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# **Efficiency and Equity in the Use of Eminent Domain, with Local Externalities**

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## Efficiency and equity in the use of eminent domain, with local externalities

Jonathan Pincus and Perry Shapiro\*

### **Abstract**

In Shapiro and Pincus (2008), we proposed a method for arriving at just compensation of private owners of urban land, in cases like *Kelo v New London*, in which government has plans to use eminent domain to ‘take’ private properties, to be assembled into a single parcel for some public purpose. The required quantum of just compensation can be discovered when the public purpose is to be pursued via private use of the assembled land parcel, and when the private user can be selected through an auction of the assembled land. This paper extends the auction mechanism to include properties which lie outside the area ‘taken’ or resumed by government, but which will be affected by the new use made of the assembled area. The auction provides an efficiency test: does the proposed change in use increase the aggregate value of the land to be resumed plus the affected properties? Local externalities are internalised through the auction. We briefly discuss the political economy of the mechanism.

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## **1 Introduction**

The present configuration and ownership of land parcels are the results of historical processes, beginning with the official subdivisions and surveys. Over time, the original division and uses of land may have become very inefficient.<sup>1</sup> Minutely subdivided low-rise commercial properties may later be more efficiently deployed in larger and more extensive commercial or mixed developments. Properties with single-family residences in the inner suburbs may now be better dedicated to a higher-density use that requires more land than any one lot provides. Moreover, substantial areas of cities may have so deteriorated that large-scale re-development is desirable.

Re-development involves planning, assembly, and approval. The private market mostly copes effectively with the first two steps. However, government sometimes supersedes the private market and acts not only as development planner but also as assembler, using the power of eminent domain; and then short-circuits of the usual processes for the determination of applications for the re-development of the assembled parcel. Also, government may subsidise the re-development in other ways.<sup>2</sup>

Three connected failings can bedevil this kind of public sector intervention. Firstly, while the changes promoted by the government may well be efficient, who can be sure, because they are not subject to the efficiency checks of the free market. Secondly, when residents are forced to surrender their properties, government compensation may be too great or too little. Third, the transformation in use can impose uncompensated costs or bestow unremunerated benefits on neighbouring property owners.

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<sup>1</sup> Michelman (1967) labels this ‘the tragedy of the anti-common’. See also Buchanan and Yoon (2000), Heller (1998), and Parisi and Depoorter (2006).

<sup>2</sup> See Fischel (2004) on the effect of grants on the use of eminent domain.

This paper offers a market method—an auction—not only for assessing what compensation should be paid to the owners of the resumed properties, but also for weighing up the local spill-over benefits and costs generated by urban development, to be set against the advantages being sought through re-development. The mechanism would be useful only when there is competitive bidding in the auction. Property owners within the zone being resumed, as well as property owners within a declared zone surrounding the resumed area, would be required to participate. The proposed mechanism utilises a single auction of the relevant properties taken as a whole, with each individual owner nominating the minimum price required for his or her own property. If a sale is made, then the resumption is approved, as are the broad outlines of the proposed re-development. Any auction proceeds are distributed to the various owners, according to fixed and exhaustive shares. The auction is to have a secret reserve, such that the aggregated property will sell only if the winning bid is at least sufficient to satisfy all of the reservation prices that the owners place on their individual properties. This set-up provides the individual owners with a financial incentive to nominate their true minimum or reservation prices. In consequence, the auction can be used to determine if resumption and re-development generates more benefits than costs, including local externalities. That is, the mechanism has attractive characteristics of fairness and efficiency.

In Section 2, we discuss why the private sector may not be able to achieve an efficient re-development of fragmented urban properties, and why the usual criterion for economic efficiency—the hypothetical compensation or weak Pareto test—may not be acceptable, when it comes to decisions about land re-development and resumptions. In Section 3, we prove that the proposed auction mechanism provides the financial incentive for truthful

nomination of minimum prices for the individual properties. Some limitations are outlined in Section 4, including what prevents its adaptation to purely private re-developments.

## **2 Entrepreneurs and efficiency**

### ***Public or private***

The private market can cope effectively with the planning and land assembly required for most major re-developments. However, in some circumstances there may be a case for governments to act as re-development entrepreneur, and to use eminent domain.<sup>3</sup>

Prospective developers discover and plan for a new use of land; identify and assemble a suitable parcel from fragments; and apply for permits to undertake the necessary work and to conduct the new economic activity. In planning, the private developer is naturally enough concerned with profit. Externalities will not weigh in the developer's calculus as heavily as will any internalised costs and benefits.<sup>4</sup> When government has a wide public purpose in view—like re-invigorating an area through the attraction of private employers—then government may have cause to act as planner. When there are many different owners, private negotiations for assemblage can be so costly that potential developers or brokers can be dissuaded from proceeding.<sup>5</sup> And, due to the 'hold-out' problem, the additional cost to the private developer can have adverse consequences for economic efficiency.

