Contracts as Threats: on a Rationale For Rewarding A while Hoping For B*

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Abstract

Contracts often reward inefficient tasks and are neither enforced nor renegotiated ex post. We provide an explanation based on the relationship between explicit contracts and implicit agreements. We show that signing but ignoring contractual clauses requiring inefficient contractible tasks (A) facilitate relational contracting on efficient non-contractible tasks (B) by anticipating and strengthening the punishment of defections. *The mechanism works even in static settings, is strengthened when the tasks are substitutes, and is not only weakened by the possibility of ex-post renegotiation.*

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1 Introduction

The puzzle. The observation that explicit contracts often contain obviously inefficient clauses has puzzled management scholars for decades.[1] Few seem to have noted, however,

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[1]Kerr's (1975) first noted the inefficient provisions very often included in contracts. His classic management-science paper "On the folly of rewarding A while aiming for B" inspired our title.

that contractual clauses are very often ignored by contracting parties, i.e. they are neither enforced, nor renegotiated. For example, in most organizations employees are contractually required to respect fixed working hours. When physical presence does not facilitate performance or monitoring (as with creative non-team tasks), this is of little value for the organization. And indeed many organizations allow informally flexible working hours. In loan contracts, debt covenants, in particular accounting-based ones, are often set excessively tight and then violated without any consequences for the borrower (Chen and Wei, 1993). 'Block booking' contracts in the film distribution industry typically specify a rigid minimum exhibition time that is ignored when a movie is unsuccessful (Kenney and Klein, 2000). At the level of the social contract, many laws and regulations are not enforced and would produce little social value if they were. In “work-to-rule” practices, or “white strikes”, a literal application of the employment contract is used by employees to slow down production when fighting management, revealing that employment contracts typically contain inefficient (or dysfunctional) clauses that are normally ignored.

The puzzle is therefore twofold: Why are inefficient tasks contractually prescribed? Why are contractual provisions often ignored?

This paper. We propose an explanation that is based on the interaction between explicit contracts and implicit agreements, and that highlights the distinction between the ex-ante decision to sign an explicit contract and the ex-post decision whether or not to enforce it. We show that contractual clauses on inefficient contractible tasks may be optimally signed ex ante, not enforced in equilibrium, but effectively used as ‘threats’ to discipline informal agreements on efficient noncontractible tasks. In other words, the enforcement of inefficient contractual clauses is discretional and used as punishment inflicted when there is poor performance on relevant but hardly contractible dimensions.

"Overcontracting" helps relational contracting because it introduces more actions within a period so that parties can react immediately to a deviation. Explicit contracts can typically be enforced as soon as the choice of actions by the parties is observed. This allows to punish a deviation in the same period in which it takes place. We show that this mechanism is effective when (i) the contracted action leads to destruction of surplus, and (ii) the parties can call for the enforcement of contractual obligations right after observing a potential deviation.

This aspect of overcontracting can also suffice to enforce cooperation in static settings. Consider for example a principal and an agent interested in trading on a valuable but noncontractible task (B) in a static framework. The principal and the agent sign an explicit contract requiring the agent to perform a different task (A) that is contractible. They then informally agree that, as long as the agent provides B, he does not have to provide A. However, if the agent defects on this agreement by not providing B, then the principal punishes him by enforcing the contract on A. With A costly enough, the agent will choose to provide B and, with A valueless, the principal will choose not to enforce the contract on A.[2] In this static setting, the optimal explicit contract exhibits overcontracting on costly verifiable tasks of little apparent value for the principal.[3]

In addition to this within-period effect, in dynamic settings overcontracting lowers the parties' payoff in periods following the deviation, intensifying "the shadow of the future". Thus, the threat of enforcement of inefficient contractual clauses stabilizes cooperation by strengthening the punishment phase.

These insights offer a rationale for the puzzles discussed earlier: organizations do not enforce contractual provisions on working hours for collaborative employees while they may apply them to punish those who behave opportunistically. Accounting-based debt covenants are ignored if the borrower exerts effort and chooses promising new projects, whilst they are enforced, causing either debt renegotiation or a change in control, if the borrower behaves poorly.[4] Minimum exhibition time clauses are waived when the movie does not attract much audience, but they are applied when the cooperative relation between distributor and exhibitor breaks down. Governments may not normally enforce inefficient laws, unless it helps them to deal with 'troublemakers'.[5]

Our model also provides a number of other results with testable implications.

First, we find that the effectiveness of overcontracting is strengthened when the contractual clause used as threat requires a task that is an imperfect substitute of the noncontractible task of real interest to the parties. This explains, for example, why in several European countries (including France, Germany and Italy) contracts for university professors establish a large number of teaching hours and long periods of presence at work. Like academic re-

[2] *Contract enforcement costs allow even valuable tasks to be credibly used as a threat.*

[3] In their account of block booking contracts in the film distribution industry Kenney and Klein (2000) write that "...transactors over-constrained exhibitor behavior while relying on the distributor's superior reputational capital to enforce the contract flexibly." (p. 435).

[4] See Dichev and Skinner (2002) and Chava and Roberts (2008). Particularly consistent with our idea is Chava and Robert's finding that covenant violations have no negative consequences for the borrower when this is involved in a long term relationship with the lender.

[5] A well known example is that of Al Capone, convicted for a number of rather lose tax evasion charges that were not enforced to such a detail against normal citizens.

search, teaching activities and staff availability improve the attractiveness of a university to students (and can therefore be seen as valuable imperfect substitutes). However, universities do not always apply these provisions: individual teaching loads are often informally reduced for good researchers and their limited presence at work is often ignored.

Second, we show that contracts as threats are also effective if task A is costless for a party to undertake, but generates a loss to the other party. Here one party is punishing the other, by applying his own dysfunctional contractual obligations. This explains "work-to-rule" practices, where employees that normally disregard dysfunctional contractual clauses to smoothen and speed up production apply them during conflicts to punish management for reneging on their promises.

Third, we show that overcontracting helps to enlarge the set of sustainable task intensities with both forcing contracts and stipulated damages (or penalties), although it is less effective with the latter. This rationalizes the anecdotal evidence that in public procurement, penalties for noncompliance are often waived.[6] While showing this, we also provide a rationale for the observation that the "infinite punishment principle" of complete explicit contracts does not extend to relational contracting. As the model highlights, contractual damages must be limited in size for overcontracting to be most effective.

Fourth, overcontracting remains equally effective when there are informational asymmetries on costs between the principal and the agent (it allows efficient sorting), provided that task A is chosen so as to require skills analogous to those required for task B, as is often the case for substitutes. Thus, our insights potentially apply both to small organizations, where information flows smoothly, and to large institutions, where delegation is pervasive and information flow is less fluent.

Fifth, the possibility of swift and cheap renegotiation reduces but does not eliminate the benefits of overcontracting. Even when renegotiation is costless, overcontracting still brings the benefit of transforming simultaneous-move stage games into sequential-move ones where a defection can be punished by exercising the contract in the same period in which it occurs.

Finally, overcontracting has relevant distributional implications: a principal with bargaining power can use overcontracting to implement the efficient relational contract without

[6] See e.g. HM Treasury (2006), where the non-enforcement of contractual penalties was explained by the desire not to spoil the cooperating environment. Analogous evidence comes form Italy. Third-party inspections commissioned by the Italian Public Procurement Agency (Consip) in the period 2005-2008 showed that on a total of 1455 ascertained infringements by a contractor, penalties where only enforced in 64 cases, i.e. for less than 5% of the ascertained infringements.

leaving any rent to the agent.

Related literature. Our paper contributes to the literature on the interaction between relational contracts and explicit contracts, dating back to Baker, Gibbons and Murphy (1994) and Schmidt and Schnitzer (1995).[7] The general insight of this literature is that the outcome of this interaction is ambiguous. On one hand, the availability of explicit contracts may hinder relational contracts by increasing parties' fall back position after a deviation, thereby limiting enforcement possibilities. This point is key, for example, in Bernheim and Whinston (1998), which emphasizes the benefit of not regulating some contractible tasks with an explicit contract. On the other hand, a supplementary explicit contract that is enforced in equilibrium may increase the parties' equilibrium payoff and thus help to sustain relational contracting. Baker Gibbons and Murphy (1994), in particular, show that a supplementary explicit reward based on an imperfect measure of output can help sustain nonverifiable effort.[8]

Our paper builds on these general insights. However, in this literature, the equilibrium supplementary contract is efficient and is always enforced. The possibility that a contract is signed and then ignored in equilibrium is not contemplated.[9]

Instead, we focus on the use of inefficient contracts that are signed and but discretionally enforced. This allows us to establish a role for contracts as mere threats, and to explain both the presence of inefficient clauses, as the ones described above, and the lack of contractual enforcement often observed in practice.[10]

[7] The formal theory of relational contracts was developed by Bull (1987), MacLeod and Malcomson (1989), Baker, Gibbons and Murphy (1994), and Levin (2003), among others, but the complex interaction between explicit and relational contracts is not yet fully understood. See MacLeod, 2007, and Malcomson (forthcoming) for surveys on relational contracting.

