

7 Integrating Rent and Demand Revelation in the Evaluation and Financing of Services

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7.1 INTRODUCTION

Location rent arises from differential access to public services and to privately supplied goods and services. Under some conditions, the net value provided by a service is equal to the increase in location rent that results from its provision. This chapter discusses these conditions and the implications of departures from them. If the conditions were generally met, one might propose that public services be evaluated and financed by the increases in rent that they generate. However, the conditions are generally not met. To accommodate this fact, the chapter develops a method of evaluating and financing public services that combines rent information with decisions made by the demand-revealing process. While any application of the demand-revealing process determines whether a proposed service satisfies a benefit–cost criterion, the incorporation of rent collection into the financing increases the likelihood of finding an acceptable way of providing an efficient service when a cost is attached to unintended redistribution. The chapter also discusses the ways in which the conclusions apply to privately provided goods and services.

7.2 THE STANDARD THEORY OF RENT AND THE NET VALUE OF A SERVICE

In a spatial competitive equilibrium, every resident chooses a location and an amount of land to consume that maximizes utility. Every business chooses a location and quantity of land that maximizes profit. Taking location as given, the quantity of space that a consumer

or business occupies is such that the marginal benefit from having more space is equal to the price of space. Taking the quantity of space occupied as given, the location is such that the marginal saving from moving slightly further from the centre of the city (or slightly further from any subcentre) is just offset by the additional transportation costs and other costs from being further from the centre. As a second-order condition, the sum of rent and non-centrality costs must have a non-negative second derivative, so that the location where the first derivative of the sum is zero will not be a relative maximum of costs (Alonso, 1964). If this condition were not met, people could raise their utility or profits by moving to the centre and the periphery, thereby bidding up rent at the centre and lowering rent at intermediate locations until the second-order condition was met.

The surface of location rent is the result of simultaneous maximization of this sort by all businesses and residents. The amounts of labour and capital used in the city will be such that the level of utility and the rate of return on capital that can be secured, after paying location rents out of wages and business income, are the same as can be secured in any other city.

Consider how such an equilibrium is affected by the introduction of a new public facility, in a city that is inconsequentially small relative to the region from which it draws labour and capital. Suppose that the city decides to build a new branch library on a vacant lot that previously provided no benefits to anyone. The value of being close to the library is added to the other locational benefits of all sites in the area served by the library. This affects the shape of the rent gradient in the way shown in Figure 7.1.

As one moves away from the library in the direction away from the centre of the city, the rent gradient is steeper than previously, because now the gradient must reflect not only the previous costs of moving further from the centre, but also the costs of moving further from the library. As one moves away from the library in the direction of the centre of the city, the gradient is now less steep because the benefits of being closer to the centre of the city are offset by the costs of being further from the library. The overall effect of these changes in gradient is that the rental value of land rises over the whole area from which people use the library.

The higher levels of rent in the vicinity of the library induce nearby residents to economize on land, thereby permitting more people to benefit from being close to it. But for migrational equilibrium to be maintained, these new residents cannot come from elsewhere in

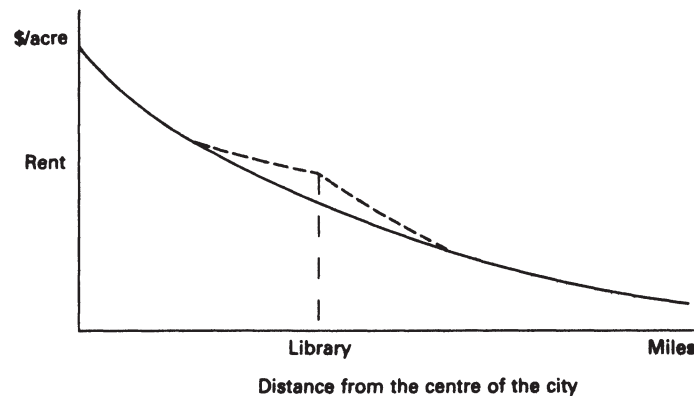


Figure 7.1 The impact of a new branch library on the rent gradient

the city, because that would lower rents elsewhere, thereby raising the net level of utility in this city above that of other cities. Thus the equilibrium effect of the higher levels of rent in the vicinity of the library, and associated economizing on land, must be to induce immigration from other cities. If:

1. the advantages of being closer to the library are valued equally by all persons,
2. there are no land use adjustment costs,
3. there are no moving costs,
4. the area affected by the library is insignificant relative to the total economy, and
5. any taxes and subsidies that vary with locational decisions reflect marginal social costs and benefits,

then the additional rent that is generated by the library is equal to the benefits generated by its existence. People and capital will continue to migrate to the city that has added the library, and to bid up the value of the surrounding land, until the utility of living there and the rate of return on capital are the same as in other places. After mobile resources have finished moving, the additional rent that is paid measures the value of proximity to the library. At any distance from the library, rent *per site* will rise by a fixed amount, reflecting the value of being that distance from the library. But at a given distance from the library rent *per acre* will rise by more on the side that is closer to the centre of the city, because each site will be smaller there.

