Continuing Contracts

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Abstract

Parties often regulate their relationships through "continuing" contracts that are neither long-term nor short-term but usually roll over: a leading example is a standard employment contract. We argue that what distinguishes a continuing contract from a short-term (or fixed-term) contract is that parties apply notions of fairness, fair dealing, and good faith as they revise the terms of the contract: specifically, they use the previous contract as a reference point. We show that a continuing contract can reduce (re)negotiation costs relative to a short-term or long-term contract when there is uncertainty about future gains from trade. However, fair dealing may limit the use of outside options in bargaining and as a result parties will sometimes fail to trade when this is efficient. For-cause contracts, where termination can occur only for a good reason, can reduce this inefficiency.

Key Words: short-term, long-term, continuing contracts, fairness, good faith bargaining, for-cause, at-will

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1. Introduction

A large literature in economics and law has studied why parties write long-term as opposed to short-term contracts. A leading explanation is that such contracts are useful to support specific investments[1]. In contrast, very little, if any, attention has been paid to the question of why parties often use contracts that are neither explicitly long-term nor short-term, but rather are of indefinite duration in the sense that most of the time they roll over. Probably the leading economic example is an employment contract where each party can often terminate the relationship at will, but where they usually do not – most of the time business continues "as usual". Other important examples are rental contracts where the lease is typically renewed or month to month rental contracts with no lease. We call such contracts "continuing"[2].

We will focus on the idea that what distinguishes a continuing contract from an explicitly short-term, or fixed-term, contract is that parties are likely to apply notions of fairness, fair dealing, and good faith as they revise or renegotiate the terms of the contract. We are not suggesting that this is a legal requirement; rather our claim is that this is how people behave[3]. Further, we will argue that the prior contract is likely to be a very important reference point for determining whether a renegotiation is seen as fair[4]. For example, consider a new wage or rent. Whether this is regarded as reasonable or not will be judged in light of the initial wage or rent: attention will be focused on the *change*. Of course, other factors can be important, such as market conditions, but the prior terms that the parties agreed to will have particular salience[5]. We will be interested in analyzing the consequences of fair dealing for the

[1] See, e.g., Williamson (1975) and Klein et al. (1978) and, for empirical evidence, Goldberg and Erickson (1987), Joskow (1987), Crocker and Masten (1988), Pirrong (1993), Brickley et al. (2006), and Bandiera (2007).

[2] We do not describe them as "indefinite-term contracts" since lawyers already use the term indefinite to describe preliminary agreements that may not be enforceable. See Bebchuk and Ben-Shahar (2001) and Schwartz and Scott (2007) for an analysis of such agreements.

[3] In some cases the courts will enforce an obligation to bargain in good faith if the parties include this in their contract. For example, Goldberg and Erickson (1987, footnote 29) describe a contract that was for three successive three-year terms. The contract stated that the parties could not terminate solely because the price was unsatisfactory without first engaging in good faith negotiation on the price. The meaning of good faith is somewhat ambiguous – it can mean as little that the parties are not dishonest, but it can also mean that they behave reasonably and are not opportunistic. The courts will sometimes enforce the broader interpretation. See Schwartz and Scott (2007), and SIGA Technologies, Inc. v. PharmAthene, Inc. (Del. May 24, 2013). In this paper we will use good faith in the broad sense that parties behave reasonably and are not opportunistic.

[4] Kahneman et al. (1986), a paper to which we return below, provides considerable support for the idea that past transactions serve as a reference point for future ones. See also Okun (1981). Rotemberg (2011) analyzes the optimal pricing policy for a firm that faces consumers who can be antagonized by prices that are higher than usual. Bar-Gill and Ben-Shahar (2003) argue that fairness is an important consideration when contracts are renegotiated and that previously agreed-upon terms will influence what is regarded as fair. See also Benjamin (2015).

[5] Some support for the idea that prior transactions serve as a reference point can also be found in the law. The Uniform Commercial Code, Article 2-305, deals with the case where parties have signed a contract but left the price open. Subsection 2, dealing with the case where the price is to be fixed by one party, includes the qualification that the price must be fixed in good faith. The commentary goes on to argue that ' in the normal case a "posted price" or a future seller's or buyer's "given price," "*price in effect*," "market price," or the like satisfies the good faith requirement.' (Italics added.) See Uniform Commercial Code 50 2014-2015.

choice of an optimal contract. We will argue that using the prior contract as a reference point can have costs as well as benefits. On the one hand it can mean that there is less to argue about if not much has changed in the relationship. On the other hand, it may make it more difficult to take outside options into account, which may cause inefficiency.

To analyze continuing contracts, we apply the contracts as reference points approach developed in Hart and Moore (2008). According to this approach one role of a contract is to get parties "on the same page", so as to avoid future misunderstanding. Misunderstanding leads to aggrievement and shading (in the form of departures from consummate performance), and consequent deadweight losses. Hart and Moore (2008) show that, under these conditions, simple contracts can be optimal[6]. So far the contracts as reference points approach has been used to study situations where the current contract is a reference point for contractual revision or renegotiation. We adapt this approach to allow for the prior contract to be a reference point.

We consider a very simple model where a buyer and a seller can trade zero or one widgets in each of two periods. Both parties are risk neutral, there are no non-contractible investments, there is symmetric information, and there are no wealth constraints. It is known that trade is efficient in the first period. If trade is always efficient in the second period a long-term contract mandating trade in both periods (specific performance) is optimal. If trade is always inefficient in the second period a short-term contract specifying trade in the first period is optimal. But suppose that there is uncertainty about whether there are gains from trade in the second period. In this case neither a long-term contract nor a short-term contract achieves the first-best. A long-term contract can be renegotiated if it is learned that trade is inefficient at the beginning of the second period, but since the parties will argue about how to divide the gains from renegotiation this is costly. (Throughout we will assume that argument is costly because it leads to aggrievement and shading.) In the case of a short-term contract, if trade is efficient in the second period, the parties must negotiate a new contract from scratch and this is costly because the parties will argue about how to divide the gains from trade.

A continuing contract may be a good compromise. To emphasize, a continuing contract is one where there is no obligation to trade in the second period but if there are gains from trade the parties will use the first period contract as a reference point. Using the first period contract as a reference point can reduce negotiation costs since there is less to argue about. For example, suppose that in the first period the buyer's value of trade is 20, the seller's cost is 10 and the price is 15. At the beginning of the second period the parties learn that the buyer's second period value has increased to 24 and the seller's second period cost is still 10; that is, surplus has increased by 4. Using the first period contract as a reference point means that argument will be confined to how the additional surplus of 4 will be split. This means that the new price will lie between 15 (the buyer gets all the incremental surplus) and 19 (the seller gets all the incremental surplus). In contrast if the parties bargain from scratch, as in a short-term contract,

[6] Note that the mechanism design critique of the foundations of incomplete contract theory (see Maskin and Tirole (1999)) does not apply to the contracts as reference points approach. For some experimental evidence in support of the Hart-Moore theory, see Fehr et al. (2011), (2015). For some related field evidence, see Iyer and Schoar (2015).

the argument will be over how to divide the surplus of 14: the price can be anywhere between 10 and 24.

Although the use of the prior contract as a reference point can reduce argument/bargaining costs and increase efficiency, this may not always be the case[7]. Consider the same situation as above, but suppose now that the seller has an outside option equal to 11 in period 2. We will argue that good faith *may* preclude this outside option from being used in the bargaining process. If the seller argues that she should be paid at least 21 in the second period this may be regarded as opportunistic or coercive since it cannot be justified on the basis of changes in value and cost within the relationship: it is not in the [15,19] range. Either the seller feels uncomfortable suggesting a price of 21 or the buyer is unwilling to go along with it; or, if it were to happen, B's aggrievement and shading would be so great that the seller would be worse off accepting the new terms than if she simply quit and took her outside option. The result may be that the relationship ends and the seller takes her outside option even though this is inefficient.

We do not wish to argue that outside options can never be taken into account in the bargaining process. Whether they can or cannot will depend on the circumstances. In an influential study, Kahneman et al. (1986), using telephone surveys, posed hypothetical situations to people to elicit their standards of fairness. They found that people think that it can be fair for a firm to raise prices when its costs go up or to lower wages if it is losing money, but not fair for it to raise prices if its product becomes scarce or to lower wages if other workers are willing to work for less[8]. This is very supportive of our assumption that using changes in value or cost within the relationship to justify a price change is consistent with good faith bargaining whereas using outside options is not. At the same time Kahneman et al. suggest that appealing to outside options may be more acceptable if these outside options represent general market trends[9]. As they put it (p.730), "Some people will consider it unfair for a firm not to raise its wages when competitors are raising theirs. On the other hand, price increases that are not justified by increasing costs are judged less objectionable when competitors have led the way." We will therefore also

[7] Hart and Moore (2008, Section V) consider the case where other parties' contemporaneous contracts, as opposed to the buyer's and seller's own prior contract, are reference points for the current transaction. This can also be beneficial or costly depending on the circumstances.

[8] This is consistent with the arguments of Okun (1981). Okun emphasizes the importance of fairness in determining firms' pricing decisions in what he calls "customer markets" (see Okun, p.154). He distinguishes between price increases based on cost increases, which are generally accepted as fair, and those based on demand increases, which are generally regarded as unfair (see Okun, p.170).

