 1$ and $C_B = co$, the specific capability is only exploited (and the bonus is paid) if and only if $\underline{\Pi}(\underline{c}) - \underline{\Pi}(\bar{c}) \geq w$. In equilibrium w does not exceed $\underline{\Pi}(\underline{c}) - \underline{\Pi}(\bar{c})$ as otherwise the benefit from organizational change ($\underline{\Pi}(\underline{c}) - \underline{\Pi}(\bar{c})$) outweighs its costs (w). Consequently, we have that $b^* = \tau_B$ (as in Proposition 1). Similar to Lemma 1 it can be shown that in equilibrium all workers adapt to new routines ($y = 1$) if and only if $b^* = \tau_B \geq \frac{e}{(1-\theta)w}$ (otherwise $y = 0$). Thus, in order for the bonus w to be effective we must have $w \geq \frac{e}{(1-\theta)\tau_B}$ and profit maximization implies that either $w = 0$ or $w = \frac{e}{(1-\theta)\tau_B}$. The incumbent's expected net benefit from paying the bonus $w = \frac{e}{(1-\theta)\tau_B}$ is $\tau_B (\underline{\Pi}(\underline{c}) - \underline{\Pi}(\bar{c}) - w)$. Thus the incumbent offers a bonus of $w = \frac{e}{(1-\theta)\tau_B}$ if and only if $\underline{\Pi}(\underline{c}) - \underline{\Pi}(\bar{c}) - \frac{e}{(1-\theta)\tau_B} \geq 0$ or equivalently if

$$\tau_B \geq \tau_B^* := \frac{e}{(1-\theta)(\underline{\Pi}(\underline{c}) - \underline{\Pi}(\bar{c}))}.$$

This is intuitive: bonus w and intensity of competition τ_B are substitutes with respect to achieving coordination. Thus, it is profitable for the incumbent to pay $w = \frac{e}{(1-\theta)\tau_B}$ whenever τ_B is above the threshold τ_B^* .

Putting this together we have that in the unique equilibrium the incumbent's expected profit in $t = 1$ is:

$$\begin{cases} \underline{\Pi}(\bar{c}) + (1 - \tau_B) \bar{\Pi}(\bar{c}) & \text{if } \tau_B < \tau_B^*, \\ \tau_B \underline{\Pi}(\underline{c}) + (1 - \tau_B) (\bar{\Pi}(\bar{c}) + \underline{\Pi}(\bar{c})) - \frac{e}{(1-\theta)} & \text{if } \tau_B \geq \tau_B^*. \end{cases}$$

Different to findings in Section 3 the incumbent's profit is continuous. If intensity of competition is just enough for organizational change to occur (i.e. for $\tau_B = \tau_B^*$) the incumbent's payment just offsets gains from obtaining a specific capability. As the expected bonus payment (i.e. $\frac{e}{(1-\theta)}$) is independent of competition τ_B , the incumbent's profit cannot be

increasing in τ_B .³²

As compensation w is a transfer within the incumbent firm (i.e. from the incumbent's shareholders to its workers), we consider the impact of competition on total production efficiency as defined by the sum of incumbent's profits and workers' payoffs.³³ If $\tau_B < \tau_B^*$ we have that $w = 0$ and no effort is exerted, i.e. total production efficiency equals the incumbent's profit, i.e. $\underline{\Pi}(\bar{c}) + (1 - \tau_B)\bar{\Pi}(\bar{c})$. If competition is sufficiently tough ($\tau_B \geq \tau_B^*$) we have that a worker's payoff is $\tau_B \frac{e}{(1-\theta)\tau_B} - e$ and total production efficiency is $\tau_B \underline{\Pi}(\underline{c}) + (1 - \tau_B)(\bar{\Pi}(\bar{c}) + \underline{\Pi}(\bar{c})) - e$. As a worker's expected payoff from adopting new practices and routines is positive, i.e. as $\tau_B \frac{e}{(1-\theta)\tau_B} - e = \frac{\theta}{1-\theta}e > 0$, we have that total production efficiency jumps upwards at $\tau_B = \tau_B^*$.³⁴ To summarize, we have the following results:

Proposition 3 *If compensation is endogenous, tougher competition may increase total production efficiency but not the incumbent's profits.*

