Strategic Reorganizations in Stable Environments

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Abstract
A key challenge in the literature has been to provide an explanation for the fact that observed reorganizations seem to be substantially more drastic and numerous than implied by changes in environmental conditions. This paper offers an explanation based on the observation that contracts are necessarily incomplete, and therefore there exists a multitude of everyday circumstances in which opportunistic behavior, such as collusion and rent seeking, can and does take place in organizations. Therefore, a dynamic organizational structure, with periodic reorganizations, can reduce the incentives for collusion and rent seeking activities and improve the performance of an organization, even if environmental conditions are stable.

Keywords: Reorganizations, dynamic organizational structure, incentives in organizations, collusion, rent seeking behavior.

JEL codes: D23, L23
1 Introduction

Corporations worldwide are not stagnant structures, but are characterized by considerable dynamic behavior and periodic reorganizations. Wave after wave of restructuring attempts such as downsizing, mergers, takeovers, consolidations, divestitures, and other organizational changes, have drawn the attention of investors, politicians and scholars. Nickerson and Zenger (2002) discuss how several well-known corporations, such as Hewlett Packard and Ford Motor Company, have historically alternated between centralization and decentralization. Halperin and Bell (1992) summarize the metamorphoses undergone by many other corporations, such as Sears, IBM, and May Department Stores. More recently, corporations such as Marriott, Xerox, AT&T, General Motors, and Intel, have also carried out massive restructuring efforts.

There are multiple accounts of the causes that prompt organizational change. Early studies recognized the response to changing environmental conditions, such as prices and technology, as a fundamental factor behind reorganizations. The subsequent literature has provided additional explanations for the observed frequent changes in organizational form, including managers seeking to leave their mark in an organization and fads in managerial behavior.\(^1\) Although the previous literature has considerably improved our understanding of reorganizations, a key theoretical challenge in the literature has been to provide an explanation for the fact that observed reorganizations seem to be substantially more drastic and numerous than implied by changes in environmental conditions (Nickerson and Zenger, 2002).

To explain why organizational modulation may take place in stable environments in which there is no change in managerial knowledge, corporate strategy, or external conditions, Milgrom and Roberts (1995) use a model of search and adjustment in which organizations have limited knowledge of the optimal orga-

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\(^1\)For the early literature on the effects of changes in environmental conditions on reorganizations see McCaskey (1976), Reimann and Negandhi (1976), Scott (1981), and Milgrom and Roberts (1995). The subsequent literature on fads and managerial behavior includes Bikhlchandani, Hirschleifer, and Welch (1992), Banerjee (1992), and Abrahamson (1996).
izational structure. A different approach is suggested in Nickerson and Zenger (2002), who present a dynamic model in which vacillations can exist in stable environments as a consequence of (i) the availability of a limited set of discrete organizational modes (e.g. centralization and decentralization) and (ii) the presence of organizational inertia. In such environments, an organization may attempt to keep its structure close to optimal by vacillating between discrete modes that straddle the optimal (but not directly adoptable) organizational form. Due to organizational inertia, this process will tend to offer approximate dynamic optimality over time.

This paper confronts the aforementioned challenge from a different perspective. To explain the occurrence of reorganizations in stable environments, we focus on the different incentives induced by dynamic and static organizational structures. The basic framework is based on the observation that contracts are necessarily incomplete, and therefore the members of an organization have discretion over a number of non-contractible variables that impact organizational performance but cannot be directly controlled by the formal organizational structure. The main implication of incomplete contracts is the existence of conditions for opportunistic behavior which can adversely affect performance, including suboptimal use of resources, collusion, and rent seeking (Tirole, 1986; Milgrom, 1988). However, it is important to recognize that the formal organizational structure induces a strategic game for the members of the organization, where the non-contractible variables are determined in equilibrium. Therefore, although the formal organizational structure cannot directly determine the non-contractible variables, variation in the formal structure will have important implications for equilibrium behavior.

