

# **Introducing Environmental Factors into the Land Cost - Transportation Cost Tradeoff Logic: A Critical Step Toward Sustainable Urban Planning**

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Working Paper, 1999

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Economic and geographic modeling of residential location decision-making in urban areas has been dominated by the frameworks developed by Alonso (1964) and Muth (1969). Both treatments of the choice focus on a tradeoff between land cost and transportation cost, assuming a need to commute to a central area of a city for employment and non-work amenities. Notwithstanding the unrealistic simplifying assumptions the models share with other optimization constructs developed by economists, an extensive body of empirical work provided significant support for the predictive power of the tradeoff approach.

Those models, however, made assumptions about the relative constancy of external costs and absence of collective consequences arising from the aggregate impacts of individual decisions that are not longer tenable. Sprawl and congestion, as well as air quality and land abandonment patterns suggest that externalities and interdependence of household utility functions need to be considered in the location choice model. The original models' predictive capacities, moreover, rely on the appropriateness of revealed preferences as measures of desired outcomes, while the constraints on available options may force decisions that are suboptimal from the perspective of the households making location choices. Those constraints, due both to public policies (regulation, zoning, transportation infrastructure decisions) and to shifts in the private supply of new housing, appear to force undesirable and economically inefficient housing choices on relocating households.

Berghall and Konvitz (1997) argued the costs that different forms of urban sprawl-related pollution cause for OECD countries, arriving at a crude minimum estimate of about 6 percent. This is a substantial amount and suggests that many policies now dismissed as "inefficient" in market return terms may, in a broader accounting framework, add to the overall efficiency of a

national or regional economy. These cost estimates post-date an OECD recommendation (1996: 70) that,

*Given the urgency of urban sustainability problems, governments cannot wait for public involvement, but must redefine public values towards more ecological outcomes. ... [and must recognize that] information is necessary but not sufficient to alter environmental behaviour.*

The information on costs that is becoming more available needs to be incorporated into more elaborated decision-making frameworks if these data are to influence choices and actions.

In essence, it is necessary to elaborate the tradeoff models to include the aggregate impacts of individual household (and, eventually, business firm) location decisions to incorporate interaction effects, especially those associated with environmental impacts. Conceptualizing the elaborated model should facilitate decisions on the types of information that should be provided to households and businesses making location choices to begin the needed process of shifting public values. Only after such shifts have occurred will there be strong political support for the public sector investments in transportation, education and social service infrastructures, in land development for use or reuse, and other actions by the state to promote more sustainable (and efficient) private location decisions.

This paper is a step toward the development of such an elaborated model, focusing on some key factors that need to be added to the private land and transportation costs that have dominated the decision logics to date. We begin with a restatement of the original models. Next we summarize key elements of the individual and collective household impacts associated with sprawl and spatial separation of economic activities. Then we translate those costs and benefits into considerations to introduce into an expanded household location optimization model. We conclude with two examinations of the implications of the elaborated model, considering first the individual household location choice decision and, second, the effects of public policy decisions on the levels of household utility that can be attained through location choices.

## **1. The Transportation - Land Cost Tradeoff**

The basic transportation-land cost tradeoff models were built for mono-centric cities, assigning transportation costs to particular locations based on distances from the recognized central business district. More elaborate models followed, dealing with polynucleated cities and other urban forms (Hirsch 1977; Mills 1972), differential demands associated with income variations (c.f. Wheaton 1982), and competition for land between industries and households. Simulations and empirical testing led to development of even more complex constructs, thanks to the number-crunching capacities of computers (Birch 1974; Mills 1972; Hamilton 1982; Kain and Apgar 1985). The basic model, however, reflects the core logic, so we can develop our argument with reference to the simplest characterization of the choice facing households.