[8] Schmidt and Schnitzer (1995) show that incentives for non-verifiable quality may increase when contracts on verifiable quantities are used. See the survey by Malcomson (forthcoming), for a discussion on the use of supplementary contracts.

[9] More generally, the economic theory of (complete and incomplete) contracts, as summarized e.g. in Bolton ad Dewatripont (2004), does not contemplate the possibility that a contract is signed and then ignored, i.e. it is neither enforced nor renegotiated. The only exception we are aware of is the recent work of Zanarone (forthcoming), where discretional enforcement of valuable contractual clauses is used within a relational agreement to provide illegal discriminatory incentives to franchisees.

[10] For example, in the university story discussed in Bernheim and Whinston (1998), the university might prefer not to specify university obligations for members of staff in order to encourage their nonverifiable effort. "With a complete contract, the faculty member would have to recourse to the courts if the universality reneged on its contractual obligations [to punish a deviation]" (pag. 904). Our paper shows that this is not true when the possibility to sign but not enforce the explicit contract is considered. With overcontracting on teaching or administrative duties, the university has the very contract as a means to punish the deviation.

Other important differences from previous work in this literature are that we find that contracts as threats can sustain cooperation on noncontractible actions even in a static setting; and that they can be effective as a sorting device in the presence of asymmetric information, an issue typically disregarded in the above literature.

The ability of contracts as threats to discipline parties even in a static setting relates to Williamson's (1983) idea that posting hostages to commit not to behave opportunistically is an alternative governance mode for economic transactions.[11] It is also reminding of how relative performance evaluation solves the principal's commitment problem to pay informal rewards in Malcomson (1984).[12]

The dynamic effects of contracts as threats relate instead our paper to the work of Halonen (2002), who emphasized the positive effect of inefficient ownership structures on long-term non-contractible investments. We emphasize the possibility to commit to inefficient actions through generic explicit contracts. This allows us to discuss the role of dysfunctional clauses, the relative effectiveness of substitute vs complement tasks and of forcing contracts vs stipulated damages as well as the implications of contract enforcement costs.

In equilibrium contracts as threats are not renegotiated, hence they are different from the contracts that shape ex-post bargaining game in Aghion, Dewatripont and Rey (1994), as well as from suboptimal clauses that affect the threat points in the renegotiation in Huberman and Kahn (1988) and Masten (2000). They also differ from the 'latent contracts' discussed in Hellwig (1983) and the option contracts that solve 'hold-up' problems studied by Noldeke and Schmidt (1995) and others: latent contracts are never actually signed in equilibrium, and option contracts are signed, but then either enforced or renegotiated.

The structure of the paper. In Section 2 we present the basic model of a repeated Principal-Agent relationship and study standard relational contracting as a benchmark. Section 3 considers the effects of contracts as threat on moral hazard in both a dynamic and a static setting. Section 4 extends the analysis to allow for interdependency between tasks, stipulated damages, adverse selection, renegotiation and costly enforcement. Section 5 briefly

[11] As contracts as threats, transferring a hostage is inefficient as a 'good hostage' is costly to lose for the party that offers it but of little value for the one that accept it. This guarantees that the first party can be punished, and that the second can credibly promise to return the hostage or to keep it, depending on the former party's behavior.

[12] It is also related to how 'money burning' ensures truthful reporting in recent work on relational contracts with subjective evaluation like MacLeod (2003), Levine (2003) and Fuchs (2007) and in repeated games with communication like Kandori and Matsushima (1998).

summarizes our main results and their empirical implications and concludes. All proofs are relegated to an Appendix.

2 Setup and benchmark

In this section we present a basic setup, within which the effects we discussed can be derived in a relatively simple way, and discuss the benchmark case of standard relational contracting.

2.1 Baseline model

Consider a long term (infinite horizon), bilateral, repeated interaction between a principal and an agent. Time is discrete and both parties discount future payoffs through a common and strictly positive discount factor $\delta < 1$. For simplicity, we begin focussing on separable tasks, postponing complementarities to the extensions. Let $c_J(j) \geq 0$ denote the agent's increasing and convex cost of providing intensity $j \in I^J$ in task $J = A, B$, and let $v_J(j) \geq 0$ denote the corresponding value to the principal, increasing in j and weakly concave. Both the principal and the agent are risk neutral and receive zero if they choose not to trade.[13]

The relationship between the principal and the agent is characterized by an explicit contract on a verifiable task A, and by an implicit agreement on A and a non-verifiable task B. The explicit contract provides for the agent to exert task intensity a at a price p_A. If a party calls for the execution of the contract, the other party must comply with it. This is the case of 'forcing contracts' or 'specific performance': we extend the analysis to the case of stipulated damages in section 4. The implicit contract prescribes task intensity b and a per-period discretionary transfer t. We assume that task A is unproductive whilst task B is productive: that is, $v_A(a) - c_A(a) < 0$ whilst $v_B(b) > c_B(b)$ up to some $b^* > 0$. We assume that the principal and the agent can commit to a long-term explicit contract and that renegotiation is prohibitively costly.

The basic timing is as follows:

period 0: *The principal and the agent agree on the explicit contract and on the implicit/relational contract.*

[13] Linearity in income is a convenient simplification, and with no uncertainty in the model, the degree of risk aversion plays no role.

period 1: *An infinite repetition of the following stage game takes place:*

STAGE GAME (simultaneous actions)

Step 1: *The principal and the agent simultaneously choose verifiable and nonverifiable actions.*

Step 2: *The principal and the agent observe each other's step 1 actions, and if violations of the explicit contract took place, they decide whether or not to enforce it.*

Step 3: *Stage-game payoffs realize.*

Note that, under specific performance, if a party calls for the execution of the contract because a violation took place, the other party must comply with the contract. In our model, this implies that if the agent performed b but not a at step 1 and the principal calls for the enforcement of the contract at step 2, the agent is forced to also perform a, which will contribute to the final stage-game payoffs.

Although our focus will be on the simultaneous actions in step 1, as described above, we shall sometime also consider the case of sequential timing, where in step 1 the principal pays a transfer before the agent chooses his action.[14]

2.2 Benchmark: standard relational contracting

Suppose that the principal and the agent informally agree that in each period the agent undertakes task B at level b and the principal operates a discretionary transfer t, with per-period payoffs $\{t - c_B(b),\ v_B(b) - t\}$. Parties use grim strategies to sustain the relational contract: if either party deviates, the principal withholds payments forever and the agent never exerts effort in the future. We refer to this type of relational contracting, based on the use of discretionary transfers, as "standard relational contracting" (ST).

The principal and the agent will accept to participate to the contract if their respective expected payoff is nonnegative, that is

$$\begin{aligned} IR^{ST} - P \quad &: \quad V \equiv \frac{v_B(b) - t}{1 - \delta} \geq 0, \qquad (1) \\ IR^{ST} - \alpha \quad &: \quad U \equiv \frac{t - c_B(b)}{1 - \delta} \geq 0. \end{aligned}$$

[14] Both these timings requre a mechanism to discipline the agent and can be seen as "efficiency wage" models. The inverse sequence, where the agent moves first and the principal pays the discretionary transfer after observing the agent's choice, is considered in Section 4.

The principal will not defect from the implicit agreement by withholding payment, if saving t in the current period does not compensate for the loss of future surplus $\frac{\delta(v_B(b)-t)}{1-\delta}$. His relational incentive constraint is then given by

$$RIC^{ST} - P : V \equiv \frac{v_B(b) - t}{1 - \delta} \geq v_B(b). \tag{2}$$

The agent will undertake task B at intensity b in the current period if enjoying the surplus $t - c_B(b)$ in all future periods is better than saving $c_B(b)$ in the current period. Thus, the agent's relational incentive constraint is

$$RIC^{ST} - \alpha : U \equiv \frac{t - c_B(b)}{1 - \delta} \geq t. \tag{3}$$

When, instead, the timing of the exchange at Step 1 is sequential, if the principal deviates by not paying t, the agent reacts immediately by not delivering b, so that the RHS of (RICST-P) becomes zero, making the constraint redundant.

As well known in the literature on relational contracting, the following result, to be used as benchmark, applies.

Lemma 1 ***(Standard Relational Contracting)*** *With demand for a single non-verifiable task and no explicit contracting on other tasks, the set of sustainable noncontractible task intensities are:*
(i) when actions are simultaneous

$$\Phi^{ST}_{Sml} = \left\{ b \in I^B : \delta^2 v_B(b) - c_B(b) \geq 0 \right\}; \tag{4}$$

and (ii) when actions are sequential

$$\Phi^{ST}_{Seq} = \left\{ b \in I^B : \delta v_B(b) - c_B(b) \geq 0 \right\}; \tag{5}$$

where $\Phi^{ST}_{Seq} \supseteq \Phi^{ST}_{Sml}$.[15]

Proof: see the Appendix.

[15] In the sequential game, we have assumed that the principal first pays t_B and then the agent chooses task intensity. Since the only possible deviation is from the agent, giving all the surplus to the agent by setting $t_B = v_B(b)$ maximized cooperation. If we inverted the sequence of moves and assumed that the agent first chooses his actions and then the principal pays t, then the relevant constraint becomes (RIC-P). The set of sustainable actions remains the same and it is now found by setting $t_B = c_B(b)$, thus giving all the surplus to the principal.

