Overcoming Contractual Incompleteness: The Role of Guiding Principles

by

David Frydlinger and Oliver Hart*

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Abstract: We consider a buyer and seller who contract over a service. The contract encourages investment and provides a reference point for the transaction. In normal times the contract works well. But with some probability an abnormal state occurs and the service must be modified. The parties expect each other to behave "reasonably", but given self-serving biases their views of reasonableness may not coincide, leading to aggrievement and deadweight losses. The adoption by the parties of guiding principles such as loyalty and equity in their contract can help. We provide supporting evidence in the form of case studies and interviews.

Key words: incomplete contracts, guiding principles, self-serving biases, reference points, aggrievement, shading, loyalty, equity

JEL codes: D23, D86, K12

*Frydlinger: Managing Partner, Cirio law firm (email: David.Frydlinger@cirio.se); Hart: Department of Economics, Harvard University (email: ohart@harvard.edu). We would like to thank Hal Bretan, Sylvain Chassang, Tim Cummins, Tore Ellingsen, Christoph Engel, Maija Halonen, Louis Kaplow, Henrik Lando, Klaus Schmidt, Andrei Shleifer, Kathy Spier, Jonathan Wight, and Christian Zehnder for helpful suggestions, and Angie Acquatella and Erica Moszkowski for research assistance. We have benefited from the comments of participants at the Mini-Conference on Relational Contact Management, Copenhagen Business School (2018), the research seminar in law, economics and organization at Harvard Law School (2019), the Symposium in Honor of Martin Hellwig (2019), the NBER working group in organizational economics (2019), the 13th International Conference, Challenges of Europe, Croatia (2019), the University of Bristol contract theory workshop (2019), and SIOE (2019).

1. Introduction

A growing number of organizations world-wide, such as the Canadian Government, Dell, Intel and the Swedish telecommunications operator Telia Company, have begun to adopt an alternative approach to contract negotiations and contract management in their outsourcing and supply chain deals, and in other complex transactions[1]. In this new approach, emphasis is placed on shared goals, the adoption of guiding principles, and structured communication. These organizations report significantly improved results and that the new approach has helped them to overcome obstacles and frictions that have been well-known for a long time but hard to deal with through traditional contracts.[2] One of the authors of the current paper (Frydlinger) has assisted several organizations to apply this alternative approach to contracting.

The goal of this paper is to explain how and why the new approach works, and why traditional ones do not. In a nutshell, our answer is that in complex relationships contracts are inevitably incomplete. Each party will expect the other to behave "reasonably" or "fairly" in interpreting or completing the contract, but given self-serving biases the parties may have different views of what is reasonable or fair. This can lead to bad feelings and counter-actions, causing deadweight losses. We argue that the parties can mitigate these deadweight losses by incorporating guiding principles, such as loyalty and equity, and structured communication processes, into their formal contract. We suggest that these guiding principles, which are fundamental social norms, can be 'activated' through ex ante and ex post communication[3]. We argue that a contract that specifies standard elements such as the price and the nature of the good or service to be traded can, in combination with the adoption of guiding principles, perform better than either a standard contract alone, or the adoption of guiding principles alone. The contract will also perform better than one based on standard mechanism design theory.

Before describing our model, let us expand on some of these points. Contractual incompleteness has the implication that events not covered by the contract may occur, and that the contract may be open to more than one interpretation[4]. In both cases the parties will have some discretion as to how to fill in the gaps of the contract. If the final outcome is seen as unfair by one or both of the parties, there will be bad feeling or "aggrievement", in the words of Hart and Moore (2008). Aggrievement can lead to several types of deadweight losses. First, the aggrieved party may engage in "shading" behavior (see Hart and Moore (2008)): he (or she) punishes the other party by withholding favors because he is angry, even though this does not increase his own payoff. Second, the aggrieved party may "shirk": he performs within the letter rather than the spirit of the contract so as to recover some of the profit he feels

[1] This approach is based on research carried out at the University of Tennessee. See Vitasek et al. (2013).
[2] See, for example, Vitasek (2016) regarding Dell, Vitasek and DiBenedetto (2018a) regarding Island Health and Hospitalists (Canadian Government), Vitasek et al. (2017) regarding Intel, and Vitasek and DiBenedetto (2018b) regarding Telia Company.
[3] Throughout this paper, by "communication" we mean not only the transmission of information from one party to another, but also the discussion and realization of a common understanding about various matters, including guiding principles.
[4] For a discussion of different types of contractual incompleteness, see Ayres and Gertner (1992) and Hart and Moore (1999).

entitled to, at the expense of the other party (the assumption is that he would not shirk if he felt well-treated). Third, the aggrieved party may have to "eat" his aggrievement and incur psychic costs[5]. Finally, the parties may have to expend time and resources "placating" the aggrieved party in order to eliminate the aggrievement and any counter-actions.

In all of these cases there will be deadweight losses going forward in the relationship. Moreover, we suggest that aggrievement and the resulting deadweight losses will be higher in bad states of the world where parties are below their reference payoffs. That is, if things are going well, a party may be less concerned and react less negatively if he does not receive the "best" outcome[6].

One approach to reduce these deadweight losses is for the parties to hire sophisticated lawyers, who can help them to write contracts that anticipate more events and are less open to interpretation. In practice this is often a fool's errand. We argue that a better approach—and one that is increasingly being adopted—is for the parties to accept a certain degree of incompleteness and incorporate guiding principles, such as loyalty and equity, and structured communication processes, into their formal contract.

To make these ideas precise, we develop a very stylized model. Needless to say, the model is much simpler than the commercial deals referred to above. In addition, it focuses on just one negative consequence of contractual incompleteness—the occurrence of events not covered by the contract—and just one deadweight loss—shading. Nevertheless, later in the paper, we will argue that the model provides a useful way to think about real deals. In the model, Buyer B and Seller S meet at date 0, and plan to trade at date 1. Imagine that B is putting on a concert and that S is providing band services. A contract specifying the price and (many aspects of) the quality of the music is written at date 0. S's costs are verifiable, but there is moral hazard and so it is efficient to make S the residual claimant on costs. Given this assignment, a first-best effort choice is achieved and there is no hold-up problem.

Much of the time (with probability $1-\pi$), this contract delivers a desirable outcome. However, with probability π an abnormally bad state occurs. Imagine that this is a state where the usual trumpeter that S was planning to hire for the band is unavailable. (The abnormal state covers many possibilities like this and that is why we will suppose that it cannot be contracted on.) So a replacement must be found at short notice. If S is an independent contractor, the replacement is S's choice (she has residual decision

[5] See Hart and Moore (2008).

[6] For a discussion of this idea, and some supporting evidence, see Lando (2019). The practitioners whom we interviewed (see Section 5) also agreed that conflicts are more serious in bad states of the world, although they may still occur in good states. In emphasizing deadweight losses arising from aggrievement we do not wish to deny the existence of other sorts of deadweight losses, e.g., those resulting from bargaining (emphasized by Coase (1937) and Williamson (1975), and analyzed by Bajari and Tadelis (2001)). Bargaining costs are hard to formalize not least because it would seem that they can be eliminated through the use of sophisticated mechanisms (Chakravarty and MacLeod (2009) argue that standard form construction contracts provide such a mechanism). Also it is easier to explain how the guiding principles discussed below reduce aggrievement costs as opposed to bargaining costs.

rights over the band composition). Under standard assumptions of rationality and self-interest, S would threaten to choose the cheapest replacement (consistent with the contract), but if another trumpeter is more efficient the parties will renegotiate. Since we will assume that there is symmetric information, the first-best is achieved.

In Section 3 we explain why we do not believe that things will work as smoothly as this in practice. The reason is that the contract creates reference payoffs. Since the abnormal state is unusual, each party's reference payoff will be biased toward his payoff in the normal state. If the abnormal state occurs, at least one party will be below his reference payoff and will expect the other party to behave fairly. However, in the absence of communication the parties may have different views of what is fair. An implication of this is that B may be upset and angry if S threatens to choose a cheap but bad trumpeter: his reasoning will be that the least S could do is to mitigate B's losses by choosing a good (albeit worse than the original) trumpeter. B may be even more upset if he is pressured to pay for a good trumpeter ("extortion"). We follow Hart and Moore (2008) in supposing that an aggrieved party will retaliate by withholding (noncontractible) cooperation ("shading"). This creates deadweight costs.

In Section 4 we argue that there is a way to reduce deadweight costs. Ideally the parties would change their reference points so that each party's reference payoff in the abnormal state equals their payoff in that state. We do not believe that this is feasible. Instead we argue that the parties can at least partially align their preferences when bad things happen by adopting guiding principles. (In practice communication can also have the important effect of aligning reference payoffs by creating a shared vision. We do not model that here.) In our formal analysis we focus on one guiding principle, loyalty. By this we mean a principle that obliges each party to treat the other party's interest as having a comparable importance to their own. We formalize this by supposing that through communication and discussion at dates 0 and 1 the parties can transform their payoffs so that each party puts weight λ on the other party's payoff, where $0 < \lambda < 1$[7]. However, communication and discussion are not costless. The higher λ is, the higher are the costs that must be incurred in discussion and communication.

We solve for the optimal contract under communication. Since communication helps only in the abnormal state, our analysis yields the plausible result that communication is worthwhile only if the abnormal state is somewhat likely. To put it another way, in routine situations where unexpected events are rare, a standard contract may suffice.

As noted, the commercial deals referred to above are much more complex than the simple concert example on which we base our model. In addition, those deals involve several other components than the guiding principle of loyalty. We believe, however, that our model can be used to identify some central aspects and consequences of contractual incompleteness and also that our simplified solution – communication about and based on activated guiding principles – captures an essential reason why the referred to organizations have been able to reduce deadweight losses and overcome contractual

[7] For a discussion of how the adoption of social preferences can increase efficiency when parties cannot write fully contingent contracts, see Chassang and Zehnder (2016).

incompleteness. We elaborate on these points in Section 5, where we report on some case studies and interviews.

The paper is organized as follows. In Section 2, we set up the model and describe the optimal contract under standard assumptions of rationality and self-interest. In Section 3 we explain why we do not think that the standard solution will work in practice, given the parties' behavioral biases. In Section 4 we analyze how adoption of a loyalty principle can help. In Section 5 we describe some interviews and case studies that provide some support for our analysis. In Section 6 we discuss the use of complementary principles, such as equity. Finally, Section 7 concludes. In an appendix we consider how things change if B purchases S's operations and turns S into an employee.