Intuitively, we view the interaction of the organization and its members as a dynamic game, where in each period the organization chooses its organizational structure and the members choose their non-contractible actions. A stable organizational structure induces a repeated game that facilitates collusion and provides incentives for creating and maintaining rents, which over time reduce the productive capacity of the organization. In those circumstances, a dynamic
organizational structure can improve performance by inducing an equilibrium with less collusion and rent seeking activities. For example, restructuring can break collusive collaborations and will reduce the incentive to create and maintain rents that are associated with a particular position in the organizational hierarchy. We call such periodic reorganizations “strategic reorganizations” because they represent strategic actions on the part of the organization to improve performance.²

The rest of the paper proceeds as follows. Section 2 introduces the basic framework of the paper and discusses how the behavior of the members of the organization, and therefore the performance of the organization, are determined in equilibrium. Section 3 discusses a number of dynamic organizational strategies which can improve performance in the context of collusion. Section 4 extends the previous analysis to other situations, such as rent seeking behavior, and provides additional discussion of the assumptions and the results. Finally, Section 5 contains our conclusion and suggestions for future research.

2 The Basic Framework

In this section we introduce a relatively simple framework to investigate the question of why reorganizations may be take place in stable environments. The analysis is based on the observation that contracts are necessarily incomplete and therefore the members of an organization have discretion over a number of non-contractible variables which determine the performance of the organization. The formal organizational structure only induces a “strategic game” for the members of the organization and the non-contractible variables are determined in equilibrium. Therefore, while the formal organizational structure cannot directly determine the non-contractible variables, variation in the formal structure may alter the equilibrium behavior of employees.

An organizational form describes the hierarchical structure, the allocation of members to managerial positions and production teams, the compensation

²Hence, our framework is closely related to the analysis of dynamic incentive problem as in Holmström (1999).
system, and more generally any contractible actions for the members of the
organization. Denote by $\Sigma$ the set of possible organizational forms. In addition,
denote by $\omega \in \Omega$ the exogenous environmental conditions such as the state of
technology, prices of inputs and outputs, and external industry or economy wide
conditions. Finally, assume the organization consists of a principal, who controls
the organizational structure, and a number $N$ of employees, referred to as the
members of the organization.

The interaction between the principal and the members of the organization is
viewed as a dynamic game. In each period $t \in \{0, 1, 2, \cdots \}$, the principal and the
members of the organization play the "stage game" described by the following
sequence of actions: (i) the environmental conditions $\omega_t \in \Omega$ are determined
by nature, $^3$ (ii) the principal observes the environmental conditions and selects
an organizational form $\theta_t \in \Sigma$, which induces a strategic game $G(\theta_t, \omega_t)$ for the
members, and (iii) the members of the organization observe the environmental
conditions and the organizational structure and choose their non-contractible
actions. Hence, the organizational form induces a strategic game $G(h^t, \theta_t, \omega_t)$
for the members of the organization, where $h^t \in H^t$ represents the history of
the organization in terms of the previous sequence of environmental conditions,
organizational forms, and non-contractible actions, and the non-contractible
actions are determined in equilibrium.

Denote by $a_t \in A^t_1 \times \cdots \times A^t_N$ the vector of non-contractible actions for the
members of the organization. In addition, denote by $\Pi_t = \Pi(h^t, a_t, \theta_t, \omega_t)$ and
$u^i_t = u^i(h^t, a_t, \theta_t, \omega_t)$ the per period payoff functions of the principal and the
members of the organization, respectively. Finally, if we denote by $\delta \in (0, 1)$
the rate of time preferences, $^4$ the overall payoff functions of the principal and
the members of the organization are

$$\Pi = \sum_{t=0}^{\infty} \delta^t \Pi_t \quad \text{and} \quad U_i = \sum_{t=0}^{\infty} \delta^t u^i_t \quad (1)$$

$^3$For completeness, we may assume there is an exogenous function $P : \Omega \to \Omega$ describing
the transition probabilities for the environmental conditions.

$^4$The rate of time preferences could vary over time, but this only strengthens the case for
reorganizations.
Formally, a strategy for the principal, referred to as the organizational strategy, is a sequence of functions \( s = \{s_i\}_{i=0}^{\infty} \) where \( s_i : H^i \times \Omega \rightarrow \Sigma \) determines the organizational structure as a function of the history of the organization and the environmental conditions in the given period. A strategy for a member of the organization is a sequence of functions \( x_i = \{x_i^t\}_{t=0}^{\infty} \) where \( x_i^t : H^i \times \Sigma \times \Omega \rightarrow A_i^t \) describes the non-contractible actions as a function of the history of the game and the environmental conditions and organizational structure in the given period. An organizational strategy is said to be static if stable environmental conditions imply a stable organizational form.\(^5\) Otherwise, the organizational strategy is said to be dynamic.