3 Contracts as threats

In this section, we first analyze the full power of contracts as threats in a dynamic environment. Then we isolate the within-period effect from the effect on the punishment phase by considering the static (one-shot) interaction.

3.1 (Over)Contracting on A to obtain B

Suppose that in period 0, the parties sign a long term explicit contract that requires the principal to pay p_A to the agent and the latter to perform task A at intensity $a > 0$. The parties also informally agree on a relational contract that provides for the agent not to perform task A but instead to perform the noncontractible task B at a level $b > 0$, and for the principal to pay an additional discretional transfer t.

The relational contract is sustained by the threat of reverting to the terms of the explicit contract forever after (i.e. in Step 2 and in all subsequent periods) in case of a defection in Step 1. Thus, if the agent deviates by not undertaking b, or if the principal deviates by not paying t or by requesting a even though b was performed by the agent, a grim punishment phase is triggered, in which task A is enforced in all subsequent periods.

In this setting, the participation constraints of the principal and the agent are respectively given by

$$
\begin{aligned}
IR^{OV} - P \quad &: \quad \frac{v_B(b) - p_A - t}{1-\delta} \geq 0, \\
IR^{OV} - \alpha \quad &: \quad \frac{t + p_A - c_B(b)}{1-\delta} \geq 0.
\end{aligned}
$$

Suppose that $t \geq 0$: the discretionary transfer takes the form of a payment from the principal to the agent. A deviation by the principal then consists in not paying t when b was observed and in obliging the agent to exert a to enjoy $v_A(a)$. The relational incentive constraint of the principal is therefore

$$
RIC^{OV} - P : \frac{v_B(b) - p_A - t}{1-\delta} \geq v_B(b) + v_A(a) - p_A + \frac{\delta\,(v_A(a) - p_A)}{1-\delta}. \tag{6}
$$

Conversely, a defection by the agent consists in not providing b, but then he will have to provide a within the period and forever after. Therefore, the relational incentive constraint of the agent is

$$RIC^{OV}-\alpha:\frac{t+p_A-c_B(b)}{1-\delta}\geq t+p_A-c_A(a)+\delta\frac{p_A-c_A(a)}{1-\delta}. \tag{7}$$

Simplifying, the two relational constraints reduce to

$$R\tilde{I}C^{OV}-P:\delta v_B(b)\geq v_A(a)+t,$$

and

$$R\tilde{I}C^{OV}-\alpha:c_A(a)+\delta t\geq c_B(b).$$

By cooperating, the principal gains the surplus $v_B(b)$ in all future periods but he foregoes $v_A(a)$ and t in current and future periods. By cooperating, the agent saves the cost $c_A(a)$ in current and future periods and it secures t in all future periods, but it incurs the cost $c_B(b)$ in current and in future periods. These relational constraints are independent of p_A since p_A must be paid, regardless of whether or not b is performed.

The next proposition gives our main result.

Proposition 1 *(**Rewarding** A **to Obtain** B) Contracting on the inefficient task A ("overcontracting") allows one to sustain higher levels of the nonverifiable task B than standard relational contracting under both sequential and simultaneous timing. In particular, any efficient task intensity can be sustained with overcontracting:*

$$\begin{aligned}\Phi^{OV} &= \left\{b\in I^J: v_B(b)-c_B(b)\geq 0\right\}, \\ \Phi^{OV} &\supset \Phi^{ST}_{Seq}\supset\Phi^{ST}_{Sml}\end{aligned} \tag{8}$$

Proof: see the Appendix.

Overcontracting on A helps relational contracting on B because of a combination of two effects. The first one is that the explicit contract allows the parties to react immediately after a deviation is observed, affecting the gains from a deviation in the same period in which it occurs. The second effect is that the explicitly contracted action A generates surplus destruction (recall that $v_A(a)<c_A(a)$), which reduces the continuation payoffs.

To see this, let us sum up the two relational constraints $(R\tilde{I}C^{OV}-\alpha)$ and $(R\tilde{I}C^{OV}-P)$, which gives

$$\delta v_B(b)-c_B(b)\geq v_A(a)-c_A(a)+t\,(1-\delta)\,. \tag{9}$$

Equation (9) shows that achieving levels of b higher than under standard relational contracting, i.e. with $\delta v_B(b) < c_B(b)$, requires as a necessary condition that the contract on A be inefficient, namely that $v_A(a) < c_A(a)$. Following the arguments in MacLeod and Malcomson (1989), (9), $(R\tilde{I}C^{OV} - \alpha)$ and $(R\tilde{I}C^{OV} - \alpha)$ are also sufficient. Thus, with a contract on A that is sufficiently inefficient, i.e. $v_A(a) - c_A(a)$ is sufficiently negative, the parties can obtain any level of b that exhibits $v_B(b) - c_B(b) \geq 0$ and that is therefore individually rational.[16] What is required is that the loss from implementing the contract on A be sufficiently large to discourage a deviation on B.

In this repeated setting, it is not important how the loss on A is distributed: only its size $v_A(a) - c_A(a)$ matters. With positive discretionary transfers t, the combination of $v_A(a)$ and $c_A(a)$ that satisfies $(R\tilde{I}C^{OV} - P)$ and $(R\tilde{I}C^{OV} - \alpha)$ and that it is individually rational cannot be uniquely determined.[17]

For example, the level of $b > 0$ such that $v_B(b) = c_B(b)$ can be achieved by using overcontracting and no transfers. With $t = 0$, the relational incentive constraints are

$$\delta v_B(b) \geq v_A(a),$$

and

$$c_A(a) \geq c_B(b),$$

showing that task A can be valuable for the principal (meaning $v_A(a) > 0$), although it needs not be, whilst it must be inefficient ($v_A(a) < c_A(a)$) to achieve $b > 0$ such that $v_B(b) = c_B(b)$.

The same level of b can also be achieved with a combination of discretionary transfers and overcontracting, for example:

$$t = \delta c_B(b)$$

and

$$c_A(a) = c_B(b)\left(1 - \delta^2\right).$$

Thus discretionary transfers and overcontracting are substitutes, albeit imperfectly, since, as shown in Proposition 1, discretionary transfers alone cannot achieve what overcontracting alone can.

[16] Instead, levels of b such that $\delta v_B(b) < c_B(b)$ can also be achieved if the contract on A is efficient, that is, if $v_A(a) > c_A(a)$. However, in this case it is inefficient to use A as a threat not enforced in equilibrium.

[17] Also, discretionary transfers are not necessary as constraints; the constraints can well be satisfied with $t_B = 0$.

3.2 Disentangling the effects: the static case

In Proposition 1, surplus destruction played a dual role: it allowed the explicit contract to reduce the agent's gains from defections in the period in which the deviation occurred, without increasing the principal's incentive to deviate, and it strengthened the punishment phase starting the period after the deviation.

To better understand the functioning of the first mechanism, we consider here a static version of the game, where there is no future interaction that can be used to discipline deviations.

In a static setting, cooperation is an equilibrium if the following conditions are satisfied

$$RIC^{OV}_{static} - P : -t \geq v_A(a),$$

$$RIC^{OV}_{static} - \alpha : c_A(a) \geq c_B(b).$$

In the static setting, discretionary transfers make cooperation unfeasible. The two relational constraints above can only be satisfied if $t = 0$. The following proposition follows immediately.

Proposition 2 *In static settings, overcontracting allows one to sustain any efficient task intensity provided that action A is both valueless, i.e., $v_A(a) = 0$, and at least as costly as task B, i.e., $c_A(a) = c_B(b)$, and that no discretionary transfers are used, $t = 0$.*

Proof: see the Appendix.

In a static context, task A must be valueless as otherwise the principal would call for the execution of the contract even when the other party cooperated on task B.[18] Task A must also be at least as costly as task B, as otherwise the agent would prefer to deviate, exerting a, rather than comply with the implicit contract, exerting b. Discretionary transfers cannot be used, as otherwise the principal would have incentive to withhold payment, despite b being performed.

[18] And task A can also not be dysfunctional, i.e. with $v_A(a) < 0$, as otherwise the principal would not call for the application of the contract following a deviation by the agent.

