Competition and Organizational Change*

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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.

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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 firms’ 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 this commitment is credible. A natural question is then: What makes business strategies credible?

There is a small but growing literature in economics that is concerned with this 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.

This paper is concerned with the interactions between competition and organizational structure. 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 provide credibility to a firm’s proposed strategy. Once commitment to a specific strategy is achieved, employees coordinate their efforts and implement changes to the organization structure. These changes improve the firm’s profitability by reducing costs and also by improving the firm’s ability to compete.
The logic behind our model is as follows. Consider a firm that is an incumbent monopolist in market $A$. At some date in the future, the incumbent may have the option to enter in a new market $B$. The incumbent’s decision is whether to retain focus and operate only in $A$ or to diversify and operate in both $A$ and $B$. The firm is unable to commit to either strategy. Thus, employees do not coordinate their actions; they do not undertake strategy-specific investments if their actions cannot be contracted upon. Under the assumption that coordination is important for building unique capabilities (for example, to reduce costs), the firm will not operate at its efficient frontier. Thus, 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 $B$. Potential entry has two important effects. First, the threat of entry reduces profitability in market $B$, making the diversified strategy less attractive for the incumbent. Second, the threat of entry provides the incumbent with additional entry-deterrence incentives to stick to $A$. Both effects increase the likelihood that the incumbent will stick to 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 unique capabilities, the firm has also a better chance of preventing entry in market $A$.

The development of a theory linking competition and organizational change is our key contribution. This simple theory has many interesting implications. Here we briefly discuss three of them.

1. **Strategic positioning and investment in organizational capabilities are complements.** They are both fostered by competition. In our model, commitment to a narrow strategy leads to more investment in strategy-specific capabilities, which by its 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 create cost inefficiencies.** In neoclassical economics, monopolies 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). Our model generates these 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 narrow strategy, which then creates coordination problems.

(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.

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 or 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 $A$. The source of monopoly power in market $A$ is the incumbent’s ownership of a unique resource, which allows it to have lower marginal costs than its competitors. At some date in the future, the incumbent may have an option to enter in a new market $B$. Entry in $B$ might be profitable as the incumbent’s unique resource can be leveraged across different markets. The incumbent’s decision is whether to retain 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.$^1$

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 regarding which of these two products will have higher demand. Define a random variable $d \in \{A, B\}$, the *demand shock*, and let $\rho$ denote the probability that $d = A$. We interpret the parameter $\rho$ as the probability that $A$ has higher demand than $B$. Consumers are

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$^1$Here 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.
heterogeneous, thus a niche market for each of the two products always exists. The demand for good \( g \in \{A, B\} \) is given by\(^2\) \( X_g = \alpha_g - \beta P_g \), where \( P_g \) is the price and

\[
\alpha_g = \begin{cases} 
\alpha + \delta & \text{if } d = g \\
\alpha & \text{if } d \neq g.
\end{cases}
\]

Thus, \( \delta > 0 \) is a demand shifter that increases demand for \( g \) with probability \( \rho \).\(^3\)

**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. CEOs 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." The precise modeling of this transition (and how it depends on workers’ coordination and efforts) is explained in the next subsection.

Similarities in the production technologies of the substitutes allow the incumbent to expand into market \( B \). Under the status quo, the incumbent’s (constant) marginal cost of producing either \( A \) or \( B \) is \( C > 0 \). With a new set of practices and routines the incumbent develops a *unique capability* in \( A \). When this capability is exploited (i.e. when workers adapt to new practices and routines) the marginal cost of producing \( A \) falls to zero (a normalization). 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

\(^2\) Linearity of demand is a simplifying assumption and could be relaxed, as long as demand functions fulfill the following assumption:

\[
X_A(P; A) > X_B(P; A) \quad \text{for all } P, \quad \text{and}
\]

\[
X_A(P; B) < X_B(P; B) \quad \text{for all } P.
\]

\(^3\) The 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.
chooses to diversify and produce 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 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. Whether the incumbent diversifies or focuses on market $A$ is decided by the CEO.

