Opportunism in Sequential Investment Settings:
On Strategies for Overcoming Holdups and Holdouts

by

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Abstract: Economic theory suggests that, although the holdup and holdout problems arise in different contexts and are typically treated as disparate, they represent the same underlying economic problem. In particular, both involve an up-front investment that reduces the investor's bargaining power with the seller of a necessary input and thereby lead to under-investment. This paper explores the implications of this result for interpreting and reconciling the corresponding case law and proposed remedies. It emphasizes the fact that institutional responses to the two problems, though outwardly different, share features that reflect the common source of their inefficiency. Recognizing the similarities can provide guidance for future legal decisions that seek to resolve disputes related to holdups or holdouts in a consistent and economically efficient way.

Revised, July 2015

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1. Introduction

A large body of economic scholarship and case law surrounds the problems of holdups and holdouts. Although it is generally recognized that they both represent impediments to contracting, it is not clear whether or how they are related.[1] According to the conventional view, the holdup problem typically arises in a setting where parties enter into a contract that requires transaction-specific investments, but one or both of the parties run the risk of losing some or all of the return on those investments in subsequent bargaining due to unforeseen future circumstances that were non-contractable. As a result, the parties tend to under-invest relative to the efficient level. Much of the literature on the holdup problem thus discusses organizational responses like vertical integration or long term contracts as ways of improving investment incentives.[2]

A separate, but similarly large, body of scholarship and case law exists regarding the problem of holdouts. The holdout problem generally describes a situation in which a developer seeks to assemble a large number of contiguous, separately owned properties for purposes of undertaking a large scale project like a highway or shopping center.[3] While there is a broad agreement that the holdout problem impedes the efficient assembly of land, there does not seem to be a consensus on the real source of the problem. For example, it has variously been described as a problem of transaction costs (Cooter, 2000, p. 289), monopoly (Posner, 2003, p.

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[1] See, for example, Fennell (2009, p. 1407, especially not 13).
[2] The literature on the holdup problem includes Williamson (1975, 1985), Goldberg (1976, 1985), Klein, Crawford, and Alchian (1978), Hart and Moore (1988), Edlin and Reichelstein (1996), Edlin (1996), and Segal (1999). Also see the survey in Bolton and Dewatripont (2005, pp. 560-578).
[3] The problem is not limited to assembly of land, however. For example, an entrepreneur may need to acquire several patents in order to market a product (Menezes and Pitchford, 2004; Heller, 2008).

55), asymmetric information (Strange, 1995), rent seeking (Goldberg, 1985), or anti-commons (Heller, 1999, p. 1170). There is agreement, however, that a forced sale (for example, eminent domain) may be necessary to overcome the problem.

Both the legal and economic literatures have therefore treated the holdup and holdout problems as distinct. However, in recent work (Miceli and Segerson, 2012a) we have argued that, although these problems arise in different contexts, economic theory suggests that they are actually two manifestations of the same underlying economic problem. Specifically, both arise from the need (or desire) of one party to a potential transaction to make specific investments prior to trade that lock him or her into the transaction. This in turn confers bargaining power on another party (or parties), who are therefore able to extract quasi-rents from the transaction in a way that affects the (marginal) returns to investment. In anticipation of this, the first party will be reluctant to make the initial investments, resulting in a loss of some potential gains from trade.

In our earlier paper (2012a), we demonstrate the theoretical equivalence of the holdup and holdout problems. In contrast, the focus of the current paper is on the implications of the theory. We use the unifying framework developed in our earlier work to provide insights into existing case law and proposed remedies for these two problems. We believe that doing so provides a means of identifying commonalities across areas of law that have generally been treated as disparate. As such, the framework can also be used as guidance for future legal decisions that seek to resolve disputes related to holdups or holdouts in a consistent and economically efficient way.

As a way to motivate the formal analysis, the next section describes some well-known cases that illustrate the holdup and holdout problems in a variety of contexts. Section 3 then briefly reviews the theory underlying the two problems, after which Section 4 highlights the

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fundamental similarities between them, as well as their differences. Section 5 turns to a discussion of the remedies that have most commonly been proposed for resolving the two problems, and argues that despite their outward differences, they share certain features that mirror the similarities between the problems they are meant to address. Finally, Section 6 concludes.