Proof. The second statement is shown above, the first follows because

$$\begin{aligned} \underline{\Pi}(\bar{c}) + (1 - \tau_B^*)\bar{\Pi}(\bar{c}) &< \tau_B^* \underline{\Pi}(\underline{c}) + (1 - \tau_B^*)(\Pi(\bar{B}) + \underline{\Pi}(\bar{c})) - e \\ \underline{\Pi}(\bar{c}) + (1 - \tau_B^*)\bar{\Pi}(\bar{c}) &< \frac{e}{(1-\theta)(\underline{\Pi}(\underline{c}) - \underline{\Pi}(\bar{c}))} (\underline{\Pi}(\underline{c}) - \Pi(\bar{B}) - \underline{\Pi}(\bar{c})) + \Pi(\bar{B}) + \underline{\Pi}(\bar{c}) - e \\ (1 - \tau_B^*)\bar{\Pi}(\bar{c}) &< \frac{e}{(1-\theta)} + (1 - \tau_B^*)\Pi(\bar{B}) - e \\ e &< \frac{e}{(1-\theta)}. \end{aligned}$$

■

³²If $\underline{\Pi}(\bar{c}) + \bar{\Pi}(\bar{c}) > \underline{\Pi}(\underline{c})$ profits are strictly decreasing in τ_B , though the slope can be very small for $\tau_B \geq \tau_B^*$. Furthermore, organizational change and the associated more moderate impact of competition on profits can already happen for $\tau_B < \frac{e}{1-\theta}$, i.e. for levels of competition too low to trigger organizational change when compensation is exogenous (see proof of Corollary 3). Adding (some) non-pecuniary benefits restores the result that profits can increase with the intensity of competition.

³³In the previous section we did not include workers' payoffs when considering (production) efficiency. As there workers' expected payoffs from adopting new practices and routines are always positive, incorporating them in the analysis would show that tougher competition may increase total production efficiency.

³⁴Furthermore, the larger organizational inertia θ the larger the benefit of an increase in competition (as long as $\tau_B^* < 1$).

The intuition for this result relies on the incumbent's cost of incentivizing coordination. Expected payments ($\tau_B w$) exceed the combined effort of workers (e) if organizational inertia is positive, i.e. $\tau_B w = \frac{e}{1-\theta} > e$. Workers need to be paid a *coordination rent* (on top of compensation for effort e) in order to overcome organizational inertia and compensate for the risk of coordination failure.³⁵ The larger organizational inertia θ , the larger the (strategic) risk of coordination failure and the larger (expected) incentive payments to workers to compensate for that risk.

As competition intensifies (τ_B increases) achieving coordination becomes cheaper and for $\tau_B = \tau_B^*$ the incumbent's benefit from incentivizing workers (i.e. the resulting gain from increased production efficiency) equals the expected payments necessary to obtain coordination. These payments are larger than the combined cost of effort e , in particular, the incumbent's benefit from incentivizing workers is larger than the combined cost of effort. Consequently, as intensity of competition τ_B increases from just below to just above τ_B^* total efficiency increases as well. It should be stressed that if a single worker's investment is enough to create a specific capability (i.e. if $\theta = 0$) or equivalently if coordination is not a problem because there is only one worker (rather than a mass of workers) such a result cannot be obtained. This is because the gains originating from the creation of a specific capability (i.e. the gains from increased production efficiency) match exactly the associated costs e at $\tau_B = \tau_B^*$.

If the incumbent firm can collect some of the workers' rents from employment, its profits can be non-monotonic in the degree of competition (τ_B). To be more specific, if a worker's opportunity cost of being employed with the incumbent is w_0 and workers have limited liability, the incumbent maximizes profits by setting a worker's fixed wage w_{Fix} such that the worker's total expected income (e.g. $w_{Fix} + \tau_B \frac{e}{(1-\theta)\tau_B} - e$ if $\tau_B \geq \tau_B^*$) equals w_0 .³⁶ The

³⁵For the intuition behind coordination rents see Section 2.2.

