THE EFFECT OF A MUNICIPAL LAND BANK ON
THE PRICE OF URBAN HOUSING:
A THEORETICAL ANALYSIS

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Introduction

Concern over the rising cost of home ownership during the late 1960s and the 1970s has rekindled interest in public land banking as a possible means of mitigating the rate of increase in housing prices in urban America.

Proponents of land banking argue that advance large-scale public acquisition of land on the urban periphery for later conversion to residential and other uses will result in lower land prices and thus lower prices for urban housing. Lower prices are alleged to result either from eliminating the excess profits of private "speculators" or through more efficient operation by the public authority, or both. Greater efficiency in the public sector is attributed to economies of scale, the power to expropriate, lower holding costs, and lower risk due to greater certainty about plans for future expansion. Other advantages cited include protection of the environment and a greater ability to contain urban sprawl.*

Opponents have been able to challenge or refute many of these propositions on theoretical grounds and have concluded that the arguments in favour of public land banking are not convincing.** The discussion will almost certainly continue, however, inasmuch as some of the questions would benefit from empirical examination and to date few relevant analytic studies have been conducted.

What the debate lacks at this point is an analysis of the effect that a land bank, operated in a variety of ways, could be expected to have on housing prices and the incidence of benefits and costs associated with each of the various operational alternatives. The purpose of this paper is to explore these topics. The following section develops a simplified, short-run, static-equilibrium model of a competitively organized private market in land and housing. This model is then used to provide a benchmark against which to compare a public land bank, operated in a variety of ways.*** Results are summarized in the final section of the paper.

*See Blumenfeld [1], Federal Task Force on Housing and Urban Development [5], National Commission on Urban Problems [8], President's Committee on Urban Housing [11], Ravis [12], and Spurr [15].

**Criticisms of land banking can be found in Carr and Smith [2,3], Davis [4], Neutze [9], and Pasour [10].

***The case of a non-competitively organized land market is discussed in Carr and Smith [2,3], and Pasour [10]. The noncompetitive case is not considered in this paper.
The Competitive Benchmark

To simplify the argument developed here, it is assumed that houses are a homogenous product, that all houses are owner occupied, and that the construction industry is competitively organized. It is also assumed that land is available in a quantity sufficient to allow urban expansion, that it is privately owned, and that it changes hands under competitive conditions. Lots are thus provided for residential expansion as demanded.

Now, postulate a growing urban area in which a portion of the existing housing stock (of an assumed total of 100,000 units) comes on the market each year. Since the average North American family moves approximately once every five years, perhaps twenty percent of the existing stock will be up for sale annually. Thus, the short-run (here annual) supply curve of used houses will be positioned somewhere near one-fifth the existing stock at current prices. Since potential sellers will have some notion of what constitutes a "low", an "average", or a "high" price in the local housing market, the schedule will be somewhat elastic.*

The annual supply schedule of new houses is obtained by summing the appropriate portions of the short-run marginal cost curves of firms in the construction industry. The resulting schedule will be upward sloping because of diminishing returns. The lateral summation of the used and the new housing supply schedules, Su and Sn respectively, produces the total housing supply schedule, THS, shown in Figure 1. The intersection of the demand schedule with this total housing supply schedule, point E in Figure 1, establishes the equilibrium price, $100,000, and quantity, 25,000 units. This price indicates the quantities of new and used housing that will be sold; in the example, 20,000 used, 5,000 new.** Different elasticities of supply and demand, of course, produce quantitatively different results in this and the following comparisons. Ruling out the extreme possibilities of completely elastic or completely inelastic schedules, however, leaves the qualitative results unaffected.***

The competitive equilibrium portrayed in Figure 1 provides the benchmark against which a land bank, managed in a variety of ways, will be compared.

The Influence of a Municipal Land Bank

Suppose, now, a municipal land bank in place of a private,

*At an "astronomical" price the entire stock of used housing would conceivably be up for sale, but this is not a practical consideration.

**A ratio of four used houses to one new house in the annual supply schedule is suggested by Mills [6, pp. 163-64]. Also see Spurr [15, p. 395].