2. Some Illustrative Cases

This section motivates the analysis by discussing some cases that illustrate the nature of the holdup and holdout problems, as well as how courts have dealt with them. The fact that the cases are derived from a variety of legal contexts reflects the pervasiveness of the problems.

The first case, which illustrates a classic holdup problem, is *Alaska Packers' Assn. v. Domenico.*[4] The case involved an employment contract between the defendant, a fishing company, and the plaintiffs, a crew of seamen that had been hired to undertake a salmon fishing expedition off the coast of Alaska. The crew had agreed to a wage before departure, but once the ship was at sea, they announced that they would not work unless the ship captain raised their wages. Because the latter was in no position to hire a replacement crew, he gave in to their demand, but once back in port, he reneged on his agreement and refused to pay the higher wage. The crew sued, but the court ruled that the higher wage was an unenforceable modification of the original contract because it was not supported by new consideration. In other words, the crew offered nothing in return for the higher wage except to carry out the original promise, so the fishing company only owed the original wage.

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[4] 117 F. 99 (9th Cir. 1902).

Another holdup case often discussed in conjunction with *Alaska Packers'* is *Goebel v. Linn*.[5] Here, the defendant was a brewer who had contracted with the plaintiff, an ice company, to supply ice during the summer months to ensure that his beer did not spoil. The contract called for the delivery of ice according to a pre-set price schedule, but because of an unusually warm winter, the market price of ice had risen well above the contract price, so the ice company refused to make delivery at that price. Fearing loss of his stock of beer, the brewer therefore agreed to a price increase, and the contract was completed. Later, however, the brewer reneged on paying the higher price, also based on the argument that the ice company had offered no new consideration for the price increase. In this case, however, the court upheld the higher price on the grounds that economic circumstances had changed in an unexpected way, and the increase was therefore needed to ensure the economic viability of the ice company.

The different rulings in the two cases are usually rationalized based on the genuine cost increase in *Goebel*, reflecting an upward shift in the supply curve for ice, as opposed to the purely opportunistic behavior of the crew in *Alaska Packers'*, reflecting their newfound monopoly power once the ship was at sea (Posner, 1977).[6] The question of interest here is whether this difference matters in terms of our understanding of the nature of the holdup problem, and whether the different rulings by the two courts make sense in that light.

The holdout problem was at the center of the recent and controversial Supreme Court case of *Kelo v. New London*,[7] which allowed the use of eminent domain for a large scale redevelopment project aimed at revitalizing the downtown area of the City of New London, Connecticut. Although the city development authority initially attempted to acquire the

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[5] 11 N.W. 284 (1882). See, for example, Posner (1977) and Miceli (2002).
[6] In both cases, the defendants (the fishing company and the brewery) could have sought damages for breach when the plaintiffs refused to honor the contract price, but neither chose to do so, perhaps fearing insolvency of the latter. See the further discussion of this point in Section 5 below.
[7] 545 U.S. 469 (2005).

necessary land through market purchases, a small group of owners refused to sell, and so the city

sought to use its power of eminent domain to forcibly acquire their land. The Supreme Court

granted the city's request, arguing that although the primary beneficiaries of the project were

private entities, the overall redevelopment plan promised sufficient spillover benefits to the

public in terms of jobs and enhanced tax revenues to satisfy the public use requirement of the

Fifth Amendment.[8] Despite the controversy over the case,[9] the facts present a classic holdout

problem, wherein a few owners acquire substantial bargaining power vis-à-vis the buyer by

virtue of their ability to stop the project through their refusal to sell. A developer who anticipates

this is therefore less likely to go forward with the project in the first place, resulting in too little

assembly.

The final case we discuss, *Boomer v. Atlantic Cement Co.*,[10] is interesting because it

seemingly embodies both problems. The case involved a nuisance suit brought by several

residents living near a cement plant operated by the defendants. The plaintiffs sought to have the

plant shut down due to the noise and dust that it caused, but the court rejected the request for an

injunction and instead ordered the plant to pay damages, thereby allowing it to continue

operating. The court's reasoning was based on the claim that shutting down the factory would

have caused the loss of over $45 million in assets and 300 jobs, compared to the estimated

damages of $185,000 that its continued operation would have imposed on the plaintiffs. Thus,

allowing the plant to continue to operate was apparently the efficient decision.

