
**INVESTING IN A BETTER FUTURE:
A REVIEW OF THE FISCAL AND COMPETITIVE ADVANTAGES
OF SMARTER GROWTH DEVELOPMENT PATTERNS**

Mark Muro
Robert Puentes

A Discussion Paper Prepared by

The Brookings Institution Center on Urban and Metropolitan Policy

March 2004

**THE BROOKINGS INSTITUTION CENTER ON URBAN AND METROPOLITAN POLICY
SUMMARY OF RECENT PUBLICATIONS ***

STATE REPORT

2003

Back to Prosperity: A Competitive Agenda for Renewing Pennsylvania

DISCUSSION PAPERS/RESEARCH BRIEFS

2003

The Workforce Investment Act: Reauthorization to Address the "Skills Gap"

Tax Policy as Housing Policy: The EITC's Potential to Make Housing More Affordable for Working Families

Managing Metropolitan Growth: Reflections on the Twin Cities Experience

Tax Credits for Working Families: The New American Social Policy

Shopping the City: Real Estate Finance and Urban Retail Development

Banking the Poor (Working Paper)

The Earned Income Tax Credit as an Instrument of Housing Policy

Paying for Prosperity: Impact Fees and Job Growth

Civic Infrastructure and the Financing of Community Development

The State Role in Urban Land Development

City Fiscal Structures and Land Development

What the IT Revolution Means for Regional Economic Development

Is Home Rule the Answer? Clarifying the Influence of Dillon's Rule on Growth Management

TREND SURVEYS

2004

The "State" of Low-Wage Workers: How the EITC Benefits Urban and Rural Communities in the 50 States

Transition and Renewal: The Emergence of a Diverse Upstate Economy

2003

Sprawl Without Growth: The Upstate Paradox

Worker Advancement in the Low-Wage Labor Market: The Importance of 'Good Jobs'

Economic and Racial Segregation in Greater Miami's Elementary Schools: Trends Shaping Metropolitan Growth

Upstate New York's Population Plateau: The Third-Slowest Growing 'State'

At Home in the Nation's Capital: Immigrant Trends in Metropolitan Washington

Welfare, Working Families and Reauthorization: Mayor's Views

Beyond Edge City: Office Sprawl in South Florida

Boomers and Seniors in the Suburbs: Aging Patterns in Census 2000

Rewarding Work Through the Tax Code: The Power and Potential of the Earned Income Tax Credit in 27 Cities and Rural Areas

TRANSPORTATION REFORM SERIES

2004

The Need for Regional Anti-Congestion Policies

Highways and Transit: Leveling the Playing Field in Federal Transportation Policy

2003

Improving Metropolitan Decision Making in Transportation: Greater Funding and Devolution for Greater Accountability

The Mobility Needs of Older Americans: Implications for Transportation Reauthorization

The Long Journey to Work: A Federal Transportation Policy for Working Families

Improving Efficiency and Equity in Transportation Finance

Fueling Transportation Finance: A Primer on the Gas Tax

Slanted Pavement: How Ohio's Highway Spending Shortchanges Cities and Suburbs

TEA-21 Reauthorization: Getting Transportation Right for Metropolitan America

LIVING CITIES CENSUS SERIES

2004

Labor Supply Pressures and the "Brain Drain:" Signs from Census 2000

2003

Vacating the City: An Analysis of New Homes versus Household Growth

The Trajectory of Poor Neighborhoods in Southern California, 1970-2000

Living Cities Databook Series

Metropolitan Magnets for International and Domestic Migrants

Stunning Progress, Hidden Problems: The Dramatic Decline of Concentrated Poverty in the 1990s

FORTHCOMING

Locating Affordable Housing: Location and Neighborhood Trends of Low-Income Housing

What does Government Spend on Children?

* Copies of these and previous Brookings urban center publications are available on the web site, www.brookings.edu/urban, or by calling the center at (202) 797-6270.

ACKNOWLEDGMENTS

The Brookings Institution Center on Urban and Metropolitan Policy thanks the Fannie Mae Foundation, the George Gund Foundation, the Joyce Foundation, the John D. and Catherine T. MacArthur Foundation, and the Charles Stewart Mott Foundation for their support of its work on metropolitan trends. The center's Metropolitan Initiative aims to better understand the mix of market, demographic, and policy trends that contribute to the growth and development patterns challenging metropolitan areas nationwide and to identify (where possible) options for reform.

ABOUT THE AUTHORS

Mark Muro is a senior policy analyst at the Brookings Institution Center on Urban and Metropolitan Policy.

Robert Puentes is the senior research manager at the Brookings Institution Center on Urban and Metropolitan Policy.

The authors wish to thank Anthony Downs and Amy Liu at Brookings, Arthur C. Nelson at Virginia Polytechnic Institute, and Daphne Greenwood at the University of Colorado for their review and comments on earlier drafts of this paper. The authors also thank L. Benjamin Starrett and Maureen Lawless at the Funders' Network for Smart Growth and Livable Communities, and Don Chen of Smart Growth America, for their support of this project.

Comments on this paper can be sent directly to Mark Muro (mmuro@brookings.edu) or Robert Puentes (rpuentes@brookings.edu).

The views expressed in this discussion paper are those of the authors and are not necessarily those of the trustees, officers, or staff members of The Brookings Institution.

EXECUTIVE SUMMARY

With the collapse of the 1990s stock market bubble and several years of national economic uncertainty, a tense new climate of austerity has sharpened debates over government spending, economic development, and the physical growth of states and metropolitan areas.

Leaders in this environment are eager for fiscally prudent ways to simultaneously support their communities and stimulate their economies.

This paper makes the case that more compact development patterns and investing in projects to improve urban cores could save taxpayers money and improve overall regional economic performance. To that end, it relies on a review of the best academic empirical literature to weigh the extent to which a new way of thinking about growth and development can benefit governments, businesses, and regions during these fiscally stressed times.

Overall, the review finds that:

- **The cost of providing public infrastructure and delivering services can be reduced through thoughtful design and planning.** Several studies suggest that rational use of more compact development patterns from 2000 to 2025 promise the following sorts of savings for governments nationwide: 11.8 percent, or \$110 billion, from 25-year road-building costs; 6 percent, or \$12.6 billion, from 25-year water and sewer costs; and 3.7 percent, or \$4 billion, for annual operations and service delivery. School-construction savings are somewhat less.
- **Regional economic performance is enhanced when areas are developed with community benefits and the promotion of vital urban centers in mind.** Studies show that productivity and overall economic performance may be improved to the extent compact, mixed-use development fosters dense labor markets, vibrant urban centers, efficient transportation systems, and a high "quality-of-place." Productivity increases with county employment density. Communities that practice growth management realize improved personal income shares over time.
- **Suburbs also benefit from investment in healthy urban cores.** Finally, studies suggest that to the extent these smarter development patterns foster equity in regions by improving center-city incomes and vitality, they will also enhance the economic well-being of the suburbs as well as the city. City income growth has been shown to increase suburban income, house prices, and population. Reduced city poverty rates have also been associated with metropolitan income growth.

