EVALUATING SMART GROWTH

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ABSTRACT

"Smart growth," the newest version of comprehensive land use planning and proposed antidote to "sprawl," can be evaluated and understood in three contexts. First, proposed smart growth policies should be evaluated as to whether they will affect urban form and travel behavior in the manner their proponents intend. Second, recommended changes in governance, the planning process, and policy regime should be understood within the context of urban planning more generally, with an eye to identifying the interests and ideals served by the changes. Finally, proposed changes in policy and governance should be evaluated based on larger social welfare criteria--an important consideration that is missing from most work on smart growth. If the smart growth vision were to be achieved in most respects, would urban residents be better off? An overview of theoretical and empirical research finds that conventional growth control aspects of the smart growth movement are problematic and potentially ineffectual, while less-conventional policies such as spatially varying impact fees, relaxation of existing zoning regimes, and congestion and parking pricing are likely to be more efficient, more equitable and more likely to result in the normative vision of urban form desired by smart growth proponents.

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I. INTRODUCTION

"Smart growth" is a label applied to a loosely defined and far-reaching agenda of policies to mold urban growth and plan infrastructure to accommodate it. The US EPA-funded Smart Growth Network recently issued a report in conjunction with the International City/County Management Association, which identifies a hundred smart growth "policies" based on ten principles that cover almost every aspect of urban planning (see Figure 1).

Figure 1

Smart growth principles

Source: SGN/ICMA (2002: ii)}.i)

1. Mix land uses
2. Take advantage of compact building design
3. Create a range of housing opportunities and choices
4. Create walkable communities
5. Foster distinctive, attractive communities with a strong sense of place
6. Preserve open space, farmland, natural beauty, and critical environmental areas
7. Strengthen and direct development toward existing communities
8. Provide a variety of transportation options
9. Make development decisions predictable, fair, and cost effective
10. Encourage community and stakeholder collaboration in development decisions

The vagueness of the agenda, in combination with its comprehensiveness, has meant that at least up until recently a number of disparate stakeholders appear to have found shelter under the smart growth tent: slow-growth advocates and environmentalists; pro-growth advocates, such as home builders and chambers of commerce; inner-city advocates; and "better-growth advocates"—those who are interested in accommodating growth but mitigating some of its impacts (Downs 2001). Potential conflicts among these groups have not always remained submerged. Recently, the American Planning Association, in association with the US Department of Housing and Urban Development, developed a 1,450-page "Growing Smart Legislative Guidebook" for state governments that has caused some controversy. The "Community Character Act," a bill introduced into both houses of the US Congress that would provide grants to states and tribal governments that adopt elements of the model codes in the

guidebook, has drawn the opposition of the National Association of Home Builders as well as conservative members of the US Congress.

Smart growth can be evaluated and understood in three contexts. First, proposed smart growth policies should be evaluated as to whether they are likely to achieve their intended effects on urban form and travel behavior if they are implemented as intended. Second, recommended changes in governance, the planning process, and policy regime should be understood within the context of urban planning more generally, with an eye to identifying the interests and ideals served by the changes. These governance reforms can also be evaluated as to whether they improve the possibility that smart growth policies will be adopted and implemented in the intended fashion, and/or whether they are likely to be implemented and adopted themselves. Finally, changes in policy and governance structure implied by smart growth should be evaluated based on larger social welfare criteria. If the smart growth vision were to be achieved in most respects, would urban residents be better off?

II. WHAT IS SMART GROWTH?

For the purpose of this paper smart growth is defined somewhat more concretely and narrowly than is implied by the smart growth principles shown in Figure 1. Smart growth can be seen as the latest version of 'urban growth management,' which is intended to use land more efficiently "to promote a suitable relationship between land use and infrastructure, that is, more efficient use of land in order to conserve land rather than consume it" (Gihring 1999: 64). It can simultaneously be characterized as a form of integrated land-use-and-transportation planning, which is the attempt to plan land use with transportation goals in mind and vice versa (Moore and Thorsnes 1994; Frank and Dunphy 1998). Proponents of integrated land-use-and-transportation planning articulate other concerns often included within the smart growth concept: Newman and Kenworthy (1999) promote city "sustainability" while Ewing (1997) focuses on

something he calls "transportation mobility." Though Newman and Kenworthy's characterization of cities is that there is *excess* mobility, they recommend many of the same policies as Ewing, such as increased transit investments and land use controls intended to lead to more compact cities.

Unlike the "no-growth movement" of the 1970s, particularly dominant in fast-growing states like California, the concept of smart growth accepts the premise that population growth in cities is inevitable and should be channeled and molded rather than blocked. As such, smart growth could be interpreted as the latest rationalization of the "growth machine" (Logan and Molotch (1987)). It can be described in two contexts: policy and governance.

Smart growth policies include many growth management policies, which can in turn be distinguished from growth controls (Landis 1992). Growth control policies include population growth caps, commercial development caps, building permit caps, and building permit moratoria, while growth management policies include urban containment boundaries, adequate public facilities ordinances (e.g., impact fee programs), zoning and subdivision regulations, and annexation rules.

The goals of urban growth management are to direct new development away from undeveloped greenfields on the fringe of the city, and towards development of "infill" sites already surrounded by the urban fabric; to ensure that new development is more densely built than typical suburban development; and to ensure that development is as contiguous as possible with existing development, rather than skipping over undeveloped areas nearer to the urban core in order to develop areas farther out (Nelson and Duncan 1995).

Smart growth goes beyond these core features of urban growth management in a number of ways. First, its vision of urban form is more expansive, including a fine-grained mix of

commercial and residential land uses at the neighborhood or small-area level, a concentration of development near transit stops, a transit infrastructure comparable to that of large European cities, and pedestrian amenities such as narrow streets and rear-of-building parking placement (e.g., BATLUC 1999; Wheeler 2000). Smart growth advocates believe that channeling growth into a more ideal urban form will not only preserve open space but also decrease the use of the auto by enabling the use of alternative modes such as transit, walking, biking, and carpooling. They are also more explicit about the need for growth management to not only designate open space as off-limits to development, but to do this only in combination with policies intended to intensify development in existing urban areas, recognizing that "if you lock up land without addressing infill, that's a big problem."[1]

Smart growth advocacy goes beyond issues of physical city form and the accommodation of growth. Advocates see smart growth as "an updating of land-use controls to make them more sensitive to the ongoing problems of lack of housing diversity, traffic congestion, and environmental degradation" (Burchell et al. 1998: 37). Thus, principles of housing affordability, environmental preservation, and transportation efficiency are all added to conventional growth management concerns with urban form and preservation of open space.

The conceptual shift from growth management to smart growth has its parallels in actual governance changes. Locally-based growth controls have been supplanted in many parts of the US by state- and regionally-coordinated growth controls (Bollens 1992; Frank and Dunphy 1998). The typical motivation for growth controls or growth management in the past was to preserve open space and reduce congestion at a local level, while smart growth advocates are concerned with region-wide problems in addition to local issues, particularly because they

[1] Robert Lang, Director of the Virginia Tech Institute for Metropolitan Research, as quoted in Flint (2002).

believe local decision making negatively impacts region-wide property values and/or distribution of impacts / public goods.

Thus smart growth advocates view with approval the trend of increased state involvement in vetting local plans—to ensure that such principles as densification, jobs-housing balance, and the like are followed in local land use plans. As of 1992 11 states required that local plans be consistent with state goals (or provided incentives to do so), while in six states, programs to directly preempt local development decisions were in place to some extent (Bollens 1992).[2] The trend towards increasing state involvement appears to be continuing.

Currently, according to Stuart Meck of the American Planning Association, "thirteen states have either adopted legislation or considered bills that incorporated language from interim versions" of the Growing Smart Legislative Guidebook (Meck 2002a). A number of other states have legislation in place that restricts the use of state controlled funds to pay for urban infrastructure such as roads, sewer plants, and water treatment plants, either by identifying a limited number of areas in which such funds can be expended, or by requiring localities to confirm that key resources such as drinking water will be available for a foreseeable planning horizon.

Downs (2001) identifies fourteen elements on the smart growth agenda, which are reworded and summarized below. First, on his account, three elements are the most contentious among smart growth advocates (i.e., some smart growthers advocate for them, while others do not):

- Imposing urban growth boundaries,

[2] The eleven states involving themselves in local land use planning were Oregon, Florida, California, Hawaii, Rhode Island, Maine, Washington, New Jersey, Vermont, Georgia, and Maryland; programs with preemptive authority were (sometimes simultaneously) in place in (parts or all of) Vermont, Florida, Hawaii, California, New York, and Massachusetts (Bollens 1992: 457 (Table 2)).

- Imposing development impact fees, and
- Encouraging alternative mode use through transit-oriented development policy, favoring transit in funding allocation, and raising gas taxes.

Seven other elements are somewhat less contentious:

- Promoting (or allowing) more compact, mixed use development;
- Creating financial incentives for local governments to adopt smart growth plans;
- Adopting fiscal resource sharing among localities;
- Adopting new forms of decision making, such as regional government;
- Creating more affordable housing; and
- Developing a public-private consensus-building process.

Finally, Downs suggests that three elements are agreed upon by most people advocating smart growth:

- Preserving open space and the environment;
- Redeveloping inner-city sites and developing infill areas; and
- Relaxing or removing zoning and development design constraints.

Other specific policies that fall under the smart growth rubric include:

- Taxing land at a higher rate than improvements (Gihring 1999)
- Purchasing development rights (Daniels 2001)

These elements can be separated into two broad categories: policies, or elements intended to affect the built environment directly, and governance, or elements intended to influence the policy-making process. The latter group includes tax revenue sharing, developing a public-private consensus-building process, and the like. Sections III and IV respectively address these two sets of elements.

Table 1
Smart growth elements, categorized

Built environment interventions	Governance changes and planning processes
Impose new regulatory controls -e.g., create urban containment boundary Relax existing regulatory constraints -e.g., reduce parking requirements Impose new development taxes -e.g., charge development impact fees Relax development taxes/provide subsidies -e.g., reduce taxes on dense housing; purchase development rights Make transportation capital investments -e.g., improve transit networks	Share tax revenues among local governments Build public-private consensus Provide grants to local governments Create regional governments or governance processes

III. INTERVENTIONS IN THE BUILT ENVIRONMENT

Most theoretical claims related to smart growth do not question whether, and to what extent, current urban forms are problematic or inefficient. The concern instead is how to change urban form and make it resemble the smart growth ideal. The question for this section of the paper, therefore, is whether smart growth policies affect urban form as intended.

