Chapter 102: Economics of Housing Externalities

by

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Glossary:

- Externality: An externality of an economic transaction is the impact of the transaction on a party that is not directly involved in the transaction.
- An agent's bid rent: The maximum price an agent is willing to bid for a parcel of land.
- Foreclosure: The legal process by which an owner's right to a property is terminated, usually due to default.
- Complement good: If two goods are complements, an increase in the price of one of the goods results in a decrease in demand for the other.
- Substitute good: If two goods are substitutes, an increase in the price of one of the goods results in an increase in demand for the other.

- Hedonic regression: A method of estimating demand or value. It decomposes the price of a good or service into its constituent characteristics and obtains estimates of the contributory value of each characteristic.

Abstract:

Housing externalities refer to the effect the characteristics of a house have on other residents and, potentially, businesses. These effects have been found to be large and to decay with distance relatively fast. As a result, the value of land in residential neighborhoods depends on the surrounding housing stock and the maintenance efforts of their owners. The size and importance of housing externalities imply that government policy aimed at revitalizing neighborhoods or imposing minimum maintenance requirements and/or residential zoning policy may potentially be beneficial. Measuring the magnitude of housing externalities is therefore an important endeavor, but it also presents many challenges.

Main Text:

Introduction

Housing externalities refer to the effect the characteristics of a house have on other residents and, potentially, businesses. In economics, the term externality refers to the effects that an economic transaction has on parties not directly involved in the transaction. In general, externalities are the result of interactions between agents that are not mediated by the market (non-market interactions) and therefore do not imply a payment for a good, service, or effect of an action. Externalities are said to be internalized if, as famously argued by Ronald Coase, property rights are well determined and therefore the indirect effects of an economic transaction are compensated and, as a result, included in the cost and benefits considered by the transacting parties.

Externalities are very common in housing markets. As most people know, investments in and maintenance of one neighbor's properties affect the beauty, cleanliness and overall amenities of other neighbors' street and neighborhood and, as a result, affect the value of their house and the housing services they derive from it. These effects of other residents' investments on the value and services derived from an owner's property are an externality because neighbors, in general, do not compensate each other for painting their houses or mowing their lawns. Therefore, the investment in a house (the economic transaction) has an indirect effect on a party not directly involved in the transaction (the neighbor), and that party cannot demand payment or be demanded compensation. Of course, correctly defined property rights may

eliminate the externality. If I have the right to demand that grass cannot grow beyond a few inches, my neighbor will be obliged to mow his lawn frequently. This gives neighbors the property rights on the length of grass in the neighborhood. So even though someone may not value having a recently mowed lawn, the surrounding neighbors can force him to do it. That is, the neighbors make him internalize the value it has for them to have neighborhood houses with well-taken-care-of yards.

Housing externalities are pervasive. The main reason is that they are the result of proximity to other residents. The modern concentration of economic activity in cities has made this proximity a requirement for most of the world's population. There are well-developed theories and corresponding empirical studies to analyze and justify the economic and social advantages of living and working in proximity to others (as emphasized by the extensive urban economics literature). Independently of the form these economic forces may take, for most people proximity is a fact of life that leads to important housing externalities.

Of course, if housing externalities are pervasive, the price of houses in a neighborhood, the level of investment in houses, and maintenance efforts will depend on the importance of these effects. Several questions remain. Do positive housing externalities reinforce themselves? That is, do positive investments by someone in a neighborhood lead to more investments by other residents or to fewer investments? The answer to this question is crucial to understanding the price dynamics of houses, the segregation of the quality of housing, and in general the distribution of housing characteristics across neighborhoods. The importance of housing externalities can also be underscored by discussing the effect of government investment projects or, on the negative side, foreclosures on neighborhood characteristics. Do housing externalities amplify the effect of these policies and events?

The policy problem

The presence of externalities in the housing market implies that absent any government policy or rules, the equilibrium allocation of houses, their quality and characteristics, as well as investments and maintenance are, in general, not optimal. For example, the state of my neighbor's house paint may affect her as well as me, but she will decide when to paint her house based only on the benefits of painting to her. That means that she will paint her house less often than she would if she was taking my preferences into account as well or if I was paying part of the cost of painting myself. This means that the frequency of house painting will be socially suboptimal.

Since externalities yield suboptimal equilibrium allocations, they justify the use of urban policy. Minimum maintenance requirements can ameliorate some of the inefficiencies created by the

externality. Other policy options involve housing investment subsidies and taxes. In general, however, this second policy instrument has much larger informational requirements, since optimal tax and subsidy policy depends on the quality of the existing housing stock in subtle ways. A third popular policy option is zoning restrictions that limit construction density or building heights. We should also note that in line with these policies, it is not uncommon for neighborhood associations in the U.S. to adopt covenants that require their residents to follow specific guidelines, precisely to make them partially internalize housing externalities that affect the neighborhood. These guidelines, for example, may prohibit residents from painting their house a certain color or vehicles beyond a certain size from being parked in driveways.