2. Model

Buyer B is putting on a concert. Seller S is providing the band. B and S contract at date 0 and the concert takes place at date 1. There is no discounting, and the parties are risk neutral and wealth unconstrained.

There are two states of the world. In the normal state N which occurs with probability $1-\pi$, the usual trumpeter, Eve, is available to play in the band. B's revenue $= v$ and S's cost $= c$. In the abnormal state *A*, which occurs with probability π, Eve is unavailable because she has broken her finger. There are two alternative trumpeters, Adam and George. Since these are late replacements, it is reasonable to suppose that they are more expensive than Eve and of worse quality. Denoting incremental cost and value by $\Delta c, \Delta v$, respectively, we have:

	Cost relative to Eve	Value relative to Eve
Adam	$\Delta\, c_a > 0$	$\Delta\, v_a < 0$
George	$\Delta\, c_g > 0$	$\Delta\, v_g < 0$

After Eve has been replaced, B's revenue = $v + \Delta\, v_i$ and S's cost= c+$\Delta\, c_i$, where i= a or g.

The following numerical example is useful: Δv_a=-10, Δc_a=8, Δv_g=-14, $\Delta c_g = 6$.

All relevant variables are observable but only some are verifiable. We suppose that v and Δv are nonverifiable (and nontransferable), while c and $c + \Delta c$ are verifiable and transferable (but Δc is not verifiable). However, c depends on S's effort e, which is private information, and which has a personal cost to S equal to e ("moral hazard"). In contrast $v, \Delta c,$ and Δv do not depend on e. S's effort might represent time spent identifying and negotiating with appropriate musicians after the contract is signed and before the concert takes place: a high ex ante effort reduces ex post costs. We assume that $c(e)$ is decreasing in e and exhibits diminishing returns: $c' < 0,\ c'' > 0,\ c'(0) = -\infty,\ \lim_{e\to\infty} c'(e)$=0.

As we shall see, the assumption that v, Δc, and Δv are independent of e implies that the hold-up problem is easily avoided in this model.

Later in the paper we will introduce some further ("shading") actions that B and S can engage in, which will affect costs and benefits. Since these actions play no role under the classical assumptions of this section, we postpone discussion of them.

It is worth justifying some of these assumptions. First, in many situations it is difficult to verify the value of a service to a buyer either because the buyer purchases services from several sellers and it is hard to keep them apart, or because the benefit is non-monetary. Second, it would be easy to generalize the analysis to the case where value is verifiable but there is moral hazard on the buyer's side. In contrast, we assume that cost is verifiable, but subject to moral hazard on the seller's side, because this is realistic[8].

We suppose that it is still worth going ahead with the concert in the abnormal state: $v - c(0) + Max(\Delta v_a - \Delta c_a,\ \Delta v_g - \Delta c_g) > 0$.

Figure 1 provides a time-line.

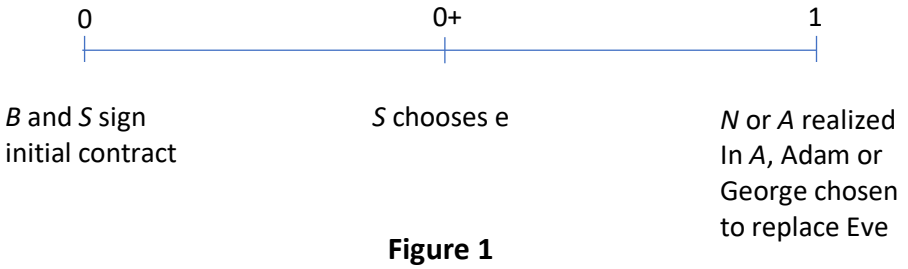

Figure 1

For most of the paper we will focus on the case where, in order to solve the moral hazard problem, S is allocated all the costs. In Appendix 2, however, we consider the case where B bears all the costs.

[8] Note that we suppose that, although final cost in the abnormal state $c + \Delta c$ is verifiable, the incremental cost Δc of hiring Adam or George rather than Eve is not. This is to rule out contracts of the form: S bears cost c, while B bears incremental cost Δc. One interpretation is that the final terms of Eve's contract have not yet been settled when she breaks her finger, and so the cost of having her (what S's cost would have been if it was not necessary to replace Eve) can never be established. A similar assumption about the nonverifiability of incremental cost is made by Bajari and Tadelis (2001).

Without loss of generality assume that George is cheaper than Adam: $\Delta c_g < \Delta c_a$. The interesting case is where there is an ex post conflict of interest: George is a worse trumpeter than Adam, that is, $\Delta v_g < \Delta v_a$.

To simplify the exposition, we will confine our attention throughout to the case where Adam is more efficient than George, $\Delta v_a - \Delta c_a > \Delta v_g - \Delta c_g$. The analysis where George is more efficient than Adam is very similar (although less interesting).

Assume $(*)$: $\Delta v_a - \Delta c_a > \Delta v_g - \Delta c_g$.

Note that $(*)$ is satisfied in our numerical example.

The first-best

A social planner chooses Eve's replacement in state A in an efficient manner, and chooses e to maximize expected net surplus. Ex post surplus is given by

(2.1) $v - c(e)$ in state N,

and by

(2.2) $v - c(e) + \Delta v_a - \Delta c_a$ in state A,

and so expected net surplus is

(2.3) $v - c(e) - e + \pi(\Delta v_a - \Delta c_a)$.

The planner maximizes (2.3) with respect to e. The first-order condition is

(2.4) $c'(e) = -1$.

Denote the solution by e_{FB}. Note that since the abnormal state affects value and cost independently of e, the probability π of the abnormal state does not affect the first-best effort level.

Substituting e_{FB} in (2.3), we can write the first-best level of net surplus as

(2.5) $v - c(e_{FB}) - e_{FB} + \pi(\Delta v_a - \Delta c_a)$.

A simple contract that achieves the first-best under classical assumptions

In what follows we will suppose that state A cannot be contracted on: Eve's unavailability is only one of many things that can go wrong. We will also assume that choosing Eve's replacement qualifies as a "residual control right" or "residual decision right" in the sense of Grossman-Hart (1986), and that S has this right (B and S are separate entities). Furthermore, Adam and George are both feasible choices for S, in the sense that neither violates the date 0 contract. In Appendix 2 we consider the case where B purchases S's operations, acquiring residual control rights, and S becomes an employee.

In spite of the fact that the parties cannot contract on state A, there is a simple way to achieve the first-best under "classical" assumptions that the parties are self-interested and rational: write an incomplete contract and renegotiate if state A occurs.

Proposition 1. Under classical assumptions, a contract that specifies the price of band services, and that S will bear all the costs, and that permits renegotiation ex post, achieves the first-best.

Proof: Let B and S agree on a price p for the band and that S will bear all of the costs, $c(e)$ in state N and $c(e) + \Delta c$ in state A (which recall are verifiable). In state N everything proceeds smoothly: Eve plays in the band and B pays p. The payoffs are given by:

(2.6) B's ex post payoff in state $N = v - p$, S's ex post payoff in state $N = p - c(e)$.

In state A, S must replace Eve. S's incentive is to choose George since he is cheaper. However, George is worse for B. Since Adam is more efficient than George, the parties will renegotiate (there is symmetric information and so renegotiation is costless). Assume (without loss of generality) that the parties have equal bargaining power. Then in state A, the payoffs are given by:

(2.7) B's ex post payoff in state $\mathrm{A} = v - p + \Delta v_g + \frac{1}{2}\left(\Delta v_a - \Delta c_a - (\Delta v_g - \Delta c_g)\right)$,

(2.8) S's ex post payoff in state $A = p - c(e) - \Delta c_g + \frac{1}{2}\left(\Delta v_a - \Delta c_a - (\Delta v_g - \Delta c_g)\right)$.

The parties' ex-ante expected payoffs are given by

(2.9) B's expected payoff $= v - p + \pi\left[\Delta v_g + \frac{1}{2}\left(\Delta v_a - \Delta c_a - \Delta v_g + \Delta c_g\right)\right]$,

(2.10) S's expected payoff $= p - c(e) - e + \pi\left[-\Delta c_g + \frac{1}{2}\left(\Delta v_a - \Delta c_a - \Delta v_g + \Delta c_g\right)\right]$.

Under rational expectations, S will choose e to maximize (2.10), which yields the first-order condition

(2.11) $c'(e) = -1$.

The first-best is achieved. Q.E.D.

Assume that there is a competitive market for sellers at date 0, and that the market-clearing expected return for a seller is $\overline{U}$. Then price p will satisfy

(2.12) $p - c(e_{FB}) - e_{FB} + \pi\left[-\Delta c_g + \frac{1}{2}\left(\Delta v_a - \Delta c_a - \Delta v_g + \Delta c_g\right)\right] = \overline{U}$,

and so B's expected payoff equals

(2.13) $v - c(e_{FB}) - e_{FB} + \pi\left(\Delta v_a - \Delta c_a\right) - \overline{U}$.

In other words, B receives the first-best level of surplus minus $\overline{U}$.

At the risk of belaboring the point, note that, in contrast to the standard literature, although the above contract is incomplete (state A cannot be contracted on), there is no underinvestment in e. The reason is that v and the incremental payoffs $\Delta c, \Delta v$ are independent of e. Hence, the contract for band services at price p avoids the hold-up problem and provides S with socially optimal investment incentives (choice of e). Note that if no contract at all were written at date 0 there *would* be a hold-up problem. At date 1 B and S would bargain over the gains from trade $v - c(e)$ in state N and $v - c(e) + \Delta v_a - \Delta c_a$ in state A. If they split these 50:50, S's ex ante payoff will equal

(2.14) $\frac{1}{2}v - \frac{1}{2}\,c(e) + \frac{1}{2}\,\pi(\Delta v_a - \Delta c_a) - e,$

and so e will satisfy the first-order condition

(2.15) $\frac{1}{2}c'(e) = -1,$

which implies $e < e_{FB}$.

3. Why we think that the classical contracting solution will not work in practice

In this section we explain why the simple contract of Section 2 is unlikely to work in practice. In our view a key factor is that the contract creates reference points. The creation of reference points has both positive and negative elements. On the positive side, the contract nails things down in the normal state and avoids disagreement there. But, on the negative side, the contract-created reference points may cause problems in the abnormal state.