A. Land use policies

Smart growth land use policies can either relax or impose constraints on the quantity, quality, form, or price of new development (Helsley and Strange 1995). Specifically, smart growth policies can either relax *existing* regulations or taxes/fees on new development, or they can intensify/impose *new* regulations or taxes/fees. Smart growth regulations can be defined as development rules that do not require payments, while taxes and fees are payments that do not otherwise impose restrictions on development. This suggests the following categorization of smart growth land use policies:

- **Impose new quantity/quality controls** or prohibitions on development. For example, a particular land use agency might require all new developments to be set back from the street not more than 20 feet, or to be developed at a minimum floor-to-area ratio (FAR),.

- **Impose or increase price controls** such as development impact fees, property taxes, or user fees.
- **Relax existing quantity/quality controls** that currently restrict private developer behavior.
- **Reduce existing price controls or provide subsidies** to developers. This might take the form of a land grant to a developer in exchange for developing in a particular way than the developer would otherwise do, or it might consist of a reduction in development impact fees for developers of housing in infill areas.

Often more than one of these actions is embodied in a given policy proposal. Sometimes a new design standard is imposed at the same time a pre-existing standard is relaxed; for example, when a maximum setback requirement replaces a minimum setback requirement. Another example is the practice in California of growth-controlled municipalities providing "density bonuses" to developers who devote a certain percentage of their developments to affordable housing. In the context of a growth control (a new regulatory requirement), yet another constraint is imposed (develop more affordable housing) in return for relaxing the growth control (maximum FAR is increased).[3]

Smart growth plans typically include some combination of policies on this list. For example, the Oregon Transportation and Growth Management Program of 1992 includes infill development programs; minimum density zoning; "transportation-efficient land use strategies," (e.g., encouraging transit oriented development); adequate public facilities requirements (i.e., developer fees and in-lieu facility provision requirements); and annexation phasing plans (Weitz and Moore 1998: 426).

Policies within each of these four categories can be expected to play out in similar ways in cases when they are applied independently of each other. Both new regulatory controls and

[3] According to Landis (1992), Glickfeld and Levine (1992) found that 44.2 percent of municipalities with growth controls also offered density bonuses to developers who provide affordable housing. In some cases neither the density bonus nor the affordable housing requirement may impose or release a constraint, depending on the particular development situation; but clearly the intention of the policy is to do both.

new development fees can be expected to reduce rather than increase overall development, while reduction of existing controls or fees can be expected to increase rather than reduce it. The changes in fees can be expected to allow flexibility in developer response, but generally to affect developer behavior, assuming that they are applied consistently. Regulations allow little flexibility in response, and so are more likely to be restrictive of development when they are constraining. At the same time, quantity regulations may be more likely than fees to have no effect at all on outcomes, because in some cases developer decisions may already be in line with regulation.

1. Quantity controls

Land use controls run the gamut, from those specifically intended to control growth to those intended to affect the character of development. They share a tendency to restrict the amount of development that occurs. This is theoretically true even of regulations intended to affect how development occurs rather than how much occurs. Such regulations tend to increase the cost of development, which decreases the amount of developed land when demand is elastic.

Not all regulatory controls directly affect the price of land, or of particular kinds of land, but many do--for example, by restricting the supply of small lots, or by restricting the overall supply of land. Under a naively applied land price model and the assumption that migration can occur in response to land price changes, increases in the cost of land promote densification (i.e., an increase in the capital-to-land ratio), reduction of population, and spillover effects.

Some work by urban economists indicates that increasing the cost of land, or of development of land, under certain assumptions should lead to a more compact city. Under other assumptions, however, certain changes in price might increase polycentricity or cause spillover effects into other jurisdictions. Thus, empirical work on regulatory controls included in smart

growth programs, such as urban containment policies and open space set-asides, is necessary to resolve the question of their impacts. However, most work on regulatory controls has not included these particular policies because they are new. This section therefore begins with a review of empirical work on traditional types of growth control before discussing the scanter empirical literature on smart growth policies, in particular, urban containment boundaries and TOD/TND ordinances.

Research on growth controls

If growth controls reduce the supply of land available for development, and the supply of undeveloped land is a limiting factor in the production of developed land, then prices of developed land (e.g., housing) can be expected to rise. This true also on the demand side, because growth controls may have amenity value that increases land value; if so increased prices can be expected. In turn, the increase in prices should cause land to be used more intensively, increasing development density.

These effects have been demonstrated in a number of theoretical models in the urban economics literature (Capozza and Helsley 1989, 1990; Pasha 1992, 1996). However, the empirical work on growth controls is ambiguous. Many authors find that growth controls do not have substantial effects on the amount of land development that occurs, while others do find such effects.

Logan and Zhou (1989) point out that much depends on how growth controls are implemented. The authors used a 1973 survey of city planning officials along with Census data from 1970 and 1980 to investigate the relationship between "indicators" of growth controls and growth in suburban areas in the US, focusing on suburban areas on the assumption that suburbs are more likely to enforce growth control policies due to higher average levels of involvement by

their citizens. City officials were asked whether their city had used various growth controls, among them development moratoria, growth limitations, environmental impact statements, open space zoning, zoning to protect the environment, public facilities requirements, and public land dedications. The answers were used as independent variables in regressions to explain changes in population size, median income, median rent, and the percentage of the population reporting themselves as Black. Using education, median income, the proportion of residents living in the city for more than five years, central city age, and density (all in 1970) as control variables, the authors found that just two of the variables were statistically significant fashion in any of these regression models. So-called "environmental zoning" was associated with a smaller percentage of Blacks (about 4 percent fewer Blacks in 1980), and the requirement for environmental impact statements was associated with higher median rents (about 14 percent higher rent in 1980). The authors conclude that the policies did little to control growth, either because they were imposed after a period of high growth that was already in decline, or because they were pro-forma policies enacted by pro-growth City Councils in response to anti-development pressures.

Similarly, Landis (1992) did not find much of an effect when he examined restrictive growth controls such as building permit moratoria and population limits. He analyzed the effects of growth controls using matched pairs of California cities, finding that some cities with growth controls had less growth than the comparison cities, and some did not; some of the cities grew faster than their historical rate, and some slower.

Findings that growth controls do not affect growth may be erroneous, because causality is complex. In a review of literature predating these studies that is relevant for its original critique--apparently unheeded by later empirical work--Fischel (1990a) critiqued a number of studies that did not find an effect of low-density zoning by noting that such studies "[take] zoning

classification, reclassification, and presence of nonconforming uses as events that are exogenous to [the people] affected by them" (10). To put it a different way, using the presence of growth controls as a treatment variable fails to recognize that the patient is choosing the treatment, rather than being randomly assigned it. Fischel contrasts these studies with a carefully specified 1974 study by Peterson that examined lots in a large suburban jurisdiction in which distance from the city center was used as an exogenous variable to tease out the effect of a consistently administered minimum lot zone requirement on land price per acre. Peterson showed that the requirement explained a significant amount of variation in land price per acre. Fischel concludes that conventional studies erroneously find no effects of policy because zoning is administered on a case by case basis in most places.

Urban containment policies

There are three types of urban containment policy: growth boundaries, limit lines, and service boundaries (Dawkins and Nelson 2002). All three types of policy are intended to make intensive land development difficult or impossible outside the already developed portion of a city along with selected contiguous undeveloped areas. Some urban containment policies allow only farming outside the designated area, while others allow very low density residential development. In a 1994 survey of US communities over 10,000 population with an 84 percent response rate, Pendall (2000) found that 17 percent of communities responding had such policies in place.

Like other growth controls, if containment boundaries are real constraints on the workings of the land market, they should affect both the supply and demand for developed land such as housing (Knaap and Nelson 1992: 70-75). In particular, demand for residential

development in places with such boundaries may increase due to preservation of recreational lands surrounding the city.

In Oregon, urban growth boundaries are adjusted every few years to mitigate possible unintended effects on housing affordability. However, such adjustments may mean the policy does not affect metro-wide development density significantly.

It can be difficult to find direct evidence for the intended effects of the UCP, such as increased density, reduced sprawl, and shorter travel distances. The comparison is between the present and a conditional present that has not occurred, and there are no good controls without using regions themselves as units of analysis. Weitz and Moore (1998) attempted to describe how urban growth boundaries in Oregon changed the form of development in three cities of 5,000, about 18,000, and almost 50,000 in population, but no controls were used. Weitz and Moore propose a definition of desirable urban form: 85 percent of housing units occurring in the "urban core," no "urban clusters" or "strips" outside the core; and new development occurring in an infill fashion. The cities were found to fulfill these criteria. But in a more careful study, Knaap and Nelson (1992) found that the evidence on the effects of urban growth boundaries on densification in Oregon was not clear. In general, development occurred at lower densities than allowed, even when allowable densities had not been not increased above their historically low levels.

Subdivision-level zoning ordinances

Transit-oriented development (TOD), traditional neighborhood development (TND) and pedestrian-oriented development (POD) ordinances have been proposed as alternative or replacement zoning codes in order to mold built form in a different way from traditional zoning

ordinances. Peter Calthorpe, one of the better known early proponents of transit oriented development, describes the concept as follows:

> Moderate and high-density housing, along with complementary public uses, jobs, retail and services, are concentrated in mixed-use developments at strategic points along the regional transit system…. A "walkable" environment is perhaps the key aspect of the concept. In order to develop alternatives to drive-alone auto use, comfortable pedestrian environments should be created at the origin and destination of each trip… Streets lined by trees and building entries also help to make the TOD environment "pedestrian-friendly." (Calthorpe 1993: 41)

In the words of Boarnet and Compin (1999: 80), TOD policy is often understood as "comprehensive, transit-based land use planning for an entire urban area." Transit oriented development programs include all kinds of policies, such as new comprehensive zoning ordinances; density bonuses near transit stops; and new transit investments. Thus a number of different types of policy with potentially countervailing influences on land price can be part of a TOD program. However, a narrower operational version of this can be gleaned from the work of Calthorpe (1993) and Duany and Plater-Zyberck (Krieger 1991). In this section I focus on new TOD-related land use controls, and leave the discussion of subsidies, relaxation of existing controls, and transit investments for other sections.