**Potential entry.** There is one potential competitor (the entrant), who may enter either in one market or in both markets simultaneously. We assume that a company, which is indifferent between entering a market or not, will abstain from that market. The entrant has marginal cost $C$ in market $g$ with probability $(1 - \tau_g)$ and marginal cost $C_e \in (0, C)$ with probability $\tau_g$. That is, there is a chance that the entrant is more efficient than the incumbent under the status quo (the entrant is never as efficient as the incumbent who abandoned the status quo). For simplicity only, we assume that $\tau_A$ and $\tau_B$ are independent distributions. We do not allow for organizational change within the entrant: in order to build a specific capability a company needs to be present in the respective market.

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4Even 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 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.

5Our setup is equivalent to a model with two competitors, in which one can only enter market $A$ and the other market $B$.

6As it will become clear this is equivalent to assuming that the competitor needs to pay a small cost $\beta > 0$ to enter each market and the company incurs the cost $\beta$ to enter market $B$.

7Our 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.
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 $A$.

At period 1, the incumbent develops a unique capability in $A$ or not.\textsuperscript{8} This becomes common knowledge.

At period 2, before making entry decisions, both the CEO of the incumbent firm and the CEO of the entrant observe their own and each other’s marginal costs and the realization of $d$.\textsuperscript{9} The incumbent firm has the first-mover advantage; its CEO makes an irreversible decision of whether or not to enter $B$, and the entrant follows by choosing whether to enter in each market.

At period 3, goods are produced and sold. If there is entry and two firms operate in the same market, firms compete in price by playing a Bertrand game. Otherwise, firms choose prices that maximize their monopoly profits.\textsuperscript{10}

\textbf{2.2. Organizational Change}

An important assumption is that 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 marginal costs. 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.

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 is required because workers need to develop and learn more efficient practices and

\textsuperscript{8}The detailed modeling of this transition and how it depends on workers’ individual decisions is explained in Section 2.2.

\textsuperscript{9}Due 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.

\textsuperscript{10}This assumption is a reduced form of a game where the entrant could enter any time but never would in a SPNE if immediately after entry the incumbent can adjust prices and leave the entrant with zero profits.
routines. We abstract from compensation costs and normalize workers’ payoff if they do not change routines to zero. Changing 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).\(^{11}\) 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 benefit that is normalized to 1 only if they invest \( e \) and the status quo is abandoned.\(^{12}\) The strength of the status quo is measured by a real number \( \theta \). 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, \( \theta \) can be seen as a measure of organizational inertia, in the sense that abandoning the status quo is more difficult the larger \( \theta \) 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. \( \theta \) 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 case of a model with heterogeneous information about \( \theta \). Specifically, we assume

\(^{11}\)These 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.

\(^{12}\)The 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.
that\(^{13}\) $\theta \sim N(0,1)$ 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 $\theta$.\(^{14}\) 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 $\theta$ becomes arbitrarily small, i.e. when $\sigma^2 \to 0$. We have the following result:

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

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

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

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 assume without loss in generality that:\(^{15}\)

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

Here we note that the equilibrium has intuitive properties. First, coordination is more likely to occur under more optimistic beliefs, i.e. if $b$ is high. This is key in our analysis;

\(^{13}\)We can more generally assume that $\theta$ is normally distributed with mean $\mu$ and variance $\sigma^2>0$; all results would go through (see Angeletos et al., 2007, for details).

\(^{14}\)This 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).

\(^{15}\)In what follows the case $\theta < 0$ is equivalent to the case $\theta = 0$ and the case $\theta > 1-e$ is equivalent to the case $\theta = 1-e$. 

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is endogenously determined in equilibrium and is affected by competition and leadership styles (see Section 4). Second, coordination is more likely when the investment cost $e$ is low. Finally, coordination is more likely when $\theta$, which is a direct measure of how difficult coordination is, is low.

Such a stylized model is rich in scope. An organizational’s propensity to change can be fully described by a triplet $(\theta, e, b)$ where $\theta$ is the strength of the status quo, $e$ is the individual 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 $\theta$. 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 $\theta$ once coordination is achieved. We thus consider the role of management styles and market forces in shaping beliefs $b$.

3. Monopoly

As a benchmark case we first consider the absence of an entrant in period 2 ($\tau_A = \tau_B = 0$); that is, the incumbent is a monopolist in market $A$ and, if it decides to diversify, in market $B$ as well. The firm’s profit in market $g$ is given by

$$\frac{(\alpha_g - \beta C_g)^2}{4\beta}.$$ 

where $C_g \in \{0, C\}$ is the marginal cost in market $g$. To save on notation, we define $c \equiv \beta C$ and to streamline the exposition we let $\beta = 1/4$. We assume that $\alpha > c$ to eliminate the corner solution of zero production in the low demand market.