[9] On this point see also http://www.npr.org/blogs/money/2014/02/07/273060341/episode-516-why-paying-192-for-a-5-mile-car-ride-may-be-rational . This podcast discusses whether Uber's strategy of surge pricing is fair, with the conclusion being that while this might be the case if the increase in price is linked to market conditions it would not be so if the price increase depended on the characteristics of individual customers. Interestingly, a rival taxi service in New York, Gett, makes it a selling point that they *never* use surge pricing; see#NYC #NoSurge pic.twitter.com/2pDxUo0jbt (retrieved 4/21/15 at 5:25pm). Another podcast describes how Coca Cola experimented with charging a higher price for coke when the weather was hot but abandoned this policy after consumers became angry: http://www.npr.org/sections/money/2015/06/17/415287577/episode-633-the-birth-and-death-of-the-price-tag.

consider the case where outside options *can* be used in bargaining[10]. By this we simply mean that in the above example the buyer will be willing to pay 21 to keep the seller in the relationship if the seller's outside option is 11[11].

However, one of the implications of our analysis that should be stressed is that, to the extent that outside options cannot be fully incorporated in bargaining, fairness or good faith has costs as well as benefits, and that ex post inefficient allocations will sometimes occur in an optimal (continuing) contract[12].

Although we will assume that the parties have a clear-cut choice between a long-term, a short-term, and a continuing contract, this may not always be the case. For example, one of the authors of this paper has rented a vacation house for many years in a row. The relationship as it has developed is best thought of as continuing even though no language was ever used to that effect. More generally, a sequence of short-term contracts may osmose into a continuing contract at some point. At the same time, calling a contract "fixed term" may be a way for the parties to create the expectation that no obligations are owed in the future[13]. Also it is useful to consider the choice of all three contracts – long-term, short-term, continuing – given that economists have traditionally focused on the trade-off between long-term and short-term contracts.

We will consider two extensions of the basic model. The first concerns "for-cause" contracts. These are contracts that require a party to show a good reason why they are terminating the relationship (as opposed to an "at-will" contract where no such demonstration is required). For-cause contracts are common in the employment context although this is sometimes for legal reasons[14]. Our analysis illuminates their benefits. A for-cause contract can help to reduce the inefficiency that arises if outside

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[10] This case is, of course, very familiar to academic economists: an employee gets an outside offer and asks his or her employer to respond and the employer does. But whether such behavior occurs, or is acceptable, can vary over time and with the industry or sector or country concerned. For example, in the case of academic economists responding to outside options has been common in the U.S. for a long time, but was uncommon in the U.K. until fairly recently. Furthermore, there can be an asymmetry in referring to outside options. It may be unacceptable for the employer to lower wages because there are cheaper workers available even when it is acceptable for employees to ask for their outside option to be matched. For a dynamic analysis of the path of wages in a world where employers match outside options, see Harris and Holmstrom (1982).

[11] Note that, even if it is difficult or costly to use outside options in bargaining, alternative arrangements may be possible that substitute for this. For example, Weitzman (1984) and Oyer (2004) argue that firms may index wages to profit or share prices as a way to avoid inefficient quits or lay-offs. Our model assumes that verifiable variables that can form the basis of an index do not exist.

[12] Herweg and Schmidt (2015) have also shown that inefficient allocations can arise when contracts are reference points if parties are loss-averse. They are concerned with a one period model where renegotiation takes place and do not study how a contract can be a reference point for transactions in future periods.

[13] Kahneman et al. (1986) find that past transactions do not form a reference point if the previous transaction was explicitly temporary, supporting the distinction we make between short-term and continuing contracts. Also Bewley (1999) finds that while wages in the primary sector (long-term employment) are downward rigid, wages in the secondary sector (short-term positions) are flexible downward, again supporting our distinction between short-term and continuing contracts.

[14] In the labor economics literature the term "just-cause dismissal policies" is often used to describe such contracts.

options cannot be used in bargaining since it makes it harder for a party to quit. The other side of the coin is that a for-cause contract can make it harder for a party to quit when this is efficient. We will argue further that, in practice, even at-will employment contracts may implicitly have some for-cause features in the sense that there is an expectation of a continuing relationship. Thus a firm that wants a true at-will contract may resort to hiring an independent contractor or temporary employee. Viewed in this light, for-cause contracts in our model can be interpreted as employment contracts and at-will contracts as independent contracting arrangements. Our theory can throw new light on the trade-off between employment and independent contracting, and provides a possible explanation for the recent shift to flexible employment arrangements in the U.S. and other countries, based on an increased value of flexibility.

In another extension we consider the distinction between continuing contracts and another type of contract that is observed in practice: a renewable contract. A renewable contract is one that continues if both parties agree. However, the terms under which the contract will be renewed are typically specified in advance: they may be the same as the terms of the initial contract, or they may be the terms that one of the parties is offering new contractors[15]. In contrast, under a continuing contract, the terms of the new contract are left open and can be adjusted according to new events (a worker's wage may stay the same most of the time but every so often he or she will get a raise; rents will typically change at the end of a lease, etc.). We will show that under some conditions a continuing contract is superior to a renewable contract. This result can be interpreted as telling us that it is sometimes better to say nothing than something[16].

There is a large theoretical literature on the determinants of contract length, and we can mention only a few contributions. Some papers assume a fixed cost of writing a (possibly contingent) contract and derive contract length as a function of the volatility of the environment; see, e.g., Gray (1978) and Dye (1985). Harris and Holmstrom (1987) consider actual duration in a model where new information arrives but as they recognize there is no reason why the initial contract should not have infinite duration. Diamond (1991) argues that short-term contracts might be used by some borrowers to signal that they are of high quality and are willing to expose themselves to the hazards of renegotiation; he does not consider continuing contracts. MacLeod and Malcomson (1993), Che and Hausch (1999), and Segal (1999) identify situations where "no contract" achieves as good an outcome as a sophisticated (incomplete) contract, which can be interpreted as saying that long-term contracts are sometimes not needed; however, they also do not explain why continuing contracts are used.

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[15] See Lafontaine and Shaw (1999). They note that when franchisees' contracts are renewed this is usually done at the "then-current" contract terms. Masten (2009) provides evidence on the value of long-term, renewable contracts for the case of heterogeneous freight transactions.

[16] Bozovic and Hadfield (2015) find that in innovative industries parties use contracts as a framework—in their words, "scaffolding"—for structuring future negotiation. In our model, in a continuing transaction, the first period contract can be regarded as scaffolding for the second period contract. In contrast, in a long-term or renewable contract, the initial contract is an attempt to "construct the whole building".

Finally, Guriev and Kvasov (2005) consider a situation where a seller makes a relationship specific investment and a buyer and seller can trade continuously over time. The buyer has an outside opportunity whose arrival time is stochastic; if it arrives it is efficient for the relationship to terminate. They show that it is optimal for parties to write what they call an evergreen contract – an indefinite contract which can be terminated by the buyer (at some cost) with notice. However, they do not consider what we have called continuing contracts where future terms are left open.

The paper is organized as follows. In Section 2 we present the model and analyze the trade-off between long-term, short-term, and continuing contracts. In Section 3 we study for-cause contracts, and in Section 4 renewable contracts. Finally, Section 5 concludes.

2. The Model

We consider a buyer B and a seller S engaged in a two period, three date relationship. See Figure 1 for a time-line. In each period they can trade zero or one widgets.

At date 0, B and S sign an initial contract that may be long-term, short-term, or continuing. This contract is negotiated under competitive conditions at date 0 in the sense that there are many alternative sellers for B. (One can imagine that B auctions off the initial contract to the potential sellers.) Each seller's outside option for the two periods is denoted by $\bar{u}$. If the contract is long-term, it may be renegotiated at date 1. If the contract is short-term or continuing, a new contract between B and S may be negotiated at date 1 for the second period.

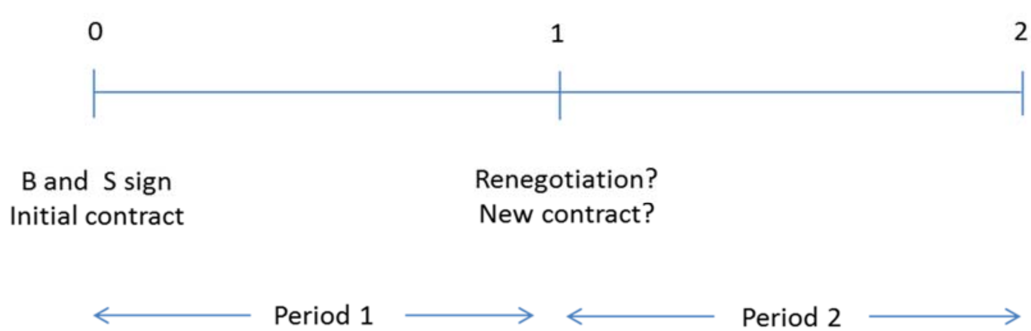

Figure 1

B's value v_1 and S's cost c_1 for the widget in period 1 are already known when the initial contract is written. We assume $v_1 > c_1$. At date 1, before the initial contract is renegotiated or a new contract is signed, B's value v_2, S's cost c_2, B's outside option r_B, and S's outside option r_S for period 2 are observed by both parties – there is symmetric information throughout (but v_2, c_2, r_B and r_S are not verifiable). Trade in period 2 is efficient if and only if $v_2 - c_2 > r_B + r_S$. At date 0, however, v_2, c_2, r_B and r_S are uncertain – they are drawn from a probability distribution F (which is common knowledge).

Both parties are risk neutral, there are no wealth constraints, and without loss of generality we suppose no discounting. We assume that $\bar{u}$ is in a range where the buyer wants to offer the seller a contract.