Following Muth (1969, 21-22), therefore, we pose the constrained optimization problem as:

$$\text{Maximize } U(G,L)$$

$$\text{Subject to } Y = P_G G + P_L(m)L + P_T(m)$$

where U = household Utility function  
G = non-housing Goods and services consumed by the household  
L = Land consumed for housing  
Y = household Income  
P<sub>G</sub> = Price of the bundle of non-housing consumption  
m = Distance from the central business district (CBD)  
P<sub>L</sub>(m) = Price of land (a function of distance)  
P<sub>T</sub>(m) = Price of transportation to the CBD (a function of distance)

In other words, the household is presumed to attempt to maximize its utility through consumption of a combination of non-housing goods and services, G, and housing, represented by land, L, subject to a budget constraint, the equation adding up to income, Y.

Given a specific household income and desire to consume non-housing goods and services, that is, fixed levels of Y and G, this maximizing decision reduces to the selection of a distance, m, that produces a combination of housing cost, P<sub>L</sub>(m)L, and transportation cost, P<sub>T</sub>(m), that adds up to Y-G and produces the highest possible utility from housing. Obviously, the existing housing market may engender a combination of land and transportation costs that is so high that the desired non-housing consumption, G, may be unattainable at a given income level Y. The pure “tradeoff,” therefore, exists only if, in fact, there is no need to sacrifice desired non-housing consumption to housing or the cost of getting to and from home to work, shopping, and recreation.

Much of the argument inherent in this construct appears to have had reasonable predictive validity, even for clearly non-monocentric cities and in the absence of (or because of the absence of) perfect information (Hirsch 1984, 69ff; Mills and Hamilton 1989, 125ff). Knapp, 1998, provides a broad synthesis of recent empirical work and finds the earlier empirical confirmations have held up over time, even in light of more complex market dynamics.

We have long known that urban form choices generate consequences in the form of externalities not captured in market transactions. The evidence on the failure of those making location decisions to fully encompass the obvious external effects associated with ever-expanding commuting distances and crowding on roads and highways may be found in the continued empirical validity of the simplistic transportation cost - land cost models. Even Potepan’s 1996 elaboration of the basic model to incorporate other variables and simultaneous determination of land and housing price fails to incorporate the critical scale factors that generate externalities. Similarly, the more advanced hedonic pricing models still appear to explain adequately all housing choices in metropolitan areas, if we are to believe Knapp’s 1998 review of them.

The Potepan (1996) construct is worth a brief description here because it demonstrates so clearly the failure of conceptual development to integrate clearly visible externalities into market predictions. His two equations for land and housing price determination specific the partial derivatives — the signs of the interactions of the dependent with the independent variables — within an implicit functional form model:

$$\text{Housing Price} = F[(+) \text{ land price, } (+) \text{ a vector of demand factors, } (+) \text{ neighborhood amenity value, } (+) \text{ construction costs, } (+) \text{ taxes and fees, } (+) \text{ growth expectations}]$$

$$\text{Land Price} = G[(+) \text{ housing price, } (-) \text{ construction costs, } (+) \text{ agricultural productivity, } (+) \text{ topographic constraints, } (+) \text{ development restrictions}]$$

The problem in this model is that the relationships change over the course of the development process and over long term metropolitan growth or decline. For example, demand factors *could* turn negative — but the model only permits a shift away from, say, the urban fringe, to appear as a change in a demand curve, not a shift in the perceived cost of housing independent of its price. That is to say, the model only allows for changes due to population, income or household factors, not those generated by a shift in transportation (or fuel) costs or other external effects arising exogenously to the two equation system. Similarly, the term “development restrictions” is used to cover only policies that limit maximum density, not those that mandate minimum densities. The very construct reflects only the current dominant policy choices, not the “reality” it should be modeling.

## 2. Externalities and Household Utility Changes Due to Urban Form Choices

What we are observing is a form of “path dependence,” both in the processes of urban spatial change *and*, arguably, in the modeling of those processes. Path dependence refers to the continuation of a technological or socio-political process over time after it has become inefficient due to the sheer costs of change (c.f. Arthur 1989, 1994). Short term costs, when compared to potential longer term returns, maintain a status quo pattern long after a change would seem warranted, since the future is discounted and the eventual returns are not valued highly by current decision-makers.