In the end, this paper makes the case that during times of tight budgets, more efficient and beneficial growth strategies make more sense than ever.

As these strategies become more widespread, the challenge for the research community will be to move beyond the obvious fiscal savings and continue to quantify the profound effects on economic competitiveness, equity, and quality of life available through better planning and community design. Ultimately, these issues lie at the crux of what better development is really all about.

TABLE OF CONTENTS

| | | |
|------|---|----|
| I. | INTRODUCTION | 1 |
| II. | DEFINING SMART GROWTH AND SMART DEVELOPMENT PATTERNS | 4 |
| III. | FISCAL, ECONOMIC, AND REGIONAL PROSPERITY BENEFITS: STATING THE CASE..... | 6 |
| IV. | SMART GROWTH'S BENEFITS: WHAT THE RESEARCH SAYS..... | 12 |
| V. | PULLING IT ALL TOGETHER: SMART GROWTH AS SMART MONEY | 24 |
| VI. | CONCLUSION | 27 |
| | REFERENCES | 28 |

**INVESTING IN A BETTER FUTURE:
A REVIEW OF THE FISCAL AND COMPETITIVE ADVANTAGES OF
SMARTER GROWTH DEVELOPMENT PATTERNS**

I. INTRODUCTION

Are bad times potentially good times for smart growth?

Do tight budgets and a spotty economy make this the right time—rather than the wrong time—to look at getting the most benefit for development efforts?

On the face of it, the argument that curbing sprawl and fostering more efficient compact development can help governments economize and businesses and regions prosper appears powerful.

Efficiency has always been a core promise of smart growth. For years, the move to more compact settlements has held out the possibility of saving taxpayers some of the cost of building infrastructure serving new development far from traditional population centers.

And yet, this dollarwise aspect of the movement to create developments of greater benefit to the community has received little attention in recent years—a period, by no coincidence, of unprecedented economic prosperity and budget surpluses.

Instead, during the good years, smarter growth was mostly pursued as a quality-of-life agenda aimed at enhancing the livability of suburbia.

Through the 1990s boom, the smart growth agenda was associated by turns with expensive state and local expenditures on farmland preservation, sizable open space projects, environmental protection, urban design initiatives, downtown revitalization, congestion relief, social equity discussions, and reducing school crowding. More recently an emphasis on human health and the reduction of obesity emerged. In short, while reformers continued to develop and advance fiscal and economic arguments for reducing population dispersal and revitalizing older neighborhoods, their greatest emphasis remained elsewhere.

But now this could be changing. With the collapse of the 1990s stock market bubble, the September 11th terrorist attacks, the onset of economic sluggishness, and serious state and local budget deficits, a tense new climate of austerity has sharpened debates over growth, government spending, and economic development—and changed the calculus for reform.

Most notably, the imperatives of controlling costs and jump-starting the economy have come to dominate the agendas of both governments and businesses, given that growth rates and tax collections may well remain depressed for several years or longer.

Businesses—struggling to restore pre-slump profit levels—are aggressively seeking creative ways to accelerate growth and promote efficiency. For their part, states and local governments—squeezed by record budget shortfalls—are looking desperately to curb wasteful spending. Suddenly, public officials are being forced to consider not just short-term budget cuts but policy reforms that will lead to long-term efficiencies. And no wonder: The states alone faced an aggregate \$100 billion in budget shortfalls this year and last, thanks to a “perfect storm” of woes that includes a slow economy that has slammed tax revenues, soaring Medicaid expenses, and huge new security costs associated with the threat of terrorism.¹ Only Arkansas, New Mexico, and Wyoming say they will face no budget problems in 2004.

In this environment, it is inevitable that opportunities to rethink how communities grow, and how they invest public dollars, would get another look. And they *are* getting it.

Notwithstanding their mostly rhetorical justifications for action, governors and advocates alike have begun to promote ideas such as the reuse of existing buildings, compact design to reduce infrastructure costs and traffic congestion, and limits on sprawl as a fiscal and economic tonic in hard times. “No longer should taxpayers be forced to bear the burden of new roads, schools, and sewers every time a McMansion is built or a mall is erected,” declared Gov. James E. McGreevey of New Jersey last year, in the most direct gubernatorial embrace ever of smart growth as a fiscal remedy. And a month later Maryland’s former Governor Parris Glendening, now president of the Smart Growth Leadership Institute, connected the moment and the message in a conference speech. “The infrastructure costs savings associated with smart growth are more imperative as officials are forced to make tough funding decisions,” asserted Glendening, who first popularized a fiscally oriented concept of growth in gaining passage of Maryland’s 1997 Smart Growth Areas Act. “Sprawl is fiscally irresponsible,” Glendening told a reporter.²

Other sitting governors have also made the connection. In South Carolina, Gov. Mark Sanford’s Quality of Life Task Force found that in order for the state to deal with its \$57 billion infrastructure deficit, state agencies and local governments will have to carefully plan and prioritize how infrastructure investments are made.³ In Michigan, Gov. Jennifer Granholm created a land use leadership council based in part on the premise that rapid metropolitan decentralization “is hampering the ability of this state and its local governments to finance public facilities and service improvements” and is “creating a strain on the efficient provision of public services.”⁴ Granholm

¹ Christopher Hoene and Michael A. Pagano, “Fiscal Crisis Trickles Down as States Cut Aid to Cities” (Washington: National League of Cities, 2003).

² Associated Press State and Local Wire, “Maryland’s Ex-Governor Says Sprawl is Fiscally Irresponsible,” February 26, 2003.

³ “Quality of Life Task Force Final Report,” Presented to Governor Mark Sanford, February 6, 2003. Available at www.state.sc.us/governor/reports.html

⁴ Jennifer Granholm, “Michigan Land Use Leadership Council / Michigan Department of Environmental Quality,” Executive Order No. 2003-4, February 27, 2003.

recently noted that encouraging more compact development patterns would help the state save money.⁵

All of which raises the question: Is it true? How much does unplanned growth cost and can governments really save money and jump-start economies by applying smarter ideas *before* approving the next development project? What are the facts of the case for looking at community growth needs and benefits as a budgetary and economic strategy?

This paper addresses those questions. Prompted by the growing interest in the fiscal benefits of compact development patterns (as well as the persistent obscurity of relevant information on the question), this report seeks to weigh the extent to which supporting smart growth development patterns can be considered a way to be smarter with money.

To do that, these pages survey the best academic empirical research literature probing the fiscal and economic implications of alternative land development patterns and conclude that, yes, thinking through growth and its impact on communities *can* save taxpayers money and deliver important benefits to business and regions.