The incumbent’s marginal cost is either zero or $C$ in market $A$ and always $C$ in market $B$. 

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The CEO can choose between two strategies $s \in \{A, AB\}$, where $A$ is the focused strategy and $AB$ is the diversification strategy.

Denote the monopoly profits by $\Pi(s, d, y)$, 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 cooperate. Then the CEO’s optimal strategy is a function $s^*(d, y) : \{A, B\} \times [0, 1] \to \{A, AB\}$ with

$$s^*(d, y) \in \arg \max_{s \in \{A, AB\}} \Pi(s, d, y) \text{ for } (d, y) \in \{A, B\} \times [0, 1].$$ (1)

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 Lemma 1. Furthermore, the belief has to be consistent with the CEO’s optimal strategy conditional on change of the status quo. To be more precise we define the following:

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

1. the belief $b^*$ is correct, i.e.
   $$b^* = \rho \Pr(s^*(A, 1) = A) + (1 - \rho) \Pr(s^*(B, 1) = A),$$

2. the mass $y^*$ of workers who change routines is given by optimal worker behavior:
   $$y^* = \begin{cases} 1 & \text{if } b^* \geq \frac{\epsilon}{1-\delta} \\ 0 & \text{if } b^* < \frac{\epsilon}{1-\delta}. \end{cases}$$ (2)

We refrain from incorporating the CEO’s strategy $s^*(d, y)$ (as defined by (1)) in the notation for equilibrium to keep the exposition simple.

**Proposition 1** For any set of parameters $\epsilon, \alpha, \delta, c$ and $\rho$, a unique equilibrium exists. The equilibrium is fully characterized by (2) and
1. $b^* = 0$ if $(\alpha + \delta - c)^2 + (\alpha - c)^2 > (\alpha + \delta)^2$

2. $b^* = 1$ if $(\alpha + \delta - c)^2 + (\alpha - c)^2 \leq \alpha^2$

3. $b^* = \rho$ if $(\alpha + \delta - c)^2 + (\alpha - c)^2 \in (\alpha^2, (\alpha + \delta)^2]$

Proof. As $\Pi(s, d, y)$ is constant in $y \in [0, \theta]$ and $y \in [\theta, 1]$ it suffices to know the values of $\Pi(s, d, 1)$ to characterize equilibria. Monopoly profits are given by $\Pi(A, A, 1) = (\alpha + \delta)^2$ and $\Pi(A, B, 1) = \alpha^2$.

Furthermore, as $\Pi(A, B, d, y) = (\alpha + \delta - c)^2 + (\alpha - c)^2$ for any $(d, y)$ we can use the following abbreviation $\Pi(AB) \equiv \Pi(AB, d, y)$.

1. Because $\Pi(AB) > \Pi(A, A, 1)$ we have that $s^*(A, 1) = s^*(B, 1) = AB$ implying $b^* = 0$ and $y^* = 0$.

2. Because $\Pi(A, B, 1) \geq \Pi(AB)$ we have that $s^*(A, 1) = s^*(B, 1) = A$ implying $b^* = 1$ and $y^* = 1$.

3. We have that $\Pi(A, A, 1) \geq \Pi(AB) > \Pi(A, B, 1)$ which implies that $s^*(A, 1) = A$ and $s^*(B, 1) = AB$ and hence $b^* = \rho$. If $\rho \geq \frac{\theta}{1-\theta}$ then $y^* = 1$, while if $\rho < \frac{\theta}{1-\theta}$ then $y^* = 0$. In the latter case we have that $s^*(A, 0) = s^*(B, 0) = AB$, i.e. in equilibrium the incumbent chooses $AB$ regardless of $d$.