***Recent empirical evidence concerning the elasticities of demand and supply schedules for urban housing is summarized by Muth [7, pp. 285-91]. In addition see Smith [14].
Figure 1

SUPPLY AND DEMAND FOR HOUSING WITH NO LOT CONSTRAINT
Four cases will be considered as illustrated by the accompanying diagram, in the first two it will be assumed that lots are made available as demanded, while in cases three and four a lot constraint will be imposed. In cases one and three it will be assumed that unserviced lots are sold at the private market price; in two and four, lot prices will be assumed to be below-private-market. To simplify further, it is assumed in all cases that the municipal government services the lots at an invariant price.

**Case One**

If the municipal authority makes lots available as demanded and sells them at the price that would prevail in the private, competitively organized market, there will be no effect on housing prices.

The equilibrium established by the intersection of DD with TBS in Figure 1c will be unaffected.

The municipal government has replaced private traders, however, and earns the profits, if any, from this activity. If revenues should exceed all opportunity costs, including of course those that otherwise would have been collected, the municipality could use these funds to finance some of its operations or provide additional services. This result would follow if the land bank proved to be more efficient than the competitive private market, as the proponents have argued. Taxpayers in general are the beneficiaries of a profitable operation under this option in the sense that taxes required to finance the operation of the municipality are lower than they otherwise would be.

**Case Two**

Suppose, now, that the municipal authority continues to make lots available as demanded, but sells them at a price below that which would prevail in the private market. Suppose that this difference amounts to $6,250 per lot. With a competitively organized construction industry, the supply schedule for new houses shifts down by this amount, to $9 in Figure 2b. Consequently TBS shifts down to TBS'1 and intersects DD' at E', at a price somewhat lower and a quantity somewhat greater than would prevail with either private land market or a municipal authority which priced competitively. At this lower price there would be some decrease in the number of unsold houses sold and some increase in the number of new houses constructed. Each individual who would have bought a house when the price was $100,000 benefits by the vertical difference between E and E' in Figure 1c. In addition, the number of house buyers would increase by the horizontal difference between E and E'. If the land bank recovered all costs, including all opportunity costs, the municipality's tax requirements would not be directly affected by the operation of the land bank. If all costs were not recovered, taxpayers would subsidize house-buyers.

**Case Three**

Case three differs from case one in that the number of lots made available is constrained to 3,000, as shown in Figure 2b. Because of the lot constraint, only 3,000 new houses can be built. Thus the lateral summation of Su and Sn results in TBS in Figure 2c which is simply displaced to the right of Su by 3,000 units above point J, where the constraint becomes effective. The demand schedule intersects this (constrained) TBS schedule at H. Compared with the benchmark example the equilibrium price of housing is higher and the total quantity sold is lower. More used housing is sold, however.

As in case one, it is assumed that the municipal authority sells lots at the price that would prevail in a private, competitively organized market. Note, however, that the previous (unconstrained) private-market price would no longer apply if only 3,000 lots were made available. In a private market where the supply was for some reason constrained, builders would bid the price of lots up to the point where the short-run supply schedule intersected the demand schedule at H. If the municipal authority charged the constrained private-market price for lots, the supply schedules would be modified as indicated by the dashed line segments in 2b and 2c.** In this case, allocation of lots is achieved through price rationing and it is not necessary to resort to lotteries. Any profits made in the land market

*It is assumed here that the transition from private to public ownership has a neutral effect in the local land and housing market. A neutral effect might be achieved for example, if the public's holdings were acquired gradually over a long period of time. This assumption permits comparison of the operational characteristics of the land bank with a private market, free from the distortions that would likely accompany a rapid changeover from private to public ownership.

**The vertical difference mentioned will always be greater than zero but less than the difference between the private market price for lots and the price actually charged as long as the price elasticity of the demand schedule is greater than zero but less than infinity.

**By increasing the cost of one of the variable factors used by the construction industry, S is shifted up. By charging the price that would prevail in a constrained, private market, this shift is just sufficient for S to intersect H at 3,000 units. The K-J portion of TBS is thus shifted to K'-H.
would accrue to the municipality and the implications for
municipality taxation would be as argued in case one.