Lastly, the public process of determining private applications for re-development may not allow the private sector to achieve efficient land re-development. Many cities have had

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<sup>3</sup> Through land grants to railway entrepreneurs, governments used eminent domain to internalise the externalities generated (Pincus 1983); similarly, in Canberra, Australia, prior to self-government. In the absence of land grants, governments have used betterment taxes and other Henry George-like schemes: Starrett (1988).

<sup>4</sup> The main importance of externalities to the private developer is how they may figure in the development approval process.

<sup>5</sup> Nosal (2007), Hellman (2004), and Alpern and Durst (1997).

experienced vigorous opposition to private planning proposals, especially for large, new or extended shopping centres or high-rise apartment buildings. Consideration of a development proposal can take years. This may or may not be a good thing, but it can add greatly to the cost and uncertainty of development planning. Opposition may arise on various grounds, but generally spillovers are involved, and these can arise during the demolition and construction phases, or through the operation and use of the new structures. Although, the current approvals process gives some consideration to the externalities imposed or conferred on other property owners (or their tenants), it is not clear how these processes measure and balance the interests of the proponents and the opponents.<sup>6</sup> Moreover, the existing arrangements are not necessarily definitive, for there is a wider, political process through which pressure can be brought to bear on government.<sup>7</sup> In reaction to these considerations, governments have declared some developments as ‘major developments’ or ‘state developments’, and legislated to give the relevant Minister the planning powers normally exercised by local government or statutory planning authorities. That is, sometimes the standard processes for assessment of proposals for development can be short-circuited or set aside completely, one way or the other.

Alternatively—and this is the focus of the paper—when the transformation of property use is judged sufficiently important to the community, government may invoke its power of eminent domain. This requires the public sector either to be the planning agency, or to be closely involved in planning. Once planning has been done, public authorities condemn

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<sup>6</sup> In its discussion of the planning approval processes, the Productivity Commission concentrated on questions of regulatory process, not content (Productivity Commission 2004).

<sup>7</sup> For example, Geoffrey Rush, the Australian actor who lived near the train station at Camberwell Junction in the Melbourne city of Boroondara, successfully led public protests against the private development of the airspace above the station, in the form of a three-storey building of shops and residences. Around Melbourne, people still recall vividly the fight, more than forty years ago, to prevent the building of a very large shopping Centre at Chadstone on a site (which was assembled through private treaty and not the use of eminent domain). Incidentally, Madison Square Garden, an entertainment venue, was built in the late 1960s on air rights atop Penn Stations in Manhattan.

property and force sale at a ‘just’ price. The assembled plot may then be offered, often at favourable terms, to private developers for some use that is deemed to be in the public interest.<sup>8</sup> It is worth noting that the use of eminent domain is commonly accompanied by a short-circuiting of the usual processes for assessing the development plans.

### ***Efficiency criterion***

Opposition to urban developments, especially those involving substantial changes in land use, can be on aesthetic grounds, or altruistic ones. Some opposition, however, is at least touched with an element of self-interest, stirred by a sense of injustice. Why should someone else enjoy a benefit at a substantial expense to my convenience and amenity or put at risk the market value of my most valuable asset?

An economist’s standard response to this kind of question is to ask about economic efficiency, in its hypothetical-compensation version—could the winners have fully compensated the losers, and still have come out ahead? The use of this ‘weak Pareto’ test can be justified as a reasonable working rule for a complex society, an *ex ante* criterion for long series of similar decisions, which on average are beneficial. This justification applies best for relatively small redistributions incidental to the pursuit of greater efficiency.

Generally, however, for land re-developments the incidental redistributions are large, not small. Then the hypothetical-compensation principle may be neither satisfactory economically, nor acceptable politically. When the potential losses are large, risk-averse citizens want some form of insurance which, for house values, is not readily available in the private market (Shiller 2008). However, it can be obtained by the opponents of development

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<sup>8</sup> The US Supreme Court accepts this reliance on private actors to carry out public purposes, but only if the public sector has conducted adequate planning and otherwise has an adequate justification: see Merrill (1986) and Dreher and Echeverria (2006).

through the development-approval process itself; or through political processes. Even if the existing processes for considering applications for re-development had been well designed to offer an efficiency test, a re-development may receive approval, despite its negative spillovers out-weighting the benefits generated—the winners from a decision to approve a development proposal individually stand to gain more than those opposed each stand to lose and, for reasons well explained in the literature, may defeat the efforts of the losers, even when the losses are greater than the gains. Outside of market processes, there is no definitive test of whether the efficiency criterion has in fact been satisfied. Relevant also is the constitutional rule in Australia, the United States and elsewhere, for ‘just compensation’ when private property is taken through eminent domain. Thus, from a ‘constitutional-contractarian’ point of view, and for reasons of political economy, the hypothetical-compensation principle may not do, for development assessments. Compensation of some kind should be involved.