From Proposition 1 and its proof it can easily be seen that

Corollary 1 The incumbent’s expected profit in equilibrium

$$\pi^* = \rho \Pi(s^*(A, y^*), A, y^*) + (1 - \rho) \Pi(s^*(B, y^*), B, y^*)$$

is as follows:
1. If $(\alpha + \delta - c)^2 + (\alpha - c)^2 > (\alpha + \delta)^2$, then

$$\pi^* = (\alpha + \delta - c)^2 + (\alpha - c)^2.$$ 

2. If $(\alpha + \delta - c)^2 + (\alpha - c)^2 \leq \alpha^2$, then

$$\pi^* = \rho(\alpha + \delta)^2 + (1 - \rho)\alpha^2.$$ 

3. If $(\alpha + \delta - c)^2 + (\alpha - c)^2 \in (\alpha^2, (\alpha + \delta)^2]$ and

3.a. $\rho \geq \frac{\alpha}{1 - \rho}$, then

$$\pi^* = \rho(\alpha + \delta)^2 + (1 - \rho)\left[(\alpha + \delta - c)^2 + (\alpha - c)^2\right],$$

3.b. $\rho < \frac{\alpha}{1 - \rho}$, then

$$\pi^* = (\alpha + \delta - c)^2 + (\alpha - c)^2.$$ 

In the first two cases, the first-best outcome is implemented in equilibrium. In case 1, the incumbent always wants to diversify regardless of its marginal cost of producing $A$. Then, it never pays off for workers to adapt to new routines. In case 2, if the marginal cost of producing $A$ is zero, the firm always prefers to focus on $A$. Workers then rationally believe that the incumbent will focus on $A$ if the specific capability is built, and this is sufficient to induce cooperation. Case 3 is the most interesting: the incumbent diversifies unless there is coordination and a positive demand shock in market $A$. Compared with the first best, there could be too little coordination: for values of $\rho \in [\epsilon, \frac{\alpha}{1 - \rho})$, coordination is not achieved despite being efficient. This is a dynamic inconsistency problem. The CEO would like to commit to $A$ to give workers incentives for coordination. However, ex post the CEO always chooses the industry with the highest demand, so commitment is not possible. If switching is very likely (low $\rho$) or coordination is very costly or difficult (high $\epsilon$ and $\theta$),

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16It is straightforward to check that all three cases are possible. Case 1 happens when $c$ is sufficiently low. Case 2 arises when $c \rightarrow \alpha > \delta$. A sufficient (but not necessary) condition for case 3 to arise is $\alpha = 2c$. 

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there is no coordination and unique capabilities are not created. This is a situation of real X-inefficiencies. Profits could be higher and workers would be better off if they could coordinate and invest in reducing costs for \( A \). 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.

4. Competition

In this section we consider an incumbent who faces potential competition in both markets \((\tau_A, \tau_B \geq 0)\). For simplicity, from now on we focus only on case 3 as defined in Proposition 1, as this is sufficient to illustrate all the important trade-offs.

**Assumption A2** \((\alpha + \delta - c)^2 + (\alpha - c)^2 \in (\alpha^2, (\alpha + \delta)^2)\).

Let \((M_A, M_B)\) denote the realization of the entrant’s marginal costs in each market. The incumbent’s profit and choice of strategy is now contingent on this information. If we denote the incumbent’s profit by \(\Pi(s, d, y, M_A, M_B)\) then, similarly to the previous section, the optimal strategy is given by

\[
 s^* (d, y, M_A, M_B) \in \arg \max_{s \in \{A, AB\}} \Pi(s, d, y, M_A, M_B)
\]

for \((d, y, M_A, M_B) \in \{A, B\} \times [0, 1] \times \{C_e, C\}^2\).

Similarly to the monopoly case, an equilibrium of the competition game is a tuple \((b^*, y^*)\) where the belief \(b^*\) is correct, i.e.

\[
b^* = \rho \Pr(s^*(A, 1, M_A, M_B) = A) + (1 - \rho) \Pr(s^*(B, 1, M_A, M_B) = A),
\]

and the mass \(y^*\) of workers who change routines is given by (2).

The following Proposition characterizes the equilibrium
Proposition 2 For any set of parameters $e, \alpha, \delta, c, \rho$ that fulfill $A1$ and $A2$, a unique equilibrium exists. This is fully characterized by (2) and

1. $b^* = \rho + (1 - \rho) \tau_B$ if $\delta > c$.

2. $b^* = \rho + (1 - \rho) (\tau_B + (1 - \tau_B) \tau_A)$ if $\delta \leq c$.

