ORGANIZATIONAL CHANGE AND VESTED INTERESTS

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ORGANIZATIONAL CHANGE AND VESTED INTERESTS

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Abstract

The nature of organizational change and the value of headquarters is analyzed in a dynamic bargaining model. Organizational change can be either imposed, or voluntary and immediate, or voluntary and delayed. Headquarters derives it value from preventing surplus reducing endogenous commitments.

Keywords: Organizational change, headquarters, dynamic bargaining game.

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ORGANIZATIONAL CHANGE AND VESTED INTERESTS

The nature of organizational change and the value of headquarters is analyzed in a dynamic bargaining model. Organizational change can be either imposed, or voluntary and immediate, or voluntary and delayed. Headquarters derives it value from preventing surplus reducing endogenous commitments.

1 Introduction

Organizational change is a recurring phenomenon. Popular press accounts report frequently about mergers, divestitures, replacements of CEO's, organizational restructuring, and so on. A puzzling feature of these organizational changes is the timing of its implementation. It is observed that there are many situations in which considerable delay occurs in actually implementing a desirable organizational change. Jensen (1993) provides many examples. He estimates for General Motors '…an opportunity loss of over $100 billion in its R&D and capital expenditure program over the eleven-year period 1980 to 1990…' in postponing desirable changes. However, there are also several examples in which organizational change seems to have taken place without (much) delay. Examples are General Electric, General Dynamics and Sealed Air (Jensen, 1993).

A second puzzling aspect regarding organizational change is that it occurs regularly that all the involved parties acknowledge after the implementation that everybody knew already that something had to be changed. Postrel and Rumelt (1992, p398) observe

> 'Why is organizational change so difficult? In particular, why is it so difficult for firms to imitate best practice **even after it has been recognized for a considerable time**?'

A third aspect of organizational change is that the involved parties may have vested interests. Jensen (1993, p853) reports for example that Kodak

> 'appointed a chief financial officer well known for turning around troubled companies. (Unfortunately he resigned only several months later – after, according to press reports, running into resistance from the **current** management and board about the necessity for dramatic change.)'

A model will be developed which accounts for these aspects of organizational change. Section 2 provides an informal presentation of the model and positions it in the literature. Section 3 develops the model formally. Section 4 determines the equilibrium and formulates the comparative statics results. Finally, section 5 provides conclusions.

2 The main arguments and their position in the literature

Section 2 provides an informal presentation of the model (2.1) and the position of the model in the literature (2.2).

2.1 Main ingredients and arguments in the model

A common starting point for analyzing the above phenomena is nowadays formed by models featuring a conflict of interest and asymmetric information. Principal-agent theory and transaction costs economics are prominent examples. This paper maintains the feature of a conflict of interest, but abandones the ingredient of asymmetric information.[2] A model is presented with complete information, costs of organizational change, costs of delay, endogenous commitment and a deadline. It is assumed that the fruits of organizational change have to be divided between two local parties, e.g. employees or business units. A third party, called headquarters, decides whether organizational change will be imposed or left to the local parties. Headquarters is endowed with the power to either prevent the manoeuvring for individual shares by imposing organizational change or allow voluntary organizational change to be reached by the two local parties (which may involve delay). Imposed organizational change comes at a cost. Examples are dulled motivation of and/or resistance against such a change, dynamic economies of scale lost in changing job assignments, and costs of organizational structure changes.

Voluntary organizational change is represented by an alternating offer bargaining game of complete information with a deadline and endogenous commitment. The deadline entails that the benefits of organizational change evaporate when the parties don't come to an agreement within a certain time frame. It represents that organizational change can not be postponed indefinitely, i.e. external pressures create a deadline in internal bargaining processes. Endogenous commitment is interpreted as a vested interest. It reflects the empirical observation that the history of the bargaining process is important in determining the prestige of a negotiator. The negotiator will suffer a loss of reputation when he accepts an offer which is worse than the best (public) offer which has been received in the past. This feature is modelled by the notion of endogenous commitment in the form of non stationarity of the bargaining process, i.e. it is assumed that a proposal is not accepted when its terms are worse than the best offer which has been received in the past. The rejection of an offer entails organizational inertia (delay). An important aim of this article is to determine the circumstamces when organizational inertia will emerge.