An attraction of our proposed auction mechanism is that, if a winning bid is made, then the strong Pareto test is satisfied: no affected property owner is under-compensated. Moreover, the auction mechanism ‘internalises’ local externalities—the new land use is more valuable than the old, when account is taken of local spill-overs. Sale at the auction is a sufficient condition for passing the weak efficiency test. It is not, however, a necessary condition—the mechanism can erroneously reject a change in land use. Nonetheless, it may be the best that is feasible.

### ***3 The Shapiro-Pincus auction with eminent domain***

Figure 1 shows a Development Area, DA, surrounded by an Affected Area, AA. DA is one property, assembled through eminent domain, from individually-owned pieces. There is a



proposal for the transformation in land-use in DA; the plans for change are confined to the Development Area. The neighbouring properties, in AA, are not subject to eminent domain, but will be affected by the proposed development, negatively or positively.

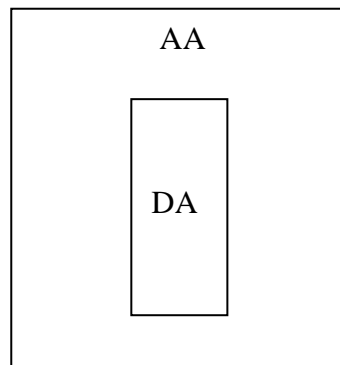


Figure 1

The boundaries of DA have been decided by public processes that we take as given, for purposes of this paper. As for AA: in theory, the whole world can be affected by the development of the DA; but for practical reasons, we focus on areas subject to local spillovers only. We assume that the area AA is known and fixed—the determination of its boundaries is immune to manipulation by the property owners.<sup>9</sup>

We are interested in testing whether the resumption and re-development of DA adds value to the combined area, {DA + AA}. Additional value can arise from the discovery of a new use for DA and planning for it; from the identification of DA as a suitable parcel of land, and its assembly (if necessary); and from obtaining planning permissions.<sup>10</sup> We assume that planning has been done.<sup>11</sup> In the settled areas, land assembly is often necessary to open up new

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<sup>9</sup> The strength of our model does not allow for landowners to appoint themselves affected or not: the optimistic conclusions for the SP mechanism would not obtain if participation is freely chosen.

<sup>10</sup> The area DA may be part of an urban renewal plan, because of its rundown state or because the community wants to encourage new industry to locate there; or fragmented ownership may be an impediment to more efficient use.

<sup>11</sup> Lengthy planning, political and legal processes may precede any DA designation, especially if there is use of eminent domain to force recalcitrant landowners to submit to the potential loss of their holding. Naturally enough, the nature of the planning-approval process can itself moderate the incentives to undertake this first step.

possibilities for land use; and sometimes the use of eminent domain can add more value than would private assembly, for the community as a whole.<sup>12</sup> Nonetheless, without approval for a new use of the assembled land, assembly by itself does not produce value.<sup>13</sup>

### ***With no externalities***

For ease of exposition, we will assume initially that only landowners within DA are affected (that is, AA is empty). This facilitates the presentation the central theorem, which we then apply to the general case. The owners in DA are designated the Potentially Displaced (PD) because, if the assembled area is successfully sold at auction, their ownership will be surrendered. They have no choice but to participate. The bidders in the auction are labelled Potential Purchasers (PP). The entire DA is to be offered at a first price auction with a designated auction reserve price, AR, which is known only to the auctioneer and is kept secret from the landowners as well as the potential bidders.<sup>14</sup> To start, every landowner is assigned a fixed non-negative share,  $\alpha_i$ , of the total auction revenue:  $\sum \alpha_i = 1$ . (Although important characteristics of the outcome depend on how the shares are determined, the ‘revelation’ theorem below does not.) Each landowner must nominate to the auction authority a price, denoted  $MP_i$ , at which he is willing to surrender his property. The auction reserve is set as the highest of the ratios of the minimum prices and the designated shares:  $AR = \max\{MP_i/\alpha_i\}$ : if that reserve is met or exceeded, then all owners can be paid at least their nominated prices.

