

Overcoming Contractual Incompleteness: The Role of Guiding Principles

by

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Abstract: We develop a model where a buyer and seller contract over a service. The contract encourages the seller to invest 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. This puts the parties below their reference payoffs and may cause costly disagreement. We discuss why neither classical mechanisms nor lawyers' standard approaches adequately deal with this issue. The adoption by the parties of guiding principles such as loyalty and equity as part of their contract can help.

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1. Introduction

A growing number of organizations world-wide, such as Intel, Novartis, Vancouver Coastal Health 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 transactions¹. 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 (Frydinger) 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 problems arise in contractual relationships when bad events, not covered by the contract, occur that put parties below their reference payoffs. In such a situation each party will expect the other party to behave “reasonably” or “fairly”, but the parties may have different views of what is fair (“self-serving biases”). Furthermore, the parties may blame each other for the occurrence of the bad event. These factors can lead to aggrievement and shading in the words of Hart and Moore (2008), and consequent deadweight losses. (In this paper we investigate only the first factor, ignoring blame.) 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 communication³. 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.

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. However, later in the paper, we will argue that it provides a useful way to think about these 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

¹ This approach is based on research carried out at the University of Tennessee. See Vitasek et al. (2013).

² See, for example, Vitasek et al. (2016b) regarding Vancouver Coastal Health, Vitasek et al. (2017) regarding Intel, and Vitasek et al. (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.

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 rights over the band composition). Under standard assumptions of rationality and self-interest, *S* would threaten to choose the cheapest replacement, 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 5 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 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 $0 < \lambda < 1$. 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 essential 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 incompleteness.

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 describe the lawyers' standard approach to writing a contract and explain why we do not think this will work in our setting either. In Section 5 we analyze how adoption of a loyalty principle can help. In Section 6 we consider how things change if B purchases S 's operations and turns S into an employee. In Section 7 we show how our suggested approach fits in with the larger context of outsourcing, supply chain and other commercial relationships mentioned above. In Section 8 we discuss the use of complementary principles, such as equity. Finally, Section 9 concludes.

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 .

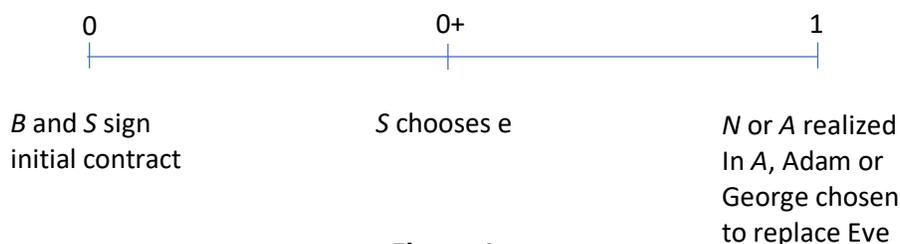
We make various verifiability assumptions. We suppose that v and Δv are observable but not verifiable (and nontransferable). In contrast, c and $c + \Delta c$ are verifiable and transferable (but Δc is only observable). However, c depends on S 's effort e , which is private information, and which has a personal cost to S equal to e ("moral hazard"). S 's effort might represent time spent identifying and negotiating with appropriate musicians: a high ex ante effort reduces ex post costs. We assume that $c(e)$ is decreasing in e and exhibits diminishing returns: $c' < 0$, $c'' > 0$, $c'(0) = -\infty$, $\lim_{e \rightarrow \infty} c'(e) = 0$.

We assume that v , Δc , and Δv are independent of e . As a result, as we will see, the hold-up problem is easily avoided in this model.

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 realistic⁴.

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

Figure 1 provides a time-line.



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 Section 6, however, we consider the case where *B* bears all the costs.

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, $\Delta v_g < \Delta v_a$.

⁴ 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. 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).

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

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

$$(2.1) \quad v - c(e) \text{ in state } N,$$

and by

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

and so expected net surplus is

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

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

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

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

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

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 B and S are separate entities ("non-integration"), and that S has the right to choose Eve's replacement (this qualifies as a "residual control right" or "residual decision right" in the sense of Grossman-Hart (1986)). Later we will 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 necessary.