Following Coase, policies that determine the property rights associated with the characteristics of a house can achieve socially optimal outcomes in the presence of housing externalities. This conclusion depends importantly on two assumptions. First, that transaction costs are zero or small. Namely, if property rights are well determined, we can bargain and determine the right price of every voluntary or involuntary interaction. Second, that property rights on everything can be costlessly determined. In practice these assumptions are rarely satisfied. We can determine property rights on the look of my house. But are the transaction costs of making my neighbors pay for the paint zero? As a result, a common policy is to just restrict the permitted actions by residents in order to ameliorate the efficiency costs of these externalities, as in the case of minimum maintenance requirements or zoning.

So far we have discussed policies designed to address housing externalities directly. Of course, another aspect of housing externalities is that they affect the impact of other housing and urban policies. One example is the impact of housing investment subsidies and neighborhood beautification or revitalization projects. A dollar spent on one of these projects may have a much larger impact in the presence of housing externalities than in their absence. Therefore, the evaluation of many housing and urban policies implies taking a stand on the size of these externalities and the role they play in offering incentives for making, or preventing, housing investments by others.

Housing externalities and housing investments

One important implication of housing externalities is that they may affect the housing investment decisions of agents. Understanding the direction of this effect is a key challenge in our understanding of these externalities in particular and housing markets in general.

There are two distinct possibilities that imply different effects on investment. The first possibility is that housing investments are complements: More investments by my neighbors make investments in my house more enjoyable or profitable (in terms of the value of my

house). To be concrete, what this means is that the marginal benefit I obtain from painting my house increases if my house is surrounded by painted houses. The implication of complementary investments is that, under some conditions, neighborhoods can be in two distinct equilibria. In the first one, everyone invests and the neighborhood has only beautifully kept, high-value houses. In the second one, no one invests in their properties, the neighborhood is not well kept, and housing prices are low. Both of these situations are equilibria because investment decisions are strategic complements. Of course, in this case, small investments in the neighborhood, or subsidized investments, may potentially shift the equilibrium from a low-investment one to a high-investment one, therefore yielding a neighborhood revival. Similarly, a few foreclosed houses may shake the faith of a neighborhood about its condition and move it to the low-investment equilibrium. This extreme sensitivity to investment or policy shocks is the result of the investment complementarity.

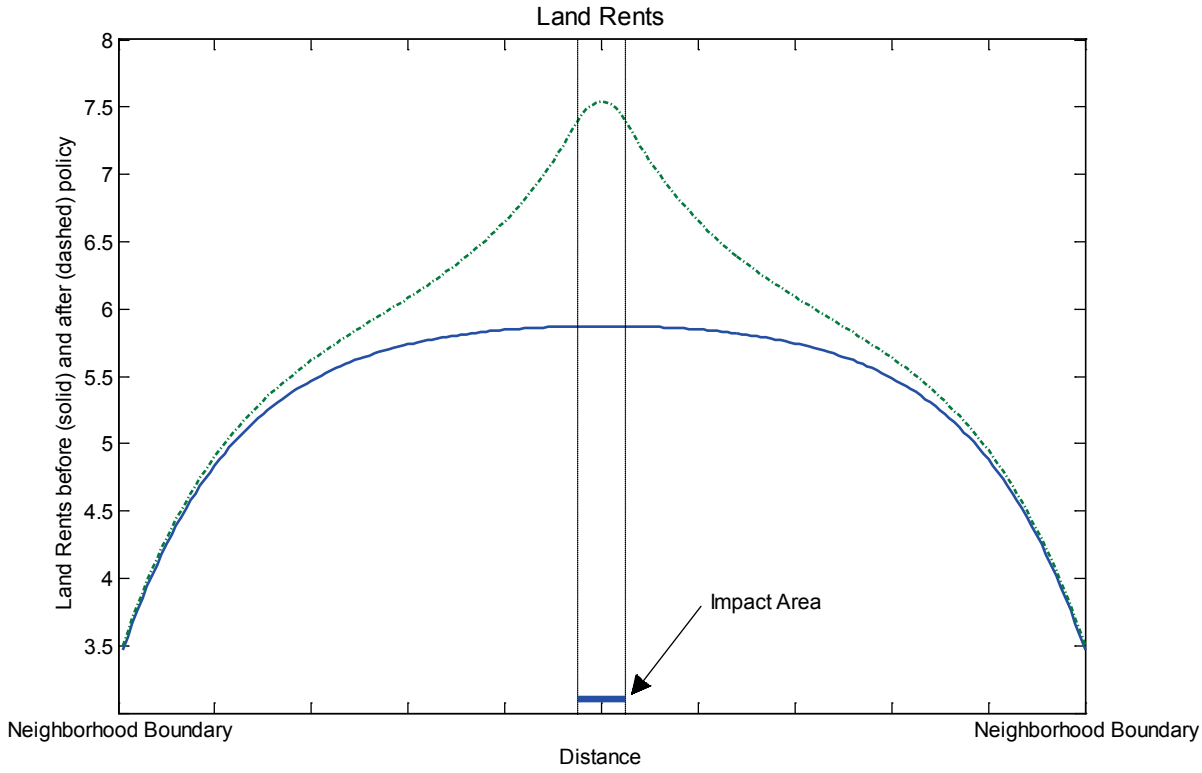
The second possibility is for housing investments in a neighborhood to be substitutes. Agents may care about total housing services, which are a combination of the characteristics of their own houses and the characteristics of the surrounding houses. If this function is additive, so that investments by others affect the level of my consumed housing services but not the marginal benefit of investing in my house, more investments in surrounding houses will lead to less investments by agents. That is, the agent substitutes housing expenditure for other consumption because her housing services are partly provided, for example, by the gardens of surrounding houses. This substitution implies that as a result of a positive investment shock, other housing investments in the neighborhood decrease, although the level of housing services consumed in general remains unchanged (but the share of income spent on housing decreases). Hence, urban policy in this case can have positive and large effects on welfare, even though total investment in the neighborhood remains essentially unchanged.