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<sup>12</sup> See Miceli and Segerson (2007) for an interpretation of the hold-out problem as a Prisoners’ Dilemma game.

<sup>13</sup> We leave aside, as irrelevant to our paper, the possibility that land is resumed for conversion into public open space.

<sup>14</sup> The assembled property is sold to the highest bidder at the bid price, if it exceeds the reserve.

We now show that this set up induces owners to nominate the *minimum* price at which he is willing to surrender his property<sup>15</sup>:  $MP_i = MP_i^*$ .

### ***Motivations of Potential Purchasers***

We impose few restrictions on the rationality of the Potential Purchasers, in arriving at their bids, which we label  $XB_j$ . The PPs anticipate considerable outflows of money before any income is realized.<sup>16</sup> The assembled tract of land must be cleared; infrastructure installed; buildings erected; tenants found; investors wooed and loan commitments solicited; detailed designs devised; planning board meetings attended; and so on. The PP will calculate the present value of the cost and income streams, incorporating the risk assessment and the required entrepreneurial return. If the assemblage can be acquired at this value, the PP anticipates an acceptable profit. This determines the maximum the PP is willing to bid. We assume there is a non-degenerate distribution of the buyers' bids, the  $XB_j$ , and that each of the potentially displaced, the PDs, has their own idea of that distribution.

### ***Motivations of the Potentially Displaced***

The PDs will generally have a variety of motivations in determining their minimum prices at which they would be willing sellers,  $MP_i^*$ . For our purposes, what matters is that the PDs are willing and capable of translating all relevant objective and subjective values into money terms.

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<sup>15</sup> In economic terms this minimum price is the amount that would make the PD indifferent between retaining and relinquishing the property. It can be thought of as the compensating variation.

<sup>16</sup> With the simple narrative about PP choice, we want to emphasize the contribution made by developers to the redevelopment process. It is an aspect of urban renewal that is often overlooked. The developers apply their considerable skills toward an uncertain end.

Home owner-occupiers have non-financial as well as financial reasons to own rather than to rent, and to occupy this property rather than some other.<sup>17</sup> Simple financial motivations could include the expectations of future capital gain (eg, from some other re-development proposal), net of capital-gains taxation and the ordinary transaction costs, taxes and fees. Meanwhile, a flow of services is being provided by use of the property itself, the value of which is influenced not only by the improvements on the property, but also by the location and neighbourhood, even its history. It can be disruptive and costly to move to another property. People may mourn the loss of an old neighbourhood, not only for themselves, but for others in DA and AA. Behavioural economists have discussed the ‘endowment effect’, whereby owners ask for more compensation for loss of a property, than they would have been willing to pay for the property in order to acquire it, and more than can be explained by ordinary transaction costs: compensating variations are larger than equivalent variations. And there can be a value in the autonomy in decision-making that home-ownership provides—as in the ‘personhood-building theory of private property’.<sup>18</sup>

There are also considerations having to do with the process itself. Owners may not previously have given serious consideration to selling on the market. Now, they are being forced to decide what price would be sufficient to compensate for displacement; so they may add a premium for that.<sup>19</sup> Some may have ideological objections to the use of eminent domain, especially if it results in profitable opportunities for a private corporation; and add a premium for that.<sup>20</sup>

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<sup>17</sup> We consider renters as having a property right in the form of a lease; their leases will need to be brought out. Those operating businesses in DA will tend to put more weight on finances than on sentiment.

<sup>18</sup> Lehari and Licht (2007, nn 48, 55).

<sup>19</sup> This is a version of Michelman’s (1967) demoralization cost.

<sup>20</sup> The objections to the use of eminent domain may diminish, even greatly, under the SP auction mechanism, as it removes the possibility of under-compensation.

As long as there is nothing ‘beyond price’, then all motivations can be accommodated. However, given the nature of the SP auction, an owner can name such a high price that no sale takes place, and could name such a price merely for the sake of aborting the auction itself. As will be explained now, this comes at a cost; but the owner may be willing to bear it, for ideological or altruistic reasons (see also Section 4).

### ***Eliciting true minimum prices from the PDs***

Given this setup, it is in the interest of each landowner within the DA to reveal his true reservation price,  $MP_i^*$ . In particular, the announcement of an inflated minimum price will not increase his or her payoff, if the sale takes place; and cannot increase and may reduce the probability that a sale will in fact take place, a sale that would have benefited the PD.