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:

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

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 (since Δv and Δc are observable, there is symmetric information). Assume (without loss of generality) that the parties have equal bargaining power. Then in state A , the payoffs are given by:

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

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

Turning to ex ante payoffs at date 0, these are given by

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

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

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

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

The first-best is achieved.

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

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

and so B 's expected payoff equals

$$(2.13) \quad v - c(e_{FB}) - e_{FB} + \pi (\Delta v_a - \Delta c_a) - \bar{U}.$$

In other words, B receives the first-best level of surplus minus \bar{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 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

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

and so e will satisfy the first-order condition

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

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.

In our context, examples of shading might be S refusing to play an encore, being rude to customers, or turning up late; or B not providing beer for the band members during the interval, not cleaning or heating the changing room adequately, or paying late⁵.

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. However, each party expects the other party to behave in a fair manner in such an event 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 Section 5 we will discuss how communication can be used to align the parties’ preferences.

It is useful to compare our approach with that of Hart and Moore (2008). In both papers contracts are reference points. However, in Hart and Moore, each party is aggrieved and shades if he does not receive the best outcome allowed by the contract. In contrast, in our model, a party is aggrieved and shades only if he is below his reference payoff.

⁵ Although some of these actions could in principle be contracted on, at least ex post, in practice they are often discretionary.

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 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 $t > \theta t$.

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 suppose that the parties' reference payoffs *equal* their ex post payoffs in state N :

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

We relax this assumption below.

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

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

and so B is below his reference payoff by

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

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.

Since B is below his reference payoff, he may well feel that S should have chosen Adam in the first place to help him out. This would have put $B - \Delta v_a$ below his reference point. Suppose that B does indeed think that this is the appropriate outcome. Then, B will be aggrieved by $\frac{1}{2}(\Delta v_a - \Delta v_g + \Delta c_a - \Delta c_g)$, the difference between the loss he bears and the loss that he thinks he should have borne, and will shade by $\frac{1}{2}\theta(\Delta v_a - \Delta v_g + \Delta c_a - \Delta c_g)$.

But the situation may be worse than this. B may regard S 's threat to hire George unless B agrees to renegotiate as coercive, an attempt to force B to pay an extra amount for an outcome (Adam) to which he feels entitled anyway. Thus B may 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 $v - p + \Delta v_a$ ⁶.

Another element may be important. The parties may feel entitled to a change in price to make up for their losses. Indeed, this could be true even if George is the only replacement for Eve. B may think that it is unfair that he loses $-\Delta v_a$ because Eve has broken her finger. He may feel that S should reduce the price to compensate for this, and may shade if this does not happen. Recall, however, that Δv is not verifiable, which may make B 's argument for a price change more challenging (v could even be non-monetary if we imagine that B is organizing a concert for his pleasure). There are many situations where people are reluctant to give or even ask for a monetary payment to offset a nonverifiable loss⁷. At the same time, in reality, although not in the model, there may be verifiable aspects of quality. Perhaps Eve has received glowing reviews or won an award whereas George has not, and B can use this as an argument for a price change.

S faces a similar challenge concerning a price increase. S may feel that the price should rise given that her costs have increased. B may feel differently, in particular that cost increases are S 's problem. B may be particularly unwilling to accept a price increase given that S 's increased costs are not verifiable. In this situation, if there is no price change, S may be aggrieved and may shade.

There are many forces at play here, all of which seem realistic and interesting. To make progress we focus on only a few of them. First, in the rest of this section, we develop a benchmark model for the case where the parties have not communicated in such a way as to align their views of fairness (communication is the subject of Section 5). Second, we suppose that a party below his (or her) reference point has an extreme self-serving bias (as in Hart and Moore (2008)): he feels entitled to his maximum payoff under the contract, and is aggrieved and shades if the other party does not enable this to happen. However, we suppose that neither party expects a price change. The one exception is if B needs to pay S to choose Adam rather than George. In this case B is prepared to make the minimum payment necessary, $\Delta c_a - \Delta c_g$ (he cannot get away with less and is unwilling and not expected to pay more). However, he will be aggrieved that he has to make this payment since he feels entitled to Adam, and will shade by $\theta(\Delta c_a - \Delta c_g)$ ⁸.