Calthorpe (1993) relies on the idea that zoning regulations must be changed and urban growth boundaries adopted. As for the TODs themselves, "one special element of the regional plan should be identification of potential transit corridors and sites for TODs… Each Comprehensive Plan…ought to support the emerging regional vision and prescribe a new standard of development" (52). Specifically, on Calthorpe's account, individual municipalities within the region should adopt a TOD ordinance that requires minimum densities near transit stops, and "encourages" mixed-use development.

Similar to Calthorpe, Andres Duany and Elizabeth Plater-Zyberk (DPZ) have a vision of traditional neighborhood developments (TNDs) that are pedestrian oriented. However, they have

less of a transit focus than does Calthorpe. They believe traditional neighborhood developments must be attained through the adoption of new policies, and they specifically espouse TND ordinances that are essentially prescriptive zoning ordinances applied to fairly small areas (Lennertz 1991).

Duany and Plater-Zyberk believe that a strong prescriptive approach is necessary. For example, the Palm Beach County Traditional Neighborhood Development Ordinance, which they helped write, is intended for application to new development on parcels ranging between 40 and 200 acres (Duany and Plater-Zyberk 1991a). Buildings on commercial lots must be between two and four stories; when fronting a square, they must be either three or four stories. These buildings must have 70 percent of their facades within 5 feet of the frontage line. Similarly, "high density residential" buildings cannot exceed three stories, and must have a masonry wall, wood fence, or hedge built along the unbuilt portion of the frontage line. Buildings with walls within five feet of a side lot line shall remain windowless. Interestingly, in the Palm Beach County ordinance, a parking space is required to be provided for every 300 square feet of building space, and for every two rooms in a residential development.[4]

Ordinances on the Calthorpe/DPZ model are typically recommended to be adopted in conjunction with public investments in transit improvements, new transit lines, station-area improvements, public buildings, and subsidies such as land grants (Bernick and Cervero 1997).

[4] Duany and Plater-Zyberk are not solely responsible for the content of the ordinance; it is a document arrived at through a political process over which they have some influence. Therefore one cannot presume that they are pleased with the minimum parking requirements or height restrictions, elements which would seem to go against their philosophy as articulated by the essayists who discuss their work in *Towns and town-making principles*. However, major elements of their vision, such as reduced setbacks, porch requirements, and parking relegated to the rear of buildings, are included wholesale within the zoning codes featured in the book, while other elements, such as reduced parking requirements, typically are not. Parking and density characteristics of development are particularly relevant from the perspective of integrated land-use-and-transportation planning because they are thought to have significant effects on congestion, VMT, and alternative mode share.

In Duany and Plater-Zyberk's conception (Krieger 1991), a TOD ordinance can be chosen by developers of sufficiently large developments as an alternative to the conventional zoning ordinance—an approach also advocated by the influential Smart Growth Network (SGN/ICMA 2002).

There have been few or no studies on the efficacy of the new zoning ordinances, although some developments have been created under their aegis. In general, providing an alternative subdivision zoning ordinance cannot constrain the development process. The more dubious proposition is replacing existing zoning ordinances with the new zoning ordinances.

Density or design requirements imposed by a public agency for a given area may increase synergy effects associated with clusters of development, if the city is essentially acting as a "master developer," i.e., trying to maximize the profit that could be made by developing a large amount of land with various land uses that benefit from proximity to each other. There is some extant literature, not reviewed here, proposing and to a lesser extent investigating the hypothesis that master plan developers use land more efficiently because they internalize externalities associated with amenities and neighborhood effects. This hypothesis may be relevant in evaluating municipal laws that require developers of smaller parcels or conventional subdivisions to build at higher density. In other words, cities or counties may be like master developers in this way. On the other hand, the behavior of numerous developers in response to land use regulations intended to externalize such externalities may not closely mimic that of a developer motivated by a profit incentive to appropriately mix land uses over a large area.

2. Price controls

Taxes and fees are usually unpopular, so is not surprising that smart growth processes do not typically focus on new or reformed price controls. The most commonly discussed policy in

this category is the development impact fee, which is potentially easy to establish in populated areas because it does not negatively affect current residents. Far less common are proposals to increase the property tax, or to modify the tax so that it is assessed solely or disproportionately on land rather than structures and other improvements. Both categories of price control are reviewed below.

In general, increasing or imposing fees on development should result in higher prices and less development. Price impacts are dependent on local conditions and how the tax is applied. In some cases, such as in markets where the elasticity of demand for developed land is high, or where the tax is applied on only a small part of the submarket, theory would predict little effect on housing prices {cite}. If alternatives exist in nearby communities it is more likely that the long run effect of price increases will be to decrease the price of land that will be subject to the fee for the intended use, including both undeveloped land and any other property, such as developed property that the buyer would like to demolish and start over with. Therefore whether development fees or taxes are likely to have intended effects on urban form depends in large part on how they are calculated and assessed.

Development impact fees and adequate public facilities ordinances (APFOs)

Smart growth proponents often recommend that the costs of providing public infrastructure and services to new development should be paid by developers rather than shared by all taxpayers. Development impact fee programs are ostensibly intended to account for the up-front capital expenses of new infrastructure required to serve new development. More generally, “exactions” consist either of development fees or dedications of infrastructure built directly by developers, and are now frequently used in the US. Exaction programs have become widespread only in the last thirty years, and therefore have typically been instituted in

municipalities long after the provision of most of the initial infrastructure (Altshuler and Gómez-Ibáñez 1993). Development fees have increased substantially over time in constant dollars. In a 1994 survey, 30 percent of US communities over 10,000 population had fee ordinances, and 16 percent imposed fees on more than one infrastructure type (Pendall 2000).

If an increase in development impact fees is not passed on to homebuyers or developers, but is instead reflected in lowered land prices, there may still be an incentive for developers to develop more densely or contiguously. That depends entirely on how the fees are calculated and assessed; specifically, whether fees are assessed differently depending on the location and other characteristics of development. As Thompson (1976) pointed out a quarter-century ago, "Ordinarily a flat price is charged for extending water or sewers to a new household regardless of whether the house is placed near to or far from existing pumping stations" (75). This has changed to some extent, but it is still largely true.[5]

Some smart growth advocates have suggested modifying the way that development impact fee programs are implemented (Downs 1994; Moore and Thorsnes 1994). In current practice, fees are commonly calculated based on average cost of providing new infrastructure for the total population to be served by that infrastructure. A more efficient way of using the impact fee would be to make sure the fee reflects the marginal cost of providing infrastructure to each new unit of development. For example, providing sewer service to new development in farther-out areas may cost more because of increased piping length. If so, making sure the fee reflected this would eliminate a subsidy to peripheral development.

There are some exceptions. In the City of Phoenix, equivalent dwelling unit (EDU) factors determine how different types of development are charged. Typically, a multifamily housing unit is charged less than a single family unit, in some cases because it is assumed that

[5] Based on my experience as a development impact fee consultant in California and Arizona.

usage of capital facilities varies linearly with average occupancy per unit (as is often done with parks fees), and in other cases based on usage data (as is often done with sewer fees). Contiguousness is not explicitly taken into account. As a result, although impact fees based on occupancy will typically be assessed at a substantially higher rate per developed multifamily acre than per developed single family acre, that will be mitigated by the lower rate for multifamily units.

The maintenance and operating costs of municipal infrastructure, as well as the personnel costs and other variable costs of providing services, are typically provided through other revenue sources, such as the property tax on development within the city limits, sales tax on sales made within the city limits, subventions from the state, and user fees {cite Burchell et al}. Because modifications of the way that development pays for infrastructure will only affect part of the cost of providing services, it will affect only part of the location incentive that is seen as inefficient. In some cases, maintenance and personnel costs may not vary as much by location as infrastructure cost.

Pendall (2000) hypothesized that the effects of adequate public facilities ordinances (APFOs) on the provision of housing are unclear: "On one hand, APFOs may hinder development because they add costs. On the other, they may facilitate development by making new facilities available." Brueckner (1997) is somewhat more positive on this point. He shows that under some plausible assumptions, initiating a program of marginal cost impact fees will decrease the infrastructure costs faced by residents of new development up to a certain city size, and will increase those costs beyond a certain city size.[6] Thus, when impact fees are imposed in a city beyond a critical size, they will at least temporarily "hinder development" by increasing the

[6] This assumes that before the imposition of the impact fee program, infrastructure costs are shared equally among landowners and are paid through debt financing.

cost of housing (or nonresidential development) for the end user under the assumption that costs are passed forward from the developer. Brueckner's model assumes every resident consumes a homogenous unit of housing, so it is better understood as a population control model than as a model with direct theoretical implications for density or contiguity of development.

Altshuler and Gómez-Ibáñez (1993) argue that AFPOs may signal a pro-growth attitude to the extent that they are used instead of growth controls. If true this implies that adoption of the APFO is sometimes a proxy for something else not being measured (cf. Fischel's (1990a) critique of zoning studies). Adoption of a land use control policy means very different things in different contexts, and investigating the policy's effect as though it were imposed randomly on the municipality that adopted seems likely to be the wrong way to research its effects.

(Still to cite: Singell and Lillydahl 1990; Pendall 1999; Heim 2001; Knaap, Ding, and Hopkins 2001).

Increased real estate taxes and reduction of sales tax

[This section is unfinished.]

The literature on property tax capitalization and land value taxation has articulated and investigated the hypothesis that the property tax is more efficient than other taxes, an idea originating with the so-called "single tax" hypothesis of Henry George (George [1879] 1979). Some portion of the property tax applies to the value of land, and that value is seen as a residual fixed value that does not change decisions about investment. Second, it is believed that removing the sales tax incentives for local governments in allowing development will change (California is a particularly strong example of this).

