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Abstract

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An Economic Analysis of Eminent Domain

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A theoretical analysis of land assembly with and without eminent domain concludes that, contrary to traditional assumptions, eminent domain is not necessarily a more efficient institution than the free market for consolidating many contiguous but separately owned parcels into a single ownership unit. In practice, prices paid under eminent domain may differ systematically from the "fair market value" standard, depending on court costs of buyer and seller. Evidence from urban renewal supports the hypothesis that, due to the structure of court costs, high-valued properties receive more than market value and low-valued properties receive less than market value.

Introduction

Eminent domain (ED) is the legal right to acquire property by forced rather than by voluntary exchange. When a buyer seeking to acquire a property has the power of ED, he must attempt to negotiate a voluntary sale. But if his highest offer is rejected, he may condemn the property, that is, obtain a forced sale at a price determined in a court of law.

In the United States, the use of ED is constrained by constitutional provisions at the federal and state level which typically require that private property only be taken for "public use" and only after payment of "just compensation."[1] Enforcement of these constitutional provisions is divided between the legislatures and the judiciary. Legislatures—federal and state—have the right to grant ED power. They typically

I would like to thank the members of my thesis committee, Professors George J. Stigler, Gary S. Becker, and Ronald H. Coase, for their guidance and valuable insights. I also benefited from the comments of an anonymous referee.

[1] Generalizations on the legal aspects of ED are based on Lewis (1909) and Nichols (1970).

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grant it to a particular body or for a specific project, leaving to the discretion of the grantee the decision as to which parcels of land to acquire and whether or not to exercise its latent power of condemnation. The main role of the judiciary is to determine "just compensation," not to review the legitimacy of the taking of a particular parcel.[2] Thus, ED is effectively a reassignment of property rights: the seller is deprived of his right to refuse to sell and constrained in his right to bargain over price. However, because of the just-compensation provision, the curtailment of private property rights implied by ED is less than that inherent in the taxing and regulatory powers of government. In fact, ED may be interpreted as a limitation on the police power of the state against private property in real estate (Scheiber 1971).

The growth in the use of ED over time suggests, if the survivorship principle may be applied to institutions, that ED reduces some component of costs to at least one party. There are two, not mutually exclusive, possibilities: (1) ED reduces total costs, permitting a net gain in efficiency, and (2) ED redistributes costs and therefore wealth.

If ED were a simple transfer of well-defined property rights, and if transactions costs under both property-right assignments were zero and wealth effects symmetrical, no change in resource allocation would be implied, according to the Coase theorem (Coase 1960).[3] But in the sparse references to ED in the economic literature,[4] the converse is assumed without rigorous justification, at least with respect to use of ED for assembly. Consolidation of many contiguous but separately owned parcels of land under one owner supposedly creates a holdout problem, with each seller having an incentive to hold out to be the last to settle and capture any rent accruing to the assembly. Because of either monopoly prices of sellers or high transactions costs or both (since the buyer can trade off between the two), the free market results in a suboptimal amount of assembly being undertaken. The next step in the argument, although not in logic, is that ED improves the situation.

A crude examination of the circumstances in which ED is actually used does not leave the impression that their outstanding common characteristic is consolidation of ownership rights, which is nowhere mentioned as a necessary condition of the granting of ED power. In practice, almost all departments of federal, state, and local government, many regulated industries, and government-related educational and medical establishments have some form of ED power in most states, regardless of whether

[2] To contest the taking, as opposed to the prices paid, the condemnee must prove that the condemnor has used his power "unconstitutionally," "fraudulently," or "abusively." The courts may, however, review the original grant of ED on the grounds that it is not for a legitimate public use.

[3] "Transaction costs" here include court costs. It is questionable whether the first precondition of the Coase theorem, exclusively assigned property rights, is met in most ED contexts, since the condemnor is usually a government-associated agency.

[4] E.g., Arrow (1970), Colean (1970), and McCloskey (1972).

they wish to acquire one parcel for a schoolhouse or campaign headquarters or 1,000 miles of right-of-way for a freeway. The outstanding characteristic of situations where ED is used is land acquisition by a government-related body, not consolidation of ownership rights.[5] The two sets, although far from mutually exclusive, are not perfectly overlapping. Notable examples of industries in the United States which must assemble property, do serve the public, but have not themselves been granted ED are agriculture, private manufacturing, and suburban development.[6]

However, since the economic efficiency argument for ED rests on its comparative advantage over the free market in assembling separately owned parcels into a single ownership unit, this is the focus of the present study. A necessary condition for ED to be an efficient institution is that the welfare costs, due to deviations between price paid under ED and the value of a parcel in its best alternative use, plus resource costs of transacting, be less than under alternative property right assignments. After a brief theoretical comparison of the relative efficiencies of ED and the free market, a model of price determination under ED is described and then tested with data from urban renewal in Chicago. A comparable set of data from free-market assemblies was unobtainable. However, theoretical considerations and the limited evidence available offer no support for the asserted efficiency of ED.

Theoretical Comparison of ED with Assembly in the Free Market

Consider an area where there are many homogeneous properties. Assuming the market functions efficiently in transferring properties to their highest-valued uses, subject to imperfect information and positive

[5] A distinction should perhaps be made here between grants of ED for which government relatedness seems to be a necessary condition and actual exercise of the latent power by use or threat of use of condemnation proceedings. It is possible that ED is more frequently exercised by bodies which have the latent power when assembly of many parcels is involved. I know of no body of data to test this hypothesis. Two pieces of crude evidence tend to support the presumption that ED is most valuable in an assembly context: (1) Although most government-related bodies now have the power, the earliest to acquire it were those engaged in assembly, e.g., gristmills, canals, roads, and railroads. (2) In terms of area taken, the most extensive current uses are for highways, urban renewal, and the U.S. Army Corps of Engineers, all of which typically involve assembly (U.S. Congress 1965).

[6] These industries, however, have presumably benefited from particular uses of ED: e.g., agriculture, from the use of ED for drainage, gristmills, and railroads; and private manufacturing, from the use of ED for highways. Similarly, although only those urban renewal projects sponsored by a public agency are entitled to use ED, it might be more correct to identify the "user" of ED as the private real estate industry, to which land acquired under ED by the urban renewal authorities is ultimately sold at less than the acquisition cost. In other words, some public agencies may be, more or less, fronts created by private industries to accommodate the constitutional "public use" requirement. Thus, it may be misleading to identify ED with government-related agencies.

search costs, the atomistic market reservation prices[7] of current owners will form a distribution skewed to the right. Transactions will take place within a range around a mean market value, which will be below the modal value of the distribution. Then, for purchases of randomly scattered parcels with an average amount of search per parcel, the supply curve is infinitely elastic at a price equal to mean market value. The supply curve of contiguous properties to any buyer, however, is an increasing function of the number of parcels to be purchased in a given period, because of the rising probability of encountering owners not at the selling margin whose reservation price exceeds mean market value of the property.[8] The supply curve of parcels for assembly is steeper the greater the dispersion of atomistic reservation prices of current owners in the market.