Case Four

In case four it is assumed that the municipality provides
only 3,000 lots, but that these lots are sold at below the
constrained private-market price. Suppose, for ease in exposition,
that the price actually charged is the one that would
prevail in the unconstrained private market. This assumption
permits the use of the solid-line $S_N$ and $THS$ schedules in 2b
and 2c.* Since, in this case alone, price is not used as a
rationing device, a lottery or some other method of alloca­
tion would be required.

In this case the land bank itself becomes a direct, if
unintentional, instrument of redistributing wealth, and the
manner in which lots are allocated can affect the price of
housing.

If lots are sold only to builders, the
higher-than-benchmark equilibrium price and quantity shown in
Figure 2 are unaffected since the vertical portion of $S_N$ and
thus the relevant portion of $THS$, are unaffected. The real­
ized "benefit" of this policy, the difference between the
constrained private-market price for lots and the price actu­
ally charged, accrues entirely to the construction industry.

If individuals are also able to acquire lots, the equi­
librium price in 2c will remain unchanged only as long as
those individuals who are successful in the lottery would
have been in the market at price $H$ anyway. In this event, if
the successful individual hires a builder to construct a
house on his lot, the individual's outlay will be less than $H
by the difference between the constrained private-market
price for lots and the price actually charged. The demand
for houses at price $H$ is reduced by the number of Individuals
successful in the lottery, but the number of houses-on-lots
put on the market by the construction industry is
the same amount, leaving the equilibrium market
affected.

Suppose, on the other hand, that some lots are made
available only to individuals who would not have been in the
market at price $H$, such as the heads of low-income families.
This leaves the demand at price $H$ unaffected. But the number
of new houses-on-lots put on the market by builders is re­
duced by the number of lots allocated in this manner. The
vertical portion of $S_N$, and thus $THS$, shifts to the left and
intersects the demand schedule, which is unchanged above $H$,
at a price greater than $H$.

Thus the realized benefit of selling a limited number of
lots at below-market prices accrues directly to those who are
successful in the lottery, either builders or individuals.**

*The analysis applies, of course, to any price below that
which would prevail in a constrained, private market.

By making the above assumption, Figure 2 is not need­
lessly complicated.

**The results of a recent empirical analysis consistent
with this interpretation are found in Reschenthaler,
McCormick, and Garant [13, pp. 589-10].
The market price of housing would not be less than \( n \) in Figure 2c and could, in fact, be driven higher, depending on who was successful in the lottery. As in case two, if the land bank recovered all costs, including all opportunity costs, the municipality's tax requirements would not be directly affected by the operation of the land bank. If all costs were not recovered, taxpayers would subsidize lot-buyers.

**Conclusions**

It was not the intention of this paper to argue the question of the efficiency of a municipal land bank compared with a private land market. Rather, the objective was to consider the impact that a municipal land bank, operated in a variety of ways, could have on housing prices and to identify the incidence of benefits and costs associated with the various operational alternatives. The results of this inquiry are summarized in Tables 1 and 2.

As demonstrated in the preceding discussion, and shown in Table 1, the only operational alternative which succeeds in achieving the objective of lower housing prices is that considered in case two.

Operation in the manner investigated in case one produces results identical to those that obtain in a competitively organized private market.

As demonstrated in cases three and four, a land bank that limited the number of lots made available would actually force the price of housing above that which would prevail in an unconstrained competitive private market. Thus both options three and four aggravate the problem that a municipal land bank is designed to alleviate. Further, when a lottery is required to allocate lots, as in case four, benefits would be selectively conferred on those who were successful in the draw, either builders or individuals, and the price may be further driven up depending on the way the lottery is run.

In Table 2 the circumstances under which the land bank would run at a deficit, earn opportunity costs, or generate a surplus are specified for each of the cases considered.