We do not model the market for buyers and sellers at date 1. This would require a general equilibrium analysis in which there are several buyers and sellers at both dates 0 and 1 and the availability of alternative partners at date 1 depends on contracts signed at date 0. The outside options r_B and r_S are a crude and short-cut way of representing market alternatives at date 1. We also do not model why the market is more competitive at date 0 than at date 1. In the background there may be some (contractible) relationship-specific investments, search costs, or other types of lock-in. Note, however, that the existence and extent of lock-in is captured implicitly. If $v_2 - c_2 > r_B + r_S$ with high probability, then this suggests significant lock-in. On the other hand, if $v_2 - c_2 \leq r_B + r_S$ with high probability, this suggests insignificant lock-in.

For simplicity we assume that B has all the bargaining power in any negotiation or renegotiation at date 1. Although bargaining at date 1 occurs under symmetric information it is not costless. Following Hart and Moore (2008), we suppose that the parties have different feelings of entitlement concerning their payoffs from bargaining and since at least one of them will be disappointed this leads to aggrievement and shading and consequently deadweight losses. More precisely, whenever there is some surplus to divide, each party feels entitled to all of it[17]. If a party receives d dollars less than what he feels entitled to, he is aggrieved by d and hurts the other party by θd, where $0 < \theta < 1$ is an exogenous parameter. The aggrieved party does this by "shading", that is, by being less cooperative or helpful, at the same time as staying within the terms of the contract[18]. Shading, which is non-contractible, has no effect on the payoff of the party doing the shading: it simply hurts the other party.

In contrast there is no aggrievement or shading at date 0 since the terms of the initial contract are determined competitively and so "there is nothing to argue about": there is no surplus to divide. All these assumptions are discussed at greater length in Hart and Moore (2008)[19].

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[17] Our results would not change significantly if each party felt entitled to a fraction α of the surplus, where $\frac{1}{2} < \alpha \leq 1$.

[18] As an example of shading, a party could withhold some useful information.

[19] It is worth saying a little more about the assumption that $v_{2,} c_2$ can be observed by both parties but are not verifiable and so cannot be part of a contingent or indexed contract. Imagine that S's costs rise from period 1 to period 2. S knows this and can perhaps produce an argument or evidence to B that will persuade him that this is indeed the case. However, if the parties wrote an ex ante contract that said that price will rise if S produces evidence that c has risen, then this could lead to abuse: S could produce something that looks like evidence but isn't really. In other words, the observability but nonverifiability of evidence can justify the assumption that $v_{2,} c_2$ are observable but not verifiable.

2.1. Long-term contract

Suppose first that the parties write a long-term contract at date 0, specifying trade in both periods (a specific performance contract). Without loss of generality we can assume the same price in each period, which we denote p. At date 1 the parties will learn v_2, c_2, r_B and r_S. It is efficient for trade to occur in the second period if and only if $v_2 - c_2 \geq r_B + r_S$. With a long-term contract renegotiation will therefore occur if $v_2 - c_2 < r_B + r_S$.[20]

Recall that we assume that B has all the bargaining power. Thus B will offer S an amount $(p - c_2 - r_S)$ in return for not trading. Then, after exercising her outside option, S's second period payoff equals her payoff under the existing contract, $(p - c_2)$. However, S feels entitled to 100% of the surplus from renegotiation, and is aggrieved that she does not get it. In other words, S feels entitled to a payoff $r_B - v_2 + p$ (which would make B's payoff, after exercising his outside option, $v_2 - p$, as under the specific performance contract). S is aggrieved by the difference between what she feels entitled to and what she receives, $r_B + r_S - v_2 + c_2$, and S takes out her aggrievement on B by shading to reduce B's payoff by $\theta(r_B + r_S - v_2 + c_2)$[21].

The bottom line is that, if $v_2 - c_2 < r_B + r_S$, after renegotiation B's second period payoff $= r_B + r_S - p + c_2 - \theta(r_B + r_S - v_2 + c_2)$ and S's second period payoff $= p - c_2$. The deadweight losses from renegotiation $= \theta(r_B + r_S - v_2 + c_2)$[22].

With these preliminaries out of the way, we can now turn to an optimal long-term contract. An optimal long-term contract maximizes B's expected payoff subject to S receiving at least $\bar{u}$. That is, it solves:

$$(2.1) \qquad Max\ (v_1 - p) + \int_{v_2 - c_2 > r_B + r_S} (v_2 - p) dF + \int_{v_2 - c_2 \leq r_B + r_S} [r_B + r_S - p + c_2 - \theta(r_B + r_S - v_2 + c_2)] dF$$

[20] For simplicity we assume that the contract always has to be renegotiated to achieve no trade. This might not be the case, however, if $v_2 - r_B < p < c_2 + r_S$ since both parties want to walk away from the contract. Allowing for renegotiation only if $v_2 - r_B > p$ or $c_2 + r_S < p$ would complicate matters without significantly changing our results.

[21] Note that it does not pay B to be generous and give S some of the surplus since an extra dollar for S reduces S's shading by θ, and so B's payoff falls by $1 - \theta$.

[22] In Hart and Moore (2008), it is assumed that a party can shade only if trade takes place: the party hurts the other party during the trading process, e.g., a seller is less cooperative or helpful (but achieves this without violating the contract). Here we assume that S can shade in a renegotiation that leads to no trade (and for simplicity that the shading parameter θ is the same). One way S could shade is by being difficult, disagreeable or unresponsive during the renegotiation process (e.g., S could drag things out by not answering B's phone calls or emails promptly). Of course, such behavior could also affect S's payoff, something we do not allow for here. Obviously, there are other reasons why renegotiation may lead to deadweight losses. We appeal to aggrievement and shading because we will use these ideas in what follows.

S.T.

(2.2) $\quad (p - c_1) + \int (p - c_2) dF \geq \overline{u}.$

Obviously (2.2) holds with equality since (2.1) is decreasing in p. Letting U_B, U_S be B's and S's overall payoffs, respectively, and substituting (2.2) into (2.1) yields

(2.3)

$$U_B^{LT} = (v_1 - c_1) + \int\limits_{v_2 - c_2 > r_B + r_S} (v_2 - c_2) dF + \int\limits_{v_2 - c_2 \leq r_B + r_S} [r_B + r_S - \theta(r_B + r_S - v_2 + c_2)] dF - \overline{u},$$

$$U_S^{LT} = \overline{u}.$$

In other words, B's payoff equals social surplus net of shading costs minus $\overline{u}$.

We should emphasize that we have considered only a particular kind of long-term contract. More general long-term contracts would allow one or both parties to breach by paying (possibly zero) damages. We will consider another type of long-term contract — a renewable contract — in Section 4, but simply note at this point that our results do not change significantly if more general contracts are allowed.

2.2. Short-term contract

We consider next the case where B and S sign a contract that specifies trade only for period 1 *with no commitment, promise, or understanding that the parties will be bound by considerations of fairness or good faith if they negotiate a future contract*.

Obviously, if $v_2 - c_2 \leq r_B + r_S$, no trade will occur in period 2. If $v_2 - c_2 > r_B + r_S$, the parties will (re)negotiate from scratch since no promises have been made: the reference point is no trade. The implication of this is that B offers S a payoff equal to r_S, but S feels entitled to $v_2 - c_2 - r_B$ (which would make B's payoff equal to r_B). Thus S's aggrievement is $A = v_2 - c_2 - r_B - r_S$, shading $= \theta(v_2 - c_2 - r_B - r_S)$, and B's net payoff $= r_B + (1 - \theta)(v_2 - c_2 - r_B - r_S)$ while S's payoff is r_S.

Let p_1 be the first period price. An optimal short-term contract solves:

(2.4) $\quad Max\ (v_1 - p_1) + \int r_B dF + \int_{v_2 - c_2 > r_B + r_S} (1 - \theta)(v_2 - c_2 - r_B - r_S) dF$

S.T.

(2.5) $\quad (p_1 - c_1) + \int r_S dF \geq \overline{u}.$

Again (2.5) holds with equality since B can always gain from reducing p_1. Hence

(2.6) $\quad U_B^{ST} = (v_1 - c_1) + \int (r_B + r_S) dF + \int_{v_2 - c_2 > r_B + r_S} (1-\theta)(v_2 - c_2 - r_B - r_S) dF - \overline{u},$

$U_S^{ST} = \overline{u}.$

As above, B's payoff equals social surplus net of shading costs minus $\overline{u}$.

2.3. Continuing contract

We now turn to what we call a continuing contract. A continuing contract is a contract that specifies trade in the first period, does not commit the parties to trade in the second period, *but includes some commitment, promise, or understanding that the parties will be bound by considerations of fairness or good faith if they do negotiate a future contract*.

It is convenient to start analyzing continuing contracts in the case where there are no outside options at date 1, $r_B \equiv r_S \equiv 0$.

2.3.1. Continuing contract with no outside options

With no outside options we formalize the idea of fairness or good faith as follows. At date 1, if $v_2 \leq c_2$, the parties walk away and surplus is zero[23]. However, if $v_2 > c_2$, they bargain using the period 1 contract as a reference point. If conditions have not changed much, that is, $v_2 \approx v_1, c_2 \approx c_1$, then good faith means that the price should not change much. (There is an exception to this, noted below, if $p_1 < c_1$ or $p_1 > v_1$.) On the other hand, if v_2 or c_2 do change relative to v_1, c_1, then good faith means that the price can change but only commensurate with the changes in v and c.

