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Site value taxes and the optimal pricing of public services - 1 - Public Policy Implications

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Introduction: Pricing Urban Services

CITIES OWE THEIR existence to the presence of activities with economies of scale or density, and to transportation costs. With no transportation costs, activity would be scattered at random. With no economies of scale, all activity would be carried on in hamlets on a household scale to minimize transportation costs. In order to reduce transportation costs and take advantage of economies of scale, people live in dense settlements.

Marginal Cost User Fees

WITH BOTH ECONOMIES of scale and transport costs, it is efficient to organize economic activity unevenly over space, with cities being locations at which economic activity is concentrated.

Decentralization of the efficient allocation requires pricing all goods and services, including public services, at short-run marginal social cost. The competitive free market is justified on the basis that it accomplishes this result for activities without economies of scale or where these economies are exhausted. For activities with economies of scale, pricing at marginal social cost will in general not cover total costs. A subsidy is then required if output is to be pushed to the point of taking full advantage of these economies. What should the source of the subsidy be?

Here, **I propose that the subsidy should be covered by a tax on site values--the value of urban locations**. Marginal cost pricing of all goods and services, along with a tax on site values to finance the deficit of increasing returns activities, is both efficient and equitable.

The mispricing of public services will reduce the potential benefits from urbanization. A subsidiary aim of this discussion is to examine how badly distorted the pricing of particular public services is in practice and what marginal cost pricing of these services would entail.

Site Value Taxation

IN ORDER TO permit marginal cost pricing of urban services, a subsidy is required to cover the fixed costs. The best source of that subsidy is revenue

derived by taxing the rental value of land or sites. (2) That value is created in part by the very services for which the site value tax will pay. Taxes on site rents are therefore an efficient, equitable, and adequate method of subsidizing services that are priced at marginal cost.

Site value taxation is nothing new. It is already a component of the property tax, which is actually two taxes in one. The property tax combines one of the best and one of the worst taxes we have. The portion of the tax that falls on sites or land values is the only major tax that is reasonably free of distortionary effects and is not intolerably regressive. The taxes on improvements and personal property are more difficult to assess properly. They impose excess burdens through undue discouragement of such investment.

In the next section, I shall show how, under suitable assumptions, these urban site rents (over and above the rent on peripheral rural land) will be just sufficient, no more and no less, to provide the subsidies needed to supplement marginal cost pricing.

Demonstrating the Principle with Models

A Linear City Model

In order to see why site value taxes are just adequate to subsidize urban services that are priced at marginal cost, let us consider a simple one-dimensional model. (3) Imagine a city laid out on a strip of oceanfront of uniform width. Imports can be landed and exports dispatched indifferently on any point on the frontage, but local (coastwise) transportation has a line-haul cost proportional to distance.

Activities with economies of scale can be represented as having a fixed cost consisting of imports, variable costs consisting of imports, local outputs of other activities and land, all varying in proportion to output.

If an activity wishes to increase the frontage it occupies, it will thereby increase the distance freight must be carried past this frontage, and require encroachment on the rural land at the edge of the city. The marginal social cost of its land occupancy is thus equal to the rural rental cost of the land plus the cost of the transportation along its frontage. Total land rents equal line-haul transportation costs plus rural rents for equivalent space.

If the city is in competition with other similar cities, and there is no scarcity of land strips on which cities can be established, competition will drive world prices of its inputs and outputs to the point where it is operating at the minimum point on its average total cost curve, and the city as a whole would just break even. Less favorable prices would cause the city to go out of business and more favorable prices would stimulate the establishment of new cities.

Urban services providers (whether cities, counties, or special districts) err in both

directions by pricing either above or below marginal cost. Some services, such as street parking, are provided at a price well below the marginal cost. (4) This results in a shortage of those services and in congestion. In other cases, such as certain public transit routes, the charge is often well above the marginal cost, contributing to underuse. Finally, a flat-rate structure, for water and sewer services, for example, might mean that some customers will pay more than the marginal cost, while others will pay less. Central city residents might thus cross-subsidize the extension of services into distant suburbs. Not only does that entail a transfer of wealth from cities to suburbs, it also means that services are not supplied where they are most valued. The entire urban economy becomes distorted, as does the spatial structure of cities.