Having established a premium for sprawling, low density housing, and having developed real estate markets and planning/permitting processes consonant with sprawl, the costs to any potential private market maker to challenge the prevailing patterns is just too great. On the public sector side, the balkanized political processes evident in the United States that permit small communities within really integrated urban regions to cut themselves off — a pattern praised in the heyday of acceptance of the 1956 Tiebout hypothesis — hamstring any coherent metropolitan planning. So, the sprawl processes continue as the time and money spent commuting rises, the quality of air in urban areas deteriorates (and the proportion of local air pollution attributable to the car continues to rise), and the social tensions and inequalities generated by segregation on the basis of class as well as race pose ever greater financial as well as social burdens on the nation and its urban areas.

Breakdowns in land markets and externalities simply cannot be examined with the statistical tools to which the urban economic modelers seem to be wed. Statistical testing requires stability of formulas across time and/or space, in order to have the data needed for calibration of models. Costs can only be measured in these models in terms of prices revealed by market transactions — so non-market externals simply cannot be incorporated. In theory, it is plausible and potentially possible to generate expanded models that incorporate the realities of such phenomena as the pattern of urban vacant land that does not reflect real estate market logics (Bowman and Pagano 1998). However, the formulation and testing of such constructs is extremely complex, and the effort may not be warranted in terms of the award available to the scholars involved in such research who operate under “publish or perish” pressures for more items in print. The path dependence of academic reward systems based on volume, not utility or validity, or output, hampers development in this arena.

It should come as no surprise, then, that policies directed at shaping urban growth patterns have had the anomalous effect at times of exacerbating, not solving, the problems caused by sprawl.

Table 1 arrays many of the consequences of urban spatial spread (This Table, and the others that follow, are based on review of some 100-plus different writings on sprawl and its consequences, and its derivation is beyond the purview of this note, given that it is merely offered as an illustration [Meyer 1999].)

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**Table 1: Some Consequences of Sprawl**

- ◆ Damage to Local Economies (Central City and Rural)
  - ◆ Decreased Land Use Control Powers Associated with political Fragmentation
  - ◆ Economic Pressure on Farming near Urban Centers
  - ◆ Higher Water and Energy Consumption in Suburban Homes
  - ◆ Increased Fiscal Disparities Across Local Governments
  - ◆ Increased Racial and Class Segregation
  - ◆ Increased Trip Distances and Total Vehicle Miles Traveled
  - ◆ Increased Urban Runoff and Flooding
  - ◆ Less Open Space near Urban Centers
  - ◆ Lowered Groundwater Tables due to reduced permeable surfaces and “runoff” capture
  - ◆ New (and Redundant) Infrastructure
    - water and waste disposal systems
    - roads and transit systems
    - schools and other public buildings, facilities
  - ◆ Pollution of Waterways; Ecological and Habitat Damage - a separate list in itself
  - ◆ Undermined Civic Values and Sense of Community
  - ◆ Widened Service Areas, Costs, for Emergency Services
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Table 2 is a summary of findings on the consequences of efforts to combat sprawl in the United States — the unanticipated impacts of an array of different interventions in regional land markets. The overlap with the list in Table 1 fails to appear remarkable only because it is such an excellent reflection of the inevitable consequences of interventions undertaken with no clear conceptualization of the processes on which the state is attempting to act.

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**Table 2: Some Inadvertent Impacts of U.S. Sprawl Policies**

- ◆ Creation of Redundant Infrastructure and Underutilization of the Existing Stock
  - ◆ Fiscal Pressures and Conflicts over Public Service Provision in Urbanizing Localities
  - ◆ Heightened Land Cost Differentials Across a Metropolitan Area
  - ◆ Higher Land Costs in Developable Areas and Declining Housing Conditions for “Workers”
  - ◆ Improved Mobility and Inner City to Suburb Access - Inducing More Flight
  - ◆ Incentives for Leap-Frog Development
  - ◆ Increased Inter-Governmental Conflict within the Urbanized Area
  - ◆ Increased Segregation, Especially that Based on Income
  - ◆ Increased Vehicle Miles Driven
  - ◆ Increased Zoning Differentials and Exclusionary Zoning
  - ◆ Pressures for Lower Density Development along Waterways
- 

