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Technical Presentation

Title: *The Holdout Problem, Urban Sprawl, and Eminent Doman*
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1. **Introduction**
    a. Purpose: To acknowledge the **holdout problem**, which is a type of land market failure, that contributes to urban sprawl by creating a bias towards the fringes of cities for large land developments
    b. **The Holdout Problem**:
        i. Definition: "is a form of monopoly power that potentially arises in the course of land assembly. Once assembly begins, individual owners, knowing their land is essential to the completion of the project, can hold out for prices in excess of their opportunity costs." or "individual owners, realizing that they can impose substantial costs on the developer, seek prices well in excess of their true reservation prices."
            1. A holdout problem must require **assembly,** which is the need for at least two distinct properties for a development
        ii. Result: Large-scale projects that require assembly, like housing developments, parks and open spaces, stadiums or shopping malls, will have high bargaining costs. This will create incentives for developers to look for land where ownership is less dispersed, which will minimize assembly. This will lead to these large building projects taking place on the fringes of cities leading to *unnecessary* urban sprawl
2. **The Economic Literature on Urban Sprawl**
    a. Definitions of Urban Sprawl:
        i. Galaster: "Sprawl is a pattern of land use in [an urban area] that exhibits low levels of some combination of eight distinct dimensions: density, continuity, concentration, clustering, centrality, nuclearity, mixed uses, and proximity."
        ii. Nechyba and Walsh: "the tendency toward lower city densities as city footprints expand"

iii. Brueckner: "the excessive spatial growth of cities…implying inefficient outward growth"

1. Sources of market failure that can lead to excessive growth
    a. When the price of agricultural land does not fully represent its social value that it produces as open space, which causes its conversion to urban areas
    b. When commuters do not properly evaluate the costs of congestion when making commuting decisions, which results in excessively long commute times
    c. When real estate developers fail to acknowledge the full social cost of the required infrastructure, which artificially lowers the cost of development
    d. Miceli and Sirmans develop a fourth potential market failure, **the holdout problem**

3. **Land Assembly and the Holdout Problem**
    a. There is a possible relationship between the holdout problem and urban sprawl suggested by the fragmentation of ownership in urban areas spatial variation in the fragmentation of ownership in urban areas…this is because lot sizes are generally smaller towards the center of cities and become larger as you move away from the heart of the city center. As a result assembly in the middle of the cities generally requires more participation for a given area then at the fringes of a city.
4. **A Simple Model of the Holdout Problem**
    a. A developer needing to acquire two adjacent, individually owned lots. We assume that bargaining between the two parties, the developer and land owners takes place in one of two periods: now (t=1) or later (t=2). The developer can only proceed with development if he (a) acquires both parcels of land in t=1 (b) acquires one parcel of land in t=1 and the other in t=2 or (c) acquires both parcels in t=2. If the developer is unable to acquire all (two) pieces of land then he is forced to scrap the project. In this model the lot owners have the option to wither "bargain," selling their property to the developer, or "hold out," not selling their property to the developer in t=1, 2.
        i. If the developer is able to acquire both pieces of land in t=1 **V > 2v**
            1. V = the profit that the developer expects to earn if he is able to acquire both areas of land in t=1
            2. 2v = the combined values of the two properties of land to the individual owners. So v is the value of one property to one owner.

3. We know that V must be greater than 2v because the land developer would never assemble the two parcels of land if he could not obtain a profit from the proposed development

ii. If the developer is able to acquire one piece of land in t=1 and one in t=2 or if the developer is able to acquire both pieces of land in t=2 **$V - \varepsilon > 2v$**

1. ε is the cost of the delay that the developer will incur. We still assume that the development is profitable at this date because otherwise the project would not progress

iii. Potential Outcomes

1. **If both sellers bargained in t=1**
    a. Both sellers will get $P\sim = V / 2$
2. **If one seller bargained in t=1, and received P_1, and the other held out in t=1…**
    a. And then the seller who originally held out in t=1 sells in t=2 for P_2
        i. Net return for the project is $V - \varepsilon - P_1 - P_2$. $P_1 = v$ because as shown below $P_2 = V - \varepsilon - v$. And assuming the developer is able to acquire the second parcel of land the $V - \varepsilon - P_1 - P_2 = V - \varepsilon - P_1 - (V - \varepsilon - v)$. Here the development is able to take place because the developer obtained both parcels of land, but he does incur a loss because of the delay caused by own of the sellers holding out until t=2
    b. And then the seller who originally held out in t=1 holds out in t=2
        i. Net return from the single parcel is $v - P_1$ because the development was scrapped because the developer was not able to acquire both plots of land.
    c. So the net gain from acquiring the second parcel of land in t=2 is $V - \varepsilon - P_1 - P_2 - (v - P_1)$ which when set equal to zero yields $P_2 = V - \varepsilon - v$. Obtaining the second parcel of land allows the developer to proceed with his land development and attempt to obtain the profit he expected.
3. **If both sellers held out in t=1**

