Toward a Simonian Theory of Integration

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Abstract

From a positive viewpoint, business as usual decisions unlike other decisions do not generally require further justifications. And when a justification is required, decision makers are often judged by results: if the resulting performance is above a pre-defined threshold this is fine; otherwise this is considered a failure. This paper explores the cost and benefit of integration under such a Simonian working of reviewing processes. We identify the following cost of non-integration : bargaining inefficiencies arise because the threshold performances that determine the criterion of success need not be adapted to every single negotiation. And the main cost of integration is its exposure to opportunism because the opportunism in one division has spillover effects in the other divisions of integrated organizations.

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1 Introduction

Many managerial decisions have effects far beyond the organization to which the decision maker belongs. That is, there are externalities. In a zero-transaction cost world the decision makers of the various concerned organizations would negotiate to overcome these externalities.

But, managers generally have to justify at least some of their decisions to the review boards in charge of assessing them. And review boards are generally not aware of the details of the information available at the time of the decision making. They need not even be aware that a negotiation took place. They are thus forced to rely on more primitive instruments to assess their managers. In particular managers are often "judged by results". That is, if the decision results in a satisfactory performance the decision is considered successful. Otherwise it is a failure.

We will illustrate how bargaining inefficiencies may arise in such contexts. Of course, inefficiencies will not always arise, and sometimes efficient negotiations will effectively take place.[1] More precisely, bargaining inefficiencies will arise only when the gains induced by the negotiation are not high enough relative to the benchmark performances that define the managerial criterion of success. In such scenarios, no negotiation takes place and suboptimal decisions are being made.

The fundamental reason for bargaining inefficiencies here is that the benchmark performances against which managerial decisions are assessed are not (solely) determined by the performances that would arise in the specific decision process under review if no negotiation were to take place.[2] To put it differently, bar-

[1]This should be contrasted with frameworks in which no negotiation whatesoever can take place (see Hart and Holmstrom 2002 for a recent theory of the firm in a such a setup). Then inefficiencies would arise as soon as the private interest of the decision maker would diverge from the collective interest. That is, as soon as a negotiation would be needed.

[2]In case a negotiation would take place, the review boards would not have access to the performances that would have arisen in the absence of negotiation.

gaining inefficiencies arise because the benchmark performance used to assess the management is the same for a range of decisions, and thus it is not always fitted to the specific decision process under review.

This paper is an attempt to bridge together two influential lines of thoughts in the theory of organization that appear to have had little influence on each other. On the one hand, organization theorists in the tradition of Coase and Williamson (1975) have been developing theories that aim to explain how large firms should be (see Grossman and Hart (1986) for a prominent theory along these lines). One of the main themes in this tradition is about the costs and benefits of integration. On the other hand, organization theorists in the tradition of March and Simon (1958) have been stressing that decision making in organizations follow patterns that radically differ (by their simplicity) from how rational behavior is usually modeled in economics.

The above description of the functioning of review boards follows the tradition of March and Simon in that the benchmark performances which define the criterion of success play much the same role as the aspiration levels (and associated satisficing behaviors) in the theory of Simon (1955). And, in the tradition of Coase and Williamson our main interest lies in shedding light on the cost and benefit of integration as generated by such a functioning of review boards, in a world where managers can either be dedicated to their organization or opportunistic.

As already stressed, a key ingredient of the model we propose is the *working* of the review when it takes place. Another key ingredient is about the specification of *when* reviews take place. Obviously, in the real world not every single decision triggers a review. (This would be too costly and/or time consuming for the review board.) Some decisions are reviewed whereas others are considered as acceptable ones without further justification.[3]

[3]We implicitly assume in the analysis to be presented below that the decision to make a review can only be based on the decisions made by the manager, not on the performance resulting from these decisions. The rationale is that unless a review takes place it is hard to

In our analysis, benchmark performances and acceptable decisions are related as follows. In any organization, the benchmark performance that defines the managerial criterion of success is assumed to coincide with the average performance obtained over all scenarios in which acceptable decisions are being made. Thus, in any given organization either an acceptable decision is being made - in which case on average the benchmark performance is being obtained - or another decision (possibly involving side-payments and negotiations) is being made - in which case the working of the review forces the organizational performance to be no smaller than the benchmark performance (whether or not the manager is opportunistic). Overall, given the working of the organization the performance is bound to be no smaller than the threshold performance. Thus, in Simonian terms the system is likely to be stable to the extent that the threshold performance is satisfactory to the board.[4]

In the rest of the paper we develop a theory of integration based on the above ingredients. We have mentioned above the bargaining inefficiencies arising in non-integrated structures. By contrast, integrated organizations do not give rise to bargaining inefficiencies. However, in integrated structures, when the manager of one division is opportunistic it may divert the surplus generated in another division regardless of whether the manager of the latter division is dedicated or opportunistic. Thus, the opportunism of managers within an integrated organi-

disentangle the effects of the various decisions contributing to the overall performance.

[4]In our analysis the sets of acceptable decisions - for which there is no review - are set exogenously. One possible interpretation is that acceptable decisions are "business as usual decisions", and the review boards would find it too costly to review systematically every such decision. Another (more ambitious) interpretation is that the set of acceptable decisions is the outcome of a search process on the part of the review board. (That is, in each organization the review board will adjust its set of acceptable decisions until a decent performance is obtained.) We do not model the search process, and we assume that every organization has reached a point that is satisfactory to the board members. (This echoes considerations appearing in Simon (1955).)

zation is a public bad among the divisions of the organization.

To summarize, the main cost of non-integration lies in the bargaining inefficiencies arising when the surplus generated by the negotiation is not high enough relative to the benchmark performances that define the criterion of success in the various organizations. And the main cost of integration lies in the public bad aspect of opportunism within organizations.

Thus, in a world where either there are no externalities or very severe externalities (but no intermediate externalities) between the activities of various divisions integrating the various divisions is not desirable. And in a world with very little opportunism integration dominates non-integration.

The theory is admittedly highly stylized, but we believe it captures important elements of the cost/benefit analysis of integration/decentralization. For example, France has had a long tradition of highly centralized administration.[5] Beyond the political pressure from the regions that led to criticize centralization, it is generally agreed that the French Administration was relatively efficient, as long as civil servants had a sufficiently strong feeling for the so-called "Service Public", i.e. as long as civil servants were sufficiently dedicated to the common interest in our terminology.[6] Our theory agrees with this, as it predicts that whenever decision makers are dedicated, centralized/integrated organizations dominate decentralized/non-integrated ones. It may also explain why in countries like the US in which there is no strong tradition for the "Service Public" a decentralized administration may be preferable.

In a different vein, many economists (in the tradition of Pigou) would see the presence of externalities as an argument in favor of integrating/centralizing the decision making. But, there are many examples in which obvious (and well

[5]It has only recently since Deferre's 1982 laws evolve toward a more decentralized organization.

[6]It is also generally considered that the feeling for "Service Public" in the French administration has significantly deteriorated over the past two decades.

identified) divergences of interest have led the concerned parties to negotiate so that no significant inefficiencies occurred despite the decentralized aspect of the decision making. To take a recent example, the refugee camp of Sangatte located close to the Chunnel tunnel was clearly a source of divergence of interest between the French and the British. Despite the strong divergence and the decentralized decision making (the EU had no say in this issue), an agreement about how to distribute the refugees between France and the UK was easily found. Hence, despite the divergence of interest, a decentralized decision making seems to have worked efficiently in this case. Our theory is also consistent with this, since in our approach decentralized decision making is mostly problematic whenever the externalities are not too severe, i.e. whenever the divergence of interest is not too strong (in the Sangatte case, the divergence of interest was very clear and strong).