Proof. See the Appendix. ■

Under competition, a change in corporate focus (i.e. playing $s = AB$) becomes less attractive ex post for two reasons. First, alternative markets are less attractive if contested and, second, staying focused (and consequently becoming more efficient) is necessary to deter entry in one’s home market. 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 the previous proposition).

Corollary 2 Tougher competition (i.e. an increase in $\tau_A$ or $\tau_B$) improves corporate focus and coordination inside the firm (i.e. it increases $b^*$ and the set of $\theta$ for which coordination 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 $\tau_A$ and $\tau_B$ on $b^*$. ■

This result illustrates an intuitive but yet insufficiently formalized effect: competition improves efficiency not only by increasing output but also by reducing costs. Our model formalizes this idea and suggests an explicit mechanism through which this effect operates. If improvements in operational efficiency require the implicit coordination of workers and managers inside the firm, competition may help coordinate their efforts by increasing the
The relative attractiveness of focusing the existing business rather than diversifying.\textsuperscript{17}

**Corollary 3** Tougther competition may increase the incumbent’s profits.

**Proof.** Assume $\delta > c$ (a very similar argument can be made for the case $\delta \leq c$). We first consider the case $b^* > \frac{c}{1-\theta}$, i.e. $y^* = 1$. If $d = A$ (which happens with probability $\rho$) it is always optimal for the incumbent to concentrate on market $A$ only (which gives a profit of $(\alpha + \delta)^2$). If $d = B$ it is optimal to either diversify (if $M_B = C$) or to focus on $A$ (if $M_B = C_\varepsilon$). In the latter case the payoff is $\alpha^2$ in the former depending on whether $M_A = C$ or $M_A = C_\varepsilon$ it is $(\alpha - c)^2 + (\alpha + \delta - c)^2$ and $(\alpha + \delta - c)^2$ respectively. Thus the incumbent’s expected profit is

$$\pi^* = \rho (\alpha + \delta)^2 + (1 - \rho) \tau_B \alpha^2 + (1 - \rho) (1 - \tau_B) \left[ (1 - \tau_A) (\alpha - c)^2 + (\alpha + \delta - c)^2 \right].$$

(3)

If $b^* < \frac{c}{1-\theta}$ (i.e. $y^* = 0$) we have that diversification is optimal if and only if $M_B = C$ and thus we have that

$$\pi^* = \rho \left[ (1 - \tau_A) (\alpha + \delta - c)^2 + (1 - \tau_B) (\alpha - c)^2 \right] + (1 - \rho) \left[ (1 - \tau_A) (\alpha - c)^2 + (1 - \tau_B) (\alpha + \delta - c)^2 \right].$$

(4)

As (3) > (4) we have that $\pi^*$ is increasing (it jumps upwards) at values $\tau_A$ for which $b^* = \rho + (1 - \rho) \tau_B = \frac{c}{1-\theta}$.

This seemingly counter-intuitive result is explained by the positive effect of competition on 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 $\frac{c}{1-\theta}$ to just above $\frac{c}{1-\theta}$. More intuitively, an increase in competition can eliminate the negative effect of the CEO’s commitment problem and induce

\textsuperscript{17}There is a literature that shows that a cost reducing innovation is more valuable in a competitive than in a monopolistic market environment (see Chapter 10 in Tirole, 2003). Our point here is related to literature on X-inefficiency, see subsection 4.1.

17
investments in a more efficient organizational configuration. Competition reduces expected profits everywhere but at \( b^* = \frac{c}{1+\theta} \), where profits jump upwards due to the elimination of inefficiencies.

### 4.1. 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 a reduction in production costs and the associated higher contracting costs, and consequently are not inefficiencies per se. Raith (2003) develops a model that shows how market structure affects costs. Greater competition increases a firm’s marginal incentive to reduce costs: firms evaluate the production costs versus agency costs trade-off more favorably, and thus provide stronger incentives to their managers in order to reduce costs.