The deadline and endogenous commitment may result in delay in reaching an agreement. Delay is costly because it reduces the pie to be shared between the two parties. It is modelled by a discount factor, which may represent either the pressure from capital or product markets, the strength of the internal control system, or the perception of the urgency of the situation by the local parties. Delay may occur despite its associated costs because the proposer in the first period may have to offer such a high share to the other party in order to get immediate acceptance that delay is preferred. Delay emerges by offering a too small share to the other party. The most attractive proposal for the proposer to get delay is to offer the responder a share 0, because this prevents that a vested interest (endogenous commitment) is built up. This proposal will be rejected by the other party in the first period. The extra benefits of reaching an immediate agreement are not sufficient in these circumstances to compensate the proposer of the first period for his disadvantageous position in the second period due to the endogenous commitment aspect of his first period proposal. The proposer claims the whole surplus in order to prevent that a vested interest for the other party is created. The parties move to the second period and reach agreement.[3]

It is shown that organizational change can be of three types. It will be either voluntary and immediate, or imposed and immediate, or voluntary and delayed. The first possibility is immediate, voluntary organizational change. It occurs when the desired change is urgent. The second possibility is that organizational change is immediate and imposed by headquarters. The benefits of preventing the

[2] There are various explanations for organizational change in an environment with asymmetric information. Examples are Ickes and Samuelson (1987), Scharfstein and Stein (1990), Boot (1992), Cramton (1992), Meyer, Milgrom and Roberts (1992), Dewatripont and Roland (1992).

[3] The two period alternating offer game can be extended to many periods without upsetting our results.

development of an unfavorable bargaining position outweighs the costs of delay for the directly involved parties when there is not much urgency with respect to organizational change and reputation loss of accepting lower offers than in the past is above a certain level. However, delay will be prevented in this situation by headquarters by an imposed organizational change when the costs of the change are lower than the costs of delay. The value of headquarters is that it is able to impose organizational change in order to break endogenous commitments. The third possibility is that organizational change will be delayed when the desired change is not perceived as being urgent and the loss of accepting lower offers than in the past is above a certain level, whereas the costs of immediate organizational change are high. The involved parties formulate unacceptable proposals for each other in order to prevent that a more reasonable proposal will create a favorable endogenous commitment for the other party. Immediate change which is desirable for the whole organization is thereby postponed. Figure 1 summarizes these results.

Costs of imposed change Urgency	Low	High
High	Voluntary change	Voluntary change
Low	Imposed change	Delay

Figure 1: Organizational change, urgency and costs of imposed change

Another way of characterizing our results is to formulate them in terms of the value added by headquarters. There is no role for headquarters in the above model when the situation is urgent or the loss of reputation is low, because the local parties know that delay would be very costly. The response of the local parties is to adopt a policy of change voluntarily and immediately. Headquarters also doesn't add value when the situation is not urgent and the costs of an imposed organizational change are high. Delay is costly, but preventing it is even more costly. Organizational change will therefore not be imposed and delay will occur. The only situation in which headquarters adds value is when the desirability of change is not perceived by the local parties as being urgent, the reputation loss is above a certain level, and the costs of imposed organizational change are low. Value is created by breaking inefficient endogenous commitments.

2.2 Literature

This article can be positioned in the management and economics literature in several ways. Rumelt et.al. (1994) characterize the field of strategic management by five research questions:

- How do firms behave?
- Why are firms different?
- What are the functions of headquarters in a multibusiness firm?
- What determines success or failure in international competition?
- Why are organizations so resistant to change?

This article addresses explicitly the third and fifth questions of this research agenda. The function of headquarters that will be stressed is the creation of value by preventing that harmful positions are chosen by local parties in the negotiation process about a desirable organizational change.

Organizations are resistant to change when costs of imposed organizational change are high compared to the costs of delay. Hypotheses are formulated regarding the circumstances in which this is expected to happen.

A second way of positioning this article is to view it as a contribution to the Coase program. The celebrated Coase theorem (1960) states that every assignment of property rights results in a Pareto efficient allocation in the absence of bargaining inefficiencies and wealth constraints. The implied research agenda is that a fruitful starting point for research on organizations is the investigation of the assumptions of efficient bargaining and no wealth constraints. Schaefer (1998) contributes to this program by relaxing the bargaining assumption from an influence costs perspective in order to analyse structural inertia. This paper investigates a relaxation of the efficient bargaining assumption in an environment of complete information. The usual assumption of stationarity of the bargaining process is relaxed. Later bargaining periods are not anymore necessarily identical to (or independent of) earlier bargaining periods, because current proposals influence the payoff structure in future bargaining periods. History matters because the rejection of a proposal by a player can not be followed by an acceptance of a worse proposal in the future by the same player without a loss (of reputation). (Inefficient) delay may be the result. Endogenous commitment does therefore not only have a distributional effect, but also a real effect in reducing the surplus which will be divided. A role for the institution of headquarters emerges. It may be able to diminish the reduction of the available surplus by breaking endogenous commitments.