One explanation for the overlap in Tables 1 and 2 is simply poor policy — the selection of inappropriate responses due to a failure to appreciate distinctions between different causes of sprawl. If interventions are directed at addressing one causal factor known to have generated sprawl in some setting, but it is not the source of the emerging local spatial pattern, then the responses may well make local conditions worse, note better. There are, admittedly, clearly disparate patterns (and apparent causes) of sprawl in the United States (Meyer 1999). However, this explanation does not address the issue that lies at the root of the policy-making problem, that of superficial or inappropriate analysis.

Urban change processes (whether in an age of sprawl or at any other time) are more disjointed than continuous, but the modeling processes do not — and, for application of the more generally accepted methods of statistical estimation — cannot accept the discontinuities. Table 3 reflects one crude heuristic construct of the apparent “phases” of urban sprawl, enumerating both costs and benefits. The artificial division may be thought of as phases of (1) exploration and extension, (2) consolidation and settlement, and (3) mass movement and overrun. The processes by which an urbanized area begins sprawl or moves from one stage to another — and even the number of phases that really should be distinguished — remain to be explored,, but that is an issue beyond the purview of this discussion. The discontinuities in the costs and benefits are obvious in the table, so the heuristic serves its limited purpose.

While Berghall and Konvitz (1997) have, as we have noted, enumerated the net costs of sprawl based on data collected across the OECD nations - and cite more in-depth analyses

conducted in a number of member countries - their findings do not help measure the shifting impacts. Their aggregate data hide the variation evident in Table 3, and the ways in which some phenomena may move from costs to benefits, or the reverse. Thus, their information may not be useful as inputs to housing location choice by current decision-makers. The information on traffic, air pollution, accidents in transportation and the like is indicative of the data that could be developed, but national aggregates are useless in examining policies in individual conurbations that may be at very different stages of the process of urban spatial spread. If there is any path dependence, then the antecedents of the current situation, not merely the current options facing location choosers, must be taken into account in information provision — and in policy responses.

Perhaps most important, the data Berghall and Konvitz cite — and the 100 studies underlying all three Tables — reflect costs and benefits experienced within the urban area and do not really examine a number of broader issues that lead to far higher estimates of the costs of sprawl than they acknowledge. To the extent that prime farmland may be lost to sprawl, there is the very real possibility that food costs may rise -- as may the costs of other commodities dependent upon agricultural feedstocks (such as cotton clothing). This issue may be seen by European as more immediate in their smaller nation-states than is the case in the U.S., so statistics from the latter provide a good indication of the severity of the problem:

*30 percent of the nation's agricultural production comes from [counties in the] so-called Metropolitan Statistical Areas, ... and 26 percent comes from adjacent counties ... (Sitarz 1998, 148)*

Urban sprawl is thus not just an urban problem — it is a matter of aggregate economic policy and efficiency in ways in which analysts, modelers, and public policy-makers have not acknowledged.

Without dwelling on an array of experiments — and implemented policies such as the “living streets” proliferating over Northern Europe (Sachs, *et al.* 1998, 152) — we can identify a number of factors that *should* be incorporated into the individual location-choice decision. The more publicity is given to the need to consider these issues in making choices, the greater will be the demand for good data on the relevant costs and benefits — and, eventually, fed by the improved information, the more ecologically and economically efficient will be the choices made.