Need two paragraphs citing literature; Gihring (1999), Mills (1998), Backhaus (1997). Also Oates (1999).

3. Relaxation of existing quantity controls

Advocates of smart growth typically oppose zoning and parking requirements that constrain development density on a number of grounds. Most obviously, such constraints can be expected to increase the amount of land consumed for development, if there are not other constraints on land consumption. Second, they reduce easy access to activities by pedestrians and alternative modes, since trip lengths are increased by over-provision of surface parking and over-consumption of land for housing. Third, by the same token, overall travel, and associated congestion and pollution, is expected to increase (this assumes that activity participation requiring travel remains constant, or at least does not decrease in inverse proportion with greater average trip distances). Finally, such ordinances may disproportionately impact poor people when practiced by municipalities on a regionwide basis, driving up the cost of smaller houses on smaller lots by reducing the supply of such housing.

Transit oriented development and infill development programs often include the use of density bonuses, which relax constraints on building height and lot coverage for identified areas.

Land use zoning reform

There are two fundamentally different claims relating to the phrase ‘zoning reform.’ One is that zoning has unduly restricted development in various ways, and could be profitably relaxed or removed. The other is that current zoning regulations cause, rather than solve, problems, and need to be replaced with new zoning regimes (e.g., Duany and Plater-Zyberk 1991b, 1991a). One type of zoning reform is to make a parallel code available as an option for developers given their developments meet certain criteria. Another is to zone for physical building characteristics only, rather than use (SGN/ICMA2002). In this section, I focus exclusively on the relaxation of existing zoning regulations.

Common zoning policies in US urban areas include minimum lot size requirements and maximum floor space to land area ratio (FAR) thresholds. The intention of these ordinances varies. Minimum lot size ordinances are often intended to increase or maintain residential neighborhood property values and ensure that fiscal revenues exceed the costs of public services. Maximum FAR ordinances are used primarily in nonresidential areas to ensure that local congestion remains manageable, to encourage uniform streetscapes, and to mitigate blocking sunlight. Both policies can uniformly be expected to decrease development density, assuming the ordinances actually constrain development. If such ordinances were relaxed, density would be expected to increase.

Also, zoning plans often denote segregated zones by land use type. It is suggested by smart growth advocates that uses are segregated too much in isolated zones, leading to longer trip distances than necessary, as well as a number of other undesirable effects such as class segregation. Restricting affordable housing through minimum lot size requirements may also constrain people's ability to locate near daily activities such as work, school and shops. Where minimum lot size requirements have restricted development from being built where it would otherwise have been, it is likely that trip distances are lengthened. Region-wide congestion is probably worsened by local density reductions, depending on the location of the additional travel (Wachs 1988). Of course, the ordinances may also force people to consume more land than they would otherwise.

However, discontinuing such policies may or may not increase development density. If consumers and/or developers demand low density houses, the zoning regulation may not be constraining the maximum density at which developers would prefer to build. Furthermore, other mechanisms may arise to intervene in the market. Fischel (1985; 1990a) points out repeatedly

that case-by-case land use decisions by planning boards account for a large fraction of development in many areas, with or without zoning ordinances (Babcock 1966). Siegan's (1972) study of Houston showed that zoning as such was not the only way to achieve higher property values through creating exclusive residential neighborhoods. Instead homeowners' organizations and covenants could achieve this, and did so quite frequently in Houston.

It is not clear to what extent zoning has contributed to the sprawling nature of regions. Urban models have long shown that most observed deconcentration can be attributed to the decline in transportation costs faced by individuals and firms (e.g., see Hoover 1968). However, in a recent study Glaeser and Gyourko (2002) find that zoning controls have significantly influenced housing affordability in certain coastal urban markets by requiring overconsumption of land. Their work implies that zoning does increase the amount of land consumed under some circumstance.

McMillen and McDonald (1999) show that land uses in Chicago prior to the establishment of zoning were fairly segregated. This is not unexpected given the long tradition of simple urban models showing the natural consequence of bid-rent curves of different classes of land user resulting in naturally occurring zones of segregated land use {cite Burgess, Park, et al}.

Parking reform

Because parking is bundled into the cost of purchasing or renting real estate, it not only takes up more space than is optimal, leading to urban sprawl, but also stimulates more driving than is efficient. Shoup (1999) suggests that the subsidy implicit in the forced provision of free parking may exceed all of the other travel externalities combined, including congestion and pollution associated with vehicle use, as well as intensifying those externalities. Shoup's guess appears to be based on counting most free parking as though it would not be provided in the

absence of parking requirements, and is also dependent on certain assumptions about the number of parking spaces in the United States and the average cost (including land value) per space.

Most US cities and counties require developers to provide free on-site parking spaces for automobiles. The rate at which parking is required is typically based on standards for specific land uses from the Institute of Transportation Engineers. These estimates are in turn based on surveys of parking demand at a few locations of the particular land use (e.g., fast food restaurant) in suburban locations where parking is provided for free (Shoup 1999). If parking requirements were removed in some places, the argument goes, developers would use less land for parking, allow the private market to separately provide it, or charge for it themselves. This in turn would encourage different transportation choices and use less land for parking.

Gómez-Ibáñez (1997) points out that certain parking costs should not necessarily be counted as externalities. Removing parking requirements is not likely to result in developers ceasing to provide on-site parking, or in building managers beginning to price their parking spaces. One question, then, is how much parking is efficient. Commercial parking provided free by employers is often considered as a wholly external cost. However, employees and customers do pay for parking to the extent that parking costs are passed on to them through higher prices for goods and lower salaries and benefits for employees. While some of this bundling is inefficient, some is probably efficient, and would continue in the absence of parking regulations.

In response, Shoup {, 2005 #710} agrees that the continuation of parking provision is probably inevitable, but this is because free parking provision has led people to make investments in cars and lifestyles that would make developers who provide less parking fail in a market that is stacked against them.

Calthrop, Proost and Dender (2000) show that pricing both parking and road use is necessary in order to achieve an efficient outcome. Analyzing second-best alternatives in their economic model, they find that unbundling parking and pricing it at resource cost is superior to the use of a cordon toll in nonresidential areas. Removing parking requirements may thus have more substantial benefits than the politically more difficult step of charging tolls on roads, at least given the particular set of assumptions used by the authors.

4. Subsidies and reduction of price controls

Smart growth advocates recommend reducing existing development impact fees or property taxes for development in infill areas or development of affordable housing {cite}.

Tax-code related subsidies (Gyourko and Voith 1999). The purchase of development rights (Daniels 2001).

B. Transportation investment

[Section unfinished. Effects of transportation investment programs on sprawl, congestion, and pollution.]

Recent rail investments in the US have been criticized extensively in recent academic literature for resulting in ridership far too low to pay for the costs of providing and operating the infrastructure, caused in large part by skewed incentives in the transportation planning process (Kain 1990; Pickrell 1992; Wachs 1993; Gómez-Ibáñez 1996). Others continue to defend rail investments, asserting among other things that rail projects are long term investments that will not always pay off in the short run (Bernick and Cervero 1997; Newman and Kenworthy 1999).

A recent review of literature by Mackett and Edwards (1998) on the likely success of major transit investments in Europe, Asia, and the US concludes that despite the fact that new planned public transit systems are expected to have positive effects on the environment, mode

switching, and urban development, few have done so. However, the authors are optimistic that well-run and planned systems do meet a cost-benefit test.

There are numerous hedonic studies of residential land use values near rail stations. The literature is mixed on the question of whether rail stations increase or decrease property values (Bowes and Ihlanfeldt 2001). The authors argue that the previous literature failed to take account of different effects that are potentially offsetting and varying: the positive value residents place on access to stations; the positive value they place on any retail development attracted to the stations; the negative value due to congestion and noise externalities for locations close to the station; and the negative value of any trend of increased crime near stations due to attraction of outsiders. They also argue that the benefit that residents place on proximity to stations will vary depending on distance to the CBD (i.e., the accessibility value of the network that the station provides access to), station characteristics, and their income (because the authors presume that lower income people are more likely to value transit access).

New transit investments are intended to affect travel behavior in part by densifying land use. In San Diego County, a light rail line opened in 1981 and a TOD-like program has been in place since 1992. The County has a successful light rail transit agency. Nevertheless, by 1995, only eight of 29 light rail stations had areas that met the FAR and housing density criteria suggested by Calthorpe (Boarnet and Compin 1999). Because the TOD program had been in place for only three years when the data collection for this study was undertaken, it may not be a strong indictment of the densification policy, but it does suggest that the effects of the transit investments alone was not sufficient, at least in a short run real estate cycle, to affect local land use markets very much.

IV. SMART GOVERNANCE

In addition to the trend towards state control over land use, smart growth is also typified by a greater concern with process. The preface to the *Growing Smart Legislative Guidebook* (Meck 2002b) emphasizes that good things flow from cooperation among local governments. This is perhaps the predominant smart growth institutional concept. Implementing it is another matter. The same could be said for other important institutional concepts, such as the specific model legislation in the guidebooks.

A. Changing public agency incentives

Policies are adopted or not adopted, implemented or not implemented, by formal agencies. The incentives that these agencies face affect the likelihood of their adopting smart growth plans. Those incentives are in turn shaped by two important factors that are particularly germane to the smart growth agenda: scale and scope of governance over land use and transportation policy, and the fiscal context as shaped primarily by state policies.

1. Regional/metropolitan governance

Knaap and Nelson (1992: 75) articulate the smart growth advocates' concern with the control of local governments over land use decision making:

> Under a system of purely local land use controls, local governments have an incentive to zone out undesirable housing types, thereby forcing such types of housing into jurisdictions less capable of exclusion--usually the central city. Alternatively, a state or regional system of land use planning has the potential to overcome exclusionary motives, reduce housing costs, and provide for a greater variety of housing types.

The issue of scale is important both for implementation of smart growth policies, many of which are intended to intervene in regional development and transportation trends, as well as for the issue of adoption of smart growth policies, since subregional governments have incentives differing from regional concerns.