An intuitive interpretation of the basic framework of the paper can be given in terms of the notion of the production function. In our framework, the production function depends on the organizational form as well as on the non-contractible actions of the members of the organization. The addition of the organizational structure directly as a variable in the production function generalizes it to accommodate for the fact that production is possible under various organizational forms. For instance, centralized and decentralized organizations can be used to organize production. In addition, production depends on the non-contractible actions of the members of the organization, which cannot be directly controlled by the organizational form.

The notion of stationarity plays an important role in our basic framework. A production function is said to be stationary if it does not depend on the history of the organization, either directly or through the equilibrium non-contractible actions of the members of the organization. In other words, the production functions is stationary if it depends only on the current environmental conditions, organizational form, and non-contractible actions of the members of the organization. The assumption of stationarity can be restrictive. For instance, in situations in which there is “learning-by-doing”, the history of the organization will enter the production function directly. In addition, the history of

\(^5\)In this context, “stable” environmental conditions need not imply “deterministic” environmental conditions. A stochastic environment can be stable if there is no change in the underlying parameters generating the stochastic behavior.
the organization may enter the production function directly because “rent seek- ing” activities can make the organization increasingly less productive over time. Finally, even if the history of the organization does not enter the production function directly, the equilibrium non-contractible actions may depend on the history of the organization, as would happen if there is “collusion” against the organization in equilibrium.

As a benchmark, we will characterize the equilibrium organizational strategy under the assumption of stationarity:

i) The game is said to be stationary if the “stage game” does not depend on the history of the organization. This implies the strategic game induced by the organizational form and the per period payoff functions of the principal and the members of the organization do not depend on the history of the organization. Formally,

\[ \Pi_t = \Pi(a_t, \theta_t, \omega_t) \quad \text{and} \quad u^t_i = u_i(a_t, \theta_t, \omega_t) \quad (2) \]

ii) A strategy for a member of the organization is said to be stationary if it does not depend on the history of the organization. Formally,

\[ x^t_i(h^t, \theta_t, \omega_t) = x_i(\theta_t, \omega_t) \quad (3) \]

In other words, the prescribed non-contractible actions depend only on payoff relevant information, such as the organizational form and the environmental conditions.

Therefore, assume the game is stationary and restrict attention to stationary strategies for the members of the organization. In addition, assume the strategic game \( G(\theta_t, \omega_t) \) has a unique equilibrium for every \((\theta_t, \omega_t) \in \Sigma \times \Omega\) and denote by \( x^*(\theta_t, \omega_t) \) the equilibrium of this game. Finally, consider the one period problem

\[ \max_{\theta} \Pi(x^*(\theta, \omega_t), \theta, \omega_t) \]

and assume this problem has a unique solution. Denote by \( \theta^* = \theta(\omega_t) \) the optimal organizational form in the one period problem. Then, the equilibrium organizational strategy \( s^* = \{s_t^*\}_{t=0}^{\infty} \) for the principal is characterized by
$s^t_1(h^t, \omega_t) = \theta(\omega_t)$ and it follows the optimal organizational strategy is static because stable environmental conditions imply a stable organizational form. The previous analysis is summarized in the following proposition.

**Proposition 1** Assume (i) the game is stationary and (ii) restrict attention to stationary strategies for the members of the organization. Then, the optimal organizational strategy is static.

The implication of the previous proposition is that, if we assume a stationary game and restrict attention to stationary strategies, reorganizations occur only in response to changes in environmental conditions. However, a central contribution in this paper is to show that the previous result may not hold if we relax the assumption of stationarity. Moreover, even if the game is stationary, there may exist equilibria in non-stationary strategies. For instance, collusion may emerge as an equilibrium, which is an equilibrium in non-stationary strategies. Therefore, in this situation the optimal organizational structure is likely to be dynamic.

The framework presented in our paper offers an alternative to the existing models in the literature. As with the models in Milgrom and Roberts (1995) and Nickerson and Zenger (2002), our model provides theoretical justification for reorganizations in stable environments. However, in contrast to the earlier literature, our analysis is not based on discreteness of organizational forms, limited knowledge of the optimal organizational structure, or managerial behavioral assumptions. Instead, our framework is based on the existence of non-contractible actions which affect the performance of an organization and the different incentives provided by a dynamic organizational structure.