³⁶The incumbent's total expenditure if each worker receives a payment w_{Fix} is given by $\int_0^1 w_{Fix} di = w_{Fix}$.

incumbent's profit is then given by:

$$\begin{cases} \underline{\Pi}(\bar{c}) + (1 - \tau_B) \bar{\Pi}(\bar{c}) - w_0 & \text{if } \tau_B < \tau_B^*, \\ \tau_B \underline{\Pi}(\underline{c}) + (1 - \tau_B) (\bar{\Pi}(\bar{c}) + \underline{\Pi}(\bar{c})) - e - w_0 & \text{if } \tau_B \geq \tau_B^*. \end{cases}$$

At $\tau_B = \tau_B^*$ the incumbent's profit jumps upwards (by $\frac{\theta}{1-\theta}e$) and an increase in the intensity of competition (from below τ_B^* to above τ_B^*) can result in larger profits for the incumbent.

This observation is summarized in the following Corollary.

Corollary 3 *If each worker's compensation consists of an endogenous bonus w and a fixed wage w_{Fix} and if workers have limited liability, tougher competition may increase the incumbent's profits.*

5.1. X-(in)efficiency

The idea that an otherwise identical firm can have lower costs of production in a more competitive market environment was first expressed by Leibenstein (1966). He coined the term "X-inefficiency" for a firm's failure to minimize costs in the absence of competition. Following Leibenstein's original article there has been a discussion among economists on whether X-inefficiency presents a new, non-allocative form of inefficiency (see the discussion in Frantz, 1992). Critics of the concept point out that differences in the costs of production of seemingly similar firms should be attributed to differences in agency costs and workers' preferences for leisure (see Stigler, 1976, Frantz, 1992). X-inefficiencies thus originate from the resolution of the trade-off between benefits of a reduction in production costs and the associated higher contracting costs, and consequently are not inefficiencies per se. Raith (2003) formally models this trade-off under varying degrees of competition and analyses how market structure affects production costs. In a heterogeneous goods oligopoly model with endogenous entry and fixed demand, more competition (as measured by the degree of product substitutability) increases a firm's marginal incentive to reduce costs. As more

competition reduces the number of active firms in equilibrium each firm produces a larger output. Thus firms evaluate the production versus agency costs trade-off more favorably, and provide stronger incentives to their managers to reduce costs. Nevertheless, total firm profits (which are always zero due to endogenous entry) and the agent's payoff (who is just paid enough to fulfill his exogenous participation constraint) are independent of competition and consequently total efficiency of the firm does not change.

Contrasted with this literature, our model does not only highlight a different source of X-inefficiency (i.e. coordination failure) but also shows that "real" inefficiencies, i.e. inefficiencies of the production process as a whole (including the intra-firm agency problem), can vanish under more intense competition. In that sense our model relates to a broader notion of X-inefficiency and provides an explanation for its potential existence.

To be more specific, (a firm's) total surplus S is the sum of the firm's profits (net-off agency costs) Π and the welfare of its employees (net-off agency costs) W , i.e. $S = \Pi + W$. Consider a situation where an increase in profits from Π_1 to Π_2 ($\Pi_1 < \Pi_2$) is necessarily associated with a change in the level of employees' welfare. We denote the level of employees' welfare (net-off agency costs) associated with the profit level Π_i by W_i . Then the difference $W_1 - W_2$ can be interpreted as social cost associated with the increase in profits $\Pi_2 - \Pi_1$ (typically W_i is the cost of effort and we have $W_1 > W_2$). Assume that for the minimal transfer w (from CEO to employees) that is required to change profits from Π_1 to Π_2 we have that $w > W_1 - W_2$. Then the firm might be stuck in an inefficient configuration if $W_1 - W_2 < \Pi_2 - \Pi_1 < w$.

In our model this inefficiency is due to coordination failure within the firm: in order to make employees select the more efficient equilibrium in a coordination game they need to be compensated for the strategic uncertainty that other employees have the option not to coordinate. The value of $\Pi_2 - \Pi_1$ in our model is affected by competition τ ; as competition intensifies the benefit of coordinating on the more profitable outcome increases, i.e. $\frac{d}{d\tau}(\Pi_2 - \Pi_1) > 0$. If there is a minimum level of competition τ^* with $w = \Pi_2 - \Pi_1$ inefficiency

in the production process is resolved if $\tau \geq \tau^*$.

Starting from the assumption that CEOs are unable to commit to a long-run business strategy, workers fail to coordinate to adapt to new, more efficient routines. Due to the CEO's lack of focus (commitment power) with respect to business strategy, the firm is stuck in an inefficient organizational configuration. Increased competition alleviates this commitment problem; it renders a change in strategy less profitable and provides workers with enough confidence in the firm's strategy in order to coordinate in adopting new practices and routines and improve the organizational configuration.