Thus, it is commonly asserted that administering growth control policies on a regional basis makes smart growth goals such as compact urban form, preservation of open space, and lower car use more likely to be achieved; and that administering such policies in only part of a metropolitan area is likely to push development elsewhere, exacerbating leapfrog development and sprawl. It is also commonly asserted that congestion is a regional problem requiring regional decision making since smart growth tactics designed to reduce congestion (including plans to increase residential densities, imposition of urban growth boundaries, and the adoption of congestion pricing) are not likely to be adopted by individual localities acting independently, and even if they were such policies would not be successful on a piecemeal basis (Downs 1992; Wachs and Dill 1999).

Some empirical work supports these claims, if indirectly. In their discussion of the implementation of transit-oriented development in California cities, Boarnet and Crane (1997) found that cities zoned areas surrounding rail transit stations more heavily for commercial uses than for residential uses. These areas have often remained undeveloped while housing prices have increased significantly, indicating that the market might take advantage of the land if it were made available. Boarnet and Crane (1997) conclude that "enabling cities to build transit-based housing works fine as long as cities want to build such housing. But [this] research… suggests that in many instances they do not" (191). Boarnet and Crane suggest that one reason for this reluctance for local municipalities to develop TODs is that they may bear costs exceeding the benefits that accrue to them:

> The advantages of transit-based housing, such as increased ridership, accrue largely to the region. The advantages of transit-area commercial developments accrue disproportionately to…local governments. (200)

This conclusion supports the argument that regional decision making would enable more development of housing. It also supports the argument for changing fiscal incentives, the subject of the next subsection.

Regional governance does not solve all problems with implementation of regional policies. As noted above, Nelson (1988) found that even a regionally-administered growth boundary seemed to lead to exurban development outside that boundary. It is hard to know where the region ends; and regions whose growth is controlled may push development to other non-controlled regions. In that case, regions allowed to sprawl will receive more of the growth, on the assumption that super-regional growth is exogenously determined.

Although the scale of the institutions governing land use policy is seen as a key element in efforts to make growth occur compactly and contiguously, even when land use decision making continues to be implemented by local government, national-level policies can still provide an important context for local land use decision making. Sellers (2002) found that in case studies of 13 cities in Germany, France, and the United States there were large differences in the extent to which new growth lowered the density gradient of the metropolitan area. Sellers concluded that "a specialized array of policies, organized interests, and institutions specifically addresses decision making in urban settings. Combined with local initiatives themselves, these 'infrastructures of urban governance' exert the most direct influences on local capacities for the governance [of] sprawl" (97).

Sprague and Lewis (1997) find that metropolitan planning organizations in California, which typically serve large parts of metropolitan regions, should be invested with more authority to make decisions about transportation investments funded at the Federal level. Similar to Knaap and Nelson (1992), they argue that "decisions relating to the interlinked policy areas of

transportation, land use, and environmental quality are regional in their effects" (vii), and that "MPOs bring together local politicians in a forum where they must confront regional problems and evaluate contrasting visions of the future" (ix). Consistent with Wachs and Dill (1999) and Norris (2001), they see federal involvement as crucial in bolstering this regional role, because they believe it is unlikely that such a role would arise on its own in many places.

As noted above, the term "regional governance" denotes any of a number of possible institutional frameworks enabling decision making at the regional "level." Many longstanding critiques of regional governance pertain specifically to strong forms of regional or metropolitan government, rather than to collaborative arrangements or so-called "single-purpose" agencies that arise either on an ad-hoc basis from region to region or in response to Federal or state legislation.

Bish and Ostrom (1976) describe a tradition of recommendations for consolidation of local governments into regional government dating back at least to the early part of the 20th century, based on a number of common arguments. Overlapping jurisdictions implied duplication of public services. Small governmental units could not realize administrative economies of scale. Citizens were unable to keep abreast of the decision making involved with electing representatives to multiple agencies, or those agencies were not often directly accountable to voters. Small governmental units inevitably devote themselves to parochial concerns and ignore metropolitan issues of importance. Finally, two-tier governance structures could assign neighborhood concerns to small governmental units while regional issues could be decided by the metropolitan government.

In rejoinder, Bish and Ostrom listed a number of potential problems with consolidated metropolitan governments, some of which apply to the smart growth ideal of regional

governance. Smart growthers typically recommend that certain key functions, such as land use regulation and transportation investment, should be carried out or influenced by regional-level agencies. The motivation behind this recommendation, however, is primarily to influence decision making, rather than to increase efficiency or make things easier for voters. Bish and Ostrom argued that local knowledge about local issues is likely to be unrepresented when decision making is elevated to a higher level, that public officials are less likely to be responsive, and that bureaucracy will become less manageable. They conclude that "the diverse nature of events in the world and the diverse preferences and life styles of people will make having recourse to multiple jurisdictions, both large and small, advantageous in the organization of urban governments," implying that whenever possible public services should be provided by overlapping and numerous governments (116-117).

Fischel (1999) critiques regional governments on grounds that echo the work of Bish and Ostrom two decades earlier. He argues that strong regional governments could be "captured" by special interests as easily as state governments, with more serious consequences if they exercise monopoly power over an entire region formerly subject to competition among parochial governments. Also, and related to the first point, the chances of successful institution are slim; as a policy for advocates to spend resources pursuing, regional governance, he asserts, is a loser.

[Still to cite: Downs (1994), Anas (1999).]

2. Fiscalization of land use

The "fiscalization of land use" is a term coined in California to refer to the asserted tendency of municipalities to make development decisions based on their anticipated impacts on municipal budgets.

Boarnet and Crane (1997) interpret the tendency of municipalities to zone TODs for industrial rather than residential space as reflective of a desire by municipalities to "use rail transit stations as centers of economic rather than residential development." More crudely, it can be seen as emblematic of a more general tendency for municipal governments to promote land uses that benefit them fiscally. In California, as in many other parts of the US, property taxes are low enough, sales taxes high enough, and municipal services residentially-focused enough that new homogenously residential development proposals typically create budget deficits and new homogenously nonresidential developments create budget surpluses.[7] This system of fiscal incentives has been identified as a major hindrance to the successful implementation of various housing-related policies included within smart growth, such as transit oriented development, subsidies for infill development, and removal of restrictive zoning (e.g., Orfield 1997).

Boarnet and Crane (1997) believe that Southern California cities exercised this preference by influencing the process of siting the stations, directing them to areas with higher commercial development (and the zoning to go with it) rather than by changing zoning once the stations were constructed. This would also be the case if the rail transit lines were simply located along existing freight train and highway rights-of-way. They support this point with regression analysis.

Boarnet and Crane identify three kinds of transit-oriented development policies:

> (1) mandating local shares of transit-based housing; (2) offering fiscal incentives that coax municipalities to permit such housing voluntarily; and (3) encouraging local governments to search for instances when transit-based residential development is consistent with the fiscal and economic goals that commercial development most commonly provides. (201)

[7] This perception is partially to do with how fiscal impact analysis is (incorrectly) carried out, as well as the historical mix of land uses and what this implies for levels of cross subsidy among land uses.

There is growing support by counties and cities in California for the second policy, as evidenced by position statements of the California State Association of Counties and the League of California Cities (California State Association of Counties 2003). The third policy essentially reflects the status quo. Municipalities already act in a manner consistent with their fiscal and economic goals subject to various constraints, none of which appears to be restricting the development of transit based housing.

B. Political process and the adoption of policy

The process of land development in the United States is subject to intense political pressures, more so than in other nations such as Sweden, Britain, and Germany, which although differing in important ways invest more authority over land use to higher levels of government (Logan and Molotch 1987). Deakin (1989) shows that the integration of land use and transportation planning in California has been significantly hindered by the fact that land use authority is invested at the local level while transportation investment decision making happens primarily as a state-level function. Thus the question of how comprehensive smart growth plans might ever come about is crucial.

How do higher levels of government get involved to create institutions or intervene in local land use decision making? Some of the answer to that question must be explained by the vagaries of particular history and culture, but in other cases such intervention can be stimulated through policy entrepreneurship. According to Bollens (1992), two kinds of growth problems have motivated intervention by states in the US—despite a strong tradition of local control over land use that continues to make itself felt. The first is "type I" growth, which has local benefits and regional costs; the second is "type II" growth, with local costs and regional benefits. There is too much of the former and not enough of the latter when local municipalities are able to make

all growth decisions independently. Bollens (1992: 455) notes that there have been long-standing recommendations, based on national commissions in the late 60s and early 70s, to give more authority to non-local agencies in order to address "such nonlocal goals as inclusionary suburban housing policies, minority equal opportunity, and alleviation of metropolitan congestion:"

> For example, policy recommendations sought to accommodate greater suburban housing diversity by giving nonlocal governments preemptive land use authority within smaller metropolitan suburbs, or proposed that state intervention occur both to protect the environment from harmful (type I) growth and to encourage development commonly excluded by local government (type II growth).

Eventually, primarily through the passage of environmental legislation at the federal level, such issues began to receive funding for planning and decision making, and state legislatures in turn began to recognize that they could provide incentives for local plans to take into account regional costs and benefits (see introduction).

The resulting variance in how policies are adopted from place to place seems likely to affect how strong the effects of policy are. Variance can occur in the type of political unit (e.g., city vs. county) adopting a policy, and the means used to adopt it (e.g., formal means such as ordinance and voter initiative, or more discretionary means such as general plan amendment or council resolution). For example, Glickfeld and Levine (1992) found that a strong majority of the urban limit line policies adopted in California through 1987 were put into place by counties (85 percent). More significantly, almost half of urban limit lines were adopted through general plan amendment or by resolution rather than through a formal process. As Glickfeld and Levine put it, the fact that informal adoption means are used for these urban limit lines implies that "while urban limit lines are a significant component of local growth approaches in California, they are probably less uniformly implemented than some of the other measures" (34).

The question of how policies are implemented is obviously related to how they are enacted, because the force of law is greater or weaker depending on the extent of the (implied)

consensus behind the policy decision, and depending on the potential ease of changing the policy.

C. Implementation issues

In many cases, what could be identified as 'implementation problems' are actually more correctly understood as government and agency actions that occur in response to the incentives that they face. With that caveat, in this section I discuss other issues that arise with respect to the implementation of smart growth policies and related policies.