In most organizations, labor costs are relatively large. Therefore, the success of an organization depends to a large extent on its ability to protect or extract

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6In the model of Milgrom and Roberts (1995), limited knowledge results in a dynamic process in search of the optimal organizational structure. However, it is unclear if such dynamic behavior can persist in the long run. While the model in Nickerson and Zenger (2002) produces modulation in both the short and long run, it requires discrete organizational forms and leaves open the question of why organizations may choose drastic overhauls (e.g., centralization versus decentralization) instead of modulation between adjacent modes straddling the optimum.
rents from employees (Shleifer and Summers, 1988). As a consequence, policies that prevent opportunistic behavior, restrict the absorption of rents, and further align the incentive structure within the organization, are likely to improve performance. The remainder of the paper discusses particular dynamic organizational strategies which can improve performance in the context of collusion and rent seeking behavior.

3 Organizational Dynamics and Incentives

In this section, we illustrate how a dynamic organizational structure may provide better incentives and improve the performance of an organization. In the context of the framework introduced in the previous section, we will assume the environmental conditions are stable and will focus on the effects of a dynamic organizational structure on the equilibrium non-contractible actions of employees. For concreteness, we illustrate the main ideas in the context of collusion. As is well documented by sociologists and organization scholars, collusive relationships in organizations are widespread phenomena which negatively impact performance.

Organizations are complex networks of employees and managers. As noted in Tirole (1986) and Martimort and Verdier (2004), various relationships can form to promote personal interests, generally at the expense of the interests of the organization. The key feature of collusive relationships is that they represent informal contracts, enforced by the repeated nature of the relationship. Most of the economics literature related to collusion in organizations, such as Tirole (1986) and Laffont and Martimort (1998), emphasizes the problem of asymmetric information and generally assumes that collusive contracts are enforceable. This assumption is motivated by “reputational” concerns or norms of “reciprocity” arguments, but the dynamic relationship is not modeled explicitly.

In this paper, we model the dynamic relationship explicitly in order to better understand how a dynamic organizational structure affects the incentives for
collusion. As illustrated in Johnson (1996), a major consequence of reorganizations is the dissolution of long-term relationships among employees. Therefore, we will illustrate how a dynamic organizational structure with periodic reorganizations can decrease the possibility of collusion. The analysis is based on a straightforward framework for repeated games. The key idea is that a dynamic organizational structure affects the nature and frequency of interaction among employees.

More formally, consider a simple model for this setting in which an organization consists of $K$ teams and each team is composed of two employees, although the results readily extend to an arbitrary number of employees in each team. In addition, assume each employee can choose between high effort ($e_H$) or low effort ($e_L$), which are the non-contractible actions of the employees. Finally, assume the compensation system is based on relative performance, which induces the game illustrated in the Figure 1.

![Figure 1: Description of the one period game.](image)

The structure of the payoffs has an intuitive interpretation. In particular, the term $w \in \mathbb{R}_+$ represents the base salary, while $c \in \mathbb{R}_+$ represents the monetary cost of high effort and $b \in \mathbb{R}_+$ the punishment/reward for observed differences in performance. Denote this game by $G$ and assume $b > c > 0$, which implies the game has the structure of a prisoners dilemma game.7

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7Martimort and Verdier (2004) also model the dynamic relationship explicitly, but their focus is on the link between collusion and innovation.

8The results in this section will continue to hold in a more general model, possibly with a continuum of effort levels, as long as the equilibrium levels of effort are higher than it is jointly optimal for the members of the team.
Many production relationships in an organization exhibit the structure of a prisoners dilemma game. This type of situation typically arises in settings of imperfect or costly monitoring, where an absolute measure of output is costly to obtain or when output depends strongly on external conditions beyond the control of employees and unobservable to the principal. Nalebuff and Stiglitz (1983), Lazear and Rosen (1981), Holmström (1982), and Vickers (1985) show that in these situations, it may be optimal for the organization to monitor and reward relative performance.

Intuitively, because compensation is based on relative performance and high effort is costly, the employees obtain a higher payoff if both choose low effort than if both choose high effort. However, compensation based on relative performance implies each employee has an incentive to choose high effort regardless of what the other employee does. Therefore, the only equilibrium of the one-stage game is \((e_H, e_H)\), where the employees exert high effort, and the organization obtains its maximum payoff.