Section 2 develops the model and describes the decentralized and the integrated structures. Section 3 discusses the issue of bargaining inefficiencies. Section 4 discusses the cost of integration. Further insights and comparative statics with respect to the set of acceptable decisions and threshold performances appear in Section 5. The relationship with the literature is discussed in Section 5.

2 The Model

Consider the manager M of an organization O. Decisions must be made, which include physical decisions (like investment decisions), and also possibly side-payments or monetary transfer decisions to or from other organizations (or interests).

An important aspect of this paper is that decisions are categorized into two classes: "business as usual" decisions, and other decisions. A key assumption is that "business as usual" decisions do not require further justifications whereas any other decision need to be justified.[7] When a justification is required, there is a review: the performance π_O of the decision under review is then made clear, and the manager is assumed to be "judged by results". That is, if π_O turns out to be above some pre-specified threshold performance π_O^T, the decision is justified, but not otherwise.[8]

We will assume that the threshold performance π_O^T coincides with the average performance obtained when "business as usual" decisions are being made. Thus, whatever the environment (that the review board of organization O need not even be aware of), the procedure is bound to produce an expected performance no smaller than π_O^T.[9/10]

We will further assume that all managers care (a lot) about not making decisions that would trigger a review and that could not be justified. The idea is that such decisions would hurt managers' career, and thus all managers will try their best to avoid making decisions that cannot be justified ex post. Apart

[7]Business as usual decisions are assumed to be known to deliver an acceptable performance on average- this is supposed to have been learnt from past experiences. This in turn explains why such decisions are considered as acceptable ones without further justification. The performance of any other decision however is not accessible (not even probabilistically, as would argue non-Bayesian organization theorists such as March and Simon 1955) to those in charge of assessing the manager.

[8]The idea that decisions are solely judged by results is clearly extreme. It fits with situations in which other aspects of the decisions (like the deliberations leading to the decision making) are not accessible to the review board (possibly because the review board has no time to study whether arguments are well funded or not).

[9]To the extent that π_O^T is an acceptable performance, the above procedure meets the satisficing requirement of Simon (1955) regardless of the environment. We do not model the search process that has led to the choice of acceptable decisions and its derived threshold performance. This should be the subject of future research. Implicitly (in accordance with our chosen wording), we assume here that acceptable decisions are the more familiar ones.

[10]This robustness with respect to the environment may explain why such procedures are so commonly used in practice. They need not be optimal however in specific environments (for a discussion about good versus optimal procedures, see Simon 1955).

from their common desire not to make decisions that cannot be justified ex post, managers can be of two possible types: either they are dedicated to their organization or they are opportunistic. When dedicated to his organization, a manager cares about the performance of his organization. When opportunistic, a manager cares about his own well-being. Manager M is dedicated with probability λ_M and opportunistic with probability $1-\lambda_M$.

The goals of dedicated versus opportunistic managers are highly stylized (and thus they are not meant to be realistic). This modeling should be thought of as providing a stylized representation of the potential non-congruence between the managerial and the organizational interest.[11]

The main objective of this paper is to analyze the cost and benefit of integration in an organizational setup such as the one described above. We will in turn analyze a decentralized structure and an integrated structure, and we will make comparative statics with respect to the economic performance of the two structures.

In the decentralized structure, two managers $i=1,2$ run separate organizations $i=1,2$. They each make decisions that can induce externalities on the other organization. But, they are allowed to bargain to overcome these externalities.

In the integrated structure, the (same) two managers $i=1,2$ belong to the same organization 0 and the same decisions as in the decentralized case have to be made by each manager. Of course, when dedicated, manager i's objective is now the performance of the integrated organization 0 because this is the organization to which he belongs. To perform the comparison between the decentralized and integrated structures, we will make the (natural) assumption that the business

[11]Issues about how to align the interest of the manager with that of the organization through an appropriate choice of wage contract is not the subject of this paper. Implicitly, we adopt an adverse selection perspective in which it is assumed that within the range of admissible wage contracts, the type of the manager is unaffected (or in a moral hazard formulation, he has no sufficient incentives to change his goal).

as usual decisions in organization 0 correspond to the profile of business as usual decisions in organizations 1 and 2 of the decentralized structure. In the integrated organization as in any organization, any decision that is not "business as usual" needs justification, and the management is then judged by results, as explained above. When a decision fails to be justified, we assume that there is a prejudice to the entire management, that is, to both managers $i = 1, 2$. Thus, both managers $i = 1, 2$ will try their best to avoid making decisions that cannot be justified ex post from the viewpoint of the integrated organization 0.

In the next two subsections, we describe in more detail the working of the decision making in the two modes of organization.

2.1 Decentralized structure

The state and decision spaces:

We let $\theta \in \Theta$ denote the state of the world. The physical decision in organization i is denoted d_i, the transfer from inside to outside organization i is denoted t_i where $t_i = t_i^{-i} + t_i^m$, t_i^{-i} stands for the transfer from organization i to organization $-i$ and $t_i^m (\geq 0)$ stands for the transfer from organization i to manager i.[12] Thus, a decision in organization i can be seen as a triple $a_i = (d_i, t_i^m, t_i^{-i})$.

The physical decision d_i belongs to $A_i \cup J_i$ where A_i is the set of business as usual decisions and J_i is the set of other decisions.

Organizational payoff:

We let

$$\pi_i \equiv u_i(d_i, d_{-i}; \theta) - t_i$$

denote the performance of organization i in state θ when the physical decisions are given by (d_i, d_{-i}) and the transfer from organization i (to other interests) is given by t_i.

[12] $t_i^m > 0$ will possibly arise due to the opportunism of manager i.

Monitoring technology:

The review board in i freely observes d_i, t_i, and it observes the realized performance π_i in case of review; nothing else.[13] If $d_i \in A_i$ and $t_i = 0$, (d_i, t_i^m, t_i^{-i}) is an acceptable decision for organization i, and there is no need for further justification. Otherwise, i.e. if $d_i \notin A_i$ or if $t_i \neq 0$, the decision $a_i = (d_i, t_i^m, t_i^{-i})$ must be justified. As explained above, a_i is justified whenever $\pi_i \geq \pi_i^T$. It is not justified otherwise.

Managerial information and payoff:

At the time the decisions are to be made, managers are assumed to know the state of the world θ, the actions spaces in both organizations A_i and J_i, $i = 1, 2$, and the functional form of the performance u_i in both organizations. When manager i is dedicated his payoff is given by:

$$v_i^{Ded}(a_i, a_{-i}; \theta) \equiv \begin{cases} \pi_i \text{ if } \pi_i \geq \pi_i^T \text{ or } (d_i \in A_i \text{ and } t_i = 0) \\ -\infty \text{ otherwise} \end{cases}$$

When manager i is opportunistic his payoff is given by:

$$v_i^{Opp}(a_i, a_{-i}; \theta) \equiv \begin{cases} t_i^m \text{ if } \pi_i \geq \pi_i^T \text{ or } (d_i \in A_i \text{ and } t_i = 0) \\ -\infty \text{ otherwise} \end{cases}$$

We allow for negotiations about (a_i, a_{-i}) between managers i and $-i$. The outcome of the negotiation is assumed to be Pareto-efficient given the managerial payoff functions. It should also Pareto-dominate the Non-cooperative outcome (or one of them if there are several of them). It will be described in more details through examples later on. For the time being, note that the transfers t_i^m, t_i^{-i},

[13] In particular, it is incapable of observing t_i^{-i} and t_i^m separately (nor does it know *a priori* the other organizations with which i may interact). It does not even need to know the set J_i.