To be precise, suppose $v_2 > c_2$, and let $\Delta G = (v_2 - c_2) - (v_1 - c_1)$. We distinguish between the cases $\Delta G \geq 0$ and $\Delta G < 0$. Previously we assumed that each party feels entitled to 100% of any change in surplus. However, that was for the case where the change was always positive. We now assume that B

[23] We are ruling out the possibility that one or other party might feel aggrieved and shade in the event that trade does not occur given that it could have; for example, if S's cost is low she might be angry with B that his value is even lower. One justification, consistent with Hart and Moore (2008), is that it is difficult for a party to hurt another party who walks away: shading can occur only if trade takes place or if a renegotiation is required. (Of course, particularly these days, you can hurt someone by bad-mouthing them or posting negative comments on a website, but the damage may be less than if you are in a relationship with them.) Note also that one interpretation of good faith bargaining that the courts have used would require a party to show that they are justified in quitting, and thus unilateral quitting would not be costless (see footnote 3 and the references therein). See Section 3 for a related idea.

and S's self-serving biases are such that each party feels entitled to any *increase* in surplus but feels that the other should suffer any *decrease* in surplus. However, both regard the initial contract as a reference point.

Before continuing, we should note that our assumption that the parties focus on changes in surplus rather than changes in v, c independently is only one of several possibilities. It would also be plausible to assume that B attributes increases in v (resp., in c) to B's (resp.,S's) actions or talent and decreases in v (resp., in c) to luck; and vice versa for S. This would change some details but not the thrust of the analysis. The important thing is that it is changes in v, c not absolute values that matter in a continuing contract.

Let us return to the case where each party feels entitled to increases but not decreases in surplus. Then B regards $\underline{p}$ as a reasonable price where

(2.7) $\underline{p} - c_2 = p_1 - c_1 + Min(\Delta G, 0)$.

That is, B believes that S's period 2 payoff should equal her period 1 payoff if $\Delta G \geq 0$ and fall by $-\Delta G$ if $\Delta G < 0$. However, B recognizes that he cannot offer a price below c_2 ($\underline{p} < c_2$ if $p_1 < c_1$ and $\Delta G > 0$) and, of course, B would never offer a price in excess of v_2 ($\underline{p} > v_2$ if $p_1 > v_1$ and $\Delta G < 0$). Thus B will adjust $\underline{p}$ so that it lies in the $[c_2, v_2]$ range and offers S

(2.8) $\hat{p} = Min\left(v_2, Max\left(\underline{p}, c_2\right)\right)$.

By a parallel argument, S regards $\overline{p}$ as a reasonable price where

(2.9) $\overline{p} - c_2 = p_1 - c_1 + Max(\Delta G, 0)$.

That is, S thinks that her payoff should rise by ΔG if $\Delta G \geq 0$ and stay the same if $\Delta G < 0$. However, S recognizes that price must lie between c_2 and v_2 and so feels entitled to

(2.10) $\tilde{p} = Min\big(v_2, Max(\overline{p}, c_2)\big)$.

It follows that S's aggrievement is given by $A = \tilde{p} - \hat{p}$ and she shades by θA. Hence B's and S's period 2 payoffs are given by

(2.11) $U_B^2 = v_2 - \hat{p} - \theta(\tilde{p} - \hat{p})$,

(2.12) $U_S^2 = \hat{p} - c_2$,

respectively.

To illustrate, return to the example of the introduction. Suppose that $v_1 = 20$, $c_1 = 10$ and $p_1 = 15$. Assume that at date 1 it is learned that $v_2 = 24$, $c_2 = 10$ (surplus goes up by 4). Then with a continuing contract B will regard 15 as the appropriate price (this gives all the additional surplus to B), while S will regard 19 as the appropriate price (this gives all the additional surplus to S). B will offer 15 but S will be aggrieved by 4 and will shade by 4θ.

In contrast, suppose instead that it is learned that $v_2 = 24,\ c_2 = 20$ (surplus goes down by 6). Now B regards 19 as the right price since this makes S bear the full decrease in surplus. However, S will not trade at 19 and so B adjusts his notion of entitlement so that 20 becomes a reasonable price. S regards 25 as a reasonable price by a similar argument, but since B will not trade at this price she adjusts her entitlement to 24. Thus B will offer 20 but S will be aggrieved by 4 and will shade by 4θ.

Given the above, an optimal continuing contract solves:

(2.13) $Max\ (v_1 - p_1) + \int_{v_2 > c_2} \big(v_2 - \hat{p} - \theta(\tilde{p} - \hat{p})\big) dF$

S.T.

(2.14) $(p_1 - c_1) + \int_{v_2 > c_2} (\hat{p} - c_2) dF \geq \overline{u}.$

It is easy to see that (2.14) holds with equality: if not, reducing p_1 a little reduces $\hat{p}$ and $\tilde{p}$ and hence raises $v_2 - (1-\theta)\hat{p} - \theta\tilde{p}$, which increases (2.13)[24]. Substituting (2.14) into (2.13) we can write the parties' payoffs as

(2.15) $U_B^C = (v_1 - c_1) + \int_{v_2 > c_2} [v_2 - c_2 - \theta(\tilde{p} - \hat{p})] dF - \overline{u},$

$U_S^C = \overline{u}.$

Note that p_1 affects $(\tilde{p} - \hat{p})$ and so is still present in (2.15). Thus in contrast to a short-term or long-term contract it is not the case that U_B^C changes one to one with $\overline{u}$.

2.3.2. Continuing contract with market based outside options (Case M)

We now allow for the possibility that $r_B, r_S \neq 0$. This does not greatly change the analysis to the extent that appealing to outside options in the bargaining process is consistent with fair dealing and good faith, e.g., because they correspond to market trends — see the discussion in the introduction. We refer to this as Case M (M for market). However, fair dealing and good faith may limit the extent to which parties can incorporate outside options into the bargaining process if the outside options are

[24] Note that p_1 plays two roles. It acts as a reference point for the period 2 price and it also serves to distribute surplus. We are ruling out the possibility that a lump sum transfer can be used to distribute surplus independently of the first period price. Our assumption is that, if this were attempted, the parties would "see through it" and use the average of the two as a reference point.

idiosyncratic and do not represent market trends: doing so may be seen as opportunistic. We refer to this as Case I (I for idiosyncratic). In this case the analysis does change significantly, as we will see in Section 2.3.3[25] .

In Case M, we suppose that each party is willing to match the other party's outside option if this is necessary to ensure trade. If $v_2 - c_2 \leq r_B + r_S$, the parties walk away and take their outside options. Suppose $v_2 - c_2 > r_B + r_S$. Then B thinks that $\underline{p}$ is a reasonable price but recognizes that price must lie in the $[c_2 + r_S, v_2 - r_B]$ range for trade to occur and so offers S

(2.16) $$\hat{p}^M = Min\left(v_2 - r_B, Max\left(\underline{p}, c_2 + r_S\right)\right).$$

S thinks that $\overline{p}$ is a reasonable price but recognizes that price must lie in the $[c_2 + r_S, v_2 - r_B]$ range for trade to occur and so adjusts her entitlement to

(2.17) $$\tilde{p}^M = Min\left(v_2 - r_B, Max(\overline{p}, c_2 + r_S)\right).$$

In other words, in Case M, each party is willing to go outside the $[\hat{p}, \tilde{p}]$ range to match the other party's outside option if this is necessary to ensure trade; but neither party will go further nor is this expected.

As an example, suppose $v_1 = 20$, $c_1 = 10$ and $p_1 = 15$. At date 1 it is learned that $v_2 = 24$, $c_2 = 10, r_B = 0$, $r_S = 11$. Without outside options B would offer S 15 in period 2. S feels entitled to 19, and is aggrieved by 4. With S's outside option, in Case M, B is willing to match the outside option and offer 21, and S does not expect more: $\hat{p}^M$ = $\tilde{p}^M = 21$ [26]. Thus trade takes place and there will be no shading.

An optimal continuing contract solves:

(2.18) $$Max\ (v_1 - p_1) + \int_{v_2 - c_2 > r_B + r_S} \left(v_2 - \hat{p}^M - \theta(\tilde{p}^M - \hat{p}^M)\right) dF + \int_{v_2 - c_2 \leq r_B + r_S} r_B dF$$

S.T.

(2.19) $$(p_1 - c_1) + \int_{v_2 - c_2 > r_B + r_S} (\hat{p}^M - c_2) dF + \int_{v_2 - c_2 \leq r_B + r_S} r_S dF \geq \overline{u}.$$

As before, (2.19) holds with equality and so we obtain

(2.20) $$U_B^{CM} = (v_1 - c_1) + \int_{v_2 - c_2 \leq r_B + r_S} (r_B + r_S) dF + \int_{v_2 - c_2 > r_B + r_S} \left(v_2 - c_2 - \theta(\tilde{p}^M - \hat{p}^M)\right) dF - \overline{u},$$

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[25] Of course, any real situation will include elements of both cases: with some probability the outside options will represent market trends and can be included in bargaining and with some probability they will not represent market trends and cannot be included. To simplify we consider the two cases separately.

[26] Note that (2.16) and (2.17) are not simply (2.8) and (2.10) with v_2, c_2 replaced by $v_2 - r_B$, $c_2 + r_S$. The reason is that the formulae for $\underline{p}$, $\overline{p}$ depend on v_2, c_2 not $v_2 - r_B$, $c_2 + r_S$. In particular, in the numerical example, if we replace c_2 by $c_2 + r_S$ =11 and set $r_S = 0$, then according to the logic of Section 2 $\hat{p}$ =24, $\tilde{p} = 21$.

$$U_S^{CM} = \overline{u}.$$

The next proposition covers both the case of no outside options and the case of market based outside options. It says that a continuing contract is always at least as good for B as a short-term contract (S is indifferent since she always gets $\overline{u}$).