Goldberg's (1985) analysis of the *Boomer* decision casts it as a hold*up* problem based on

the argument that, once the plant was in place, granting the nearby residents the right to shut it

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[8] A previous ruling by the Supreme Court in *Berman v. Parker* (348 U.S. 26, 1954) had reached a similar conclusion.
[9] As it happened the project never materialized. See Benedict (2009) for an interesting history of the case.
[10] 309 N.Y.S.2d 312 (1970).

down (i.e., issuing an injunction) would have given them substantial bargaining power in any negotiations with the plant over its right to pollute. Thus, although an injunction would not necessarily have resulted in the plant's closing given its high value relative to the external costs it imposed, the difficult bargaining the owner would have faced to remain open would likely have chilled future entrepreneurs from making similar investments.[11] In other words, too few plants would have been built from a social perspective. Goldberg thus argues that the damage remedy was appropriate because it did not allow the residents to hold up the plant ex post.

Fischel (1995, pp. 75-77) reaches the same conclusion regarding the outcome of the *Boomer* case—namely that a damage remedy was appropriate—but justifies the ruling instead as overcoming a hold*out* problem.[12] As he sees it, the problem with use of an injunction in this case is that it would have required the cement company to negotiate with multiple residents because of the necessity to convince each of them to forego enforcing the injunction. In other words, the company would have had to "assemble" pollution rights from the residents, any one of whom could have prevented the plant from operating. The court's issuance of a damage remedy thus effectively allowed the cement company to "take" the pollution rights in return for compensation.[13]

The *Boomer* case exemplifies the commonality between the holdup and holdout problems by revealing that they stem from the same source—namely, the need for one party to a potential transaction to pre-commit to the transaction in a way that confers bargaining power on another party or parties. Our review of the underlying theory in the next section is aimed at illustrating that point more formally.

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[11] In this sense, the holdup problem closely resembles the problem of bilateral monopoly (Fennel, 2009, p. 1439).
[12] Also see the discussion of the case in Cooter and Ulen (1988, pp. 175-176), on which Fischel's argument is based.
[13] This reflects the fact that damages and eminent domain are both "liability rules" as discussed in Section 5 below. See Calabresi and Melamed (1972).

3. Theoretical Preliminaries

This section describes the essential elements of the prototypical holdup and holdout problems, respectively, with an emphasis on identifying their commonalities. The key results are illustrated through a simple numerical example.[14] The analysis sets the stage for examining various strategies for overcoming the two problems, which is the primary objective of this paper.

3.1. The Holdup Problem

Consider an economic development project that promises a gross return of *V*, but which requires the entrepreneur first to make a fixed up-front investment, *x*, that is at least partially non-salvageable, and then to purchase an essential input whose cost of provision is *C*. For example, in the *Alaska Packers'* case the initial investment is the cost of the voyage (other than labor costs), and the essential input is the effort of the fishermen; in *Goebel* the initial investment is the cost of brewing the beer, and the essential input is the ice; and in *Boomer* the initial investment is the cost of the cement plant, and the essential input is the right to impose environmental harm on nearby residents. We assume that the project is profitable in the sense that the gross value exceeds the cost of the input plus the initial investment; that is, *V>C+x*. As an example, suppose the gross profit from the project is $1,000, the cost of the initial investment is $500, and the cost of the essential input is $300. Thus, the expected profit is $200.

We further assume, as is typical in the literature on the holdup problem, that the entrepreneur and the seller of the input cannot pre-commit to a price for that input. This means that the transaction price is effectively determined by a spot contract after the initial investment is already sunk. We will assume that whenever there is a gain from trade, the parties will transact (given zero bargaining costs), but that the price will be determined by ex post

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[14] For details, see Miceli and Segerson (2012a).

bargaining. Under ordinary Nash bargaining and equal division of the surplus, the price will therefore be

$$P=(V+C)/2, \qquad\qquad\qquad (1)$$

which is independent of the sunk input cost, x. In the numerical example, the price for the input is $650, which divides the quasi-rent of $700 (=$1,000–$300) evenly between the entrepreneur and the input supplier.

Now go back to the entrepreneur's decision to make the initial investment. Although we have assumed that the project is profitable in the sense that the gross revenue exceeds the opportunity cost of the initial investment and the essential input, in the current example the entrepreneur would actually expect to incur a *loss* of $150 (= $1,000–$500–$650) as a consequence of the fact that the negotiated price of the input exceeds its opportunity cost by $350. The entrepreneur will therefore not initiate the project. The ability of the input seller to capture a share of the quasi-rent created by the sunk investment is the source of the potential inefficiency associated with the holdup problem.