Figure 1 represents supply and demand conditions of a typical buyer for parcels for one type of project within the universe of projects requiring assembly, for example, urban renewal or highways. *MCm* is the supply curve of randomly scattered parcels, and *MCa* is the supply curve of contiguous properties. Both reflect atomistic reservation prices and social opportunity costs. The slower the rate of acquisition, the flatter *MCa*, approaching *MCm* in the limit. The demand curve is the marginal value product curve per parcel of a given size, as part of an assembly, for a given rate of acquisition and set of initial conditions with respect to number of buyers in the industry. The slower the rate of acquisition, the lower the demand curve.[9]

If the buyer cannot discriminate between sellers (because reservation prices are not freely observable), and so expects to pay all n sellers the reservation price of the nth, *MCa* is the buyer's average cost curve. Profit

[7] "Atomistic market reservation price" is defined as the reservation price of a seller to a buyer whom he did not suspect of planning an assembly.

[8] Assume that assembly involves drawing a sample of size n from the distribution of atomistic reservation prices. Let Y_i denote the ith order statistic of this sample, i.e., $Y_1 < Y_2 < \cdots < Y_n$. The height of the *MCa* curve, the supply curve of contiguous parcels, at n parcels is the expected value of the nth-order statistic from a sample of size n. For any point i between the origin and the point n, the height of *MCa* measures the expected value of Y_i. Strictly, there is a different *MCa* curve for each sample size. The precise shape of the curve is not important. It is sufficient to establish that it is upward sloping. This follows from the fact that for many density functions, e.g., normal, gamma, and exponential, the expected value of the nth order statistic has the following form:

$$E(Y_n) = \theta + \beta(n)\sigma,$$

where θ = mean of underlying distribution, σ = standard deviation of underlying distribution, and $\beta(n) > 0$, $\beta' > 0$, $\beta'' < 0$. The exact form of $\beta(n)$ depends on the specific distribution.

[9] If the project has some minimum feasible size, the demand curve will be discontinuous at the corresponding number of parcels. If assembly of dispersed ownerships into one unit permits the internalization of externalities, there may be increasing returns to scale, implying an upward-sloping demand schedule over an initial range. The shape of the demand curve may affect the conclusion but not the method of analysis of the respective welfare costs of the free market and ED.

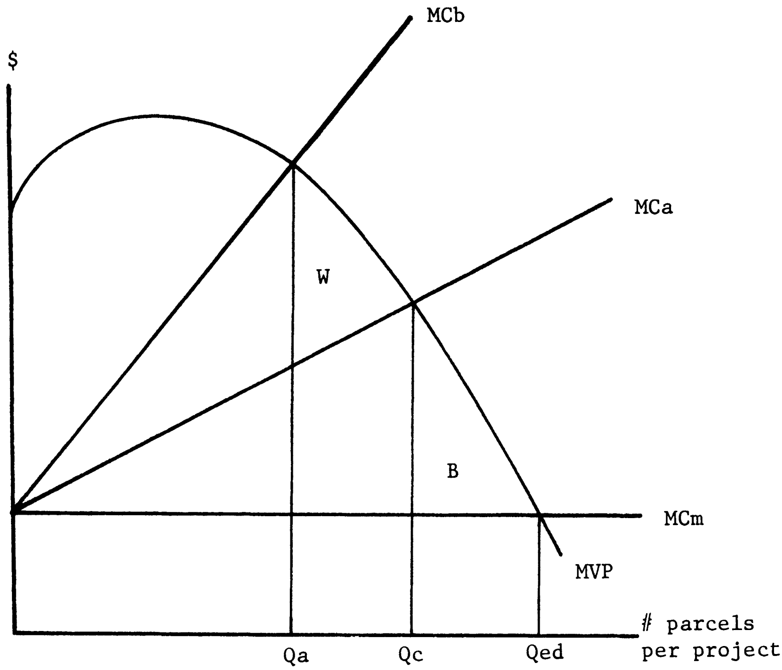

FIG. 1.—Welfare costs of assembly with and without eminent domain

maximization implies *Qa* parcels will be bought. A resource misallocation cost equal to the triangle *W* is implied. Rents accrue to the buyer and to intramarginal sellers.

In the absence of barriers to entry by other buyers and sellers on alternative sites, these quasi-monopsonist and scarce-factor rents cannot persist in the long run. Competition among buyers, attempting to capture the rent which accrues to intramarginal sellers in the absence of discrimination, will lead to the development of techniques to discover true seller reservation prices. This is facilitated by competition among sellers on alternative sites. The incentive to conceal atomistic reservation price exists only if substitutes are not available at competitive prices.

With competition on both sides of the market, seller reservation prices to an assembler will be no different from atomistic reservation prices. This implies that *MCa* is the effective marginal cost curve. The profit-maximizing number of parcels per project is *Qc*. This is consistent with the criteria of social optimality, although it is less than *Qed* at the intersection of the *MVP* curve with the market supply curve of isolated parcels, because the social opportunity cost of contiguous properties exceeds the social opportunity cost of the same number of randomly scattered properties.

In the absence of perfect substitutes for a particular site, a rent exists that is potentially capturable by the owners of land. However, a holdout problem, as distinct from a monopoly problem, is implied only if the rights to the rent are not exclusively assigned. For example, if uniqueness is obviously specific to a particular parcel, the rent will accrue to its owner, and there is no reason for the owners of other inputs to raise reservation prices above atomistic market level. In general, there may be less than perfect substitutes for many or all parcels in a group, that is, for the ith of n parcels in a group, A, there exist alternative parcels which may be substituted for it at a cost to the assembler x_i percent higher, where x_i may vary across the n parcels. If each seller in set A anticipates that sellers of the alternative parcels will settle at their atomistic reservation prices and that other sellers in set A will settle for not less than their share of the rent as defined by substitution possibilities, prices and shares of the rent are determinate. Assembly is characterized by monopoly prices (or rents to superior factors), but it is misleading to speak of a holdout rather than a monopoly problem, since changing the unit of ownership is immaterial.

A distinct holdout problem, specific to assembly, arises only if at least one seller anticipates that others will settle for less than their "share" of the rent and therefore tries to capture more than his "share," up to a maximum for any one seller of the entire rent net of competitive prices for other inputs. Moreover, the existence of a potential rent, due to lack of perfect substitutes, may occur in assembly even though there are physically equivalent sites for a particular project. For competition to be effective, substitutes must be available at competitive prices throughout the negotiation process. But assembling many ownerships is typically a sequential process, because transacting is time consuming. When some parcels on site A have already been acquired, in negotiations for the outstanding parcels, site B, assumed physically equivalent, is a less than perfect substitute unless the expected cost of B gross of transactions costs is no greater than the expected cost of the remainder of A gross of transactions costs plus the resale value of parcels already acquired on A net of transactions cost. Thus, the costs of negotiating many contracts and of uncertainty as to prices, rather than physical availability, may limit the operation of competitive forces in an assembly context. The implied potential rent to outstanding parcels on a particular site when some have already been acquired creates an incentive to hold out.[10]

In conclusion, a problem which is specific to the assembly of several ownerships into a single unit arises as a combination of a monopoly and free-rider problem. If a particular site is physically unique, rents will accrue to current owners as to any scarce factors. Even in the absence of

[10] The options contract is a method of maintaining competitive pressures throughout the negotiation process.

physical uniqueness, assembly may create a potential rent to the last parcels to settle, due to transactions costs and uncertainty as to prices of alternatives. Even if property rights are sufficiently well defined for the market to function efficiently when changing the unit of ownership is not in question, the rights to any rents generated by changing the unit of ownership may not be well assigned, since reservation prices are not freely observable and there may be uncertainty as to prices charged by other sellers. This creates a type of free-rider problem, each party having an incentive to try to capture more than his atomistic reservation price for his input, on the assumption of asymmetrical behavior by other parties.

