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ABSTRACT

Past and Future Developments in the Economics of Relational Contracts

This paper was written as an editorial preface to a "Symposium on Relational Contracts", that was jointly edited by the three authors, and that will appear in the Journal of Institutional and Theoretical Economics (JITE). The Symposium contains eleven contributions to the economics of relational contracts, written by many of the leading scholars in the field. This editorial preface provides a narrative that positions the eleven contributions within the broader context of relational contracts, as addressed by economists, and it explains how these contributions are linked to each other.

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1 Introduction

This Symposium featured by the *Journal of Institutional and Theoretical Economics* contains eleven contributions to the economics of relational contracts, written by many of the leading scholars in the field. The format is novel: we approached the authors of seminal contributions, asking them to elaborate on their personal (subjective) perspective on this literature based on their own work, and to explain what they perceive as interesting open questions that should be studied in the future. Our goal is to improve readers' understanding of these seminal contributions and the field of relational contracts, and to identify promising themes for future research. Each paper has been evaluated by several anonymous referees and has benefited from their insightful comments. We hope that readers will enjoy this Symposium as much as we did in putting it together.

This editorial preface provides a narrative that positions the eleven contributions within the broader context of relational contracts, as addressed by economists, and it explains how these contributions are linked to each other.

The literature begins with the prisoners' dilemma game that provides the classic framework for modeling cooperation over time (Section 2). We then discuss a series of papers that extend the prisoners' dilemma game by the addition of contracts, and highlight the role of dynamic programming for characterizing the set of equilibria (Section 3). Next is a discussion of how parties coordinate upon efficient agreements, followed by a discussion of optimal team incentives and the rule of imperfect information (Sections 4 and 5). We conclude with a discussion of empirical evidence (Section 6) and some directions for future research (Section 7).

2 The Prisoners' Dilemma

It has long been recognized that the quality of exchange relations depends upon maintaining a "good relationship". In general, relationships do not involve an instantaneous exchange of services. For example, in international trade, if the buyer pays in advance, the seller may or may not deliver substandard goods. The celebrated prisoners' dilemma game provides the paradigm example of this type of problem.[1] When two parties meet they can "cooperate", but each unilaterally benefits from "defecting" from any agreement. If parties meet repeatedly over time, then defection may be met with less cooperation in the future, which in turn can enforce good behavior in the current transaction. This simple game has played an important role in thinking about human organizations.[2]

Though the intuition for cooperation is clear, providing a theoretical model of human behavior using the prisoners' dilemma has proven challenging. With symmetric information

[1] See Flood (1958) and Luce and Raiffa (1957) for early seminal work on the prisoners' dilemma.

[2] For example, Axelrod (1984)'s work discusses how humans may follow different strategies for cooperation, and that these ideas have profound implications for the functioning of human institutions. Moreover, the prisoners' dilemma has been used to explain the performance of the military (Biddle, 2021), how Russia's economy can function in the absence of strong rule of law (Frye, 2017), or cooperation among animals (Dugatkin, 2000).

and a finite time horizon, the unique (subgame perfect) Nash equilibrium is to have no cooperation, yet, since the work of Flood (1958), we know that individuals often cooperate early in a finitely repeated game. Kreps et al. (1982) show that when parties believe there is sufficient diversity in the preferences of their counter-party, this can lead to cooperation early in the prisoners' dilemma game, that breaks down close to the end of play. There is extensive theoretical and empirical research into these behaviors that continues today (see e.g. Dal Bo and Frechette, 2018; Aoyagi, Frechette, and Yuksel, 2022). An attraction of the prisoners' dilemma is that the game form is fixed, and thus it can be used as a benchmark game to explore how individuals reason about their strategies.

However, many features of observed behavior and institutions cannot be understood within the context of the prisoners' dilemma game alone. The theory of relational contracts extends the prisoners' dilemma in two directions. First, it is assumed that parties explicitly enter into agreements on how to behave, or follow commonly accepted norms of behavior. Second, parties can make side payments that vary with performance, and are enforced with the promise of future exchange. Thereby, a situation in which mutual trustworthiness is required can be transformed into a problem in which only one party – the one making transfers to reward cooperation – needs to be trusted.

3 From Implicit Contracts to Relational Contracts

Most of our discussion is based on the worker-firm relationship. The employment context is familiar with an extensive theoretical and empirical literature in labor economics that can be used to assess the usefulness of relational contract theory. Thus, the employment relationship forms the basis of a paradigm relational contracting model that we use to discuss the various contributions in this Symposium. Traditionally, labor markets have been modeled as venues of spot exchange, where firms directly "purchase" labor hours. However, the inherent incompleteness of labor relationships has generated various deviations from the standard model that take into account the role of repeated interaction. The starting point for the literature on such reputation effects is *implicit contract theory* developed by Baily (1974) and Azariadis (1975). It begins with the observation that optimal employment contracts insure risk-averse workers against negative productivity shocks. In personal correspondence, Costas Azariadis tells us:

> "I spent the spring and summer of 1972 working on my thesis, and in particular trying to figure out how the labor market differed from ordinary spot markets. The idea that seemed to make most sense at the time was what we would call now a reputationally enforceable contract. Under this arrangement, firms would play the joint role of employer and financial intermediary for a pool of employees who could not otherwise lend, borrow or buy insurance. Wage payments would smooth out fluctuations in the marginal product of labor and in workers' consumption just as if firms were risk-neutral entities and workers were risk-averse ones."

In Keynesian macro-economics rigid wages play an important role because they provide a potential explanation of why downturns lead to layoffs rather than wage reductions. The goal of implicit contract theory is to provide a micro-foundation for this behavior. The theory builds upon the hypothesis that in exchange for lower expected wages, risk averse workers will accept an employment contract with a rigid wage. The term "implicit" is due to the assumption that firms cannot commit to long term contingent wage contracts, hence contract enforcement has to depend upon firm reputation and tacit or implicit cooperation with workers.

Rosen (1985) provides a critical review of implicit contract theory. He points out that despite its wide adoption in labor economics, the term "implicit contract" is not well defined. Rather, in his view the central contribution of the theory is to model labor markets from the perspective of a contractual relationship, rather than the consequence of anonymous exchange on a competitive market. He observes that the standard impersonal Walrasian auction market does not provide a good model of many aspects of the employment relationship. Instead, an employment contract entails the worker agreeing to provide the firm state-contingent labor services in exchange for state-contingent compensation.

Implicit contract theory assumes that the primary economic goal of an employment contract is to efficiently share the risk from productivity shocks between workers and the firm. Since workers are assumed to be more risk averse than firms, the optimal employment contract entails rigid real wages.[3] In the context of standard at-will-employment firms do not commit to maintaining employment nor keeping wages fixed. Rather, underlying implicit contract theory is the assumption that firm reputation allows for some commitment to continued employment at a fixed wage contract, an assumption that is not formally studied in Azariadis (1975) and in Rosen (1985).