**Table 3: Phases of Urban Sprawl And Their Consequences For Suburbanites or Movers to The Suburbs**

	<b>Benefits</b>	<b>Costs</b>
<b>Phase I</b>	<p>cheaper land  lower property taxes  little/no traffic  a lot of open space  total privacy  minimal air pollution  minimal water pollution  minimal/no noise pollution</p>	<p>increased trip distances (work, shopping, etc.)  increased car-related expenses  increased commute times  damage to natural habitat  not on school bus routes</p>
<b>Phase II</b>	<p>moderate traffic  some open space  moderate privacy  minimal-moderate water pollution  minimal-moderate air pollution  moderate noise pollution</p>	<p>longer commute times (due to more traffic)  increased trip distances (work, shopping, etc.)  increased car-related expenses  higher insurance costs (farther from fire dept.)  longer response times (fire, police, ambulance)  reduction of open space  more damage to natural habitat  increase in risk of flooding  lowering of groundwater table</p>
<b>Phase III</b>	<p>new infrastructure  new schools and busing routes  new service routes/areas (fire, police, ambulance, waste disposal)  lower shopping/recreation costs due to travel (closer to commercial and retail development)</p>	<p>heavy traffic  even longer commute times  increased trip distances (work)  higher insurance costs (farther from fire dept.)  longer response times (fire, police, ambulance)  little/no open space  even more damage to natural habitat  reduction in attainable privacy  moderate-heavy noise pollution  moderate-heavy air pollution  moderate-heavy water pollution  tax increases to pay for more services  greater increase in risk of flooding  more expensive land/houses  more lowering of groundwater table</p>
<b>Constant Effects</b>	<p>sense of security (away from city)  idea of fulfilling the “American Dream”</p>	<p>increased consumption of water and energy (higher bills, environmental damage and deterioration)</p>

So, let us enumerate some elements of the improved choice framework. For purposes of discussion, we can address three primary issues. They are indicative of how others may be approached, and all reflect the need to examine the duality of individual and social or cumulative costs and benefits. These are phrased here in terms of households and communities, but the same issues arguably apply to businesses making location decisions.

- **TIME** — the value of time spent in travel or other activities must be weighed in terms of true opportunity costs, not some social norms of mean wages foregone or similar measures.
  - *Individual Time Costs*, whether for transportation, household maintenance, or even pursuit of income needed to support a suburban lifestyle, may perhaps be measured better in terms of time not spent with children, or engaging in other non-work activities that an individual may value more than higher income.
  - *Social Time Costs* include the collective consequences of the loss of familial roles in socialization and social control that may be associated with less time spent with children, and the social costs of reduced time available for participation in community affairs (and the associated undermining of all efforts to promote participatory planning, community involvement, bottom up approaches to public policy-making).
- **COMMUNITY** — being part of a social group may have psychological value and contribute to individual sense of well-being, but it also generates increased productive efficiency.
  - *Individual Community Benefits* involve the psychic returns to participation and a sense of control over one's local affairs, as well as possible gains in cooperative provision for household needs (including child care and physical security).
  - *Social Community Benefits* include the productivity inherent in various forms of mutual aid that may not merely reduce the costs to the state for provision of services that it would otherwise have to provide (such as forms of care for the infirm), but may provide those services more efficiently, thus reducing total social costs, whether spent publicly or privately.
- **SPACE** — community facilities are deemed amenities, but so are private spaces, yet the former seem routinely sacrificed to the latter with no thought of losses incurred.
  - *Individual Space Benefits and Costs* include both home area and external space in gardens or other uses, providing privacy, but also requiring maintenance, the provision of which may be a cost or a benefit (if pleasure is derived from gardening or housework), and, if acquired at the cost of public spaces, may impose other (travel) costs on the household. (More private space, in the case of businesses, may impose costs for additional advertising needed to attract what

might otherwise have been ‘drop-in’ business, although parking may be an amenity for customers.)

- *Social Space Costs (there seem to be no Benefits)* that are lost in sprawl are the value of proximity for community and time savings, but also the loss of open spaces for communal use: the typical suburban tract development typically has no sports fields, no nearby stores or other potential gathering places, and thus imposes costs on households valuing team or group activities. (Additional costs in terms of vacant lands not generating rates and potentially posing burdens on the state for their maintenance are another common problem associated with spread rather than redevelopment and more compact urban forms.)