Where rents are attributable to physical uniqueness, they are no different from rents to scarce factors. No resource misallocation is implied, but assembly may entail a welfare cost not generally associated with scarce factors if the rent is dissipated in bargaining over its distribution. However, where potential rents are attributable solely to the transactions costs of maintaining competitive pressures, assembly entails resource misallocation and welfare costs similar to those implied by the monopsony solution in figure 1. If holdout behavior is anticipated, *MCa*, reflecting atomistic reservation prices, is no longer the relevant marginal cost curve. Expenditure on devices to circumvent or eliminate the incentive to hold out will be incurred. Such devices include concealment of the identity of the buyer, the purpose and extent of the planned assembly and prices paid for parcels, and the use of brokers and special contractual forms, such as options or uniform price contracts. The optimal level of such expenditure defines a new *MC* curve, lying above *MCa* but not necessarily equal to *MCb*, and a new free-market level of output and welfare cost, which may exceed or fall short of *W* in figure 1.[11] The expenditure on transactions to avoid the holdout problem represents an additional waste due to assembly, if efficiency is defined relative to the zero transactions cost situation.

If the free market tends to produce suboptimal-sized assemblies, the *ED* "just compensation" standard may have the opposite effect. Just compensation is defined as "fair market value" exclusive of the value to this particular seller. If enforced, this implies prices equal to *MCm* in figure 1. If the demand curve is assumed unchanged, optimal output, at *Qed*, is excessive. Fixing the price at the market average understates the social opportunity cost. The welfare cost, given by the triangle *B*, may be less than or exceed *W*.

Note that the welfare costs of ED are likely to be high in precisely those circumstances in which the market is inefficient, that is, where seller

[11] The various devices developed in the free market to circumvent the holdout problem are discussed in Munch (1973).

reservation prices are dispersed, implying an inelastic social opportunity cost curve, *MCa*, and high transactions costs of discriminating between sellers. A similar symmetry exists in the absence of transactions costs. In the free market, the buyer would discriminate along the *MCa* curve. Under ED, if the expected court award, *MCm*, were less than *MCa*, the value of the parcel to the seller, he would offer the buyer the difference to prevent the taking of the parcel. Then *MCa* would be the effective marginal cost curve to the buyer, and the profit-maximizing output level would also be socially optimal. Thus, with zero transactions costs, both the free market and the ED assignments of property rights yield an optimal result. Since transacting under both regimes is not costless, the efficiency conclusion on ED relative to the market is theoretically ambiguous, even if fair market value is paid.

Price Determination under ED

Constitutional dictates notwithstanding, since fair market value is not a freely observable datum, both buyer and seller will invest in searching for the most favorable price, and the outcome may differ systematically from fair market value, depending on the costs of and returns to search for the two parties. For both, the optimum search strategy implies setting a reservation price for settlement out of court which maximizes expected wealth, net of transactions costs, over the two alternatives, settlement in or out of court.

Price determination under ED may be formulated by the following reduced-form model:

$$S^b = \bar{S}^b, \tag{1}$$

$$S^s = \bar{S}^s, \tag{2}$$

$$C^b = C^b(P_m), \tag{3}$$

$$C^s = E[k(P_c - P_o)], \tag{4}$$

$$P_c = P_m - h^b(C^b) + h^s(C^s) + v;\ v \sim [0, \sigma_v^2(P_m)], \tag{5}$$

$$E(P_c)^b = P_c + w;\ w \sim [0, \sigma_w^2(P_m)], \tag{6}$$

$$E(P_c)^s = P_c + z;\ z \sim [0, \sigma_z^2(P_m)], \tag{7}$$

$$P_o^{\max} = E(P_c)^b + (C^b - S^b), \tag{8}$$

$$P_a^{\min} = E(P_c)^s - (C^s - S^s), \tag{9}$$

$$P_o^{\max} - P_a^{\min} = E(P_c)^b - E(P_c)^s + C^b + C^s - S^b - S^s \geq 0, \tag{10}$$

$$P_v = \tfrac{1}{2}(P_o^{\max} + P_a^{\min}) \tag{11}$$

$$= \tfrac{1}{2}[E(P_c)^b + E(P_c)^s] + \tfrac{1}{2}[(C^b - S^b) - (C^s - S^s)]$$

$$= P_c + \tfrac{1}{2}[\Delta C^b - \Delta C^s], \tag{11'}$$

where S^b = buyer's costs of out-of-court settlement, C^b = buyer's court costs, S^s = seller's costs of out-of-court settlement, C^s = seller's court costs, $\Delta C^b = C^b - S^b$, $\Delta C^s = C^s - S^s$, P_c = price awarded in court, $E(P_c)^b$ = buyer's expectation of court award, $E(P_c)^s$ = seller's expectation of court award, P_m = market value, P_o^{max} = buyer's maximum offer in out-of-court negotiations, P_a^{min} = seller's minimum ask price in out-of-court negotiations, P_v = price determined voluntarily in out-of-court settlement, and v, w, z = stochastic error terms. All variables are measured relative to market value.

Equations (1) and (2) state that settlement costs are a constant proportion of market value. Equation (3) makes buyer court costs a variable function of market value. Equation (4) states that seller court costs are the expected value of the attorney's fee, which, in a contingent fee contract typically used in ED cases, is some fraction of the difference between the court award and the buyer's final offer.

Equation (5) describes the determination of price in court. Any systematic deviation of court award from market value is the result of expenditure by both parties on court inputs and the function $h^b(\ )$ and $h^s(\ )$, which relate this expenditure to influence on court verdict. Equations (6) and (7) state that both parties have unbiased expectations of court award, with random errors having zero mean and variance a function of parcel value. The assumption that expectations are unbiased is plausible if both hire legal counsel with experience in the field of condemnation.

Equations (8) and (9) state the upper and lower bounds, respectively, on offer and ask prices consistent with wealth maximization.[12] Equation (10) is a necessary condition for settlement out of court, that is, $P_o^{max} \geq P_a^{min}$. Rearranging terms produces

$$(C^b - S^b) + (C^s - S^s) \geq E(P_c)^s - E(P_c)^b = z - w.$$

Thus, settlement out of court requires that the sum of the incremental costs due to going to court exceed the difference between the seller's and buyer's expectations of court award. Note that this is independent of the assignment of liability for court costs.

Equation (11) describes the determination of price in an out-of-court settlement. It makes the simplest assumption that the parties split the difference between P_o^{max} and P_a^{min}. The subsequent analysis applies if $\frac{1}{2}$ is replaced by any positive fraction, to reflect "unequal bargaining power," and the Δ in equation (11′) omitted, since settlement costs are assumed to be an invariant fraction of market value.

[12] Actual final offers and asks may lie within these bounds, depending on each party's assessment of the probability of going to court.