The competitive movement of factors that are supplied perfectly elastically produces an equality between rental impact and benefits. Similarly, competition among creators of cities produces an equality between rental impact and the cost of the efficient level of services. This is a variation on a relationship known as the Henry George Theorem, that under certain conditions aggregate land rent equals the cost of the efficient amount of public goods.¹ Among the conditions that are necessary for the Henry George Theorem are that land outside cities is homogeneous and has no opportunity cost, that activities in cities do not affect rent in other cities, and that it is possible to fit the population into a whole number of optimal-sized cities without having people left over. (If each city is an inconsequential fraction of the whole economy, then departures from the last condition are inconsequential.) If land is homogeneous and has a positive opportunity cost outside cities (as in agriculture), then the cost of an efficient amount of a public good is equal to the increase in rent above its opportunity cost.

The Henry George Theorem can be considered a consequence of a zero-profit condition for cities treated as firms. If the rent generated by a city is more than the cost of providing the services that offer the greatest net benefit, then someone will build a new city and reap a profit. If the rent generated by a city is less than the cost of the most efficient level of services, then cities cannot pay their way, and efficiency is improved if some cities disband and people squeeze into other cities, bidding up rents until profits of cities are non-negative.

Now suppose that some locations have features (for example, harbours) that make them particularly suited for cities, and that the number of locations with such features is less than the efficient number of cities. Then rent in these locations will exceed the cost of the efficient level of services. However, there is still a remnant of the Henry George Theorem. If one were to ask, 'How much rent would a developer of new cities pay for the land under this city if there were no city here?', and compare that amount with rent in the developed city, the difference between the two would be the cost of the efficient level of services. This is a consequence of competition among developers of new cities eliminating the profit in that activity. The cases of a constant agricultural opportunity cost of land and of a zero opportunity cost of land are special cases of the more general result, that the efficient level of a service raises rent by as much as it costs.

Return now to the newly provided library. If the decision about adding the library is made efficiently, then it will be added if and only

if its benefits (as measured by the resulting increase in rent) exceed its cost. The efficient level of expenditure on the library will be such that marginal benefit equals marginal cost. If people in all cities have the same opportunities to create libraries, then new libraries will be created until there is no further chance to profit from doing so, and the cost of each efficiently provided library will equal the increase in rent that it generates. On the other hand, if some cities have unique opportunities to provide libraries, then the increases in rent that are generated by their libraries will exceed their cost, and this 'profit' will be capitalized into the value that the land has in the absence of a city.

The next section considers the consequences of relaxing the five assumptions that led to the conclusion that the value of a service could be measured by its impact on rent.

7.3 THE EFFECTS OF RELAXING THE ASSUMPTIONS

The assumption that all persons value the good equally can be relaxed in two different ways. The first way of relaxing it is to assume there are two types of people, those who value the library, all of whom value it equally, and those who do not value it at all. If this is the only difference between people, then those who value the library will occupy the land closest to it. If there are few enough of them that they can all live close enough to it to receive some benefit from it, then they will not bid land rents up by the full amount of their benefits. Some of the value of the library will be reflected in higher rents and some will be reflected in a higher level of utility of those who value the library. If there are so many people who value the library that they cannot all live close enough to it to receive some benefit from it, then the value resulting from it will be reflected entirely in higher land rent.

The second way that the assumption of equal valuations can be relaxed is by allowing the value received from the library to be a different number for each person. Then, among persons who do not vary in other ways, if A values the library more than B , then A will live at least as close to the library as B . The change in the rent of each site will be what is needed to induce those who must be further away to be content with their locations.