This lacuna is filled by the seminal contribution of Thomas and Worrall (1988) who provide a theory of implicit contract enforcement. Using the Bellman principle from dynamic programming, they show that there is a competitive equilibrium with some income smoothing. The central point is that the firm benefits from smoothing real wages over the cycle because this reduces the long term expected cost of labor. If the firm is tempted to reduce the real wage during a downturn, it would forgo the lower wage it would pay the worker during upturns. Similarly, workers are not tempted to leave for the market during an upturn because they would forego the benefit of a higher wage during downturns in the future.

This basic trade-off between the temptation to defect today versus the gain from a long term relationship forms the basis of all the contributions considered in this Symposium. An implicit contract is a particular case in the larger class of "relational contracts". The term "relational contract" has its origins in the law and economics literature where it is well recognized that observed contracts do not rely solely upon court enforcement, but also upon the promise of continued trade. There is a large informal literature on the topic, with seminal contributions by Macaulay (1963), MacNeil (1974) and Bernstein (1992) providing evidence

[3]It is a well known weakness of implicit contract theory that it cannot explain rigid *nominal* wages – see Moore (1985). One of the contributions of Macleod and Malcomson (1993) is to show that non-contractible relationship specific investments leads to a theory of rigid *nominal* wages.

on the widespread use of relational contracts.

We begin with a brief outline of the basic relational contract model introduced by Thomas and Worrall (1988). Suppose there is no legal enforcement and consider an agreement for an indefinite period between a worker and firm at an agreed upon wage profile W_t. Also suppose that in any period parties have two choices only, breach (B) or perform (P). Breach by one party terminates the relationship, in which case the worker leaves and collects the market wage w_t, while the firm hires a replacement worker (also at wage w_t). Denote by $u(\cdot)$ the worker's utility function (increasing and concave). Upon performing the contract in period t, the worker's payoff is:

$$U_t^P = u\left(W_t\right) + \delta U_{t+1}^P,$$

where U_{t+1}^P is the future expected value for the relationship at date t under the hypothesis that both parties perform, and δ is the common discount factor. If the worker breaches the contract for the first time at date t, then in the absence of court enforcement, the payoff is:

$$U_t^B = u\left(w_t\right) + \delta U_{t+1}^0,$$

where U_{t+1}^0 is the future expected market return. It follows that the worker will breach the contract whenever

$$u\left(w_t\right) - u\left(W_t\right) > \delta\left(U_{t+1}^P - U_{t+1}^0\right).$$

If we suppose that firms are in a perfectly competitive market with zero profits where the worker gets all the rents in each period, then $U_{t+1}^P - U_{t+1}^0 = 0$. In this case, whenever $w_t > W_t$ the worker would optimally breach the contract, thereby terminating the relationship with the firm.

Consider next the worker's breach decision when $w_t > W_t$ for the case where legal enforcement is feasible. The standard court-specified breach remedy in both common and civil law jurisdictions is *expectation damages*, i.e. damages are equal to the harm that the breach has imposed upon the breached-against party. Note that under expectation damages, courts cannot force contract performance; the best they can do is provide an incentive for parties to *choose* to perform.[4] In our example, under the expectation damages rule, the court would award damages $D_t = w_t - W_t > 0$ to the firm (i.e. a payment from the worker to the firm to compensate the firm for the additional costs from hiring the replacement worker). The damage payment D_t just offsets the worker's gain from the breach, thereby rendering the breach unprofitable. Similarly, the firm has an incentive to fire a worker whenever $W_t > w_t$. In this case, the court would award damages $D_t = W_t - w_t > 0$ to the worker, again offsetting the gain from breach for the firm. This illustrates precisely what

[4]There is an alternative rule, known as '*specific performance*". Under specific performance, the court forces the breaching party to perform instead. For example, an unjustly fired tenured faculty member must be rehired. This remedy is considered to be more frequent in civil law jurisdictions such as continental Europe. There is an extensive literature on the comparative benefits of these rules. In particular, the use of specific performance can be useful in some contexts (see e.g. Aghion, Dewatripont, and Rey, 1994). Recently, Fehr et al. (2021) have shown that these rules do not take into account behavioral features of the environment, that in turn require incorporating relational enforcement.

is meant by a *legally enforceable contract* – one where harmed parties can seek a financial remedy in court.[5] The expectation damages rule is considered desirable because parties have an incentive to breach an agreement if and only if this is efficient.

In general, the default rule for employment contracts is not expectation damages, but at-will employment.[6] This is the starting point for the notion of an implicit contract used in Thomas and Worrall (1988) that is discussed in the first paper of the Symposium, **Thomas and Worrall (2023)**, who also discuss some recent advances, and provide conditions under which the implicit contract wage, W_t, is less variable than the market wage, w_t.

Rather than work with the wages, we can outline a slightly more general version of their model. Let u_t^B and u_t^P (π_t^B and π_t^P) be the worker's (firm's) one period payoffs if they breach or perform, respectively. Similarly, let U_{t+1}^P and U_{t+1}^0 (Π_{t+1}^P and Π_{t+1}^0) be the future discounted payoffs for the worker (firm) under performance and breach, respectively. For the models we discuss here, the breach payoff will typically be the return to the labor market if there is separation after breach, though this is not strictly necessary for the performance of a relational contract. It follows that a contract is *self-enforcing* if, for all $t = 1, 2, ...$, the loss in future returns from the relationship is greater than the short run returns from contract breach:

$$\begin{aligned} U_{t+1}^P - U_{t+1}^0 &\geq \tfrac{1}{\delta}\left(u_t^B - u_t^P\right) \\ \Pi_{t+1}^P - \Pi_{t+1}^0 &\geq \tfrac{1}{\delta}\left(\pi_t^B - \pi_t^P\right). \end{aligned}$$

These conditions imply that at least one party must enjoy sufficient rents from being in the relationship. What makes the contract *relational* rather than a legally enforceable contract is that performance is assured due to the effect that breach has upon *future* returns. The innovation of Thomas and Worrall (1988) is to illustrate how risk aversion combined with limited enforcement can provide empirically meaningful predictions. For example, the model predicts that wages are backloaded in good times and front loaded in bad times, a result that is consistent with the evidence in Balke and Lamadon (2022).

At the same time that the implicit contract literature was being developed, an emerging literature on the "principal-agent problem", or simply "agency theory," also studied the issue of contracting with risk-averse workers in the presence of moral hazard. In seminal contributions, Ross (1973) and Holmström (1979) assume that contracts are complete and legally enforceable. However, performance can only be observed with noise. This results in a trade-off between between providing insurance to an agent arising from the noisy observation of performance, and providing an incentive to work hard with compensation that is tied to the observed noisy measure of performance.

The assumption of risk aversion in agency models is mainly to ensure that the theory results in a unique prediction. Prendergast (2002) shows that this is also the "Achilles heel" of agency theory since the evidence tends to reject the hypothesis that there is a trade-off

[5] See Hermalin et al. (2006) and Kornhauser and MacLeod (2012) for more detail on the law and economics approach to contract.