The Alternative Hypotheses

Given this model, one set of sufficient conditions for prices paid under ED to approximate market value with random errors is the following: (i) Anticipation of ED does not affect market value prior to the filing of the petition to condemn. It is fair market value as of the date of filing the petition to condemn that the courts are instructed to award. The timing of filing is at the discretion of the condemnor. (ii) $C^b(P_m) = C^s(P_m)$, that is, buyer and seller court costs bear the same functional relation to market value. (iii) $S^b = S^s$. (iv) $h^b(\ ) = h^s(\ )$, that is, the returns to court expenditure are the same for buyer and seller.

These conditions yield the null hypothesis that prices paid under ED approximate market value with random errors, regardless of whether the price is negotiated voluntarily or awarded in court. An alternative hypothesis may be generated by incorporating into the model the following assumptions based on economic theory or empirical evidence from urban renewal in Chicago: (i′) Anticipation of ED tends to depress market value. ED implies a loss of use rights associated with the property, in particular, effective loss of the right to refuse to sell and greater uncertainty of lease duration, since condemnors have special rights to terminate leases. Thus, anticipation of ED would tend to depress market value, *ceteris paribus*.[13] (ii′) $C^b(P_m) \neq C^s(P_m)$, that is, optimum expenditures on court costs are not the same for buyer and seller.

Optimum expenditure on court costs depends on the costs of and returns to hiring legal "inputs" and constraints on choice of quality and quantity. The buyer in condemnation cases is typically constrained by statutory requirements on the use of legal personnel. Thus, the Department of Urban Renewal in Chicago is represented in all court cases by the City of Chicago's corporation counsel and is required to obtain at least two independent appraisals in each case. The seller, on the other

[13] If at time t_0, condemnation is anticipated at some future date, t_n, the present value of the property at t_0 is

$$PV_{t_0} = \frac{E(Pt_n)}{(1+r)^n} + R\frac{1-(1+r)^{-n}}{r},$$

where $E(Pt_n)$ = expected price obtainable at t_n under ED and R = value of service stream derived from property from t_0 to t_n. Uncertainty as to the value placed by the courts on maintenance expenditure may reduce the optimum maintenance program and reduce R; if the property is rented, this will be exacerbated by a reduction in the demand for leases because of uncertainty as to duration. Thus, even if the courts award the market value of the property, measured as the present value of its expected income stream at t_n when condemnation is filed, this PV_{t_n} will be lower than it would have been in the absence of anticipated condemnation. This may be offset by defensive expenditures on "improvements" that are valued by appraisers and the courts higher than they would have been by the market, or by arranging dummy sales at inflated prices to be used in court as evidence of market value. Thus, the net effect of anticipation of ED on property value is ambiguous a priori. However, since the properties acquired for urban renewal in Chicago are predominantly rented, the former negative effect is expected to dominate.

hand, presumably adjusts the quality (or implicit hourly wage rate)[14] of attorneys and witnesses commensurate with the stakes of the case.

However, on the other dimension of court expenditure—hours per case—it seems likely that the seller faces greater constraints than the buyer. Handling any case requires some minimum number of hours of appearance in court independent of the value of the property being litigated. This number of hours times the implicit hourly wage rate of the lowest-quality lawyer represents a minimum fixed cost of going to court for the seller. The buyer, on the other hand, may have greater flexibility in reducing hours per case because of the possibility of grouping several similar parcels in one case. The possibility of spreading the fixed cost of a court case over several parcels is available on equal terms to sellers only if the costs of negotiating to hire the same lawyer are zero.

If we ignore for the moment constraints on hours per case, constraints on the buyer's choice of quality of lawyer will have the effect of raising the buyer's expenditure on low-valued properties and lowering it on high-valued properties relative to the seller's expenditure. The effect is illustrated for low-valued properties in figure 2.

Figure 2 represents the costs and returns to hours per case for the buyer and seller. The null-hypothesis supply and demand curves, S_0 and D_0, are drawn on the assumptions that both parties face unconstrained choices, that both correctly anticipate the other's behavior and adjust accordingly, and that courts are neutral. Both would have identical expenditures, $W_0 H_0$.

The curves S_1 and D_1 are drawn on the assumption that the buyer is constrained to employ above-optimum-quality lawyers at a higher wage rate, W_1. Assuming the seller's choice of quality unchanged at W_0, the buyer's lawyers will be relatively more effective, implying an upward shift in the buyer's returns-per-hour curve and a downward shift in the seller's returns-per-hour curve to D_1. Thus, the effect of the constraint is to raise buyer expenditure on court influence above that of the seller ($W_1 H_1 > W_0 H_1$). Given the buyer's constrained choice, it may be optimal for the seller to raise quality above W_0. But this need not result in an equal level of expenditure. If quality levels were equalized at W_1, the returns curves would shift back to D_0, the curves representing returns to equal-quality hours. Optimal-hours input would be H_1. Thus, the same court outcome would be achieved with a more quality intensive input mix. But if hours per case are not flexible downward but are constrained at some minimum above H_1', the higher-quality lawyer would require a higher fraction of the award, implying a downward shift in the seller's demand curve, and reduced expenditure.

[14] Although on the seller's side the form of contract is typically a contingent fee or share contract, not a fixed hourly wage contract, the seller can vary the implicit hourly wage rate and hours per case indirectly by choice of attorney and by varying the attorney's share of the final award.

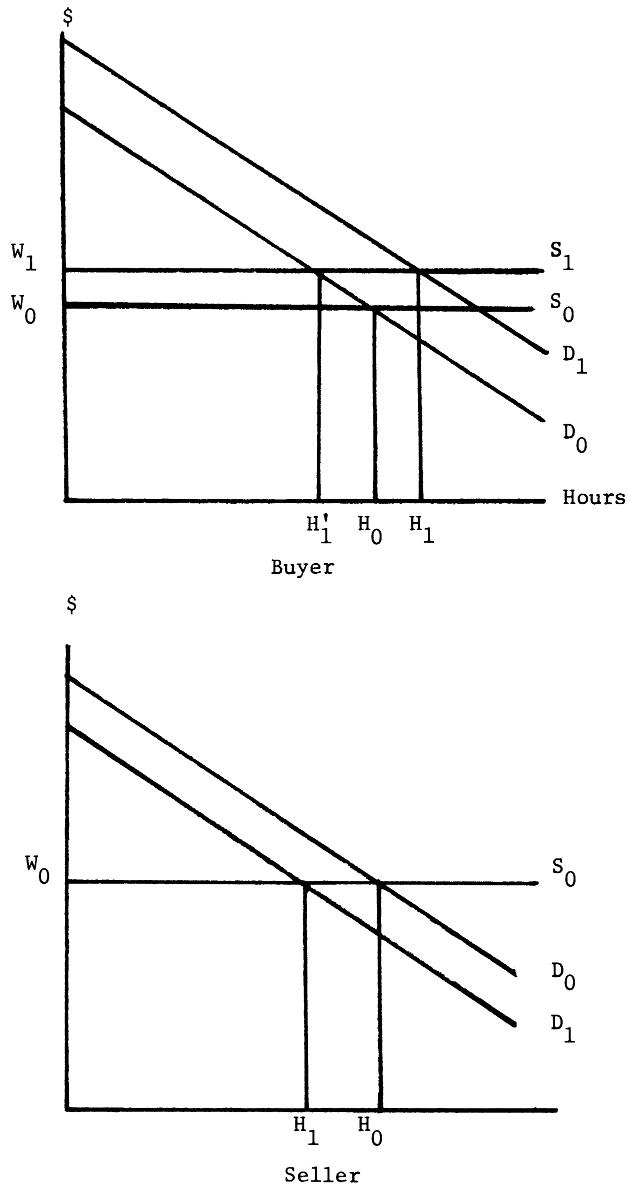

FIG. 2.—Expenditure on court inputs

Thus, constraints on reduction in quality of legal inputs by the buyer and on hours per case for the seller will tend to result in the buyer's expenditure on court costs exceeding the seller's on low-valued properties. For high-valued properties, the quality ceiling produces the reverse effect. The hours constraint is inoperative.