⁶ There is a countervailing force. Given B 's shading, S 's final payoff under George is $p - c - \Delta c_g - \theta(\Delta v_a - \Delta v_g)$, whereas if she picked Adam her payoff would be $p - c - \Delta c_a$ since B will not shade in this case. Thus if $\theta(\Delta v_a - \Delta v_g) > \Delta c_a - \Delta c_g$, S will choose Adam. However, in this case, S may feel that she was "forced" to choose Adam. Given that her payoff is $p - c - \Delta c_a$ under Adam, but would have been $p - c - \Delta c_g$ under George, she will shade by $\theta(\Delta c_a - \Delta c_g)$. For more on this, see Hart and Moore (2008, Section 4).

⁷ See, e.g., Roth (2007).

⁸ One implication of these assumptions is that there is no aggrievement or shading in the case where only George, say, is available to replace Eve (neither party expects a price change).

For the rest of the paper we make the further simplifying assumption that

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

(**) ensures that, absent a payment from B , S will choose George rather than Adam: the cost reduction from doing so exceeds the shading cost B would impose (see also footnote 6).

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.

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

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

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 \bar{U} . Thus

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

Finally, B 's expected payment equals

$$(3.8) v - p + \pi(\Delta v_a - \Delta c_a + \Delta c_g) = \\ v - c(e_{FB}) - e_{FB} + \pi(\Delta v_a - \Delta c_a) - \pi \theta(\Delta c_a - \Delta c_g) - \bar{U}.$$

In other words, B 's expected payoff equals expected net surplus minus expected shading costs minus \bar{U} .

Let us now reconsider the issue of reference payoffs. Since the parties at date 0 have rational expectations they know that the adverse state can occur and so it seems strong to suppose that their reference payoffs do not incorporate this information. In the spirit of Kőszegi and Rabin (2006), let us therefore now suppose that each party's reference payoff is given by his or her *expected* payoff⁹.

The final outcome is still the same: S is inclined to pick George but B will pay her $\Delta c_a - \Delta c_g$ to pick Adam. What does change is B 's aggrievement. B 's reference payoff is given by

⁹ 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.

$$(3.9) \quad v - p + \pi(\Delta v_a - \Delta c_a + \Delta c_g),$$

while his payoff in state A equals

$$(3.10) \quad v - p + (\Delta v_a - \Delta c_a + \Delta c_g).$$

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

$$(3.11) \quad -(1 - \pi)(\Delta v_a - \Delta c_a + \Delta c_g).$$

Since B feels aggrieved only when he is below his reference point, B 's aggrievement is capped by (3.11).

Hence B 's aggrievement, which was previously $(\Delta c_a - \Delta c_g)$, is now given by

$$(3.12) \quad \text{Min}(\Delta c_a - \Delta c_g, -(1 - \pi)(\Delta v_a - \Delta c_a + \Delta c_g)),$$

shading equals

$$(3.13) \quad \theta \text{Min}(\Delta c_a - \Delta c_g, -(1 - \pi)(\Delta v_a - \Delta c_a + \Delta c_g))^{10},$$

and expected shading equals

$$(3.14) \quad L = \pi \theta \text{Min}(\Delta c_a - \Delta c_g, -(1 - \pi)(\Delta v_a - \Delta c_a + \Delta c_g))^{11}.$$

(Here L stands for deadweight losses.)

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

$$(3.15) \quad \pi < -\Delta v_a / (-\Delta v_a + \Delta c_a - \Delta c_g).$$

Note that the deadweight losses in (3.14) can be large. Suppose that $\Delta v_a - \Delta c_a = \Delta v_g - \Delta c_g = -\alpha$, where $\alpha > 0$. Then if $\Delta v_g = -\alpha$, $\Delta c_g = 0$, $\Delta v_a = 0$, $\Delta c_a =$

α (thus making conflicts of interest large), it is easy to see that the expression in (3.14) equals $\alpha/4$ if $\pi = \frac{1}{2}$ and $\theta = 1$, and this can be as high as $(1/4)(v - c(0))$ (recall that we have assumed that $v - c(0) + \text{Max}(\Delta v_a - \Delta c_a, \Delta v_g - \Delta c_g) > 0$).

In Section 5 we will discuss how these deadweight losses can be mitigated.