Specifically, we suppose that each party has a reference payoff based on the probability distribution of payoffs under the contract (as in Kőszegi and Rabin (2006)). When a party is below his reference payoff he will become sensitive to the actions of the other party, expecting the other party to behave "fairly", and being disappointed or aggrieved if this does not happen. Aggrievement will lead to the withdrawal of (noncontractible) cooperation, or "shading" in the language of Hart and Moore (2008), with consequent deadweight losses. One difference from Hart and Moore (2008) is that we suppose that a party is aggrieved and shades only if he does not receive a "fair" outcome *and* is below his reference payoff.

In our context, examples of shading might be B not providing beer for the band members during the interval, not cleaning or heating the changing room adequately, or being slow to pay; or S refusing to play an encore, being rude to customers, or turning up late[9]. We will suppose that such shading actions always exist.

In our model, what puts a party below his reference payoff is the occurrence of the abnormal state A. We should emphasize that we suppose that the event "Eve breaks her finger" is exogenous and not something that either party could have controlled or prepared for. Thus, we take the view that neither party will blame the other for the fact that A has occurred. For this reason a party does not feel

[9] Although some of these actions could in principle be contracted on, at least ex post, in practice they are often discretionary.

aggrieved about the fact that the abnormal state has occurred per se. Rather, because the party is below his (or her) reference payoff, he expects the other party to behave in a fair manner and will shade if he feels that the other party does not.

Our basic position is that absent communication at date 0 the parties may have different views of what is fair. In fact we suppose that a party below his reference point has an extreme self-serving bias (as in Hart and Moore (2008)): he feels entitled to the best outcome under the existing contract. Note that a party does n*o*t feel entitled to his reference payoff: he merely feels entitled to the best payoff consistent with the contract to the extent that this is below his reference payoff. In Section 4 we will discuss how communication can be used to align the parties' preferences.

We model shading as in Hart and Moore (2008). We suppose that a party who feels entitled to a payoff s but receives a payoff $s' < s$, will be aggrieved by $s - s'$ and will retaliate by shading on performance in such a way that the other party's payoff falls by $\theta(s - s')$, where $0 < \theta < 1$ is an exogenous parameter ("negative reciprocity"). The party doing the shading neither gains nor loses (significantly) from shading: the only effect is on the party who is the recipient of the shading. Shading is noncontractible.

Note that, since $0 < \theta < 1$, it never pays one party to hand over money to the other party to reduce shading: a transfer of t reduces shading by θt but costs t> θt.

In what follows the contract will continue to provide S with first-best effort incentives and so we will set $e = e_{FB}$ and write $c(e_{FB}) = c$.

Since A is an unusual state, the parties' reference payoffs will be weighted toward their payoffs in the normal state N. To simplify we suppose in the body of the paper that the parties' reference payoffs *equal* their ex post payoffs in state N:

(3.1) B's reference payoff $= v - p$, S's reference payoff $= p - c$.

In Appendix 1 we consider the case where reference payoffs equal *expected* payoffs[10].

If renegotiation proceeds as in Section 2, we know from (2.7) that

(3.2) B's ex post payoff in state A $= v - p + \Delta v_g + \frac{1}{2}\big(\Delta v_a - \Delta c_a - (\Delta v_g - \Delta c_g)\big) = v - p + \frac{1}{2}\big((\Delta v_a - \Delta c_a) + (\Delta v_g + \Delta c_g)\big)$,

and so B is below his reference payoff by

(3.3) $-\frac{1}{2}\big(\Delta v_g + (\Delta c_g - \Delta c_a) + \Delta v_a\big)$,

[10] In the case analyzed in the body of the paper, where reference payoffs equal payoffs in the normal state, it will turn out that aggrievement and shading are the same as in Hart and Moore (2008). However, this is no longer the case if reference payoffs equal expected payoffs since aggrievement is bounded above by the difference between expected payoffs and actual payoffs. See Appendix 1.

a positive amount since $\Delta v_g < 0, \Delta v_a < 0, \Delta c_g < \Delta c_a$. S may be below or above her reference payoff after renegotiation depending on the parameters.

In our numerical example, Δv_a=−10, Δc_a=8, Δv_g=−14, $\Delta c_g = 6$, B is below his reference payoff by 13.

Since B is below his reference payoff, he will feel that S should have chosen Adam in the first place to help him out (this is the best outcome under the existing contract, and yields a payoff that is below his payoff in the normal state). This would have put $B - \Delta v_a$ below his reference point. Thus, B will be aggrieved by $\frac{1}{2}\left(\Delta v_a - \Delta v_g + \Delta c_a - \Delta c_g\right)$, the difference between the loss he bears and the loss that he thinks he should have borne, and will shade by $\frac{1}{2}\theta\left(\Delta v_a - \Delta v_g + \Delta c_a - \Delta c_g\right)$.

In our numerical example, if S had chosen Adam directly, B would have been 10 below his reference payoff. Hence he is aggrieved by 3 and shades by 3θ.

But the situation may be worse than this. B may regard S's threat to hire George unless B agrees to renegotiate as coercive, particularly if S asks for more than the incremental cost of choosing Adam rather than George, that is, anything above $\Delta c_a - \Delta c_g$. B may then refuse to renegotiate out of principle, leaving the outcome as George. In this case the deadweight loss is $\Delta v_a - \Delta c_a - \Delta v_g + \Delta c_g + \theta(\Delta v_a - \Delta v_g)$, where the first term reflects the fact that George is less efficient than Adam and the second term that B's final payoff $= v - p + \Delta v_g$, whereas he feels entitled to $v - p + \Delta v_a$.

In the rest of this section, we suppose that B *is* prepared to make the minimum payment $\Delta c_a - \Delta c_g$ necessary to persuade S to choose Adam rather than George, but no more. However, he will be aggrieved that he has to make this payment since he feels entitled to Adam, and will shade by $\theta(\Delta c_a - \Delta c_g)$[11]. In our numerical example, B is aggrieved by 2 and shades by 2θ.

There is one small lacuna that needs to be dealt with. The above discussion implicitly assumes that

(**) $\Delta c_a - \Delta c_g > \theta\left(\Delta v_a - \Delta v_g\right)$.

(**) ensures that, absent a payment from B, S w*ill* choose George rather than Adam: the cost reduction from doing so exceeds the shading cost B would impose. We assume (**) in the rest of the paper.

To sum up, given the above assumptions, we may conclude that in state A the efficient outcome Adam will occur but B will have to pay $(\Delta c_a - \Delta c_g)$ to S, and will be aggrieved and will shade by $\theta(\Delta c_a - \Delta c_g)$.

We can now compute the parties' payoffs.

(3.4) B's ex post payoff in state A $= v - p + \Delta v_a - (\Delta c_a - \Delta c_g)$,

[11] We rule out the possibility that parties feel entitled to (further) price changes to make up for their losses; for example, S (resp., B) might feel entitled to a price increase (resp., price decrease) because her cost (resp., his value) has risen (resp., fallen) as a result of Eve's breaking her finger. But see Section 6.

(3.5) S's ex post payoff in state A (ignoring shading) = $p - c(e) - \Delta c_g$.

Hence S's expected payoff net of effort and shading costs equals

(3.6) $p - c(e) - e - \pi\Delta c_g - \pi\,\theta(\Delta c_a - \Delta c_g)$.

Since S maximizes (3.6), we can confirm that S will choose $e = e_{FB}$.

The price p adjusts so that S's expected payment equals $\overline{U}$. Thus

(3.7) $p - c(e_{FB}) - e_{FB} - \pi\Delta c_g - \pi\theta(\Delta c_a - \Delta c_g) = \overline{U}$.

B's expected payment equals

(3.8) $v - p + \pi(\Delta v_a - \Delta c_a + \Delta c_g) =$

$$v - c(e_{FB}) - e_{FB} + \pi\,(\Delta v_a - \Delta c_a\,) - \pi\theta(\Delta c_a - \Delta c_g) - \overline{U}.$$

Finally, expected shading costs or deadweight losses are given by

(3.9) $L = \pi\theta(\Delta c_a - \Delta c_g)$.

In other words, contrary to the classical approach, the first-best is not achieved.

In Appendix 1, we extend the analysis to the case where each party's reference payoff is given by his or her *expected* payoff (as in Kőszegi and Rabin (2006))[12]. We show that qualitatively things do not change. Indeed for small π they do not change at all.

4. How communication leading to the adoption of guiding principles can help

In this section we suggest a way for B and S to improve matters. While still being important to safeguard investments (in this case, the seller's choice of effort, e), the contract can be written to ensure alignment of preferences, thereby avoiding shading behavior. As a matter of fact, in many situations, we would argue that such alignment is the best and maybe the only way to ensure good performance.

Specifically, B and S could write a contract that specifies the service, quality and price but that also includes a number of guiding principles of fairness that the parties commit to apply in case of unexpected events. For simplicity, in this section, we will focus on one such principle, a principle of loyalty. In our general discussion in Section 6, however, we will consider also the role of other principles.

[12] Of course, a critical question is why each party's reference payoff in state A does not equal his payoff in state A. In this case there would no aggrievement or shading and the first-best would be achieved. It is a basic assumption of our analysis that a perfect state-contingent adjustment of reference points is (psychologically) infeasible.

By a principle of loyalty, we mean a principle that obliges each party to treat the other party's interest as having a comparable importance to their own. Applying this principle could mean that a party should refrain from taking an action that costs the other party more than it benefits the first party. It could also mean that a party should bear a risk if that party is in the best position to avoid or mitigate it.

The loyalty principle, as we use this term, is a widely shared social norm, which can be 'activated' to alter the parties' payoff preferences. To activate such a principle will require an ex ante communication process and to use it in case of unexpected events ex post will similarly require communication. Ex ante, this can be done in practice by the parties entering into discussions about what the principle means, how it applies in different private and professional situations, and whether using the principle would be beneficial for B and S in their relationship. Once the principle is 'activated', it can be incorporated into the formal contract as well, which is important in order to make it part of the parties' reference points.

Assume that B and S agree on band services and price as before; but they also agree that, in case of unexpected events not dealt with under the contract, they will meet, discuss and apply the principle of loyalty (as defined above). What would happen, under these conditions, if Eve breaks her finger and George and Adam are the available alternatives?

As noted above, the loyalty principle asks each party to treat the other party's interest as having a comparable importance to their own. One way to formalize this is to suppose that each party's payoff becomes their own private payoff plus λ times the other party's payoff, where $0 < \lambda < 1$. Note that under these conditions S will not be prepared to reduce the price (unless $\lambda = 1$) since she prefers a dollar in her pocket to a dollar in B's, and for the same reason B will not agree to a price increase. Consistent with this, we maintain our assumption that neither party expects or feels entitled to a price change.