A third force tending to produce the same result is the existence of economies of scale for the buyer. Court recognition of precedent implies an outward shift in the returns-per-hour curve for parcels which are sufficiently homogeneous for a precedent effect to operate. In the urban renewal sample, homogeneity, and hence the buyer's relative advantage due to precedent economies of handling many parcels, is expected to be greater on low- than on high-valued parcels. Again, transactions costs are assumed to prevent sellers from enjoying these scale economies to the same degree.

These assumptions about the structure of court costs and returns imply:

$$C^b > C^s \text{ on low-valued properties;}$$

$$\frac{\partial C^b}{\partial P_m} < \frac{\partial C^s}{\partial P_m} \leq 0.$$

Incorporating into equations (5) and (11′) yields the alternative hypotheses:

1) $$P_c < P_m \text{ on low-valued properties;}$$

$$\frac{dP_c}{dP_m} = \frac{-d[h^b(C^b)]}{dP_m} + \frac{d[h^s(C^s)]}{dP_m} > 0.$$

Thus, in the absence of any court bias, high-valued parcels will tend to receive a higher fraction of market value in court than will low-valued parcels.

2) $$\frac{dP_v}{dP_m} - \frac{dP_c}{dP_m} = \frac{1}{2}\left(\frac{dC^b}{dP_m} - \frac{dC^s}{dP_m}\right) < 0.$$

Prices reached voluntarily in out-of-court settlements rise less, relative to market value, than do court awards.

Empirical Evidence

The empirical estimates of the relationship between ED prices and market value are based on land acquisitions by the Chicago Department of Urban Renewal for three large projects during the period 1962–70.[15] The data obtained from HUD consist of final price paid (*Ped*), assessed value for tax purposes (*TAVL*), and date of acquisition (*DATE*) for all parcels. In addition, for all parcels in two of the three projects, method of acquisition —voluntary settlement or court—is known. In order to compare price actually paid with market value, an estimate of market value was derived for each parcel in the ED sample. The procedure used was to estimate a

[15] The projects are Southeast Englewood, Near West Side, and Lincoln Park I.

TABLE 1*

MARKET SAMPLE SUBDIVIDED BY ZONE, REGRESSIONS OF *PRL*

Zone	*C*	*TAVL*	*DATE*	*TEN*	*VALL*	*DC*	*DCT*	*DZ*	*DZT*	R^2	SEE
*R*2 and 3........ *r* = 674(1)	7.2348 (50.16)	0.3109 (17.005)	...	...	...	...	...	...	...	.3008	.2228
Z = *R*3......... *n* = 637(1′)	6.2324 (9.508)	0.32304 (4.182)	0.00396 (5.517)	0.03495 (3.186)	0.17033 (3.526)	0.04878 (0.597)	...	0.33513 (0.5270)	−0.03805 (−0.4789)	.3648	.2133
*R*4 and 5........ *n* = 423(2)	7.35623 (33.9)	0.28457 (10.916)	...	...	...	...	...	...	...	.2206	.42557
Z = *R*5......... *n* = 72(2′)	5.31613 (10.79)	0.22607 (7.465)	0.00678 (4.165)	0.03419 (3.074)	0.49279 (5.399)	0.03213 (0.23008)	...	0.16596 (0.3011)	−0.00905 (−0.1344)	.3354	.3958
*B*1 and 2........ *n* = 64(3)	7.57294 (18.5)	0.26047 (5.566)	...	...	...	...	...	...	...	.3332	.3587
Z = *B*2......... *n* = 55(3′)	7.80816 (6.36)	0.05664 (0.412)	0.00462 (1.326)	0.00109 (0.03668)	0.27981 (2.4468)	−1.59456 (−1.482)	0.156829 (1.347)	−1.47020 (−1.255)	0.173948 (1.26021)	.4542	.344567
*C*1 and 2........ *n* = 30(4)	8.94112 (15.2)	0.086657 (1.292)	...	...	...	...	...	...	...	.0562	.40077
Z = *C*2 .... *n* = 5(4′)	7.54587 (5.37)	0.103007 (1.011)	0.011168 (1.8275)	−0.10787 (−1.0255)	0.251795 (1.1031)	−0.916476 (−1.656)	0.082346 (2.005)	−6.35926 (−1.5718)	0.714092 (1.5336)	.4960	.338189
*R*4 .... *n* = 351	5.41779 (12.6380)	0.26699 (9.4933)	0.007903 (5.2367)	0.0313 (1.6916)	0.402177 (4.8588)	...	...	...	...	.3757	.330719
*R*5 .... *n* = 72	4.35524 (2.5109)	0.11731 (1.48779)	...	0.051675 (2.3779)	0.88131 (2.53988)	...	...	...	...	.2555	.624102
B .... *n* = 64	6.57099 (11.1487)	0.22758 (4.8762)	0.00535 (1.61136)	...	0.2320 (2.11887)	...	...	...	...	.4112	.34266
C .... *n* = 30	6.75036 (5.75987)	0.156731 (1.79205)	0.01059 (1.73873)	...	0.3066 (1.3799)	−1.11580 (−2.15098)	0.08720 (2.13507)	...	...	.4707	.33858

* All variables defined in table 1A.

TABLE 2

ED Sample Subdivided by Zone
(t-Statistic in Parentheses)

Zone	A. Regressions of *Ped*			B. Regressions of $\hat{P}m$		
	C	$\hat{P}m$	R^2/SEE*	C	*Ped*	R^2/SEE*
*R*4 . . . . . . $n = 202$	−11.2807 (−10.4540)	2.20652 (19.0102)	.6437 (.430314)	6.60185 (46.493)	0.291745 (19.01)	.6437 (0.15647)
*R*5 . . . . . . $n = 192$	−2.71576 (−1.28492)	1.27976 (5.75121)	.1476 (.696318)	8.40721 (44.2836)	0.115344 (5.75124)	.1476 (0.209045)
C . . . . $n = 232$	−6.01600 (−3.1975)	1.64972 (8.43511)	.2363 (.70775)	8.20651 (48.909)	0.143216 (8.43517)	.2363 (2.0853)
B . . . . $n = 147$	−9.5534 (−7.24648)	1.99435 (14.7574)	.6003 (.48559)	6.77291 (33.465)	0.301006 (14.757)	.6003 (0.188652)

Zone	$\hat{P}m_{\text{min}}$	$\hat{P}ed_{\text{min}}$	$\hat{P}m_{\text{mean}}$	$\hat{P}ed_{\text{mean}}$	$\hat{P}m_{\text{max}}$	$\hat{P}ed_{\text{max}}$
*R*4	6,180	2,920	11,272	9,200	35,260	135,000
*R*5	6,464	4,985	13,619	13,000	22,100	24,200
C	7,729	6,340	15,449	20,100	28,300	53,700
B	9,045	5,515	17,951	22,100	38,600	98,800

Note.—Definition of variables:

$\hat{P}m$(min), $\hat{P}m$(mean), $\hat{P}m$(max) = minimum, mean, maximum estimated market values from $\hat{P}m = Xed\hat{\beta}$

$\hat{P}ed$(min), $\hat{P}ed$(mean), $\hat{P}ed$(max) = minimum, mean, maximum predicted ED prices given $\hat{P}m$ and regression coefficients estimated from regression of *Ped* on $\hat{P}m$ (first set above)

* SEE = standard error of estimate.

relationship between market value, assessed value, and several property characteristics from a sample of properties sold on the free market in areas of Chicago similar in character to those where urban renewal projects have been undertaken.[16] The estimating equations used are the last four reported in table 1. The coefficients obtained were then applied to data on the same explanatory variables to generate an estimate of market value, $\hat{P}_m$, for all parcels in the ED sample.