Line-haul distances will vary in proportion to the output and size of the city, as will also freight volumes, so that transportation costs vary as the square of the output of the city. (5) Marginal transportation costs will be twice average transportation costs. Where average total cost is a minimum, marginal cost equals average cost, so that total fixed cost equals total transportation cost equals the excess of land rents over rural rents.

More Realistic Models

A similar, but somewhat more complicated analysis, can show the same result for two- and three-dimensional models, except that for the two-dimensional models excess land rent and fixed costs are equal to one-half of the local transportation costs. Also, if we have such elements as locally produced components of fixed costs, land used in transportation, line-haul transportation costs not proportional to distance, and the like, precise modeling becomes dauntingly complex, but the main result--that site rents in excess of rural values will remain just sufficient to cover the subsidies needed to implement marginal cost pricing--seems reasonably robust. However, if city sites with special characteristics, such as harbors, are limited in supply, this would tend to produce rents exceeding the subsidy requirements.

Application to Specific Services

THE EFFICIENCY OF marginal cost pricing applies to all goods and services. In the context of public services, users should pay marginal costs and site owners should pay the fixed costs through a tax on site rates. In what follows, I illustrate what marginal cost pricing entails for specific public services and how considerably such marginal cost pricing is at variance with current practice.

Fire Protection

Superficially, the beneficiaries of fire protection are the owners of the combustible property. But the cost of providing fire protection of a given grade to a given area is at least 80 percent independent of the number of combustible

structures in the area, aside from the pathological cases like the South Bronx. Direct costs of responding to alarms amounts to a relatively small part of the total cost, as does the value of the impairment in the service quality resulting from the possibility that the unit may be out on another call when a new call comes in. Costs are chargeable 80 percent or more to land occupancy, and only 20 percent or less to possession of combustible property.

Utilities

Water mains, sewers, telephone lines, cable services, power lines must all be carried past property whether the occupant uses the service or not, and a large part of the cost is independent of the quantity of the service used. The independent costs comprise the portion that should be paid by property owners. Their property values reflect the availability of those services. The actual per-unit costs should be paid by customers.

Land holders should expect to pay for access to utilities, whether or not they use them, for the same reason that car renters should expect to pay for headlights and windshield wipers, whether or not they use them. One cannot expect to avoid paying for the headlights or windshield wipers on a rental car merely because one is not going to drive at night or in rainy weather. Similarly, tennis players will pay more to play on a court next to a fire house, because it is located in a neighborhood where these various services are available. The tennis court benefits from the provision of fire services even if it can never catch fire. And even if it did not benefit, it would be reasonable to charge the tennis court for appropriating some of the limited land that is served by fire protection. Rents in Westport are what they are because of the subways in New York, even though Westport residents never set foot inside the subway but all work in such places as the Pan Am building. (6)

Postal Service

In the case of mail service, financing of pick-up and delivery services in part from site value taxes would open up the possibility for keeping decisions as to the nature and frequency of such services in local hands, leaving the national postal service with the job of transporting mails between offices and performing some of the sorting operations.

Pricing of Streets, Bridges, and Other Congested Facilities

Congestion pricing of streets and bridges is a more specialized case than the others. The full marginal cost of driving on city streets would include the variable costs of pavement wear, police and emergency services, and accident costs not

covered by private insurance. However, the marginal cost is close to zero for most of the physical infrastructure and services provided for street use. Most of the cost should therefore be paid out of site value taxes. The largest portion of marginal cost is the delay motorists impose on each other by creating congestion. (7)

Dramatic congestion relief can be obtained by applying short-run marginal social cost pricing to street networks. For much of the day, traffic densities exceed that for which flow is a maximum. By pricing street use in such a way as to keep accumulation of traffic in the congested area below the maximum flow point, flows at the height of the peak can be significantly increased, and possibly aggregate flows for the day as a whole; speeds will be increased generally, except possibly for brief shoulder periods where traffic is being shifted out of the peak; noise and air pollution will be reduced; and substantial revenues will be obtained that can be used to subsidize transit or reduce other taxes. (8)

In the case of a bridge, the fixed cost should be borne by the property owners in the area at both ends of the bridge, who benefit from the increased activity and convenience. Vehicles at peak hours should be charged a congestion toll -- a user fee equal to the external cost a vehicle imposes on other vehicles. The marginal external social cost of a trip is measured by the time from the passage of the bottleneck to the next gap in the flow of traffic. Rather than charging on the basis of the actual duration ex post, one can properly charge on the basis of the expected duration estimated from past experience for comparable recent periods.