With each party putting weight λ on the other party's payoff,

(4.1) B's ex post payoff in state $A = v + \Delta v - p + \lambda(p - c - \Delta c)$,

(4.2) S's ex-post payoff in state $A = p - c - \Delta c + \lambda(v + \Delta v - p)$.

Communication is, of course, not costless. We suppose that achieving the weight λ costs an amount (in time and energy) at date 0 equal to $g(\lambda)$ where $g(0) = 0,\ g' \geq 0,\ g'' > 0,\ \lim_{\lambda \to 1} g\ (\lambda) = \infty$. (There could be a fixed cost of communication but for simplicity we do not consider this.) The assumption that $\lim_{\lambda \to 1} g\ (\lambda) = \infty$ captures the idea that it is prohibitively costly to make a party fully internalize another party's preferences. For simplicity, assume that the communication cost is borne entirely by B.

We will make two further assumptions: first, the level of communication, and hence the choice of λ, can be specified in the date 0 contract (this is not very realistic, but it simplifies matters); second, loyalty preferences are not activated until after communication takes place. The second assumption implies that each party evaluates the contract according to their pre-loyalty preferences. It is worth emphasizing this point. If we assumed that loyalty affected preferences before the contract was signed, then loyalty

would increase the total surplus available even if actions stayed the same. In contrast, in our formulation, loyalty affects surplus only because it changes behavior.

As we have emphasized above, in practice, aligning preferences is also likely to require communication (and the incurring of communication costs) ex post at date 1. For simplicity, we ignore this.

We will suppose that reference payoffs equal payoffs in the normal state. Note that a similar argument to that in Appendix 1 shows that for small π nothing changes if we suppose instead that reference payoffs equal expected payoffs.

Consider state A. Whatever happens, B will be below his reference payoff. S's inclination previously was to choose George, while B wanted Adam. Now, however, with the payoff in (4.2), S will choose Adam directly as long as

(4.3) $\lambda\Delta v_a - \Delta c_a > \lambda\Delta v_g - \Delta\, c_g,$

that is,

(4.4) $\lambda > (\Delta c_a - \Delta\, c_g)/\left(\Delta v_a - \Delta v_g\right).$

Under these conditions, renegotiation will not be required and there will be no aggrievement by B. On the other hand, if (4.4) is not satisfied, renegotiation will take place. B will have to pay S an amount m to make S indifferent between Adam and George: $\lambda(\Delta v_a - m) - (\Delta c_a - m) = \lambda\Delta v_g - \Delta\, c_g$, that is, $m = \ (\lambda\Delta v_g - \Delta\, c_g - \ (\lambda\Delta v_a - \Delta c_a))/(1-\lambda)$. Since B puts weight λ on S's payoff, paying m to S causes B to be aggrieved by $m(1 - \ \lambda) = (\lambda\Delta v_g - \Delta\, c_g - \ (\lambda\Delta v_a - \Delta c_a))$ and B will shade by $\theta(\lambda\Delta v_g - \Delta\, c_g - (\lambda\Delta v_a - \Delta c_a))$.

It is worth rehearsing what the effect of loyalty is on aggrievement and shading. First, for high λ S picks Adam and shading is zero. Second, even if S is inclined to pick George the amount B needs to pay S to switch to Adam goes down, given that S puts some weight on $B's$ preferences. Finally, every dollar that B pays causes less aggrievement than before since B puts some weight on S's payoff.

We can combine the cases where (4.4) does and does not hold: In state A, B pays S

(4.5) $m = (\frac{1}{1-\lambda})Max\left(\lambda\Delta v_g - \Delta c_g - (\ \lambda\Delta v_a - \ \Delta c_a), 0\right),$

and shading equals

(4.6) $\theta\, Max(\lambda\Delta v_g - \Delta c_g - (\ \lambda\Delta v_a - \ \Delta c_a), 0).$

Expected shading costs or deadweight losses are given by

(4.7) $L = \pi\theta Max\left(\lambda\Delta v_g - \Delta c_g - (\ \lambda\Delta v_a - \ \Delta c_a), 0\right).$

It is easy to see that L is decreasing in λ and that, when $\lambda = 0$, $L{=}\pi\theta(\Delta c_a - \Delta c_g)$, as in Section 3.

Let us compute ex ante payoffs. As we have noted, each party evaluates the contract according to their pre-loyalty preferences. Thus, if B anticipates paying m to S at date 1, this gets full weight rather than weight $(1 - \lambda)$, and similarly for S. Hence

(4.8) B's expected payoff= $v - p + \pi\ (\Delta v_a - (\frac{1}{1-\lambda})[Max(\lambda\Delta v_g - \Delta c_g - (\lambda\Delta v_a - \Delta c_a), 0)]) - g(\lambda)$,

and

(4.9) S's expected payoff= $p - c(e) - e - \pi(\Delta c_a - (\frac{1}{1-\lambda})[Max(\lambda\Delta v_g - \Delta c_g - (\lambda\Delta v_a - \Delta c_a), 0)])$

$$- \pi\theta[Max(\lambda\Delta v_g - \Delta c_g - (\lambda\Delta v_a - \Delta c_a), 0)],$$

from which we can confirm that S chooses $e = e_{FB}$. In a competitive market for sellers, p will adjust so that the right-hand side of (4.19) equals $\overline{U}$. B's expected payoff therefore equals

(4.10) $v - c(e_{FB}) - e_{FB} + \pi\ (\Delta v_a - \Delta c_a) - L - g(\lambda) - \overline{U}$.

That is, B's expected payoff equals expected net surplus minus the sum of deadweight losses and communication costs minus $\overline{U}$.

So far we have taken λ to be exogenous. Since λ is contractible, in an optimal contract it will be chosen efficiently to minimize $L + g(\lambda)$, the sum of deadweight losses and communication costs. Thus, λ will be chosen to minimize

(4.11) $g(\lambda) + \pi\theta\ Max(\lambda\Delta v_g - \Delta c_g - (\lambda\Delta v_a - \Delta c_a), 0)$.

Since Max $(\lambda\Delta v_g - \Delta c_g - (\lambda\Delta v_a - \Delta c_a), 0)$ is decreasing in λ, it follows from a standard revealed preference argument that the optimal value of λ is increasing in π. Also the optimal value of λ converges to zero as π converges to zero.

The first-order condition for (4.11) is

(4.12) $g'(\lambda) = \pi\ \theta(\Delta v_a - \Delta v_g)\ if\ 0 < \lambda < (\Delta c_a - \Delta\ c_g)/(\Delta v_a - \Delta v_g)$,

(4.13) $g'(\lambda) \geq \pi\ \theta(\Delta v_a - \Delta v_g)$ if $\lambda = 0$, $g'(\lambda) < \pi\ \theta(\Delta v_a - \Delta v_g)$ if $\lambda = (\Delta c_a - \Delta\ c_g)/(\Delta v_a - \Delta v_g)$.

It follows from (4.13) that, if we replace $g(\lambda)$ by $\alpha g(\lambda)$, where $\alpha > 0$ is sufficiently small , then the optimal value of λ >0. Proposition 2 sums up our results.

Proposition 2. The optimal value of λ is increasing in π and $\lambda \to 0$ as $\pi \to 0$. If we replace $g(\lambda)$ by $\alpha g(\lambda)$, where $\alpha > 0$, then, for sufficiently small α, the optimal value of λ >0.

Proposition 2 tells us that communication will be small if the abnormal state is unlikely. To put it another way, in routine situations where unexpected events are rare, a standard contract may suffice.

Proposition 2 also tells us that $\lambda > 0$ if communication costs are small relative to the magnitude of the transaction .(Note that multiplying $g(\lambda)$ by α is equivalent to multiplying values and costs by $\frac{1}{\alpha}$.)

(4.12) sheds light on how conflicts of interest affect λ. Suppose that $\Delta v_a - \Delta v_g$ increases, that is, conflicts of interest about quality increase. Then the right-hand side of (4.12) rises, which suggests that λ will rise. However, it is also possible that we are at a corner solution: $\lambda = (\Delta c_a - \Delta\, c_g)/(\Delta v_a - \Delta v_g)$. In this case λ will fall. The intuition is that an increase in the amount by which B favors Adam makes it more likely that S will choose Adam for a given λ. Thus, it may be possible to reduce λ.

One caveat should be noted. We have derived Proposition 2 for the case where reference payoffs are payoffs in the normal state. If reference payoffs are expected payoffs, then λ is increasing in π only in a range. Once π becomes very high, the abnormal state becomes (approximately) the reference point and communication is not needed (see Appendix 1).

So far we have argued that communication can be a valuable supplement to a contract. An important question to ask is, would it ever make sense to rely on communication and loyalty alone and dispense with a contract altogether?

It is not completely obvious how to analyze the no contract case since we have assumed that reference points and payoffs are determined through the contract. One approach is to follow Hart and Moore (2008), and assume that absent a contract each party feels entitled to 100% of the ex post surplus from the transaction. Note that the loyalty principle will not change this since each party prefers a dollar in their pocket to a dollar in the other party's pocket, although other principles, such as equity, which we discuss in Section 6, could be important.

In the absence of a contract the parties will bargain over the gains from trade: $v - c$ in the normal state and $v - c + \Delta v_a - \Delta c_a$ in the abnormal state. If the parties have equal bargaining power ex post, they will compromise on a 50:50 split[13]. It follows that each party will be aggrieved by the half of the gains they do not get times $(1-\lambda)$ and so will shade by θ times this amount. In the normal state this means that the deadweight losses from shading will be $\theta(1-\lambda)\,(v-c)$, where c depends on S's choice of effort; and in the abnormal state they will be $\theta(1-\lambda)(v - c + (\Delta v_a - \Delta c_a))$. Hence deadweight losses are given by

(4.14) $$L_{NC} = (1-\pi)(1-\lambda)\,\theta(v-c) + \pi(1-\lambda)\,\theta(v-c+(\Delta v_a - \Delta c_a))$$

$$= \theta(1-\lambda)[(\mathrm{v}-\mathrm{c}) + \pi\ \ (\Delta v_a - \Delta c_a)].$$

Modifying (2.14), we can see that S will choose her effort to maximize:

(4.15) $$\left(\tfrac{1}{2}v - \tfrac{1}{2}\,c(e)\right)(1+\lambda-\theta(1-\lambda)) + \tfrac{1}{2}\,\pi(1+\lambda-\theta(1-\lambda))\,(\Delta v_a - \Delta c_a) - e,$$

[13] Experiments by Ellingsen and Johannesson (2004) suggest that a fair-minded B might be willing to grant S more than 50% of the ex post surplus to compensate S for her effort investment. In our setting this effect is likely to be mitigated since B does not observe S's effort.

yielding

(4.16) $\frac{1}{2}(1+\lambda-\theta(1-\lambda))c'(e)=-1.$

Obviously, compared to the case where loyalty is combined with a contract, we have under-investment. But more than this, shading costs are greater for any level of e . To see this, compare the deadweight losses without a contract, L_{NC}, given by (4.14), with the deadweight losses with a contract, L_C, given by (4.7).