3.3 Distributional effects

It is worth noting that overcontracting may also have relevant distributional effects. Under standard relational contracting, $t \geq c_B(b)/\delta$ is necessary for (RIC$^{\text{ST}}$-α) to be satisfied, so that the agent must be given a rent of at least $(1-\delta)c_B/\delta$. Under overcontracting, instead, an agent who gets no surplus can still be disciplined because there is an *immediate* cost of deviating. For example, with $t = 0$ and $v_A(a) = 0$, choosing a such that $c_A(a) = c_B(b)$ suffices to remove any incentive to deviate for the agent. Thus, overcontracting has important distributional effects. To emphasize:

Corollary 1 *(**Distributional Effects of Overcontracting**) Overcontracting on A allows the principal to implement any level of B that is feasible under standard relational contracting whilst retaining a greater share of the surplus.*

3.4 Dysfunctional clauses

Up to this point, we have focused on contractual clauses requiring the agent to perform actions that are weakly valuable to the principal - we assumed $v_A(a) \geq 0$ - but are inefficient ($c_A(a) \geq v_A(a)$). Indeed, most of the examples discussed in the introduction are of this kind. However, inefficient contract clauses that help overcontracting can also take the form of dysfunctional clauses, such that $v_A(a) < 0$. The example of "work-to-rule" practices, sometimes called "white strikes", is of this type.[19] To punish management, workers slow down or completely block production by literally applying unproductive clauses that are typically present in the detailed labor contracts. Under normal circumstances instead, on the cooperative equilibrium path, workers ignore these clauses to speed up firm production.

The main difference is that dysfunctional clauses are used to discipline the party other than the one contractually required to undertake the action. To see this more clearly, consider just in this section the inverse sequential timing for the stage game than that considered earlier, with the principal deciding last about the transfer.

[19] See *http://libcom.org/organise/work-to-rule* for a nice up-to-date explanation of the practice from direct users, where one also reads the following: "Almost every job is covered by a maze of rules, regulations, standing orders, and so on, many of them completely unworkable and generally ignored. Workers often violate orders, resort to their own techniques of doing things, and disregard lines of authority simply to meet the goals of the company. There is often a tacit understanding, even by the managers whose job it is to enforce the rules, that these shortcuts must be taken in order to meet targets on time."

Stage Game (simultaneous actions)

Step 1: *The agent chooses verifiable and non-verifiable actions.*

Step 1.5: *The principal observes the agent's actions, and then decides whether to pay the discretionary monetary transfer.*

Step 2: *The agent observes the principal's decision, then all parties decide whether to call for the enforcement of explicit contracts.*

Step 3: *Stage-game payoffs realize.*

With this timing the main problem is how to discipline the principal and avoid his reneging on the promised transfer after the agents performed as agreed upon. Focussing on the static case will suffice to clarify the argument.

Suppose that the principal and the agent agreed that the agent should deliver b and that the principal should then pay the discretionary performance bonus t. Without overcontracting, this transaction would not be viable, as the principal would find it convenient to renege on t even after the agent delivered b. Anticipating this, the agent would not perform.

Now consider the case in which the explicit labor contract contains a clause requiring agents to apply a very cumbersome and slow procedure that costs the usual procedure to the agent, so that $c_A = 0$, but delivers nothing but delayed production, so that $v_A(a) < 0$. It is easy to verify that with dysfunctional overcontracting the exchange of b against t is a subgame perfect equilibrium in a static interaction. The agents have no incentives to apply the dysfunctional routine when the principal sticks to his promises, but if the principal deviates by reneging on the bonus, the agent applies the contract to punish the management.[20]

We highlight this point in the following remark.

Remark 1 ***Dysfunctional clauses.*** *A reinterpretation of task A suggests that parties can also use as threats contractual clauses prescribing tasks that impose no cost on the performing party (e.g. prescribe following one particular procedure rather than another), but to impose a substantial damage to the other (e.g. slow down production). In this interpretation,* $v_A(a) <$

[20] Of course, an alternative way of using overcontracting without relying on dysfunctional clauses would be a contractual clause requiring the principal to perform some inefficient costly action that brings little benefit to the agent.

0 *is the damage suffered by the principal when the agent executes the contract in order to punish a deviation, and* $c_A(a) = 0$.

4 Alternative assumptions and extensions

Here we consider here a number of extensions in which we relax the simplifying assumptions adopted earlier and explore the robustness and limits of the mechanisms we characterized.

4.1 Complements and substitutes

Let us now relax the assumption that the principal's objective function is separable in the two tasks (whether the cost function is separable is irrelevant in this simple model). We now assume that the principal values the two tasks with the generic function $v(a, b)$, increasing and weakly concave in both arguments. We then consider both the case of substitutes, where $v_{ab} < 0$, and the case of complements, where $v_{ab} > 0$.

Static case. In a one-shot interaction, cooperation is now an equilibrium if the following conditions are satisfied

$$RIC^{OV}_{static} - P : v(0, b) - t \geq v(a, b),$$

$$RIC^{OV}_{static} - \alpha : c_A(a) \geq c_B(b).$$

It is easy to verify that if the tasks are substitutes, so that $v_{ab} < 0$, positive discretionary transfers t can be sustained even in the static setting. If - as with a separable objective function - a valueless contractible task is chosen with $v(a, 0) = 0$, the substitutability between tasks, $v_{ab} < 0$, implies that the value of b is higher if a is not performed and - most importantly in our context - that the value of a is lower if b is performed, so that $v(0, b) - v(a, b) > 0$. This reduces the incentive of the principal to deviate by calling for the application of the contract on an action a that is valuable ex ante.

$RIC^{OV}_{static} - P$ is then satisfied as long as $t \leq v(0, b) - v(a, b)$, and even valuable contractible tasks with $v(a, 0) > 0$ can be credibly used to enforce cooperation on a substitute non-contractible task in a static setting, provided $v_{ab} < 0$.

If the tasks are complements, so that $v_{ab} > 0$, cooperation becomes impossible instead. The reason is that whether or not the agent complied with the promise to deliver b, the principal will always find it convenient ex post to call for the application of the explicit contract, obtaining an extra gain $v(a,.) - v(0,.) > 0$. The following proposition summarizes these conclusions.

Proposition 3 *In a static setting, if tasks are substitutes overcontracting allows one to sustain any efficient task intensity on the noncontractible task, even with positive discretionary transfers or a valuable contractible task. On the contrary, if tasks are complements no level of the non-contractible task can be sustained in equilibrium in static settings.*

Dynamic case. The same basic intuition of the static setting applies to the dynamic setting, although the results are less sharp due to the compensating effects of the following punishment phase. The participation constraint of the principal now becomes

$$IR^{OV} - P : \frac{v(0,b) - p_A - t}{1-\delta} \geq 0,$$

and his incentive constraint

$$RIC^{OV} - P : \frac{v(0,b) - p_A - t}{1-\delta} \geq v(a,b) - p_A + \frac{\delta\left(v(a,0) - p_A\right)}{1-\delta}.$$

Instead, the participation and incentive constraints for the agent are not affected by (positive or negative) complementarities in the principal's objective function.

Simplifying, the relational constraint becomes

$$R\tilde{I}C^{OV} - P : v(0,b) \geq t + (1-\delta)v(a,b) + \delta v(a,0),$$

which allows us to state the following.

Proposition 4 ***(Complements and Substitutes)*** *Overcontracting on a verifiable task A allows one to sustain higher levels of the non-verifiable task B when the two tasks are substitutes for the principal. The opposite happens when the tasks are complements.*

Proof: see the Appendix.

The logic behind the result is simple and best explained by an example. Suppose the non-contractible task B is the effective quality of a professor with students, in terms of both teaching and tutoring, and that the contractible action A is the everyday physical presence of the professor in his office. For the Dean, these two tasks may be substitutes. If the professor delivers well on B in the days he is with the students, neither the Dean nor the students will care where he spends the other days of the week. If, instead, the professor does not excel in teaching and tutoring, having him available in his office every day may have some compensating value for the students (and the Dean, assuming a benevolent institution), as they may need to ask unexpected clarification questions anytime during the week. When this is the case, the threat of requiring daily presence in case of poor tutoring is more credible, because if tutoring is poor, the daily presence is valuable. Conversely, the promise not to enforce daily presence in the office as long as teaching and tutoring is good enough to clear all students' doubts is more credible, because the presence of the professor is effectively valueless in that case.

Because of this, overcontracting is more effective when the tasks are substitutes and less when they are complements, a clear and empirically testable prediction.[21]

4.2 Stipulated damages

Let us abandon our assumption of specific performance and suppose instead that the explicit contract prescribes a stipulated damage or penalty (we shall use these terms interchangeably) F^{α} for the agent in case of non-compliance. Now Step 2 of the stage game becomes:

Step 2: *The principal observes the agent's action in Step 1 and, in case of a violation of the explicit contract, he chooses whether to levy penalty* F^{α}.

As before, suppose that the implicit contract prescribes $a = 0$ and $b > 0$ in Step 1 on the equilibrium path, sustained by the threat of enforcing the explicit contract on A in Step 2 in case of defection in Step 1. Thus, if the agent deviates by not undertaking B, a grim punishment phase is triggered, in which the explicit contract is enforced, requiring the agent to exert a or incur penalty $F^{\alpha} \geq c_A(a)$ forever after.