6. Conclusion

Our model relates various market and firm characteristics (such as intensity of competition, organizational inertia, and CEO leadership styles) to the choice of business strategies. The connection is as follows: the optimal business strategy (i.e. whether to focus on the core market or to diversify) depends on the intensity of competition and, in particular, on whether the company has a competitive advantage with respect to a competitor in its core market. The latter can be achieved by building a specific capability that enables the company to produce more efficiently than a competitor. In order to build a specific capability, the company's workers have to coordinate their efforts. This happens if sufficiently many workers share a belief that the company stays focused on its current business. Whether the company stays focused or not depends on the intensity of competition, the degree of organizational inertia, and the CEO's leadership style.

We concentrate on two factors that have an impact on workers' beliefs (and consequently on intra-firm coordination, production efficiency, and optimal business strategy): competition and leadership style. Both higher competition and a committed leadership style increase the probability that workers attribute to the event that the CEO chooses a focused strategy. Consequently, it is easier to achieve coordination to build a specific capability if (a) compe-

tition is tougher and/or (b) the CEO has a visionary/committed leadership style. Effect (a) is closely related to the concept of X-inefficiencies. We here provide a mechanism through which competition can have an impact on production efficiency: it does so by fostering coordination. Effect (b) adds new insights to the recent economic literature on leadership styles; the value of commitment (and hence the optimal leadership style) can also depend on the strength of competitive forces, a factor that is absent in the previous literature.

7. Appendix

Proof of Proposition 1:

The relevant incumbent's profits are given by $\Pi(A, B, 1, C) = \underline{\Pi}(\underline{c})$, $\Pi(AB, B, 1, (co, nc)) = \underline{\Pi}(\bar{c})$, $\Pi(AB, B, 1, (co, co)) = 0$, $\Pi(A, A, 1, C) = \bar{\Pi}(\underline{c})$, $\Pi(AB, d, 1, (nc, nc)) = \bar{\Pi}(\bar{c}) + \underline{\Pi}(\bar{c})$, $\Pi(AB, A, 1, (co, nc)) = \underline{\Pi}(\bar{c})$ and $\Pi(AB, B, 1, (co, nc)) = \bar{\Pi}(\bar{c})$.

1. If $C_B = co$ entering market B is for the incumbent not profitable conditional on $y = 1$ as $\Pi(A, B, 1, C) \geq \Pi(AB, B, 1, (co, nc))$ and the CEO chooses the focused strategy regardless of the realization of d , y and C_A , i.e. $s^*(d, 1, (C_A, co)) = A$. If $C_B = nc$ then conditional on $y = 1$ focussing on market A is profitable if and only if $d = A$ (i.e. we have $s^*(A, 1, (C_A, nc)) = A$ and $s^*(B, 1, (C_A, nc)) = AB$) as $\Pi(A, A, 1, (C_A, nc)) \geq \Pi(AB, A, 1, (C_A, nc))$ and $\Pi(A, B, 1, (C_A, nc)) < \Pi(AB, B, 1, (C_A, nc))$ (the latter inequality follows from $\bar{\Pi}(\bar{c}) > \underline{\Pi}(\underline{c})$). This implies that $\Pr(s^*(A, 1, C) = A) = 1$, $\Pr(s^*(B, 1, C) = A) = \tau_B$ and $b^* = \rho + (1 - \rho)\tau_B$.
2. We have already shown that $s^*(d, 1, (C_A, co)) = A$. The only difference to case 1 is that $\Pi(A, B, 1, (co, nc)) \geq \Pi(AB, B, 1, (co, nc))$ and the CEO chooses the diversification strategy (conditional on $y = 1$) if and only if $d = B$ and $C_A = nc$ (if $C_A = co$ she now prefers to defend the contested market A). To be more precise we have

that $s^*(A, 1, (C_A, nc)) = A$, $s^*(B, 1, (co, nc)) = A$ and $s^*(B, 1, (nc, nc)) = AB$. This implies that $\Pr(s^*(A, 1, C) = A) = 1$, $\Pr(s^*(B, 1, C) = A) = \tau_B + (1 - \tau_B)\tau_A$ and $b^* = \rho + (1 - \rho)(\tau_B + (1 - \tau_B)\tau_A)$.

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