3.2. The Holdout Problem

Now consider a situation where a buyer wishes to assemble a large ($n \geq 2$) number of contiguous, independently owned parcels of land so as to undertake a large investment project like a highway or a shopping center.[15] In this context, a holdout problem can arise if two conditions hold. The first is that collective value of the parcels when assembled for the project exceeds the sum of the values of the parcels in individual use. This ensures that assembly is socially efficient in the sense that the land yields a higher return when fully assembled than when left in its current uses. In other words, there is a complementarity among the parcels to be

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[15] For purposes of this discussion, we will not distinguish between public and private projects, as the nature of the holdout problem is independent of the type of project.

assembled. The second condition is that the buyer values individual parcels less than their current owners. This condition implies that, in the absence of full assembly, transferring the land from the individual sellers to the buyer is not socially desirable. In other words, partial assembly is inefficient.

These two conditions can be captured formally in the following way. Let V be the value of the consolidated parcels, and let R be the value of each parcel to its current owner (i.e., the reservation price). Assembling the land for the project will then generate a social gain as long as $V>2R$, which we assume holds. For simplicity, we assume that the value of any one parcel to the buyer is zero, reflecting an extreme case of complementarity where the land is valuable to the buyer only if full assembly occurs. As an example, let $V=\$1,000$ and let $R=\$400$. The fact that $\$1,000>\$400+\$400$ therefore reflects the complementarity.

How the assembly process unfolds depends critically on whether the sellers are aware that assembly is occurring. If sellers are ignorant of the buyer's ultimate plan, his purchases should proceed smoothly, with no impediment to the completion of individual sales (absent bargaining costs). In other words, individual transactions should be independent of one another in this case. Sometimes, the assumption of independent purchases will be a reasonable one, especially for private development projects where the developer may be able to use secret buying agents to disguise his ultimate purpose (Kelly, 2006). However, this is rarely possible for public projects (like highways), or publicly sponsored private projects (like the redevelopment plan in *Kelo*), since the need for public approval and financing will require the nature of the project to be revealed before assembly can commence. Even for purely private projects, at some point the buyer's intent will become clear and the purchaser must then bargain sequentially with

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landowners. Thus, the sequential bargaining approach used below will apply to all public and many private projects.

To determine the prices that will emerge in equilibrium, we begin, as before, by determining the equilibrium price of the second parcel purchased, assuming sale of the other (first) parcel has already occurred at a price of P_1 (to be determined later). Given that the purchase of parcel one is a sunk investment for the buyer, Nash bargaining between the buyer and the owner of the second parcel with equal division of the remaining surplus yields a price of

$$P_2=(V+R)/2 \tag{2}$$

for the second parcel, which is independent of P_1. In the example, $P_2=\$700$, which in this case divides the quasi-rent of $600 (=$1,000–$400) from acquisition of the second parcel evenly between the buyer and the second seller.

Knowing the equilibrium price that would emerge from bargaining with the owner of the second parcel, we can turn to the determination of the price for the first parcel. The buyer will only make that initial purchase if he expects to earn a profit from the completed project. However, given the anticipated negotiations with the second seller, the maximum surplus from buying the first parcel is $300 = $1,000 – $700, which in the current example is not enough to cover the seller's reservation price of $400. Thus, even though we have assumed that the assembly is efficient, the buyer will not initiate it. This is the inefficiency associated with the holdout problem.

The common sources of the holdup and holdout problems should be apparent from this example and the one in the previous section. Note in particular that the purchase of the first parcel here is analogous to the buyer's initial investment in the above holdup example because both are sunk investments that lock the buyer into the transaction, thereby conferring bargaining

power on the later seller. In the holdup context, we showed that, because the buyer anticipates this opportunistic behavior by the seller, the buyer may fail to make an otherwise efficient investment. A similar inefficiency arises in the holdout context in the form of some efficient projects requiring assembly not being undertaken. The next section provides a more specific accounting of the common features of the two problems.