Suppose there are N persons who will live close enough to the library to benefit from it. Give each of these persons an index equal to his or her rank with respect to benefits, with the index of 1 going to

the person who will receive the *least* benefit, and an index of 0 to the person who values the library next most. Give the sites where the beneficiaries will live indexes from 1 to N as well, with an index of 1 for the most distant site from which any benefit is received. Define B_{ij} as the benefit that person i receives from the library when living in location j . In rental equilibrium, the library will add B_{01} to the rental value of site 1, to make person 0 satisfied not to live at site 1, leaving person 1 with a net benefit of $B_{11} - B_{01}$. It will add $B_{01} + B_{12} - B_{11}$ to the rental value of site 2, to make person 1 satisfied not to live at site 2, leaving person 2 with a net benefit of $B_{22} - B_{12} + B_{11} - B_{01}$. More generally, the addition to the rent of site i will be

$$B_{i-1,i} - \sum_{j=1}^{i-1} (B_{jj} - B_{j-1,j}) \quad (7.1)$$

and the addition to the net benefit of person i will be

$$\sum_{j=1}^i (B_{jj} - B_{j-1,j}) \quad (7.2)$$

Note that when all persons value the library equally, (7.1) reduces to the full benefit to a person of being near the library and (7.2) reduces to 0. However, when the library is valued differentially, the addition to rent is less than the value of the library, and those who live close to it receive positive net benefits, with the greatest net benefit going to those who value the library most. As with the case of persons who value the library equally, the rise in rent per acre at a given distance from the library will be greater for locations that are closer to the centre of the city, because each site will be smaller in those locations.

Next, consider what happens if all persons value the library equally, but changes in land use have a positive cost. The higher rent in the vicinity of the library generates a reduction in the equilibrium size of each residential site in its vicinity. If existing structures must be demolished to increase density, then the higher rental value of the land will hasten the time when it is efficient to demolish them, thereby reducing their current value. The higher rental value of land prior to their demolition will also reduce the return that is added by structures during the time prior to their demolition. This reduction in the value of structures must be subtracted from the increase in the present discounted value of future land rent to determine the value of the library.

If people value the library differentially, then the conclusion of the previous paragraph continues to hold, but now the value of the

library has three parts: the addition to the rental value of land, the addition to the utility of those who live near the library that is not reflected in their residential rents, and the subtraction from the value of structures stemming from the higher rental value of land.

Now relax the assumption that there are no moving costs. If all persons value the library equally, then the only moving that will be required for efficiency will be that associated with the higher residential density in the vicinity of the library. This cost will be taken into account in decisions about constructing new structures and will already be reflected in land rents. However, if people value the library differentially, then a new component must be added to the calculation of the value of the library. People who live near the library but do not value it highly will find that the rent of the land they occupy rises by more than the benefits they receive from the library. In the absence of moving costs they would relocate. But with positive moving costs, some of them will find that they are better off staying and paying the higher rent than paying the costs of moving. Now the calculation of the value of the library must include deductions both for the moving costs of those who are induced to move because they do not value the library enough to pay the higher rent of remaining in its vicinity, and for the reduction in welfare of those who stay despite valuing the library less than the increase in rent of the land under their residences, because that is cheaper than moving. In the long run, everyone will have moved, and these components of the value of the library will disappear.

Next, consider the significance of the assumption that the radius of influence of the library is small relative to the total economy. The consequences of relaxing this assumption are best explored by a mathematical model. The model that is developed here employs particular function forms that entail assuming that the elasticity of output with respect to variable factors is the same for the city under consideration as for the rest of the economy, that the production function for the economy is additively separable with respect to production in the city and in the rest of the economy, and that a change that increases rent in the city has no effect on the elasticity of city output with respect to variable factors. It would be good to know whether relaxing these assumptions would change any conclusions.

Consider an economy of two regions: the economy outside the city under consideration, with variables denoted by a subscript of 1, and a city under consideration, with variables denoted by a subscript of 2. In each region there is a fixed factor, land, and a variable factor,

which will be referred to as labour though it could also be a combination of labour and capital. The amounts of labour used in the two regions will be denoted by L_1 and L_2 respectively, and their sum by L . For the bulk of the economy, the production function is given by

$$Q_1 = L_1^\alpha \quad (7.3)$$

with the scaling of Q chosen so that no multiplicative coefficient is needed for this equation. For the city under consideration, the production function is given by

$$Q_2 = a L_2^\alpha \quad (7.4)$$

with the coefficient a reflecting the effective quantity of land in the city. Building a library that produced benefits that exceeded its costs would raise the coefficient a . The marginal products of labour in the two regions are given by