$i = 1, 2$ must satisfy two feasibility constraints:[14]

$$\begin{aligned} t_i^{-i} + t_{-i}^i &= 0 \\ t_i^m + t_{-i}^m + \pi_i + \pi_{-i} &= u_i(d_i, d_{-i}; \theta) + u_{-i}(d_{-i}, d_i; \theta) \end{aligned}$$

Acceptable decisions and threshold criterion:

The value of π_i^T is determined by:

$$\pi_i^T = \underset{\theta}{E} \left[u_i(d_i(\theta), d_{-i}(\theta); \theta) \mid d_i(\theta) \in A_i \text{ and } t_i(\theta) = 0 \right]$$

where $d_j(\theta)$ (resp. $t_i(\theta)$) denotes the equilibrium physical decision in organization j (resp. transfer from organization i) in state θ. That is, the threshold criterion coincides with the expected equilibrium value of organization i 's performance conditional on an acceptable decision (d_i, t_i^m, t_i^{-i}), $d_i \in A_i$, $t_i = 0$ being made in organization i.

2.2 Integrated structure

The state and decision spaces:

The state and decision spaces are the same as in the decentralized structure. That is, manager i's action is $a_i = (d_i, t^{m_i})$ where d_i is the physical decision in division i and t^{m_i} is the transfer from the integrated organization 0 to manager i.[15]

[14]The first condition expresses an accounting constraint (what goes from i to $-i$ should be the opposite of what goes from $-i$ to i). The second condition expresses that the money distributed among the organizations and the managers has to come from payoffs produced by the physical decisions.

[15]There is no transfer to organizations outside 0 because we assume there are no externalities with these. (However, it is important to keep in mind that the review board need not be aware of that, so that it cannot regard the fact that there is a transfer from organization 0 as a sign that his management is corrupt.)

Organizational payoff:

It is given by:

$$\pi_0 \equiv u_i(d_i, d_{-i}; \theta) + u_{-i}(d_{-i}, d_i; \theta) - t^{m_i} - t^{m_{-i}}$$

Monitoring technology:

The review board in 0 observes d_1, d_2, $t = t^{m_i} + t^{m_{-i}}$, and it observes the realized performance π_0 in case of review. If $d_i \in A_i$ $i = 1, 2$ and $t = 0$, $(d_1, d_2, t^{m_1}, t^{m_2})$ is an acceptable decision for organization 0 and there is no need for further justification. Otherwise, i.e. if $d_i \in J_i$ for $i = 1$ or 2, or if $t \neq 0$, the managerial joint decision $a = (d_1, d_2, t^{m_1}, t^{m_2})$ must be justified; a is justified whenever $\pi_0 \geq \pi_0^T$. It is not justified otherwise.

Managerial information and payoff:

When manager i is dedicated his payoff is given by:

$$v_i^{Ded}(a_i, a_{-i}; \theta) \equiv \begin{cases} \pi_0 \text{ if } \pi_0 \geq \pi_0^T \text{ or } [(d_1, d_2) \in A_1 \times A_2 \text{ and } t = 0] \\ -\infty \text{ otherwise} \end{cases}$$

When manager i is opportunistic his payoff is given by:

$$v_i^{Opp}(a_i, a_{-i}; \theta) \equiv \begin{cases} t^{m_i} \text{ if } \pi_0 \geq \pi_0^T \text{ or } [(d_1, d_2) \in A_1 \times A_2 \text{ and } t = 0] \\ -\infty \text{ otherwise} \end{cases}$$

Our specification assumes that both managers $i = 1, 2$ get $-\infty$ whenever a decision other than business as usual is being made and the resulting performance falls short of the threshold performance π_0^T. This is consistent with the view that based on what the review board observes it is unable to distinguish who in the organization might be responsible for the bad performance.

Acceptable decisions and threshold criterion:

The value of π_0^T is determined by:

$$\pi_0^T = \underset{\theta}{E} \left[u_i(d_i(\theta), d_{-i}(\theta); \theta) + u_{-i}(d_{-i}(\theta), d_i(\theta); \theta) \mid d_j(\theta) \in A_j,\ j = 1, 2 \text{ and } t(\theta) = 0\right]$$

where $d_j(\theta)$ (resp. $t(\theta)$) denotes the equilibrium physical decision of division j (resp. transfer from organization 0) in state θ.

3 On Bargaining Inefficiencies

An interesting implication of the setup is that - in the decentralized setting - the decisions may be inefficient even though we allow for bargaining between the managers. As we will show, managers bargain less often than what would be optimal (from the overall organizational viewpoint) because they are not willing to make decisions that cannot be justified ex post. Our paper thus points out to a new form of transaction costs (Coase 1960) that we believe is of practical major importance.

It is worth mentioning that the bargaining inefficiency does not arise because of the possibility that managers are opportunistic. As it turns out the same physical decisions are made irrespective of whether managers are dedicated or opportunistic.[16] Bargaining inefficiencies arise because managers have to justify their "non-business-as-usual" decisions, and the justification technology is based on the "judged by results" principle.

To illustrate the claim, consider the following simplification:

Manager 1 must make a physical decision d_1 in $\{d_A, d_J\}$, where d_A denotes the business as usual decision and d_J requires further justification, i.e., $A_1 = \{d_A\}$ and $J_1 = \{d_J\}$. Manager 2 has no physical decision to make (i.e., $A_2 = J_2 = \emptyset$). Decision d_A induces a nul payoff both in organizations 1 and 2, irrespective of the state of the world θ. That is,[17] for all states θ,

$$u_i(d_A; \theta) = 0.$$

An interpretation is that d_A corresponds to the status quo decision, and the

[16] The type of the manager is however a key determinant with respect to the distribution of the rent created by the decisions. A dedicated manager leaves the entire rent to his organization whereas an opportunistic manager takes the maximal rent for himself leaving only the minimum threshold performance to his organization.

[17] Since there is no physical decision in organization 2, payoffs depend solely on the decision d_1 and the state of the world θ. Notations are simplified accordingly.

status quo delivers a constant payoff (normalized here to 0) to all concerned organizations whatever the state of the world.

For the following discussion, it is convenient to distinguish states according to whether decision d_J is preferable to d_A from the viewpoint of organization 1 and from the aggregate organizational viewpoint. This leads us to divide states of the world into four categories. Denoting by $u(d_1;\theta) = u_1(d_1;\theta) + u_2(d_1;\theta)$ the aggregate organizational payoff, we let:

$$\begin{aligned}
\Theta_J^{Cong} &= \{\theta \mid u_1(d_A;\theta) < u_1(d_J;\theta) \text{ and } u(d_A;\theta) < u(d_J;\theta)\} \\
\Theta_A^{Cong} &= \{\theta \mid u_1(d_A;\theta) \geq u_1(d_J;\theta) \text{ and } u(d_A;\theta) \geq u(d_J;\theta)\} \\
\Theta_J^{Div} &= \{\theta \mid u_1(d_A;\theta) \geq u_1(d_J;\theta) \text{ and } u(d_A;\theta) < u(d_J;\theta)\} \\
\Theta_A^{Div} &= \{\theta \mid u_1(d_A;\theta) < u_1(d_J;\theta) \text{ and } u(d_A;\theta) \geq u(d_J;\theta)\}
\end{aligned}$$

$\Theta^{Cong} \equiv \Theta_A^{Cong} \cup \Theta_J^{Cong}$ refers to those states in which the private interest of organization 1 coincides with the aggregate organizational interest. $\Theta^{Div} \equiv \Theta_A^{Div} \cup \Theta_J^{Div}$ refers to those states in which the private interest of organization 1 diverges from the aggregate organizational interest. $\Theta_A \equiv \Theta_A^{Cong} \cup \Theta_A^{Div}$ denotes those states for which d_A is best from the aggregate organizational viewpoint. $\Theta_J \equiv \Theta_J^{Cong} \cup \Theta_J^{Div}$ denotes those states for which d_J is best from the aggregate organizational viewpoint.

Preliminary observations:

1) The threshold performance in organization 1 is $\pi_1^T = 0$. This because $u_1(d_A;\theta) = 0$ for all θ, and the relation of the threshold performance to the organizational payoff.