The paper is organized as follows. First, a brief initial section defines smart growth development patterns for the purposes of this review. Next, it lays out the basic arguments for why compact, mixed-use development holds out important fiscal, economic, and community benefits. A third section then reviews the evidence on the three major clusters of probable fiscal/economic gains identified by the literature—savings of public infrastructure and service costs, gains in private-sector economic development, and suburban prosperity benefits from reducing core distress. Finally, the conclusion reiterates that, despite some caveats, supporting smarter growth development patterns amounts to smart policy for the smart money.

⁵ Keith Schneider, "Turfism is an Anachronism: Granholm Responds to Council Report, Sets Priorities to Strengthen Cities, Lasso Sprawl," Great Lakes Bulletin News Service, November 4, 2003. Available at www.mlui.org/growthmanagement/fullarticle.asp?fileid=16589.

II. DEFINING SMART GROWTH AND SMART DEVELOPMENT PATTERNS

Broadly defined, "smart growth" refers to a new way of thinking about how communities, cities and towns, and entire metropolitan regions grow and develop. This new thinking asserts that current patterns of growth and decline are harmful to communities, undermine urban economies and broader environmental objectives and exacerbate deep racial, ethnic and class divisions. Smart growth proponents argue that these growth patterns, popularly known as "sprawl," are not inevitable but result at least in part from major governmental policies that distort the market and facilitate the excessive decentralization of people and jobs.

Almost never does smart growth mean no growth; instead, it entails accommodating it in a way that maximizes its benefits and reduces as much as possible its frequent negative side effects. More specifically, smart growth refers to an overall set of broad goals and policies designed to counteract sprawl. These usually include: (1) limiting outward expansion, (2) encouraging higher density development, (3) encouraging mixed-use zoning as distinct from fully segregating land uses, (4) reducing travel by private vehicles, (5) revitalizing older areas, and (6) preserving open space. Promoting more affordable housing may or may not be an explicit goal of smart growth programs.⁶

In investigating whether smart growth saves money, the paper narrows the usual definition and makes at least one crucial assumption that some may find troublesome: It deems smart growth development patterns essentially a matter of two rather crude land-use characteristics—compactness and density.

This admittedly limited definition of smart growth is necessitated by the limited scope of the academic literature to date. So far, the economics-of-development literature has primarily focused on the fiscal implications of providing infrastructure and services under different physical patterns of development, whether spread-out or more densely clustered. Consequently, any assessment of the economic implications of smarter growth must begin with that work—and with a definition of "smart growth" that reduces the doctrine's many dimensions to its simplest impact on the physical form of development. Clearly, this proxy definition fails to capture the full social, environmental, and design dimensions of smart growth, and leaves aside the much broader panoply of goals (such as transportation choice and social equity) and tools (such as open space preservation) that constitute the smart growth paradigm.

Nevertheless, this narrower emphasis clearly captures two fundamental tenets of smart growth. And it has the critical benefit, in lieu of abundant research on smart growth *per se*, of focusing on the elements of smart growth—compactness and density—that have been evaluated most thoroughly in the academic literature.

⁶ See Anthony Downs, "What Does 'Smart Growth' Really Mean?" *Planning*, April 2001.

In this fashion, the sections that follow present the most important academic research and empirical findings on three key dollarwise contributions of smart growth development patterns. Specifically, they review research findings that contend that smart growth can:

- Reduce the public costs of providing new infrastructure and delivering new services
- Improve a region's economic performance
- Bring economic gains to suburbs as well as cities

To be sure, this typology hardly encompasses all the benefits of smart growth. For example, “softer”—although theoretically quantifiable—potential benefits of smart growth such as preserving open spaces or protecting farmland go unmentioned except to the extent that they produce budget savings for governments or amenity gains for families and businesses. Nor do potential transportation benefits receive much discussion, including savings on individual households' costs.

Instead, priority has been given here to quantifiable gains in a few widely studied areas where rough consensus exists in the research literature. “Much” if not “general” agreement exists on each of the major measurable benefits of smart growth identified in these three areas. That means that policymakers, advocates, and the general public can take the following review as a reliable, if not comprehensive, survey of the likely fiscal, economic, and community gains of more compact development patterns.

Which is not to say this review ignores the contention that sprawl-style suburbanization offers certain benefits. Dispersed, low-density living clearly remains a popular preference among American households. What is more, significant evidence suggests that such development patterns bring with them lower land and housing costs—a significant factor in a nation with serious housing affordability challenges.⁷ To that extent, the several “benefits” of sprawl may offset some of the fiscal and economic benefits of concentrating development.

And yet, that does not change the importance of the economic benefits outlined here.

⁷ It should be cautioned, however, that much of this literature fails to consider the role—and hidden costs—of public policy in facilitating such development. Transportation policies support the expansion of road capacity at the fringe of metropolitan areas and beyond, which enables people and businesses to locate miles from urban centers but still benefit from metropolitan life. Tax and regulatory policies have also given added impetus to people's tendencies to move further and further out. For example, the deductibility under the federal tax code of mortgage interest and property taxes appears spatially neutral but in practice favors suburban communities, because they have higher home-ownership rates and higher-income residents. Superfund and other environmental policies, for their part, have helped make the redevelopment of urban land prohibitively expensive and cumbersome, increasing the attraction of suburban greenfields. At the same time, costs such as increased infrastructure outlays, air pollution, or associated urban disinvestment frequently go uncalculated in discussions of the benefits of sprawl.

III. FISCAL, ECONOMIC, AND REGIONAL PROSPERITY BENEFITS: STATING THE CASE

The claim that smart growth holds out potential fiscal benefits to governments is at once intuitive and longstanding. The arguments for economic and regional prosperity benefits, meanwhile, are newer but not novel either.

Fundamentally geometric, both arguments turn on the recognition that it matters *where* and *how* development occurs in a region.

In this regard, 70 years have passed since planners recognized that different locations, patterns, and types of growth might have different fiscal and economic implications. And it has been 30 years since a series of systematic fiscal impact studies began showing, with specific dollar values, that more compact, less sprawling development patterns can reduce the capital and operations costs governments incur from new growth. Even the recent economic work that is beginning to tease out the potential economic and regional boons of smarter growth patterns reflects economic and fiscal theories that go back decades.

But now the confluence of a generation of sprawling development, a changing national economy, and the fiscal problems of localities calls for another look at the relationship between development patterns and fiscal and economic outcomes.

A. Fiscal Benefits

On the fiscal side, the logic is straightforward. For 50 years planners and engineers have hypothesized two related ways urban form can decrease public capital and service-delivery costs (Wheaton and Schussheim 1955, Kain 1967, Knaap and Nelson 1992, Carruthers and Ulfarsson 2003):

- *Economies of scale*—because the marginal cost of serving additional population decreases as more residents cluster within a smaller geographic area. Also referred to as "density efficiencies" (Greenwood 2003)
- *Economies of geographic scope*—because the marginal cost of serving each additional person decrease as each person locates more closely to existing major public facilities

Together these theories suggest that more compact and dense settlement can reduce government capital and operation costs.