If charges are levied according to the rules indicated above, an equilibrium will eventually be reached in which all users reach their destinations with less delay by paying a premium (peak-period) toll approximately equal to the value of the time saved by the marginal driver. (9) If part or all of the revenue from the premium toll is used to reduce the base toll, nearly everyone will be made better off. (10) Airport take-off and landing fees are similar to bridge tolls. (11) Runway charges should reflect the marginal social cost that planes impose by pre-empting valuable take-off and landing times. Auctioning of time slots differentiated by time of day and week is one possibility, though some modifications may be desirable to take account of the differences in the strength of the vortexes produced by lighter and heavier planes. Under some conditions the airspace requirements of a small plane may actually be greater than for larger planes due to the differences in speeds. Some concessions may also be in order for scheduled flights to or from points with which service is relatively infrequent or in smaller planes, due to the stronger economies of scale prevailing under such circumstances.

Transit Fares

Transit fares are badly in need of revision to promote more efficient use of the

service provided, including drastically reduced fares for short-haul and off-peak service, and through fares for multi-mode trips. Thus, the first reform that is needed is the limitation of routes to ones that increase site values by an amount greater than the fixed cost of the route. Along the routes that remain, the second reform should be instituted: the application of marginal cost pricing. This might be accomplished either with zone fares or by charging passengers less who ride only a short distance, especially over segments and at times where there are ample numbers of empty seats. The reduction should be around 10 cents per half mile on uncongested segments and perhaps 25 cents per half mile under severe crowding conditions. (12)

Another vital step is to provide for through bus-subway fares to reduce discrimination between transit modes and the use of inefficient routings. (13) At transfer stations, magnetic cards can be used to obtain one-way or two-piece round trip transfers for a suitable charge, without the need to wait for the installation of equipment on busses. (14) Transfers should not be entirely free, to discourage the use of busses for very short segments which often will be the peak load portion of the bus trip.

Starting from an Imperfect World

THE PRICING OF services in actual cities does not come close to the efficient ideal. Businesses are forced to pass on the excess burden of costs associated with the inefficient pricing of municipal services. Prices in the world market generally exceed the minimum average costs that would be attainable in an efficiently run city -- one where activities are subsidized by site rent taxation. The way is therefore open for any given city to go ahead with such a program, and, for the time being at least, make a profit until such a time as other cities follow suit and compete the profits away.

In the meantime, in the medium long run, it would be profitable for the landowners of a city to get together and agree to tax themselves to provide the subsidies necessary to bring their local service prices down to marginal cost, thereby increasing the efficiency of the city. In the not too long run they would themselves be the beneficiaries of this increased efficiency: returns to mobile capital are set in regional and national markets, as to a lesser extent are wages; thus it is the landlords, as the owners of the main immobile factor, that stand to gain the most from an increase in the efficiency of the local economy.

Conclusion

CITIES HAVE THE capacity to be fully self-financing without dependence on

either federal assistance or on general taxes that are unrelated to benefits received. As I have explained here, in an efficient city the government should price all public services at marginal cost, and finance the deficit from activities with economies of scale through a subsidy.

Even without outright subsidy, changing pricing patterns in the direction of marginal cost plus a premium would produce a vast increase in the efficiency of the city. Road pricing of overcrowded streets (properly applied with electronic techniques) can result in higher speeds and traffic flows, and reduced air and noise pollution. Responsive pricing of electric and telephone services can improve patterns of usage, lower overall costs, and provide increased reliability. Transit fares are badly in need of revision to promote more efficient use of the service provided, including drastically reduced fares for short-haul and off-peak service, and through fares for multi-mode trips.

Ideally, the subsidy to services priced at marginal cost should come from site value taxes, which merely captures the economic surplus produced by urbanization. It would provide revenues to replace taxes having excess burdens, such as sales taxes, wage taxes, and the property tax. Site value taxation is thus the key to a drastic improvement of the economic efficiency of cities.