Proposition 1

With no outside options or with market based outside options, a continuing contract is superior to a short-term contract.

Proof: Consider an optimal continuing contract with market based outside options. We know from (2.6) and (2.20) that

$$\text{(2.21)} \quad U_B^{CM} = (v_1 - c_1) + \int_{v_2 - c_2 \leq r_B + r_S} (r_B + r_S) dF + \int_{v_2 - c_2 > r_B + r_S} \left(v_2 - c_2 - \theta(\tilde{p}^M - \hat{p}^M)\right) dF - \overline{u}$$

$$\geq (v_1 - c_1) + \int (r_B + r_S) dF + \int_{v_2 - c_2 > r_B + r_S} (1 - \theta)(v_2 - c_2 - r_B - r_S) dF - \overline{u} = U_B^{ST},$$

where the inequality follows from the fact that $\tilde{p}^M - \hat{p}^M \leq v_2 - c_2 - r_B - r_S$. The proof for the no outside options case is similar. Q.E.D.

In other words, with no or market based outside options good faith is always a plus: it reduces aggrievement and shading since, with the first period contract as a reference point, there is less to argue about in period 2.

Thus in the case of no outside options or market based outside options the optimal contract boils down to a horse-race between a continuing contract and a long-term contract. Proposition 2 describes a situation where a continuing contract is superior to a long-term contract.

Proposition 2 (for Case M)

Suppose $Prob(|(v_2 - c_2) - (v_1 - c_1)| \leq \varepsilon | v_2 - c_2 > r_B + r_S) = 1$ for some $\varepsilon > 0$. Assume $0 < Prob(v_2 - c_2 > r_B + r_S) < 1$. Then for ε small enough a continuing contract is optimal.

Proof

Note that a continuing contract achieves the first-best if $\varepsilon = 0$. If $v_2 - c_2 \leq r_B + r_S$, the parties walk away. If $v_2 - c_2 > r_B + r_S$ by good faith bargaining the price can change only if a price change is necessary to match an outside option. B offers S $\hat{p}^M = Min\left(v_1 - r_B, Max(p_1, c_1 + r_S)\right)$ and there is nothing to argue about in period 2. p_1 is chosen so that $(p_1 - c_1) + \int_{v_2-c_2>r_B+r_S}\big(Min\big(v_1 - r_B, Max(p_1, c_1 + r_S)\big) - c_1\big)dF + \int_{v_2-c_2\leq r_B+r_S} r_S dF = \overline{u}$ and B obtains all the surplus. Thus the first-best is achieved. A long-term contract does not achieve the first-best since renegotiation and shading occur if $v_2 - c_2 < r_B + r_S$. Also, by Proposition 1, a short-term contract is inferior to a continuing contract. Therefore a continuing contract is optimal. By continuity the same is true if $\varepsilon > 0$ is small. Q.E.D.

Proposition 2 says that in Case M a continuing contract will be optimal if conditional on trade being efficient in the second period surplus does not change very much relative to the first period (a leading case of this is, of course, where $v_2 \approx v_1, c_2 \approx c_1$). Then by good faith bargaining the price cannot change – unless it is necessary to match an outside option – and there is nothing to argue about. To put it in everyday language a continuing contract works well if it is known in advance that either business will remain as usual or a big change will occur that will make it efficient for the relationship to break up[27]. A continuing contract allows the parties to break up costlessly while a long-term contract would have to be renegotiated, resulting in shading.

As a simple example, without outside options, suppose $v_1 = 20$, $c_1 = 10$; and with probability ½ $v_2 = 20$, $c_2 = 10$, while with probability ½ $v_2 < c_2$. Then a continuing contract achieves the first-best, whereas a long-term contract does not.

2.3.3. Continuing contract with idiosyncratic outside options (Case I)

When outside options are idiosyncratic (Case I) they *cannot* be used in bargaining. Now matters become more complex. It is helpful to start with the same example: $v_1 = 20$, $c_1 = 10$, $p_1 = 15$, $v_2 = 24$, $c_2 = 10$, $r_B = 0$, but let us not fix r_S. Without outside options, as noted, B would offer 15 in the second period, while S feels entitled to 19. With S's outside option we suppose that B is willing to adjust the price up to 19 if this is necessary to ensure trade but he is not willing to go any further. In other words, B is flexible enough to accept that some or all of the increase in surplus can be attributed to S but not to go beyond this: any further price increase would smack of opportunism. Of course, with B's increased

[27] As noted earlier in this section, our assumption that the parties focus on changes in surplus rather than changes in v, c independently is not incontrovertible. A more restricted version of Proposition 2 (and 3(i) below) applies to the case where entitlements can depend on changes in v, c: we must now assume $v_2 \approx v_1, c_2 \approx c_1$. Another qualification should be noted. We have assumed that v_1, c_1 are known for sure. But suppose, say, that the buyer is uncertain about the suitability of the seller's product. Then v_1 represents an expected value. If the buyer learns that the product is suitable the value in the second period will be higher even if nothing else has changed. It seems reasonable that good faith bargaining now means that the price should not change even though $v_2 > v_1$. Our analysis and propositions can be extended to this case.

flexibility, trade can occur whenever $r_S \leq 9$. But, if $9 < r_S < 14$ trade will not occur even though this is inefficient. Thus in Case I good faith sometimes leads to inefficient outcomes.

It is worth rehearsing the arguments given in the introduction for why a price above 19 is infeasible in Case I. The first argument is that B would feel exploited and is not prepared to accept this even if the result is to leave money on the table. The second is that S feels uncomfortable as the exploiter or opportunist. The third is that, even if each can stomach their distaste and negotiate a price above 19, the lingering aggrievement on B's part, and his consequent shading, would be so great that S would be worse off accepting the new terms than if she simply quit and took her outside option.

Let us now move to the general analysis. As we have seen B feels that $\hat{p} = Min\left(v_2, Max\left(\underline{p}, c_2\right)\right)$ is a reasonable price. However, B is willing to ascribe all increases in surplus and no decreases in surplus to S if this is necessary to ensure trade, which yields $\tilde{p} = Min\big(v_2, Max(\overline{p}, c_2)\big)$ as a reasonable price. (Of course, this is the price S thinks is reasonable although analogously to B she is flexible enough to accept $\hat{p}$ if this is necessary to ensure trade.) Thus the range of acceptable prices is $[\hat{p}, \tilde{p}]$. If this range intersects with the range $[c_2 + r_S, v_2 - r_B]$, trade is possible; otherwise it is not. (If $v_2 - r_B < c_2 + r_S$ the intersection is of course empty.) In our example $[\hat{p}, \tilde{p}] = [15,19]$, $[c_2 + r_S, v_2 - r_B] = [10 + r_S, 24]$ and so the intersection is nonempty as long as $r_S \leq 9$.

If $[c_2 + r_S, v_2 - r_B] \cap [\hat{p}, \tilde{p}] \neq \emptyset$, let p' be the smallest price in the intersection and p'' the largest price. B will offer p', S will be aggrieved by $(p'' - p')$ and shading $= \theta(p'' - p')$.

Thus a continuing contract solves:

(2.22) $$Max\ (v_1 - p_1) + \int_{[c_2+r_S,v_2-r_B]\cap[\hat{p},\tilde{p}]\neq\emptyset}\big(v_2 - p' - \theta(p'' - p')\big)dF + \int_{[c_2+r_S,v_2-r_B]\cap[\hat{p},\tilde{p}]=\emptyset,} r_B dF$$

S.T.

(2.23) $$(p_1 - c_1) + \int_{[c_2+r_S,v_2-r_B]\cap[\hat{p},\tilde{p}]\neq\emptyset}(p' - c_2)dF + \int_{[c_2+r_S,v_2-r_B]\cap[\hat{p},\tilde{p}]=\emptyset} r_S dF \geq \overline{u}.$$

An important difference from previous analysis is that (2.23) may not be binding at the optimum. The reason is that (2.22) may not be monotonic in p_1 given that a lower p_1 may lead to inefficient outcomes. In other words an "efficiency" wage (or price) may be optimal. Also it is no longer true that a continuing contract is always superior to a short-term contract. Example 2.1 illustrates both of these possibilities.

<u>Example 2.1</u>

There is no uncertainty, $v_1 = 20, c_1 = 10, v_2 = 20, c_2 = 10,\ r_S = 1, \overline{u} = 1$.

Consider a continuing contract in Case I. Suppose $10 \leq p_1 \leq 20$. Since $v_2 = v_1,\ c_2 = c_1,\ \overline{p} = \underline{p} = p_1$ and so $\hat{p} = \tilde{p} = p_1$. That is, $p_2 = p_1$: no change in price is possible. Hence, given S's outside option in period 2, trade will occur in period 2 only if $p_2 = p_1 \geq 11$. Given $p_1 \geq 11$, it is optimal for B to set $p_1 = 11$: this ensures trade in both periods and yields $U_B = 18, U_S = 2$. Alternatively, if $p_1 < 11$, since no trade occurs in period 2, it is best for B to set $p_1 = 10$. This yields $U_B = 10, U_S = 1$. (It is easy to show that $p_1 < 10$ or $p_1 > 20$ is not optimal.)

Obviously the first contract is superior, and this gives S more than her reservation utility $\overline{u}$. As promised (2.23) is not binding.

Now let's compare the optimal continuing contract with a short-term contract. Under a short-term contract

$$U_S^{ST} = p_1 - c_1 + r_S = \overline{u}$$

and so $p_1 = 10$. Hence

$$U_B^{ST} = 10 + (1-\theta)9 = 19 - 9\theta$$

$$> 18 = U_B^{CI}$$

if $\theta < \frac{1}{9}$.