Strategic management research is often distinguished between a process or content orientation. Chakravarthy and Doz (1992) characterize the difference by that 'The latter subfield focuses exclusively on what strategic positions of the firm lead to optimal performance under varying environmental contexts. In contrast, strategy process research is concerned with how a firm's administrative systems and decision processes influence its strategic positions.' Our model can be viewed as a contribution to the process oriented branch of the strategic management literature. More specifically, it focusses on bargaining problems in decision processes.

Finally, the model can be viewed as endogenously deriving whether the nature of organizational change will be top-down or bottom-up. Top-down change is predicted in circumstances which are perceived as not urgent, entail at least some loss of prestige of local negotiators in the bargaining process when offers are accepted which are lower than the highest offer in the past, and the costs of imposed organizational change don't exceed the reduction in surplus due to delay. All other situations will face bottom-up change, which is either immediate or delayed. It is delayed when there is no sense of urgency and the costs of imposed change by headquarters exceed the costs of delay. Otherwise it will be immediate.

3 Model

A non-cooperative, game theoretic model of complete information and endogenous commitments is presented. There are three parties: headquarters and two local parties. Headquarters decides about imposing organizational change. If organizational change is not imposed, then the two local parties will bargain about the distribution of the surplus which will be generated by the organizational change.

The model consists of three periods. Headquarters decides about imposing organizational change in the first period. The choice of headquarters is assumed to be driven completely by efficiency considerations. If organizational change is imposed, then the game ends. An alternating offer game (Rubinstein, 1982) starts between the two parties in the second period when organizational change is not imposed in the first period. The proposer formulates a proposal s to divide the surplus and is subsequently either accepted or rejected by the responder. It is

assumed without loss of generality that person 1 is the proposer. The game ends when the proposal is accepted. If the proposal is rejected, then the game moves to the third and final period. One of the players is randomly assigned to formulate a proposal for dividing the surplus and the other player decides subsequently about acceptance.

The fruits of organizational change are normalized to 1. The costs of an imposed organizational change are C. The Pareto-improvement of imposed organizational change is assumed to be divided equally between the two local parties. Party/person 1 receives $v_1(\delta,L,C)$ and person 2 receives $v_2(\delta,L,C)$ of the net benefits, where δ is the discount factor and L summarizes the dynamic bargaining feature.

Figure 2 represents the sequence of moves and the payoffs in the first two periods. The first (second) component of each vector represents the payoff of person 1 (2). Imposed organizational change by headquarters is reflected by the choice Y(es), whereas no imposed organizational change is reflected by N(o).

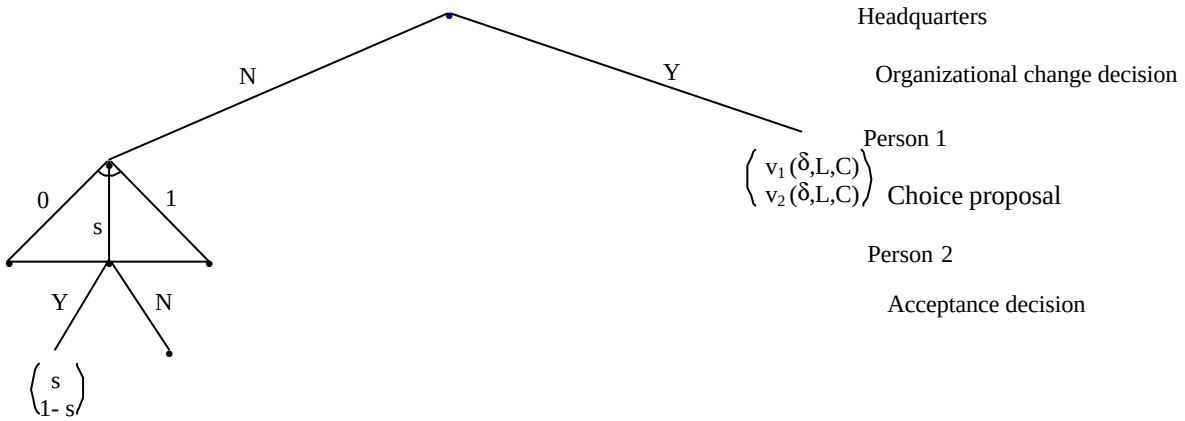

Figure 2: Extensive form of the second period

Nature determines in the first stage of the third period who will be the proposer and responder. This is done randomly and each party is equally likely to be assigned the role of proposer. The proposer asks for a share r in the second stage of the third period. The responder subsequently decides about acceptance of this proposal.