$$\frac{\partial Q_1}{\partial L_1} = \alpha L_1^{\alpha-1} \quad (7.5)$$

and

$$\frac{\partial Q_2}{\partial L_2} = a \alpha L_2^{\alpha-1} \quad (7.6)$$

respectively. Labour flows between the two regions equating these marginal products. In equilibrium,

$$L_1 = \frac{L}{1 + a^{1/(1-\alpha)}} \quad (7.7)$$

and

$$L_2 = \frac{L a^{1/(1-\alpha)}}{1 + a^{1/(1-\alpha)}} \quad (7.8)$$

which can be confirmed by the fact that these quantities sum to L and yield equal marginal products of labour. Total output of the economy is given by

$$\begin{aligned}
 Q &= \left(\frac{L}{1 + a^{1/(1-\alpha)}} \right)^\alpha + a \left(\frac{L a^{1/(1-\alpha)}}{1 + a^{1/(1-\alpha)}} \right)^\alpha \\
 &= L^\alpha (1 + a^{1/(1-\alpha)})^{1-\alpha}
 \end{aligned} \tag{7.9}$$

The impact of an increase in the effective quantity of land in the city on total output is given by

$$\begin{aligned}
 \frac{\partial Q}{\partial a} &= L^\alpha (1 - \alpha) (1 + a^{1/(1-\alpha)})^{-\alpha} \frac{1}{1 - \alpha} a^{\alpha/(1-\alpha)} \\
 &= L^\alpha a^{\alpha/(1-\alpha)} (1 + a^{1/(1-\alpha)})^{-\alpha}
 \end{aligned} \tag{7.10}$$

The wage throughout the economy is the marginal product of labour in the bulk of the economy, namely

$$W = \alpha \left(\frac{L}{1 + a^{1/(1-\alpha)}} \right)^{\alpha-1} \tag{7.11}$$

Thus labour income in the city, the product of the wage rate and the quantity of labour, is

$$Y_2 = \frac{\alpha L^{\alpha-1}}{(1 + a^{1/(1-\alpha)})^{\alpha-1}} \frac{L a^{1/(1-\alpha)}}{1 + a^{1/(1-\alpha)}} = \frac{\alpha L^\alpha a^{1/(1-\alpha)}}{(1 + a^{1/(1-\alpha)})^\alpha} \tag{7.12}$$

Rent in the city is what is left from city output after paying wages, namely

$$R_2 = (1 - \alpha) L^\alpha a^{1/(1-\alpha)} (1 + a^{1/(1-\alpha)})^{-\alpha} \tag{7.13}$$

The impact on city rent of an improvement in the effective quantity of land in the city is

$$\begin{aligned}
 \frac{\partial R_2}{\partial a} &= (1 - \alpha) L^\alpha [-a^{1/(1-\alpha)} \alpha (1 + a^{1/(1-\alpha)})^{-\alpha-1} \frac{1}{1 - \alpha} a^{\alpha/(1-\alpha)} \\
 &\quad + \frac{1}{1 - \alpha} a^{\alpha/(1-\alpha)} (1 + a^{1/(1-\alpha)})^{-\alpha}]
 \end{aligned}$$

$$\begin{aligned}
&= L^\alpha \left[-a^{(1+\alpha)/(1-\alpha)} \alpha (1 + a^{1/(1-\alpha)})^{-\alpha-1} \right. \\
&\quad \left. + a^{\alpha/(1-\alpha)} (1 + a^{1/(1-\alpha)})^{-\alpha} \right] \\
&= L^\alpha a^{\alpha/(1-\alpha)} (1 + a^{1/(1-\alpha)})^{-\alpha} [1 - \alpha(1 + a^{-1/(1-\alpha)})^{-1}] \quad (7.14)
\end{aligned}$$