Table 2 reports the results of ordinary least-squares regressions of price paid under ED on estimated market value. Since the equation is estimated in logarithmic form, the null hypothesis predicts a zero intercept and coefficient of unity on $\hat{P}_m$. The evidence strongly supports the alternative

[16] The market sample consists of property sales in Chicago over the period 1968–72 in the Community Areas (as defined by the 1960 census) in which some urban renewal project has been located. Sample size considerations dictated drawing from a much larger area than that covered by the ED sample, which includes only three of the 20 or more urban renewal sites. Theoretically, it is appropriate to draw the market sample from areas similar in character to the ED sample but not sufficiently close to actual urban renewal sites for property values to have been affected, since ED compensation is not supposed to reflect value of the property to the buyer. In practice it was found that private market sales in the immediate vicinity of urban renewal sites were very sparse, so contamination of the market sample by the effects of urban renewal should be minimal.

hypothesis, that low-valued properties receive less than market value and high-valued properties receive more than market value.[17]

To test the plausibility of the results and obtain an idea of the order of magnitude involved, the mean, minimum, and maximum $\hat{P}_m$ were calculated for each zoning class and compared with the corresponding values implied by the regression equations for ED prices. The exact results vary across zones, but the generalization that ED is a tax on low-valued and a subsidy on high-valued properties holds for all zones. As a rough approximation, a \$7,000 parcel receives about \$5,000, a \$13,000 property breaks even, and a \$40,000 property may get two or three times its market value.

The regressions in table 3 are designed to investigate which property characteristics are associated with deviations of ED price from market value ($PDIF = Ped - \hat{P}m$). If deviations of ED prices from market value were due solely to factors common to all properties of a particular value, the coefficients in the *PDIF* equations should be insignificantly different from zero. The consistently positive coefficients on *TAVL* are surprising if $\hat{P}_m$ accurately incorporates all of the systematic relation between tax-assessed value and market value. A possible explanation is that either appraisers or the courts treat assessed value as an indicator of market value and fail to recognize that component of actual assessed value which is a deviation from the average market assessment ratio and which would be capitalized into property value in a free-market sale because of the effect on tax liability. This would imply a coefficient closer to unity for the ED than for the market sample, which is in fact found.[18] While there may be some validity to this explanation, it is insufficient alone to account for the evidence on deviations of ED prices from market value. If courts

[17] This estimate is no doubt affected by, but cannot be readily explained away in terms of, either random or systematic error in $\hat{P}_m$. The purpose of using a predictive equation for $\hat{P}_m$ is to control for any systematic variation across properties in the ratio of assessed value to market value, and hence avoid a systematic bias in the estimate of market value that would exist if assessed value alone were used as a simple proxy for market value. Systematic bias in the predicted $\hat{P}_m$ may nonetheless exist, since measurement error in the explanatory variables of the predictive equation will lead to biased estimates of the coefficient vector used to predict $\hat{P}_m$. The direction of the bias is not known, however, in the case of a multivariate ordinary least squares regression with errors in more than one independent variable. Assuming that the errors in $\hat{P}_m$ are additive in the logarithmic specification and uncorrelated with either the true values or the stochastic disturbance term in the relation between ED price and true market value, then a lower bound on the true value of the slope coefficient is given by the estimate obtained by regressing P_{ed} on $\hat{P}_m$ (set A in table 2) and an upper bound by the reciprocal of the coefficient obtained by regressing $\hat{P}_m$ on P_{ed} (set B in table 2). Both exceed unity. However, if the assumptions with respect to the error structure in $\hat{P}_m$ are not met, this test does not yield bounds on the true coefficient. In the absence of knowledge of the direction of bias in $\hat{P}_m$, nothing can be said a priori about the direction of potential bias in the estimated relation between ED price and market value.

[18] The total coefficient on *TAVL* is the sum of the coefficient of the *PDIF* equations (table 3) and that from the market equations (table 1) used in calculating $\hat{P}_m$.

TABLE 3

ED SAMPLE REGRESSIONS OF $PDIF = Ped - \hat{P}m$

Zone	*C*	*TAVL*	*DC*	*DCT*	*TEN*	*DATE*	*VALL*	R^2	SEE	D-W
R4 .... $n = 203$	−3.74440 (−12.2364)	0.457536 (12.069)	...	...	...	...	...	.4202	.40588	1.446
	−2.49465 (−2.7131)	0.438037 (8.6888)	1.09439 (0.9387)	−0.13135 (−1.0111)	0.054508 (2.6284)	−0.11790 (−1.787)	−0.26440 (−1.1276)	.4613	.396182	1.5377
R5 .... $n = 192$	−5.29391 (−21.135)	0.66307 (21.02)	...	...	...	...	...	.6993	.38425	1.4726
	−3.58377 (−5.373)	0.654012 (17.2521)	0.829029 (0.9892)	−0.115636 (−1.1976)	0.02035 (0.98535)	0.005178 (2.96548)	−0.365624 (−3.26795)	.7315	.36797	1.4762
C .... $n = 232$	−4.92328 (−16.4360)	0.59878 (17.41)	...	...	...	...	...	.5686	.46737	1.6456
	−4.13779 (−8.2683)	0.51725 (10.9138)	2.2541 (3.607)	−0.20778 (−2.9596)	0.06961 (4.9107)	−0.00895 (−2.7589)	−0.04547 (−0.5782)	.6941	.3979	1.8546
B .... $n = 147$	−3.75475 (−9.7705)	0.44967 (10.215)	...	...	...	...	...	.4185	.43675	1.965
	−3.81760 (−7.526)	0.498201 (6.954)	1.3078 (1.51186)	−0.14715 (−1.5153)	0.098495 (3.59549)	0.00477169 (1.54103)	−0.107667 (−1.37942)	.5087	.408545	2.0402

were guided solely by assessed value, there would be no reason for sellers to engage lawyers and appraisers to defend them in court. Moreover, the adherence-to-assessed-value hypothesis cannot account for the divergence between the pattern of court awards and settlement prices in relation to market value predicted by the court-costs theory and confirmed by the evidence discussed below.

Other variables of interest are *TEN*, the number of tenants with listed phones, and *DATE*, the date of acquisition, measured in months from earliest observation in each location.