In contrast, our model highlights a different source of X-inefficiencies: coordination failure. 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. We do not have agency costs in
our model or, to be more precise, a CEO cannot incentivize the adoption of new routines as individual adoption is not observable. In that sense, agency costs are prohibitively high independent of the presence of competition.\footnote{We require the existence of some benefits to workers for adopting new routines if they are put into practice. These individual benefits potentially exist independently of market structure.} The consequences of this contractual incompleteness (i.e. the presence of X-inefficiency) cannot be alleviated by the CEO, but only by competitive forces. In the next subsection, we consider a possible substitute for competitive pressure: a CEO with a visionary leadership style.

### 4.2. Optimal Leadership Styles

In this section we ask how a CEO’s "leadership style" affects organizational configuration and the incumbent’s 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 

\begin{itemize}
  \item \textit{flexible} (type \( f \)) or 
  \item \textit{visionary/committed} (type \( v \)).
\end{itemize}

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 \( d, M_A \) and \( M_B \), 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).

If \( l = f \), profits depend on whether \( \delta \leq c \) or \( \delta > c \) (see Proposition 2). We concentrate on the more interesting and complicated case \( \delta \leq c \) where both the direct and the indirect competition effects are present.\footnote{The case \( \delta > c \) leads to the same qualitative results.} If \( l = v \), then \( b^* = 1 \) and expected profit under a committed type is

\[ \pi_v = \rho (\alpha + \delta)^2 + (1 - \rho) \alpha^2. \]
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 enters \( B \), thus the strength of competition in \( B \) is not relevant for the incumbent.

The optimal (i.e. profit maximizing) leadership style depends on \( \rho \). If \( \rho \) 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 \( \rho \) 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 \( B \). The following proposition describes the optimal leadership style.

**Proposition 3** Assume \( \delta \leq c \). The optimal choice of leadership style \( l^* \in \{p, v\} \) 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

\[
\rho^h = \frac{e + (1-\theta)(\tau_A\tau_B - \tau_A - \tau_B)}{(1-\theta)(1+\tau_A\tau_B - \tau_A - \tau_B)} \quad (5)
\]

and

\[
\rho^l = \frac{(1-\tau_B)(\alpha + \delta - c)^2 + (1-\tau_A)(\alpha - c)^2 - \alpha^2}{(\alpha + \delta)^2 - \alpha^2 - (\tau_B - \tau_A) \left[(\alpha + \delta - c)^2 - (\alpha - c)^2\right]} \quad (6)
\]

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

If \( b^* < \frac{e}{1-\theta} \) we directly compare \( \pi_v \) with the expected profits under a flexible leader:

\[
\pi_f = \rho \left[(1-\tau_B)(\alpha - c)^2 + (1-\tau_A)(\alpha + \delta - c)^2\right] \\
+ (1-\rho) \left[(1-\tau_B)(\alpha + \delta - c)^2 + (1-\tau_A)(\alpha - c)^2\right].
\]

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 $\rho$, while the committed style is optimal for intermediate values of $\rho$ (provided that $\rho' < \rho^h$). 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 $\rho$ is low enough ($\rho \leq \rho'$), 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 $(1 - \rho)(1 - \tau_A)(1 - \tau_B)$. Unless $\rho$ 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* ($\rho$ not too low) but *risky* ($\rho$ not too high). For undertaking focused

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20 A committed CEO only selects the sub-optimal market if $d = B$, $M_A = C$ and $M_B = C$. If $\delta > c$ a committed CEO makes the wrong decision with probability $(1 - \rho)(1 - \tau_B)$ (i.e. if $d = B$ and $M_B = C$).
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 \(\tau_A\) and \(\tau_B\)). As above, if the status quo is believed to be abandoned anyway (i.e. if \(b^* \geq \frac{\epsilon}{1-\theta}\)), a flexible leadership style is clearly more profitable (ex-ante). Thus 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 \((l = f)\). This resembles Case 1 from above: if competition is sufficiently high coordination can be achieved without commitment. We have that \(\tau^h(\rho)\) is decreasing in \(\rho\). In particular, competition can substitute for inadequacy of a focused business strategy: a drop in \(\rho\) can be compensated by an increase in \(\tau_A\) and/or \(\tau_B\) such that the lowest parameter \(\theta\) for which coordination can be achieved stays the same.