The impact on rent in the city of an improvement in the effective quantity of land in the city is equal to its impact on total output if and only if (7.14) is equal to (7.10). These would be universally equal only if

$$\alpha(1 + a^{-1/(1-\alpha)})^{-1} \quad (7.15)$$

were equal to 0, and this is generally not the case. However, (7.15) approaches 0 in the limit as a approaches 0, as long as $\alpha < 1$. Thus if a city is small relative to the economy from which it draws its variable factors, if all factors other than land are perfectly mobile, and if people have identical tastes, then the increase in rent in a city is a valid measure of the benefit of an improvement in the effective quantity of land in the city. On the other hand, if the city is large relative to the total economy, then an increase in the effective quantity of land in the city has an impact on rent that is noticeably less than its impact on total output, because it produces a detectable rise in the real wage throughout the economy, as reflected in the fact that (7.14) is less than (7.10). However, this discrepancy is generally very small. To give some examples, if $\alpha = 0.8$, that is, 80 per cent of the income in the city goes to variable factors, and the city is 1 per cent of the size of the rest of the economy, then (7.15) is 8×10^{-11} . If $\alpha = 0.8$ and the city is half as large as the rest of the economy, then (7.15) is 0.024. Thus it appears that effects stemming from the fact that the city is not infinitesimal relative to the economy from which it draws variable factors can generally be ignored.

Finally, consider the assumption that any taxes and subsidies that vary with locational decisions reflect marginal social costs. This assumption is violated, for example, if cities vary with respect to the value of education provided to children, the external benefits of education are less than its costs, and education is financed by taxes on local factors of production. If education is financed by a tax on local wages or interest, then any migration of labour and capital to the city as a consequence of the new library has an external benefit of expanding the tax base. Thus the impact of the library on rent would underestimate its social value (assuming that labour and capital were

not taxed elsewhere). If education is financed by a tax on local rent, then the opportunity to receive subsidized education draws families to cities with above average educational expenditures, beyond the point where the marginal product of labour is equalized among cities. In this case the impact of the new library on rent overstates its social value because the marginal migrants who are drawn to the city do not produce as much as they would elsewhere.

It might seem that some combination of taxes on wages and rent could balance these opposing externalities. However, this would be true only if all families had the same ratio of wages to educational costs. In general, the only way to achieve an efficient allocation of labour and capital is to refrain from taxing them and from introducing subsidies that vary with locational decisions. To the extent that education is subsidized, this argues for a national source of financing for such subsidies. A national tax on labour or capital creates distortions in labour-leisure or consumption-saving decisions. Only a national tax on land can finance education without distortions. And then it must be a tax not on all land value, but only on that part of the value of land that is not created by local services. If all land value were taxed to finance education, cities would find that it did not pay to build some worthwhile libraries, because of the added obligation to finance education elsewhere. Thus for neutral financing of education, or any other subsidy to individuals (welfare or a guaranteed income for example), the tax base would need to be the value that land would have for agriculture, for its potential as the site of a city on the assumption that no city was there, and for the value of access to other cities.

To summarize the effects of relaxing the assumptions that led to the conclusion that the benefit of the library could be measured by its impact on rent in the city:

- If people do not all value the library equally, then those who value the library most will live closest to it and will receive benefits not captured in rent, since each person will bid up rent by only enough to displace the person who values the library next most highly
- If there are land-use adjustment costs, then the library will cause a reduction in the value of structures in its vicinity
- If there are moving costs as well as unequal valuations of the library, then there will be reductions in the levels of utility of those who live close to the library but do not value it highly enough to pay the additions to rent under their residences

- If the area affected by the library is large relative to the economy from which it draws variable factors, then the impact of the library on the effective quantity of land will produce a detectable rise in returns to variable factors throughout the economy, and this benefit will not be reflected in the rise in rent near the library
- If there are local taxes on labour or capital, then the impact of the library on rent understates its value because the mobile factors that it draws to the area raise the local tax base
- If there are subsidies to individuals (or head taxes) that vary with location and do not reflect social benefits or costs, then these distort locational decisions and the addition of the library accentuates these distortions.

Since some of these influences lead to additions to net benefit while others lead to subtractions from net benefit, one cannot say whether the effect of the library on rent in the city is an overestimate or an underestimate of its full benefits.

7.4 USING RENTAL IMPACTS TO DECIDE WHETHER TO PROVIDE PUBLIC SERVICES

The idea that the effect of a local public service on rent is a useful, though imperfect, estimate of its net benefits leads to the ideas that decisions about providing public services might be based on impacts on rent and that rent might be used to finance them. In entertaining these ideas, one might ask first whether operational difficulties of identification would be insurmountable. The rent at any location is affected by a wide variety of public services and by private activities as well. Sorting out the separate effects of all of these factors may be difficult. On the other hand, it can be expected that rent will vary continuously with location and that the widest combinations of access to different services will be found. So while the task of sorting out separate effects is challenging, it should not be insurmountable (Tideman, 1990).