Proposition 3. Fix $\lambda<1$ and e. Assume $v+\Delta v_g > c(0)+\Delta c_a$. Then $L_{NC} > L_C$.

Proof:

Let $S_{NC}=\frac{L_{NC}}{\theta}$, and $S_C=\frac{L_C}{\theta}$. It suffices to show that $S_{NC}>S_C$.

From (4.14),

(4.17) $S_{NC}=(1-\lambda)[(v-\mathrm{c})+\pi\ (\Delta v_a-\Delta c_a)]$,

which is greater than

(4.18) $(1-\lambda)\pi\ [(v-\mathrm{c})+\ (\Delta v_a-\Delta c_a)]$.

Also, from (4.7),

(4.19) $S_C=\pi Max(\lambda\Delta v_g-\Delta c_g-(\lambda\Delta v_a-\ \Delta c_a),0)$.

Hence, since the expression in (4.18) is positive, it suffices to show (dividing by π) that

(4.20) $(1-\lambda)\ [(v-\mathrm{c})+(\Delta v_a-\Delta c_a)]>\ \lambda\Delta v_g-\Delta c_g-(\lambda\Delta v_a-\ \Delta c_a)$.

But we have assumed $v+\Delta v_g > c(0)+\Delta c_a \geq$ c+Δc_a. From this it follows that

(4.21) $v+\Delta v_a-\mathrm{c}-\Delta c_a>\Delta c_a-\Delta c_g$.

But it can easily be seen that this implies (4.20).

Q.E.D.

Note that to prove the result we need an extra assumption, borrowed from Hart and Moore (2008, Section 4), that the value-cost intervals for Adam and George in the abnormal state overlap: $v+\Delta v_g > c+\Delta c_a$.

The intuition behind Proposition 3 is that in the abnormal state, in the absence of a contract, the parties argue about the total surplus $v-c+(\Delta v_a-\Delta c_a)$, while in the presence of a contract they argue about

the cost difference $\Delta c_a - \Delta c_g$, which is lower. The proof of Proposition 3 is "brute-force" since it compares shading with and without a contract in the abnormal state. Given that, with a contract, shading is less in the normal state (it is zero), and effort is higher, there will be many situations where $v + \Delta v_g < c(0) + \Delta c_a$, and yet the conclusion of Proposition 3 still holds.

Proposition 3 implies the following. Start with a situation where there is no contract and let λ be optimal for this situation. Replace this with an optimal contract but keep λ fixed. Then e rises to the first-best level and deadweight losses fall by Proposition 3 (note that L_C is independent of e). Now choose the optimal λ for the new situation. This can only improve matters. The conclusion is that a contract plus loyalty dominates loyalty alone.

It is worth drawing out a further implication. The no communication-no loyalty model of Section 3 is a special case where $\lambda = 0$. Thus the argument in the proof shows that in that world a contract is better than no contract[14].

5. Connecting the model to commercial deals

The concert example, which forms the center-piece of our paper, is quite special in the sense that the deal has low complexity and (realistically) a relatively low likelihood of an abnormal state. Further, the deadweight losses in the model – shading behavior by not providing beer during the interval, not cleaning or heating the changing rooms, refusing to play an encore, being rude to customers, or turning up late, and so on– are rather innocuous. Finally, the model describes a one-shot situation, whereas the outsourcing and supply chain deals that we are really interested in are multi-shot.

We have argued that, *even in the simple concert scenario*, the parties will often fail to achieve an efficient outcome given that the contract itself creates reference points and noncontractible shading behavior when these reference points are not met. Our view is that the problems will typically be much larger in complex commercial settings such as outsourcing or supply chain deals, where the probability

[14] Throughout this section we have supposed that, having agreed to the guiding principles, the parties will uphold them. There are two justifications for this. The first is that the principles are not legally enforceable but are upheld because there is a psychic cost to each party of breaching them. In this case the analysis would hold only in a "self-enforcing" range (for an analysis along these lines, see Hart (2009)). The second justification is that the principles are enforceable: a court may be able to determine (possibly from the parties' interactions) that one party has not been loyal (or equitable) to the other, even if the court does not know exactly what a loyal (or equitable) outcome is. Indeed some recent court decisions suggest that courts are willing and able to enforce guiding principles (see, e.g., Supreme Court of Canada, Bhasin v. Hrynew 2014 SCC 71). We return to some of these issues in Section 6.

of an abnormal state occurring at some point is quite high[15] [16]. In our model, when parties are below their reference payoffs, they become aggrieved if their counter-parties do not behave reasonably in their eyes, and this can lead to shading. However, as we made clear in the introduction, shading is only one form of deadweight loss triggered by aggrievement: we focused on it for ease of modeling. Other forms, which in practice may be as important, are shirking (a party cuts back on noncontractible performance to increase his payoff at the expense of the other party), or the time and resources devoted to overcoming the aggrievement. In some cases parties may have to "eat" the aggrievement, another form of deadweight loss.

In applying the model to the real world, we will therefore interpret the deadweight losses broadly.

As mentioned in the introduction, there are companies and organizations that have applied the so-called Vested model, which includes the adoption of guiding principles such as loyalty and equity, in order to overcome contractual frictions.[17] Below we report on three case studies and two other deals about how the Vested approach has worked. The Vested model and the contracts-as-reference-points theory were developed in parallel and the case studies were not written with the concepts of aggrievement and shading in mind. For this reason, we conducted a follow-up interview with participants in one of the cases. For various reasons, we chose not to obtain interviews in the other two cases,[18] but instead conducted interviews with customers and suppliers in two deals where Vested was adopted at some point, but that are not yet case studies. In the interviews we looked for examples of shading and other deadweight losses prior to the adoption of the collaborative approach and the guiding principles, and evidence as to how these deadweight losses were reduced after the guiding principles were adopted.[19] In summary the interviews involve (1) Canada's Vancouver Island Health Authority and South Island Hospitalists, regarding a contract on professional labor services (this deal has been written up as a case); (2) Accenture and ISS regarding facilities management services in Holland; (3) PwC and ISS also regarding

[15] A countervailing force is that, as is well-known from the game theory and relational contracting literatures, repeated play can lead to cooperative behavior. However, cooperative behavior is typically only one of several possible outcomes. We discuss the difference between our approach and the relational contracting literature in Section 7.

[16] In Appendix 1, we consider the case where reference payoffs are given by expected payoffs. Under these conditions, if the probability of an abnormal state is close to 1, aggrievement and shading are low because the abnormal state becomes the new reference point. However, this conclusion is obtained under the assumption that payoffs in the abnormal state are always the same. The conclusion will not hold if there is uncertainty about payoffs in the abnormal state, which is very likely to be the case.

[17] See Vitasek at al. (2013).

[18] As regards the Dell-FedEx deal referred to below, this deal was originally made in 2012, which led us to believe that the parties would not have a clear memory of problems prior to and after their Vested deal. As regards the Telia-Veolia deal referred to below, Veolia was one of twenty suppliers prior to the deal, while it was the sole supplier after the deal. Thus the deal does not permit an "apples to apples" comparison.

[19] The interviews were conducted in June 2019 together with Kate Vitasek, a faculty member of the University of Tennessee.

facilities management in Holland. The case studies where we did not carry out interviews involve Dell and FedEx, and Telia and Veolia.

Vancouver Island Health Authority and South Island Hospitalists[20]

Vancouver Island Health Authority contracted with South Island Hospitalists, a group of doctors in British Columbia, to provide inpatient care for patients. A hospitalist is a physician who works solely in a hospital and cares for patients with medical problems that are too complicated for many family physicians. Prior to 2016 Island health Authority and the Hospitalists had a conventional contract, but it was not working well, and the relationship was severely strained. One issue was how to manage variation in the demand for health services (numbers of patients cared for by Hospitalist physicians on any given day). The contract included provisions on how volume changes would affect the hours allocated for Hospitalist services. In 2010, the service delivery model changed – consistent with other hospitals across Canada – whereby family practitioners no longer cared for their patients in hospitals. On top of this, there was a shortage of family physicians in many communities, and an increasing number of patients who were admitted to hospital did not have a family physician. As the Hospitalist model grew, and fewer family physicians were involved in hospital care, and more patients were admitted without family physicians, the Hospitalists were put under a great deal of pressure. Since they were not able to respond quickly by hiring additional staff, at times workloads soared and many felt that they could not devote adequate time to patients to provide safe, high quality care.

Physicians became fatigued. Although it was never statistically established, it was believed that discharges became slower and admissions lasted longer (both from conscious and unconscious actions), reducing the throughput of patients.

Some hospitalists eventually responded by refusing to accept the responsibility for admitting some patients from the emergency room, which was a requirement to facilitate flow into the hospital. This led to a heavy strain on the relationship, and the administration eventually temporarily suspended the privileges of three hospitalists.

Our interpretation of this incident is the following. Although the contract did not preclude the Health Authority's decision to reduce the use of community doctors (and remember this was not solely a health authority decision and reflected a trend across Canada; also most family physicians no longer wanted to provide inpatient care), the Hospitalists felt that the decision was unilateral and unanticipated, and resulted in unreasonable expectations of the Hospitalists. They responded with a shading/shirking action: by not agreeing to take patients from the emergency room they relieved their stress, and also avoided ethical issues arising from not being able to devote adequate time to patients (a doctor can ethically decline to accept new patients if he or she cannot provide an expected and consistent standard of care both to these new patients and existing patients). On the other hand, the Health Authority expected the Hospitalists to take care of the patients and at the same time deal with volume changes, even significant ones, as they felt that there was enough flexibility in the contract. The result was that

[20] We conducted an interview with Jean Maskey, a doctor with South Island Hospitalists, and Kim Kerrone, Island Heath Authority's Vice-President, Chief Financial Officer, Legal Services & Risk.

the Authority was frustrated by the Hospitalists' actions. Both sides reacted in ways that they would not have if everything was going well, and there were large consequent deadweight losses.

After 2016 the parties switched to a Vested contracting model. We will describe below how this improved matters[21].