The spatial decay of housing externalities

Another key aspect of housing externalities is their rate of decline with distance. How do the benefits from investing in a given house affect other agents that are located at different distances? Of course, the importance and overall impact of housing externalities depend fundamentally on this rate of decline. If externalities die out fast, their effect is local and the overall impact is small. If they decay slowly (so people still benefit from having nice and well-kept houses several blocks away), then the impact of these externalities can be rather large.

To fix ideas, consider the effect a local revitalization program has on the land rents of a neighborhood. The figure shows an example of the effects of a program that subsidizes investment of a fifth of land rents at the center of a neighborhood using an economic model

with housing externalities that decay with distance.[1] Of course, the subsidy implies that housing prices increase in the impact area (the area that was subsidized directly). However, the impact of the subsidy (the difference between the dashed and solid lines in the graph) goes well beyond the impact area. Even in the impact area the actual effect of the subsidy on land rents is larger than the subsidy itself, but in areas that were not affected by the subsidy, land prices can increase substantially too. At the boundaries of the neighborhood, the effect in this example is negligible.



The graph illustrates several characteristics of spatially decaying housing externalities that are worth mentioning. First, the value of the subsidy and housing externalities will be capitalized in land rents. It is the location of the houses that gives them access to the indirect benefits of the improved houses. These location attributes are capitalized in the value of the land, not in the structure built on top of it. Note that land rents are the highest at the center of the neighborhood and decay as we move to the boundaries. The assumption here is that houses at the boundary do not benefit from houses outside the neighborhood (for example, because of the presence of highways or other neighborhood boundaries). Thus these houses experience externalities only on one side and so the value of land there is smaller than at the center of the

[1] The details of the model used in the figure can be found in "Housing Externalities," by Rossi-Hansberg, et al. (see reference in the Further Reading section).

neighborhood where houses are relatively close to every other house. Second, even though the impact of the policy is fairly localized and narrow, the value of a whole neighborhood can be affected through the housing externalities. The impact comes from the direct effect of the improved houses on others and from the reaction of others to this original external effect. The total effect is the compounded impact and one needs an economic land valuation model to compute it.

Of course, the quantitative effect of these types of policies depends on the particular rate of decline of the externality and the average effect of these externalities. Given that fiscal resources are costly to obtain via taxation, whether the type of revitalization policies are welfare improving depends crucially on the measurement of the parameters determining the strength and scope of housing externalities. In the next section we discuss measurement and some available estimates.

Measurement

Measuring housing externalities is a complicated task. In fact, measuring any form of externality is a complicated task. First, many types of externalities, such as the ones related to housing, cannot be directly observed and measured. This implies that to measure them, we need theories of how they affect some observable variable and then measure that effect. Of course, the observable variable (such as the value of land) can take a particular value, for many reasons unrelated to housing externalities. So the problem of measuring externalities becomes one of disentangling their effect on observables from other characteristics that determine the observables. This is, in general, hard to do if we do not have a theory of how externalities affect the observables.

Second, there is a reverse-causality problem. The value of a house may be high because it is surrounded by high-value houses, but the house may be surrounded by nice houses because its value is high. That is, the occurrence of the phenomenon of high-value houses surrounded by nice houses does not inform us about the direction of causality. This is a fairly general problem in spatial contexts where agglomeration is endogenous, and it creates, or may be created by, greater productivity or more amenities. To measure the externality we need some exogenous change in observables, for example, in our context, an investment in housing that we know for a fact is not caused by the characteristics of the surrounding houses.

Government revitalization programs can provide such an exogenous increase in investments. This is particularly the case if the criteria for selection of certain houses or blocks are well specified and can be taken into account in the empirical studies or if houses are chosen randomly. We have used this empirical design for the “Neighborhoods in Bloom” revitalization

program in the city of Richmond, VA, and estimate that housing externalities decline by half every 1000 feet using individual transactions data. This is the rate of decline used in the theoretical exercise presented in the figure.

This fast rate of decline is also roughly consistent with the findings of studies that have used more aggregate data. In particular, studies of a ten-year residential investment program in New York City imply residential externalities lasting out to 2000 feet from a project site, with stronger effects in poor neighborhoods. Community development corporations' investments in Cleveland imply price effects that dissipate between 300 and 500 feet from a project site (although longer distances where not investigated). All of these studies use house prices and hedonic regressions to calculate the effect of fixed-location investment projects.

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