In this setting, the participation constraints of the principal and the agent are unchanged whilst a deviation by the principal consists in not paying t when b was observed and in levying

[21] Our work can then also be seen as a contribution to the economics of 'multi-tasking' and 'job design' sparked by the seminal work of Holmstrom and Milgrom (1991). In this literature, however, only productive tasks are considered. See e.g. Schottner (2007), who adopted a job design approach within a relational contracts environment, highlighting the benefits of bundling tasks in terms of dissuading the principal from reneging on discretional bonuses.

the penalty F^{α} on the agent for not exerting a.[22] After such a defection, the principal will have to pay p_A forever after. The relational incentive constraint of the principal is therefore

$$RIC^{OV}_{Damages} - P: \frac{v_B(b) - p_A - t}{1-\delta} \geq v_B(b) - p_A + F^{\alpha} - \frac{\delta p_A}{1-\delta}. \tag{10}$$

Conversely, the agent can defect from the relational contract by not providing b, but then he will have to provide a (optimal if $F^{\alpha} \geq c_A(a)$) or pay the penalty F^{α} (optimal if $F^{\alpha} < c_A(a)$). Therefore, the relational incentive constraints of the agent is

$$RIC^{OV}_{Damages} - \alpha: \frac{t + p_A - c_B(b)}{1-\delta} \geq t + p_A - \min\left[F^{\alpha}, c_A(a)\right] + \delta\frac{p_A - \min\left[F^{\alpha}, c_A(a)\right]}{1-\delta}. \tag{11}$$

From the incentive constraints above, we obtain the following Lemma.

Lemma 2 ***(Optimality of Low Penalties).*** *The maximum level of b sustainable with relational contracts and overcontracting is obtained by setting the stipulated damage F^{α} at the minimum level necessary to induce compliance with the explicit contract, that is: $F^{\alpha} = c_A(a)$.*

Proof: see the Appendix.

Lemma 2 provides a novel rationale as to why penalties for underperformance are often rather low.[23] Contractual penalties have a disciplining effect for the agent, but with overcontracting they also generate a stronger incentive to defect for the principal by cashing the penalty even when the other party complied with the informal agreement. For this reason F^{α} is set at the minimum level necessary to induce compliance with the explicit contract.[24]

The next Proposition characterizes the set of relational contracts sustainable with overcontracting when forcing contracts cannot be used and stipulated damages are the only instrument available to ensure compliance with the explicit contract.

[22] Deviating by not paying the transfer p_A at the beginning is not profitable, as then the agent will not perform and will exercise the penalty $F^P \geq p_A$.

[23] See e.g. the evaluation of standard penalties for late delivery in US highway construction in Bajari and Lewis (2011). An obvious reason why higher penalties are not used in the US is that punitive damages are not admitted in Anglo-Saxon legal systems. But penalties are also typically moderate in countries where punitive penalties are admitted and enforced (see e.g. the calibration of penalties in D'Alpaos et al., 2012).

[24] We have focused on the fine in case of noncompliance by the agent. However, one can also think of a stipulated damage or fine F^P if the principal unduly withholds payment p_A. Repeating the same reasoning as above, one can show that the maximum level of b sustainable with relational contracts is obtained by setting $F^P \geq p_A$. The weak inequality here arises because p_A must be paid in any case, independently of whether cooperation occurred.

Proposition 5 ***(Stipulated Damages)*** *With stipulated damages, overcontracting on a verifiable task A allows one to sustain higher levels of the non-verifiable task B than standard relational contracting under both sequential and simultaneous timing. The set of sustainable task intensities is*

$$\Phi^{OV}_{Damages} = \left\{ b \in I^J : \begin{array}{ll} v_B(b) - c_B(a) \geq 0 & for \quad \delta > .5 \\ \frac{\delta}{1-\delta} v_B(b) - c_B(a) \geq 0 & for \quad \delta < .5 \end{array} \right\},$$

with

$$\Phi^{OV} \supset \Phi^{OV}_{Damages} \supset \Phi^{ST}_{Seq} \supset \Phi^{ST}_{Sml}.$$

The maximum sustainable task intensity is weakly smaller than the one achievable with overcontracting and forcing contracts.

Proof: see the Appendix.

Recall that the RICs conditions have been set under the assumption that $t \geq 0$. Therefore the above solution is feasible for $\delta \geq 0.5$ (for $\delta < 0.5$, the use of discretionary transfers *strictly* reduces the set of sustainable task intensities) In addition, with stipulated damages, overcontracting helps to enlarge the set of b achievable with relational contracting. It remains the case that overcontracting allows to react immediately to a deviation by calling for the application of the explicit contract and allows the punishment of a deviation by creating surplus destruction. However, overcontracting with stipulated damages is less effective than with specific performance clauses. This is because monetary damages make utility transferable, so that the principal's temptation to defect from the implicit agreement by imposing the penalty F_α, even if the agent complied with the implicit contract, is stronger than the principal's temptation to defect by calling for the application of contract A. From Lemma 2, we know that the optimal penalty sets the cost of (not) complying with the contract for the agent equal to $c_A(a)$, as is the case under overcontracting with forcing contracts. The difference is that now the "value" of contract A is also $c_A(a)$, whilst it is equal to $v_A(a) < c_A(a)$ under specific performance. This limits the degree of freedom for the parties on the characteristics of contract A, (weakly) reducing the set of sustainable task intensities.

Furthermore, static contracts with relational contracting once again become unfeasible. The principal always has incentives to deviate by calling for the application of the penalty, whilst in $(RIC^{OV}_{static} - P)$, $v_A(a) = 0$ ensures that he will not.

A final note. Letting μF_α denote the net benefit for the principal from receiving F_α, where $\mu \in [0, 1]$, shows that it is optimal to choose a low μ, if possible, for example by introducing a third party as the recipient of the penalty. In public procurement, the administration in charge of the contract is often not the recipient of the fine. Whilst this is typically done for accountability reasons, it turns out to be valuable for the effectiveness of contracts as threats.

4.3 Adverse selection

We have so far assumed that the costs for the agents of undertaking tasks A and B is publicly observable by the parties. We now extend the analysis to asymmetric information, by considering the possibility that these costs are private information.

We know from the relatively small literature on relational contracting with asymmetric information that the latter typically reduces the set of sustainable task intensities (see e.g. Levin 2003). We show instead that if the explicit contract on task A is appropriately chosen, asymmetric information has no impact. To make our case as strong as possible, we consider the case of stipulated damages, rather than forcing contracts.

Let θ denote the agent's type, with $\theta \in \{\underline{\theta}, \overline{\theta}\}$ and $\Pr(\underline{\theta}) = \gamma$, and suppose that type $\underline{\theta}$ has cost $\underline{c}_B$ of undertaking task B and cost $\underline{c}_A$ of undertaking task A, whilst these costs for type $\overline{\theta}$ are respectively $\overline{c}_B$ and $\overline{c}_A$. We assume that $\overline{c}_B(b) > \underline{c}_B(b)$ and refer to $\underline{\theta}$ as the "efficient" type. We shall say that costs are 'positively correlated' across types if $\overline{c}_A(a) > \underline{c}_A(a)$, so that $\underline{\theta}$ is also more efficient at undertaking A. We shall say that costs are 'negatively correlated' if $\overline{c}_A(a) < \underline{c}_A(a)$.

Suppose that the principal wants to induce both types to exert effort on B.[25] Applying the revelation principle, we consider a direct truthful mechanism and let $\{\underline{p}, \underline{a}, \underline{b}\}$, $\{\overline{p}, \overline{a}, \overline{b}\}$ denote the contract, specifying both implicit and explicit terms, offered to the agent when he reports $(\underline{\theta}, \overline{\theta})$ respectively, where p is the explicitly contracted price. For simplicity, and without loss of generality, we ignore discretionary transfers.

The participation constraints for the agent are now

$$\overline{IR} \quad : \quad \frac{\underline{p} - \underline{c}_B(\underline{b})}{1+\delta} \geq 0, \tag{12}$$

$$\underline{IR} \quad : \quad \frac{\overline{p} - \overline{c}_B(\overline{b})}{1+\delta} \geq 0. \tag{13}$$

[25] Instead, if he wants to induce only $\overline{\theta}$ to work, then it suffices to offer $t = \underline{c}_B(b) = \underline{c}_A(a) < \overline{c}_A(a) = \overline{c}_B(b)$. Type $\overline{\theta}$ will then be indifferent between exerting effort and shirking on B, and he will get zero rent. Type $\underline{\theta}$ will not accept the contract.

The incentive compatibility conditions for each type are given by a set of three conditions, one for each possible deviation. The principal has to solve a more complicated program than usual. He must deal with no-deviation conditions for moral hazard linked to the relational contract, with truth-telling conditions imposed by adverse selection, and with a third 'mixed' type of condition that prevents a double-deviation: the agent can now both misrepresent his type and defect on the noncontractible task.