### 3. Household Location Optimization Revisited: The Expanded Model

Whether we look at Muth’s optimization formula, or at Potepan’s simultaneous determination of housing and land prices, these observations underscore the need to expand the constructs based on private costs and benefits to allow for interaction effects between individual actors and to account for cumulative impacts. Notably, we need to incorporate:

- a travel cost function that links time to aggregate traffic flow and demand, so cost rises not just with distance but also with the total population traveling, modified for different travel modes, and can move from zero congestion costs to higher levels over time;
- a community interaction and economic activity function, that loses value as household activities are distributed across longer distances and/or other costs for participation rise, so community involvements fall as a result;
- a series of environmental impact functions, linked to travel distance, mode of travel, intensity of urban land use, aesthetic and environmental opportunity costs associated with urbanization, all of which are aggregated into a ‘sustainability’ measure; and,
- specific household and aggregate regional cost measures associated with alternative public infrastructure provisions, including not only transit systems and roads, but also other ‘utilities’, including power, water and waste disposal.

The common characteristics of these additions to the model are two-fold, albeit linked:

- (1) Their impacts on decision-makers change over time (as in the case of transportation, when, at some point, congestion costs on roads rises from zero to a positive number);
- (2) They are a function of the cumulative effects of individual decisions (which is why they change over time), thus rendering inappropriate any individual’s decision logic that fails to incorporate some prediction of the behavior of other parties.

Perhaps more importantly, the enumeration of the different social and individual costs and benefits underscores then issue of *distribution*. In using this term we do not mean to raise here the growing issue of inequality in access to environmental amenities (or exposure to risks)

that has arisen under the label of “environmental justice” in the US. The key element of distribution that is central here is that of public versus private, or individual versus collective. The distinction is obviously of major importance, but it tends to be generally ignored. The United Nations’ efforts at introducing environmental factors into national accounts, for example, distinguished twelve subelements of “land” in a “classification of non-financial assets,” but not one of these elements addresses the issue of ownership and thus of the patterns of use of the resource (United Nations 1993, 161-163).

#### **4. The “New Rationality” in Housing Location Choice**

If we can describe as “rational” any selection of housing location, we need to return to the basic underlying assumptions of market economics and discuss the use of “information” in the decision-making process. Perfect markets assume not only the perfect competition elements of no dominant buyer or seller and a broad array of choices, but also “perfect information” for the market participants — and, most importantly, the knowledge needed to utilize the information. This last element is the one alluded to in the OECD quote above that information was necessary but not sufficient to change behaviors.

The “new rationality,” then, must incorporate the information from an array of studies of sprawl and its effects (such as the elements of Tables 1 and 3) into a decision process. But this information cannot be down-valued within the context of a dismissive “it can’t happen here” mentality. Economic development practitioners and other promoters of regions and cities tend to highlight uniqueness and special features as a means of distinguishing the locations they are, in effect, selling. In so doing, however, they may contribute to households’ tendency to dismiss the experiences of friends and relations with their location choices in other settings as irrelevant. All that knowledge and information base must be incorporated into individual households’ decisions. If they listen to other people, the location choosers have a body of data at their disposal that is clearly far greater than the information provided by the state.

But listening to others and learning of their experiences is not enough. To the extent that the decision-makers individually discount the future and place a strong emphasis on short term returns, then the negative consequences of sprawl — which rarely are immediate in time — will not be given adequate weight to ever alter behaviors. The future needs to be more highly valued than it is at present in individual household or business location decisions.

Obviously, a new ethic embracing the principles of sustainable development would alter the weight given to future consequences that are incurred by successive generations. Such a change in values, however, is not likely and cannot be expected to be easy to generate. An alternative may be for households to think more carefully about the future consequences of their actions in terms of the impact of their personal wealth and that of their inheritors. Individual decisions on automobile purchases and leases (in the US, at least) often depend in part on resale value. Yet future value does not appear to be a major value in home purchasing decisions in the US. This is remarkable since households in the US are more likely to relocate than families in other countries, and thus the impact of future conditions on resale value is likely to be experienced much sooner than elsewhere.