In the market sample, *TEN*, the number of tenants with listed phones, is expected to measure a combination of tenant capacity and current occupancy. If tenant capacity and potential income vary among structures to an extent not fully captured in assessed value, the positive coefficients observed in the predictive equation for the two residential zones are to be expected. The significant positive coefficients on *TEN* in three of the four *PDIF* equations then suggest that high capacity or occupancy rates have a greater impact on ED awards than on free-market prices. If it is the case that anticipation of ED reduces occupancy rates due to uncertainty of lease duration and compensability of improvement and maintenance expenditure and that this is reflected in lower ED awards, then ED creates an incentive for the buyer to delay acquisition or hold out to depress prices analogous to the seller's supposed incentive to hold out in the free market.[19]

However, if the effect of ED, whether intended or not, is to reduce occupancy rates below normal, then the observed number of tenants will measure with error the potential rental capacity of properties in the ED sample. Then the positive effect of rental capacity on market value will be biased down in the estimates of market value. If courts respond to potential rather than actual occupancy, a positive coefficient on *TEN* in

[19] Residential buildings are predominantly tenant occupied in urban renewal areas of Chicago, with average period of occupancy 1–3 years. Anticipation of the effect of ED by sellers presumably includes awareness that high vacancy rates may depress ED prices. This would create an incentive to maintain occupancy rates by lowering rental charges. The extent to which such defensive behavior by sellers is a good investment depends on the relative magnitudes of the price elasticity of demand for leases, the reduction in demand for leases due to uncertainty as to duration, and the elasticity of ED prices with respect to number of tenants and rental rates. An upper bound on the estimated effect on ED price of an increase by one in the number of tenants lies between 5 and 10 percent. As a rough calculation, at the point of means for the court sample (table 5), an increase in the number of listed tenants from one to two would raise ED price by $600–$1,200. For any individual landlord, the demand for leases is likely to be inelastic, since he cannot assume other landlords will maintain higher rentals as he reduces his if anticipation of ED is widespread in the neighborhood. The less elastic the demand curve, the greater the reduction in rental rates required to increase the number of tenants, and the greater the loss in rental income over the interim between anticipation of ED and filing the petition to condemn. Thus, stocking up with tenants in anticipation of ED is only likely to be profitable if the demand curve is elastic, or, if inelastic, where the expected delay is short, so that loss of rental income is less than expected gain in ED price.

the *PDIF* equations may be expected. Given this potential for errors-in-variables bias if the effect to be measured in fact exists, it seems, in principle, not possible to measure the holdout incentives of buyers to depress occupancy and hence prices under ED in the absence of better data on potential rental capacity.

The coefficients on the *DATE* variable only support the weak conclusion that there is no evidence that ED holds down the rise in prices over the duration of the assembly. The coefficients must be interpreted as the difference between the monthly rate of inflation in the market and ED samples, since the former was incorporated into $\hat{P}_m$ (except in *R*5, since for this zone *DATE* was insignificant in the market sample). But the market rate of increase of property values differs across the city at any point in time and over time. The average market rate of inflation was probably less in the early 1960s, from which roughly half the ED sample was drawn, than in 1968–72, from which the market data were drawn. Therefore, ignoring interarea differences, the null hypothesis that ED prices follow the same pattern over time as the market would imply a negative coefficient on *DATE* in the equations for *PDIF*. The size should be the difference between the monthly market rate of inflation in 1968–72 and 1962–65 weighted by the proportion of the ED sample drawn from the earlier period. Taking 5 percent and 2.5 percent as the average annual rates for the two periods, weighting the difference by 0.5 yields a rough estimate for the expected coefficient on *DATE* of −0.001. Of the estimated coefficients, two exceed and two fall short of this benchmark for the null hypothesis. To the extent prices under an assembly in the free market would rise faster over time than the market average due to the holdout problem, the conclusions are more favorable for ED.

The second proposition to be tested is that prices are the same fraction of market value for parcels settling in and out of court, against the alternative that high-valued parcels receive a higher price (gross of court costs) relative to market value in court awards than in voluntary settlements, because court costs or expenditures fall, relative to parcel value, more for buyers than for sellers.[20]

The Southeast Englewood and Near West Sidé samples, for which there are data on method of settlement, were pooled and divided into subsets according to whether the price was awarded in court or agreed on in

[20] It may be shown that the predictions of the alternative hypothesis of the model of price determination,

$$\frac{d(P_c/P_m)}{dP_m} > 0 \quad \text{and} \quad \frac{d(P_v/P_m)}{dP_m} - \frac{d(P_c/P_m)}{dP_m} < 0,$$

imply

$$\frac{d \ln P_c}{d \ln P_m} > 1 \quad \text{and} \quad \frac{d \ln P_v}{d \ln P_m} < \frac{d \ln P_c}{d \ln P_m},$$

which is the form in which the theory was tested.

TABLE 4

COURT AND VOLUNTARY SUBSETS

Sample	Regressions of *Ped*			Regressions of $\hat{P}m$		
	C	*Ped*	R^2/SEE	C	$\hat{P}ed$	R^2/SEE
Total	−8.7925	1.9443	.4340	7.2689	.2232	.4340
n = 409(1)	(−8.5177)	(17.665)	(0.60505)	(60.7518)	(17.6656)	(0.205006)
Court	−15.6772	2.64492	.5250	7.46553	.205416	.5250
n = 139(2)	(−9.20981)	(16.9542)	(0.56203)	(48.6196)	(12.3066)	(0.19292)
Voluntary	−4.26741	1.47504	.4013	6.87258	.262747	.4013
n = 270(3)	(−3.5263)	(11.4465)	(0.56203)	(36.4998)	(13.4038)	(0.207576)
Court low	−17.5926	2.86844	.3330	8.15226	.116157	.3330
n = 80(4)	(−4.17866)	(6.24299)	(0.76188)	(50.164)	(6.2429)	(0.153316)
Court high	−19.0518	3.00196	.4817	8.0373	.160492	.4816
n = 59(5)	(−4.80677)	(7.27886)	(0.508257)	(37.1296)	(7.278)	(0.117512)
Voluntary low	−2.31007	1.26691	.1404	8.16297	.11087	.1402
n = 146(6)	(−0.961430)	(4.85109)	(0.480118)	(38.1640)	(4.85109)	(0.142034)
Voluntary high	−9.39095	2.0058	.3715	7.75796	.185238	.3714
n = 124(7)	(−4.4468)	(9.0979)	(0.51278)	(38.7253)	(9.0979)	(0.155829)

voluntary negotiations. The results are reported in table 4. The regressions were run in both directions to estimate bounds on the true coefficient, on the assumption of additive measurement errors in both variables when the equation is estimated in logarithmic form.

Comparing equations (2) and (3) in table 4 in the regressions of *Ped* on $\hat{P}_m$, we find that the intercept is lower and the coefficient on $\hat{P}_m$ higher in the court set than in the voluntary set. The difference is statistically significant by a Chow test. This evidence tends to refute the null hypothesis and support the alternative of greater regressivity in court. A similar conclusion is implied by the regressions of $\hat{P}_m$ on *Ped*. However, if these two sets of estimates are treated as bounds on the true coefficients, the ranges overlap:

$$2.645 < \beta_c < 4.87; \qquad 1.475 < \beta_v < 3.81,$$

where β_c is the coefficient on $\hat{P}_m$ in the court set and β_v is the coefficient in the voluntary set. The hypothesis that the true values are equal can therefore not be firmly rejected.