2) Whenever there is congruence between the private interest of organization 1 and the aggregate organizational interest (i.e. $\theta \in \Theta^{Cong}$) the efficient decision is made, and there is no negotiation. That is, $d_1(\theta) = d_A$ if $\theta \in \Theta_A^{Cong}$ and $d_1(\theta) = d_J$ if $\theta \in \Theta_J^{Cong}$.[18]

[18]This is clearly true whenever $\theta \in \Theta_A^{Cong}$. Decision d_J is chosen whenever $\theta \in \Theta_J^{Cong}$ because

Observe also that when $\theta \in \Theta^{Cong}$ and $u_2(d_1;\theta) > \pi_2^T$, manager 2 when opportunistic diverts $t_2^m = u_2(d_1;\theta) - \pi_2^T$ from organization 2.

3) For $\theta \in \Theta_J^{Div}$, the efficient decision $d_1(\theta) = d_J$ arises (through bargaining) whenever[19]

$$u(d_J;\theta) \geq \pi_2^T$$

Otherwise, there is no bargaining and the inefficient decision $d_1(\theta) = d_A$ is chosen.

Observe that if $\pi_2^T \leq 0$, there is always an efficient decision because $u(d_J;\theta) > u(d_A;\theta) = 0$ for $\theta \in \Theta_J^{Div}$.

4) For $\theta \in \Theta_A^{Div}$, the efficient decision $d_1(\theta) = d_A$ arises (through bargaining) whenever

$$0 \geq u_1(d_J;\theta) + \pi_2^T$$

Otherwise, there is no bargaining and the inefficient decision $d_1(\theta) = d_J$ is chosen.

The bargaining inefficiencies arising for $\theta \in \Theta^{Div}$ can be described as follows. For the sake of illustration, consider $\theta \in \Theta_A^{Div}$ and suppose that $u_1(d_J;\theta) + \pi_2^T > 0$. Here, no bargaining takes place in equilibrium and the resulting physical decision is d_J. This is inefficient from the aggregate organizational viewpoint because by definition we have that $u(d_J;\theta) < u(d_A;\theta)$ for $\theta \in \Theta_A^{Div}$. In a zero-transaction cost world, such an inefficient decision could not be the final outcome. Indeed, manager 1 might instead propose the following bargain to manager 2: "I will make decision d_A (rather than decision d_J) if you, manager 2, transfer an amount of money of $t_2^1 = u_1(d_J;\theta) + \frac{u(d_A;\theta) - u(d_J;\theta)}{2}$ to organization 1." If such a deal were to be accepted by manager 2, manager 1 would be happy with it in our setup. However, manager 2 would not accept such a deal. The problem is that by so doing the net payoff of organization 2 would only be $u_2(d_A;\theta) - t_2^1 = -u_1(d_J;\theta) + \frac{u(d_J;\theta)}{2}$, and this payoff is strictly less than π_2^T (remember that $u(d_J;\theta) < u(d_A;\theta) = 0$). Hence, manager 2 (whether dedicated or not) would end up making a decision

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$u_1(d_J;\theta) > u_1(d_A;\theta) = 0$ and $\pi_1^T = 0$, see above.

[19]This is because the threshold performance in organization 1 is 0, see above.

that is not business as usual (since $t_2^1 > 0$) and that could not be justified ex post (since it would result in a payoff that is inferior to the threshold payoff π_2^T). Thus, manager 2 would refuse such a deal, and more generally no bargaining (however the surplus is shared between the parties) can take place in such a case.

It is worth stressing that the source of the problem is that manager 2 is not evaluated relative to the situation that would arise if[20] no bargaining were to take place;[21] he is evaluated relative to the benchmark performance π_2^T and π_2^T is not solely determined by this situation.

5) Finally, the threshold payoff in organization 2 satisfies the following fixed point condition:

$$\pi_2^T = \lambda_2 E\left[u_2(d_1(\theta);\theta) \mid \theta \in NB_{Ded}(\pi_2^T)\right] + (1-\lambda_2) E\left[u_2(d_1(\theta);\theta) \mid \theta \in NB_{Opp}(\pi_2^T)\right] \tag{1}$$

where

$$NB_{Ded}(\pi_2^T) = \left\{\theta \in \Theta^{Cong} \text{ or } (\theta \in \Theta_J^{Div} \text{ and } u(d_J;\theta) < \pi_2^T) \text{ or } (\theta \in \Theta_A^{Div} \text{ and } u_1(d_J;\theta) + \pi_2^T > 0)\right\}$$

denotes the set of states in which there is no bargaining between the two organizations,[22] and

$$NB_{Opp}(\pi_2^T) = \left\{ \begin{array}{c} (\theta \in \Theta^{Cong} \text{ and } u_2(d_1(\theta);\theta) \leq \pi_2^T) \text{ or} \\ (\theta \in \Theta_J^{Div} \text{ and } u(d_J;\theta) < \pi_2^T) \text{ or } (\theta \in \Theta_A^{Div} \text{ and } u_1(d_J;\theta) + \pi_2^T > 0) \end{array} \right\}$$

denotes the set of states in which there is no transfer from organization 2 (either to organization 1 or to manager 2) whenever manager 2 is opportunistic.

Thus, π_2^T is the expected value of $u_2(d_1(\theta);\theta)$ conditional on no transfer being made from organization 2 (either to organization 1 or to manager 2 and irre-

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[20] The review board does not have access to such counterfactual data.

[21] Here the no-negotiation payoff of organization 2 is $u_2(d_J;\theta)$, and such a benchmark payoff would allow the managers to bargain efficiently.

[22] This is also the set of states in which there is no transfer from organization 2 whenever manager 2 is dedicated.

spective of whether or not such transfers are the result of bargaining between organizations 1 and 2).[23]

It is worth noting that $\pi_2^T \leq E\left[u_2(d_1(\theta);\theta) \mid \theta \in NB_{ded}(\pi_2^T)\right]$ for all λ_2.

Bargaining inefficiencies and divergence of interest:

We start by assuming that $u_2(d_J;\theta) = 0$ for all $\theta \in \Theta_J^{Cong}$. That is, when the interest of organization 1 is congruent with the aggregate organizational interest, the payoff to organization 2 is 0. In this case, we have:

Proposition 1 *Suppose that $u_2(d_J;\theta) = 0$ for all $\theta \in \Theta_J^{Cong}$. Then (1) An inefficient decision must occur for some $\theta \in \Theta_A^{Div}$; (2) The efficient decision always arises whenever $\theta \in \Theta_J^{Div}$. And this holds true whatever the specifications of λ_1, λ_2, the distributions of payoffs and of the states of world.*

Proof. Observe first that $\pi_2^T \leq 0$. (This is because π_2^T is a convex combination of $u_2(d_A;\theta) = 0$ and of $u_2(d_J;\theta)$ for $\theta \in \Theta_A^{Div}$, $u_2(d_J;\theta) = 0$ for $\theta \in \Theta_J^{Cong}$ and $u_2(d_J;\theta) < 0$ whenever $\theta \in \Theta_A^{Div}$.) This implies (2) that bargaining is always efficient whenever $\theta \in \Theta_J^{Div}$ (see the third preliminary observation). Suppose now (by contradiction to 1) that the decision is always efficient whenever $\theta \in \Theta_A^{Div}$. We should then have that $\pi_2^T = 0$ (because $NB_{Ded}(\pi_2^T)$ would not contain any $\theta \in \Theta_A^{Div}$). But, for all $\theta \in \Theta_A^{Div}$, we have that $u_1(d_J;\theta) > 0$. Hence, $u_1(d_J;\theta) + \pi_2^T > 0$ and there is no room for an efficient bargaining whenever $\theta \in \Theta_A^{Div}$, thus yielding a contradiction. ■

Beyond showing the presence of bargaining inefficiencies (for some $\theta \in \Theta_A^{Div}$), the above Proposition also shows that it is not the mere divergence of interest between the two organizations that causes the inefficiency. Indeed, inefficiencies must occur for some $\theta \in \Theta_A^{Div}$, but never for $\theta \in \Theta_J^{Div}$. So the mere divergence of interest is not an indication as to whether or not an inefficiency must occur.