In other words, if $\theta < \frac{1}{9}$, a short-term contract is superior to a continuing contract: the reason is that the shading cost is less than the cost of offering S an efficiency wage.

Of course, in this example, with no uncertainty, a long-term contract achieves the first-best since trade is always efficient. However, it is easy to construct a version of Example 2.1 with uncertainty where for some parameters a short-term contract is optimal in Case I; and for other parameters a continuing contract is optimal and the seller receives a utility level strictly above $\overline{u}$. See Halonen-Akatwijuka and Hart (2015).

Proposition 3 provides some general conditions under which the contracts can be ranked in Case I.

<u>Proposition 3 (for Case I)</u>

(i) Suppose $Prob(|(v_2 - c_2) - (v_1 - c_1)| \leq \varepsilon, r_B \leq \varepsilon, r_S \leq \varepsilon | v_2 - c_2 > r_B + r_S) = 1$ for some $\varepsilon > 0$. Assume $0 < Prob(v_2 - c_2 > r_B + r_S) < 1$ and $\overline{u} \geq Er_S$. Then for ε small enough a continuing contract is superior to a long-term or a short-term contract.

(ii) Suppose there exist r_1, r_2 such that $(v_1, c_1, r_1, r_S) \in$ support F for some r_S and $(v_1, c_1, r_B, r_2) \in$ support F for some r_B, where $v_1 - c_1 > r_B + r_2$, $v_1 - c_1 > r_1 +$

r_S, $v_1 - c_1 < r_1 + r_2$. Then for θ small enough a long-term or a short-term contract is superior to a continuing contract.

Proof

To prove (i), note that a continuing contract achieves the first-best if $\varepsilon = 0$. The reason is that either $v_2 - c_2 \le r_B + r_S$ and the parties walk away or $v_2 - c_2 > r_B + r_S$ and there is nothing to argue about in period 2 since by good faith bargaining no change in price is possible. Furthermore, since $r_B = r_S = 0$ trade occurs. p_1 is chosen so that $(p_1 - c_1) + \int_{v_2 - c_2 > r_B + r_S} (p_1 - c_1) dF + \int_{v_2 - c_2 \le r_B + r_S} r_S dF = \bar{u}$. Note that $p_1 \ge c_1$ since $\bar{u} \ge E r_S$. Therefore B obtains all the surplus and the first-best is achieved. In contrast, a long-term contract does not achieve the first-best since renegotiation and shading occur if $v_2 - c_2 < r_B + r_S$. Similarly a short-term contract does not achieve the first-best since shading occurs if $v_2 - c_2 > r_B + r_S$. By continuity a continuing contract remains optimal if $\varepsilon > 0$ is small given that p_1 can be adjusted slightly to ensure that trade continues to take place in the presence of small outside options.

To prove (ii), note that if θ is small a long-term or short-term contract approximates the first-best. In contrast a continuing contract does not since good faith bargaining leads to a second period price equal to p_1 if $v_2 = v_1$, $c_2 = c_1$. In (v_1, c_1, r_1, r_S) trade occurs if and only if $p_1 \in [c_1 + r_S, v_1 - r_1]$ and in (v_1, c_1, r_B, r_2) trade occurs if and only if $p_1 \in [c_1 + r_2, v_1 - r_B]$. Trade cannot occur in both since by assumption $v_1 - r_1 < c_1 + r_2$. Q.E.D.

Proposition 3(i) is similar to Proposition 2. A continuing contract works well if either business is as usual or it is efficient for the relationship to break up. In Case I there is an additional condition: the outside options have to be low when trade is efficient. This ensures that there is no inefficient quit when outside options cannot be used in bargaining. Under these conditions a continuing contract approximates the first-best. A long-term contract would have to be renegotiated when trade is inefficient and a short-term contract would have to be (re)negotiated from scratch when trade is efficient, both leading to argument and shading.

Proposition 3(ii), on the other hand, depicts conditions where a continuing contract does not work well in Case I. If the shading costs are negligible, a short-term or a long-term contract approximates the first-best. However, a continuing contract may lead to an inefficient outcome in a situation where the surplus does not change, trade is efficient, but S and B have (moderately) high outside options. Then to keep S from quitting requires a high enough p_2 while the opposite is true for B. In Case M a continuing contract still works well under these conditions since p_2 can respond to outside options whenever it is efficient to trade.

3. For-cause contracts

We have seen that in Case I good faith can lead to an inefficient outcome: an agent may leave the relationship if price cannot adjust to meet his outside option. We now explore one way the parties can mitigate this effect: through the use of "for-cause" contracts.

For-cause contracts are common in the employment context[28]. Under such a contract an employer can dismiss a worker only for a good reason, e.g., if he misbehaves or if the firm downsizes. Our model is too simple to allow for misbehavior and so we focus on downsizing as the only legitimate reason.

We suppose that under a for-cause contract B can refuse to trade with S in the second period if he claims that production is unprofitable, but then, as "proof", B cannot trade with anyone else. In this section we continue with our symmetric treatment and so we will suppose that for-cause applies also to S. Specifically, if S refuses to trade with B, it must be because trade is unprofitable for S. But then S cannot take her outside option.

In reality, for-cause is probably more common on the buyer (employer) side than the seller (employee) side, but for-cause does exist on the seller side too. A non-compete contract achieves something close to for-cause on the seller side. A non-compete does not permit the seller to work with another (competing) buyer for a period of time; one can interpret this to mean that her effective outside option drops from r_S to zero[29].

We will allow the parties to renegotiate a for-cause contract ex post.

Under a for-cause contract it does not matter whether we are in Case M or Case I. The reason is that price does not have to adjust to keep the parties in the relationship given that neither party has the right to quit absent renegotiation.

[28] According to the common law a standard employment contract is interpreted to be at-will: either party can leave the relationship for any or no reason. However, between 1979 and 1995, 46 states in the U.S. imposed some for-cause restrictions on employment contracts. See Autor (2003). Also for-cause employment contracts are very common in the rest of the world. Employment Protection Legislation in most OECD countries, with the exception of Iceland, Israel and the U.S., requires a reasonable cause for dismissal. http://www.oecd.org/els/emp/All.pdf

[29] Contracts where one party can pay a penalty to abrogate a for-cause clause are also possible. We do not consider them here. We should also note that in the employment context there may be an asymmetry in price adjustment. While it may be acceptable for a worker to use an outside job offer to justify a wage increase it may not be acceptable for a firm to use the availability of cheap outside labor to pay a lower wage (or it would lead to so much shading that it would be counterproductive). We return to this later.

To analyze the optimal for-cause contract, suppose first that B and S learn at date 1 that $v_2 - c_2 \geq r_B + r_S$. Then the contract will not be renegotiated since trade is efficient. The outside options are irrelevant since neither party can walk away. Hence the analysis is as in Section 2.3.1. B will offer S

(3.1) $\hat{p} = Min\left(v_2, Max\left(\underline{p}, c_2\right)\right)$,

and S will shade by $\theta(\tilde{p} - \hat{p})$, where

(3.2) $\tilde{p} = Min\left(v_2, Max(\overline{p}, c_2)\right)$.

The parties' period 2 payoffs are

(3.3) $U_B^2 = v_2 - \hat{p} - \theta(\tilde{p} - \hat{p})$,

(3.4) $U_S^2 = \hat{p} - c_2$.

Suppose next that $v_2 - c_2 < r_B + r_S$. Then renegotiation will occur to allow the parties to trade elsewhere. There are two subcases. If $v_2 \leq c_2$, in the absence of renegotiation the parties would not trade and so each would get a payoff of zero. In this subcase B will offer S $-(r_S)$, S will feel entitled to r_B, and S will shade by $\theta(r_B + r_S)$. The period 2 payoffs are

(3.5) $U_B^2 = (1-\theta)(r_B + r_S)$,

(3.6) $U_S^2 = 0$.

The second subcase is where $v_2 > c_2$. Then in the absence of renegotiation B and S would bargain in good faith and agree to trade. The analysis of good faith bargaining is the same as in Section 2.3.1. B will offer $\hat{p}$, and S will feel entitled to $\tilde{p}$. S's payoff $= \hat{p} - c_2$. Consider now the renegotiation to allow the parties to trade elsewhere. B will offer S $-r_S + \hat{p} - c_2$, and S will feel entitled to $r_B - v_2 + \tilde{p}$. S's total shading $= \theta(r_B + r_S - v_2 + c_2 + \tilde{p} - \hat{p})$. Thus period 2 payoffs will be given by

(3.7) $U_B^2 = r_B + r_S - \hat{p} + c_2 - \theta(r_B + r_S - v_2 + c_2 + \tilde{p} - \hat{p})$,

(3.8) $U_S^2 = \hat{p} - c_2$.

It follows that an optimal for-cause contract solves:

(3.9) $Max\ (v_1 - p_1) + \int_{v_2 - c_2 \geq r_B + r_S} \left(v_2 - \hat{p} - \theta(\tilde{p} - \hat{p})\right) dF + \int_{v_2 \leq c_2} [(1-\theta)(r_B + r_S)] dF + \int_{v_2 - c_2 < r_B + r_S, v_2 > c_2} [r_B + r_S - \hat{p} + c_2 - \theta(r_B + r_S - v_2 + c_2 + \tilde{p} - \hat{p})] dF$

S.T.

(3.10) $(p_1 - c_1) + \int_{v_2 > c_2} (\hat{p} - c_2) dF \geq \overline{u}$.