**Static Organizational Structure**

As a benchmark, consider a static organizational structure, as represented by the allocation of employees to the teams, the monitoring system, and the compensation system based on relative performance. The static organizational structure induces a repeated game for the members of each team. Moreover, if we restrict attention to stationary strategies, the only subgame perfect equilibrium is one in which the employees exert high effort in every period. However, if we allow for non-stationary strategies, the repeated game can have multiple subgame perfect equilibria. In particular, if the rate of time preferences \((\delta)\) is close to one, the collusive outcome in which the employees exert low effort in every period may be supported as a subgame perfect equilibrium outcome.

For instance, suppose each employee uses a trigger strategy, where an employee will “cooperate” (choose \(e_L\)) as long as the other employee has cooperated in every previous period and will “punish” (choose \(e_H\)) if the other employee did
not cooperate in some previous period. These strategies will form a subgame perfect equilibrium if \( \delta \geq \delta^* \), where

\[
\delta^* = \frac{b - c}{b}
\]  

(4)

The important point here is that trigger strategies are non-stationary, because they depend on the history of the game (whether or not an employee "cooperated" in all previous periods). Therefore, in this situation, a dynamic organizational structure may improve the performance of the organization by decreasing the possibility of collusion.

We caution that some care is required in interpreting these results. While it is true that when the rate of time preferences is close to one the collusive outcome can be supported as a subgame perfect equilibrium, the Folk Theorem indicates “almost anything” can be supported as a subgame perfect equilibrium. In particular, the strategies where each employee exerts high effort in every period, regardless of the history of the game, form a subgame perfect equilibrium of the repeated game. Therefore, we cannot say whether collusion will occur in equilibrium, although one can argue that the fully collusive outcome Pareto dominates all other outcomes. For these reasons we interpret the results in terms of the “possibility of collusion”, where we interpret the minimum rate of time preferences necessary to sustain collusion as a measure of its likelihood of occurrence.\(^9\)

**Dynamic Organizational Structure**

In the presence of collusive behavior, performance can be improved if the organization can implement a dynamic structure which changes the nature and frequency of employee interactions. Intuitively, an important implication of reorganizations, in which some employees are moved to new departments and other employees are replaced with new employees, is that collusive relationships are terminated. This is likely to improve performance, particularly if it takes

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\(^9\)The analysis is being carried out in the context of an infinitely repeated game but, as illustrated in Kreps, Milgrom, Roberts, and Wilson (1982), collusion may emerge even in finitely repeated games if the players have incomplete information about each other’s type.
time for new relationships to move from a non-collusive to a collusive state, because it takes time for employees to form relationships and to learn to trust each other.

As a more formal illustration of this idea, we will consider the following organizational strategies, which induce a dynamic organizational structure:

i) The "termination" strategy: The organization periodically replaces one of the members in one of the teams with a new employee. More formally, every $n_T \in \{1, 2, \cdots\}$ periods, the organization selects a team at random and with probability $p_T \in (0, 1]$ replaces one of the employees in the selected team. For simplicity, if one of the employees in a team must be replaced, assume each employee is replaced with equal probability.

ii) The "rotation" strategy: The organization periodically rotates employees from one team to another. More formally, every $n_R \in \{1, 2, \cdots\}$ periods, with probability $p_R \in (0, 1]$ there is a rotation and employees are paired with a different employee. In addition, the matching is "systematic", in the sense that all possible employee pairs are exhausted before a match is repeated.

The "termination" strategy induces a dynamic organizational structure in which the members of the organization are constantly changing. The main formal implication of the termination strategy is that a relationship is terminated periodically with positive probability. Therefore, compared to a static organizations structure, this increases the incentives of each team member to deviate from the collusive outcome. As an illustration, consider the simpler version of the termination strategy in which every period ($n_T = 1$) the organization selects one of the teams at random and with probability one ($p_T = 1$) every member of the selected team is replaced. In this situation, it is easy to see that, using the trigger strategy for each player, the collusive outcome can be supported as a subgame perfect equilibrium outcome if

\[
\left( 1 - \frac{1}{K} \right) \delta \geq \delta^*
\]  

(5)
Therefore, it follows that the dynamic organizational structure induced by the termination strategy decreases the possibility of collusion. This conclusion will hold for any termination strategy of the form \((n_T, p_T) \in \{1, 2, \cdots \} \times (0, 1]\), as can be easily shown.