For all cases, if opportunity costs are not recovered, the land bank would have to be partially funded from general tax revenues. In this event, taxpayers would subsidize house buyers in cases one and two, the construction industry in case three, or those successful in the lottery in case four. On the face of it, none of these would appear to be justifiable on equity grounds.

If earnings equal or exceed opportunity costs the land bank would either have no direct effect on municipal tax requirements or would actually make a contribution to general revenue. In this event, the options discussed in cases one and two would appear to be acceptable on equity grounds although, as shown above, option one would not lead to lower housing prices. When the land bank is managed as in cases three or four, the municipality in effect operates the land bank for the benefit of the construction industry (case three) or for those successful in the lottery (case four) while at the same time raising housing prices. Both of these options are clearly undesirable.
Table 1
SUMMARY COMPARISON OF OPERATIONAL CHARACTERISTICS: LAND BANK VERSUS PRIVATE MARKET

<table>
<thead>
<tr>
<th></th>
<th>Benchmark</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price of Lots Sold</td>
<td>$P_L^*$</td>
<td>$P_L^* = P_L^*$</td>
<td>$P_{L2} &lt; P_L^*$</td>
<td>$P_{L3} &gt; P_L^*$</td>
<td>$P_{L4} = P_L^*$</td>
</tr>
<tr>
<td>Quantity of Lots Sold</td>
<td>$Q_L^*$</td>
<td>$Q_{L1} = Q_L^*$</td>
<td>$Q_{L2} &gt; Q_L^*$</td>
<td>$Q_{L3} &lt; Q_L^*$</td>
<td>$Q_{L4} &lt; Q_L^*$</td>
</tr>
<tr>
<td>Price of Houses</td>
<td>$P_H^*$</td>
<td>$P_{H1} = P_H^*$</td>
<td>$P_{H2} &lt; P_H^*$</td>
<td>$P_{H3} &gt; P_H^*$</td>
<td>$P_{H4} &gt; P_H^*$</td>
</tr>
<tr>
<td>Quantity Used Houses</td>
<td>$Q_U^*$</td>
<td>$Q_{U1} = Q_U^*$</td>
<td>$Q_{U2} &lt; Q_U^*$</td>
<td>$Q_{U3} &gt; Q_U^*$</td>
<td>$Q_{U4} &gt; Q_U^*$</td>
</tr>
<tr>
<td>Quantity New Houses</td>
<td>$Q_N^*$</td>
<td>$Q_{N1} = Q_N^*$</td>
<td>$Q_{N2} &gt; Q_N^*$</td>
<td>$Q_{N3} &lt; Q_N^*$</td>
<td>$Q_{N4} &lt; Q_N^*$</td>
</tr>
<tr>
<td>Quantity Total Houses</td>
<td>$Q_T^*$</td>
<td>$Q_{T1} = Q_T^*$</td>
<td>$Q_{T2} &gt; Q_T^*$</td>
<td>$Q_{T3} &lt; Q_T^*$</td>
<td>$Q_{T4} &lt; Q_T^*$</td>
</tr>
</tbody>
</table>

<sup>1</sup> In case 4, $P_{L4}$ was assumed to equal $P_{L}^*$ for sake of convenience in constructing Figure 2. $P_{L4}$ could be any price below the constrained private market price without affecting the other relationships in case 4.
In summary, of the four operational alternatives considered, only the one discussed in case two achieves the objective of lower housing prices and is acceptable on equity grounds, only if earnings equal or exceed opportunity costs. Thus the argument comes full circle. The economic justification for a municipal land bank does indeed depend on whether the public authority can be more efficient in this area than the private sector. At present this question remains unresolved. In returning to this point, however, it has been demonstrated that greater efficiency alone would not produce the desired results. A number of operational alternatives lead to unacceptable results even given greater efficiency. Only management of the type discussed in case two would produce the desirable results and be acceptable according to both efficiency and equity criteria.

Extension of this analysis from a short-run to a long-run context would alter the supply schedule for new houses, and thus the total housing supply schedule. It would also involve a comparison based on the long-run equilibrium values of the variables listed in Tables 1 and 2. The nature of the argument and the general conclusions, however, should not be affected.

References