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Notes

(1.) Editor's note: This essay is an edited version of the notes Prof. Vickrey used for two lectures he gave in New York on October 15 and 17, 1991, one at the University Club and the other at St. John's University. The title of his St. John's lecture was "Site Value Taxes and Public Services." The title of the University Club lecture was "Notes on Land, Traffic and Markets." The St. John's lecture was largely theoretical, with few examples, and the University Club lecture was primarily case studies with little theory. Since the themes of the two lectures were similar, and neither was in final form for publication, it seemed appropriate to combine them into a single essay, retaining as much of the original language as possible. Some of the material in this essay was published in Wenzer (1998), which contains three other essays by Prof. Vickrey.

(2.) Urban site value generated by the availability of various goods and services close at hand in the city is to be distinguished from rural land value related to the "original and indestructible powers of the soil." In other words, site values are a product of location, not of the quality of the land itself.

(3.) Editor's note: The author first expounded his linear city model in Vickrey 1969. At that time he called it the "littoral city." I am indebted to Prof. Mason Gaffney for this information.

(4.) Charges for street parking should be based on the added difficulty that occupancy of space imposes on others seeking to park. In practice this can be approximated by a rule that whenever, in a given neighborhood, during a given time slot, fewer than 2 to 5 percent vacancies are observed over a suitable period, charges should be increased, and whenever vacancies average 10 to 20 percent, charges should be reduced (to zero in some cases).

(5.) Editor's note: An example may help. Tripling output alone causes a tripling of distance traveled (three times as many freight cars filled, traveling the same distance). Tripling the length of the city (and track length) to accommodate the increased output triples the distance traveled per freight car. Tripling the units of travel and of distance traveled means a nine-fold increase in transportation costs. Prof. Nicolaus Tideman was helpful in clarifying Prof. Vickrey's meaning here.

(6.) Editor's note: Westport is in southwest Connecticut. From Westport one can take a Metro North train to Grand Central Station, immediately below the Pan Am building.

(7.) Another cost motorists impose on each other and on third parties is air pollution. A surcharge could be added to capture that cost: it would be adjusted according to each model year's standard emissions rating, where it is driven, and local conditions (such as inversions). A well-maintained vehicle could he submitted for voluntary inspection to show that it performed better than the standardized rating, thereby qualifying it for lower pollution fees. (Testing could then be more stringent and costly, as it would usually be undertaken only when likely to prove worthwhile.) Heavily polluting vehicles that are driven mostly in areas of little pollution would not pay much. An incentive system would encourage rural drivers to buy polluting vehicles from urban owners. This would be much more effective in reducing urban pollution than applying uniform standards to all new vehicles.

(8.) The simplest implementation consists of units carried by all vehicles operating in the congested area, operating on power beamed from roadside scanners and responding with a signal identifying the vehicle. If the area is divided into zones with scanners at all thoroughfares crossing zone boundaries, charges can be computed based on the trip segment at a given time from the entry point to the exit point of each controlled zone traversed. Systems have been available at least since 1959, and have been since upgraded and thoroughly tested.

More sophisticated methods are being studied involving the use of "smart cards" and moderately elaborate apparatus on the car permitting the driver to be given an immediate indication of charges as they accumulate, as well as providing anonymity for those concerned with the privacy red herring. In some versions the charge would be related to the speed or delay experienced by the vehicle itself, but this seems undesirable both because of the incentive it would provide for aggressive driving and because the relation between delay experienced and delay caused by a particular vehicle is at best loose and indeed often inverse.

(9.) It is important that the tolls rise and fall gradually. Otherwise, half or more of the benefit will be lost, and difficulties may be encountered with racing or lagging when tolls change. Adjustments are also needed for casual users. They might be provided with rebate vouchers realizable as lottery tickets or redeemable at service stations.

(10.) One can guarantee that absolutely no one is made worse off by providing a lay-by in which those who so desire can wait for a period equal to the reduction in the queuing time resulting from the change in regime and obtain a voucher entitling him to pay only the old toll.