For instance, in terms of capital spending, smarter, more compact growth should entail smaller outlays to extend roadways, sewers, water lines, and other infrastructure to reach each new consumer. This follows from the fact that reducing the distance between houses and businesses

can be expected to reduce the necessary length of streets, sidewalks, storm drain systems, and sewer and water lines.⁸

Similarly, by pursuing more compact development patterns, states and localities could reduce their per capita outlays on service delivery such as maintaining their roads and providing water, solid waste, transit, and school bus services. Again, the argument is geographical and geometric. Fire departments may be able to respond to more emergencies or get to major accidents faster with less personnel if development is more compact. Better bus service can be provided to more commuters with shorter routes and fewer vehicles in a more densely populated, more compact service area.

Nor are these potential efficiencies trivial. Spending on capital and services makes up fully one-quarter of annual state and local outlays, underscoring the importance of examining the savings smart growth seems to offer.

Over the year 1999–2000, states and localities spent:

- Nearly \$140 billion on capital outlays for such infrastructure (shaped by development patterns) as elementary and secondary schools, highways, sewer lines, solid waste management, and utility systems (e.g., water, electric, gas supply)⁹
- More than \$200 billion on recurring expenditures to provide such services (also influenced by development patterns) as highway maintenance, police and fire protection, trash collection, and utility service

Considering that these outlays represent almost 20 percent of the \$1.7 trillion states and localities spent during 1999–2000, realizing even modest percentage savings from smart growth could save taxpayers billions. And such savings grow only more attractive in light of economic stagnation, weakening federal support for states and cities, and the twin challenges many states face with shrinking revenue bases and increasing mandatory spending.

B. Economic Development Benefits

But this is only the fiscal side of smart growth. Largely overshadowed by these more pennywise considerations has been a more positive recognition of the larger economic benefits of reorienting scattershot development.

⁸ Of course, higher densities also impose greater loads on street and sewer lines, which may also impose costs.

⁹ These and other state and local government finance figures come from U.S. Census Bureau, “State and Local Government Finances by Level of Government and by State: 1999–2000.” Available at www.census.gov/govs/estimate/00s100us.html (March 2003)

To begin with, smart growth policies and practices in many circumstances create real estate value. That is, they may be expected to enhance property values, and so provide an important economic benefit to regions and localities.

In terms of residential land and housing process, numerous studies have illustrated that when the supply of housing is spatially contained (as in some smart growth and growth management regimes) housing prices in those areas increase (Katz and Rosen 1987, Fischel 1990, Glaeser and Gyourko 2002).¹⁰ Other such as Nelson (2000) contend that containment results in higher housing prices, not due to limits on the supply of housing, but rather from the creation of benefits such as heightened convenience, enhanced public transit, and lower service costs. Other studies, such as Segal and Srinivasan (1985) and Lillydahl and Singell (1987) suggest the potential for growth management policies to increase property values across the region. These effects suggest that smart growth may also have significant positive effects on land and house prices, either by limiting the supply of developable land or increasing the overall desirability of the community. In this fashion, some aspects of smart growth such as urban containment or land conservation may raise housing costs if they are not accompanied—as true smart growth ordains—by increases in housing density and supply. But they also may enhance regions' tax bases, create wealth through housing appreciation, and boost property tax collections. In that sense, smart growth may well create substantial value by enhancing the real estate market.

But there are other potential gains that merit even closer consideration. Most notably, a variety of new urban scholars has begun in recent years to suggest that important productivity gains accrue to economies that foster dense labor markets, vibrant centers, efficient transportation systems, and a high “quality-of-place”—all objectives of the smart growth movement.

These scholars start from the premise, foreshadowed over 100 years ago by Alfred Marshall, that density is a fundamental purpose of cities (Bogart).

They also assume—with economists like Robert Lucas, Paul Romer, and Edward Glaeser—that in the “knowledge economy” clusterings of talented people, or “human capital,” represent a prime driver of aggregate economic growth.

In this view, cities play a key role in spurring growth because they facilitate companies' access to suppliers, contractors, and the regional labor pool, and because they catalyze the sort of “agglomeration” efficiencies or “knowledge spillovers” that result from the sharing of information, ideas, technology, and opportunities.

¹⁰ It is important to note that housing prices are uncertain and depend greatly on the type of regulation imposed. It is also important to note that to reduce the negative impacts on housing affordability, regionally-based smart growth and growth management efforts typically have inclusionary elements specifically intended to broaden choices to more housing segments (Nelson and others 2002; Nelson and Duncan 1995).

So what kind of city works best in economic terms? Building on the theory that knowledge and efficiency matter most, the new urban thinkers come very close to endorsing key tenets of smart growth as strategies for competitiveness.

- Ciccone and Hall (1996) have shown that average labor productivity increases with the employment density of counties
- Cervero (2000) demonstrates that higher productivity levels can be found in cities that are compact—and served by efficiently integrated transportation systems
- And Nelson and Peterman (2000) have found a positive association between the presence of growth management and the improvement of a metropolitan area's market share as measured by personal income.¹¹

In a more qualitative vein, the economic development expert Richard Florida (2000) argues that attributes like compact “24-7” urban scenes, subway or light rail systems, and sustainable development spur growth because they appeal to the affinity for such qualities among highly educated, highly mobile “knowledge workers” who “vote with their feet.” His econometric and focus group evidence suggests that such workers seek out smart growth attributes and that providing them can enhance regions’ “ability to attract talent and develop high technology industries.”

To be sure, this second economic argument for smart growth remains less well established than the fiscal contention—and relates to the spatial tenets of smart growth per se less directly. Nevertheless, the growing case for the economic benefits of the sort of focused development favored by smart growth parallels that for fiscal savings, and offers a tantalizing complement to it.

Once again: How and where development occurs—those crucial preoccupations of smart growth—appear to matter. Once again: Reducing sprawl, promoting urban focus, and encouraging more compact development (along with providing good transportation links) may well enhance outcomes.

Smart growth, in short, appears to offer a promising tool for economic development as well as for fiscal management.

¹¹ "Growth management" is also a term that requires some definition. We define growth management as the deliberate and integrated use of the planning, regulatory, and fiscal authority of state and local governments to influence the pattern of growth and development in order to meet projected needs. Included in this definition are such tools as comprehensive planning, zoning, subdivision regulations, property taxes and development fees, infrastructure investments, and other policy instruments that significantly influence the development of land and the construction of housing. Growth management is often distinguished from growth control. Where growth management accommodates projected development in a manner that achieves broad public goals, growth controls limit or ration development. Typical growth control tools are moratoria, permitting caps, development quotas, and the like (Nelson and others, 2002).

C. Regional benefits

Finally, smart growth seems to offer another benefit: To the extent it fosters urban revitalization, it may well promote the economic well-being of the suburbs as well as the city.

In this connection, the growing literature on urban-suburban “interdependence” provides evidence that policies that promote reinvestment and prosperity in the urban core have the power to enhance not just the overall competitiveness of a region but the economic health of all of its parts. (Greenstein and Wiewel 2000).