Accenture and ISS[22]

Accenture is a multinational professional services company that provides services in strategy, consulting, digital, technology and operations. ISS is a workplace experience and facility management service provider. Accenture contracted with ISS to look after management of its Dutch facilities. Among other things ISS provided catering services for Accenture.

Prior to entering their Vested contract, the parties had a performance-based contract whereby ISS was compensated according to whether it met key performance indicators (KPIs). The contract was incomplete in the sense that it gave Accenture some discretion in deciding whether the KPIs were met. This led to tension in the relationship. Based on the interviews conducted, it seems as if Accenture used this discretion opportunistically. Accenture was expecting ISS to perform above the minimum levels set in the contract and tended to give more negative scores on the KPIs if ISS did not meet those expectations. Accenture also made life difficult for ISS by requiring ISS to get quotes from several suppliers for incremental work, even for small things.

According to our interviewees, ISS responded to this shading/shirking behavior by engaging in such behavior itself: it "gamed the system," by ensuring high performance during the periods when the KPIs were assessed. The interviewees felt that the tit-for-tat behavior by Accenture and ISS was frustrating and quite inefficient.

An interviewee described one example of an incident that triggered tit-for tat behavior. The number of customers eating meals increased. According to the contract ISS was entitled to a larger payment (the number of "tickets" had risen). Accenture felt that it was unreasonable for ISS to receive more, since they believed that ISS's costs had not increased. ISS disagreed.

In 2017 both parties agreed to adopt the Vested model, which improved matters, as we will describe below.

PwC and ISS[23]

PwC is a global network of firms delivering assurance, tax and consulting services. PwC contracted with ISS to manage its facilities in Holland. Among other things ISS provided catering and hospitality services for PwC meetings. The meeting services yielded a high margin for ISS and were consequently expected to be a large source of profit for them. At some point during the course of the contract, PwC needed to

[21] See also Frydlinger et al. (2019) for a discussion of how the Vested model improved the contractual relationship between Island Health Authority and the Hospitalists.
[22] We conducted interviews with Boudewijn Hamersma from Accenture and Vivian van Eijsden from ISS.
[23] We conducted interviews with Kyrsa de Bruine from ISS and Marjolein Kurstjens from PWC.

cut costs and decided to reduce the number of meetings. ISS was given very short notice about this. Obviously, this was very bad news for ISS: an important generator of profit was going to be eliminated. Things were made worse for two reasons. First, Dutch law made it impossible for ISS to lay off workers quickly. Second, ISS had recently negotiated with PwC to expand the services provided through the addition of extra hosts. The parties had agreed to split the cost of this 50:50, with much of the return coming from an anticipated high volume of meetings, which now would not materialize.

As with the Health Authority and the Hospitalists, PwC was within its contractual rights to make the changes. But it is clear from conversations with participants that there was a great deal of unhappiness/aggrievement on the ISS side. PwC eventually agreed to pay ISS's share of the cost of the extra hosts, but they did not make up for ISS's lost profit. We could not find any sign that ISS reciprocated negatively, although they probably had the ability to do so. So the source of the deadweight loss in this example was ISS's aggrievement, which ISS had to "eat." One factor that may have stopped ISS from retaliating is that the parties agreed to a Vested model shortly after this event (partly because of the event). This improved the relationship, as we will describe below.

We now outline the Vested model. Organizations adopting the Vested approach use a structured step-by-step process entering into commercial relationships, in which the parties sit in face-to-face meetings and jointly create their deal and contract one step at a time. The process starts by the parties adopting a shared vision for their relationship. Both parties must make a conscious effort to create an environment of trust—one in which they are transparent about their high-level aspirations, specific goals, and concerns. The parties also commit to six guiding principles: loyalty, equity, honesty, integrity, autonomy, and reciprocity. (For modelling reasons we have focused on loyalty in our analysis, but we discuss the equity principle in Section 6.) Those principles serve many functions. They will guide the parties throughout the rest of the process, they are made contractually binding to prohibit tit-for-tat behavior, and they also provide a framework for resolving potential misalignments when unforeseen circumstances occur. The parties further break down their shared vision into more concrete strategic goals or desired outcomes, and detailed objectives. Having set the foundation for the relationship in the first steps, the parties hammer out the terms of the deal—for example, responsibilities, metrics and pricing. It is crucial that all terms and conditions of the formal relational contract are aligned with the guiding principles. With the right mindset, the development of the contract becomes a joint problem-solving exercise rather than an adversarial contest. As a final step, the parties agree on structures and processes to govern the relationship over time, involving well-defined communication processes to ensure continuous alignment of interests and expectations. (In the case of Island Health Authority and the Hospitalists, the contract specified a "two in a box" communication approach in which an administrator was teamed with a hospitalist.)

All the components, from vision and guiding principles to the pricing model and governance processes, are documented in the written and enforceable contract, together with more traditional contractual clauses such as limitation of liability, indemnification, confidentiality, etc., all of which are, however, aligned to the adopted guiding principles.

From the interviews, it is clear that using the Vested methodology and adopting the guiding principles have improved things significantly in the three deals above. Start with Vancouver Island Health Authority and the Hospitalists: the parties report that the guiding principles have provided them with a common language and a 'platform' on the basis of which upcoming problems – unexpected events – can be discussed and dealt with in a fair manner. Much of the tension that existed before seems to have disappeared. Jean Maskey of the Hospitalists said: "I think the guiding principles are at the root of why our relationship is no longer contentious. We are now talking about tough issues in a tight fiscal environment in a healthy and more productive way. We work together toward mutual benefits in an open and honest manner so that solutions are beneficial for the Health Authority, hospitalists, and most importantly for the patients we care for. The guiding principles provide a 'Home Base'. Because of trust in the relationship, the administration are clearly giving the Hospitalists autonomy and we're both being honest and respectful about our limitations and best practice for excellent patient centered care." The parties report that they frequently bring out their statements of the guiding principles, discussing them and, in our language, re-activating them.

One example of how the Vested model helped the parties to surmount challenges occurred when a Canadian law legalizing medical assistance in dying went into effect. The joint Sustainability Team, which focuses on recruiting and retention of Hospitalists and their workloads and scheduling, was put to the test[24]. At the time the contract was developed in 2016 and 2017, the legislation had just been passed and there were too many unknowns about how it would be implemented to incorporate it in the contract. When the uncertainty was resolved, the sustainability team came up with a pilot project to help the parties to incorporate this new scope of work fairly into their schedule and pricing model. In the past there would have been battles about whether or not the new services were within the scope of the existing contract or simply assumed to be part of the overall workload. Now there was a spirit of "How can we fairly solve for this given our statement of intent? And how can we do this in a respectful manner for the benefit of the patients and the system in which we work?"

Going through the Vested process and adopting the guiding principles positively changed things for Accenture and ISS too. Both parties report that the guiding principles have given them "a language" to talk about and deal with upcoming challenges. The guiding principles have facilitated communication. And they have helped the parties to build trust, which has decreased the tension levels. Boudewijn Hamersma from Accenture reports that "having the guiding principles we jointly agree on together focuses on what we think is really important for a healthy relationship and how you should do your business or have each other's business in mind". Vivian van Eijsden from ISS reports: "For me the biggest change in moving to a Vested model is the way we interact with each other; now they trust … that I can be responsible for the money of Accenture. I no longer have to defend myself on every little thing. For example, they just trust when we get quotes from subcontractors we're spending their money wisely. That is a big thing." Both quotes indicate, importantly for this paper, how the parties are putting weight on each other's interest and how this facilitates communication and solving of problems. The

[24] For more on this, see Frydlinger et al. (2019).

gaming of KPIs and insistence on multiple quotes for even the smallest items seem to be things of the past.

In the case of PwC and ISS, one interviewee highlighted the following as an example of how Vested can improve matters. ISS subcontracted some security services to a security firm (SF). The contract allowed the price charged by SF to rise by up to 2% a year if SF's costs increased. However, as a result of a country-wide collective bargaining agreement SF's costs increased by more than 2%. SF asked for a greater than 2% price increase and ISS agreed (even though its contract with SF was not a Vested one), but only if it could pass on the increase in turn to PwC. PwC accepted the pass-through and our interviewee attributed this to the fact that the PwC-ISS contract was a Vested one. If it had not been, she thought that the price increase would not have been possible. The consequence might well have been that ISS or SF would have found ways to recover some of their lost profit by "shirking."

We close this section by describing two case studies where we did not get interviews.

Dell and FedEx

Dell and FedEx (originally Genco) entered into a contractual relationship regarding return and repair processes in 2005[25]. While quite successful, the parties had a strained relationship, not least because Dell constantly pushed for lower prices while at the same time demanding innovations and investments from FedEx. In 2011, both parties were ready to leave the relationship. But instead, they renegotiated their contract, using the Vested model. Three years into the term of the new contract, Dell's costs had been reduced by about 44 percent, quality levels were at a record high, and repair expenditures were at record lows. At the same time, the contract was very profitable for FedEx. The parties report that these results came about as a result of using the collaborative process and approach to contracting[26].

Dell and FedEx did not deliberately discuss and activate guiding principles such as loyalty, the simple reason being that adopting such principles was at the time not an integral part of the Vested model. But it seems that an important explanation for their success is indeed that such principles were activated through the process. A FedEx executive said that earlier Dell and FedEx had not had transparent dialogues, looking out for each other's interests. "But now, we at FedEx Supply Chain truly have a vested interest in the success of Dell—and vice versa."[27]

Telia and Veolia

In the deals described so far, an existing contract was replaced by a new one. The deal between the Swedish telecommunications operator Telia Company and Veolia, a facilities management company, was different. Telia was looking for someone to manage its facilities, and Veolia was chosen as a result of a competitive bidding process, which in the context of the Vested model is called a Request for

[25] Under this contract, FedEx is responsible for transporting and repairing defective Dell products.
[26] See Vitasek (2016).
[27] Vitasek et al. (2017), p. 21

Partner process.[28] The process was preceded by a pre-study, in which Telia realized that their existing facility management suppliers were not at all satisfied with their relationships, that Telia was heavily micromanaging them, and that there was no focus on innovation, which was an important matter for Telia. Telia decided to adopt the collaborative approach described above, incorporating the guiding principles, and used the approach to enter into a contract with Veolia as the so-called prime contractor. Again, both Telia and Veolia report significantly better results, with cost savings above budget, improved quality and increased innovation, and higher margin levels for Veolia[29]. The parties came to a point where they started to view their deal as a joint, virtual, enterprise, to which they even gave a name – OneTech – suggesting that the loyalty principle has enabled the parties to adopt one another's view and look out for one another's interests.[30]

One example of this is the way they view the economics of their deal. Outsourcing deals typically have two structural components: a standard set of services provided on a continuous basis and separate projects, which are agreed on a case-by-case basis in what is called a change management process. These change management processes proceed through negotiations which are often not smooth Coasian bargains, but instead are rife with friction and frustration.[31] Telia and Veolia have been able to move beyond this common challenge in outsourcing deals. One representative of Veolia said: "Shifting to Vested means both Telia and Veolia now look at the financials across the whole portfolio of business together and not just the price of individual projects or services. We are now making much smarter and collaborative business decisions that ultimately motivate Veolia to make investments that will have a high ROI (return on investment) for *both* (our italics) parties."[32] This again seems to be the loyalty principle in action, where the parties adopt one another's view and look out for one another's interests when managing their virtual entity.