Consider type $\underline{\theta}$. First, the contract must ensure that the agent has incentive to undertake task B when he truthfully reports his type. The following moral hazard constraints must then be satisfied

$$\begin{aligned}
\overline{RIC} &: \frac{\underline{p}-\underline{c}_B\left(\underline{b}\right)}{1+\delta} \geq \frac{\underline{p}-\underline{c}_A\left(\underline{a}\right)}{1+\delta}; \\
\underline{RIC} &: \frac{\overline{p}-\overline{c}_B\left(\overline{b}\right)}{1+\delta} \geq \frac{\overline{p}-\overline{c}_A\left(\overline{a}\right)}{1+\delta}.
\end{aligned}$$

Second, the agent must have incentive to truthfully report his type when he complies with the relational contract and undertakes B. That is, the following adverse selection constraint must be satisfied

$$\begin{aligned}
\underline{IC} &: \frac{\underline{p}-\underline{c}_B\left(\underline{b}\right)}{1+\delta} \geq \frac{\overline{p}-\underline{c}_B\left(\overline{b}\right)}{1+\delta}; \\
\overline{IC} &: \frac{\overline{p}-\overline{c}_B\left(\overline{b}\right)}{1+\delta} \geq \frac{\underline{p}-\overline{c}_B\left(\underline{b}\right)}{1+\delta}.
\end{aligned}$$

Third, the agent must have incentive to truthfully report his type and at the same time comply with the relational contract by undertaking B. That is, the following novel constraint, combining both adverse selection and moral hazard, must be satisfied

$$\begin{aligned}
\overline{IC}-\overline{RIC} &: \frac{\overline{p}-\overline{c}_B\left(\overline{b}\right)}{1+\delta} \geq \frac{\underline{t}-\overline{c}_A\left(\underline{a}\right)}{1+\delta}; \\
\underline{IC}-\underline{RIC} &: \frac{\underline{p}-\underline{c}_B\left(\underline{b}\right)}{1+\delta} \geq \frac{\overline{p}-\underline{c}_A\left(\overline{a}\right)}{1+\delta}.
\end{aligned}$$

From $\underline{IC}-\underline{RIC}$ and $\overline{IR}$, we have

$$\frac{\underline{p}-\underline{c}_B\left(\underline{b}\right)}{1+\delta} \geq \frac{\overline{p}-\underline{c}_A\left(\overline{a}\right)}{1+\delta} \geq \frac{\overline{c}_B\left(\overline{b}\right)-\underline{c}_B\left(\underline{b}\right)}{1+\delta} > 0.$$

As in standard principal agent models, the efficient agent must receive an informative rent to induce truthful revelation of his type. Since the efficient type can obtain $\overline{p}$ whilst saving on the cost of undertaking B, this rent must be at least equal to[26]

$$\underline{U} = \Delta_B\left(\bar{b}\right),$$

where $\Delta_B\left(\bar{b}\right) \equiv \bar{c}_B\left(\bar{b}\right) - \underline{c}_B\left(\bar{b}\right)$. With $\underline{U} = \Delta_B\left(\bar{b}\right)$ and $\overline{U} = 0$, the set of incentive compatibility constraints can then be rewritten as

$$\bar{c}_A\left(\underline{a}\right) \geq \underline{c}_B\left(\underline{b}\right) + \Delta_B\left(\bar{b}\right), \tag{14}$$

$$\underline{c}_A\left(\underline{a}\right) \geq \underline{c}_B\left(\underline{b}\right), \tag{15}$$

$$\bar{c}_A\left(\bar{a}\right) \geq \bar{c}_B\left(\bar{b}\right). \tag{16}$$

Constraints (15) and (16) are the standard relational constraint under known costs. Constraint (14) is new and it arises from the interaction between adverse selection and relational contracting. In standard adverse selection models, the inefficient type has no incentive to mimic the efficient type because he would be unable to cover his costs for the same transfer as the efficient type. This is also true in our setting, where the inefficient type would incur a loss if he undertook the level of task B designed for the efficient type, $\bar{b}$, for a transfer $\bar{p}$. Now, however, the temptation to mimic the efficient type is stronger because the agent can also choose to shirk on task B. If then constraint (14) is binding in equilibrium, the level of $\underline{a}$ will need to increase to ensure truthtelling, thus increasing the incentives of the principal to defect.

The gain from this double deviation is however affected by the cost correlation across types for the two tasks. With sufficiently correlated tasks, for any given $\underline{b}$ and $\underline{a}$ such that $\underline{c}_A\left(\underline{a}\right) = \underline{c}_B\left(\underline{b}\right)$, we have that $\bar{c}_A\left(\underline{a}\right)$ is sufficiently high that constraint (14) is slack at the optimum. We then obtain the following.

Proposition 6 *The presence of asymmetric information on the costs of task B has no impact on the set of task B intensities that is sustainable through overcontracting, provided the cost of task A, c_A, is strongly and positively correlated with the cost of task B.*

Take, for example, academic research as the unverifiable task B and teaching hours as the verifiable task A waived if quality research is observed. Whilst, say, 80 hours may be sufficient

[26] From $\underline{IC} - \underline{IC}$ and $\overline{IR}$, we have

$$\frac{\underline{t} - \underline{c}_B\left(\underline{b}\right)}{1+\delta} \geq \frac{\bar{t} - \underline{c}_A\left(\bar{a}\right)}{1+\delta} \geq \frac{\bar{c}_B\left(\bar{b}\right) - \underline{c}_B\left(\underline{b}\right)}{1+\delta} > 0.$$

to induce a good researcher to do quality research in exchange for the teaching reduction, they may be too low for a poor quality researcher not to be attracted by the prospect of taking the research position and then doing low-quality research and 80 more hours of teaching. This temptation is enhanced (resp. weakened) if skills in teaching and research are negatively (resp. positively) correlated, in the sense that the type who is inefficient at undertaking research is instead good (resp. bad) at teaching. The intensity of task B sustainable with overcontracting is then maximized when the cost of performing task A is positively correlated with that of performing task B, like for consultancy in our previous example, rather than teaching.

4.4 Renegotiation and short-term contracts

In situations such as centralized contracts, national university contracts or employment contracts in unionized industries, contracts are designed and managed by third parties and actions are chosen repeatedly and frequently within a contractual span. In public procurement contracts, bilateral renegotiation without a new public tender is often explicitly forbidden for accountability reasons. In all these common situations renegotiation is not an issue for the commitment value of long-term explicit contracts.

In other situations, however, actions are taken less frequently and the time and cost of renegotiation are moderate, relative to the gains renegotiation may bring ex post, as in our examples of debt covenants and exclusive contracts.

To take these situations into account, suppose now that the signed contracts can be renegotiated at the end (or the beginning) of each stage game, between Step 3 of each period t and Step 1 of the following period t+1, as is typically assumed in the literature on relational contracting.[27] After a deviation is observed, at the renegotiation stage, the principal and the agent will bargain to share the gain from not implementing the inefficient explicit contract in the future. The gain from renegotiation is $\frac{\delta c_A(a)}{1-\delta} - z$, where z denotes the total cost of renegotiation, including losses due to delay and any other type of "haggling cost" (Williamson, 1986), as well as costs linked to reference point effects (Herweg and Schmidt, 2012).

When $z \geq \frac{\delta c_A(a)}{1-\delta}$ at $c_A(a) = c_B(b) = v(b)$, no renegotiation takes place, so here we focus on $z < \frac{\delta c_B(b^{OV})}{1-\delta}$. Assuming $0 \leq z < \frac{\delta c_A}{1-\delta}$ and 50:50 Nash bargaining in the renegotiation

[27] See e.g., Halonen (2002) and Levin (2003).

phase, the agent obtains

$$\frac{\delta\left(p_A-c_A\right)}{1-\delta}+\frac{1}{2}\left(\frac{\delta c_A}{1-\delta}-z\right)=\frac{\delta\left(p_A-\frac{1}{2}c_A\right)}{1-\delta}-\frac{z}{2},$$

whilst the principal gets

$$\frac{-\delta p_A}{1-\delta}+\frac{1}{2}\left(\frac{\delta c_A}{1-\delta}-z\right)=-\frac{\delta\left(p_A-\frac{1}{2}c_A\right)}{1-\delta}-\frac{z}{2}.$$

We then obtain the following Proposition.

Proposition 7 ***(Overcontracting with Renegotiation).*** *Renegotiation reduces the task intensities that are sustainable with overcontracting. However: (i) As long as $z \neq 0$, overcontracting allows one to sustain higher levels of non-contractible task intensities b than standard relational contracting. (ii) Even with $z = 0$, overcontracting strictly dominates standard relational contracting when the timing of the stage game is simultaneous and weakly dominates it when under sequential timing.*

Proof: see the Appendix.

By increasing the payoffs of the parties in the punishment phase, renegotiation reduces the sustainability of relational contracts with overcontracting. As these payoffs are larger the lower are the renegotiation costs, the maximum sustainable task intensity decreases when z decreases. However, even in the degenerate case of $z = 0$, renegotiation does not eliminate the value of overcontracting. By giving the parties a move after a deviation in the stage game, overcontracting creates a sequentiality within the stage game that allows the immediate punishment of a deviation. Only if renegotiation is assumed possible and costless also within the stage game, i.e. even between Step 2 and Step 3, would overcontracting then be ineffective.

It is immediate to realize that the same reasoning applies when only short-term explicit contracts are available.

Corollary 2 ***(Overcontracting with Short-term Contracts)*** *The set of sustainable relational contracts with overcontracting when only short term contracts are feasible is the same as that with long-term overcontracting and costless renegotiation ($z = 0$).*

Proof: see the Appendix.