Consider the financial consequences for an individual owner of communicating to the auction authority an untruthful high nomination of the minimum price at which he or she would be a willing seller (that,  $MP_i > MP_i^*$ ). A defining feature of the auction process is that, if there is a successful bidder, each of the PDs will receive what they have nominated as their individual minimum price,  $MP_i$ ; or more, if the winning bid exceeds the reserve.<sup>21</sup> Inflating his or her announced minimum price does not increase his or her payment, if a sale of the assembled asset goes through—this is because the distributed payment to each owner is a fixed percent or fraction of any auction proceeds. Now, it is the case that an untruthfully-high minimum compensation can raise the reserve price. However, and this is crucial, there is no financial upside, only a possible downside. Notice first that, since the reserve is secret, changing it will not change the size of the highest bid—and the highest bid, if it exceeds the reserve, is what

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<sup>21</sup> If the auction price were equal to the secret reserve,  $R$ , then each  $PD_j$  receives  $\alpha_j AR = \alpha_j \max\{MP_i/\alpha_i\} \geq \alpha_j(MP_j/\alpha_j) = MP_j$ .

is shared with the individual owner.<sup>22</sup> However, an artificially-high nomination could raise the reserve so that it exceeds the (yet-to-be-revealed) highest bid, when otherwise it would not have. If so, then no sale takes place when, other than for the untruthfully-high nomination, a sale would have taken place. Such a lost sale would have paid the individual at least the minimum price that he or she truly regards as satisfactory.<sup>23</sup> It is in this sense that there is no financial upside of an inflated nomination, only downside. On similar reasoning, the announcement of an untruthfully-low minimum price will not improve the expected financial value of the auction to the individual owner. That is, by ‘manipulating’ his or her announced minimum price, the individual cannot gain financially. A formal proof follows.

### ***The fundamental proposition***

Assumptions:

- 1) Every  $PD_i$  knows exactly how much money,  $MP_i^*$ , is needed to be indifferent between selling their property and retaining ownership.
- 2) The auction shares allocations,  $\alpha_i$ , cannot be manipulated by the PDs.
- 3) The auction reserve is the largest of the ratios of announced  $MP_i$  to individual shares, i.e.  $AR = \max\{MP_i / \alpha_i\}$
- 4) Every  $PD_i$  believes there is a positive (maybe small) probability that his true auction reserve,  $AR_i$ ,  $(MP_i/\alpha_i)$  is the largest.

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<sup>22</sup> Every PD has some notion about what might be the highest bid for the DA. These notional distributions of highest bids need be neither correct nor the same for all PDs. It is necessary only that each PD, when approaching the problem of announcing his minimum price,  $MP_i$ , takes into account a possible distribution of such bids.

<sup>23</sup> Specifically, a rise in an individual’s nominated minimum price for his or her property will increase the reserve only if that minimum price ‘determines’ the reserve (that is, if it is the nominated compensation become the numerator of the highest of all the ratios of minimum price to share); otherwise, the reserve is unchanged. If an untruthfully-high minimum price is nominated and it does increase the reserve, then it may cause no sale to occur, when a sale would otherwise have occurred; and will abort the auction if the reserve has been pushed above the (exogenous) highest bid--a rise in a secret reserve will have no effect on the size of the highest bid.

- 5) Every PD holds a notional distribution of potential maximum bids,  $XB_j$ . These distributions are characterized by individual specific, density functions,  $f_i(XB)$  such that  $f_i(XB) > 0$  for  $XB \in (0, \infty)$ . The analysis that follows it is assumed that the maximum bids are continuous random variables. The conclusions do not depend on continuity; indeed, some individuals may consider the MPs as continuous and others as discrete. We emphasize that the density functions are notional and potentially unique to any  $PD_i$ .
- 6) PDs are risk neutral, i.e., they seek to maximize the expected value when choices are risky.

*Theorem: If conditions 1- 6 hold, then it is a dominant strategy for all PDs to announce the true individual MPs.*

Proof.

Define the cumulative density function for  $PD_i$  as  $F_i(AR) \equiv \int_0^{AR} f_i(XB)dXB$ , where  $AR$  is the auction reserve. The best auction reserve for every PD is the value of  $AR_i$  that maximizes individual expected values

$$EV_i = F_i(AR)MP_i^* + [1 - F_i(AR)]\alpha_i \int_{AR}^{\infty} XB \frac{f_i(XB)}{1 - F_i(AR)} dXB$$

$$EV_i = F_i(AR)MP_i^* + \alpha_i \int_{AR}^{\infty} XB f_i(XB) dXB$$

Find the maximum expected value by setting its derivative with respect to  $AR$  equal to zero

$$\frac{\partial EV_i}{\partial AR} = [MP_i^* - \alpha_i AR]f_i(AR) = 0.$$

The solution to this is unique: the optimum  $AR = \frac{MP_i^*}{\alpha_i}$ . Since the density function is

positive, there is a unique optimum because the derivative is positive for  $AR < \frac{MP_i^*}{\alpha_i}$  and

negative for  $AR > \frac{MP_i^*}{\alpha_i}$ .