Informing this claim is the fundamental intuition of the “interdependence” literature that the fates of cities and their suburbs are linked.

To be sure, the diverging paths of cities and suburbs since World War II has seemed for decades to dramatize the separateness of urban and suburban interests in the U.S. In region after region, after all, the fast growth of seemingly successful suburbs just miles from sagging core neighborhoods tended (especially to suburban interests) to confirm the suburbs’ independence. Suburban well-being had seemed to detach from that of the centers.

Yet for all that, the recognition that cities and suburbs have become adjacent sub-units of encompassing regional economies has increasingly made clear the relatedness of city and suburban fortunes (Pastor 2000).

Neal Peirce (1993), for example, has argued that all parts of a region are “in it together” when regions compete as “citistates” in the global economy to train and mobilize the workforce, lure business relocations, and assemble amenities. Henry Cisneros (1995) has emphasized the need for suburban interests to recognize that “political borders do not seal off the problem of concentrated poverty.” And Myron Orfield (1997) has shown that problems once confined to central cities, such as crime, unemployment, and tax-base erosion, tend eventually to undercut the stability of the suburbs.

At the same time, systematic cross-sectional studies have gone farther and increasingly suggested the interrelation of urban and suburban fortunes, and the likelihood of substantial spillover effects from one kind of community to another. Analyses by Richard Voith (1992), H.V. Savitch and colleagues (1993), and Larry Ledebur and William Barnes (1993), for example, have all associated central city decline and wide urban-suburban prosperity gaps with regional stagnation, as measured by slowed income growth. These assessments suggest that urban decay can undercut the attractiveness of the entire region by harming its ability to maintain the physical infrastructure, reducing the number of regionally valued amenities, weakening its agglomeration economies, and imposing other social costs manifested by high crime, poor health, and unproductive workers (Voith 1992).

Conversely, and even more on point, rigorous empirical calculations by Voith (1998) and Pastor (2000) have shown, respectively, that boosting central city income growth and reducing core

poverty each tend to improve overall metropolitan area income growth. This work demonstrates that to a measurable degree suburban welfare depends on central-city welfare.

Hence the claim about smart growth: To the extent smart growth places a high priority on reinvesting in older established neighborhoods and regional centers as opposed to facilitating decentralization, it will likely tend to improve the region's economic performance and benefit city-dwellers and suburbanites alike.

This, then, is the third and culminating contention about smart growth's virtue as a fiscal and economic strategy: By focusing greater attention on the center city smart growth will over time generate growing economic benefits across the entire region, including the suburbs. In short, smart growth benefits the suburbs as well as the city.

IV. SMART GROWTH'S BENEFITS: WHAT THE RESEARCH SAYS

So: Given these lines of arguments, what exactly does the research say? What are the impacts of smart growth on fiscal, economic, and regional health, specifically?

According to recent and established scholarship, smart growth appears to offer governments the possibility of quantifiable fiscal savings over time through the reduction of capital-facility and service-delivery costs. It also promises regional economic and productivity gains. Finally, it likely will enhance both urban and suburban income levels.

A. Smart Growth Reduces the Cost of Providing Infrastructure and Delivering Services

A number of conclusions about the fiscal benefits of smart growth can be drawn from the voluminous literature that investigates the costs of alternative development patterns. These benefits to state and local governments, while diverse, tend to be associated with the provision of infrastructure and, to a lesser extent, with the provision of services.

1. Savings on Capital Facility Costs

Serious work on the infrastructure costs of new growth goes back 30 years, and repeatedly concludes that more compact development patterns can save governments money.

Of principal interest here is a series of “cost of sprawl” studies published in the 1970s, 1980s, and 1990s that has exposed the specific fiscal implications of how and where development takes place in a region.

Prior to this work, the planners’ contention that compact development reduces infrastructure and service outlays remained largely that: a contention based on a quite frail empirical foundation (Frank 1989).

Only a handful of “fiscal impact” studies had examined the costs of public facilities associated with various development patterns before the 1970s. And still fewer considered costs or savings other than those generated within or immediately adjacent to a particular local development.

Over time, however, fiscal impact analysts widened their scope and began to endorse the superior cost-effectiveness to taxpayers of compact—as opposed to sprawling—development by providing harder and more useful numbers on region-scaled development alternatives.

The pioneer “costs of sprawl” study prepared by the Real Estate Research Corporation (1974) for the federal government estimated the public costs of a large range of densities (single family to high-rise) as well as those of differing large-scale community prototypes, ranging from “high density planned” development to “low density sprawl.” Frank (1989) soon gathered and critiqued all

of the early research and concluded that high-density development generated the lowest costs, while Duncan (1989) reached the same conclusion through case studies of actual communities in Florida.

And the reach of the research continued to widen. Through the 1990s Robert Burchell and his associates produced a series of large-scale “cost of sprawl” modelings for whole states and regions (Burchell and others 1998). More recently another Burchell-led team that included Anthony Downs of the Brookings Institution took the analysis to a national scale with “The Costs of Sprawl—2000” (Burchell and others 2002). These analyses calculate that “compact” (compared to “current”) growth patterns could reduce 25-year road-building outlays 12 to 26 percent. And the national tabulation put the infrastructure differential between sprawl and planned growth—meaning, the potential savings of smart growth—at over \$100 billion over 25 years, for a savings of about 11 percent.

Of these assessments and others, of course, it bears noting that care must be taken in wielding the conclusion that smarter growth can reduce public facilities costs.

Local conditions, rules, and practices condition everything about development costs, making it hard to generalize from one study to another. Likewise, fiscal impact studies remain heavily determined by their authors’ particular modeling and accounting techniques. This, unfortunately, enlarges the role of practitioners’ individual assumptions and methodologies (which are not always explicit or clear) in particular studies, and tends to make the studies incompatible. Not all of the studies, for example, consider the same costs or categorize them the same way. Nor do they assess precisely comparable changes in development pattern. And many conflate local subdivision savings from clustering or dwelling type with savings associated with more dispersed development patterns. As a result, the studies sometimes differ in their assessment of cost savings by orders of magnitude. All of which can make it hard to generalize findings and apply them.

Still, the fact remains that a near consensus now exists. As the congressional Office of Technology Assessment summarized: “Though there is a good deal of disagreement on the assumptions and calculations for such estimations, there is general agreement that decreased density leads to increasing public and private development costs” (Office of Technology Assessment 1995).

Here, then, are some of the key research findings pointing to the likely savings in infrastructure costs of smarter growth (all cost figures are those quoted at the time of original publication).

- **Real Estate Research Corporation (1974).** RERC broke new ground by reporting that three “planned” development patterns—consisting of higher densities, more diverse dwelling types, and more contiguousness—reduced the public infrastructure cost of accommodating 10,000 new units by as much as 47 percent. RERC’s basic study method was to compare detailed estimates of the costs associated with building five hypothetical new communities assembled out of mixes of six different neighborhood types, ranging from single-family

houses to high-rise apartments. This work-up revealed that providing the infrastructure to support high-density planned development cost about half as much, at \$5,167 in 1973 dollars, than the \$9,776 required to accommodate low-density sprawl. Shortened utility lines produced the largest savings (Table 1).