The next question with respect to evaluating public services in terms of rental impacts is what should be done about the fact that not all impacts are reflected in rent. In some cases, negative impacts of new services on the value of structures are likely to be substantial. For example, the construction of a subway system can generate a very large increase in the rental value of the land in a city. But the

realization of much of the potential represented by such an increase in rent requires the demolition of existing structures that are inefficient under the new conditions. Not to take account of this could lead to significant overstatements of benefits. To estimate such effects, one must ask, structure by structure, how the rise in land rent reduces the return to the structure (the excess of the return to the combination of land and structure above the rent of the land), year by year, for as long as the structure would have lasted. This is a difficult task and one for which it is also difficult to know the accuracy with which it has been accomplished, no matter how much effort has been put into it.

Effects arising from the combination of moving costs and differential evaluations of services are even harder to deal with because they do not in general leave market traces. A person who moves in response to a rise in the rent under his or her residence experiences not only the financial costs of moving but also, in many cases, the emotional costs of the disruption of social relationships. A person who does not move may be someone who receives a benefit from the new service far in excess of the increase in rent under his or her residence, but such a person may also be someone who receives no benefit at all from the service but does not move because to do so would entail very high emotional costs. To some extent these costs are offset by personal benefits for persons who, because of the dispersion of valuations, are able to obtain access to the service for a rental cost that is significantly less than the benefit experienced. But there is no reason to suppose that these factors are perfectly offsetting. In particular, it should be noted that the extra costs from the combination of moving costs and differential valuations are transitory, while the extra benefits from differential valuations are permanent.

7.5 A ROLE FOR THE DEMAND-REVEALING PROCESS

With such complex effects not reflected in rent, it might seem that there is little hope for an accurate determination of whether a service is worth its cost. However, if the persons who would be affected by a new service decide whether it will be instituted by using the demand-revealing process, then they will all be motivated to reveal the value of impacts on them, so that it will be possible to determine whether the service is worth its cost (Clarke, 1971; Tideman and Tullock,

1976). But this could be done without any attention to rent. The role that rent can usefully play in this process is to reduce the unintended redistribution that would otherwise occur.

The change in the rent of the land that a person occupies is a good first approximation to the benefits that the person receives from the provision of a new service. Not only does financing a public service by the increase in rent that it generates approximate the benefit received from the service, but it also has the very great advantage of generating no dead-weight loss, unlike almost all other taxes. Thus increments in rent that are generated by a public service offer an attractive basis for assigning the tax shares that are required by the demand-revealing process. To take account of reductions in the value of structures, estimates of these effects can be added to the cost of the service. If there are any characteristics of individuals that are believed to be correlated with benefits from the new service and are also socially permissible bases of distinction with respect to taxes, then these can be incorporated into costs as well. A decision by the demand-revealing process, with adverse impacts on capital and immobile persons included in costs and with tax shares determined by estimated effects on rent, generates the minimum feasible redistribution while remaining efficient. Redistribution can be further reduced, at some cost in efficiency, by weighting effects on persons who are harmed more heavily than effects on persons who benefit. The administrative procedures that are required to implement these ideas will now be developed in more detail.

Suppose that city analysts believe that a new branch library would be worthwhile. They estimate its impact on surrounding rent and on the value of surrounding structures. If there are any characteristics of individuals that are expected to be associated with losses (assuming that financing will come from the effect of the library on rent), then these are reported by analysts as well. If these figures suggest that the library is worthwhile, then the next step is taken.

To the direct costs of the library are added the amounts needed to compensate owners of structures and any residents who are expected to experience measurable losses from the increase in rental value of the land around the library. This total cost is annualized and allocated among the parcels of land that are expected to increase in value from the presence of the library, in proportion to the expected increases. Notices are sent to all residents, all owners of businesses and all owners of title to land, informing them of the amounts by which the rent of the land they occupy is expected to rise if the library is built,

the compensation, if any, that has been provided for them, and, for the owners of title to land, their shares of the cost of the library. Each of these potentially affected persons is invited to state the amount of money that he or she would be willing to pay to have the library built or to prevent it from being built, given the proposed financing and compensation. The participants are informed that, as provided in the demand-revealing process, any participant whose valuation is large enough to alter the outcome, given the reported valuations of others, will be charged a fee equal to the smallest valuation that he or she could have submitted and changed the outcome. This rule, in effect an application of marginal cost pricing, provides the motivation for all participants to state their valuations honestly (Clarke, 1971; Tideman and Tullock, 1976).