*Choice of announced MP.* Since every PD thinks there is a chance (4 above) that it most preferred auction reserve is larger than any other, it is best to announce its true minimum payment, irrespective of what any other PD announces. It is costless to announce the optimal AR: if it is smaller than the maximum, there is no loss, and if it is larger than any other announcement, the PD achieves its largest possible expected value.///

### ***Effect of the shares***

The proof did not depend on how the shares,  $\alpha_i$ , were determined. However, the shares matter for other characteristics of the auction. In particular, if there were no variance in the ratios of individual valuation to share of proceeds, then the auction reserve would be exactly sufficient to meet the minimum prices of all of the property owners. Therefore, the precision of the market test for efficiency, which is simulated through the auction, depends on the correlation between the individual shares and the individual valuations. Specifically, one outlier will reduce the efficiency of the mechanism (but maybe not the fairness). Unfortunately, negotiations among the property owners could not be relied upon to bring the reserve closer to  $\sum_i MP_i$ , for the very reasons that lead to the 'hold-out' problem itself.



### ***Compensating those outside the development area***

In the US cases motivating Shapiro and Pincus (2008), *Kelo v New London* and *Poletown*, at issue was an efficient method to achieve just compensation for the residents displaced from the development area itself.<sup>24</sup> As explained above, the SP auction ensures that the change in property-use meets a market-like test, with respect to the owners in DA. However, in most instances other property owners will be affected by the building of a factory (say) where previously there were residences. These are the owners in AA of Figure 1. Some may gain in amenity or market value—e.g., because of the prospect of employment in the new factory, or the convenience of a new shopping centre. Others in the AA may lose amenity, and their market values may fall—due, say, to noise pollution or congestion. These external gains and losses should also be taken into account, when judging the efficiency and equity consequences of the proposed development.

An extension of the SP auction could deal with these effects. It would require government to declare around DA a geographic zone, AA in Figure 1.<sup>25</sup> All property owners within AA, *as well as those within DA* are required to participate in the SP auction. If the auction leads to a sale, only then will the development plans be approved. Fixed, positive auction shares are allocated prior to the personal revelation of value, and the AA and DA shares together add to one. As long as all the additional participants have the knowledge and the pecuniary motivation that we have postulated, then this extension would satisfy the central revelation theorem, proved above. By increasing the area, the set of those potentially affected is increased, from {PD} to {PD + AA}, but the calculus remains the same: it is rational for all

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<sup>24</sup> The SP auction draws upon the work of Lehari and Licht (2007) and Heller and Hill (2007).

<sup>25</sup> The literature on the 'Henry George theorem' is of relevance here, as is that on land-grant railways, company town, and the like (see note 2).

the owners to announce their true minimum price. We now discuss both sides of the auction.<sup>26</sup>

### ***Motivations of the PPs***

Expanding the auctioned area from {PD} to {PD + AA} makes the problem more complicated for the potential developers. They are forced to internalize the potential externalities they generate with the development plans, which is what economic efficiency requires. First, the profitability of the development itself is evaluated, as described earlier.<sup>27</sup> The next step is to decide how the development within the DA affects the property in the AA (and maybe, *vice versa*).<sup>28</sup> Suppose the prospective development is a shopping centre with many amenities. The value of the adjoining property might substantially increase. The ownership of that land is a potential profitable advantage for the PP, and the PP may have attempted to gain some of these advantages by making secret purchases of properties in the AA zone.<sup>29</sup> Otherwise, the PP is willing to pay more for the entire AA and DA area together than for the DA by itself; more, that is, according to the estimate of the potential capital gains in the AA itself.<sup>30</sup> Suppose instead the prospective use of the DA is disagreeable to the neighbouring properties—for instance, a polluting and/or noisy industrial complex. The AA properties, if they remain exclusively residential, may decline in value. Through the addition

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<sup>26</sup> In the longer version of this paper (Pincus and Shapiro 2008a), we discuss its political economy.