[6] Either party can terminate the relationship at will with no monetary damages, see Section 2.A.3 of Rothstein and Liebman (2007).

between incentives and risk. Thus, the early literature that studies relational contracts in the presence of moral hazard supposes that workers are risk neutral, but that performance measures are either subjective or non-contractible. MacLeod and Malcomson (1989) begin with the assumption that both the worker and the firm can observe effort, but it is not observable to a third party. For example, a firm might observe a security person sleeping on the job, but if there is no third party verification, then the firm cannot make legally enforceable payments to the worker based upon this observation.

A solution is to use an *efficiency wage contract* (Malcomson, 1981; Shapiro and Stiglitz, 1984). Under such a contract the worker is paid a wage that is higher than their alternative, and when caught sleeping they are fired and replaced by an equally skilled worker. The firm does not gain with this strategy since the new worker has the same skill and cost as the fired worker, and therefore the firm has no reason to misrepresent what it saw. However, the worker is punished for their poor performance by having to leave for a lower market alternative.

As in the case of implicit contract theory, the efficiency wage model relies upon reputation effects that are not fully worked out, as shown by Carmichael (1985). The problem is deceptively simple. Under an efficiency wage contract a worker is offered a high wage to elicit high effort. The problem is that incentives are provided by the promise of a high *future* wage – the current wage has no effect on incentives. If contracts are not legally enforceable, then the current wage does not commit the firm to a high future wage.[7]

MacLeod and Malcomson (1989) solve this problem and provide a complete characterization of all the contracts possible in a settings where performance is not contractible.[8] In particular, they show that the existence of an equilibrium in a competitive market requires the combination of performance pay (in the form of an efficiency wage or explicit performance pay) and self-enforcing social norms of behavior that together allows for more efficient production than in the absence of such norms. In this way, they show that relational contract theory can provide an approach that unifies competitive market theory with labor market theory that relies on social norms, such as Akerlof (1980), Akerlof and Yellen (1990) and Solow (1990).

These ideas are further elaborated on in the second contribution of this Symposium, **MacLeod and Malcomson (2023)**. One of the most fruitful consequences of the characterization of all relational contracts is to show that the self-enforcing constraints introduced above can be merged into one single condition that is necessary and sufficient to sustain performance (provided each player at least receives their outside option):

$$V_{t+1}^P - V_{t+1}^0 \geq \frac{1}{\delta}\left(v_t^B - v_t^P\right), \tag{1}$$

where $v_t^P = \pi_t^P + u_t^P$, $v_t^B = \pi_t^B + u_t^B$ define the total *flow surplus* when there is performance (P) or breach (B), while $V_{t+1}^P = \Pi_{t+1}^P + U_{t+1}^P$, and $V_{t+1}^0 = \Pi_{t+1}^0 + U_{t+1}^0$ similarly define *total expected*

[7]The original idea for an efficiency wage goes back to work in development economics by Lewis (1954) and Leibenstein (1958). They were thinking in terms of a subsistence economy where a higher wage would allow for greater food consumption and hence directly increase worker productivity in the current period. In that case, there is no commitment problem.

[8]See Carmichael (1989) for an extended discussion of the issue.

future surplus when there has been performance (P) or breach (B). This result allows one to separate the question of whether or not there exists an efficient self-enforcing agreement from the question of how the resulting gain from trade is to be shared. This condition also shows that outside options and discount factors (which capture time preferences and the inherent stability of the relationship) are the defining factors of the effectiveness of a relational contract. Note that, although the threat of a termination determines a player's outside option, a separation does not need to materialize after a deviation. Instead, the fact that any allocation of a given surplus is feasible implies that a deviation can also be punished by a move to the (productive) relational contract that pushes the deviator to their outside option, then providing the same incentives as if a deviation causes a separation. This result has been introduced by Levin (2003), who also demonstrates that many insights derived in MacLeod and Malcomson (1989) survive if effort (or productivity) is the agent's private information. A further point made by MacLeod and Malcomson is that a relational contract is the manifestation of a social norm that coordinates parties upon an efficient allocation of the surplus.

A natural next question is what would be the consequence if one can use a *combination* of relational and enforceable contracts? This issue is taken up in the third paper, **Baker, Gibbons, and Murphy (2023)**, who begin with a discussion of their highly influential contribution (Baker, Gibbons, and Murphy, 1994) that focuses on the interaction between formal and relational contracts.

Generally, the integrated use of verifiable and non-verifiable (but observable) performance measures allows for a more precise assessment of an agent's behavior. Therefore, formal contracting often has a role in structuring relationships. However, if the formal contract alone yields a more efficient outcome than the market, it determines the fallback option after contract breach. Then, an improvement in the formal environment increases V_{t+1}^0 by (ceteris paribus) more than V_{t+1}^P, causing a deterioration of the informal relationship. Only if exiting the relationship determines the best fallback-option does a formal performance measure improve the relational contract.

Baker, Gibbons, and Murphy (2023) then integrate ideas from Williamson (1981) to highlight the important distinction between relationships within the firm and between firms (Baker, Gibbons, and Murphy, 1999, 2002). In particular, the ability to allocate decision rights depends upon both the ability for the principal/owner to monitor performance, and the consequences in case of breach. They show that the fallback options used to enforce relational contracts depend upon whether or not the relationship is inside the firm or market based. This in turn provides a general theory of the firm – whether or not a relationship should be in the market or in the firm.

Baker et al. (2023) also discuss their later work on relational adaptation (Baker, Gibbons, and Murphy, 2011), and how the allocation of asset ownership and decision rights interact to affect the cost of conflict and the ability of parties to effectively manage a relationship in the event of breach. In particular, the relational view provides a lens through which one can interpret Williamson (1981)'s observations on forbearance – the fact that relationships within the firm are for the most part shielded from formal contract law. Hence, organizational

performance and adaptation is more flexible, though necessarily governed by relational contracts. This general idea allows the authors to generate important insights into the optimal allocation of decision rights (which may determine how the relationship adapts to changed circumstances) or asset ownership. Their main takeaway is that formal governance structures should be designed to optimize and extend the direct effects of relational contracts.

In summary, the perfectly competitive model has proven to be very useful for understanding the broad patterns of employment and output over time. However, it cannot explain the empirical fact that conflict and social norms are a ubiquitous feature of all economies. The theory of relational contracts builds upon the observation that markets are incomplete to provide a theory that shows how conflict and social norms work together to enhance productivity in the face of market imperfections. The next step is to refine these insights to produce sharper predictions, the goal of the subsequent contributions to this Symposium.

4 Balancing Self-Interest and Efficiency in Relational Contracts

Most models of relational contracting focus on equilibria that maximize the relationship surplus or a weighted average of profits. Generally, the focus on one particular equilibrium is considered the main difference between relational contracting and (repeated) game theory. As **Miller and Watson (2023)** state in the fourth contribution to this Symposium, "while the repeated games literature is largely concerned with characterizing the set of equilibria, the relational contracting literature focuses on equilibria that jointly benefit the contracting parties." Moreover, classic contributions such as MacLeod and Malcomson (1989) or Levin (2003) state that it is natural to focus on surplus-maximizing contracts, without further discussing how exactly players arrive at such a particular equilibrium.