Endogenous commitment (Stahl, 1990 and Fershtman and Seidmann, 1993) entails that a proposal will have a lower value for the responder when it offers less than the highest offer in the past. It is assumed that the value of an offer for the responder is reduced by L when the offer is worse than the best offer in the past. Figure 3 represents this dynamic bargaining feature.

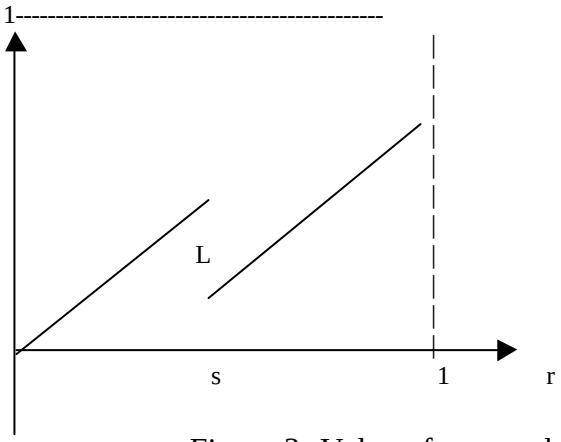

Figure 3: Value of proposal r by person 1 for person 2

The payoffs are determined by the proposal r, the dynamic bargaining feature L, and a discount factor $\delta \in [0,1]$ which is the same for both players. Both parties earn 0 when the proposal is rejected in the final period. Figure 4 presents the third period.

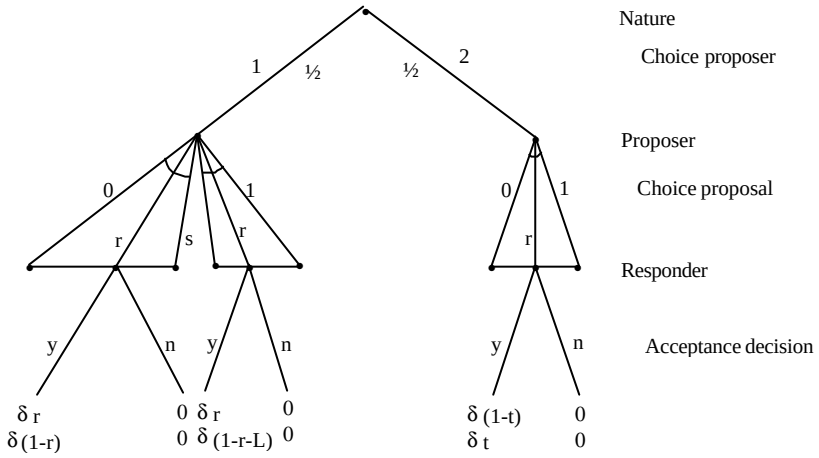

Figure 4: Extensive form of third period

4 Equilibrium and comparative statics

The subgame perfect equilibrium (SPE) of the model is determined by the method of backward induction. We start therefore with period 3, given the decisions in period 2. Suppose person 1 proposes in period 2 that he gets a share s. The offer to person 2 in period 2 is therefore 1-s. If person 1 is assigned the role of proposer in period 3, then there is a vested interest of person 2 of size 1-s. Person 2 accepts a proposal r in the third period when his payoff is non negative. This occurs when person 1 does not ask more than s in the second period, i.e. $r \leq s$, or when the share 1-r received by person 2 outweighs the loss associated with abusing the vested interests, i.e. $1-r \geq 1-L$.. The subgame perfect equilibrium strategy of person 2 in the third period when person 1 is assigned the role of proposer is therefore

Yes, when $r \leq s$
Yes, when $r > s$ and $1-r \geq L$
No, when $r > s$ and $1-r < L$.

The vested interest of person 2 will be broken by person 1 when the most attractive proposal establishing this and getting acceptance by person 2, i.e. 1-L, outweighs the value of the proposal of the second period, i.e. 1-L ≤ s. If person 1 is asking a value of s in the second period which can not be improved in the third period without getting a rejection, i.e. s > 1-L, then the payoff maximizing strategy in the third period is to ask r = s. The subgame perfect equilibrium strategy of person 1 in the third period when he is the proposer is therefore

$$r = \begin{cases} 1-L & \text{, when } s \leq 1-L \\ s & \text{, when } s > 1-L. \end{cases}$$

If person 2 is assigned the role of proposer in period 3, then he will claim and get the whole surplus by asking r = 1, because person 1 has not received an offer in the previous period and has therefore no vested interest (endogenous commitment) built up.