Table 4 also reports estimates of the same equations with the sample subdivided into low- and high-valued parcels, the division being made at \$12,000, which is close to the mean for both court and voluntary sets. The purpose is to test the possibility that the true relation is nonlinear and that differences in the estimated coefficients for the court and voluntary sets are attributable to different frequency distributions of parcel values for the two sets. The evidence does not support this conclusion.

Two indirect tests of the reasonableness of the model of price determination may be performed with these estimates. First, cost minimization for the buyer requires that $P_v \leq E(P_c)^b + C^b$. Both $E(P_c)^b$ and C^b are unknown. However, an estimate of the lower bound on $E(P_c)^b$ is given by P_c, observed court award for a property of equal market value. It is a lower bound because the voluntary set will not be a random drawing from the distribution of parcels but will tend to "select" those parcels on which the buyer overestimated the court award and thus offered a high price relative to the seller's minimum ask (assuming errors in buyer and seller expectations are not positively correlated). Then cost minimization requires that

$$P_v - P_c \leq E(P_c)^b - P_c + C^b;$$

that is, the difference between the regression estimates of settlement price and court award for a property of a given market value is a lower bound on the sum of the buyer's error in predicting court award and his court costs. At the sample mean of \$12,000, $P_v - P_c = \$3,000$, which seems not unreasonable.

The second test utilizes the assumption that prices reached in voluntary

TABLE 5

SUMMARY STATISTICS OF VARIABLES FOR COURT AND VOLUNTARY SETS

Variable	Court Mean	Court Antilog Mean	Court Variance	Voluntary Mean	Voluntary Antilog Mean	Voluntary Variance
*Ped**	9.15617	$9,475	1.00027	9.57907	14,450	0.404433
*TAVL**	8.16021	3,495	0.988743	8.34385	4,250	0.590253
$\hat{Pm}$*	9.35127	11,550	0.080279	9.38721	11,950	0.070708
DATE	9.64748	...	18.3893	7.9629	...	26.5488
DC	0.10791	...	0.09696	0.07407	...	0.068842
TEN	1.07914	...	1.986	1.8444	...	3.90136
VAL	75.1439	...	883.312	71.8333	...	634.080

* Arithmetic mean of logs = geometric mean of absolute numbers:

	Arithmetic Mean	Variance	Arithmetic Mean	Variance
Ped	15,199.6	0.335801 E09	17,881.7	0.192506 E09
$\hat{Pm}$	11,980.6	0.118874 E08	12,385.8	0.134233 E08

settlements are the average of minimum offer and maximum ask, which reduces to

$$P_v = P_c + \tfrac{1}{2}(C^b - C^s).$$

Three thousand dollars, the difference between settlement price and court award for a mean-valued property, seems excessive as an estimate of half the difference in court costs. However, again the model may be salvaged by selectivity bias considerations.

The voluntary set will comprise two groups of parcels, *A* and *B*, on which the buyer overestimated and the seller underestimated, respectively, P_{c_v}, the hypothetical court award on a parcel which settled out of court. Assuming uncorrelated errors, for set *A*

$$P_v = P_{c_v} + \tfrac{1}{2}(C^b - C^s) + \tfrac{1}{2}[E(P_{c_v})^b - P_{c_v}] > \bar{P}_v,$$

and for set *B*

$$P_v = P_{c_v} + \tfrac{1}{2}(C^b - C^s) - \tfrac{1}{2}[P_{c_v} - E(P_{c_v})^s] < \bar{P}_v,$$

where

$$\bar{P}_v = P_{c_v} + \tfrac{1}{2}(C^b - C^s).$$

Thus, observed P_v is an unbiased proxy for $\bar{P}_v$ only if *A* and *B* are equal-sized samples from the same population and if average buyer and seller errors are equal in absolute value. If the buyer makes larger or more frequent errors, set A will dominate and observed $P_v > \bar{P}_v$, so that $P_v - P_c > \frac{1}{2}(C^b - C^s)$.

The question arises whether observed P_c is an unbiased proxy for P_{c_v}. By a similar argument, the court set will comprise two groups of parcels, with negative errors in buyer expectations of P_{c_v}, and therefore low offers relative to $\bar{P}_v$, and positive errors in seller expectations, and therefore relatively high asks. However, even if negative buyer errors dominate in frequency or mean absolute magnitude, actual court awards are still unbiased for P_{c_v} if the courts are unaffected by the asks and offers of pretrial negotiations. This assumption is plausible if it is cheap for sellers to match low offers by symmetrically high asks in court in excess of asks in pretrial negotiations. This is implicit in equation (5), which makes court award only a fraction of market value and expenditure on court inputs.

Conclusions

This study of urban renewal in Chicago suggests that ED does not ensure that fair market value is paid in an assembly. The mean ratio of price to market value is 1.27 for the court sample and 1.45 for the voluntary sample, with a weighted average of 1.388. This does not necessarily imply a suboptimal amount of assembly, since the opportunity cost of land for an assembly is expected to exceed mean market value. However, it seems unlikely that the pattern of reservation prices corresponds to the pattern of ED prices. Under ED, high-valued parcels systematically receive more than market value and low-valued parcels receive less than market value. This is consistent with a simple model of how prices would be determined assuming optimizing behavior within the constraints imposed by ED and a structure of court costs which induces higher buyer expenditure relative to the seller's on low-valued properties, but the opposite relation on high-valued properties. Obviously, the structure of court costs may vary in different contexts, so the conclusion with respect to the pattern of ED prices is only generalizable in similar contexts.

The full-cost calculus of the relative efficiency of ED and the free market in handling assemblies cannot be made without data on comparable market assemblies and on transactions costs, including labor inputs and forgone income on land due to delay in transferring it to a higher-valued use. Both components of transactions costs are likely to be higher under ED. Thus, both theoretical considerations and the evidence available leave unproved the case for the superior efficiency of ED.

Appendix

TABLE A1

GLOSSARY

Variable	Definition	Source
PRL	Price of property in sample of random market sales; natural logarithm	Transfer tax stamps reported in *Real Estate News*
Ped	Price of property in ED sample; natural logarithm	Unpublished HUD records
TAVL......	Assessed value of land plus assessed value of improvements; natural logarithm	Cook County property tax roles: 1969–70, market sample; 1965, Lincoln Park ED sample. Unpublished HUD records: Southeast Englewood and Near West Side samples (date of assessment unknown)
VALL	Value per foot of frontage; natural logarithm	*Olcott's Land Values* (year prior to the year of the first observation for the market and for each ED sample)
Z..........	Zoning category	*Olcott's Land Values* (year as for *VALL*)
TEN.......	Number of tenants with listed phones	Donnelley's *Street Address Directory* (year as for *VALL*)
DC	Commercial use dummy; 0 = no commercial use; 1 = commercial use	Donnelley's *Street Address Directory*
DCT.......	*DC* × *TAVL*	...
DATE	Number of months from month of first observation in each sample	As for *PRL* and *Ped*
DZ	Zoning dummy; 0 = more restrictive zone; 1 = less restrictive zone	As for *Z*
DZT.......	*DZ* × *TAVL*	...
$\hat{P}_m$	Predicted market value of properties in ED sample; natural logarithm	...

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