4. Commonalities Between the Holdup and Holdout Problems

The preceding analysis highlights the relationship between the holdup and holdout problems. The fundamental similarity is that both problems arise in the context of a project undertaken by one party (the buyer) that has the following specific characteristics:

(1) the project (or activity) involves an up-front, non-salvageable commitment of resources by that party;

(2) completion of the project requires the purchase of an input or inputs from another party or parties;

(3) the price of that input(s) is determined by bargaining; and

(4) the bargaining takes place *after* the initial commitment of resources by the buyer.

The up-front, non-salvageable investment reduces the buyer's bargaining power with the seller(s) of the input(s) necessary for completion of the project. The buyer anticipates this reduction, which then creates a disincentive for the buyer to undertake the project in the first place. Since the reduction in the buyer's bargaining power is a private cost but not a social cost, this disincentive is socially inefficient, i.e., some projects or activities that are socially efficient are foregone.

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Although the holdup and holdout problems involve the same fundamental economic problem, both the case law and the legal and economic scholarship on these two problems treat them separately. A likely explanation is that the contexts in which they are discussed differ. As noted, the holdup problem is typically couched in terms of only two parties (a buyer and a seller) where incomplete contracting (due to uncertainty or non-verifiability) forces bargaining to occur after the initial investment is made by the buyer. Thus, in this context the non-salvageable commitment of the buyer stems from the fact that the buyer would lose his investment if the project fails. In contrast, the holdout problem arises in assembly contexts, which by definition must involve at least three parties (one buyer and at least two sellers). In this context, it is the need to bargain sequentially (rather than simultaneously) with the two or more sellers that forces the bargaining with the second and later sellers to occur after the initial commitment is made by the buyer. Here, the commitment is the purchase of land from the first seller, which represents a non-salvageable investment since, as noted above, the buyer pays more for the first parcel than it is worth to him as an individual parcel, implying that he will lose his investment if the project is not completed.

To highlight these differences, we return to the *Boomer* case, which we argued above embodies *both* a holdup and a holdout problem. This stems from the fact that the case includes both an up-front investment x and the potential for sequential bargaining with the nearby residents, either of which could lead to non-salvageable investment by the buyer. Consider first the holdup problem that stems from the investment of x. Even if there were only one resident (or a coalition of residents) who would be a party to the bargaining (so that sequential bargaining is not an issue), an injunction requiring the plant to shut down would have led to bargaining between the plant owner and the neighboring resident(s) *after* the investment in the plant was

made. This feature of the case implies that use of an injunction would lead to a holdup problem, which is consistent with Goldberg's (1985) analysis of the case.

In addition, though, the *Boomer* case has features of the holdout problem, since an injunction would also have forced the plant owner to negotiate with *multiple* residents in order to lift the injunction. The need to bargain with residents *sequentially*—in essence, to "assemble" their permission—is what gives rise to the holdout problem, consistent with the argument made by Fischel (1995). Again, however, the key is the potential for non-salvageable investment, in this case as a result of sequential bargaining with individual landowners over pollution rights that are of no value to the buyer individually and only become valuable once they have been fully "assembled," thereby allowing the buyer to begin operating the plant. Note that, because of this feature of the case, the inefficiency of an injunction would have arisen even if the investment in the factory itself were fully salvageable.

The main point here is that the interpretations of both Goldberg (1985) and Fischel (1995), while seemingly different on the surface, are, in fact, both consistent with our framework identifying the four conditions above as the critical features that give rise to a holdup/holdout problem and the associated inefficiency. Thus, our framework provides a means of reconciling these two alternative views of this classic case. Both interpretations can be justified using the same underlying economic principles embodied in our framework, simply applied to different aspects of the case. More importantly, our approach allows a unified treatment of remedies for the holdup and holdout problems, which is the subject of the next section.

5. Remedies

Although we have argued that the holdup and holdout problems stem from the same underlying problem, the commonly proposed remedies are generally quite different. We will argue in this section, however, that they share certain features.

5.1. Remedies for the Holdup Problem

Discussions of the holdup problem usually point to long term contracts or vertical integration as the remedy (Klein, Crawford, and Alchian, 1978; Williamson, 1975, 1985; Goldberg, 1985). In both cases, the parties avoid ex post negotiation over the price of the essential input, either by committing to a legally enforceable price before any investments are made under a contract, or by consolidating the investment and input-delivery decisions into the hands of a single decision-maker (the residual claimant) under vertical integration. The choice between the two depends on the relative transaction costs of writing and enforcing contracts versus vertically integrating, a problem first studied by Coase (1937) and subsequently examined in detail in the large literature on transaction cost economics.