Person 2 knows in the second period that his discounted expected payoff in the third period is $(1-(1-L)+1)\delta/2 = (L+1)\delta/2$ when $s \leq 1-L$ and $(1-s+1)\delta/2 = s\delta/2$ when $s > 1-L$. This determines the subgame perfect equilibrium acceptance or rejection strategy of person 2 in the second period. Person 1 takes this into account by determining his subgame perfect equilibrium proposal in the second period. This proposal is summarized in figure 5. Calculations are provided in the appendix.

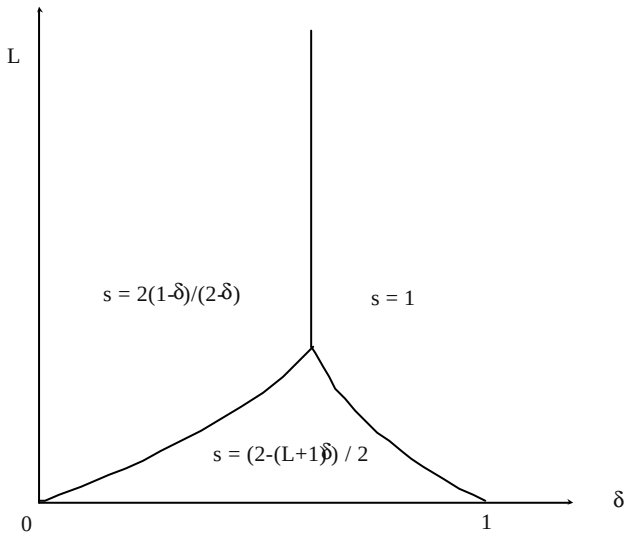

Figure 5: Subgame perfect equilibrium proposal of the second period

Three areas are distinguished in figure 5 regarding the subgame perfect equilibrium of the bargaining proces. The area in the north-east involves delayed change, whereas the other two areas involve voluntary and immediate change. Delay occurs in the area in the north-east because it does not reduce the pie very much. Person 1 has to offer person 2 such a large share of the surplus in the second period in order to get acceptance that delay is preferred. This is established by asking s=1. Person 1 can not ask much in order to get acceptance in the second period because person 2 knows that the attractive take-it-or-leave-it position is obtained with probability .5 in the third period and that delay is not very costly because δ is relatively high. Person 1 prefers delay by asking s = 1 above asking low value of s which is immediately accepted by person 2 because the attractive take-it-or-leave-it position is obtained with probability .5 in the third period.

There is no delay in the other two areas because the costs of delay are too high, i.e. δ is low. Computational considerations, i.e. s≤1-L and s>1-L, are behind the distinction between the areas in

the north-west and in the south. Voluntary, immediate change occurs when there is high urgency, i.e. a low value of δ. The urgency of the situation reduces the pie to such an extent when there is delay that change will be voluntary and immediate. Change will also be voluntary and immediate when urgency is low and the value of L is low. The circumstances of the Coasian world hold in the extreme case of L=0, i.e. there will always be voluntary, immediate change.[4]

A number of comparative statics results emerge from the above analysis.

Proposition 1: A decrease in δ never causes a switch from immediate change to delayed change.

An increase in the urgency of the situation makes delay more costly. The parties respond by choosing strategies in the second period which result in immediate change.

Proposition 2: The share of the surplus received by person 1 doesn't increase when L increases.

The share of the surplus received by person 1 is not influenced by the level of L when $s > 1-L$ is chosen. An increase in the reputation loss L never reduces the share of the surplus received by person 2 when $s \leq 1-L$, because bids r of person 1 are limited to 1-L in order to get acceptance in the third period when person 1 tries to formulate bids in the second period which are accepted. Person 1 has to take this into account when s is chosen, which will reduce the level of the subgame perfect equilibrium choice of s in the second period.

Proposition 3: An increase in L never causes a switch from delayed change to immediate change.

Proposition 2 states that person 1 has to lower his bid in period 2 in order to get acceptance when the value of L is increasing. The payoff associated with this lower bid may decrease to such an extent that delay by the bid s = 1 results in a higher payoff for person 1.[5]

The implication of this result is that it is attractive to prevent that L occurs. The policy implication regarding endogenous commitment is that it is valuable to create bargaining circumstances in which no public announcements are (allowed to be) made. It seems that this is understood in both business and politics. The press is often completely blocked from information regarding the results during a negotiation process. Only the final outcome is communicated. The above model suggests that this is a surplus generating practice when the situation is not perceived as urgent and the loss of reputation associated with accepting a bid which is lower than a public bid received in the past is above a certain level ,i.e. $L>2(1-\delta)/\delta$.

Proposition 4: The share of the surplus received by person 1 doesn't increase when δ increases.

A decrease in urgency increases the payoff associated with delay for person 1 and 2. Person 1 has therefore to lower its bid s in order to get acceptance in the first period.