[23]Observe that π_2^T does not depend on the probability λ_1 that manager 1 is dedicated. This is because the type of manager 1 has no effect on whether or not there are transfers from organization 2 in equilibrium.

To generalize Proposition 1, we allow for more general specifications of $u_2(d_J;\theta)$, $\theta \in \Theta_J^{Cong}$. As the following Proposition shows, efficient bargaining takes place for all $\theta \in \Theta_J^{Div}$ in a number of situations:

Proposition 2 *There always exists $\overline{\lambda}_2$ such that for all $\lambda_2 \leq \overline{\lambda}_2$, there is an efficient bargaining for all $\theta \in \Theta_J^{Div}$. Besides, if $E\left[u_2(d_J;\theta) \mid \theta \in \Theta_J^{Cong}\right] \leq 0$, the decision is always efficient for all $\theta \in \Theta_J^{Div}$ and whatever λ_2.*

Proof. As for the first part, observe that π_2^T must be non-positive as λ_2 approaches 0. (This is because as manager 2 gets opportunistic with a probability close to 1, he gets to divert some positive amount from his organization whenever the realization of $u_2(d_J;\theta)$, $\theta \in \Theta_J^{Cong}$ is above π_2^T, which can be made consistent only if $\pi_2^T \leq 0$, see expression (1).) Part 1 follows, since $\pi_2^T \leq 0$ implies that there is efficient bargaining for $\theta \in \Theta_J^{Div}$ whenever $\pi_2^T \leq 0$. As for the second part, observe that for all λ_2, π_2^T is no greater than a convex combination of $u_2(d_A;\theta) = 0$ and $E\left[u_2(d_J;\theta) \mid \theta \in \Theta_J^{Cong}\right]$. (For $\theta \in \Theta_A^{Div}$ the absence of bargaining implies that $u_2(d_1;\theta) < 0$.) Hence, $\pi_2^T \leq 0$ if $E\left[u_2(d_J;\theta) \mid \theta \in \Theta_J^{Cong}\right] \leq 0$, and we may conclude. ■

The following Proposition identifies conditions under which bargaining inefficiencies must occur for some $\theta \in \Theta_A^{Div}$:

Proposition 3 *Let $w_2 = \min_{\theta \in \Theta_J^{Cong}} u_2(d_J;\theta)$. Suppose that*

$$\max_{\theta \in \Theta_A^{Div}} u_1(d_J;\theta) + \min(w_2, 0) > 0.$$

Then whatever λ_2 bargaining inefficiencies must arise for some $\theta \in \Theta_A^{Div}$.

Proof. Observe that if bargaining is efficient for $\theta \in \Theta_A^{Div}$ we must have $\pi_2^T \geq \min(w_2, 0)$. But, $\max_{\theta \in \Theta_A^{Div}} u_1(d_J;\theta) + \pi_2^T \geq \max_{\theta \in \Theta_A^{Div}} u_1(d_J;\theta) + \min(w_2, 0) > 0$ implies that bargaining cannot be efficient for all $\theta \in \Theta_A^{Div}$. ■

Corollary 1 *Suppose that $w_2 = \min_{\theta \in \Theta_J^{Cong}} u_2(d_J;\theta) \geq 0$. Inefficient bargaining must occur for some $\theta \in \Theta_A^{Div}$.*

Proof. $\min(w_2, 0) = 0$ and for all $\theta \in \Theta_A^{Div}$, $u_1(d_J;\theta) > 0$. Hence, $\max_{\theta\in\Theta_A^{Div}} u_1(d_J;\theta) + \min(w_2, 0) > 0$. ■

In contrast with Proposition 1, we now show conditions under which bargaining inefficiencies do arise for some $\theta \in \Theta_J^{Div}$:

Proposition 4 *Suppose that* $\Theta_A^{Div} = \emptyset$. *Assume that* $E\left[u_2(d_1(\theta);\theta) \mid \theta \in \Theta^{Cong}\right] > 0$. *If*

$$\min_{\theta\in\Theta_J^{Div}} u(d_J;\theta) < E\left[u_2(d_1(\theta);\theta) \mid \theta \in \Theta^{Cong}\right],$$

then an inefficiency must arise for some $\theta \in \Theta_J^{Div}$ *whenever* λ_2 *is sufficiently large.*

Proof. Let $\lambda_2 = 1$. If bargaining is always efficient whenever $\theta \in \Theta_J^{Div}$ one must have $\pi_2^T = E\left[u_2(d_1(\theta);\theta) \mid \theta \in \Theta^{Cong}\right]$. But, $\min_{\theta\in\Theta_J^{Div}} u(d_J;\theta) < E\left[u_2(d_1(\theta);\theta) \mid \theta \in \Theta^{Cong}\right]$ implies that inefficiencies must occur for some $\theta \in \Theta_J^{Div}$. More generally, inefficiencies must arise for some $\theta \in \Theta_J^{Div}$ whenever λ_2 is sufficiently large. ■

It should be noted that if $\min_{\theta\in\Theta_J^{Div}} u(d_J;\theta) > z_2$ (and $\Theta_A^{Div} = \emptyset$), then there is no bargaining inefficiency for $\theta \in \Theta_J^{Div}$. Since a larger $u(d_J;\theta)$, $\theta \in \Theta_J^{Div}$ indicates a higher divergence of interest between organization 1 and the aggregate organizational viewpoint, it follows that more divergence of interest may help the functioning of the non-integrated structure in our setup.

4 The cost of integration

The main cost of integration in our setup is that one opportunistic manager is enough to have a very negative effect on the functioning of the overall integrated organization. More precisely, as soon as one manager is opportunistic, and even if the other manager is dedicated, the surplus wherever it is created (in the integrated organization) will be diverted by the opportunistic manager(s).

To illustrate the claim, assume first in the model of Section 2 that $u_i(d_i, d_{-i};\theta)$ is independent of d_{-i} for all d_i and θ. (With some abuse of notation, we will write

$u_i(d_i;\theta)$.) Manager i must make a physical decision in $\{d_A^i, d_J^i\}$ where d_A^i denotes the business as usual decision in division i. Assume further that $u_i(d_i^A;\theta) = 0$ for all θ. We refer to such a specification as the no interaction scenario.

Proposition 5 *In the no interaction scenario, the non-integrated structure dominates the integrated structure. More precisely, the net expected gain of non-integration over integration is*

$$\lambda_1(1-\lambda_2)E[\max(u_1(d_J^1;\theta),0)] + \lambda_2(1-\lambda_1)E[\max(u_2(d_J^2;\theta),0)].$$

Proof. All threshold payoffs must be 0 under the assumed specification. It follows that the net expected payoff of organization i in the non-integrated structure is $\lambda_i E[\max(u_i(d_J^i;\theta),0)]$. The net expected payoff of organization 0 in the integrated structure is

$$\lambda_1\lambda_2 E[\max(u_1(d_J^1;\theta),0)] + \lambda_1\lambda_2 E[\max(u_2(d_J^2;\theta),0)].$$

The result follows. ■

To get further insights as to the comparison between the integrated and non-integrated structures, consider the setup of Section 3 and assume that $\Theta_A^{Div} = \emptyset$, but $\Theta_J^{Div} \neq \emptyset$ (so unlike in the above Proposition the interest of organization 1 is not always aligned with the aggregate organizational interest). Assume further that both the interests of organization 1 and of organization 2 are aligned with the aggregate organizational interest whenever $\theta \in \Theta^{Cong}$. That is, $u_2(d_J;\theta) \geq 0$ for all $\theta \in \Theta_J^{Cong}$.