1. 'Policies' vs. 'constraints'

Landis (1992) emphasizes that how growth controls are implemented is a key element in evaluating them. This is useful in understanding the implementation of smart growth development quantity controls. It is not enough to assume that the policy is simply a binding constraint imposed by an implacable government. First, for some of the California cities in Landis's study, the policies may not have served as a binding constraint; in some cases the maximum allowable limit was not reached. In other cases, the maximum allowable limit was not far below the historical share of growth previous to immediately proximate high years of growth, so that in the author's opinion it did not present much of a constraint. He suggests in some cases the effect of the policies has been to constrain development in a boom year, but only to shift that development to an out year when the boom has subsided. In other words the timing of growth, rather than the amount, was affected. Landis also points out that the policies are weakly enforced and many exceptions are made.

Knaap (1985) found disproportionately increasing land values inside the second perimeter of the Portland growth boundary, as would be expected if the boundary is working correctly to densify the metropolitan area. However, he also found that where local governments

had some discretion, in an intermediate zone between the first and second perimeters, one of the two counties included inside the boundary did not have a property value reduction below the unimpeded price gradient. Fischel (1990a: 23) interprets this as supporting the hypothesis that a policy is often dependent on how it is enforced, and developers and landowners are probably aware that the less-affluent Clackamas county is more likely to allow development inside the boundary than Washington County, when it is allowed the discretion to do so.

2. Anticipating market outcomes

In a later analysis of the implementation of the Portland UGB, Knaap and Nelson (1992) showed that the fact that the boundary is designed with a five-year planning horizon in mind still enables growth to be shaped so as to occur contiguously with the existing built-up urban areas. Similar to Landis's (1992) findings (see below), Knaap and Nelson assert that the boundary allows the timing and location of growth to be affected without the amount of growth being changed. Rather than being a weakness of the policy, it is arguably a strength--as long as the intent of the policy is to affect not the cost, density, or amount of development, but rather its timing and location. However, an important smart growth goal is densification of developed land.

Uncertainty about when the boundaries will be moved (or, for that matter, lifted altogether) may affect landowners' decisions to develop rural land in unexpected ways. In general, the institution of an urban growth boundary can only increase uncertainty about development, since it adds another decision making variable to the mix. Using a mathematical model of land conversion, Capozza and Helsley (1990) show that under fairly restrictive assumptions (including investor risk neutrality), this kind of uncertainty delays agricultural land conversion and reduces equilibrium city size. This could have the unintended effect of hastening

development of farther-out areas such as edge cities, leading to a "leapfrog" pattern of development that is not necessarily efficient.[8] Nelson (1988) found that urban containment in Portland appears to be contributing to exurbanization.

The implementation of TOD in San Diego County in some cases failed to take into account of the real estate market (Boarnet and Compin 1999). First, most stations were placed in already-developed areas, where TOD policies and transit investments themselves can be expected to have little effect on land use patterns unless land assembly is possible under redevelopment or by a motivated private developer. Another major problem with the transit stations themselves was their tendency to be located on pre-existing rail or highway corridors. Such areas may be difficult to develop when they include development incompatible with residential uses, such as heavy manufacturing and warehousing. Finally, the planners in the eight cities in the county were focused on fiscal incentives more than worrying about TOD principles. Multifamily housing, in particular, is unlikely to have much cachet in such circumstances.

3. Bundling vs. incrementalism

Boarnet and Compin's interpretation of the TOD process in San Diego County lends support to the idea that TOD, like other kinds of planning goals, is likely to be subsumed within the incrementalist approach that Lindblom (1959) argues is characteristic of modern planning. This critique is particularly relevant to comprehensive land-use-and-transportation strategies such as TOD, and less applicable to more focused strategies such as a marginal-rate impact fee programs. But advocates of integrated smart growth frequently emphasize the importance of bundling a number of policies together in order to have a substantial and socially beneficial effect. For example, Landis (1992) uses two California cities, Lodi and Thousand Oaks, as

[8] However, as noted elsewhere in this paper, leapfrog development is not necessarily inefficient or a sign of "irrational speculation," as is commonly asserted.

examples of how to appropriately administer growth controls in combination with other mitigating policies addressing the availability and affordability of housing. Annexations were subject to voter approval in Lodi, and the town also had an infill development policy and "aggressively" followed its General Plan. Thousand Oaks, with an annual building permit cap of 650 units per year, gave unused building permit allocations to developers of affordable housing.

Boarnet and Compin's critique of the implementation of TOD in San Diego County spells trouble for any such attempt, because such bundling of policies on a metro- or region-wide level is arguably, in many cases, even more complicated politically.

V. WILL SMART GROWTH IMPROVE SOCIAL WELFARE?

> Urban spatial expansion results mainly from three powerful forces: a growing population, rising incomes, and falling commuting costs. Urban growth occurring purely in response to these fundamental forces cannot be faulted as socially undesirable. (Brueckner 2000: 160)
>
> In addition to social prejudices, desires to limit noise and traffic, and other quality-of-life concerns, there are financial advantages, for both communities and current residents, in maintaining low-density, exclusionary land use regulations. (Carliner 1999: 549)
>
> Regulations are adopted to create some kind of benefit for someone. (Fischel 1990a: 3)

Is urban sprawl a problem? Do the smart growth policies intended to stop it have benefits that outweigh their costs? Will they redress perceived inequities? How are the implementation and process issues related to smart growth policies likely to affect the expected social welfare? Many smart growth policies are explicitly intended to manage growth without exacerbating metropolitan problems associated with growth management in the past. But not all smart growth policies are so finely tuned in theory, and many of them can be expected to be less than finely tuned in practice. How do we know we wouldn't be better off just getting out of the way of the land market, imperfect as it is, and to allow the current status quo in land use regulations to continue unabated? Is the status quo in metropolitan land use and transportation policy really

worse than the smart growth alternatives? Could it possibly be not much different, or even better?

The conventional wisdom is that conditions in American metropolises have become more unpleasant in certain respects: traffic is worse, living costs are higher, and so on. But without a clear understanding of the tradeoffs involved in making attempts to change these conditions, it is impossible to assess whether smart growth policies intended to ameliorate them is a good idea.

Some whose beliefs run on the pro side of the smart growth movement explicitly believe that bundles of smart growth policies are for the net social benefit or would reduce unnecessarily inequitable outcomes for the poor and otherwise disadvantaged (Ewing 1997; Newman and Kenworthy 1999). Others focus on the costs of sprawl and hold a relatively unexamined belief in the normative value of a particular vision of how growth should occur, how the city and its neighborhoods should look, and what kinds of travel behavior are appropriate (Krieger 1991; Calthorpe 1993; Kunstler 1993; Duany, Plater-Zyberk, and Speck 2000).

On the other side of the normative debate, some authors take issue with key elements of the smart growth agenda, claiming that these create inefficiencies or inequities, or take away property "rights," either because of unintended consequences or because of the way they are implemented (Fischel 1985, 1990a; Shaw and Utt 2000). Other authors point to opinion surveys showing consistently stated preferences for segregated low-density single-family neighborhoods served by uncongested freeways (e.g., Gordon and Richardson 1997; Carliner 1999).

The positive debate is carried out on somewhat different terms. Smart growth, or integrated land-use-and-transportation planning, is seen by planners with training in economics, like Moore and Thorsnes (1994), as increasing the efficiency of the urban system by correcting market failures that cause inefficient development patterns. For example, the failure to charge the

full cost of vehicle congestion and emissions is believed to cause trip lengths to be longer than they should be in an efficient urban system. This is because perceived transportation costs are substantially lower than true social costs, lowering the bid-rent curve for land and therefore encouraging greater land use decentralization. As an illustration of this point, Wheaton (1998) compares a monocentric model of a city with and without congestion and shows that when the congestion cost is internalized, the city is significantly more dense as residents trade off proximity to the city center for less dwelling space. A similar argument can be made for the likely impacts of charging drivers for the full costs of pollution and parking.

The use of land-use-and-transportation policy as a means of internalizing the external costs associated with driving is seen by some economists as likely to suffer from the same problems that subsidizing transit does (Kerin 1992); namely, that other inefficiencies are introduced and social welfare is possibly reduced (see, e.g., Glaeser 1998). In the presence of existing market distortions, can efficient pricing of transportation be expected to increase social welfare? Implementing a Pigouvian tax in a system with other distortions that are not remedied can yield an equilibrium that is worse than not intervening at all (Parry and Bento 2000; Parry and Oates 2000). The implications of this for the attempt to mold land use into a form that resembles that which would occur under optimum pricing are even more complex and dubious.

Logan and Molotch (1987) see the question of land use regulation and intervention as a function of the power of elites to encourage growth (i.e., land development and intensification) for the purpose of maximizing exchange value. In their account, exchange value, or the value of property on the market, is opposed to use value, or the (partially non-market) value of property to individual users (p. 14). Since their book was written, local growth controls have become more frequently implemented, and the "growth machine" has been slowed down in those places

(although as noted above, Logan and Zhou (1989) contest this interpretation of growth controls). Using Logan and Molotch's framework, that apparent change in power could be interpreted as the local triumph of use value over exchange value. But the pursuit of use value is not necessarily separable from exchange value in the way that Logan and Molotch seem to assume is possible. In particular, local growth controls usually increase local property values by restricting increases in supply and by increasing the amenity value of living in the growth-restricted community, and in fact function as a way to maximize exchange value as well as use value. However, Logan and Molotch use some interesting and more complex examples of use value relating to the creation of social networks, the "daily round" of individual habit forming, and knowledge creation regarding the local environment that are more difficult to relate with exchange value from a buyer's perspective, since these investments simply disappear when long-time residents leave neighborhoods. Clearly there are externalities of "staying put" that have gone unnoticed in models of residential turnover, for which no Coasian solution can be imagined.[9]

The motivation for enacting of growth controls provides evidence as to whether they are intended to protect the interests of a particular group. According to Deakin (1989), opinion surveys suggest that growth controls are motivated not so much by an attempt to increase property values as by environmental and other more innocuous concerns. Glickfeld and Levine (1992) test the theory that growth controls "are enacted by predominantly white, predominantly middle-class communities" for which the term 'NIMBY' was invented. The analysis performed by Glickfeld and Levine on survey data of California municipalities showed virtually no

[9] Perhaps these are declining over time as residential neighborhoods, shopping opportunities, transit systems, road networks, and the like become more homogenous, as connections among physical neighbors become more tenuous, and as careers rather than social networks drive location decisions.

correlation between income levels, race/ethnicity, or home ownership and the enaction of growth controls, also suggesting that property values are not the primary motivation for enaction.