¹⁰ 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.

¹¹ Note that $L=0$ if $\pi = 0$ or 1.

4. Why the lawyers' traditional approach is unlikely to work here either

A contracting lawyer approaching the situation between B and S has a different perspective from the economist. Typically, the lawyer would be engaged by either B or S to protect their interests in the negotiation and formulation of the written contract. But as we will see, in practice, many of the problems will be the same. And not least, the conclusion is the same that a contract based on classical assumptions will not work.

For simplicity, we assume that B uses a lawyer to negotiate and draft the contract with S . B would have some more or less formal business case in mind and would want the contract to be written to maximize the likelihood of this business case working out. The business case would involve expected revenues, v , and a price paid to S , p . B would also have expectations as regards the service provided by S , i.e., a certain kind of music (rock, pop, jazz, classical, etc.) and a certain quality. Both will be important for the expected revenues since playing jazz in a rock club will decrease revenues and using poor trumpeters in a jazz club will have the same effect.

An important factor for B and his lawyer is *time*. If the concert is at date 1, it will be harder for B to find a band that fits B 's needs and profit expectations the closer date 1 becomes. In other words, the more B will be in a hurry, the lower will be his bargaining power. But time will be important for S as well. If S has agreed to play at date 1, she will have said no to other bookings on that date and as date 1 draws closer, it will be harder for S to find another remunerative gig. B and B 's lawyer will know this.

Given the above, B 's lawyer has to write a contract including three basic components to protect B 's business case: a description of the services and their quality, the price, and incentives for S to comply with her contractual obligations. A simple contract could include a brief description of the band service, for example that S shall play high quality jazz from the traditional repertoire at date 1 with a band of, say, six members at a price p . The contract can be elaborated on a great deal, but the difficulty in writing contractual obligations on how to perform music cannot be completely overcome. As regards the incentive mechanisms, there are two that B can use, both involving forms of power. First, B can induce S to perform through state power, i.e., the threat of enforcing the contract in court, either before the concert or after the concert by claiming damages from S for failure to perform. Second, B can include a right to terminate the contract in advance, regardless of whether a breach has occurred, i.e., a termination for convenience clause. By using the threat to terminate the contract and go to the market to find another band, B can induce S to comply with the contract. This second form of power we therefore call market power.

Now suppose state A occurs and Eve has broken her finger, and B and S negotiate whether George or Adam should be used. S is entitled to choose, having the residual control rights, but she will have to consider B 's reaction. B is, through the contract, entitled to a certain quality and price. George is less expensive for S but a worse player than Adam. Here, the weakness of the traditional contract appears. The termination for convenience clause, entitling B to terminate the contract, will have low influence on S since S knows that B most likely will not terminate close to date 1 given that it is very hard for B to find alternative bands at that point. So B 's market power is low. B and S could, of course, use a "knife-

edge” contract. That is, they could choose the price p so that B is indifferent between having Adam and not having a concert at all in state A ($v - p + \Delta v_a = 0$). In this case a termination for convenience clause would cause S to choose Adam. But notice that the slightest uncertainty about v would lead to inefficient terminations under these conditions¹².

As regards B 's state power, B could of course use it to reject a worse trumpeter than Eve. But B 's revenues v are only observable and not verifiable. B would therefore have great difficulty in proving a cause-and-effect relationship between S 's choosing George and lower revenues for B . In effect, B 's state power is low as well and, therefore, S 's incentive to choose Adam is low since the risks from choosing George are low.

Hence, in this scenario, the contract will probably not stop S from choosing the less efficient George.

The underlying problem is, of course, that the contract is incomplete. It is not possible to specify with accuracy the quality of the services, or to prove the relationship between performance quality and revenues. And the parties' shading behavior cannot be contracted on. This means that the parties are not, with a traditional contract, prepared to deal with uncontracted-for contingencies such as Eve breaking her finger. In short, they have no good mechanisms to deal with the unexpected.

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

B 's lawyer could, however, approach the situation from another perspective, using an alternative approach to the contract. 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 and reference points, thereby avoiding shading behavior. As a matter of fact, in many situations, such alignment is the best and maybe the only way to ensure good performance. As the already simple example above shows, both state and market power (as we defined these terms) are often weak incentives for performance, forcing the parties to rely on other mechanisms.