[4] The case L = 0 corresponds also with the classic model of Rubinstein (1982).

[5] The more formal argument is as follows. The intersection point of the three curves is $(3-\sqrt{5},(3-\sqrt{5})/(-1+\sqrt{5}))$. If $\delta > 3-\sqrt{5}$ and L increases above $(3-\sqrt{5})/(-1+\sqrt{5})$, then L doesn't influence the share received by person 1 anymore because the subgame perfect equilibrium of the case $s > 1-L$ applies. If $\delta > 3-\sqrt{5}$, then an increase in L will reduce the share of the surplus received by person 1 when L is small. Further increases in L will force person 1 to lower s in order to get acceptance in the second period to such an extent that delay is preferred.

Proposition 5: The first-mover position of person 1 is not attractive (in terms of payoffs) when $(1-\delta)/\delta < L < \min(\delta/(2-\delta), 2(1-\delta)/\delta)$ or $\delta \in (.5, 3-\sqrt{5})$ and $L > \delta/(2-.\delta)$.

The driving forces behind this result are the propositions three and four. An increase in δ as well as L reduce the attractiveness of being in the position of person 1. The lower bound $(1-\delta)/\delta$ is equivalent to $(2-(L+1)\delta)/2 < (L+1)\delta/2$. The upperbound $\min(\delta/(2-\delta, 2(1-\delta)/\delta)$ excludes the areas $L>\delta/(2-\delta)$ and $L>2(1-\delta)/\delta$. The second subset of the parameter space is obvious.
Three types of subgame perfect equilibria are distinguished with respect to the behavior of headquarters. First, delay will emerge in the bargaining process when it is not very costly, i.e. the discount factor is close to 1. Efficiency dictates that organizational change will not be imposed when its costs outweigh the benefits of preventing delay. Second, organizational change will be imposed by headquarters when delay is not very costly and the cost associated with imposed organizational change are even lower. Imposed organizational change is a way to break endogenous commitments. This occurs in the area in the north-east when $3-\sqrt{5} \leq \delta \leq 1-C$. Finally, voluntary, immediate agreement occurs when the cost of delay are large, i.e. organizational change is urgent. The responder in the second period is in these circumstances not able to elicit an endogenous commitment which improves his bargaining position in the third period to such an extent that it compensates for the costs of delay. Headquarters will not intervene in order to prevent the costs C. Figure 1 has summarized these results.

The welfare characterization of our results is provided in terms of transaction costs. They are defined as the difference in surplus between the efficient outcome and the equilibrium outcome. Transaction costs are zero when the situation is urgent or the loss of reputation is small. Organizational change will occur immediately, without interference by headquarters. Transaction costs are C when headquarters imposes organizational change. There will be no delay in situations with lower costs of imposed organizational change than the costs of delay, but this comes at a cost C. Finally, transaction costs are equal to $1-\delta$ in circumstances where delay in less costly for the organization than imposed organizational change. Figure 6 presents the size of the transactions costs as a function of the parameters regarding urgency, loss of reputation and costs of organizational change parameters.

		Delay	
		No	Yes
Change	Voluntary	O	$1-\delta$
	Imposed	C	-

Figure 6: Transaction costs

The value added by headquarters follows immediately from figure 6. Headquarters can only add value when it prevents delay by imposing organizational change. The value of imposed organizational change is to prevent endogenous commitments. This is attractive when revenues are larger than the costs. Figure 7 presents the value added by headquarters in each possible case.

		Delay	
		No	Yes
Change	Voluntary	O	O
	Imposed	$1-\delta-C$	-

Figure 7: Value added of headquarters

5 Conclusions

A model of organizational change is presented with complete information, costs of organizational change, costs of delay, endogenous commitment and a deadline. It is shown that two scenarios for enterprise restructuring emerge when the change is not urgent. It is delayed (imposed immediately) when the costs of imposed change are higher (lower) than the costs of delay. The value of imposed organizational change is that it breaks endogenous commitments. Organizational change will occur immediately and voluntarily when it is urgent. Headquarters only adds value by imposing organizational change in order to break endogenous commitments in situations which are not perceived as being urgent and entail low costs of imposed change. The difference between the organizational inertia of GM and the immediate changes at GE may due to the different perceptions of the urgency of change. The management policies at GE may have had the effect of increasing the sense of urgency.

The focus has been on the character of organizational change and on identifying situations in which headquarters adds value. It was not intended to provide a comprehensive account of these phenomena, but to limit attention to a particular aspect in order to shed another light on some empirical phenomena. Extensions of the above model, e.g. along the lines suggested by Bolton and Scharfstein (1998), in order to advance our knowledge and understanding of organizational change and headquarters can therefore be readily pursued in many directions, both theoretically and empirically.