Private efforts to promote more “rational” location decisions, then, should dwell not on the need to preserve resources for future generations, but on the cumulative impacts of current private location decisions (and the expected public sector responses to them) on future property values. This focus makes much more immediate some market economic consequences of individual choices. If the disamenities associated with sprawl are presumed to reduce property values, then location decisions may shift to those that avoid the negatives. In so doing, the pursuit of *individual* net benefits in terms of Time, Community, and Space and *financial returns on housing investments* may simultaneously reduce the cumulative ecological and economic costs of sprawl and increase the *social* net benefits.

## 5. Public Policy to Expand Household Utility Attainable from Location Choice

A recent survey in a typical medium-sized US conurbation found strong preferences for living in settings in which both shopping, work and at least some entertainment is within walking distance of home is seen as the ideal residential setting. This finding is confounded by the further response that such an ideal is no longer attainable. However, the combination of the answers may suggest a public policy path: promoting the feasibility of such districts. (The US is a good test bed for discussion of the feasibility of shifting state policies, since it has been the unfortunate leader, both in timing and extent, of the processes of urban sprawl in the industrialized nations of the North.)

Further US experience suggests that a focus on promoting such spatial patterns is very likely to produce premium housing prices. First, housing expenditure levels are increasingly discretionary for households (they have spare cash for housing “investment” due in large part to recent climbs in asset values associated with the US financial markets). Second, many surveys have shown that a growing proportion of workers in the US are prepared to trade off income for time — so the value of time really *is* greater than the value of income foregone, and people will be willing to pay for the proximity values associated with more spatially integrated land uses. Third, the degree of political support for the balkanized tiny municipalities that undermine regional planning in most US conurbations is waning as the costs of such units (on other levels of the state apparatus as well as on civil society) becomes ever greater.

A variety of possibilities present themselves, many at least partially implemented in Europe and Japan. The totality appears not to have been promulgated in law in any nation (let alone actually implemented on the ground):

- a sectoral or issue focus in plans, addressing location of key facilities or affecting how different uses should intersect;
- a direct attack on exclusionary zoning, especially that which promotes longer transport linkages and imposes demands for public resources to support private development;
- a link between regulatory flexibility for some aspects of financial institutions’ operations and their willingness to support environmentally sensitive development — and *not* invest in environmentally damaging new construction;

- location efficient mortgages (so debt may be higher for households that incur lower transport expenses)
- taxation and other financial incentives to more environmentally sensitive or sustaining development (such as preferential treatment for reuse of previously developed lands);
- regulation and taxation directed at emissions that raise the costs of automobile use and contribute to denser development, more public transport, or both
- enhancing the powers of local government units to pursue sustainable development (but providing power only to local state units large enough to have the planning capacity);
- ... and myriad other options.

This problem is not devising the tools, but creating an individual choice setting in which the public policy tools are acceptable as vehicles for enhancing *individual* well-being while simultaneously producing the *social* benefits that require, among other things, the maintenance and enhancement of local ecological conditions.

## 6. In Summary

Many of the OECD's 1996 prescriptions of *Innovative Policies for Sustainable Urban Development* seem increasingly plausible today, even in the US context, because of, not in spite of, market pressures. The recommendation (130-131) for "Sustainability Performance Areas," for example, proposes an area approach that is broadly accepted in other economic development planning contexts. There is real estate market evidence that such districts, if they offer amenities valued by home-buyers or business locators, can generate exceptional property value premiums.

There thus is every reason to expect that the successful implementation of an SPA in a city — an area in which some regulations may be relaxed in return for compliance with high standards of aesthetic and environmental performance, no single-use zoning, mass transport, perhaps care limits, and the like, accompanied by stimulus for local business and perhaps job staining for residents — will produce imitators. A suburban jurisdiction or property developer, even absent controls limiting or commanding particular land uses or forms of development, might be inclined to imitate the SPA in hopes of realizing similar returns in the form of increased property values.