When manager 1 is opportunistic for sure, we have:

Proposition 6 *Suppose that $\Theta_A^{Div} = \emptyset$ and $u_2(d_J;\theta) \geq 0$ for all $\theta \in \Theta_J^{Cong}$. Non-integration dominates integration whenever manager 1 is opportunistic with probability 1, i.e. $\lambda_1 = 0$. The expected gain of non-integration over integration is no smaller than*

$$\lambda_2 E[u_2(d_J;\theta) \mid \theta \in \Theta_J^{Cong}]\,\Pr(\theta \in \Theta_J^{Cong}).$$

Proof. The expected organizational payoff in the integrated structure is 0 (since $\pi_0^T = 0$). In the non-integrated structure, we have that $\pi_2^T \geq 0$ (because $\Theta_A^{Div} = \emptyset$ and $u_2(d_J;\theta) \geq 0$ for all $\theta \in \Theta_J^{Cong}$). For $\theta \in \Theta_J^{Div}$ either no negotiation is possible (because $u(d_J;\theta) < \pi_2^T$) - and then the organizational payoff is 0 - or negotiation can take place and then there is at least a non-negative gain of π_2^T of the nonintegrated structure over the integrated one. Thus, when $\theta \in \Theta_J^{Div}$, the overall organizational payoff can be larger and is never smaller in the non-integrated structure than in the integrated one. For $\theta \in \Theta_J^{Cong}$, there is a zero payoff in organization 1 as manager 1 is assumed to be opportunistic. When manager 2 is opportunistic, the payoff in organization 2 is $\min(u_2(d_J;\theta), \pi_2^T) \geq 0$. When manager 2 is dedicated, the payoff in organization 2 is $u_2(d_J;\theta)$. Hence, the expected gain of the non-integrated structure over the integrated one is no smaller than $\lambda_2 E[u_2(d_J;\theta) \mid \theta \in \Theta_J^{Cong}] \Pr(\theta \in \Theta_J^{Cong})$. ■

Under the same conditions, when manager 2 is opportunistic for sure, we have:

Proposition 7 *Suppose that* $\Theta_A^{Div} = \emptyset$ *and* $u_2(d_J;\theta) \geq 0$ *for all* $\theta \in \Theta_J^{Cong}$. *Non-integration dominates integration whenever manager* 2 *is opportunistic with probability* 1, *i.e.* $\lambda_2 = 0$. *The expected gain of non-integration over integration is no smaller than*

$$\lambda_1 E[u_1(d_J;\theta) \mid \theta \in \Theta_J^{Cong}] \Pr(\theta \in \Theta_J^{Cong})$$

and it is no greater than

$$\lambda_1 E[u_1(d_J;\theta) \mid \theta \in \Theta_J^{Cong}] \Pr(\theta \in \Theta_J^{Cong}) + \lambda_1 E[u(d_J;\theta) \mid \theta \in \Theta_J^{Div}] \Pr(\theta \in \Theta_J^{Div}).$$

Proof. The expected organizational payoff in the integrated structure is 0 (since $\pi_0^T = 0$). In the non-integrated structure, we have that $\pi_2^T = 0$ (because $\Theta_A^{Div} = \emptyset$ and $u_2(d_J;\theta) \geq 0$ for all $\theta \in \Theta_J^{Cong}$). The expected overall organizational surplus in the non-integrated case generated by organization 1 when $\theta \in \Theta_J^{Cong}$

is $\lambda_1 E[u_1(d_J;\theta) \mid \theta \in \Theta_J^{Cong}] \Pr(\theta \in \Theta_J^{Cong})$ (it corresponds to manager 1 being dedicated). When manager 1 is dedicated and has the entire bargaining power, the surplus generated for $\theta \in \Theta_J^{Div}$ is $\lambda_1 E[u(d_J;\theta) \mid \theta \in \Theta_J^{Div}] \Pr(\theta \in \Theta_J^{Div})$. Hence, the result. ■

Remark: Whenever manager 1 has some bargaining power (in the negotiations arising for $\theta \in \Theta_J^{Div}$), the gain of non-integration over integration positively depends on $E[u(d_J;\theta) \mid \theta \in \Theta_J^{Div}]$. Hence, "more" divergence of interest (or an increase of Θ_J^{Div}) between organization 1 and the aggregate interest tends to increase the relative advantage of non-integration over integration. This arises because unlike in setups in which negotiations are not allowed, here negotiation does take place whenever $\theta \in \Theta_J^{Div}$. And some of the surplus generated by such negotiations benefits organization 1 (in the integrated structure the surplus is diverted by manager 2 who is assumed to be opportunistic with probability 1).

As the above results show, non-integration may dominate integration even if the interest of organization 1 is not congruent (always) with the aggregate organizational interest. When both managers are known to be dedicated for sure however, integration dominates non-integration:

Proposition 8 *Suppose that* $\Theta_A^{Div} = \emptyset$ *and* $u_2(d_J;\theta) \geq 0$ *for all* $\theta \in \Theta_J^{Cong}$. *Integration dominates non-integration whenever* $\lambda_1 = \lambda_2 = 1$, *and the expected gain of integration over non-integration is*

$$E[u(d_J;\theta) \mid \theta \in \Theta_J^{Div} \text{ and } u(d_J;\theta) < \pi_2^T] \Pr(\theta \in \Theta_J^{Div} \text{ and } u(d_J;\theta) < \pi_2^T)$$

where

$$\pi_2^T = \frac{\Pr(\theta \in \Theta_J^{Cong}) E[u_2(d_J;\theta) \mid \theta \in \Theta_J^{Cong}]}{\Pr(\theta \in \Theta^{Cong}) + \Pr(\theta \in \Theta_J^{Div} \text{ and } u(d_J;\theta) < \pi_2^T)}$$

Proof. Integration induces the first-best whenever both managers are dedicated with probability 1. Non-integration results in bargaining inefficiencies whenever $\theta \in \Theta_J^{Div}$ and $u(d_J;\theta) < \pi_2^T$. The result of the Proposition follows from the expression of π_2^T. ■

Remark 1: If[24] $u(d_J;\theta) > E[u_2(d_1(\theta);\theta) \mid \theta \in \Theta^{Cong}]$ for $\theta \in \Theta_J^{Div}$, then $\pi_2^T = E[u_2(d_1(\theta);\theta) \mid \theta \in \Theta^{Cong}]$ and there are no bargaining inefficiencies in the non-integrated structure. Hence non-integration and integration have the same performance whenever $\lambda_1 = \lambda_2 = 1$.

Remark 2: In the setup of Section 3 (and without any further restriction), integration (weakly) dominates non-integration whenever both managers are known to be dedicated with probability 1. This is because integration leads to the first-best organizational payoff , i.e. $E[\max(u(d_J;\theta),0))]$, whenever $\lambda_1 = \lambda_2 = 1$ (see Proposition 9 below). However, quantifying the expected gain of non-integration over integration is a bit cumbersome in this general specification.

5 Further insights

5.1 When acceptable decisions deliver random performances

Consider a one-organization setup in which the manager has to make a physical decision $d \in \{d_A, d_J\}$ where d_A designates the business as usual decision and d_J is a decision that requires further justification. The organizational payoff associated with decision d when the state of the world is θ is denoted $u(d;\theta)$. We first observe that:[25]

Proposition 9 *Suppose that $u(d_A;\theta)$ is independent of θ. The efficient decision is made in all states of the world.*

[24]
$$\frac{\Pr(\theta \in \Theta_J^{Cong})E[u_2(d_J;\theta) \mid \theta \in \Theta_J^{Cong}]}{\Pr(\theta \in \Theta^{Cong})} = E[u_2(d_1(\theta);\theta) \mid \theta \in \Theta^{Cong}]$$

[25] The result is independent of the probability with which the manager is dedicated. But, the performance of the organization does depend on this probability since an opportunistic manager will divert the surplus created by the efficient decision to his own interests.