An obvious problem with this approach is that it is not internally consistent due to what is known as the problem of renegotiation proofness. Consider cooperation in the repeated prisoners' dilemma. One subgame perfect equilibrium entails cooperation in each period, followed by defection forever if one party ever defects. Since the game has exactly the same structure each period, then if parties indeed can cooperate, what stops the defecting party to offer to their counter party a restart of cooperation? MacLeod and Malcomson (1989) address this problem by using the concept of renegotiation proofness developed by David Pearce, and discussed in more detail in Pearce and Stacchetti (2023). Levin (2003) uses the notion of strong renegotiation proofness developed by Farrell and Maskin (1989).

Neither of these approaches explicitly incorporates notions of bargaining power. The goal of Miller and Watson (2013) and Watson, Miller, and Olsen (2020) is to develop an approach to relational contracting that takes into account that parties discuss and bargain about their relationship, and these meaningful discussions should actually affect outcomes. Miller and Watson (2023) review this approach to modeling relational contracts that they call a "contractual equilibrium".

They assume that negotiations occur at the beginning of every period and that this period's actions and payments, as well as intended future play (conditional on the history of the relationship), are discussed. Upon agreement, transfers are exchanged, then the worker

exerts effort. Bargaining outcomes are guided by several axioms which, for example, imply that parties would never agree on a Pareto-dominated outcome, and that they exercise their bargaining power in every period. Then, as in other bargaining models, an agreement gives parties their payoffs upon disagreement (i.e., when bargaining fails), plus a share of the relationship surplus, where this share is commonly perceived to capture bargaining power.

The imposed principles severely restrict feasible punishments and thus cooperation in a relational contract. Miller and Watson address this challenge by incorporating future *disagreement* outcomes into today's negotiation, which can respond to the history of the relationship as long as they are subgame perfect. This is different from the relational models that rely upon Abreu (1988)'s insight that disagreements correspond to the worst perfect equilibria in the contract game, typically the market payoffs in the event of separation. Miller and Watson suppose that players decide about future disagreement play in a way that optimizes their incentives today. This implies that, in a period t, Π^0_{t+1} and U^0_{t+1} are minimized for the party that breached the relational contract. This difference in disagreement payoffs shapes bargaining outcomes and consequently incentives to perform. The resulting equilibrium is unique, with the relationship surplus increasing in the worker's bargaining power. All this implies that Miller and Watson do not arrive at the same outcomes as MacLeod and Malcomson (1989) or Levin (2003) where bargaining power does not affect efficiency. Thus, they are able to produce sharp predictions on observed contract form by explicitly incorporating the bargaining process as an additional constraint on outcomes.

This approach illustrates the predictive power of the pure rational choice model. An open question is the relationship between the notion of a contractual equilibrium and notions of reputation that play an important role in many approaches to relational contracts. In the fifth paper of the Symposium, **Pearce and Stacchetti (2023)** provide some insights into how to think about and model such a relationship. They begin with a review of Pearce (1992) and Pearce and Stacchetti (1998), who explore how formal contracts should optimally be designed if their main purpose is to support informal arrangements in long-term relationships. As in Baker et al. (2023), this implies that a formal contract is supposed to reduce incentives to breach the relational contract. The focus of Pearce and Stacchetti is slightly different. They explore *how* such a formal contract should be designed in the first place and then continuously be adapted and renegotiated.

Imagine that a one-period formal contract can be written at the beginning of every period. It specifies the worker's compensation and is based on a verifiable (but imperfect) signal of performance. Since the worker is risk averse, a contract has to balance the classic risk-incentive trade-off. Pearce and Stacchetti show that an informal relational contract allows for more consumption smoothing while maintaining incentives if the principal can observe the agent's effort (which still is not verifiable). Then, the principal "voluntarily" increases payments to the agent if the latter has exerted effort but the formal contract, due to bad luck, calls for a low payment. Now, the role of the formal contract is two-fold. First it is designed to minimize v^B_t and thereby support a high v^P_t. Second, it determines V^0_{t+1} because, as in Baker et al. (2023), players have to rely on spot contracting in the future upon contract breach.

Pearce and Stacchetti also discuss a more general approach (which has been carried out by Kostadinov, 2021) where long-term formal contracts are possible. Then, the formal contract still determines payoffs after breach and thus constitutes the optimal punishment. Moreover, it is continuously replaced on the equilibrium path, to adapt to situations in which the worker exerted high effort but was unlucky. Finally, Pearce and Stacchetti (2023) discuss the role of renegotiation and reputation in relational contracting, where reputation pertains to the credible promise to use information in a certain way given formal commitment is not available. They point out that the strong renegotiation proof concept relies upon "Pareto thinness" – all continuation strategies are Pareto unranked – which is a strong assumption that does not appear to correspond to how individuals think and act in practice. They conclude with a discussion of their work extending ideas from Kreps et al. (1982).

Miller and Watson (2023) and Pearce and Stacchetti (2023) illustrate the advances that have been made regarding the theoretical foundations for relational contract theory and the renegotiation process that sustains cooperation. In contrast, the sixth paper of the Symposium, **Ghosh and Ray (2023)**, begins with a discussion of the complexity and variety of informal institutions that are observed in their native home of India. The challenge is to provide a framework to explain both the form and complexity of the many relational institutions one observes in a developing economy.

The starting point for this analysis is a network model in which developing economics are characterized by many individuals who have network ties that they model using random matching. When individuals meet, they trade and develops norms of behavior that increase the cost of leaving a relationship, thereby providing the necessary conditions for a productive relational exchange. They begin with the self-enforcing constraint for a relational contract that is central to the theory of relational contracts:

$$\left(V_{t+1}^{P} - V_{t+1}^{0}\right) \geq \frac{1}{\delta}\left(v_t^B - v_t^P\right).$$

In this case, V_{t+1}^0 is interpreted as the value of forming a new relational contract. This value depends on various factors. For example, V_{t+1}^0increases in the chances of finding an alternative partner; moreover, it is lower if sustaining a "market reputation" for performance is possible. In the latter case, potential new partners are not willing to form a productive relationship with someone who breached in previous matches. Ghosh and Ray (2023) rule out the use of such a multilateral enforcement mechanism because a lack of transparency makes it impossible to observe someone's performance in earlier relationships. Moreover, they focus on situations in which finding a new match is easy. If this new match is as productive as a continuation of the current one, players have no incentive to perform today. Therefore, performance can only be sustained if V_{t+1}^0 is reduced, which may happen due to lower productive effort in the early stages of a relationship.