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 8, however, we will consider also the role of other principles.

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

¹² For more on the fragility of knife-edge contracts, see Hart and Moore (2008, Section 4).

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 a band service 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,

$$(5.1) \quad B\text{'s ex post payoff in state } A = v + \Delta v - p + \lambda(p - c - \Delta c),$$

$$(5.2) \quad S\text{'s ex-post payoff in state } A = p - c - \Delta c + \lambda(v + \Delta v - p).$$

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 $g(0) = 0$, $g' \geq 0$, $g'' > 0$, $\lim_{\lambda \rightarrow 1} g(\lambda) = \infty$. (There could be a fixed cost of communication but for simplicity we do not consider this.) The assumption that $\lim_{\lambda \rightarrow 1} g(\lambda) = \infty$ 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.

For simplicity, we will focus on the case where reference payoffs equal payoffs in the normal state. Note that a similar argument to that in Section 3 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 (5.2), S will choose Adam directly as long as

$$(5.3) \quad \lambda \Delta v_a - \Delta c_a > \lambda \Delta v_g - \Delta c_g,$$

that is,

$$(5.4) \quad \lambda > (\Delta c_a - \Delta c_g) / (\Delta v_a - \Delta v_g).$$

Under these conditions, renegotiation will not be required and there will be no aggrievement by B . On the other hand, if (5.4) is not satisfied, renegotiation will take place. B will have to pay S an amount m where $\lambda(\Delta v_a - m) - (\Delta c_a - m) = \lambda \Delta v_g - \Delta c_g$, 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. 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 (5.4) does and does not hold: In state A , B pays S

$$(5.5) \quad m = \left(\frac{1}{1-\lambda}\right) \text{Max}(\lambda \Delta v_g - \Delta c_g - (\lambda \Delta v_a - \Delta c_a), 0),$$

and shading equals

$$(5.6) \quad \theta \text{Max}(\lambda \Delta v_g - \Delta c_g - (\lambda \Delta v_a - \Delta c_a), 0).$$

Expected shading costs or deadweight losses are given by

$$(5.7) \quad L = \pi \theta \text{Max}(\lambda \Delta v_g - \Delta c_g - (\lambda \Delta v_a - \Delta c_a), 0).$$

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

$$(5.8) \quad B\text{'s expected payoff} = v - p + \pi \left(\Delta v_a - \left(\frac{1}{1-\lambda}\right) [\text{Max}(\lambda \Delta v_g - \Delta c_g - (\lambda \Delta v_a - \Delta c_a), 0)]\right) - g(\lambda),$$

and

$$(5.9) \quad S's \text{ expected payoff} = p - c(e) - e - \pi(\Delta c_a - (\frac{1}{1-\lambda})[\text{Max}(\lambda\Delta v_g - \Delta c_g - (\lambda\Delta v_a - \Delta c_a), 0)]) \\ - \pi\theta[\text{Max}(\lambda\Delta v_g - \Delta c_g - (\lambda\Delta v_a - \Delta c_a), 0)],$$

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 (5.19) equals \bar{U} . B's expected payoff therefore equals

$$(5.10) \quad v - c(e_{FB}) - e_{FB} + \pi(\Delta v_a - \Delta c_a) - L - g(\lambda) - \bar{U}.$$

That is, B's expected payoff equals expected net surplus minus the sum of deadweight losses and communication costs minus \bar{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

$$(5.11) \quad g(\lambda) + \pi\theta \text{Max}(\lambda\Delta v_g - \Delta c_g - (\lambda\Delta v_a - \Delta c_a), 0).$$

Since $\text{Max}(\lambda\Delta v_g - \Delta c_g - (\lambda\Delta v_a - \Delta c_a), 0)$ 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 (5.11) is

$$(5.12) \quad g'(\lambda) = \pi\theta(\Delta v_a - \Delta v_g) \text{ if } 0 < \lambda < (\Delta c_a - \Delta c_g)/(\Delta v_a - \Delta v_g),$$

$$(5.13) \quad g'(\lambda) \geq \pi\theta(\Delta v_a - \Delta v_g) \text{ if } \lambda = 0.$$

It follows from (5.13) that, if we replace $g(\lambda)$ by $\alpha g(\lambda)$, where $\alpha > 0$ is sufficiently small, then the optimal value of $\lambda > 0$. Proposition 1 sums up our results.