a. And then sell in t=2 the price per parcel is **$P^* = (V - \varepsilon) / 2$.** This is true because the two sellers will split the payment equally. In this case the developer is once again able to start his development because he was able to assemble both parcels of land, but he once again has to incur the loss due to the delay of assembly

4. Conclusions
    a. Sellers would prefer to sell jointly in period one as opposed to period two, because the later involves a delay, ε. This delay causes the overall profit of the development to be decreased.
    b. It is better for a seller to be the lone holdout in period two, as opposed to the case where both sellers holdout and sell in period two, as seen by $P_2 > P^*$. This is the same as the classical prisoner's dilemma problem where both owners are better off selling out promptly, but each individually has the incentive to delay selling.
        i. $P_2 = V - \varepsilon - v$ and $P^* = (V - \varepsilon) / 2$
    c. It is unknown if being the lone holdout or selling jointly in period one is better, because while the holdout has superior bargaining power, the available surplus in period two is smaller due to the cost of delay. The ambiguity comes from the relationship between ε and (V-2v)/2.
    d. The worst possible outcome for a seller is to be the lone seller in period one because the price the seller obtains is only v. $P_1 = v$
    e. The overriding takeaway form this model is that costly delays can arise in projects involving land assembly. We can assume that the more parcels of land necessary for a certain development will make assembly even more difficult, and thus lead to more costly delays. So developers will prefer locations where ownership is less dispersed, all else equal.

b. Equilibrium strategies (depend upon the relationship between P~, the price the sellers would get if they both bargained in t=1 and P_2, the price that the lone holdout in period one would receive if he then sold in period 2)
    i. Suppose $P\sim > P_2$ which is true whenever $\varepsilon > (V-2v)/2$
        1. The two Nash equilibriums are (bargain, bargain) and (holdout, holdout) holdout assumes that the seller will then bargain in period two

ii. Suppose $P\sim < P_2$ which is true whenever $\varepsilon < (V-2v)/2$

1. There is only one Nash equilibrium (holdout, holdout)

5. **The Spatial Configuration of Lot Sizes and Urban Sprawl**
    a. Lot sizes decrease towards the city centers for two reasons: 1) increasing land prices toward the city center cause housing producers to substitute land for capital and 2) increasing housing prices toward the city center also cause the demand for housing to decrease. Due to these two reasons there is greater population density nearer to the city center. Which we can reasonably extrapolate from and say that ownership of a piece of land of a given size is more dispersed the closer it is to the city center, meaning that more people own a given area of land the closer the closer this area of land is to the center of the city.
6. **Remedies**
    a. In order to combat urban sprawl…
        i. Developers can maintain their secrecy about projects by utilizing dummy buyers to help acquire assemblies. This would be useful because sellers would not know that a single buyer is attempting all of the land in a certain area. This is more difficult for government-backed projects because they often require openness.
        ii. Governments can create incentives or subsidies for building in city centers or disincentives for building in the suburbs. The justification for this can come from redevelopment of central areas.
        iii. The use of **eminent domain**, but this often raises issues about whether or not a private organization should be able to benefit from the use of eminent domain.
7. **Conclusion**
    a. **The holdout problem** "represents a situation where landowners whose property is essential to the completion of some large development project to seek to block completion of the project in an effort to extract monopoly rents"
        i. This biases development away from areas where ownership is the most dispersed, city centers, and towards areas where ownership is more concentrated, the fringes or suburbs of cities

References

All quotes are from the following citation

Miceli, Thomas J., and C. F. Sirmans. "The Holdout Problem, Urban Sprawl, and Eminent Domain." *Journal of Housing Economics* November 16.3-4 (2007): 309-19. Web. 1 Mar. 2014.