Ghosh and Ray argue that this can be achieved by *social norms* which structure relationships accordingly. Thereby, they follow Kandori (1992), Ellison (1994) and Greif (1994), who have suggested that norms may serve as a device to select and sustain a certain equilibrium in a repeated game. Ghosh and Ray (2023) discuss what norm-based outcomes we should expect in different kinds of markets, based on which "makes sense" in credibly punishing contract

breach and maximizing the payoffs of relevant groups. Generally, the value of cooperation goes up over time, to incentivize parties to perform early on. In later periods, performance is ensured by the costs of having to re-start an initially unproductive new relationship upon breach.

Ghosh and Ray (2023) review a number of different cases where these ideas can be applied, including gift exchange, gradual reputation acquisition when parties have different unobserved types, and matching frictions. In these cases there are well defined optimal norms that can sustain effective relational contracts. In effect they show that the relational contract paradigm produces a rich set of predictions that vary with the details of the environment in which parties operate. Hence, the theory has the potential to provide a unified approach that is consistent with the various institutions that we observe in developing economies.

5 Agency Theory meets Relational Contracts

The contributions so far mostly deal with how repeated game theory can be extended to interact with contract design. The focus is upon the structure of equilibria, and how to formally model the "meeting of the minds" that is central to the effective implementation of a contract. By contrast, agency theory as pioneered by Ross (1973) and Holmström (1979) approaches contract theory through the lens of principal-agent theory. While this strand of literature focuses on a tension between providing noisy performance pay and insurance to the worker, contract incompleteness generates a different set of trade-offs, as the early literature on relational contracts (discussed above) address. The work of Baker, Gibbons, and Murphy (1994) and Pearce and Stacchetti (1998) highlights the role that pay for performance can play in sustaining effective relational contracting by affecting the gains from trade. The next three contributions extend this analysis to deal with agency problems that arise with (i) team production, (ii) asymmetric information regarding the value of trade within the relationship, and (iii) asymmetric information about the next best alternative.

5.1 Relational Contracts in Teams

Many projects in firms require the collaboration of a team of workers that in turn creates agency problems such as free-riding or collusion of workers against the firm. Whereas these frictions have been widely analyzed in organizational economics and related fields, the theory of relational contracts can add novel insights into the functioning of teams because its members may also form arrangements with each other. Formal models of team production in economics begin with the papers by Holmström (1982) and Eswaran and Kotwal (1984). They show that efficient effort of team members is not possible if they act as a cooperative, i.e., share the resulting output. This is because workers have an incentive to free-ride on each others' effort, but can potentially be addressed by incorporating a residual claimant. MacLeod (1984) shows that repeated interaction can provide team members with incentives to exert higher effort and overcome the free-rider problem when parties are sufficiently patient and there is a cost to leaving the cooperative. This result provides a way to formalize

Hirschman (1970)'s point that easy exit can lead to organizational failure.

Che and Yoo (2001) extend the team model to demonstrate that even with a principal who is the residual claimant of the resulting team output, a relational contract between team members affects the optimal incentive scheme the principal designs to motivate the agents. They analyze a setting in which a principal deals with two agents whose (binary) effort choices generate verifiable performance signals and the agents can observe each other's effort, therefore an additional design choice has to be made between using relative or joint performance evaluation (the former penalizes, the latter rewards an agent whose peer performs well). Whereas relative performance evaluation (RPE) is optimal in a static setting, joint performance evaluation (JPE) may dominate with repeated interaction because it involves a more severe punishment of a shirking agent whose counterpart does not exert effort anymore. Put differently, JPE creates incentives to perform precisely by muting "static" incentives and thereby reducing the agents' outside options. Thus, as Baker, Gibbons, and Murphy (2023) have emphasized, the formal governance structure here is designed to optimize the informal relational contract.

In the seventh contribution **Kvaloy and Olsen (2023)** review their impressive research agenda on relational contracts in teams. They extend the Che and Yoo (2001) teams model by supposing the performance signals the principal observes are not verifiable. Thus, in a production team there may be two relational contracts – one between the principal and team members and another one among team members. In the first step, based on Kvaloy and Olsen (2006) they show that in the absence of verifiable performance signals, RPE increases the principal's commitment under multilateral relational contracts. The reason is that under RPE, the principal commits to a limited total payment, and the reduced variation of payments compared to JPE reduces the principal's incentives to deviate. This insight relates to Malcomson (1984) who derives the benefits of RPE in case a firm can formally pre-commit to a total payment. Then, the principal has no incentives to misrepresent workers' effort, and hence as long as the principal receives the market return, such a mechanism is incentive compatible.

All this is true under the hypothesis that workers do not collude. The difficulty is that under RPE workers can earn a higher return if they collude and produce less effort as a group. As Kvaloy and Olsen discuss, this incentive does not arise under JPE – in that case if a worker reduces effort, then all workers face a loss, which in turn creates an incentive for mutual monitoring to maintain high joint incentives. However, the system does require the principal to reward high output, that in turn requires a relational contract that punishes defecting firms, and hence the firm must earn a higher return than under RPE.

These results illustrate how the interaction between two forms of relational contract can have some very interesting implications. It also illustrates the basic point made by MacLeod and Malcomson (1989) and MacLeod and Malcomson (1998) that the contract *form* can vary with how the gains from trade are divided between the two parties. When parties use joint performance evaluation, then the self-enforcing relational contract requires the firm to be allocated a sufficiently high rent. Conversely, the use of relative performance evaluation can leave the firm with lower rents. However, workers as a group may collude to reduce effort,

and hence they must be allocated some of the rent from the relationship to ensure efficient cooperation.

5.2 Relational Contracts Under Asymmetric Information

From the literature on organizational economics it is known that the source of private information creates an additional margin that affects the efficient allocation of the gains from trade. This point is explored in the next two contributions that relax the assumption that all components of firm profits are observed by workers. These contributions demonstrate that, as a consequence of asymmetric information, inefficient outcomes may be observed on the equilibrium path that seeminly correspond to organizational conflict.

The eighth paper of the Symposium, **Li and Matouschek (2023)**, provides a simplified version of Li and Matouschek (2013) to illustrate how firms can design compensation schemes that simultaneously reward worker effort and adjust compensation to reflect the unobserved opportunity cost of funds. They show that the optimal contract concentrates payments in periods where the cost of funds to the firm is low. When the opportunity cost of funds is high, no payments are made however continuation profits Π^P_{t+1} are lower than in the periods where bonuses are paid. This is necessary to ensure the firm keeps its side of the bargain.

In order to achieve the needed variation in firm profits, a second requirement is that repeated low payments result in the agent reducing effort in order to "punish" the principal. Thus, in case of opportunity costs repeatedly being high, the surplus-maximizing relational contract involves a gradual reduction of effort and a gradual increase of the bonus (paid once costs are low again) until each reaches an upper/lower bound. When the opportunity cost of cash is low, then a high bonus is paid and the relationship "re-starts" with high effort and high profits for the principal. Therefore, the relationship is characterized by infinite cycles of varying effort and compensation levels.