Proposition 1. The optimal value of λ is increasing in π and $\lambda \rightarrow 0$ as $\pi \rightarrow 0$. If we replace $g(\lambda)$ by $\alpha g(\lambda)$, where $\alpha > 0$, then, for sufficiently small α , the optimal value of $\lambda > 0$.

Proposition 1 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 1 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 $\frac{1}{\alpha}$.)

(5.12) 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 (5.12) 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 1 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 also Section 3).

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 7, 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 split¹³. 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

$$(5.14) \quad L_{NC} = (1 - \pi)(1 - \lambda) \theta(v - c) + \pi(1 - \lambda) \theta(v - c + (\Delta v_a - \Delta c_a)) \\ = \theta(1 - \lambda)[(v - c) + \pi (\Delta v_a - \Delta c_a)].$$

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

$$(5.15) \quad \left(\frac{1}{2}v - \frac{1}{2}c(e)\right)(1 + \lambda - \theta(1 - \lambda)) + \frac{1}{2}\pi(1 + \lambda - \theta(1 - \lambda))(\Delta v_a - \Delta c_a) - e,$$

yielding

$$(5.16) \quad \frac{1}{2}(1 + \lambda - \theta(1 - \lambda))c'(e) = -1.$$

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

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.

losses without a contract, L_{NC} , given by (5.14), where we write $c = c(e)$; with the deadweight losses with a contract, L_C , given by (5.7).

Proposition 2. 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 (5.14),

$$(5.17) \quad S_{NC} = (1 - \lambda)[(v - c) + \pi (\Delta v_a - \Delta c_a)],$$

which is greater than

$$(5.87) \quad (1 - \lambda)\pi [(v - c) + (\Delta v_a - \Delta c_a)].$$

Also, from (5.7),

$$(5.19) \quad S_C = \pi \text{Max}(\lambda \Delta v_g - \Delta c_g - (\lambda \Delta v_a - \Delta c_a), 0).$$

Hence, since the expression in (5.18) is positive, it suffices to show (dividing by π) that

$$(5.20) \quad (1 - \lambda) [(v - c) + (\Delta v_a - \Delta c_a)] > \lambda \Delta v_g - \Delta c_g - (\lambda \Delta v_a - \Delta c_a).$$

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

$$(5.21) \quad v + \Delta v_a - c - \Delta c_a > \Delta c_a - \Delta c_g.$$

But it can easily be seen that this implies (5.20).

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 2 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 2 is “brute-force” since it focuses on a comparison of 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 Proposition 2 still holds.

Proposition 2 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 2 (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.

6. 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: $e = 0$ ¹⁴. 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 if the loyalty principle is adopted. Now S will choose e to maximize

$$(6.1) \quad p - e + \lambda(v - p + \pi(\Delta v_a - \Delta c_a)) - c(e).$$

The first-order conditions are

$$(6.2) \quad \lambda c'(e) = -1.$$

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

The expected net surplus under employment equals

¹⁴ 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.

$$(6.3) \quad v - c(e(\lambda)) - e(\lambda) + \pi (\Delta v_a - \Delta c_a) - g(\lambda),$$

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

From (6.3) it follows that under employment it is optimal to choose the level of communication λ to minimize

$$(6.4) \quad g(\lambda) + c(e(\lambda)) + e(\lambda).$$

Let λ^* be the solution of (6.4). Then the total deadweight costs under employment are

$$(6.5) \quad g(\lambda^*) + c(e(\lambda^*)) + e(\lambda^*) - c(e_{FB}) - e_{FB}.$$

To see whether employment is better than non-integration we must compare (6.5) with the optimized expression in (5.11). 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 (6.2) 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 (6.5)) become very large, either because $e(\lambda^*)$ is bounded away from e_{FB} or because λ^* is close to 1, in which case $g(\lambda^*)$ is large (we have supposed that $\lim_{\lambda \rightarrow 1} g(\lambda) = \infty$). Thus, for large k , non-integration will dominate employment.