(11.) In addition to auctioning runway rights, additional charges might be imposed on the noise emitted by aircraft (similar to the pollution charges discussed in note 7 above). The charge might vary by time of day (higher at night), but it should not vary according to the runway used, since air traffic controllers can already take noise factors into consideration in assigning runways. An incentive approach is more efficient than uniform regulations. It allows each airline to adjust operations in the least costly fashion: by assigning the noisier aircraft to airports that are less subject to noise constraints, by exchanging planes between airlines, and by retrofitting planes.

(12.) The ability to differentiate between short-haul and long-haul trips depends on technology. Marginal cost pricing could be implemented without waiting for a full complement of magnetic equipment, however, by providing for the sale by agents to short-haul riders of pre-imprinted magnetic cards for $5, $10, and $20, to be inserted in a magnetic entry turnstile which will deduct the regular fare (possibly plus a small premium to discourage use for regular fares) from the balance and imprint the time and place of entry. Short-haul riders can then insert the card in an adjustment register outside the controls at the destination station to have the appropriate amount rebated. Longer-haul riders would continue to use tokens for the time being. Balances too small for entry could be added to balances on new cards at the adjustment registers.

(13.) Editor's note: It is evident here and in the previous and following notes that Prof. Vickrey was thinking in terms of the subway system in New York City, where he lived. It is harder to imagine how his proposals would work for an urban-suburban bus system in smaller cities such as Denver or Cleveland.

(14.) It is likely to prove politically unpopular, and in many cases it will be economically inefficient, to differentiate fares between, say, a 6-mile trip on a given train and a trip to the end of the line, cars in most cases having to be carried to the end of the line whether occupied or not. Differentiation can result in inefficient routing where passengers have a choice as to where they will board the train. In some cases a suitable incentive can be provided for passengers to select less crowded transfer points. For example, passengers between Flushing and downtown can be offered a small fare reduction for transferring at Queensboro Plaza, 6th Ave. or Times Square rather than at Grand Central, implemented by their inserting their magnetic cards in a register in the transfer station with the lower fare.

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Creating public value in e-government: A public-private-citizen collaboration framework in web 2.0. Australian Journal of Public Administration 69 (1): 120â€“131. Iyer R., Eastman J. K. 2006. The elderly and their attitudes toward the internet: The impact on Internet use, purchase, and comparison shopping.Â Kalambokidis L. 2014. Creating public value with tax and spending policies: The view from public economics. Public Administration Review 74 (4): 519â€“526. Karunasena K. 2012. An Investigation of the Public Value of e-Government in Sri Lanka . PhD Thesis. RMIT University: Melbourne, Australia. https://researchbank.rmit.edu.au/eserv/rmit:160100/Thanthri_Waththage.pdf (accessed: 20.08.2018). Kearns I. 2004. Public value and e-government . Optimal policy analysis is complicated by problems of the second best. Two of the most important problems â€“ non-ideal distribution and labour supply distortion â€“ are intimately connected with limitations of income taxation. In a first-best world, individualized lump-sum taxes can be used to achieve any desired distribution without causing distortion.Â The foregoing framework can be employed to address the optimal provision of public goods, the optimal control of externalities, and other government actions, as developed by Kaplow (1996, 2004, 2008). The reason is that departures from firstbest rules in these contexts are formally analogous to differential commodity taxation and hence are inefficient in the basic case (a conclusion that also is subject to similar qualifications). Using the optimal control theory, we obtain a dynamic pricing strategy of subscription and the optimal level of advertisements shown to the subscribers. Since the decision in any one time period affects the decisions of all subsequent time periods, the proposed dynamic model provides a globally optimal solution. Our model shows that the subscription fee is reduced initially to attract more customers, and is subsequently increased once a large customer base is obtained.Â (without any ads) and the content quality for a sponsored site offered free to all consumers (with ads). Dawande.Â and the value of content), and negative factors (such as price increases, annoyance due to ads, and network. congestion). Optimal tax theory encompasses a range of models that focus on particular aspects of the tax system. These different models share three features. First, each model specifies a set of feasible taxes for the government, such as commodity taxes, and the governmentâ€™s revenue needs. The models typically rule out lump-sum taxes, which would cause no economic distortion. Second, each model specifies how individuals and firms respond to taxes.