Alternatively, the rotation strategy induces a dynamic organizational strategy in which the composition of teams is constantly changing. Hence, an organization can exhibit dynamic behavior even if there is no change in the members of the organization. The formal implication of the rotation strategy is that it decreases the frequency of interaction. As in the previous situation, this increases the incentive to deviate from the collusive outcome because the punishment be delayed. As an illustration, consider the simpler version of the rotation strategy in which in every period \((n_R = 1)\) there is a rotation \((p_R = 1)\), and the rotation is systematic. In addition, assume each employee can only observe the actions taken by the other member of the team. In this situation, the same employees interact with each other only every \(K\) periods (the number of teams). Therefore, if each employee use the trigger strategy, the collusive outcome can be supported as a subgame perfect equilibrium outcome if

\[
\delta^K \geq \delta^* 
\]

As in the previous situation, the dynamic organizational structure induced by the termination strategy decreases the possibility of collusion, and this conclusion can easily be derived for a more general rotation strategy.

Therefore, the implementation of a more dynamic organizational structure can decrease the possibility of collusion because it affects the incentives of the members of the organization and the equilibrium non-contractible actions. The main results of this section can be summarized as follows:

**Proposition 2** A dynamic organizational structure can decrease the possibility of collusion. Therefore, periodic reorganizations can be optimal even in stable environments.

The preceding analysis illustrates how a dynamic organizational structure
can provide better incentives than a static one. However, a number of remarks are necessary to complete the analysis. First, our results are consistent with the arguments in Tirole (1986), derived in the context of coalitions, who maintains that policies which increase mobility and shorten productive relationships have important implications for reducing collusive pressures and hence improving organizational performance.\textsuperscript{10}

The results about the rotation strategy may not hold if employees can credibly communicate information to employees in other teams. In the presence of “community enforcement”, the rotation game may not decrease the possibility of collusion because defection against one member causes sanctions by other members of the organization. For a discussion of the problem of obtaining cooperative behavior in the context of community enforcement, see Kandori (1992), Milgrom, North, and Weingast (1990), and Annen (2001). The presence of community enforcement decreases the importance of changing partners, but the results hinge crucially on the flows of information about previous play. In the presence of community enforcement, more drastic restructuring solutions may be necessary to terminate a culture of collusion against the organization.

Finally, the previous analysis assumes stable environmental conditions but frequent changes in environmental conditions can serve as a substitute for a dynamic organizational structure. This can be useful for understanding organizational structure and performance in different industries, as industries differ in terms of the frequency and magnitude of environmental shocks, and hence the probability of restructuring due to changes in environmental conditions.

### 4 Extensions and Discussion

In this section, we consider extensions of the previous analysis to other situations in which a dynamic organizational structure may increase performance. In addition, we provide some discussion of a number of key elements of the

\textsuperscript{10}Tirole (1986) suggests that practices such as external recruiting and the use of outside consultants offer evidence favoring such a claim. Despite the fact that outsiders typically have inferior knowledge about the organization, they are less subject to coalitional pressures.
analysis which we have ignored in order to emphasize the incentives provided by a dynamic organizational structure. This discussion includes the costs associated with a dynamic organizational structure as well as the problem of time inconsistency.

Extensions

A straightforward but important extension of the previous analysis concerns rent seeking behavior, which decrease the performance of an organization. The term “rents” here is used to refer to the additional compensation, directly in the form of wages or indirectly in the form of perquisites, that accrues to the holder of a job in the company, that is not typical of other such jobs. Milgrom (1988) provides a more extensive discussion of rent seeking behavior in organizations. In general, the problems with rent seeking behavior include (i) the extraction of additional compensation from the organization and (ii) the opportunity cost of the effort and resources associated with seeking rents. A number of rent seeking activities are referred to as influence activities, where an employee may use valuable time and effort trying to manipulate the decision making process. The opportunity cost of the resources expended in the process are called influence costs.

Therefore, rent seeking behavior can be thought of as activities that are aimed at redistribution of the surplus in the organization or at capturing rents that lie in the “public domain” (Barzel, 1997). As employees within an organization spend effort and resources trying to capture and maintain rents, the result is almost inevitably a situation in which the performance of the organization decreases over time. For this reason, an organization may introduce policies, such as automatic decision processes that limit discretion in decision making, to reduce incentives for rent seeking behavior. A well know example is the way in which airlines allocate routes to employees, which is an automatic decision process based on seniority. In this paper, we argue that a dynamic organizational structure can reduce the incentives for rent seeking behavior in
situations in which rents are associated with positions and their transferability across positions is limited\textsuperscript{11}.