Proof. Let $u_A \equiv u(d_A;\theta)$ for all θ. Clearly, we have that $\pi^T = u_A$. Whenever $u(d_J;\theta) > u(d_A;\theta)$, decision d_J can be made because it results in a payoff no smaller than the threshold u_A. ■

However, when $u(d_A;\theta)$ varies with θ the efficient decision need not always been made. For the sake of illustration:

Proposition 10 *There are two states θ_A, θ_J which occur with positive probability. Decision d_A (resp. d_J) is efficient in state θ_A (resp. θ_J). Assume further that $u(d_A;\theta_A) > u(d_J;\theta_J)$. The decision must be inefficient with positive probability.*

Proof. Suppose the decision is always efficient. Then the threshold is $\pi^T = u(d_A;\theta_A)$. But, this does not allow for the efficient decision whenever the state is θ_J because then the efficient decision d_J could not be justified ex post as $\pi^T > u(d_J;\theta_J)$. ■

Of course, the randomness of $u(d_A;\theta)$ does not systematically cause inefficiencies. If in the above two-state example, $u(d_A;\theta_A)$ were lower (instead of larger) than $u(d_J;\theta_J)$, then the efficient decision would always obtain.

More generally, we let $\Theta_A = \{\theta \mid u(d_A;\theta) \geq u(d_J;\theta)\}$, $\Theta_J = \{\theta \mid u(d_A;\theta) < u(d_J;\theta)\}$, and $u_A \equiv E(u(d_A;\theta) \mid \theta \in \Theta_A)$. It is readily verified that:

Proposition 11 *Assume that $u(d_J;\theta) \geq u_A$ for all $\theta \in \Theta_J$. Then the decision is always efficient.*

Remark: When $u(d_J;\theta) < u_A$ for some $\theta \in \Theta_J$, sometimes the decision must be d_A even for some states $\theta \in \Theta_J$. (Standard fixed point arguments guarantee the existence of an organizational equilibrium under mild continuity assumptions on $u(d;\theta)$ whenever Θ_J is a continuous type space.)

5.2 Varying the set of acceptable decisions

In the above analysis we took the set A of acceptable decisions as given. In this short subsection, we wish to suggest some comparative statics with respect to the set A. The interpretation of this comparative statics exercise is not at all clear, as the primary interpretation of A is in terms of familiarity to those in charge of assessing the manager (hence it can hardly be thought of as a choice variable in the organizational design). But, in those contexts in which the review board would be familiar with many possible decisions, it might consider requiring justifications also for familiar decisions. The following arguments might be of some value for such cases.

Consider a one-organization setup with a payoff given by $u(d;\theta)$ where d denotes the decision and θ the state. There are two decisions d_1 and d_2 and two states θ_1, θ_2. Each state θ_i, $i = 1, 2$ is such that decision d_i is optimal relative to d_{-i}. That is, $u(d_i;\theta_i) \geq u(d_{-i};\theta_i)$. To fix ideas, we assume that $u(d_1;\theta_1) > u(d_2;\theta_2)$.

We ask ourselves whether the set A should be $\{d_1\}$ or $\{d_2\}$. As we have seen above (see Propositions 10-11), if $A = \{d_2\}$ the optimal decision will be made whereas if $A = \{d_1\}$ sometimes an inefficient decision will arise.

As a corollary of this observation, we get that if the manager is dedicated with a sufficiently large probability, letting $A = \{d_2\}$ leads to a more efficient working of the organization than $A = \{d_1\}$. Suppose now that the manager is opportunistic with a very large probability, say with probability 1. Letting $A = \{d_2\}$ will result in an organizational payoff of $u(d_2;\theta_2)$ (whenever $\theta = \theta_1$ the manager will choose $d = d_1$ and he will divert $u(d_1;\theta_1) - u(d_2;\theta_2)$ from the organization). Letting $A = \{d_1\}$ will result in an organizational payoff of $u(d_1;\theta_2)$ (that is, decision d_1 will always been made, and when $\theta = \theta_1$ the manager will divert $u(d_1;\theta_1) - u(d_1;\theta_2) > 0$ from the organization; the threshold payoff is $\pi^T = u(d_1;\theta_2)$). Since $u(d_1;\theta_2) < u(d_2;\theta_2)$ (because d_2 is the efficient decision when $\theta = \theta_2$), we get:

Proposition 12 *If the manager is either dedicated with a sufficiently large probability or opportunistic with a sufficiently large probability, letting $A = \{d_2\}$ leads* *to a more efficient working of the organization than* $A = \{d_1\}$.

Remark: For intermediate values of λ (the probability that the manager is dedicated), it may well be that letting $A = \{d_1\}$ dominates $A = \{d_2\}$.[26]

Another possible modification (not considered so far) is to enlarge the set A of acceptable decisions. But, doing so may be harmful in the presence of opportunistic managers (because managers are assumed to have entire discretion over the set of acceptable decisions A). In particular, if the set A is enlarged to allow for some side-payments, opportunistic managers will systematically take advantage of this to divert some money from their organization. Even if side-payments are not allowed for decisions in A, opportunistic managers have no incentive to choose the best decisions in A. On the contrary, if managers do take into account that their decisions affect the threshold payoff criterion, they have (weak) incentives to choose the worst possible decisions in A so as to lower the threshold criterion (and allow them to take advantage of this in good times when surplus can be generated). Of course, if the manager is known to be dedicated for sure, giving full discretion to the manager cannot hurt the organization. But, as soon as the manager is not dedicated for sure, the best set A should not necessarily consist of all possible decisions.

5.3 On the determination of the threshold performances

The threshold performance in an organization has been assumed so far to be determined as the expected organizational performance conditional on an acceptable decision being made in the organization. A rationale for this is that such a procedure guarantees that the expected performance can be no smaller than the threshold performance. But, what about other specifications of the threshold performances? In this subsection we investigate the effect of changing

[26]To see this, set λ (the probability that the manager is dedicated) sufficiently large, and adjust $\Pr(\theta = \theta_2)$ to be sufficiently small, and $u(d_2; \theta_2)$ to be sufficiently low.

the threshold performance in specific environments.

To start with, consider the case of a single organization O; the decision maker can make one of two possible decisions d_A and d_J. Decision d_A is the business as usual decision and delivers a nul performance in all states θ. Decision d_J (which requires further justification) delivers a performance θ in state θ. The state θ is distributed on $(\underline{\theta}, \overline{\theta})$ with $\underline{\theta} < 0 < \overline{\theta}$ according to a density $f(\cdot)$ with cumulative $F(\cdot)$. The manager is assumed to be dedicated with probability $\lambda \in (0,1)$.

Let π^T be the threshold performance. The manager will choose decision d_J whenever $\theta > \pi^T$, and decision d_A otherwise. When the manager is dedicated, the organizational payoff is 0 (resp. θ) if the decision is d_A (resp. d_J). When the manager is opportunistic, the organizational payoff is $\min(0, \pi^T)$ if the decision is d_A, and it is π^T if the decision is d_J.