Appendix

The SPE of the bargaining stages of the game are determined. Consider first the case $s > 1-L$. The proposal s by person 1 is accepted in the second period by person 2 when

$$\begin{aligned} & 1-s \geq (2-s)\delta/2 \\ \Leftrightarrow \quad & s \leq 2(1-\delta)/(2-\delta). \end{aligned}$$

This is feasible when $2(1-\delta)/(2-\delta) > 1-L$, i.e. $L > \delta/(2-\delta)$. Person 1 gets acceptance in the second period and maximizes his payoff by asking $2(1-\delta)/(2-\delta)$. The alternative is to elicit a rejection. The payoff maximizing proposal achieving this is asking $s = 1$ in the second period. The discounted expected payoff of person 1 by asking $s = 1$ is $\delta/2$. Person 1 prefers acceptance in the second period above delay when

$$\begin{aligned} & 2(1-\delta)/(2-\delta) \geq \delta/2 \\ \Leftrightarrow \quad & \delta \leq 3-\sqrt{5} \end{aligned}$$

If $L \leq \delta/(2-\delta)$, then $s=2(1-\delta)/(2-\delta)$ is not large enough to be above the lower bound 1-L. Offers higher than $2(1-\delta)/(2-\delta)$ will not be accepted by person 2 in period 1. The payoff maximizing bid by person 1 in period 1 is therefore $s = 1$.

The subgame perfect equilibrium when $s > 1-L$ is therefore

If $L > \delta/(2-\delta)$ and
$\delta \leq 3-\sqrt{5}$: second period: person 1: $s = 2(1-\delta)/(2-\delta)$
person 2: yes
third period: Nature chooses person 1:
person 1: r=s
person 2: yes
Nature chooses person 2:
person 1: yes
person 2: t=1.

$\delta > 3-\sqrt{5}$: second period: person 1: s= 1
person 2: no
third period: Nature chooses person 1:
person 1: r=s
person 2: yes
Nature chooses person 2:
person,1: yes
person 2: t= 1.

If $L \leq \delta/(2-\delta)$: second period: person 1: s= 1
person 2: no
third period: Nature chooses person 1:
person 1: r=s
person 2: yes
Nature chooses person 2:
person 1: yes
person 2: t=1.

The second case consists of $s \leq 1-L$. The proposal s by person 1 is accepted in the second period by person 2 when

$$1-s \geq (L+1)\,\delta/2$$
$$\Leftrightarrow s \leq (2-(L+1)\,\delta)/2.$$

Person 1 gets acceptance in the first period and maximizes his payoff by asking $(2-(L+1)\delta/2$ when feasible bids $(2-(L+1)\delta)/2 < 1-L$, i.e. $L < \delta/(2-\delta)$, are considered. The alternative is to elicit a rejection. The payoff maximizing proposal achieving this is asking $s = 1-L$ in the second period. Person 1 will bid r= 1-L in the third period. The expected discounted payoff for person 1 by asking $s = 1-L$ is $(1-L)\delta/2$. Person 2 will earn $(L-L+1)\delta/2 = \delta/2$ when the bid $s = (2-(L+1)\delta)/2$ is rejected, which is less than the payoff $(L+1)\delta/2$ when there is no delay. Person 1 prefers immediate agreement above delay when

$$(2-(L+1)\,\delta)/2 \geq (1-L)\delta/2$$
$$\Leftrightarrow \delta \leq 1.$$

One possible feasible bid to be considered is $s = (2-(L+1)\,\delta)/2 = 1-L$. If $s = 1-L$ then there is not a higher bid in the final period possible which will get acceptance. This raises the attractiveness of rejection in the second period for person 2, because the expected payoff will be $(L+1)\delta/2$. However, this is not a higher payoff than the payoff associated with accepting in the first period.

Suppose $L > \delta/(2-\delta)$. Person 2 accepts all bids in the second period higher than the highest feasible bid of person 1. Person 1 will bid the highest feasible bid, i.e. $s = 1-L$.

The subgame perfect equilibrium is, when $s \leq 1-L$ and

$L \leq \delta/(2-\delta)$: second period: person 1:$s = (2-(L+1)\delta)/2$
person 2: yes
third period: Nature chooses person 1:
person 1: r = 1-L
person 2: yes

Nature chooses period 2:
person 1: yes
person 2: t = 1
$L > \delta/(2-\delta)$: second period: person 1: s = 1-L
person 2: yes
third period: Nature chooses person 1:
person 1: r = 1-L
person 2: yes
Nature chooses person 2:
person 1: yes
person 2: t = 1.