These results illustrate the use of Abreu, Pearce, and Stacchetti (1990) to solve a potentially complex dynamic programming problem. An interesting implication of the analysis is that even though the model has a time stationary payoff structure, the equilibrium exhibits variation in payments and behavior over time in response to past events, and not just to the current realization of the state. Finally, Li and Matouschek (2023) nicely illustrates the point that the opportunity cost of capital can interact with the structure of relational contracts. This has led to a literature on the interplay of financial markets and relational contracts (see, e.g., Fahn, Merlo, and Wamser, 2019 and Barron, Li, and Zator, 2022).

In the ninth contribution, **Halac (2023)**, introduces asymmetric information regarding the firm's outside option that determines its continuation payoff after breach, Π^0_{t+1}. As an example, firms may have better information regarding the value of alternative employees and therefore the benefits of replacing the current worker. Halac (2023) provides a simplified, two-period, version of Halac (2012). There, she demonstrates that the consequences of asymmetric information crucially depend on the allocation of bargaining power.

Bargaining plays little role in the early models of relational contracts because risk neutral parties can achieve any division of the surplus with *ex ante* side payments. This is no longer the case with asymmetric information. In the context of an agency model, Gibbons

(1987) shows that when worker productivity is private information held by the worker, then performance pay is inefficient. If the firm could be "sold to the workers" this effect would go away because they would become residual claimaints to their effort. Kanemoto and MacLeod (1992) demonstrate that when worker productivity is persistent private information that is valued on the market, then efficient performance pay is possible. Together these papers illustrate the point that with one-sided asymmetric information there can be contract forms that implement the efficient allocation depending upon the information available to the market and the extent to which parties can reallocate decision rights, as is in Baker, Gibbons, and Murphy (2002).

Halac (2012) shows that this intuition does not carry over to relational contracts. The reason is that when a firm's outside option is persistent private information, then regardless of the firm's bargaining power, information is revealed slowly over time and the first best is not achieved. Halac (2023) provides a beautiful example to illustrate this point. If the informed party (in this case the firm) has the bargaining power, it may renege upon their bonus pay. This is because the firm with a high outside option is tempted imitate the firm with a low outside option. At this equilibrium, the low type firm always performs (pays the promised bonus), but the high type firm may renege on the bonus payment, leading to an inefficient breakdown of the relationship in the second period.

6 From Theory to Evidence

The final two papers in this Symposium discuss the empirical implications of the theory. If the goal of theory is to help us understand observed economic institutions, then it should provide testable implications. The starting point is the potential outcomes framework discussed in Holland (1986), which allows us to analyze counterfactual choices for a decision maker i who could be a worker, buyer, seller, firm or other organization.[9] In the context of relational contracts, a fundamental question is whether we can show the causal effect of the future surplus on the current gains from trade. Thus, the goal is to formally test the implications of the fundamental incentive constraint (1). The gold standard for testing a theory is the use of a randomized control trial. The paradigm application is testing the effectiveness of a vaccine, as in the case of the recent COVID-19 pandemic. There, the vaccine is allocated to a randomly selected treatment group, and the placebo with no medical benefit to a randomly selected control group. One then compares the incidence of illness in both groups to see if individuals in the treatment group are significantly healthier than individuals in the control group.

When one is dealing with observational data, particularly data on commercial relationships, it is very difficult to identify sources of variation that can distinguish between correlation and causation.[10] Macchiavello and Morjaria (2015) deal with this problem by using political

[9] See Imbens and Rubin (2015) for a book length treatment of this subject.

[10] For a good discussion on causal inference in economics see the background material for the 2021 Nobel prize in economics, see `https://www.nobelprize.org/prizes/economic-sciences/2021/press-release/`.

instability in Kenya as an exogenous shock to relational contracts. They assume that parties do not anticipate future political instability, and hence this is not incorporated into expectations at the time parties enter into a relational contract. Thus, when there is instability, this leads to a sudden loss of future surplus and hence may cause a breakdown of relational contracts.

To formally incorporate political instability into the basic model, suppose that instability affects the probability that parties are able to trade in the future. More precisely, let the effective discount factor at date t be given by

$$\delta_t = \rho_t \times \bar{\delta},$$

where $\rho_t \in [0,1]$ is the probability that the relationship can continue to period $t+1$, and $\bar{\delta}$ is the risk-free one-period discount factor. Therefore, with probability $1-\rho_t$ the relationship terminates for exogenous reasons at the end of period t.

Importantly, an event that affects political stability may have consequences on top of a mere change of the exogenous relationship stability. In the following, we illustrate the danger of neglecting additional factors, thereby possibly distorting the researcher's interpretation when relying on observable outcomes.

Suppose that an increased uncertainty also reduces the value of (future) market alternatives, V_{t+1}^0 used in (1). Thus, we assume that $V_{t+1}^0 = V_{t+1}^0(\rho_t)$, where $V_{t+1}^0(\rho_t)$ is increasing in ρ_t – more political stability and hence a higher level of ρ_t leads to more productive market alternatives. This is illustrated by the dashed curve in Figure 1. For simplicity let V_{t+1}^P, the future expected surplus from a relational contract, be independent of ρ_t (illustrated by the horizontal straight line in Figure 1). Thus, we presume an isolated political event that reduces ρ_t but leaves all future ρ_τ, $\tau \geq t+1$, unaffected. This event increases the probability with which the relationship ends for exogenous reasons, and decreases the value of next-period's market alternatives.[11]

Moreover, define

$$g_t^B = v_t^B - v_t^P > 0,$$

as the temptation to breach the relational contract in period t. Of course, instability could also affect the current value of honoring the agreement (which is the case in Macchiavello and Morjaria, 2015, where electoral unrest reduces the available supply), but for simplicity we ignore this possibility.

Under the hypothesis that parties choose the most efficient arrangement, it follows from (1) that there will be an agreement to trade under a relational contract at date t whenever

$$V_{t+1}^P \geq V_{t+1}^0(\rho_t) + \frac{g_t^B}{\rho_t \bar{\delta}}.$$

Assume furthermore that a higher stability reduces the one-time deviation gain by more than it increases the future value of market alternative (i.e., $V_{t+1}^0(\rho_t) + g_t^B/\rho_t\bar{\delta}$ is decreasing

[11] Note that a more realistic setting in which the change in ρ_t was permanent would yield very similar results.