Two of the major criticisms of this study, meanwhile, somewhat cancel each other. While the analysis erred in not fully providing for the school costs associated with high-density growth, it also underestimated the costs of facilities by failing to address the need for new regional facilities external to the hypothetical communities (Frank 1989; Benfield, Raimi, and Chen 1999). Correcting the first error would have reduced the cost difference between high-density, planned growth and low-density sprawl. Addressing the second omission would likely have increased the difference.

Table 1. Infrastructure and Operating Costs of Five Community Prototypes (RERC 1974)

| Type of Impact | Community Prototypes (10,000 units) | | | | |
|-----------------------|---|-------------------|----------------------------|--------------------|-----------------------------|
| | <i>Low-Density Sprawl</i> | <i>Sprawl Mix</i> | <i>Low-Density Planned</i> | <i>Planned Mix</i> | <i>High-Density Planned</i> |
| INFRASTRUCTURE | Capital Costs per Unit | | | | |
| Recreation | \$268 | \$268 | \$297 | \$297 | \$297 |
| Schools | 4,538 | 4,538 | 4,538 | 4,538 | 4,538 |
| Public Facilities | 1,662 | 1,645 | 1,626 | 1,622 | 1,630 |
| Roads/Streets | 3,797 | 3,235 | 3,377 | 2,708 | 2,286 |
| Utilities | 6,197 | 3,868 | 4,744 | 3,323 | 2,243 |
| Infrastructure | 16,462 | 13,554 | 14,582 | 12,488 | 10,994 |
| Subtotal | | | | | |
| Construction/Other* | 34,994 | 23,728 | 34,398 | 23,266 | 17,711 |
| Total Units Costs | \$51,456 | \$37,282 | \$48,380 | \$35,754 | \$28,705 |
| Public Portion | 19% | 24% | 12% | 16% | 18% |
| Public Costs | \$9,776 | \$8,948 | \$5,805 | \$5,720 | \$5,167 |
| OPERATING | Annual Nonresidential Operating and Maintenance Costs per Unit (in Year 10) | | | | |
| Operating Costs | \$2,111 | \$1,965 | \$2,067 | \$1,937 | \$1,873 |
| Public Portion | 57% | 61% | 51% | 55% | 55% |
| Public Costs | \$1,203 | \$1,199 | \$1,054 | \$1,065 | \$1,030 |

* Includes construction cost of the unit and other expenses such as land dedication

- **Frank (1989).** Frank's contribution was to reanalyze all of the major research available prior to 1989 using updated cost numbers. Conducted for the Urban Land Institute, Frank's synthesis harmonized the various findings into an equivalent-dollar summary table comparing eight different development patterns, and allowing for consideration of a development's distance from existing facilities. What Frank found was stark. By his calculations, the per-dwelling-unit public cost of providing streets, sewers, water systems, storm drainage, and schools to new residents varied sharply from \$20,300 (1987 dollars) in the densest, most centralized configuration to \$92,000 for houses 10 miles from central facilities on 1 dwelling-unit (d.u.)-per-four-acres (ac.) "estate" zoning. Within this 80 percent variation were other telling comparisons. Most notably, Frank calculated that moving to closer-in compact growth at 12 d.u. with half the units multifamily could cut to \$24,000, or

halve, the \$48,000 per home capital costs of low-density (3 d.u./ac.) sprawling growth 10 miles from central services. Another note: Throughout Frank’s tabulations utility costs occupy a surprisingly large share of the per-unit costs. His work has the capital cost of streets varying from \$29,898 per unit on the fringe down to \$1,843 in core high-rise neighborhoods. By contrast, outlays for sewers, water lines, and storm systems vary from \$49,551 to \$5,789.

- Duncan and others (1989).** Duncan advanced the study of growth costs by widening the inquiry beyond density, and focusing on the broader “regional” costs of different scenarios. To probe these issues, Duncan’s team examined the total public facility expenses associated with eight actual (as opposed to hypothetical) developments in Florida. These case studies represented five different development patterns (compact, contiguous, satellite, linear, and scattered). The result: The public capital and operating costs for close-in, compact development were much lower than they were for fringe, scattered, linear, and satellite development. To be specific, the costs per dwelling unit ranged all the way from a low of \$9,252 for downtown Orlando (1989 dollars) to a high of \$23,960 to serve new homes in Wellington, a low-density fringe development. And the study went further. By deeming the “compact” and “contiguous” growth cases “planned” and the others “unplanned” the analysis estimated the savings that might accrue from smarter, planned growth. This estimate concluded that planned growth could save significantly on road costs (60-percent savings over unplanned growth) and on utilities (40-percent savings), but only modestly on schools (7.4-percent savings) (Table 2).

Table 2. Community and Regional Costs per Single Family Dwelling Unit Under Planned and Unplanned Development in Florida (Duncan and others 1989)

| Category of Capital Costs | Unplanned Development | Planned Development | Unplanned v. Planned Development | |
|---------------------------|-----------------------|---------------------|----------------------------------|--------------|
| Roads | \$7,014 | \$2,784 | \$4,230 | 60.3% |
| Schools | 6,079 | 5,625 | 454 | 7.4% |
| Utilities | 2,187 | 1,320 | 867 | 39.6% |
| Other | 661 | 672 | -11 | -1.7% |
| Total | \$15,941 | \$10,401 | \$5,540 | 34.7% |

Source: Office of Technology Assessment, *The Technological Reshaping of Metropolitan America*

- Burchell and others (1992, 1997a, b); Burchell, Dolphin, and Galley (2000).** Teams led by Robert Burchell of Rutgers University supplied additional evidence by applying a near-standard methodology to a series of modelings of statewide alternative growth scenarios throughout the 1990s. Starting in New Jersey, these comparisons of development-as-usual (“trend”) and more compact (“planned”) development attempted to quantify the 20-year road and water/sewer cost savings that would accompany other resource savings. In each case, Burchell’s calculations projected solid savings from modestly increased densities and shifting growth closer to population centers. For example, the modelings projected that shifting from sprawl to planned growth could reduce total road-building expenditures 12 percent in South Carolina, 12 percent in Michigan, and 26 percent in New Jersey. On water and sewer

infrastructure the savings ran from 8 percent in New Jersey to 13 percent in South Carolina to 14 percent in Michigan. A 2000 update of the 1992 New Jersey assessment, meanwhile, quantifies the potential savings in current dollars. Overall, Burchell’s team projected that New Jersey could shave \$2.32 billion, or 15 percent, off its total road and water/sewer infrastructure bill between 2000 and 2020 by adopting the state’s moderately rigorous draft development plan. He calculated that more than half (\$1.46 billion) of the savings would result from a 13 percent reduction in water/sewer expenditures due to more efficient clustering, more use of existing infrastructure, and more attached and multifamily housing. Local road savings came in at \$870 million—a 23 percent reduction (Table 3).