<sup>27</sup> That is, estimate the distribution of the potential cost and revenue streams generated directly from the project and then compute what land price is necessary to meet whatever is the desired expected return. In this calculation, the larger is the perceived riskiness, the larger the expected return required

<sup>28</sup> Developers or brokers sometimes secretly purchase properties outside of what we have called the Development Area, to capture some of the spillover benefits. For example, universities have purchased surrounding properties, to internalise the externalities and to reduce the political action to stymie development plans. “Company towns” and “betterment taxes” are other methods used to try to capture some of the financial spillovers from development.

<sup>29</sup> Or, the purchases may be designed to reduce opposition to the proposed development.

<sup>30</sup> It is important to realize that the PP need not take into account the effects of the spillovers on the minimum prices nominated by those in AA. As is argued in the next sub-section, those in AA have a financial incentive to nominate what their properties are worth to them, regardless of whether or not they are worth more to someone else.

of the AA into the bundle of property that the PP must purchase, the overall value to the PP is lowered; and, with it, the maximum bid that a developer would be willing to make.<sup>31</sup>

To reduce the burden of evaluation and sale outside the PD area itself, presumably the PPs will use the services of firms specialised in the real-estate market for domestic and light commercial properties, or enter into partnerships with them. These brokers may see opportunities for assembling small parcels within AA for re-development of, say, shops serving the workers in the new factory; or for denser accommodation near the new factory; and so on. And presumably, these specialists would seek to sign contracts of re-sale of properties in AA, contingent on the auction being concluded. These most likely would include owners in AA, many of whom may wish to re-purchase their own homes, or buy back into the area.<sup>32</sup>

### ***Motivations of those in AA***

There is a financial incentive for the owners in AA to nominate the true minimum price at which they would be willing sellers. That price—for reasons spelled out earlier—should not be influenced by what the properties are worth to others but only by what the property is worth to them, subjectively. However, the size of the financial incentive for truthfulness does vary, and vary usefully for our proposal. The owners in AA and DA have been forced into an auction, for reasons that they may not understand and certainly may not appreciate. This and other reasons could lead some of them to wish to abort the auction, by nominating such high minimum prices that no sale takes place, and the development is stopped. The expected financial benefit from a truthful nomination is the premium or difference between the

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<sup>31</sup> The sponsoring public agency might change the acceptable uses of the AA property (e.g., rezone) to allow uses that are more complementary with the DA uses. The new zoning can lead to capital gains in the AA.

<sup>32</sup> Nothing in the scheme prevents the owners in AA (or DA) from signing of such contingent contracts. However, governments may need to consider reducing or removing capital gains taxes and transactions taxes and fees on such sales and re-purchases of those ‘forced’ to sell (and later to buy) a property.

owner's share of the auction price, and the owner's minimum price for his own property. When the collective property {AA + DA} is likely to be very much more valuable after the development of DA than otherwise, then the premium for truthfulness could be large. Alternatively, it is 'cheaper' for property owners to ignore the financial incentive when the developmental proposal is in fact a poor one, in terms of economic efficiency.

#### **4 Limitations**

This section discusses boundaries; efficiency; private assemblies; and non-financial motivations.

*Boundaries of AA.* Re-development of an area like DA produces external effects. In the current arrangements for assessing proposals for re-development, some but not all of those spill-overs are considered. In effect, a boundary is drawn around an affected area. However, we have nothing to say here, about what criteria should be used for this purpose. The notion of declaring a limited 'affected zone' is motivated by the realisation that there is a trade-off involved between fairness and efficiency. Similar 'zoning' has been used by governments to limit the households to which compensation is made for the additional noise created by the extension of airport runways or relaxation of airport curfews (e.g., via free or subsidised sound-proofing). For developments on private properties, it is common for the agency considering the development application to require notification to the owners of a number of contiguous properties, and to receive their active or passive agreement.

*Inefficiently high reserve?* Unless there is a perfect correlation between the shares,  $\alpha_i$ , and the individual owners' minimum prices,  $MP_i$ , then the auction reserve AR will be greater than the sum of  $MP_i$ , and a sale may fail, even when the highest bid exceeds what is necessary to compensate all the owners. Therefore, it may seem tempting to iterate from the revealed  $MP_i$ ,

back to the auction reserve. However, the revelation result in Section 3 depends on the incapacity of an individual property owner to gain financial advantage from nominating an untruthfully-high  $MP_i$ . So, in particular, if the auction reserve were set as the sum of  $MP_i$ , or related to that sum, this would open up the possibility of profitable manipulation of  $MP_i$ . Similarly, we believe that negotiations among the owners cannot be relied upon to bring the reserve closer to its theoretical minimum—there is insufficient incentive for truth-telling during such negotiations.<sup>33</sup>