As an illustration, consider an static organizational structure with some compensation system and some allocation of employees to different positions and assume that each employee can dedicate time either to rent seeking activities or to productive activities. In this situation, it is reasonable to assume that the payoff of the principal increases with the time employees spend on productive activities but decreases with the time employees spend on rent seeking activities. However, the payoff of an employee increases with the rents associated with their position and the formal compensation from the organization. Therefore, an employee will choose how to allocate their time to rent seeking and productive activities based on the marginal payoff from each type of activity. Finally, assume the rents associated with a particular position are a function of the time spent in rent seeking activities in the previous periods.

The main formal implication of the last assumption is that the game is not stationary, because the payoff functions of the principal and the members of the organization will depend directly on the history of the organization. Therefore, a dynamic organizational structure can potentially improve the performance of the organization by reducing the time that employees spend on rent seeking activities. For instance, as in the previous section, consider a more dynamic organizational structure in which every certain number of periods, with some probability, employees are “rotated” across positions. For example, managers may be rotated across departments. In addition, assume the transferability of rents across positions is limited. Therefore, when an employee is transferred to another position, the employee looses a fraction of the rents they had captured in the previous position.

In this situation, a dynamic organizational structure will decrease the time employees spend on rent seeking activities\textsuperscript{12}. Intuitively, in equilibrium the

\textsuperscript{11}This class of situations is likely to be relatively large. For instance, Baker, Gibbs, and Holmstrom (1996) observe that benefits and pay are associated with the position in the company, not with the person who occupies the position.

\textsuperscript{12}This conclusion can be obtained formally by employing the model in Milgrom and Roberts.
marginal payoff from rent seeking activities is equal to the marginal payoff from productive activities. As compared to a static organizational structure, a dynamic organizational structure decreases the marginal payoff from rent seeking activities, because the positive probability of a rotation and the limited transferability of rents across positions. Therefore, a dynamic organization reduces the incentives for rent seeking activities. Informally, we summarize the preceding arguments in the following proposition:

**Proposition 3** A dynamic organizational structure can decrease the incentives for rent seeking activities. Therefore, periodic reorganizations can be optimal even in stable environments.

An important implication of the previous proposition is that organizations can prevent the formation of special interests and decrease the level of influence activities by consciously trying to avoid entrenching workers and managers in positions with strong incentives for rent seeking activities. In addition, the transferability of rents has implication for understanding the type of reorganizations that may be observed. In particular, organizations may have an incentive to implement reorganizations that are associated with a low transferability of rents. This may help to explain drastic reorganizations, which has been a puzzling aspect of organizational behavior.

The evidence in Nickerson and Zenger (2002), where an organization alternates between centralization and decentralization, can be interpreted as the periodic creation and destruction of positions. Therefore, while alternating between centralization and decentralization is likely to affect incentives and performance in many ways, because of the different properties of each organizational structure in term of the use of information, the incentives for innovation, and the ability to coordinate productive activities, our results suggest that such periodic reorganizations can reduce the incentives for collusion and rent seeking.
behavior. Linbeck and Snower (2000a,b) discuss the nature of technology and human capital in the new economy and present evidence on the increased use of team production and job rotation. They explain the increased use of team production and job rotation in terms of task complementarities and the need for versatility in production. However, as we have shown in this paper, job rotation also has important implications for collusion and rent seeking activities.

In addition to collusion and rent seeking activities, there are a number of other situations in which a dynamic organizational structure can improve performance. For instance, consider the interaction between the principal and an employee in which the principal decides whether to monitor the employee and the employee decides whether to work hard. From the perspective of the principal, the optimal outcome is one in which the employee works hard and the principal does not have to monitor the employee. However, this outcome may not be supported as an equilibrium because if the principal does not monitor the employee, the employee may not have the incentive to work hard. Moreover, the only equilibrium will generally be in mixed strategies, where the principal monitors the employee only some of the time and the employee works hard only some of the time. This mixed strategy equilibrium can be interpreted as inducing a dynamic organizational structure, where periodically the manager monitors the employee and, if performance is found to be suboptimal, the manager replaces the employee with a new employee.