4.5 Contract enforcement costs

Djankov et al. (2003) empirically document how contract enforcement can be slow and costly even for simple contracts and in highly developed legal systems.[28] It is therefore natural to ask how our results are affected by the possibility that enforcing the explicit contract is costly. To show that our qualitative results are unaffected by the presence of enforcing costs, it is sufficient to consider the static setting described in Section 4.2.

Let $e > 0$ denote the cost of enforcing the explicit contract. With $v(a) = 0$ or smaller than e, overcontracting is ineffective, since the principal cannot credibly commit calling for the application of the explicit contract if the agent deviates on B. With $v(a) > e$, overcontracting is also ineffective, but for a different reason. Now, the principal would always call for the application of the contract, even if the agent cooperated on B.

Thus, to ensure that contracting on A can help relational contracting on B, the parties need to choose the task A so that $v(a) = e$. The principal can then credibly threaten to call for the application of the explicit contract if the agent deviates on B, and can credibly promise to ignore this contract if the agent cooperates. With such adjustment, the use of contracts as threats remains as effective as when enforcement is costless, and slightly more valuable tasks become effective as credible threats.

5 Conclusions

We have shown that explicit contracts can not only be seen as safe "boundaries" within which relational contracts operate better, as suggested by Klein (2000), or as constraints on discretion that hinder relational contracting, as suggested by Bernheim and Whinston (1998), but also as credible "threats" that are not applied on the equilibrium path but actively help governing relationships.

Whilst we emphasize the strategic use of contracts in a bilateral exchange, our insights equally apply to cases where the inefficient contractual clauses are designed by third parties (the ministry of education, a procurement agency, national employers and employees representatives) nonstrategically, yet inefficiently. Inefficient clauses may be inherited because of mistakes or contract standardization needs or simply because changing laws and regulations is costly.

[28] See also http://www.doingbusiness.org/ExploreTopics/EnforcingContracts/

We have given an 'optimistic' explanation as to why contractual clauses are often signed but not enforced. But, of course, discretion in contract enforcement may be abused for private purposes. Indeed, all our results can be readily reinterpreted from a much less optimistic point of view. The principal could be a non-benevolent agent of a large firm or public organization exploiting his discretion by extracting B-ribes or other private B-enefits in exchange for not enforcing explicitly contracted clauses between his organization and outsiders. As productive nonverifiable tasks, illegal exchanges must also be part of a self-enforcing implicit agreement sustained by credible threats.

Journalist Mike Royko, in his book "Boss: Richard J. Daley of Chicago", describes how the corrupted Chicago political machine worked at the time of the first Mayor Daley, who was in power from 1955 to 1975. If candidates ran for office against one of Daley's men, non-machine-backed candidates and their supporters faced every kind of punishment imaginable. Businesses who donated campaign contributions or displayed campaign signs for independent reform candidates would face punitive city inspectors thoroughly checking them and their businesses.

When Stone ran for alderman, a store owner put one of Stone's campaign signs in the store's front window. The day after the election, the ward superintendent came to the store and issued the owner two tickets for displaying products on the sidewalk. The store owner said, "I have had products on the sidewalk in front of my store for seven years. Why are you issuing me tickets now?" The ward superintendent replied, "You should have thought about that before you put Stone's sign in your window."[29]

The trade-off between the positive and negative effects of overcontracting and the optimal regulatory response to it in different legal and cultural environments appears to be an important question to address in future work.

We conclude with a few empirical predictions.

Our perspective appears consistent with the evidence in Ryall and Sampson (2009) that contracts are more detailed and more likely to include penalties when contractors engage in frequent deals, i.e. when a long-term relationship is also likely present. Thus overcontracting goes hand in hand with relational contracting.

The analysis suggests that inefficient tasks that are imperfect substitutes for the effectively desired non-contractible task are the ideal type of contractible tasks to be used as

[29] We thank an anonymous referee for this story.

threats. A prediction is therefore that we should observe contracts used as threats mostly with substitute tasks.

To the extent that we have greater lack of contractibility in countries with higher enforcement costs, our analysis also suggests that we should observe overcontracting more often in environments where enforcement costs are greater. We also showed that the value of contractible tasks used as threats should be larger the larger are contract enforcement costs.

When adverse selection is also a problem, the contractible task chosen as a threat should require skills analogous or correlated to those necessary to perform the needed noncontractible task.

Finally, considering the pessimistic interpretation of overcontracting where B would stand for bribes, we should also observe more inefficient laws in countries with higher corruption. This seems consistent with the ancient Romans' view that "*In a State where corruption Abounds, there must be many laws*" (Tacitus Ann. 3, 27, 16). We would just qualify this sentence by adding "[...many laws] *that are inefficient and often not enforced.*"

6 The Appendix

Proof of Lemma 1. **(i)** With standard relational contracting and simultaneous timing, the highest b sustainable in equilibrium obtains maximizing b subject to (IR$^{\text{ST}}$-P), (IR$^{\text{ST}}$-α), (RIC$^{\text{ST}}$-P) and (RIC$^{\text{ST}}$-α). When (RIC$^{\text{ST}}$-P) and (RIC$^{\text{ST}}$-α) are satisfied, (IR$^{\text{ST}}$-P) and (IR$^{\text{ST}}$-α) are also satisfied, thus we can ignore the latter two constraints. Now let $b^{Sp}(\delta)$ denote the highest sustainable b under standard relational contracting. We show that at b^{Sp}, both (RIC$^{\text{ST}}$-α) and (RIC$^{\text{ST}}$-P) must be binding. Suppose by contradiction that (RIC$^{\text{ST}}$-P) is binding whilst ($\tilde{\text{RIC}}^{\text{OV}}$-$\alpha$) is slack at $b^{Sp}(\delta)$. Then b can be increased, which increases $c_B(b)$ and $v_B(b)$, keeping both (RIC$^{\text{ST}}$-α) and (RIC$^{\text{ST}}$-P) satisfied: a contradiction. Suppose next that (RIC$^{\text{ST}}$-P) is slack whilst ($\tilde{\text{RIC}}^{\text{OV}}$-$\alpha$) is binding at $b^{Sp}(\delta)$. Then b can be increased, whilst $p(b)$ is increased so that (RIC$^{\text{ST}}$-α) and (RIC$^{\text{ST}}$-P) remain satisfied: a contradiction. Finally, at the optimum (RIC$^{\text{ST}}$-α) must also be binding (which implies that (RIC$^{\text{ST}}$-P) is also biding), since if it was not, it would be possible to increase b and thus $c_B(b)$, keeping both (RIC$^{\text{ST}}$-α) and (RIC$^{\text{ST}}$-P): a contradiction. We then obtain: $p = \frac{c_B(b)}{\delta}$ and substituting for this value in (RIC$^{\text{ST}}$-P), we get condition (4). **(ii)** With sequential timing, the set of sustainable relational contracts satisfies (IR$^{\text{ST}}$-P), (IR$^{\text{ST}}$-α) and (RIC$^{\text{ST}}$-α), and again we can ignore (IR$^{\text{ST}}$-α) implied by (RIC$^{\text{ST}}$-α). Noting that (RIC$^{\text{ST}}$-α) is easier to satisfy the higher is p, the highest sustainable b is obtained by taking the highest p compatible with (IR$^{\text{ST}}$-P), which gives $p = v_B(b)$. Substituting for $p = v_B(b)$ in (RIC$^{\text{ST}}$-α) we obtain expression (5).■

Proof of Proposition 1. The upper bound on the set of tasks B intensities sustainable by the relational contracts with overcontracting obtains by maximizing b subject to (IR$^{\text{OV}}$-P), (IR$^{\text{OV}}$-α), ($\tilde{\text{RIC}}^{\text{OV}}$-$\alpha$) and ($\tilde{\text{RIC}}^{\text{OV}}$-P). Since p_A only affects (IR$^{\text{OV}}$-P), (IR$^{\text{OV}}$-α), then any $p_A \in [c_B(b), v_B(b)]$ is feasible. Now let $b^{OV}(\delta)$ denote the highest sustainable b. We show that at b^{OV}, both ($\tilde{\text{RIC}}^{\text{OV}}$-$\alpha$) and ($\tilde{\text{RIC}}^{\text{OV}}$-P) must be binding. Suppose by contradiction that ($\tilde{\text{RIC}}^{\text{OV}}$-P) is binding whilst ($\tilde{\text{RIC}}^{\text{OV}}$-$\alpha$) is slack. Then $c_A(a)$ can be reduced so as to keep (RIC$^{\text{OV}}$-α) satisfied whilst loosening ($\tilde{\text{RIC}}^{\text{OV}}$-P), making higher levels of b implementable: a contradiction. Suppose next that (RIC$^{\text{OV}}$-α) is binding whilst ($\tilde{\text{RIC}}^{\text{OV}}$-$\alpha$) is slack. Then, we can increase b and a so as to leave ($\tilde{\text{RIC}}^{\text{OV}}$-$\alpha$) binding and keep ($\tilde{\text{RIC}}^{\text{OV}}$-P) satisfied. Setting both ($\tilde{\text{RIC}}^{\text{OV}}$-$\alpha$) and ($\tilde{\text{RIC}}^{\text{OV}}$-$P$) binding we obtain expression (8).■