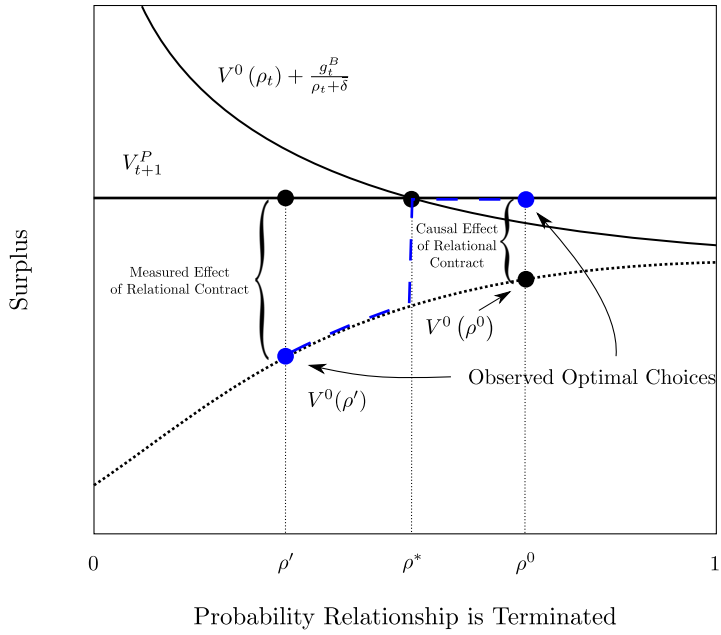

Figure 1: Measuring the Causal Effect of Choice (source: MacLeod (2013))

in ρ_t as illustrated by the solid hyperbolic line in Figure 1). It then follows that there exists a cutoff ρ^* such that the relational contract is feasible for all $\rho_t \geq \rho^*$, that is, for all probabilities $\rho_t \geq \rho^*$ the payoff is given by V_{t+1}^P.

Consider now the different values of ρ in Figure 1 which represent various levels of (exogenous) stability. When stability is given by ρ^0, then the relational contract can be sustained, leading to a payoff of V_{t+1}^P. The counterfactual payoff is the surplus gained from market transactions, which in this case would be $V_{t+1}^0(\rho^0) < V_{t+1}^P$. Thus the *causal effect* of a relational contract (RE) is:

$$RE = V_{t+1}^P - V_{t+1}^0\left(\rho^0\right).$$

However, under the hypothesis that parties are optimizing, the payoff $V_{t+1}^0(\rho^0)$ is *not observed.* Hence, one cannot measure the causal effect of a relational contract. This leads to what Holland (1986) calls the *fundamental problem of causal inference.* One might be able to measure the effect if time travel were possible, and one could go back in time and ban relational contracts to measure the consequence. Since time travel is impossible, to make causal inference from data one needs to add some *theoretical* assumption to create what applied economists would call an identification strategy.

In our example, consider an unanticipated and temporary stability shock in the form of a move from ρ^0 to ρ'. Relational contract theory predicts a large fall in surplus. Assuming that the realized surplus can be measured, then the *estimated effect* of a relational contract ($\widehat{RE}$) is:

$$\widehat{RE} = V_{t+1}^P - V_{t+1}^0(\rho') > RE.$$

In fact, we would overestimate the effect of the gain to a relational contract. In particular,

if one has only two observations one can definitively not test the predictions of relational contract theory. However, with multiple observations one can trace out the relational effect as a function of ρ, as illustrated by the dashed blue curve in Figure (1). The sharp drop in realized surplus at $\rho = \rho^*$ would then be consistent with the use of a relational contract.

In the tenth paper, **Macchiavello and Morjaria (2023)** review strategies that have been applied to solve the identification problem to test relational contract theory, beginning with a discussion of Macchiavello and Morjaria (2015). Their approach utilizes the structure of the dynamic enforcement constraint, in that performance is negatively affected by strong incentives to breach, i.e., by a large v_t^B, and positively by a high relationship value $V_{t+1}^P - V_{t+1}^0$. The major contribution of Macchiavello and Morjaria (2015) is to introduce a creative solution to the identification problem. They exploit the fact that there are unanticipated shocks to the value of relationships in the Kenyan flower market due to political instability. This clever idea illustrates how one can move beyond the simple treatment-control framework for randomized control trials to provide causal evidence on the impact of relational contract theory in practice. They also extend the basic theory presented above to allow for learning about the characteristics of one's counter party. This implies that the surplus needed to support a productive relationship varies with the age of the relationship. Just as the basic model makes some sharp predictions regarding the shape of the exchange frontier, they show that the level of trade when faced with a negative shock results in an inverted U-shape function of the age of the relationship.

Finally, Macchiavello and Morjaria (2023) review a growing literature on the relationship of relational contracts with firm productivity. This literature shows how existing theory based only upon the competitive model or simple agency models can be rejected in favor of relational contract models that highlight the role of how expectations of future exchange can affect current productivity. As an example, they discuss literature that exploits variation in competition, in for example the Rwandan coffee market (Macchiavello and Morjaria, 2021), where a larger competition among coffee mills indeed reduces the extent and productivity of relational contracts.

The final contribution, **Huffman (2023)**, discusses how behavioral and experimental economics can enhance our understanding of relational contracts. This is important because, as discussed above, a person's choice in a relational contract depends upon counterfactual reasoning – what would happen if one violates the agreement, an experiment that is not carried out for many of the equilibrium concepts that are used in the theory. This in turn implies that a direct test of the behavior underlying many theories of relational contracts cannot be carried out using observational data. One solution is to use experiments where the researcher can directly manipulate the counterfactual choices.

Huffman begins with a discussion of Altmann et al. (2014) in which they study the role of contractual incompleteness. Some participants assume the role of firms and can "hire" other participants who are in the role of workers. Treatments differ with respect to the verifiability of a worker's effort. The authors find that non-verifiable effort leads to the emergence of long-term relationships that generate substantial rents. Thus, they confirm one major prediction of relational contracting, that relationship rents are needed

to provide informal incentives. But their study also presents insights on the functioning of labor markets. The non-verifiability of effort and the associated relationship rents are responsible for involuntary unemployment; moreover, high- and low-rent jobs can co-exist. Interestingly, although this and other lab experiments confirm the "dynamic programming" approach of relational contracting – actions today are shaped by expectations about future consequences – they are within a (deterministic) finite time horizon. Therefore, the results cannot be rationalized by standard, "non-behavioral," game theory, which indicates that relational contracts are not just a subset of repeated game theory that focuses on a particular equilibrium.

In the second part, Huffman (2023) presents results that can help extend the (theoretical and empirical) literature on relational contracts, based on Goette, Huffman, and Meier (2006, 2012). There, they explore how social ties caused by group membership affect cooperation, building upon results from an experiment in which participants (officers of the Swiss army) have been randomly assigned to real-world social groups (temporary platoons). Those who are part of the same group engage in significantly more cooperation, and punishments are more frequent against someone who defected against a member of one own's group. These results indicate that relational arrangements in an organization are likely to be different from those between organizations and in markets.

7 Next Steps

The contributions to this Symposium have demonstrated the substantial progress the economics literature on relational contracting has made in the past decades. The role of repeated interaction as a means to sustain mutually beneficial cooperation has also been influential outside economics. For example, Avner Greif identifies such reputation mechanisms in his study of exchange among the Maghribi Jewish traders across the Islamic Mediterranean in the late Middle Ages (Greif, 1989, 1993, and 1994). There, trade was governed by "implicit" contracts that specified desired behavior as well as the consequences of misbehavior, which resulted in an expulsion from the traders' coalition. Landa (1981) studies the behavior of Chinese middlemen in the Malaysian rubber markets in the 1960s who promised to help each other on an ongoing basis. Again, a refusal to cooperate resulted in an exclusion from the group and a loss of the benefits of future cooperation. Bernstein (1992) analyzes diamond dealers in the New York of the 1980s who concluded business agreements solely based on a handshake, knowing that reneging on a promise would cause an expulsion from the "New York Diamond Deals Club". Biddle (2021) uses the insights underlying relational contracts to provide a better understanding of the strategies applied by state- or non-state military actors, in particular whether these strategies are more "conventional" or use guerilla-style, asymmetric, tactics. He argues that this is to a large extent determined by the institutions they have been able to build as those are crucial for the specifics of possible cooperation.