Substitutability of \(\rho\) and \(\tau_B\) is intuitive; both increase the (ex-ante) attractiveness of \(A\) as compared to \(B\). In contrast, substitutability of \(\rho\) and \(\tau_A\) is less intuitive, as it relies on 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 \(\tau_A, \tau_B\) as long as \(\tau_A + \tau_B - \tau_A\tau_B\) does not cross \(\tau^h(\rho)\). If \(\tau_A + \tau_B - \tau_A\tau_B < \tau^h(\rho)\), i.e. if organizational change does not happen under a flexible CEO, the value of commitment can be sufficiently high to make
it profitable to hire a committed CEO. This resembles Case 3 from above: commitment is more valuable than flexibility and the former can only be achieved under a committed CEO. In particular, if the value of commitment is high (because \( \rho \) is "large" and/or because the benefits of organizational change as measured by \( c \) are large), it is possible that the optimal leadership style is \( l = v \) for all levels of competition \( \tau_A, \tau_B \) with \( \tau_A + \tau_B - \tau_A \tau_B < \tau^h(\rho) \).

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. \( \delta \leq c \)) a visionary CEO can only be optimal if both markets are relatively uncontested \((\tau_A + \tau_B - \tau_A \tau_B < \tau^h(\rho))\). If however the value of organizational change is small \((\delta > c)\) defending the core business is never a profitable strategy for a flexible CEO. Thus a visionary CEO can only be optimal if market \( B \) is relatively uncontested \((\tau_B < \tau^h(\rho))\); competition in the core business \( A \) has no impact on her strategy and consequently cannot determine her optimal trait.

5. 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

21 A sufficient condition for this to hold is \( \frac{(\alpha - c)^2 + (\alpha + \delta - c)^2 - \alpha^2}{(\alpha + \delta)^2 - \alpha^2} < \rho \).

22 The CEO might decide to stay focused on \( A \) only because of a positive demand shock for that market.
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) competition 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.

6. Appendix

Proof of Proposition 2:
The relevant incumbent’s profits are given by \( \Pi(A, B, 1, M_A, C_e) = \alpha^2 \), \( \Pi(A, B, 1, M_A, C) = \alpha^2 \), \( \Pi(AB, B, 1, C, C_e) = \alpha^2 \), \( \Pi(AB, B, 1, C_e, C_e) = 0 \), \( \Pi(A, A, 1, M_A, C) = (\alpha + \delta)^2 \), \( \Pi(AB, d, 1, C, C) = (\alpha + \delta - c)^2 + (\alpha - c)^2 \), \( \Pi(AB, A, 1, C_e, C) = (\alpha - c)^2 \) and \( \Pi(AB, B, 1, C_e, C) = (\alpha + \delta - c)^2 \).

1. If \( M_B = C_e \) entering market \( B \) is for the incumbent not profitable conditional on \( y = 1 \) as \( \Pi(A, B, 1, M_A, C_e) \geq \Pi(AB, B, 1, M_A, C_e) \) and the CEO chooses the focused strategy regardless of the realization of \( d, y \) and \( M_A \), i.e. \( s^*(d, 1, M_A, C_e) = A \). If \( M_B = C \) then conditional on \( y = 1 \) focussing on market \( A \) is profitable if and only if \( d = A \) (i.e. we have \( s^*(A, 1, M_A, C) = A \) and \( s^*(B, 1, M_A, C) = AB \) as \( \Pi(A, A, 1, M_A, C) \geq \)
Π(AB, A, 1, MA, C) and Π(A, B, 1, MA, C) < Π(AB, B, 1, MA, C) (the latter inequality follows from δ > c). This implies that Pr(s*(A, 1, MA, MB) = A) = 1, Pr(s*(B, 1, MA, MB) = A) = τB and b* = ρ + (1 − ρ)τB.

2. We have already shown that s*(d, 1, MA, Ce) = A. The only difference to case 1 is that Π(A, B, 1, Ce, C) ≥ Π(AB, B, 1, Ce, C) and the CEO chooses the diversification strategy (conditional on y = 1) if and only if d = B and MA = C (if MA = Ce she now prefers to defend the contested market A). To be more precise we have that s*(A, 1, MA, C) = A, s*(B, 1, Ce, C) = A and s*(B, 1, C, C) = AB. This implies that Pr(s*(A, 1, MA, MB) = A) = 1, Pr(s*(B, 1, MA, MB) = A) = τB + (1 − τB)τA and b* = ρ + (1 − ρ)(τB + (1 − τB)τA).

References