The subgame perfect equilibrium of the game when there are no restrictions regarding the choice of s in period 1 for person 1 is determined by choosing from the two cases the payoff maximizing level of s for each possible combination of values of δ and L.

If $L \in [0, \delta/(2-\delta)]$, then the subgame perfect equilibrium choice of s is realized in the case $s \leq 1-L$ when

$$(2-(L+1)\,\delta)/2 \geq \delta/2$$
$$\Leftrightarrow L \leq 2(1-\delta)/\delta.$$

If $L \in [0, \delta/(2-\delta)]$ and $L > 2(1-\delta)/2$, then the subgame perfect equilibrium choice of s emerges in the case $s > 1-L$, i.e. $s = 1$.

If $L > \delta/(2-\delta)$ and $\delta \in [0,3-\sqrt{5}]$, then the subgame perfect equilibrium choice of s is realized in the case $s > 1-L$ when

$$1-L < 2(1-\delta)/(2-\delta)$$
$$\Leftrightarrow L > \delta/(2-\delta).$$

So, $s = 1-L$ is never a subgame perfect equilibrium strategy when $L > \delta/(2-\delta)$ and $\delta \leq 3-\sqrt{5}$. Finally, if $L > \delta/(2-\delta)$ and $\delta \in (3-\sqrt{5},1]$, then the subgame perfect equilibrium choice of s emerges in the case $s > 1-L$ when

$$\delta/2 \geq 1-L$$
$$\Leftrightarrow L \geq 1-\delta/2.$$

The curves $L = 1-\delta/2$ and $L = \delta/(2-\delta)$ intersect at $\delta = 3-\sqrt{5}$, i.e. $s = 1-L$ is not a subgame perfect equilibrium strategy.

The subgame perfect equilibrium entails organizational change if and only if $C \leq 1-\delta$, $\delta > 3-\sqrt{5}$ and $L \geq 2(1-\delta)/\delta$. Figure 1 summarizes the results by defining low urgency as $\delta > \max(3-\sqrt{5}, 2/(2+L))$ and low costs as $C \leq 1-\delta$.

REFERENCES

Bolton, P. and D.S. Scharfstein, Corporate Finance, the Theory of the Firm, and Organizations, Journal of Economic Perspectives, 1998, 12(4), 95-114.

Boot, A.W.A., Why Hang on to Losers? Divestitures and Takeovers, Journal of Finance, 1992, 47(4), 1401 -1422.

Chakravarthy, B.S. and Y.L. Doz, Strategy Process Research: Focusing on Corporate SelfRenewal, Strategic Management Journal, 1992, 13, 5-14.

Coase, R.H., The Problem of Social Cost, Journal of Law and Economics, 1960, 3,1-44.

Cramton, P.C., Strategic Delay in Bargaining with Two-Sided Uncertainty, Review of Economic Studies, 1992, 59, 205-225.

Dewatripont, M. and G. Roland, The Virtues of Gradualism and Legitimacy in the Transition to a Market Economy, The Economic Journal, 1992, 102, 291-300.

Fershtman, C. and D.J. Seidmann, Deadline Effects and Inefficient Delay in Bargaining with Endogenous Commitment, Journal of Economic Theory, 1993, 60, 306-321.

Ickes, B.W. and L. Samuelson, Job Transfers and Incentives in Complex Organizations: Thwarting the Ratchet Effect, Rand Journal of Economics, 1987,18(2), 275-286.

Jensen, M., The Modern Industrial Revolution, Exit and the Failure of Internal Control Systems, Journal of Finance, 1993, 48(3), 831-880.

Meyer, M., P. Milgrom and J. Roberts, Organizational Prospects, Influence Costs, and Ownership Changes, Journal of Economics and Management Strategy, 1992, 1 (1), 9-35.

Postrel, S. and R.P. Rumelt, Incentives, Routines and Self-Command, Industrial and Corporate Change, 1992, 1, 397-425.

Rubinstein, A., Perfect Equilibrium in a Bargaining Model, Econometrica, 1982, 50, 97-110.

Rumelt, R.P., D.E. Schendel and D.J. Teece, Fundamental Issues in Strategy, Harvard Business School Press, 1994.

Schaefer, S., Influence Costs, Structural Inertia, and Organizational Change, Journal of Economics & Management Strategy, 1998, 7(2), 237-263.

Scharfstein, D.S. and J.C. Stein, Herd Behavior and Investment, American Economic Review, 1990, 80(3), 465-479.

Stahl, D.O., Bargaining with Durable Offers and Endogenous Timing, Games and Economic Behavior, 1990, 2, 173-187.

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