However, Fischel (1990a) asserts that property values are already maintained in many places using minimum lot size zoning, a type of "growth control" not typically considered by analysts (including Deakin and Glickfeld/Levine). This implies that growth controls or growth management policies (using Landis' definitions of these terms) may be more likely to be used to protect the property values of resident homeowners in the absence of a zoning regime. [This is an interesting research hypothesis that might be tested—but begs the question of why a growth control is used rather than a zoning ordinance.]

In a general work with application to this particular research question, Wolf (1988) provides a structured way to examine claims for and against government intervention through policy. He posits that market failures need to be considered, but so should so-called "policy failures," areas in which policies cannot be expected to lead to greater social welfare than a situation with no intervention in an identified market failure, or where policies spring up for no market-justifiable purpose. This is instructive in understanding the gulf between partisans on both sides of the smart growth question. Gordon and Richardson (1997) believe that observed behavior of individuals in cities reveals true preferences, ignoring the possibility that this behavior is significantly influenced by market and nonmarket (i.e. policy) failures that could be rectified. Shaw and Utt (2000) emphasize the importance of particular costs and benefits, namely those directly borne by individuals, and discount the possibility that policy could deal with externalities. Meanwhile, Newman and Kenworthy (1999) focus almost exclusively on external costs of various kinds, suggest that individual preferences are often misguided, and are silent on

the possibility that through intervening, government could create costs that might exceed the benefit of the intervention.

In the sections below, I discuss a number of issues not always considered within the smart growth framework but relating to the normative question of desirable urban form and what constitutes a desirable societal outcome.

A. Housing prices

> Numerous empirical studies…have all come to the same conclusion: growth controls raise the price of housing. (Engle, Navarro, and Carson 1992: 269)

Landis (1992) argues that regional housing supply constraints are caused by the ubiquitous use of land use controls such as downzoning and impact fee ordinances. Based on a fairly simple comparison of employment growth and housing production from 1980 to 1987, he estimates that in California, such action resulted in a shortfall of a half million units of housing production during that period. Much of the shortfall occurred in counties typified by "slow-growth sentiment," including not only strict growth controls but also the use of the other growth management policies; but it also occurred in counties that have been labeled pro-growth. Landis concludes that "the negative aspects of local growth caps – higher home prices – were avoided [in California] only because relatively few communities adopted them, and because the programs that were adopted proved so porous" (504). Glickfeld and Levine (1992) reach a similar conclusion about the most stringent growth controls. By the same token, however, growth controls that are implemented "porously" are unlikely to have significant effects on the shape of the built environment; so it is unclear whether growth controls (other than MLS zoning, which is far more widespread), as implemented by relatively few communities and in an inconsistent fashion, have much to do with affordable housing.

This point should be stressed, because it implies that growth controls only fail to have negative impacts on social welfare (by increasing the cost of some land while decreasing the cost of other land, the cost of development) when they also fail to control growth (unless the growth control creates a large public benefit from the preserved land—but see working paper by Anas and Rhee, 2005, showing how large this benefit would have to be to make an urban growth boundary as efficient as congestion pricing).

In a study that addresses a number of the policies typified by smart growth programs, Pendall (2000) evaluates how several types of land use control—large lot zoning, urban containment policies, building permit limitations, and adequate public facilities ordinances (i.e., impact fee and in-lieu programs)—affect the provision of multifamily housing and in turn the concentration of African-American and Hispanic residents in those localities. Pendall hypothesizes that any land use control that reduces the supply of multifamily housing will affect African Americans and Hispanics disproportionately, because these groups are more dependent on the availability of lower-cost housing because they have lower incomes, and because they are discriminated against, particularly in tight housing markets.

Pendall's analysis is somewhat limited because the data set does not include information on when the policies were adopted. Pendall finds that large lot zoning and population growth caps (but not the other land use control policies, urban containment and impact fees) are associated with a lower growth increment of multifamily housing and, in turn, a lower concentration of African Americans and Hispanics respectively. However, in modeling racial demographic change as a function of land use controls, Pendall does not control for other important possible determinants, such as the relative age structure of the Black and Hispanic populations in 1980 and changes in occupational structure of the labor market. Furthermore,

Pendall's analysis may be picking up a spurious correlation if correlated decisions to adopt growth controls among localities in a given region (Glickfeld and Levine 1992) are in turn correlated with the racial demographic makeup among localities in that region. Finally, there are some tricky endogeneity problems with the second two of Pendall's models. Housing stock growth is used as a dependent variable with growth controls used as an independent variable even though growth-pressured places may be more likely to adopt growth controls. Other independent variables used in the analysis have similar problems.

Like other growth controls, urban containment policies can be expected to affect the price of land, although this seems to be a controversial assumption among planners. Some planning scholars have suggested that UCPs can be implemented in such a way as to avoid price increases. However, most researchers have concluded that UCPs do increase the cost of housing as well as potentially having positive amenity affects due to open space benefits (see also Brueckner 2000; Jun and Bae 2000).

According to the theory of land rent, urban growth boundaries should increase the value of land inside the boundary and decrease the value outside the boundary. This can have the perverse result of making large tracts of land available just outside the boundary for the wealthy to put their estates on, as has happened in Portland (Moore and Thorsnes 1994: 81).

Glaeser and Gyourko (2002) find that policy-related housing cost increases are occurring in particular cities in the US, particularly coastal cities such as Boston and San Francisco. Their data and methods do not allow an explicit determination of which policies are at fault, but do suggest that minimum lot size zoning plays a role, rather than other growth controls such as caps on housing units.[10] This has positive implications for reform of zoning laws from an affordable

[10] Glaeser and Gyourko test land values as residuals net of construction costs both in aggregate and per square foot, and find that in 'unaffordable' cities, parcel land values are very high while marginals are

housing perspective (though see below for other social welfare questions regarding zoning controls).

B. Aggregate land rents

Fischel (1990a) recommends comparing the "before" and "after" aggregate market value of land for an urban area as a social welfare test for a growth control policy (47). For example, inside an urban growth boundary, land values can be expected to increase due to the supply restriction and possibly due to the greenbelt or land preservation amenity. Outside the boundary, land values can be expected to decrease due to the loss of development option value, although that loss may be mitigated by reduction of negative crop production externalities from urban proximity. The net "before-and-after" comparison of aggregate land values provides a social welfare test of the policy; Fischel asserts, "The economic case for growth controls hinges on the possibility that conventional regulations allow too much development and aggregate land values can be increased by further retarding development" (49). Fischel presumes this test is not likely to be met in most cases but that in some cases, the effect of increasing land values could reduce the use of exclusionary land use policies and create further benefits by increasing firm agglomeration, which is generally theorized to have positive externalities. In the Korean case, Jun and Bae (2000) review literature concluding that the net social welfare impact of Seoul's greenbelt is negative, taking into account both the supply restrictions on land and the amenity values of the greenbelt as a recreational resource.

Fischel (1990b) concludes another survey of empirical studies on growth controls, including large lot zoning, development moratoria, and urban growth boundaries, by arguing that land use controls of all kinds do constrain the land use market; do provide benefits that may only

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low, implying overconsumption of land that is undervalued on a per square foot basis. Their analysis addresses overconsumption, not (explicitly) supply constraints.

be achievable through such or similar regulations (unless negotiations between developers and residents were unfettered); and on net are inefficient, imposing costs that exceed their benefits when a net welfare approach is taken. He bases his last point on the fact that of the research studies on growth controls in his survey, few found evidence of significant amenity effects.

In addition, so-called "leapfrog" or sprawling development may be efficient, allowing underdeveloped parcels to come in at a higher density later because redevelopment costs for those parcels are kept low (Mills 1981; Mills and Hamilton 1989: 139-142; Peiser 1989).To the extent that urban containment policies constrain such development, they will decrease net social welfare to some extent.

C. Commute times and distances

Greenbelt policies have been strictly enforced in England and Korea. Evans (1998) discusses the British case, in which greenbelts have been established around most cities for half a century, and concludes that a gas tax may be more efficient than the indirect attempt to control travel behavior through the urban growth boundary. Evans claims that greenbelts have lengthened commutes, citing British studies. On Evans' account, this is because greenbelts in Britain essentially create a number of clusters of development within a given commute shed. Jun and Bae carry out a simulation study using the case of Seoul, Korea to show that the net effect on commuting of the greenbelt is a cost of about $400 million per year including out-of-pocket costs and value of travel time.

D. Congestion and pollution

Evans (1998) suggests that in the presence of underpriced car use, urban growth boundaries may worsen environmental impacts of car use due to concentration of pollution. "In

this case, the more compact development would cause more congestion and wasted fuel as people still use their cars but travel more slowly, using fuel at a greater rate per mile" (141). A similar argument can be made for localized transit oriented development policies. Assuming that parking is provided at the same rate as it is everywhere else, such areas are likely to create as much traffic, with more localized impact, as suburban developments. The only question is the extent of mode switching and trip de-generation that is associated with more compact development, but the evidence is not strong for the local effects of such development (Chatman 2002).

E. Density efficiencies and inefficiencies

Evans (1998) also argues that forced densification may be more resource intensive and therefore inefficient, because multistory development uses more building materials per square foot of habitable space. For the purpose of evaluating smart growth policies, this argument rests on the possibility that these policies actually densify development to an inefficient extent, rather than removing barriers to dense development or densifying up to the point that the resulting built environment is roughly on par with that which would result from a fully priced urban system.