The best threshold for the expected organizational performance satisfies:

Proposition 13 *Assume that* $\theta \to \frac{1-F(\theta)}{f(\theta)}$ *is non-decreasing on the domain* $(\underline{\theta}, \overline{\theta})$. *The expected organizational payoff is maximized for* $\pi^T = \pi^*$ *where* π^* *is the unique solution to*

$$(1-\lambda)\frac{1-F(\pi^*)}{f(\pi^*)} = \pi^* \tag{2}$$

Proof. Given the threshold π^T, the expected organizational payoff is given by

$$\begin{aligned} &(1-\lambda)[F(\pi^T)\min(0,\pi^T) + (1-F(\pi^T)\pi^T] \\ &+\lambda \int_{\pi^T}^{\overline{\theta}} \theta f(\theta) d\theta \end{aligned}$$

Easy manipulations show that the best π^T is positive and satisfies condition (2). ■

Remark: When the manager is known to be dedicated, the best threshold is $\pi^* = 0$, which results in the first-best decision. When the manager is known to be opportunistic, the best threshold satisfies $\frac{1-F(\pi^*)}{f(\pi^*)} = \pi^*$, which corresponds also to the revenue maximizing reserve price in an auction setup in which the valuation of the seller is 0 and the valuation θ of the buyer(s) is distributed on

$(\underline{\theta}, \overline{\theta})$ according to density $f(\cdot)$. For $0 < \lambda < 1$ the best threshold is in between these two values.

In the above one-organization setup, the best threshold never lies below the expected organizational performance obtained when an acceptable decision is being made (this is 0 in the above example). But, in more complex environments (in particular those requiring negotiations between organizations), this need not be the case. For example, in the context of Section 3 if managers are known to be dedicated with a sufficiently large probability, setting threshold performances below the expected organizational payoffs obtained when acceptable decisions are being made would be desirable because it would allow the managers (assumed to be dedicated) to negotiate more often.

From the perspective on the optimal determination of threshold performances, the above finding that the lowering the threshold performance may be a good idea is probably one of the most interesting ones, but our view is that the review boards need not know the prior distributions of the parameters relevant to the decision makers. In such a world, it would seem that the reviewing process should not depend finely of the details of these distributions.

6 Related literature

Grossman and Hart (1986) and Hart and Moore (1988) have developed a very influential theory of integration based on the hold-up idea (Williamson 1975). Since different forms of integration result in different hold-up inefficiencies the theory provides a rich theory of the firm. In our setup, the decision d_i in organization i can possibly be interpreted as an ex ante investment as in the Grossman-Hart-Moore theory. However, in contrast with the literature on incomplete contracts, we assume here that the decisions d_i can be made through negotiations. Our insights do not rely on the hold-up phenomenon, but rather on the working of the review processes.

Bernheim and Whinston have analyzed the extent to which a contract should be as specific as possible in a world where verifiability constraints impose that the contract cannot be made contingent on every single observation. They observe that leaving some discretion (in the form of incomplete contracting) to an employee may sometimes be good in multi-period setups. In a different vein, Aghion and Tirole (1997) (see also Holmstrom 1984) analyze the optimal degree of delegation, and they quantify how much the discretion of the employee should be restricted as a function of the divergence of interests between the employee and the employer.

In our setup, enlarging the set A of acceptable decisions can be interpreted as leaving more discretion to the manager. And the probability $1-\lambda_M$ that manager M is opportunistic is a measure of the divergence of interest between the manager and his organization. Thus, the insight that when the manager is known to be dedicated with a sufficiently large probability enlarging the set A may be a good idea echoes insights in Aghion-Tirole's theory. But, our insights about the cost and benefit of integration (taking as given the sets A of acceptable decisions) do not have their counterpart in Aghion-Tirole's theory nor in Bernheim-Whinston's one.[27]

Rajan and Zingales (2000) have analyzed the cost and benefit of integration based on the idea that a party receiving monetary transfers can use them to improve his bargaining position in future negotiations. This can be interpreted in the multi-task perspective (because parties can invest in different sorts of activities) (Holmstrom-Milgrom 1991) or in the influence cost perspective (Milgrom-Roberts 1988). From the bargaining theory viewpoint, the use of monetary transfers for future negotiations translates in imperfect transferability of utilities at the

[27] One possible insight (not much developed above) that may be vaguely related to Bernheim-Whinston is that if A may possibly consist of several decisions, it need not necessarily be a good idea to include all of them, as this may affect adversely the threshold performance that defines the criterion of success (see subsection 5.2).

bargaining stage, and as Rajan-Zingales shows this imperfection is more or less severe depending on the distribution of property rights. In Rajan-Zingales' theory there are bargaining inefficiencies in the sense that the bargaining outcome does not necessarily maximize the joint surplus (due to transferability problems).[28] But, the channel through which bargaining inefficiencies occur is very different from that in the current paper. In particular, in our setup bargaining inefficiencies are due to the fact that review boards are not present at the bargaining stage whereas in Rajan-Zingales' theory bargaining inefficiencies arise because of the inabilities of the parties to commit not to use side-payments to improve their bargaining position in future negotiations.[29]

Finally, there is a vast literature that studies how the organizational performance is affected by the monitoring technology of the decision making (see, for example, Mookherjee and Png (1992)) and/or by the degree of opportunism of the management (see, for example, Rajan-Zingales (1998)). The current paper can be viewed as providing a different and complementary perspective on the performance of organizations: while the monitoring technology and the degree of opportunism are set exogenously, we compare the relative performance of organizations as a function of their degree of integration.

[28]See also Jehiel (1997) for another source of transferability problems in a public economics context in which jursidictions bargain over local public goods and takes to attract mobile citizens.

[29]It should also be mentioned that while bargaining inefficiencies take the form of a complete breakdown of the negotiation in our case, they take the form of suboptimal negotiations in Rajan-Zingales' theory.

References

[1] Aghion P. and J. Tirole [1997]: " Formal and Real Authority in Organizations," *Journal of Political Economy* **105**, 1-29.

[2] Bernheim D. and M. Whinston [1998]: "Incomplete Contracts and Strategic Ambiguity," *American Economic Review* **88**, 902-932.

[3] Coase, R.H. [1960]: "The Problem of Social Cost," *Journal of Law and Economics*, **3**, 1-44.

[4] Grossman S. and O. Hart [1986]: "The Costs and Benefits of Ownership: a Theory of Vertical and Lateral Integration," *Journal of Political Economy*, **94**, 691-719.

[5] Hart O. and J. Moore [1990]: "Property Rights and the Nature of the Firm," *Journal of Political Economy*, **98**, 1119-1158.

[6] Holmström, B. [1982]: "Managerial Incentive Problems: A Dynamic Perspective," in Essays in Economics and Management in honor of Lars Wahlbeck, Helsinki, Swedish School of Economics.

[7] Holmström, B. [1984]: "On the Theory of Delegation," in *Bayesian Models in Economic Theory* edited by Marcel Boyer and Richard Kihlstrom, Elsevier.

[8] Holmström, B. and P. Milgrom [1991]: "Multi-task Principal-Agent Analyzes: Incentive Contracts, Asset Ownership and Job design," *Journal of Law, Economics and Organization*, **7**, 24-52.

[9] Jehiel, P. [1997]: "Bargaining between benevolent jurisdictions or when delegation induces inefficiencies," *Journal of Public Economics.*

[10] March J. and H. Simon [1958], Organizations, New York, Free Press.

[11] Milgrom P. and J. Roberts [1988], “An Economic Approach to Influence Activities in Organizations,” *American Journal of Sociology*, **94**, S154-S179.

[12] Mookherjee D. and I. Png [1992], "Monitoring versus Investigation in Law Enforcement,” *American Economic Review.*

[13] Pigou C. [1950]: “The Economics of Welfare,” 4^{th} edition, Macmillan, London.

[14] Rajan R. and L. Zingales [1998]: "Power in a Theory of the Firm,” *Quarterly Journal of Economics* **113**, 387-432.

[15] Rajan R. and L. Zingales [2000]: "The Tyranny of the Inequality: An Inquiry into the Adverse Consequences of Power Struggles,” *Journal of Public Economics* **76**, 521-558.

[16] Simon H. [1955], "A Behavioral Model of Rational Choice,” *Quarterly Journal of Economics* **69**, 99-118.

[17] Williamson, O. [1975]: Markets and Hierarchies, New York, Free Press.