Clearly, not every household or business has the financial resources to compete for location in such districts. The first actions will largely benefit only an elite. However, what the elite values is commonly imitated or pursued by the rest of society. If elite location choices are seen to be those reflecting the environmental values of SPAs, then the process of a cultural shift in what is seen as appropriate locations may also be launched. Thus, without ever directly pursuing a shift in the environmental ethics of a society, a change in behavior may be generated. Once the behavior (or the locational ideal) is in place, then that spatial form may be provided with a rationale (as has always been done for every past spatial pattern) — and that explanatory argument may lay the foundations for the value shift needed for real longer-term sustainability.

## References

- Alonzo, W. 1964. *Location and Land Use: Toward a General Theory of Land Rent*. Cambridge, MA: Harvard U. Pr.
- Arthur, W.B. 1989. Competing Technologies, Increasing Returns and Lock-in by Historical Events. *Economic Journal* LXXXIX(1): 106-131.
- Arthur, W.B. 1994. *Increasing Returns and Path Dependence in the Economy*. Ann Arbor: Univ. of Michigan Press.
- Berghall, E., and J. Konvitz. 1997. Urbanisation and Sustainability. Chapter 13, pp. 155-164 in Organization for Economic Cooperation and Development, eds. *Sustainable Development: OECD Policy Approaches for the 21<sup>st</sup> Century*. Paris: OECD.
- Birch, D., et alia. 1974. *Patterns of Urban Change*. Lexington, MA: Lexington Books.
- Bowman, A.O., and M.A. Pagano. 1998. Urban Vacant Land in the United States. *Working Paper*. Lincoln Institute of Land Policy. Cambridge, MA.
- Hamilton, B.W. 1982. Wasteful Commuting. *J. of Political Economy* LXXX: 1035-1058.
- Henderson, J. V. 1977. *Economic Theory and The Cities*. New York: Academic Press.
- Hirsch, W.Z. 1984. *Urban Economics*. New York: Macmillan Publishing Company
- Hirsch, W.Z. 1977. The Coming Age of the Polynucleated Metropolis. In H.J. Bryce (ed.) *Small Cities in Transition: the Dynamics of Growth and Decline*. Cambridge, MA: Ballinger.
- Kain, J., and W. Apgar. 1985. *Housing and Neighborhood Dynamics*. Cambridge: Harvard U. Pr.
- Knapp, G. 1998. The Determinants of Residential property Values: Implications for metropolitan Planning. *Journal of Planning Literature* XII(3): 267-282.
- Mills, E.S., and B.W. Hamilton. 1989. *Urban Economics*. Fourth Edition. Glenview, IL: Scott, Foresman and Company.
- Mills, E.S. 1972. *Studies in the Structure of the Urban Economy*. Baltimore; Johns Hopkins.
- Muth, R.F. 1969. *Cities and Housing*. Chicago: U. of Chicago Pr.
- OECD (Organization for Economic Cooperation and Development. 1990. *Environmental Policies for Cities in the 1990s*. Paris: Author.
- OECD. 1996. *Innovative Policies for Sustainable Urban Development: The Ecological City*. Paris: Author.
- Potepan, M.J. 1996. Explaining Intermetropolitan Variation in Housing Prices, Rents and Land Prices. *Amer. Real Estate and Urban Economics Assoc. Journal* XXIV(2): 219-245.
- Sachs, W., R. Loske, and M. Linz, et alia. 1998. *Greening the North: A Post-Industrial Blueprint for Ecology and Equity*. London: Zed Books.
- Sitarz, D. (Ed.) 1998. *Sustainable America: America's Environment, Economy and Society in the 21<sup>st</sup> Century*. Carbondale, IL: Earthpress.
- Tiebout, C. 1956. A Pure Theory of Public Expenditure. *Journal of Political Economy* LXIV: 416-424.
- United Nations, Department for Economic and Social Information and Policy Analysis. 1993. *Integrated Environmental and Economic Accounting. Interim version*. Studies in Methods. Series F, No. 61. United Nations, NY: Author.
- Wheaton, W. 1982. Urban Residential Growth Under Perfect Foresight. *J. of Urban Economics* XII (July): 1-21.