**Discussion**

In the previous analysis, we have illustrated how a dynamic organizational structure can improve incentives and increase the performance of an organization. However, we have ignored the costs associated with organizational change. Therefore, in this section we discuss the potential costs associated with a dynamic organizational structure. There are a number of direct costs associated with a change in the organizational structure. For instance, the new organizational structure must be designed and communicated to the members of the
organization. Moreover, changes in the organizational structure generally require costly changes in the monitoring, accounting, and information systems. For simplicity, we will focus here on the indirect costs associated with the incentives of employees.

For instance, in the context of repeated games used to analyze the possibility of collusion, there are situations in which “cooperation” by the members of a team increases the performance of the organization. These situations arise when there are strong complementarities but the actions of the employees are unobservable to the principal and therefore the principal can only provide incentives based on team performance. In this situation, the members of the team have an incentive to ”free-ride” on the work of others, and the equilibrium of the one period game can be suboptimal from the perspective of both the members of the team and the principal. Therefore, if the members of the team can observe the actions of other members, repeated interaction can facilitate cooperation and improve the performance of the organization. This suggests that, in the terminology described earlier, the use of a replacement or rotation strategy is not always optimal, and should only be employed in situations in which the repeated interaction is more likely to affect incentives and performance in a detrimental way.

In addition, there are other potential costs associated with a replacement or rotation strategy. For instance, increasing the probability that an employee will be replaced or rotated to another position may decrease their incentives to make investments which can increase their productivity and the performance of the organization. Alternatively, there may be a distortion in the investment incentives, as the employee may choose to invest in general knowledge which can be transferable across positions instead of knowledge useful only in a particular position. Therefore, in any given situation, a replacement or rotation strategy can decrease both the incentives for collusion and rent seeking activities as well as the incentives for investments that increase the productivity of an employee.

Finally, the previous analysis assumes the principal can ”commit” to a dynamic organizational structure. For instance, if the principal adopts the rotation
strategy, in which every certain number of periods workers are rotated across teams, such strategy will affect the incentives of employees only if the employees believe the principal will actually implement the rotation when the time arrives. However, if the rotation is costly and the announcement of the rotation strategy actually decreases collusion, the principal may have an incentive to delay the rotation. In other words, the optimal dynamic organizational structure may exhibit "time inconsistency". Hence, in equilibrium a reorganization will not occur until the gains from reorganization exceed the costs. Therefore, the problem of time inconsistency may explain why there is a tendency for organizations to carry out drastic reorganizations and only when performance is considerably low or when changes in environmental conditions imply additional gains from reorganization. Hence, observed reorganizations will tend to be more drastic than implied by changes in environmental conditions.\textsuperscript{13}

5 Conclusion

There is substantial evidence which indicates successful organizations exhibit a dynamic organizational structure, while organizations with a static organizational structure tend to become increasingly unproductive. The standard explanation for why successful organizations exhibit a more dynamic organizational structures is that such organizations are better able to adopt to changes in environmental conditions, and therefore more likely to be successful. This paper provides an alternative, but complementary, explanation. In particular, we have shown how a dynamic organizational structure can provided better incentives and improve the performance of an organization, even in stable environments. Therefore, this paper provides a bridge between the literature on organizational restructuring and the literature on corporate governance and incentives in or-

\textsuperscript{13}There is considerable evidence which indicates that reorganizations are more likely occur during economic downturns. For instance, Nickell, Nicolitsas, and Patterson (2001) present empirical evidence for this phenomenon and explain the evidence in terms of (i) managers and workers having more time to design and implement organizational changes and (ii) the increased probability of bankruptcy. Hence, our framework, with the associated problem of time inconsistency, provides an alternative explanation for why reorganizations are more likely to occur during "bad" times.
ganizations.

There are a number of important extensions that are beyond the scope of this paper and that we leave for future research. For instance, as previously discussed, a dynamic organizational structure may not always be optimal. Therefore, a more in-depth investigation of the nature of the production process and the non-contractible variables would be helpful for identifying the conditions under which a dynamic organizational structure can improve performance. Another area of interest concerns the question of whether a dynamic organizational structure can improve the selection of employees when employees have private information about their preferences and productivity. Finally, it would be of interest to consider how the framework introduced in this paper can be applied to other social organizations where opportunistic behavior can take place, such as political organizations.
References