Under a for-cause contract the inefficiency that arose with a continuing contract in Case I does not occur. In particular, trade takes place whenever $v_2 - c_2 > r_B + r_S$, since neither party can quit without renegotiation.

It is easily seen that B's payoff in (3.9) is decreasing in p_1: a reduction in p_1 reduces $(1-\theta)\hat{p} + \tilde{p}$. Hence (3.10) will be binding at an optimum. (Recall that this is also true for long-term and short-term contracts but was not true for continuing contracts in Case I.) We can therefore write B's payoff as

(3.11) $U_B^{FC} = v_1 - c_1 + \int_{v_2 - c_2 \geq r_B + r_S} \big(v_2 - c_2 - \theta(\tilde{p} - \hat{p})\big) dF$

$$+ \int_{v_2 \leq c_2} [(1-\theta)(r_B + r_S)] dF$$

$$+ \int_{v_2 - c_2 < r_B + r_S, v_2 > c_2} [r_B + r_S - \theta(r_B + r_S - \ v_2 + c_2 + \tilde{p} - \hat{p})] dF \ - \ \overline{u},$$

while

(3.12) $U_S^{FC} = \overline{u}$.

Let us refer to the continuing contracts of the previous section as at-will contracts. There are two types of at-will continuing contracts, depending on whether we are in Case M or Case I; but only one type of for-cause continuing contract.

It is easy to establish

Proposition 4

In Case M, an at-will continuing contract is superior to a for-cause continuing contract.

Proof

Compare (2.20) and (3.11) and note that $\tilde{p}^M - \hat{p}^M \ \leq \ \tilde{p} - \hat{p}$. Q.E.D.

This proposition tells us that for-cause contracts will not be useful if outside options can be used in bargaining. Since price can adjust to meet these outside options there is no reason to constrain people from taking them.

For-cause contracts can be useful, however, in Case I since they may prevent parties from quitting when this reduces surplus: in particular, trade will always occur when $v_2 - c_2 > r_B + r_S$. On the other hand, for-cause contracts involve renegotiation costs if $v_2 - c_2 < r_B + r_S$, and it is efficient for the parties to quit.

The following proposition identifies a situation where a for-cause contract approximates the first-best.

Proposition 5

Suppose that for some $\varepsilon > 0$, (i) $v_2 - c_2 \geq r_B + r_S \Rightarrow |(v_2 - c_2) - (v_1 - c_1)| \leq \varepsilon$, (ii) $v_2 - c_2 < r_B + r_S \Rightarrow v_2 < c_2$ and $r_B < \varepsilon$, $r_S < \varepsilon$. Then, if ε is small, a for-cause contract approximates the first-best.

Proof

(i) guarantees that, whenever trade is efficient, there is little to argue about given that the period 1 contract is a reference point. (ii) guarantees that, whenever trade is inefficient, there is also little to argue about given that $r_B + r_S$ is small. Q.E.D.

Two points should be noted. First, if there is a significant probability that $v_2 - c_2 < r_B + r_S$ and that $v_2 - c_2 > r_B + r_S$, then neither a long-term contract nor a short-term contract will approximate the first-best since both will involve (re)negotiation costs. Also an at-will continuing contract in Case I will not approximate the first-best if r_B or r_S can be high when $v_2 - c_2 \geq r_B + r_S$, since it will be impossible to find a p_1 such that neither party ever quits. Hence under the conditions of Proposition 5 a for-cause contract will be optimal among the contracts we have considered.

Note also that condition (ii) is less restrictive than it may appear. It says that when trade is inefficient between B and S neither party can do well elsewhere. But this may be the case if a high cost c_2 for S also means that S's cost of supplying elsewhere is high; and if a low value v_2 for B also means that B's value from buying elsewhere is low.

Proposition 5 can be interpreted as saying that a for-cause contract is good if either business is as usual or a big change will occur so that the gains from trade vanish both in the relationship and outside. Note the different role the outside options play in the first-best at-will contract of Proposition 3 and the for-cause contract of Proposition 5. Under the at-will contract outside options have to be low when trade is efficient but they can be high when the relationship breaks up. To the contrary under the for-cause contract outside options can be high when trade is efficient but they have to be low when the relationship breaks up. Therefore an at-will contract works well in Case I if efficient matching is important while a for-cause contract is optimal when viability is the main issue.

We are not aware of a substantial prior literature that tries to explain for-cause contracts. Levine (1992) shows that for-cause contracts are underprovided in the market although they could allow the firm to pay lower efficiency wages because they would attract employees talented in providing low effort without leaving a trail of evidence.[30] Autor (2003) argues that for-cause contracts (on the firm side) are useful to encourage workers to make non-contractible specific investments. We offer a complementary explanation: they can be useful to prevent parties from quitting in situations where quitting is inefficient but price cannot adjust to meet idiosyncratic outside options[31].

The above is only the beginning of an analysis of for-cause. First, the symmetry assumption could be dropped. There are many situations where an employee is free to quit but an employer is not free to dismiss an employee; and also others where an employer is free to dismiss an employee but the employee cannot quit to work for a competitor. There can also be an asymmetry on price adjustments. It may be acceptable for a worker to receive a higher wage on the basis of a good outside option but unacceptable for a firm to pay a lower wage because there are cheaper workers available (or if it did the consequences would be massive worker shading). In other words, there can be mixtures of Cases M and I.

Second, although some firms have for-cause firing in employment contracts, this is often imposed by legislatures.[32] The model of this section suggests that for-cause firing should often be chosen voluntarily. One way to reconcile these findings is to observe that in practice even at-will labor contracts may have some for-cause elements. Some authors have argued that employment comes with an implicit promise of a long-term relationship and that workforce reorganizations that eliminate jobs tarnish a firm's reputation (see Osterman (1988), Belous (1989), and Davis-Blake and Uzzi (1993)). Dismissing a worker without a good reason may also be bad for the morale of remaining workers. According to this interpretation, if a firm wants the flexibility of a true at-will contract, it should hire an independent contractor or a temporary worker rather than an employee. Viewed in this way the at-will continuing contracts of Section 2 should be interpreted as independent contractor arrangements and the for-cause continuing contracts of this section as employment arrangements. Our model then suggests that one advantage of an independent contractor relationship is that the buyer can terminate the independent seller if a cheaper, more efficient alternative becomes available; while a disadvantage is that the buyer will sometimes terminate the seller when a cheaper, *less* efficient alternative becomes available.

This is not the only way to view an arrangement with a temporary worker or independent contractor. In some cases such an arrangement might be closer to a short-term contract than a continuing contract, in the sense that not only is there no obligation not to trade with anyone else in the future, but also there is no understanding that the previous contract will be a reference point if the relationship continues.

[30] See Summers (1989) for a similar adverse selection argument for Employment Protection Legislation.

[31] Autor uses a traditional incomplete contracting approach and so more complicated mechanisms might achieve the first-best in his framework.

[32] For-cause firing is common in union contracts and in government jobs in the U.S. (Levine, 1992). Many private firms also specify reasons needed for dismissal in their personnel policies (Autor, 2003).

The above analysis provides a possible explanation of the recent shift to flexible employment arrangements in the U.S. and other countries, as documented by Katz and Krueger (2016) and Weil (2014). Suppose that as a result of new technology and increased off-shoring possibilities the value of flexibility has increased: the possibility of disruptive shifts means that it is more likely that the gains from trade will vanish. Assume further that in the absence of disruptive shifts business is “as usual”. Then, according to Propositions 2 and 3, an at-will contract is optimal. It would seem useful to pursue this idea in future work[33].

4. Renewable contracts or why more can be less

Continuing contracts allow the parties not to trade in the second period and also do not specify a second period price if they do trade. It is possible, however, to separate these features. This leads us to a consideration of renewable contracts. A renewable contract is a contract that specifies a first period price and a second period price if trade occurs, but allows either party to walk away in the second period. Another way to think of a renewable contract is that, concerning the second period, it is an “agreement to agree”. As mentioned in the introduction such contracts are observed in practice[34].

A renewable contract can then be represented by a first period price p_1 and a second period price p_2.[35]

Trade occurs in the second period at price p_2 if

(4.1) $v_2 - p_2 \geq r_{B,}$

(4.2) $p_2 - c_2 \geq r_S$.

If one of (4.1) – (4.2) fails to hold, but $v_2 - c_2 > r_B + r_S$ the parties renegotiate. In this case B offers S a price $p = c_2 + r_S$, S feels entitled to $v_2 - r_B$, and S shades by $\theta(v_2 - c_2 - r_B - r_S)$. An optimal renewable contract solves:

(4.3) $Max\ v_1 - p_1 + \int_{v_2 - p_2 \geq r_{B,} p_2 - c_2 \geq r_S} (v_2 - p_2)\, dF$

[33] Our explanation of the shift to flexible employment should be distinguished from a related one based on the idea that fairness norms dictate that workers within a firm cannot be treated very differently, while such norms do not apply across firms. Then a period of increasing dispersion in productivity might lead firms to outsource lower-wage work. See, e.g.,Weil (2014). We see this explanation as complementary to the one provided here.

[34] If the second period price equals the first period price a renewable contract can also be interpreted as an evergreen contract.

[35] We could consider a price range, with B choosing from this range ex post, instead of a single second period price (as in Hart and Moore (2008)). This would not change the analysis significantly.

$$+\int_{v_2-c_2>r_B+r_S, v_2-p_2<r_B \text{ or } p_2-c_2<r_S}[v_2-c_2-r_S-\theta(v_2-c_2-r_B-r_S)]dF+\int_{v_2-c_2<r_B+r_S} r_B dF$$

S.T.