7. 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 (realistically) has low complexity and a relatively low likelihood of an abnormal state. In addition the deadweight losses in the model – shading behavior by refusing to play an encore, being rude to customers, or turning up late, not providing beer for the band members during the interval and so on – are rather innocuous. We have argued that, *even in such a simple scenario*, the parties will often fail to achieve efficient outcomes 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 more complex commercial settings such as outsourcing or supply chain contracts, where the probability of an abnormal state is high¹⁵.

Indeed, there are strong indications of the existence of these kinds of problems in the practical world of commercial contracts. Experience and studies¹⁶ show that outsourcing customers often complain about

¹⁵ Our model has the feature that, if the probability of an abnormal state π is close to 1, aggrivement and shading are low because the abnormal state becomes the new reference point (see footnote 10). However, we have supposed 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.

¹⁶ See, for example, Deloitte (2016) and Vitasek et al. (2013).

lack of proactivity and innovation from the supplier (innovation obviously has ex ante as well as ex post features), and suppliers often complain about the customer's micromanaging of the supplier, who in theory is supposed to be the expert on the work. And both customers and suppliers complain about the time and transaction costs spent arguing about what is inside and outside the scope of the contract.¹⁷

We are not claiming that all these inefficiencies can be identified as forms of shading due to missed contractual reference points¹⁸. But we do believe that many of them can be. In the practical world of contracting, most professional buyers and sellers base their decision to enter into a contract on some kind of business case. What components such a business case include will vary somewhat but the typical customer business case includes a combination of costs (and often cost savings), functionality, and quality, while the typical supplier business case includes a combination of revenues and margins. Those business cases form the expectations and therefore reference points of the respective parties, against which they evaluate the contractual relationship as it plays out. When the goals of the business case are not met, disappointment and blame ensue.

But, as mentioned in the introduction to this paper, there are also companies and organizations that report that using alternative approaches to both ex ante contract negotiations and ex post contract management have helped them eliminate deadweight losses and achieve unusually good financial and other results. Many of these organizations have applied the so-called Vested model, which is a collaborative method for commercial contracts that is based partly on research at the University of Tennessee,¹⁹ and which one of the authors (Frydlinger) has assisted several organizations to apply. Of particular interest for the purpose of our paper is the use of guiding principles in this approach.

Those organizations 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 as well as general rules such as overall guiding principles (for example, regarding loyalty) and other forms of collaboration-improving behaviors. In the next step, the parties agree on strategic goals or desired outcomes, which are typically broken down into more detailed objectives, giving the parties a clear view of what they want to achieve in their relationship. They also agree on the scope of the services to be provided and allocate responsibilities in a way that best promotes achieving the stated goals. The parties then agree on what key performance indicators to use to determine if and to what extent the goals have been achieved. Only at this stage of the process do the parties discuss prices and compensation. The Vested model relies on an outcome-based economic approach, according to which part of the supplier's margin is tied to achieving the agreed upon goals and objectives. 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.

¹⁷ Studies from the automotive industry show that when the level of trust between suppliers and customers is low suppliers are unwilling to provide price concessions and non-price related benefits such as improved service levels and innovation. See, for example, Henke et al. (2014).

¹⁸ Some are no doubt the result of asymmetric information.

¹⁹ See Vitasek et al. (2013).

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.

We will here briefly discuss three cases in which this approach has been used and proved successful: (i) Dell and FedEx in an outsourcing regarding return and repair processes, (ii) Canada's Vancouver Island Health Authority and SIHI Hospitalists, regarding a contract on professional labor services, and (iii) Telia Company and Veolia, regarding outsourcing of facilities services in Sweden. We have picked these scenarios because these organizations have chosen to talk publicly about their approach and results and because they cover different categories of deals. We could also have chosen other examples, such as Intel and DHL, regarding logistics services in Costa Rica and the Netherlands, Discovery Health Medical Scheme / Discovery Health (Pty) Limited, regarding administration and managed care services in South Africa, or Novartis and JLL, regarding facilities management services, all of which use a similar approach.²⁰

Dell and FedEx (originally Genco) entered into a contractual relationship regarding return and repair processes in 2005. While quite successful, the parties had a strained relationship (no doubt exhibiting a great deal of inefficiency), 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 approach described above. The parties report that initially this was not an easy journey since the parties' trust levels were so low. 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 contracting²¹.