In summary, we have presented some evidence from three interviews (one of which was also a case study) and two case studies. Obviously, one should be careful about drawing strong conclusions based on such a small sample. But we believe that the reported results provide support for our claim that shading and other deadweight losses occur under standard contracting and that adopting guiding principles such as loyalty and equity (see Section 6) can mitigate these losses.

6. Other principles

[28] In the Request for Partner process, suppliers are assessed not only on offered solutions and price but also on "softer" factors such a cultural compatibility and willingness to act in accordance with the guiding principles. In the typical process, the customer initially selects a few suppliers, with which a number of workshops are held where the parties, among other things, adopt a shared vision and the guiding principles, in addition to discussing scope and how the customer's needs can be met. Also, the suppliers are asked to provide indicative cost levels, which are made part of the customer's overall assessment. Thereafter, the customer chooses one or sometimes two suppliers with which the rest of the Vested methodology is implemented, after which contracts are signed. For a more detailed description of this approach, see Vitasek et al. (2019).
[29] Vitasek and DiBenedetto (2018b), p. 25.
[30] Vitasek and DiBenedetto (2018b), p. 25.
[31] See, for example, Deloitte (2016), where this change management process was reported as by far the most common challenge in the outsourcing deals covered by the report. See also Chakravarty and MacLeod (2009).
[32] Vitasek and DiBenedetto (2018b), p. 21.

In the examples described above, not only loyalty but also other guiding principles were adopted. For modelling reasons, we have focused only on the principle of loyalty in our analysis, but we believe that other principles are also very important. One of them is the equity principle, deliberately activated and adopted by Island Health/Hospitalists, Telia/Veolia and other parties to Vested deals. A principle of equity means that costs, benefits and risks should be allocated in proportion to each party's effort (where taking a risk can also be an effort). Equity is therefore not necessarily only about equal splits of revenues or costs. Equity calls for a proportionate allocation of benefits, losses, etc. Applying this principle could lead the parties to split the benefits of a joint investment in strict proportion to how much each party has contributed to the investment.

A principle of equity seems particularly applicable in a situation where, contrary to our maintained assumption, value and incremental cost are verifiable. In our concert example, equity could come into play in a number of ways. Let us assume, for simplicity, that S and B agree, ex ante, on only the equity principle. How should the decreased value (Δv) and increased cost (Δc) be allocated? If we assume that it has taken no effort to find and hire Eve's replacement, B and S would most likely agree on a 50:50 split of the losses, Δv$-\Delta c$. Under these conditions there will be unanimity that the more efficient choice, Adam, should be made, and there will be no shading. The first-best is achieved.

If we assume, instead, that finding Adam on short notice required a lot of effort from S, an equitable split would take this into account, allocating a larger proportion of the losses to B.

Equitable splits are unlikely to proceed as smoothly under our assumption that value and incremental cost are observable, but not verifiable, and where subjectivity and self-serving biases can come into play. Yet people are often able to find amicable solutions on how to allocate losses, and compensate for emotional damage and other problems, even if they would not be able to prove their case in court. Thus, the equity principle is probably relevant in our setting too. Incorporating the equity principle into the analysis is an important topic for future research.

There are also other principles that could be taken into consideration, for example a principle of reciprocity, obliging each party to return good actions in kind; or a principle of autonomy, obliging each party not to make threats or be coercive. An autonomy principle would apply not to the allocation of losses, but rather to the *process* for coming to a decision and the allocation of responsibilities. In the Island Health/Hospitalists case, one representative of the Hospitalists reported this principle to be of significant importance, giving them freedom from the previous micromanagement by Island Health.

In practice, then, B and S could adopt a number of principles ex ante which would come into play ex post to assist the parties in achieving outcomes that meet their reference points, thus avoiding shading.

A very important question that our analysis raises is, what is special about principles like loyalty or equity? Why could the parties not use other principles? For example, why couldn't the parties adopt the principle that in an abnormal state they will sort things out using the bargaining protocol underlying the first-best contract described in Section 2 (50:50 bargaining using side-payments). This bargaining outcome would become the new reference point and neither party would be aggrieved or would shade. The first-best would be achieved. Other possibilities would be that the parties agree that if something

unexpected happens B will make a take-it-or leave-it offer to S about how to proceed, or the parties will play a Maskin-Tirole (1999) mechanism to make observable information verifiable.

Our (tentative) answer is that the principles of loyalty and equity are not just ad-hoc principles chosen by the parties. They rest on strong social norms and are thus better described as being 'activated' than 'chosen'. This makes them different from mechanisms such as take-it-or-leave-it offers or Maskin-Tirole revelation games, which have no motivating power in themselves. The motivating power to apply principles such as equity or loyalty does not rest only on the urge to fulfill a promise made. Making a promise to fulfill a social norm has more force than making a promise to apply a principle not based on a social norm, for example to receive a take-it-or-leave-it offer[33].

There is evidence that social norms affect outcomes in economic transactions. First, it has been convincingly shown in the laboratory and elsewhere that people have not only self-regarding motives but also other-regarding motives.[34] Second, the extent to which they exhibit other-regarding motives will depend on the economic and social context. Fehr and Schmidt (1999) have shown that there is an important interaction between the distribution of preferences in a given population and the strategic environment: in some situations a minority of self-regarding players can hamper collaboration and in other situations a minority of other-regarding players can induce the self-regarding players to cooperate.

[33] Our emphasis on norms is related to the work of Macneil (1977, 1983) and Macaulay (1963). Macneil (1983) put forward the view of contracts as "instruments of social co-operation", by which he meant instruments to mitigate a tension between self-regarding and other-regarding preferences in commercial relationships. He specifically pointed to two important social norms – reciprocity and solidarity (with a similar meaning to what we here call loyalty) – serving this mitigation. The importance of such norms grows, according to Macneil, as a commercial relationship shifts on a continuum from discrete exchanges to relationships of longer duration and higher complexity. Macaulay (1963) showed that businesses often do not rely on their written contracts but instead on social norms and industry standards to overcome challenges posed by incomplete contracts. While Macneil and Macaulay pointed to the importance of *informal* social norms for contracts, we suggest that the parties can gain from incorporating such social norms, in the form of guiding principles, in the written contract. This shift from the informal to the formal resembles the trend shown by Hadfield and Bozovic (2016). Hadfield and Bozovic (2016) show that, while many organizations still rely on informal norms and mechanisms, there is also a growing reliance on the formal contract in what they call innovation-oriented commercial relationships, where the parties lack background support from social ties or reputational mechanisms. Using an expanded view of contracts-as-reference-points as compared to Hart and Moore (2008), they show, based on empirical studies, how the formal contract can help the parties to get on the same page not only regarding what the parties are explicitly entitled to under the contract but also, through ex post communication, concerning how unexpected events should be dealt with. Our approach is similar to theirs, but with the added element that the contracting parties can benefit by explicitly including social norms in the contract.

[34] See Charness and Rabin (2002), Fehr and Schmidt (1999), and Thaler and Dawes (1992).

Also relevant are studies by Ostrom (1990) and Ellickson (1991). These authors show how groups of people can overcome social dilemmas in situations where people must engage in face-to-face discussions and negotiations on how to solve problems, for example on how to allocate costs and risks. Put in situations where they have to make decisions and argue their case, people are affected by social norms, and are led by those norms to efficient outcomes[35].

Our analysis in Section 4 rests on the idea that communication can align preferences and induce cooperative behavior. It is a well-established fact that communication, not least face-to-face communication, can in many circumstances improve cooperation and reduce deadweight losses. An area of particular focus has been how communication can mitigate conflicts of interest in social dilemmas, starting with studies by Deutsch (1958, 1960) and Loomis (1959). In a 1995 meta-study, Sally (1995) analyzed over 100 studies and concluded, having tested a number of independent variables, that communication increases cooperation by 40 percent and was the variable having the strongest effect on cooperation. These results were confirmed in a later meta-study by Balliet (2010), who concluded also that face-to-face communication has a stronger effect than written communication.

Not only does communication as such have an effect; the *content* of the messages communicated matters. For example, Charness and Dufwenberg (2006) have shown in the laboratory that a statement of intent or promise can have a particularly strong effect on cooperation. We find this important, since our model builds on a scenario with ex ante communication where the parties exchange promises to follow certain guiding principles.

Communication has also been studied within the framework of contracts-as-reference-points. In a study related to Hart and Moore (2008), Brandts et al. (2016) (BCE) tested whether communication affects parties' reference points and thereby shading behavior. As noted by Hart and Moore (2008), an important consequence of the fact that contracts serve as reference points is that there is a tension between contractual rigidity and flexibility. Whereas a flexible contract is generally preferable, it can also lead to increased shading behavior since the flexibility gives more room for conflicting feelings of entitlement. In their experiment, BCE showed that free-form communication significantly reduced shading levels in flexible contracts, making them more profitable for both parties than rigid contracts. In particular, clarification of transfer plans, friendliness and promises helped the subjects align their expectations and resolve ambiguity, thereby reducing shading behavior.

[35] Our suggested approach for overcoming contractual incompleteness is also related to the work of Bernstein. In Bernstein (2015), evidence is put forward that, in outsourcing and supply chain relationships, organizations rely on the enforceability of contracts only to a limited extent to mitigate contractual risks, for example regarding hold-ups. Instead, other mechanisms are used, such as control over production in supplier plants and over supplier labor. In particular, Bernstein (2015) points to the use of governance and institutional mechanisms to generate conditions for cooperation, one of them being the creation of social capital based on trust and social norms. Our understanding is that the organizations studied have not explicitly included social norms such as loyalty or equity in their formal contracts, as we suggest here.