(4.4) $$p_1-c_1+\int_{v_2-p_2\geq r_B, p_2-c_2\geq r_S}(p_2-c_2)dF+\int_{v_2-c_2>r_B+r_S, v_2-p_2<r_B \text{ or } p_2-c_2<r_S} r_S dF+\int_{v_2-c_2<r_B+r_S} r_S dF\geq \overline{u}.$$

Since (4.3) is decreasing in p_1, (4.4) will be binding at the optimum. Thus we can write

(4.5) $$U_B^R = Max_{p_2}\left[v_1-c_1+\int(r_B+r_S)dF+\int_{v_2-p_2\geq r_B, p_2-c_2\geq r_S}(v_2-c_2-r_B-r_S)\,dF+\int_{v_2-c_2>r_B+r_S, v_2-p_2<r_B \text{ or } p_2-c_2<r_S}[(1-\theta)(v_2-c_2-r_B-r_S)]dF-\overline{u}\right],$$

$$U_S^R=\overline{u}$$

Compared with a continuing contract, a renewable contract has advantages and disadvantages. The advantage is that the second period price is nailed down and so, if (4.1) – (4.2) are satisfied, trade will occur and there is nothing to argue about. In contrast, under a continuing contract, there will be argument and aggrievement if $v_2-c_2\neq v_1-c_1$ and, in Case I, trade may not occur at all. The disadvantage of a renewable contract is that, if (4.1) or (4.2) is not satisfied, the parties will bargain over the whole gains from trade $(v_2-c_2-r_B-r_S)$ in renegotiation and there will be substantial shading. In contrast under a continuing contract the use of the first period contract as a reference point may allow the parties to adjust to the new situation relatively easily.

Since our focus in this paper has been on continuing contracts we present two examples showing that a continuing contract can be superior to a renewable contract. We do not mean to suggest, however, that the ranking cannot be reversed[36].

<u>Example 4.1</u>

$(v_1,c_1)=(20{,}10),(v_2,c_2)=(20{,}10),(35{,}25)$ or $(10{,}20), r_B=r_S=0, \overline{u}=0.$

[36] In our formulation a renewable contract is always at least as good as a short-term contract. This is because the parties can always renegotiate if (4.1) or (4.2) fails to hold, as if the renewable contract never existed. This may be too optimistic. In some cases renegotiation of a renewable contract may be seen as opportunistic and the parties may simply walk away. A short-term contract can then be better than a renewable contract. A renewable contract may also have advantages and disadvantages relative to a continuing contract not captured in the text. In some cases, courts may make it hard for the parties to escape from or change the terms of a renewable contract (particularly if the parties have specified good faith bargaining; see footnote 3 and the references therein). This may reduce the scope for opportunistic behavior on the one hand, but also lead to inefficient outcomes on the other.

The first-best can be achieved with a continuing contract where $p_1 = 10$. In period 2 the surplus is the same as in period 1 if it is positive. Therefore the parties agree that S's payoff should be zero as in period 1. This yields $p_2 = 10$ if $(v_2, c_2) = (20{,}10)$ and $p_2 = 25$ if $(v_2, c_2) = (35{,}25)$. There is no shading.

In contrast, a renewable contract does not achieve the first-best since there is no $p_2 \in [10{,}20] \cap [25{,}35]$.

Example 4.2

$(v_1, c_1) = (20{,}10), (v_2, c_2) = (20{,}10)$ or $(10{,}20)$, $(r_B, r_S) = (7{,}0), (0{,}7)$ or $(4{,}4)$. (v_2, c_2) and (r_B, r_S) are independent. $\overline{u} = Er_S$.

Assume that outside options *can* be used in bargaining (Case M). Then a continuing contract with $p_1 = 10$ achieves the first-best. Suppose $(v_2, c_2) = (20{,}10)$. Then since $(v_2, c_2) = (v_1, c_1)$, both parties think that $p_2 = 10$ is a reasonable price. However, both recognize that outside options must be matched to ensure trade. This yields $p_2 = 10$ if $(r_B, r_S) = (7{,}0)$, $p_2 = 17$ if $(r_B, r_S) = (0{,}7)$, and $p_2 = 14$ if $(r_B, r_S) = (4{,}4)$. There is no aggrievement or shading.

In contrast, a renewable contract does not achieve the first-best. The reason is that there is no p_2 such that (4.1) – (4.2) are satisfied for $(v_2, c_2, r_B, r_S) = (20{,}10{,}7{,}0)$, $(v_2, c_2, r_B, r_S) = (20{,}10{,}0{,}7)$ since that would require

(4.6) $20 - p_2 \geq 7$,

(4.7) $p_2 - 10 \geq 7$,

which is impossible.

Note also that, more generally, Propositions 2 and 3 provide general conditions under which a continuing contract will achieve (approximately) the first-best and can therefore be expected to be superior to a renewable contract.

The case where a continuing contract is superior to a renewable contract can be interpreted as one where "more is less": it is better to say nothing about the second period price than to say something. This idea is explored at greater length in Halonen-Akatwijuka and Hart (2013).

5. Conclusions

In this paper we have studied the trade-off between long-term, short-term, and continuing contracts in a setting where gains from trade are known to be present in the short-term, and may or may not be present in the long-term. We have shown that a continuing contract, which uses the prior contract as a reference point, can sometimes be a useful compromise between a long-term contract and a short-term contract. A continuing contract will perform particularly well if either "business will remain roughly as usual" over time or a big change will occur that will make it efficient for the relationship to break up. In these circumstances (re)negotiating a short-term contract from scratch when trade is efficient is costly while under a continuing contract good faith bargaining ensures that there is little to argue about. Renegotiating a long-term contract when trade is inefficient is also costly while under a continuing contract the parties are free to walk away. A situation where either business is as usual or a big change occurs may describe quite well many employment or rental relationships and help to explain why continuing contracts are often seen in these settings. Continuing contracts are not a panacea, however, since good faith bargaining may preclude the use of outside options in the bargaining process and as a result parties will sometimes fail to trade when this is efficient.

One way to mitigate this inefficiency is to introduce for-cause features in the contract, thus make quitting more difficult. For-cause clauses are an important element of many employment contracts but there has been very little analysis of them. Our theory helps to fill the gap. To the extent that even apparently at-will employment contracts have implicit for-cause features, our theory throws new light on the trade-off between employment and independent contracting, and also on the trade-off between regular and temporary employees. In addition it provides a possible explanation of the recent shift to flexible employment arrangements observed in the U.S. and other countries, based on an increased value of flexibility.

We have also shown that a continuing contract that leaves the terms of trade in subsequent periods open can be superior to a renewable contract that specifies these terms. We can interpret this result as saying that the parties may prefer to write a contract that is deliberately incomplete; that is, it says nothing rather than something about the future.

Our paper is based on the idea that, in a continuing contract, parties will apply notions of fair dealing and good faith and this will constrain the changes in prices that can occur. We have argued that the assumption seems plausible in the employment context. In the case of property rentals, it may apply in some situations but not others. For example, the idea that a landlord may be reluctant to raise the rent greatly because this would be a violation of good faith may be reasonable in the case where the landlord and tenant are individuals who have a personal relationship, such as in the vacation house example mentioned in the introduction, but less reasonable when the landlord is a large, anonymous company and the tenant is a business. As another example of the importance of context, we noted in the introduction that in some employment settings it is the norm for employers to match employees' outside offers, whereas in others it is not. Thus whether Case M (outside options can be used in bargaining) or Case I (they cannot) is more appropriate will depend on the circumstances. Identifying situations where the model applies, and whether Case M or I is relevant, is an important direction for future research.

There are several developments of the model that seem fruitful. First, our model is based on the idea that the market at date 0 is more competitive than at date 1: indeed at date 0 it is perfectly competitive, whereas at date 1 parties' outside options are exogenous and may yield each party strictly less than if they trade together. In other words there is a "fundamental transformation" in the sense of Williamson (1985). However, we have not modeled this transformation explicitly. It would be interesting to do this, perhaps by introducing relationship-specific investments.

Related to this, if there are many buyers and sellers at date 0, then the contracts they sign with each other will affect who is available as a trading partner at date 1. Under these conditions outside options at date 1 will no longer be exogenous, but will be determined as part of a general equilibrium. Analyzing this general equilibrium would seem valuable although challenging.

Our analysis has several other obvious limitations. First, we have ignored risk-aversion and wealth constraints. Both of these may be important in determining the nature and length of contracts. Second, by considering a finite horizon model we have ignored reputational concerns. But in practice these are obviously important in determining how parties negotiate or renegotiate contracts, how they react to not getting what they feel entitled to (whether they shade or not), whether they are willing to match outside options, etc.

Finally, we have assumed that the parties have a clear choice between writing a short-term or a continuing contract. But in practice even a short-term contract may create obligations between the parties that require them to treat each other fairly in the event that they trade again. In other words a short-term contract may osmose into a continuing contract. To understand what contracts are feasible requires a theory of how obligations are determined, including whether parties can manipulate or design notions like good faith or instead must take them as given[37]. This is a challenging research agenda that seems an important complement to what we have done here.

[37] If the parties were able to design fairness or good faith without constraints they could choose them to mean that the parties must split the ex post surplus 50:50. In our context of symmetric information and no noncontractible specific investments a long-term, short-term, and continuing contract would then all achieve the first-best. While splitting the surplus is a familiar idea when value and cost are verifiable, it is not something that we see in other contexts such as ours. This is perhaps because our model is a crude attempt to capture a more complex situation where the parties do not observe value, cost, and outside options exactly and there is some flexibility about how they interpret these variables; this opens the door to conflict.

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