Proof of Proposition 2. With $v_A(a) = 0$, $c_A(a) = c_B(b)$, and $p = 0$, both $(RIC^{OV}_{spapic} - P)$ and $(RIC^{OV}_{spapic} - \alpha)$ are satisfied. Thus by choosing $p_A(a) \in [c_B(b), v_A(b)]$, any level of b such that $c_B(b) \leq v_A(b)$ satisfies also (IR$^{\text{OV}}$-P), (IR$^{\text{OV}}$-α).■

Proof of Lemma 2. Summing up (RIC$^{\mathrm{OV}}$-P) and (RIC$^{\mathrm{OV}}$-α), we obtain

$$RIC^{OV}: \frac{v_B(b) - c_B(b)}{1-\delta} \geq v_B(b) + p + F^{\alpha} - \frac{\min\left[F^{\alpha}, c_A(a)\right]}{1-\delta}.$$

Suppose $F^{\alpha} > c_A(a)$, then (RIC$^{\mathrm{OV}}$) becomes

$$RIC^{OV}: \frac{v_B(b) - c_B(b)}{1-\delta} \geq v_B(b) + p + F^{\alpha} - \frac{c_A(a)}{1-\delta}.$$

and as F^{α} appears with a positive sign on RHS, the set of sustainable contracts is maximized by minimizing F^{α}, giving $F^{\alpha} = c_A(a)$. Similarly, if $F^{\alpha} \geq c_A(a)$, then (RIC$^{\mathrm{OV}}$) becomes

$$RIC^{OV}: \frac{v_B(b) - c_B(b)}{1-\delta} \geq v_B(b) + p - \frac{\delta F^{\alpha}}{1-\delta},$$

the RHS of (RIC$^{\mathrm{OV}}$) decreases in F^{α} so that the highest b is found for $F^{\alpha} = c_A(a)$.■

Proof of Proposition 3. Setting $F^{\alpha} = c_A(a)$, the two RICs become

$$RIC^{OV}_{Damages} - P: \delta v_B(b) - p \geq (1-\delta)\, c_A(a),$$

$$RIC^{OV}_{Damages} - \alpha: \delta p \geq c_B(b) - c_A(a).$$

Adding up the two RICs:

$$\delta v_B(b) - p\,(1-\delta) \geq c_B(b) - \delta c_A(a).$$

from which we notice that the set of sustainable task intensities is maximized at $p = 0$ (recall that $p = 0$ cannot be negative). Substituting for this value in RICs, we have

$$\delta v_B(b) - (1-\delta)\, c_A(a) \geq 0,$$

$$c_B(b) \geq c_A(a)$$

which give $\delta v_B(b) - (1-\delta)\, c_B(b)$ as the highest sustainable level of b. Thus for $\delta \geq 0.5$, b^* such that $v_B(b^*) = c_B(b^*)$ is sustainable: overcontracting allows to sustain any efficient level of task b. In particular, to achieve b^* without discretionary transfers, it suffices to set $p = 0$ and $c_A(a) = c_B(b^*)$, so that the two RICs reduce to:

$$\delta v_B(b^*) - (1-\delta)\, c_B(b^*) \geq 0$$

$$c_A(a) = c_B(b).$$

Note also that for $\delta \geq 0.5$, b^* can be achieved also with a combination of positive discretionary transfers and overcontracting. To achieve b^* with discretionary transfers, choose a and p such that $\left(RIC^{OV}_{Damages} - P\right)$ and $\left(RIC^{OV}_{Damages} - \alpha\right)$ bind at $v_B(b^*) = c_B(b^*)$. From $\left(RIC^{OV}_{Damages} - \alpha\right)$ binding we have

$$p = \frac{v_B(b) - c_A(a)}{\delta},$$

and subsituting it in $\left(RIC^{OV}_{Damages} - P\right)$:

$$c_A(a) = \frac{v_B(b)\left(1-\delta^2\right)}{1-\delta+\delta^2}$$

Thus the equilibrium value of p is

$$\begin{aligned} p &= \frac{v_B(b) - c_A(a)}{\delta} \\ &= \frac{v_B(b)}{\delta} - \frac{v_B(b)\left(1-\delta^2\right)}{\delta\left(1-\delta+\delta^2\right)} \\ &= \frac{(2\delta-1)\,v_B(b)}{1-\delta+\delta^2} \end{aligned}$$

Recall that the RICs conditions have been set under the assumption that $p \geq 0$. Therefore the above solution is feasible for $\delta \geq 0.5$. (For $\delta < 0.5$, the use of discretionary transfers *strictly* reduces the set of sustainable task intensities). ■

Proof of Proposition 4. Re-scaling the value function so that $v_B(b) = v(0,b)$ and $v_A(a) = v(a,0)$, the sign of the cross derivative v_{ab} affects the tightness of the incentive constraint - relative to the separable tasks case - only through the second term of the right hand side $(1-\delta)v(a,b)$.

$$R\tilde{I}C^{OV} - P : v(0,b) \geq p + (1-\delta)v(a,b) + \delta v(a,0).$$

When $v_{ab} = 0$, the incentive constraint is equal to that in the separable case. When tasks are substitutes, i.e. $v_{ab} < 0$, the right hand side of the inequality becomes smaller and the principal incentive constraint less tight. The converse happens when the tasks are complements ($v_{ab} < 0$). In the Proof of Proposition 1 we have shown that the participation constraints are satisfied and that both (RIC$^{\text{OV}}$-α) and (RIC$^{\text{OV}}$-P) must be binding in equilibrium. Since

(RIC$^{\mathrm{OV}}$-α) is not affected by the cross derivative of v, the latter affects the level of b that is can be sustained in equilibrium only through (RIC$^{\mathrm{OV}}$-P), and the statement follows.■

Proof of Proposition 7. With renegotiation, the relational incentive constraints of the principal and the agent become respectively (penalties are unchanged and $p=0$)

$$
\begin{aligned}
R\hat{I}C^{OV}-P \quad &: \quad \frac{v_B(b)-p_A}{1-\delta} \geq v_B(b)-p_A+c_A(a)-\delta\frac{p_A-\frac{1}{2}c_A(a)}{1-\delta}-\frac{z}{2}, \\
R\hat{I}C^{OV}-\alpha \quad &: \quad \frac{p_A-c_B(b)}{1-\delta} \geq p_A-c_A(a)+\delta\frac{p_A-\frac{1}{2}c_A(a)}{1-\delta}-\frac{z}{2}.
\end{aligned}
$$

Suppose that $\frac{\delta c_B(\hat{b}^{OV})}{1-\delta} \geq z$. The two relational constraints simplify to

$$
\begin{aligned}
R\hat{I}C^{OV}-P \quad &: \quad \delta v_B(b) \geq c_A(a)[\mu(1-\delta)+\frac{\delta}{2}]-(1-\delta)\frac{z}{2}; \\
R\hat{I}C^{OV}-\alpha \quad &: \quad c_A(a)(1-\frac{\delta}{2}) \geq c_B(b)-(1-\delta)\frac{z}{2}.
\end{aligned}
$$

and following the same reasoning as in the proof of Proposition 1, the set of sustainable relational contracts is found by choosing a and b such that (R$\hat{\mathrm{I}}$C^{OV}-α) and (R$\hat{\mathrm{I}}$C^{OV}-P) are binding. This gives

$$
\begin{gathered}
c_A(\hat{a}^{OV})(1-\frac{\delta}{2}) = c_B(\hat{b}^{OV})-(1-\delta)\frac{z}{2}, \\
\delta v_B(\hat{b}^{OV})-c_B(\hat{b}^{OV})\frac{2(1-\delta)\mu+\delta}{2-\delta}+(1-\delta)z\frac{1+\mu(1+\delta)}{2-\delta}=0,
\end{gathered}
$$

with $\frac{\delta}{1-\delta}c_A(\hat{a}^{OV})-z = 2\frac{\delta c_B(b^{OV})-z(1-\delta)}{(1-\delta)(2-\delta)} > 0$ for $\frac{\delta c_B\left(\hat{b}^{OV}\right)}{1-\delta} \geq z$. Then the parties will prefer not to renegotiate the contract during the punishment phase and the analysis is equivalent to the case developed in Section 3.■

Proof of Corollary 2. Under a short term contracting, the relational incentive constraints become respectively (penalties are unchanged and $p=0$)

$$
\begin{aligned}
RIC^{OV}_{Shorp}-P \quad &: \quad \frac{v_B(b)-p_A}{1-\delta} \geq v_B(b)-p_A+c_A(a), \\
RIC^{OV}_{Shorp}-\alpha \quad &: \quad \frac{p_A-c_B(b)}{1-\delta} \geq p_A-c_A(a).
\end{aligned}
$$

Simplifying and summing up the two constraints we obtain $\delta v_B(b)-c_B(b) \geq 0$,which characterizes Φ^{OV}_{Shorp}, with $\Phi^{OV}_{Shorp} = \tilde{\Phi}^{OV}$at $z=0$.(**??**). This proves the first statement. The second one follows directly from the Proposition.■

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