The solution of the holdup problem under vertical integration is achieved by merging the buyer and seller so that the lone decision-maker's problem in theory coincides with the social problem. In reality, of course, some inefficiencies may remain due to agency or other management costs, the exact nature and magnitude of which depend on the internal governance structure of the firm.

The efficiency of the contracting approach depends on the characteristics of the legal remedy for breach. The most common remedy is expectation damages, which is defined to be an amount of money that the leaves the victim of the breach as well off as if performance had occurred. In other words, it fully compensates the victim. To examine this remedy in the context of the holdup model, suppose that before the buyer makes any investment, the buyer and

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seller negotiate a price for the essential input, denoted P_0, which is legally enforceable. Then, if the seller refuses to deliver the input at that price, for whatever reason, the buyer can go to court and obtain a damage payment of D from the seller, which under expectation damages equals $D=V–P_0$. Thus, in the event of breach, the seller must compensate the buyer for the expected "variable" profit from the transaction. We are interested in the efficiency of this remedy regarding both the performance decision of the seller—i.e., whether or not she supplies the input (ex post efficiency), and the buyer's prior decision of whether or not to make the initial investment (ex ante efficiency).

Concerning performance, observe that the seller will deliver the input if $–D{\leq}P_0–C$ and breach if the reverse is true. Substituting for $D=V–P_0$ into this condition yields $C{\leq}V$, which is exactly the condition for performance to be efficient, given the sunk investment. This verifies the well-known result that the expectation damage measure induces the efficient breach-performance decision (Shavell, 1980; Rogerson, 1984). The reason is that the seller fully internalizes the buyer's cost of breach through the damage remedy.

As for the buyer's initial investment decision, the crucial point here is that the price, P_0, is negotiated *before* the buyer invests. Thus, given that the buyer's expected return at that point is $V–P_0–x$, while the seller's expected profit is $P_0–C$, Nash bargaining will yield a price equal to

$$P_0 = (V–x+C)/2, \tag{3}$$

which evenly divides the overall surplus. Importantly, note that the price in (3) is less than the spot price in (1). The buyer will go ahead with the investment of x if $V–P_0–x{\geq}0$, or, given (3), if

$$(V–C–x)/2 \geq 0, \tag{4}$$

which holds if and only if the project is efficient. Thus, in addition to assuring efficient performance of the contract, the expectation damage measure also achieves efficiency of the

buyer's initial investment decision. In terms of our example, $P_0=\$400$, compared to the spot

price of $P=\$650$ in (1). The resulting returns are $V–P_0–x = \$100$ for the buyer and $P_0–C=\$100$

for the seller. Thus, both expect to enjoy a profit and the project goes forward.

It is interesting to note that, although the parties in *Alaska Packers'* and *Goebel* chose to

organize their transactions by contract, the buyers in each case opted *not* to pursue the breach of

contract remedy when the seller failed to perform the contract as written (a fact that the court

pointed out in *Goebel*). This shows that, despite the preceding analysis, enforceable contracts do

not always represent a perfect solution to the holdup problem, either because of enforcement

costs, or the possibility that defendants lack sufficient assets to pay damages in the event of

breach.[16] When this is the case, the enforceability of the previously negotiated price, P_0, does

little to protect the buyer from a holdup threat, as the *Alaska Packers'* and *Goebel* cases revealed.

The actual rulings in these two cases, however, show that this does not necessarily leave buyers

vulnerable to a holdup; it depends on whether the court enforces the renegotiated (spot) price in

(1) or reinstates the original contract price of P_0. Recall that the court did enforce the

renegotiated price in *Goebel* based on evidence that there had been a genuine increase in its

performance costs. In contrast, the court reinstated the original contract price in *Alaska Packers'*

since there was no evidence of a cost increase. Posner (1977) argues that this is the efficient

rule—specifically, that the renegotiated price should only be enforced if it is a response to a true

cost increase. We can use the above model to show, however, that for this rule to fully solve the

holdup problem, it must be supplemented by a cost-based limitation on the renegotiated price.