If the sum of the amounts that those who favour the library are prepared to pay to have it built exceeds the sum of the amounts that those who oppose the library are prepared to pay to keep it from being built, then it is efficient to build the library.² However, the amounts that the opponents of the library are prepared to pay to keep it from being built represent unintended redistributive losses. While it is impossible to guarantee that there will be no unintended redistribution as long as individual preferences vary in ways that cannot be predicted perfectly and there is not a universal veto, there may be a shared understanding that a dollar of unintended losses counts more than a dollar of unintended benefits. Such an understanding can be incorporated into the decision by providing that a weight of 1.0 will be given to gains and a weight of some number greater than 1.0 will be given to losses, before the gains are compared with the losses. When the valuations are weighted, fees for decisive valuations should be charged whenever a valuation is sufficient to alter the weighted outcome, with the fee equal to the minimum unweighed valuation that would have been sufficient to do so (Good, 1977).

Such a system for evaluating and financing local public services offers a compromise between the goals of efficiency and distributive stability. If all effects of a service are reflected in rent, or if the adverse effects that are not reflected in rent are offset perfectly by compensation, then every worthwhile service will be supported unanimously. If there are effects for which the necessary compensation is not predicted, then unanimity is not achieved and the system approves all proposals that yield enough in efficiency gains to offset their unintended redistribution.

7.6 EXTENDING THE SYSTEM TO PRIVATE ACTIVITIES

So far it has been assumed that the activity that raises land value is a local public service. However, many elements of the analysis remain unchanged if it is assumed that the source of the increase in rental value of land is a private activity.³ Private activities do not generally require financing in the same way that public ones do. However, if a private activity raises surrounding rent significantly, then this increase in rent is a positive externality of the activity, and the activity will not generally be provided efficiently unless the provider receives a payment equal to the externality. If all people valued the activity equally, and if there were perfect factor mobility, then it would be sensible to say that everyone who provides an activity that raises rent should receive a payment equal to the increase in rent that results from the activity. However, imperfect factor mobility and differential valuations imply that such a system would generate unintended redistributive losses. These losses can be weighed against the gains from rewarding those who undertake activities that raise land values, by treating private activities as if they were public ones.

Any provider of a private activity can be invited to apply for a subsidy equal to the impact of the activity on rent. City analysts can then estimate the impact of the activity on rent and the amounts of money that would be required to compensate for losses in the value of buildings and in individual utility from higher rents, for people who valued the service at less than its impact on their rent and found it too expensive to move. The person who applied for the subsidy would then be offered the chance to pay the administrative costs of an election by the demand-revealing process, to discover whether the offered compensation was regarded as sufficient by affected persons. If the election produced approval when negative votes were weighted according to the established extra cost of unintended redistributive losses, then the applicant for the subsidy, upon payment of the designated compensation, would thereafter be entitled to an annual payment equal to the estimated effect of his or her activity upon land rent, collected from those who held title to land. Under such a mechanism, people are compensated for the net external benefits of the activities they undertake and are thereby motivated to undertake efficient amounts of them.

7.7 CONCLUSION

Any public or private service that provides benefits that diminish with distance from the place where the service is offered raises land value in the vicinity of the service by an amount that is a good first approximation to the public (external) benefits of the service. This increase in rent is an attractive source of financing for public services and of compensating for externalities in the case of private services. However, because people do not value services equally, and because there are moving costs and costs of changing land uses, the impact on rent is not a perfect measure of the value of a service. A more accurate mechanism for measuring the value of a service is obtained by combining estimates of positive rental impacts with estimates of negative impacts on the value of fixed durable structures and the positive and negative effects on individuals arising from variations in individual valuations of the service and the financial and emotional costs of moving. Decisions by the demand-revealing process permit these effects to be aggregated when they cannot be observed perfectly, and also permit adjustment for the extra cost of unintended redistribution.

Notes

1. One extensive discussion of the Henry George Theorem can be found in Arnott and Stiglitz (1979). For a review of other discussions of the Theorem, see Mieskowski and Zodrow, 1989, pp. 1135–40.
2. One set of beneficiaries that is ignored in this analysis is persons who will find it attractive to move into the area because of the library. To take account of the benefits of these dispersed beneficiaries, one would have to permit anyone who wished, irrespective of location, to participate in the voting process.
3. For a theoretical development of this idea, see Asami, Fujita and Thisse, 1990.

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