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."²² This is the loyalty principle (as we define it here) in action.

Before Canada's Vancouver Island Health Authority and SIHI Hospitalists renegotiated their contract on professional labor services, their relationship was also severely strained. For many years, there had been a wide chasm between Island Health and the physicians. The Hospitalists felt they were being mismanaged and squeezed for money and Island Health suspected that the Hospitalists were over-billing. Trust levels were at the bottom. Again, the parties chose to apply the approach also used by Dell

²⁰ See Vitasek et al. (2017) regarding Dell and FedEx, Vitasek et al. (2018 b) regarding Island Health and Hospitalists, and Vitasek et al. (2018a) regarding Telia Company and Veolia.

²¹ See Vitasek (2016a).

²² Vitasek et al. (2017), p. 21

and FedEx and were able to completely shift the relationship and their results. At a very early stage, the parties adopted a shared vision and six guiding principles for their relationship, loyalty being one of them, which created a profound shift in the relationship and enabled a successful continuing process. The legal counsel of the Hospitalists said: “I think that the development of the Guiding Principles and the relationship building was absolutely fundamental. On several occasions the parties would remind each other they had a duty to follow the Guiding Principles.”²³

The two cases briefly discussed above entailed shifting an existing contract into a new one. In the case of the Swedish telecommunications operator Telia Company and Veolia, Veolia was instead chosen as a result of a competitive bidding process. The process was preceded by a pre-study, in which Telia realized that their existing facility management suppliers were not at all satisfied with the relationship, that Telia was heavily micromanaging them, and that there was no focus on innovation, which was an important matter for Telia. It appears thus that deadweight losses existed under those contracts. Telia decided to adopt the collaborative approach described above, incorporating the same six guiding principles as Island Health and the Hospitalists, 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 Veolia²⁴. 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, just as with Dell and FedEx, that the loyalty principle has enabled the parties to adopt one another’s view and look out for one another’s interests.²⁵

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 upon 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.²⁶ 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 for *both* (our italics) parties.”²⁷ 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.

To be clear, the three cases described are vastly more complex than our simple concert example. Nevertheless, we believe that our model can help provide a key to understanding why these deals have

²³ Vitasek et al. (2018b), p. 41.

²⁴ Vitasek et al. (2018a), p. 25.

²⁵ Vitasek et al. (2018a), p. 25.

²⁶ 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.

²⁷ Vitasek et al. (2018a), p. 21.

been reported to be so successful: it is because of the alignment created by adopting guiding principles such as loyalty at an early stage.

8. Other principles

In the examples described above, not only loyalty but also other guiding principles were adopted. For reasons of simplification, we have focused only on the principle of loyalty in our model, but we believe that other principles are also very important. One of them is the *equity* principle, deliberately activated and adopted by both Island Health/Hospitalists and Telia/Veolia. 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, (incremental) 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, $\Delta v - \Delta c$. 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 incremental value and 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 not the parties 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 offer²⁸.

²⁸ 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.

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.²⁹ 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.

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.

Our analysis in Section 5 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

²⁹ See Charness and Rabin (2002), Fehr and Schmidt (1999), and Thaler and Dawes (1992).

particular, clarification of transfer plans, friendliness and promises helped the subjects align their expectations and resolve ambiguity, thereby reducing shading behavior.

To be sure, we are not claiming that communication is a solution in all situation. Fehr et al. (2015) obtain less optimistic results about communication although they do not allow for free-form communication. Also, in a working paper, 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 context³⁰. 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. Indeed this claim is consistent with our discussion of the commercial contracts in Section 7, where we noted the importance attributed by the parties to agreeing to a shared vision.

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.

³⁰ Habermas (1984).

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 litigation over the breach of a guiding principle may be unrealistic, we believe that the parties will be much more reluctant to commit a breach if the guiding principle is formalized.

9. 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 well³¹.

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

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, the relational contracting literature considers relationships that are repeated whereas our model is one-shot (although we are not in any way denying the importance of long-term interactions). Second, relational contracting models are plagued by multiple equilibria whereas our model has a unique equilibrium. Third, 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.

³¹ 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.

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