To demonstrate this, note first that non-enforcement of the renegotiated price in the

absence of any cost increase, as in *Alaska Packers'*, simply reinstates the original price, P_0, and

thereby discourages a holdup by the seller when a price increase is not cost-justified. When the

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[16] Posner (2003, p. 101) makes this point. Also see Miceli (2002)

cost unexpectedly rises, however, and the court allows the renegotiated price to stand as prescribed by the "Posner rule," the possibility of a holdup remains *unless the court limits the amount of the price increase to that which can be justified by the cost increase* (Miceli, 2002). Specifically, instead of allowing the parties to negotiate the price in (1), the court should only allow the price to be increased to $P=C$, which is less than the value in (1) given that given that performance is ex post efficient; that is, given that $V≥C$, $C≤(V+C)/2$. In that case, the buyer's expected return would never fall below $V–P–x=V–C–x$, which means he would not be inefficiently discouraged from making the initial investment for fear of a holdup problem later. In contrast, the possibility of a higher price (i.e., $P>C$) would cause buyers to forego some efficient projects.

This analysis has shown that, when the standard damage remedy for breach does not provide adequate protection against the holdup problem, efficient incentives can nevertheless be maintained as long as courts limit any ex post price increase to an amount justified by a genuine cost increase. Miceli (2002) provides some evidence from contract modification cases that courts in fact tend to follow this rule and only allow increases that are justified by unforeseen cost changes.[17]

5.2. Remedies for the Holdout Problem

As noted, the usual remedy for overcoming the holdout problem for public assembly projects is for the government to forcibly acquire the needed properties by using its power of eminent domain, as authorized by the Fifth Amendment "Takings Clause." According to this clause, the government can take private property without the owner's consent provided that the land is put to "public use" and the owner is paid "just compensation," an amount usually equated

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[17] In addition, the Uniform Commercial Code states that enforceable price increases must be made in good faith and must be "motivated by an honest desire to compensate for commercial exigencies" UCC § 2-209:61, citing *Roth Steel Products v. Sharon Steel Corp.*, 705 F.2d 134 (1983).

to the property's fair market value. For present purposes, the crucial feature of eminent domain is that owners are deprived of the right to refuse the sale, thereby eliminating their ability to hold out or negotiate over the price. In the *Kelo* case, the U.S. Supreme Court found that although the primary beneficiaries of the project were private entities, the public use requirement was satisfied by the jobs and enhanced tax revenues that the project promised, and so the Court authorized the use of eminent domain in that case.

Eminent domain is an example of a "liability rule," which allows courts to force the transfer of assets from one user to another provided that the recipient compensates for the loser's damages. According to Calabresi and Melamed (1972), this action is justifiable when consensual (market) exchange of the asset would fail to bring about an efficient transfer due to high transaction costs or other sources of market failure, such as the holdout problem. The court's use of a damage remedy rather than an injunction in the *Boomer* case reflects this logic, and for that reason, it has often be referred to as a "private taking" (see, for example, Fischel (1995, pp. 75-77)).

In cases where private land assemblers either do not have access to eminent domain, or choose not to pursue the power, other remedies for the holdout problem are possible. As noted above, one possible strategy is for buyers to use secret purchases in an effort to hide the scope of their projects (Kelly, 2006), thereby eliminating the inefficiency that arises from sequential bargaining. Another strategy, proposed by Cooter (1985), is for the prospective buyer, before commencing with assembly, to purchase "option contracts" (specifically, call options) from property owners that entitle the buyer to acquire the properties over a set period of time and for a pre-determined price.[18] (Note that eminent domain is therefore a form of option contract that the

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[18] Cooter originally proposed this strategy as a way to overcome the moral hazard problem associated with market-value compensation for takings, a problem first identified by Blume, Rubinfeld, and Shapiro (1984).

government holds vis-à-vis all landowners, subject to the conditions of the Fifth Amendment.)

In the current context, the key feature of this contract is that, if and when the buyer exercises the option, the seller cannot seek to renegotiate the price.