To be sure, we are not claiming that communication is a solution in all situations. Fehr et al. (2015) obtain less optimistic results about communication although they do not allow for free-form communication. Also, Fehr et al. (2017) show that, under certain competitive conditions, communication, rather than being used by buyers for aligning expectations and improving cooperation, was instead abused for the purpose of influencing the activities of the seller. The distinction made by German social philosopher and sociologist Jürgen Habermas between communication in strategic actions, aimed at influencing others, and communicative action, aimed at reaching a common understanding, seems relevant in this context[36]. It seems plausible that the interaction between the distribution of preferences in a given population and the strategic environment, emphasized by Fehr and Schmidt in the context of social preferences, is highly relevant for communication as well. Communication can be a weapon in the pursuit of strictly self-regarding behavior, even though strong evidence also shows that communication can promote and be part of other-regarding behavior.

In summary, both social norms and communication have been shown to improve cooperation and reduce deadweight losses. Based on this, we find it plausible that ex ante and ex post communication *about* social norms should have important effects and be capable of aligning reference points.

The idea that communication about norms is important is also related to the concept of *principled negotiations*, introduced by Roger Fisher and William Ury (1981) in their classic negotiation book *Getting to Yes,* which was a product of the Harvard Negotiation Project. Among other things, Fisher and Ury recommend that negotiating parties avoid imposing their wills on one another and instead apply standards of fairness, market practice or scientific merit, which both parties recognize as valid. While disagreement is still possible, the parties avoid damaging conflicts by agreeing on common criteria.

Fisher and Ury did not frame their recommendations in the language of reference points. However, it could easily be argued that the reason that following their recommendations has proved to be valuable for so many organizations negotiating agreements is related to reference points: by agreeing on common standards, the parties will have their expectations (reference points) tied to outcomes based on those standards and even though the actual application of the standard may not in all cases lead to the optimal solution for one party, that party will still not be disappointed since the standard adopted by that party was followed.

Fisher and Ury saw principles of fairness as just one among many possible objective criteria. While we acknowledge that there can be several principles playing a similar role, in this paper we emphasize the importance of principles based on social norms, which have the motivating force discussed above to induce cooperation.

As a final point, it can be asked why the adopted guiding principles should be documented in a written contract. Would it not be enough to make them part of an informal agreement? While we believe that informal agreements about guiding principles can be helpful, we still want to emphasize the importance of formalization. The signing of a contract has significant symbolic meaning and, even though it may be

[36] Habermas (1984).

challenging to litigate over the breach of a guiding principle, we believe that the parties will be more reluctant to commit a breach if the guiding principle is formalized (see also footnote 14)[37].

7. Conclusions

A common explanation for the idea that contracts are incomplete is that there are too many future contingencies for parties to contract on. However, as the literature has noted, even though writing down all the contingencies may be impossible, anticipating the payoff consequences of these contingencies should be feasible and the question then is, why do the parties not contract on these payoff consequences instead of the contingencies themselves, via mechanisms?

Our paper provides an answer to this question, and also proposes an alternative approach to dealing with contractual incompleteness. We have suggested that the parties can improve the situation by committing as part of the contract to apply a number of guiding principles such as loyalty or equity in case of unexpected events, and to build in communication processes that will enable the application of these principles. These principles rest on strong social norms and are thus better described as being 'activated' than 'chosen'. This makes them different from mechanisms such as take-it-or-leave-it offers or revelation games, which have no motivating power in themselves, and which we believe will not work as well[38].

We have also provided evidence that organizations are already using and benefiting from the combination of a contract and the guiding principles described here.

An important limitation of our analysis is that we have focused on ex post deadweight losses and how the parties can reduce them through the use of guiding principles (but see Appendix 2). However, business people often describe a lack of innovation by suppliers as a serious problem in outsourcing deals, which is more of an ex ante problem. There is every reason to think that the analysis we have presented could be used to study this issue too. We believe that this is an interesting topic for future research.

There is obviously an overlap between the ideas that we have presented and those that form the basis of the vast economics literature on relational contracts in that both highlight the importance of trust and norms (see Malcomson (2013) for a survey). However, the approaches are also importantly different. First, relational contracting models are plagued by multiple equilibria whereas our model has a unique equilibrium. Second, formal contracts are often a negative in that literature since they can make informal relationships harder to sustain (see Baker et al. (1994)); in contrast, in our model formal contracts and guiding principles are complements. Finally, we stress the importance of communication to align reference points and notions of fairness, something that is not a major feature of the relational contracting literature.

[37] Formalization is also useful in the eventuality that the people who negotiated the original deal are no longer the ones overseeing it.

[38] Aghion et al. (2018) find that revelation games do not work well in the lab. See also Fehr et al. (2018).

Obviously, much more work needs to be done to explore the generality of our ideas. We believe that theory, empirical work, and experiments are all promising directions to pursue to clarify the role of guiding principles in overcoming contractual incompleteness[39].

[39] One topic in need of further research is the extent to which our suggested approach for overcoming contractual incompleteness works across cultures. It should be noted that the effect of "national cultures" on trading relationships is a complex topic, not least because the concept of culture is inherently vague. There may exist organizational cultures that are stronger than national cultures: for example, the former may emphasize maximizing leverage in commercial relationships whereas the latter may be more aligned to guiding principles such as loyalty and equity. Or vice versa. While we do not ignore the influence of national cultures, we suggest that our approach has general applicability since social norms such as loyalty, equity and reciprocity seem to exist in most cultures and hence can be "activated" between two or more organizations, as we suggest here.

Appendix 1. Reference payoffs equal expected payoffs.

Consider what happens in the abnormal state when reference payoffs equal expected payoffs. As in Section 3, S is inclined to pick George but B will pay her $\Delta c_a - \Delta c_g$ to pick Adam. What changes is B's aggrievement. B's reference payoff is given by

(1) $v - p + \pi(\Delta v_a - \Delta c_a + \Delta c_g)$,

while his payoff in state A equals

(2) $v - p + (\Delta v_a - \Delta c_a + \Delta c_g)$.

Thus, in state A he is below his reference payoff by

(3) $-(1-\pi)(\Delta v_a - \Delta c_a + \Delta c_g)$.

Since B feels aggrieved only when he is below his reference point, B's aggrievement is capped by (3). Hence B's aggrievement, which was previously $(\Delta c_a - \Delta c_g)$, is now given by

(4) $Min(\Delta c_a - \Delta c_g, -(1-\pi)(\Delta v_a - \Delta c_a + \Delta c_g))$,

shading equals

(5) $\theta Min\left(\Delta c_a - \Delta c_g, -(1-\pi)(\Delta v_a - \Delta c_a + \Delta c_g)\right)$[40],

and expected shading equals

(6) $L = \pi\theta Min(\Delta c_a - \Delta c_g, -(1-\pi)(\Delta v_a - \Delta c_a + \Delta c_g)$[41].

One useful observation is that, as long as π is not too high, the more sophisticated treatment of reference points does not change anything. Deadweight losses will be $\pi\theta(\Delta c_a - \Delta c_g)$as long as

(7) $\pi < -\Delta v_a / (-\Delta v_a + \Delta c_a - \Delta c_g)$.

[40] This leads to the intuitive conclusion that if π is close to 1, shading in state A will be very low: basically, the abnormal state becomes the reference point.

[41] Note that L=0 if $\pi = 0$ or 1.

Appendix 2. Employment

So far we have supposed that S has residual rights of control and bears all the costs $c + \Delta c$. We can think of this as non-integration. Another possibility would be for B to acquire S's operations; B would then possess residual rights of control. We can think of this as vertical integration or employment. In this case it is natural to suppose that B bears 100% of the costs: S is on a fixed wage.

Of course, under both non-integration and vertical integration, cost-sharing is feasible since costs are verifiable. For simplicity we stick to the polar cases where S bears all the costs under non-integration and B bears all the costs under integration.

Under employment there is no conflict of interest ex post since B bears both the value and cost consequences of replacing Eve. However, under standard assumptions, S has no incentive to work since she bears none of the ex post costs: $e = 0$[42]. Thus, under the classical assumptions of Section 2, employment (with B bearing all the costs) would never be optimal (recall that we saw in Section 2 that under classical assumptions a simple non-integration contract achieves the first-best).

However, employment can be attractive in the models of Sections 3 and 4. Suppose that the loyalty principle is adopted. Now S will choose e to maximize

(1) $\quad p - e + \lambda(v - p + \pi\,(\Delta v_a - \Delta c_a\,) - c(e))$.

The first-order conditions are

(2) $\quad \lambda c'\,(e) = -1$.

Denote the solution by $e(\lambda)$.

The expected net surplus under employment equals

(3) $\quad v - c\big(e(\lambda)\big) - e(\lambda) + \pi\,(\Delta v_a - \Delta c_a\,) - g(\lambda)$,

where recall that there are no shading costs since there are no ex post conflicts of interest.

From (3) it follows that under employment it is optimal to choose the level of communication λ to minimize

(4) $\quad g(\lambda) + \ c(e(\lambda)) + \ e(\lambda)$.

Let λ^* be the solution of (4). Then the total deadweight costs under employment are

[42] The idea that If *B* bears all the costs there will be no ex post conflicts of interest but *S* will have poor effort incentives, while if *S* bears all the costs there will be ex post conflicts of interest but *S* will have strong effort incentives, underlies Bajari and Tadelis's (2001) analysis of cost-plus versus fixed price contracts.

(5) $g(\lambda*) + c(e(\lambda*)) + e(\lambda*) - c(e_{FB}) - e_{FB}$.

To see whether employment is better than non-integration we must compare (5) with the optimized expression in (4.11). Some simple conclusions are immediate. Suppose that S's effort does not matter much: $c(e_{FB}) + e_{FB}$ is close to $c(0)$. Then employment with no communication ($\lambda = 0$) achieves approximately the first-best (whereas non-integration typically does not).

Perhaps more interesting, suppose that we replace S's effort cost e by ke and the cost function $c(e)$ by $kc(e)$, where $k > 0$. Then the first-best effort level e_{FB} and the effort under employment $e(\lambda*)$ remain the same (the left-hand and right-hand sides of (2.4) and (2) are both multiplied by k). However, the deadweight cost from an inefficient choice of e is multiplied by k. Thus if k is large the deadweight costs from employment (in (5)) become very large, either because $e(\lambda*)$ is bounded away from e_{FB} or because $\lambda*$ is close to 1, in which case $g(\lambda*)$ is large (we have supposed that $\lim_{\lambda\to 1} g(\lambda) = \infty$). Thus, for large k, non-integration will dominate employment.

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