Besides providing real-world examples for the importance of reputation mechanisms, these contributions can inform us about potential future paths the economics literature may take. In particular, they point to the role of identity and group membership, since the

aforementioned studies all focus on the behavior of homogeneous groups where members share the same ethnic background: Maghrebi Jews in Greif's case, Chinese merchants who all originated from one out of four clans in Landa (1981), and members of the New York Diamond Dealers Club who have numerous social connection in Bernstein (1992) (see Rauch, 2001, for more examples). Those ties increase the cost of commercial misbehavior because punishments spread to the social sphere. Thereby, more interaction within a group supports cooperation, and a similar outcome can be achieved by interacting less with non-members. As Dixit (2004, p. 40) states: "...cooperation within a group is better sustained if the consequences of deviation are made worse, which requires worse outcomes from dealing with people outside the group. This is a trade-off: better within-group cooperation may require worse cross-group relations. In starker terms, a benefical sense of 'us' may be fostered only by sharpening the sense of 'us versus them' hostility." While group membership has been shown to support cooperation among members, it can also impede reforms needed to increase productivity. As Macchiavello and Morjaria (2023) state in their contribution to this Symposium, consolidations among coffee mills in Rwanda improved performance only if a mill was acquired by a foreign firm (Macchiavello and Morjaria, 2022). Macchiavello and Morjaria (2023) argue that this may be explained by social ties domestic owners have with their local communities. Moreover, as David Huffman has displayed, the mechanisms that support cooperative behavior among group members extend beyond the social costs of severed social ties (Huffman, 2023). His studies indicate that group membership can boost cooperation even if it is exogenously assigned and temporary, and group members who interact do not know their counterpart's individual identity. All this implies that group membership can be an important determinant for the functioning of relational contracts, however the specifics are not yet fully understood.

We conclude by suggesting additional directions for future research. First, we go back to the core of relational contracting: Performance is sustained by beliefs about how an action made today affects one's well-being tomorrow. Individuals assign a value to each action and understand that, if they cheat, their future value will fall. A relational contract is self-enforcing if everyone's future returns to performance are higher than the net benefit of breach. This is important because it does not require parties to carry out a complex computation of the gains from different strategies. In particular, the "Bayesian" approach to relational contracts (Savage, 1972) supposes that parties build models of their counterparties, asking themselves whether or not their counterparty is "trustworthy". In any given transaction the only relevant information is the probability that the counterparty will perform. Kreps et al. (1982) show that such an approach can not only be modeled formally as a Bayesian game, but also has the benefit of predicting cooperation in the finitely repeated prisoner's dilemma. This approach provides a nice way to model how parties think about relationships. However, measuring an individual's beliefs is potentially even more difficult than trying to assess the available counterfactual strategies. Incorporating and simplifying such approaches will be useful, taking into account the cognitive limitations humans face. There, experimental economics can be of great value and help develop informative and tractable models.

Second, a better understanding of the role of social preferences in dynamic contexts is

needed.[12] How are social preferences formed and how do they respond to the environment as well as the institutions needed to sustain effective relational contracts? What can we say about the interaction between context and social preferences, and how do the resulting insights help us understand the emergence and evolution of organizational culture?

Third, while the empirical literature on relational contracts has been growing rapidly in the past years, more work to cleanly identify the forces that sustain informal relationships is certainly needed. So far, most approaches rely on individually-collected data that provide deep insights into individual firms or markets, often in environments with weak legal institutions. Less work exists in settings where relationships are not directly observable and registry data is used instead. Some authors have started applying indirect, model-based, approaches, which already indicate that the main trade-offs of relational contracts systematically matter also in environments with arguably well-functioning formal institutions (Gil and Zanarone, 2017; Ahammer, Fahn, and Stiftinger, 2023).

Fourth, another important, though under-researched area, is the role of accounting in performance assessments. The ability of firms to measure and evaluate the output of their workers can allow for more effective management and less reliance on relational contract based upon subjective evaluations. Work in this area include Rajan and Reichelstein (2006), Rajan and Reichelstein (2009) and Baldenius et al. (2016).

Finally, one starting point for relational contract theory has been the fact that markets are incomplete. However, a feature of markets is that over time standards evolve that help specify acceptable behavior in an exchange. Moreover, technologies are developed that allow us to better observe and measure quality. Scholars such as Llewellyn (1939), Bernstein (2001) and Allen (2012) document how standardization and improvements in measurement have helped the transition from relational contracts to market exchange. The question then is to what extent relational contracts are still important beyond governing dimensions that remain difficult to measure (such as cooperativeness in teams, service quality,...). Put differently, is the "clarity problem" as formulated by Gibbons and Henderson (2012) just a temporary phenomenon that disappears once standards and routines (Chassang, 2010) have determined acceptable behavior in a given situation? We think that the answer is no. The reason is that more standardized markets often go hand in hand with an increase in competition which provides incentives to innovate as a means to increase profits. But successful innovation reinstates uncertainty about appropriate conduct and adequate standards, therefore effective incentives to innovate rely on employees' trust that firms reward their efforts. Moreover, innovation (ideally) is not only conducted by R&D departments which develop novel products and thereby create new markets, but by all layers of an organization who work on improving the production process or detect and eliminate flaws of existing commodities. Indeed, Gibbons and Henderson (2012) present cases of firms in which workers in lower tiers of the hierarchy are subject to relational contracts that provide incentives to innovate. Lincoln Electric is a prominent example where a substantial part of the compensation of workers is based on hard-to-verify aspects such as reliability or dependability. Relational contracts are also used to encourage workers to make suggestions

[12] See MacLeod (2007), Dur and Tichem (2015), and Fahn (ming) for first approaches.

for improving work processes. Since Lincoln Electric does not rule out piece rate adjustments when fundamental methods change, workers who develop a process improvement might fear that piece rates are adjusted after a revelation. Therefore, they need to trust managers to grant them their fair share of an increase in productivity. Also Toyota's extraordinary success in the 1980s and 1990s was caused by its ability to continuously improve its production process. Workers were encouraged to identify inefficiencies and be creative in proposing solutions. Because such solutions could make workers redundant, they had to trust managers to implement improvements without reducing the workforce as a means to increase a department's short-run profits. All this implies that the potential disruption of existing modes of governance caused by an agent's good performance is an exciting venue for future (empirical and theoretical) research.

The past decades have seen exciting research on the theory of relational contracts. Informal relationships govern numerous interactions within and between organizations but still are not completely understood. We are convinced that future research can deliver at least as fascinating insights, in particular if we broaden our approaches.

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