Consider the effect of this strategy in the simple holdout model above, where a buyer wishes to acquire the properties of two sellers. Suppose that the option price is equal to P_i for seller i ($i=1,2$), which the parties have previously negotiated. With these prices set, the buyer will either exercise both options, yielding a return of $V–P_1–P_2$, or exercise neither option, yielding a return of zero. (Recall our assumption that the value of a single parcel to the buyer is zero, so he would never exercise only one of the options.) Given these alternatives, consider the bargaining between the buyer and seller two over P_2, assuming that P_1 has already been determined. The buyer's return from exercising both options (the only circumstance under which a sale occurs) is $V–P_1–P_2$, while seller two's return is $P_2–R$. Nash bargaining therefore produces a price of

$$P_2 = (V–P_1+R)/2. \tag{5}$$

Now move back to the buyer's negotiation with seller 1, and note that the same logic applies. Thus, the option price for seller 1 is

$$P_1 = (V–P_2+R)/2. \tag{6}$$

Solving (5) and (6) simultaneously yields

$$P_1 = P_2 = (V+R)/3. \tag{7}$$

In our example, $P_1=P_2=\$466.67$, which is considerably less than the \$700 price the second seller was able to negotiate in the sequential bargaining scenario.

As usual, the condition for the buyer to undertake the project is $V–P_1–P_2\geq0$, but given (7), this condition becomes $V \geq 2R$, which coincides with the condition for efficient assembly. The

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holdout problem is therefore avoided in this case, not because the sellers are deprived of the ability to bargain over the sale prices (as was true under eminent domain), but because the bargaining took place with both sellers *before* the buyer purchased a parcel from either one. Thus, although bargaining may technically be sequential, neither seller is in a position to take advantage of the buyer's prior purchase of the other seller's parcel, as was true under true sequential purchase.

As a final remedy to the holdout problem, consider contracts that give the buyer the right to cancel any previously negotiated contracts at any point in the assembly process without penalty (Asami and Teraki, 1991).[19] The analysis of this "cancellation contract" closely mirrors that of the option contract. To illustrate, suppose that the buyer has already negotiated a price of P_1 for seller one's property, and so he turns to seller two. If he acquires two's property for a price P_2 such that the project promises a positive overall return, he will proceed with the deal, but if he fails to do so, he will cancel the first sale, given that the first parcel alone is worthless. This implies that the buyer's gain from a successful purchase of the second parcel is $V–P_1–P_2$, while the seller's return is $P_2–R$. The resulting value for P_2 based on Nash bargaining is therefore given by (5). Similar reasoning regarding negotiation between the buyer and seller one yields the expression in (6). The resulting prices for the two sellers are therefore given by (7), and the outcome is identical to that under the option contract approach. Although bargaining and purchase in the current setting proceeds sequentially, the buyer's right of cancellation at any stage eliminates the ability of later sellers to negotiate for higher prices. As a result, the

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[19] Zillante, Schwarz, and Read (2014) examine land assembly contracts that consist of "guaranteed" payments, which are non-refundable, and "contingent" payments, which are only made if the developer acquires all of the desired parcels. The "cancellation contract" to be considered here is therefore a special case that includes only contingent payments.

negotiation with the initial seller does not generate a non-salvageable investment, and hence the holdout problem is eliminated.

6. Conclusion

Although the holdup and holdout problems arise in different contexts, they share certain fundamental similarities that have not generally been recognized. This paper provides a unifying framework that can be used to understand these two problems as different manifestations of the same underlying conditions. In particular, both involve activities requiring an up-front, non-salvageable investment, and both require the investor to purchase an input, the price of which is determined by bargaining *after* the non-salvageable investment has been made. The effect of this prior investment is to reduce the investor's bargaining power with the seller of the input. The anticipation of the outcome of this bargaining creates a disincentive for the investor to undertake the project in the first place, causing some efficient projects to be foregone.

The analysis in this paper showed how this framework for understanding holdups and holdouts can be used to evaluate proposed remedies for the two problems, which, though outwardly different, share features that reflect the common source of their inefficiency; namely, the bargaining power realized by sellers of the needed input once the buyer has committed to a non-salvageable investment or prior purchase. We showed that the key to eliminating this inefficiency is therefore to remove the seller's ability to extract additional surplus through bargaining once the initial investment is sunk. The various responses to the holdup and holdout problems, either from the caselaw or proposed in the scholarly literature, reveal that this can be accomplished in a number of ways: by consolidating control over both the investment choice and the input supply in a single decision-maker (vertical integration); by allowing the court to set the

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price of the input (a liability rule); by writing a contract that specifies a legally enforceable price before the investor commits any resources; or by allowing the buyer the option to back out of any unprofitable contracts. Since these remedies differ in their feasibility and cost, the optimal response will depend on circumstances. The crucial point is that they can all be understood within a common theoretical framework.

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