Table 3. Infrastructure Costs of Trend Versus Planned Development in New Jersey, 2000–2025 (Burchell, Dolphin, and Galley 2000)

| Type of Impact | Trend Development (in Millions) | Planned Development (in Millions) | Trend v. Planned Development | |
|------------------------------|---------------------------------|-----------------------------------|------------------------------|--------------|
| Roads | 3,720 | 2,860 | 870 | 23.4% |
| Water Laterals | 1,390 | 1,360 | 25 | 1.8% |
| Sewer Laterals | 2,260 | 2,090 | 171 | 7.6% |
| Full Sewer Costs | 7,540 | 6,280 | 1,260 | 16.7% |
| <i>Total Water and Sewer</i> | 11,190 | 9,730 | 1,460 | 13.0% |
| TOTAL | \$14.910 | \$12.590 | \$2.326 | 15.6% |

Of such findings, it should be noted that all depend—like most modelings—on massive assumptions about the future distribution of households and their consumption of resources. It should also be remembered that each study adopts a different, locally bound definition of “compact” development, making it hard to gauge the aggressiveness of land-use change needed to produce the noted savings. Still, the consistency of the sizable identified savings adds credence to the claim that smart growth can yield fiscal efficiencies.

- Burchell and others (2002).** Moving the argument to the national level, another Burchell-led team broadened the analysis even further with “The Costs of Sprawl—2000,” a 50-state projection. This time the modelers projected the potential 25-year savings of reducing “trend” sprawl in all non-urban areas by 25 percent and relocating the curbed growth to the already urbanized portions of developed counties. To achieve this, the researchers found that controlled growth could be accomplished with only a 20-percent increase in density and a 10-percent increase in floor area ratio (FAR) for non-residential uses. The result: The calculations identified national infrastructure savings on the order of the state ones. On the road front, Burchell’s simulations estimated that a saving of 188,300 lane miles of local roads and \$110 billion could be achieved by 2025 with more compact growth patterns. This represents a saving of 11.8 percent in state and local road costs. Water and sewer savings were smaller. Thanks to more compact growth patterns, the combined cost savings of lower tap-in fees and 4.6 million fewer lateral lines offers an infrastructure saving of \$12.6 billion, or 6.6 percent, over 25 years (Table 4). How much of the utility savings flow to local

governments and how much to property developers and occupants of new homes, however, remains unclear in Burchell's report.

Table 4. Infrastructure Costs of Uncontrolled Versus Controlled Growth Nationwide: 2000–2025 (Burchell and others 2002)

| | Uncontrolled | Controlled | Uncontrolled v. Controlled Development | |
|---------------------------|------------------|----------------|--|--------------|
| Local road infrastructure | 927,010 | 817,310 | 109,700 | 11.8% |
| Water / sewer | 189,767 | 177,160 | 12,607 | 6.6% |
| Total | 1,116,777 | 994,470 | 122,307 | 10.9% |

Abundant academic research confirms, then, that smart growth holds out significant potential savings to governments on one-time infrastructure outlays by comparison with the spending required by low-density sprawl. Repeatedly the research suggests that adopting smart growth could reduce some states' and localities' capital expenditures by 10 to 20 percent at least, and maybe more.

2. Savings on Service Delivery

Capital costs are one-time costs to be defrayed over the useful life of facilities. Usually they are associated with major infrastructure construction.

Equally significant, though, are a whole series of recurring additional costs to communities that can also be influenced by regional growth patterns.

These outlays range from the cost of operating and maintaining roads, sewers, and other infrastructure to the annual cost of providing basic services like police and fire protection, school buses, emergency medical coverage, trash collection, utilities, and transit. To varying degrees, these expenditures have also been shown to be ripe for economies of scale and geographical scope, although Ladd (1992) has raised the possibility that after declining at many densities such costs actually rise in very dense counties, perhaps due to the "harshness" of traffic congestion, crime rates, and other conditions.

Public works outlays, in any event, can be reduced in many compact communities because fewer lane-miles and shorter sewer and water pipes can be serviced and repaired less expensively. Likewise, compact cities require fewer police and fire stations per capita than more sprawling areas because more households live within the acceptable response time of established service providers.

In view of that, many of the analyses that report the infrastructure savings associated with smarter growth do the same for operating accounts and services.

Here are some of the findings:

- **Real Estate Research Corporation (1974).** RERC's early tally of the "costs of sprawl"—including those associated with infrastructure construction—also broke out the operating and maintenance costs generated by its five hypothetical new communities. Once again planning growth and mixing neighborhood elements reduced the public's costs—though by a lesser amount than they did for infrastructure costs. According to RERC, the year-10 public operating costs for 10,000 new units came to \$1,030 per unit for a high-density planned development compared to \$1,203 a unit for a sprawling, low-density community (1973 dollars). That represented a 14 percent saving for the most planned alternative (Table 1).
- **Burchell and others (1992, 1997a, b); Burchell, Dolphin, and Galley (2000).** Burchell's modelings of statewide growth scenarios also suggest that better planning can make government operations more efficient. In each case, Burchell's studies project modest fiscal benefits when they compare the public service costs and the revenues associated with planned as opposed to trend development. In New Jersey, Burchell's analysis concluded that the 1992 state plan's modestly increased densities and slightly more concentrated growth pattern offered an annual \$400 million, 2-percent, fiscal advantage to localities and school districts. This advantage reflected the ability under the state plan for localities to save \$112 million annually by drawing on usable excess operating capacity in already developed areas as well as efficiencies of delivery. For instance, reductions in lane-miles of local roads were assumed to reduce municipal maintenance and debt service costs. Similarly, school districts were projected to realize a \$286 million annual financial saving from more efficient use of existing facilities. Projections in other states located slightly larger but comparable fiscal savings on operations and service delivery. A nearly 4-percent cost-revenue gain was forecast in Michigan and a 5-percent savings in South Carolina. More recently the 2000 update of the 1992 New Jersey assessment projected a 4-percent, \$107-million annual operations-service saving by 2020. Set beside a 13-percent revenue gain from more planned growth, this service saving could help the state improve its net fiscal position by \$160 million in 2020, according to Burchell. "Steering growth toward urban areas causes the fiscal deficit associated with growth to shrink," the Burchell team concludes. But it also adds of New Jersey's overall trends that "by no means will the deficit be reduced enough to render the costs versus revenues of growth anything but negative."
- **Bollinger, Berger, and Thompson (2001).** This University of Kentucky analysis compared the relative costs of government in 10 Kentucky counties, and associated large differences in service costs with the counties' growth patterns. This assessment reveals that the per unit costs for police, fire, highway, schools, sewer, and solid waste services were consistently lowest in counties whose growth was more concentrated in established areas between 1987 and 1997, and highest in the counties with the most dispersed growth. Among counties containing center city of a major metropolitan area, households in compact Fayette County (which includes Lexington) actually save \$1.08 in service costs for every additional 1,000 new residents in their community while those in spread-out Jefferson County (home of Louisville) see their taxes go up by \$36.82 every time their sprawling county accomodates 1,000 new residents. Similarly, the arrival of 1,000 new residents in Shelby

County (a relatively focused suburb) costs each household \$88.27 while in dispersed Pendleton County it costs households \$1,222.39. And in small-town counties the results are the same: Warren County (with growth focused in Bowling Green) can accommodate 1,000 new residents at a cost of \$53.89 per household while in sprawling Pulaski County such growth costs each household \$239.93. The bottom line: More established places accommodate growth at lower costs than newer, more spread-out ones, with fire protection, schools, and police driving much of the result (Table 5).