Based on an empirical cross-sectional study of US counties, Ladd (1992) shows that costs of providing public services appear to increase with higher population density, implying that there is a U-shaped cost function in density for public services. Ladd concludes that policies successfully increasing density may be inefficient from the standpoint of public service provision. This study, while widely cited, does not explicitly control for the possibility that differences in costs of providing public services are accounted for by higher quality of services, in addition to the higher costs associated with providing and maintaining infrastructure in dense

urban environments. Another problem with the study is that density and population growth are equivalent measures in the data set, as counties are used rather than urbanized area boundaries.

F. Transportation investments

In general the question of when new transit investment increases social welfare has not been very well addressed in the literature, which tends to focus on the question of ridership and fiscal costs, and to a lesser extent possible reductions of car use. The literature does not typically address the substantial positive and negative externalities associated with transit systems. In particular, these include possible user-side scale economies in bus trip production (in waiting and walking times, primarily) which may be so large that in some cases, it has been argued, people should be paid to ride buses (see Mohring 1972; Walters 1982; Kerin 1992).

Rail systems may also exhibit scale economies, although the literature is mixed. I focus on one recent study here. Using data on US rail systems from 1985 to 1991, Savage (1997) finds substantial scale economies of service density in operating costs (exclusive of user time inputs), also suggesting that pricing below average cost (and therefore subsidization) may be efficient. He finds more or less constant returns to scale in system size, with the exception of heavy rail where the data suggests there are diseconomies of scale. Savage's paper is different from previous work in assuming that managerial decisions about service frequency create endogeneity in system characteristics. Labor costs are treated as exogenous, and assumed demand elasticities are used. Savage's results differ from some previous studies showing diseconomies of scale in US rail systems (although more recent ones showed economies of scale) in service density, which he attributes to his dataset containing more medium sized systems, as it is more recent than those studies and such systems have recently come online.

In addition, possible reductions of negative externalities associated with marginal reductions in auto use, or changes in aggregate land value due to accessibility increases,[11] could be included in assessments of transit investments.

Whether congestion does or does not result from the MLS zoning requirement (and other land use regulations) depends on road capacity. When discussing congestion effects, we often assume that transportation infrastructure is fixed. But if roads were provided dynamically on the basis of usefulness (which could be accomplished if the financing system were entirely different), congestion outcomes would likely be different.

G. Fiscal issues, neighborhood amenities, and local property values

One element of the smart growth effort is to reduce the use of minimum lot size (MLS) zoning. MLS zoning has been extensively addressed in the urban economics literature. Fischel (1985) notes that minimum lot size zoning has some benefits, because people value neighborhoods that exclude lower-valued property (and, it should be added, they may value excluding lower-income people or minorities who might occupy it). Tiebout (1956) showed that residents of municipalities have an incentive to zone for housing units of value equal to or greater than theirs, because municipal services are funded primarily through a property tax based on percentage of assessed value, so that the contribution of each household to the cost of municipal services is partially dependent on the size of their house and lot while the cost of public services might be roughly equivalent per household. Thus MLS zoning may be primarily a means of stopping a free-rider problem, and in that sense efficient (increasing net social welfare). Oates (1969) provided evidence that the value of municipal services is capitalized into the value of the housing unit, which supports Tiebout's hypothesis.

[11] There is probably some double counting here.

While agreeing that MLS zoning can increase social welfare, Fischel argues that communities tend to exclude too much. Internalization of externalities, or more generally the aggregate land rent function, is the basis for Fischel's essentially social-welfarist argument. If there were a Coasian mechanism that allowed compensation to be paid by developers (who are assumed to represent potential residents) to existing residents of communities that have incentives to exclude lower-cost housing, more lower-valued housing, high-density housing would be built in those places at a higher value per acre. This is because in cases where the value to potential residents of locating the housing there (as expressed in the developer's profit function) exceeds the value to existing residents of excluding the housing, there is room to make a deal if only the mechanism to make a deal were in place. Unfortunately, Fischel points out, it is generally illegal to make side payments since these are seen by US courts as extortionary, not a legitimate example of the land use police power.

Thus Fischel contends that there is some inefficiency associated with the operation of MLS zoning, but that the solution does not lie in banning it. Instead the ideal solution is to facilitate negotiations over payment between communities and potential developers. If MLS zoning were removed, a similar argument would apply: negotiation and payments would be necessary in order to reach an efficient solution. Without such a possibility, removing the right of communities to engage in MLS zoning could be just as inefficient as giving them that right.

However, Fischel's argument ignores the possibility that MLS zoning might increase travel distances by artificially lowering the density of new residential development. Taking this inefficiency into account, and assuming that developers would develop more densely and if MLS zoning was prohibited, then (in the absence of allowing explicit negotiation between developers and communities) removing MLS zoning in a given municipality might be better than allowing

it. But smart growth plans do not generally include removal of zoning; instead, zoning constraints are typically relaxed in some targeted area.

H. Other social welfare measures, direct and indirect

Brueckner (1997) models three different methods of financing urban infrastructure: impact fees paid up-front by developers (i.e., new residents or firms); sharing of up-front infrastructure costs by all landowners in a jurisdiction; and bond financing shared by all landowners. Modeling growth under the assumption that agricultural land is converted by land owners to urban use based on a comparison of future rents under urban vs. agricultural use, based on an extension of the urban growth model of Capozza and Helsley (1989), Brueckner shows that of the three schemes, the impact fee scheme generates the "efficient growth path for the city;" in other words, the net social welfare is highest under the impact fee method of paying for infrastructure. This result is robust in that it holds for an open city model in which population growth is endogenous; and it is expected, given the conventional understanding of efficiency as being a function of prices reflecting costs, but not previously formally shown.

Brueckner's work assumes that costs are passed on to new residents. The question of who pays impact fees is key to a question both about equity and about the ultimate effects of the fees. Singell and Lillydahl (1990) argue that in the short run, in a city in Colorado where an impact fee increase of more than $1,000 was instituted, for 18 months following the imposition of the fee (as well as months prior to the anticipated increase) new fees not only were passed on but actually increased the price of housing substantially more than the amount of the fee (about three times as much). They explain this result by referring to the possibility that developers marked up the fee to reflect carrying costs; that developers changed characteristics of housing in response to the fee program, focusing more on high value housing on the theory that the fee increase was less

noticeable in that market; and that some developers may have left the market if only temporarily, resulting in a supply effect that further increased housing prices. The price of old homes also increased as a result of imposing the impact fee, which the authors interpret as a sign that since the cost of new housing increased significantly due to the increase in the fee, the market for old homes was also affected by the spillover of demand. However, old homes increased even more than new ones did. An alternative interpretation of the result is that all housing in the community appreciated in price over this period for exogenous reasons. It is not clear what this result implies for the possible effects of appropriately administered impact fee programs on density and contiguity of urban form. Interestingly, Singell and Lilleydahl's work suggests that to the extent existing home prices increase due to the imposition of a fee, the incentive for cities to adopt development impact fees may be more to capture the increment in property tax due to increased house values, which would tend to be substantially higher in net present value than the fees themselves.

Knaap, Ding and Hopkins (2001) agree in principle with the theory of marginal cost impact fees as articulated by Brueckner, but suggest that such fees are politically untenable. They first model urban growth and efficient public infrastructure focusing on the assumption (present also in Brueckner's model) that population growth degrades public services provided using that infrastructure. This assumption creates an externality in growth, as expressed through negative impacts of growth on rent of existing land due to degradation in the level of public services. Without the possibility of charging marginal costs for congestion of the public service, the authors assert, land use regulation is the alternative.

Altshuler and Gómez-Ibáñez (1993) point out that "most [development impact fees] are levied at a flat rate per bedroom or per dwelling unit, so they add a greater percentage to the cost

of inexpensive than of luxury homes. Few communities offer reductions or waivers for affordable housing units" (6). The implications of this for equity are unclear, as whether residents of affordable housing units impose greater or lesser costs on the public infrastructure depends on a number of factors, such as occupancy rates and per capita usage. The larger distributional concern is not usually considered by urban planners focused on paying for publicly provided infrastructure.

VI. CONCLUSIONS

There are strong reasons to believe that urban form in the United States and throughout the world is inefficient and both the cause and symptom of social inequities. But policies intended to combat sprawl may or may not reduce these inefficiencies and inequities.

Smart growth policies that are intended to influence the development and redevelopment of the built environment have sometimes unintended effects; when their effects are generally of the direction and nature expected, they are often weaker than hoped for. In addition, there is ample reason to believe the "unintended" effects of smart growth policies are substantial; with the exception of the housing affordability question, these are rarely addressed by advocates of smart growth, academic or otherwise.

There is little empirical research that bears directly on the question of how specific smart growth policies affect the built environment, since many smart growth policies differ in important ways from growth management and transportation investment policies of the past, and they have not been implemented in many places. However, empirical research on other policies, covered in the previous sections, makes the following inferences possible:

1. Conventional growth management policies such as urban containment policies and adequate public facilities ordinances are referred to here as "quantity controls." If constraining as intended and occurring in the context of a market demand for land that is not perfectly elastic,

such controls can be expected to result in what amounts to a transfer in land value among landowners within the urban area (from those with future use subject to the control, to those whose future use is not subject to the control) and a transfer in wealth from the (future) purchasers of land to the existing owners of that land. This transfer may or may not occur within the context of a net increase in social welfare, depending on the magnitude of the amenities provided by the quantity control. Given the political context in which urban growth boundaries and new prescriptive development ordinances are likely to be imposed, there is strong reason to be dubious about their value when implemented in a piecemeal fashion.

2. Bundles of such policies can be more efficient and equitable than policies implemented on an piecemeal basis. For example, an infill development policy that subsidizes affordable housing in the city core can complement an urban containment policy that restricts development on the urban fringe and might drive up housing prices without such an infill policy. Similarly, Daniels (2001) argues that increasing the tax on land values in order to encourage more rational development of land should be combined with purchasing development rights of agricultural land in greenbelts, so that the land value tax does not inadvertently hasten edge development.

3. Three broad policy types are most likely to be beneficial on a net social welfare basis: (a) Relaxation of existing quantity controls when those quantity controls are no longer necessary to manage nuisances, spillovers and the like; (b) Finely-tailored price controls that provide a better accounting of spatially-varying municipal service costs, and (c) Price controls that internalize externalities of land use and travel (such as congestion pricing and parking pricing).

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