*Limited to eminent domain.* The SP auction occurs after the government has made public its plans for re-development, which are backed by the power of eminent domain. Although the theorem can be applied to any proposal, private or public, for assembly and re-development of land, nonetheless it seems irrelevant to private re-developments.<sup>34</sup> A private re-development planner would have invested in creating a plan for re-development; the plan would then put up in open auction, along with the right to the assembled property. This would seem to reduce, and possibly eliminate, private incentives to engage in development planning.<sup>35</sup>

*Non-financial motivations.* Expanding the number of properties involved in the auction, from those in area  $\{DA\}$  to those in area  $\{DA + AA\}$ , increases the possibility that one or more property owner may not be motivated to maximize their expected financial values, but to

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<sup>33</sup> In the longer version, we derive the incentive effects of setting shares according to assessed value, when it is related to market value; or setting them according to some observable characteristic that is highly correlated with subjective values, the  $MP_i$ .

<sup>34</sup> Plassmann and Tideman (2007) offer two mechanisms to solve the ‘hold-out’ problem, and lead to efficient land assembly without resorting to the use of eminent domain. They noted that their first, a Clarke tax, is unfair. We believe second, using a valuation tax, is impractical : see Pincus and Shapiro (2008a).

<sup>35</sup> Of course, the creator of the re-development plan would have better information than would other bidders; but that does not seem sufficient incentive to engage in development planning in the circumstances. Relevant is that governments, before they auction the rights for exploration of mineral provinces, commonly engage in preliminary investigations of prospectivity, and make the information available to possible bidders. Private firms also conduct such investigations, but keep their information to themselves.

achieve other purposes and, especially, to stop the proposed development for ideological or altruistic reasons. And it increases the likelihood of a kind of ‘holdout’ problem arising, from an owner who does not understand or accept the kind of argument that supports the proof of the theorem; or who contemplates an even more desirable outcome which is inconsistent with the success of the development proposal.

These and similar “problems” arise when there is a large difference between willing to accept compensation for a loss of property, and willingness to pay to obtain the property or to stop its loss. In mundane market transactions, a sale does not take place unless one person’s willingness to pay exceeds another’s willingness to accept. The fundamental propositions of welfare economics, and especially the notion of gains from trade or exchange, swing on the notion that willingness to accept compensation is the appropriate value to compare with willingness to pay.

The economic case for compensation is complicated not only by the efficiency arguments first adduced by Blume, Rubinfeld and Shapiro (1984), but also by consideration of the standing that a society should afford to an individual’s willingness to accept money in compensation for a loss, especially when that amount is very much greater than the willingness to pay to avoid the loss. If the willingness to accept is taken at face value, then the Shapiro-Pincus scheme would achieve equity and efficiency. However, sometimes when a great difference can exist between willingness to pay and to accept, this leads society, for reasons discussed in Section 2, to set aside the implied veto to collective action that is provided by private ownership of property. The use of eminent domain is such an instance. For these reasons, in the longer version (Pincus and Shapiro 2008a), we suggest hedging around the pure scheme with an arbitrary limit on the acceptable announcements of

willingness to accept compensation; and with some essentially arbitrary, additional financial motives for people not to exaggerate their claims for compensation.

## **5 Conclusion**

This paper proposes an auction mechanism to achieve two related goals: to test for the economic efficiency of a proposed change in land use; to arrive at the minimum just compensation for those adversely affected by the change. In terms of welfare economics, it is designed to satisfy the strict Pareto test (within a geographical region); and not to fail the weak Pareto test, too often. We suspect that, in the circumstances set out, there is no other mechanism that can satisfy the strict Pareto test of fairness; and perform better on the weak or efficiency test.

Individuals own property, but not absolutely. Some of what they may wish to do with property requires the agreement of others, including government. In effect, there is a collective as well as an individual element to property rights or values. In *Kelo v New London* and similar cases, an essential feature was that the value of an assembled property may be greater than the value of the separate parts; but the individual owners cannot access that enhanced value unless the property is assembled. Assembly is like the production of a local public good. The Shapiro-Pincus mechanism facilitates the generation of that collective value, by rewarding each property owner with at least the value that they subjectively place on their own property. It is the counterpart of the Wicksellian mechanism for the finance of public goods proper. It could be adapted to other circumstance in which there are collective rights or values, as well as individual ones, and when there is an additional value from the aggregation of individually-owned pieces of property.<sup>36</sup>

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<sup>36</sup> Pincus and Shapiro (2008b) adapt it to the sale of irrigation water.

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