Table 5. Dollar Costs of New Services per 1,000 New Residents for a Family of Four in Kentucky (Bollinger, Berger, and Thompson 2001)*

| Central City Counties | Development Pattern | Cost |
|----------------------------------|----------------------------|-------------|
| Fayette | (more concentrated) | (\$1.08) |
| Jefferson | (more spread out) | \$37.55 |
| Suburban Counties | | |
| Shelby | (more concentrated) | \$88.27 |
| Pendleton | (more spread out) | \$1,222.39 |
| Counties with small towns | | |
| Warren | (more concentrated) | \$53.89 |
| Pulaski | (more spread out) | \$239.93 |
| Outer ring and rural | | |
| Garrard | (more concentrated) | \$454.51 |
| McCracken | (more spread out) | \$618.90 |

*Services include police, fire, highway, schools, sewer, and solid waste

- Burchell and others (2002).** The massive national projection of “The Costs of Sprawl—2000” also quantifies public service savings and fiscal benefits from controlled growth, albeit ones smaller than it projects for infrastructure. Using per-capita service-cost estimates, this analysis estimates that localities could reduce their public-service costs by a collective \$4.2 billion a year, or 3.7 percent, after 25 years if the country were to embrace controlled growth nationwide. Comment the authors: “The decrease in costs is possible because, under controlled growth development, more development will take place in developed areas where public service costs may be more expensive, but public-service demand can be absorbed more readily due to the excess capacity found there.”
- Grow Smart Rhode Island (1999).** This innovative assessment, prepared by H.C. Planning Consultants, Inc., and Planimetrics, LLP, deserves special mention, because it supplements an unusually clear accounting of the infrastructure, service, and other savings of a “compact cores” scenario with a striking analysis of the fiscal benefits of avoiding urban decay—another goal of smart growth. On the infrastructure and service-cost side, the study’s accountings conform to expectations. Compact development could reduce Rhode Island’s 20-year infrastructure costs by \$243 million—or about 40 percent—concluded the study. And it could reduce the operating costs of that infrastructure by \$181 million over the 20 years—or 37 percent, with 80 percent of the savings coming from more efficient utility operation.

But now the study goes farther: Turning to the revenue side of the equation, the report details huge additional savings from compact growth. First, the analysis observes that compact growth could reduce suburban and rural towns' projected sprawl-related deficits by as much as an average \$10.6 million per year over the 20 years. That represents an additional saving of \$212 million. Then, looking to the cores, the analysis concludes that more compact development would help core cities even more by reversing urban decline. In this fashion, the report shows that smart growth in Rhode Island could increase core cities' property tax revenues by \$39 million annually, or \$782 million over 20 years. All told, these gains hold out the possibility of a 20-year, \$1-billion improvement in the state's fiscal position. Add on the savings in infrastructure and service costs savings and compact growth promises to save Rhode Islanders some \$1.4 billion over 20 years (Table 6).

Table 6. Summary of Costs of Sprawl in Rhode Island (Grow Smart Rhode Island 1999)*

| Cost Items | Net Cost of Sprawl per Year (\$ million) | 20-Year Net Cost of Sprawl (\$ million) |
|--|--|---|
| Capital Cost of Infrastructure | | |
| Local Roads | 3.9 | 78 |
| Schools | 1.6 | 32 |
| Utilities | 6.7 | 133 |
| Subtotal | \$12.2 | \$243 |
| Operating Cost of Infrastructure | | |
| Local Roads | 0.7 | 14 |
| School Facility Management | 0.9 | 19 |
| School Transportation | 0.3 | 6 |
| Utilities | 7.1 | 142 |
| Subtotal | \$9.1 | \$181 |
| Total Expenditures | \$21.2 | \$424 |
| Value of Agricultural Products Lost Due to Disappearing Farmlands | \$0.7 | \$14 |
| Decaying Urban Centers: Tax Revenue Loss Due to Depreciated Properties | \$39.1 | \$782 |
| Tax Revenue Loss Due to Sprawl in Non-Urban Areas | \$10.6 | \$212 |
| Total Revenue Loss | \$50.4 | \$1,008 |
| Total Costs | \$71.6 | \$1,432 |

*Includes the capital and operating costs of infrastructure of adding 25,000 housing units over 20 years in 1998 dollars. A minor part of these costs may be considered as private costs. For example, part of local roads may be constructed by private developers.

** Potential tax revenue losses from urban and non-urban areas.

- **Speir and Stevenson (2002).** Finally, Speir and Stevenson recently found that "lot size (or density) is the spatial attribute that has the most impact on water and sewer costs." They demonstrated that dispersed large lots at low densities result in significantly higher public service costs than smaller lots closer together.

Once again, a series of detailed analyses confirms that smart growth can reduce states' and localities' per-unit costs—in this case for operations, maintenance, and service delivery. The consensus is clear: All things being equal, governments can save taxpayers money by channeling development into established areas where services can be provided more cheaply.

B. Smart Growth Improves Economic Performance

But these are savings primarily for governments. It also appears that smart growth may well improve regional economic performance.

Granted, comparatively little empirical work has addressed this possible connection. Nevertheless, urban economists have long theorized that urban form influences economic outcomes. And now, researchers have actually begun to demonstrate that such key smart-growth goals as compactness, density, well-integrated land-use and transportation, growth management systems, and rejuvenated urban centers may each be associated with enhanced economic growth.

In each case, smart growth goals like compactness, density, and "quality of life" enhancement seem to support—or at least be associated with—modestly strengthened economic performance. Presumably, this is because such urban qualities improve productivity by enhancing businesses' access to quality workers.

Here are a few of the most suggestive findings of this type:

- **Ciccone and Hall (1996).** Ciccone and Hall have quantified the economic benefit of density, which reduces transportation costs, puts more workers and companies in close contact, and promotes beneficial exchange among workers and organizations. Using county-level data on employment density and state-level data on productivity, they used statistical modeling to estimate that doubling employment density increases average productivity by around 6 percent. More tangibly, they found that workers in the 10 densest states produced \$38,782 of value annually while those in the 10 least dense states produced only \$31,578 in output—about 25 percent less. Overall, Ciccone and Hall attributed more than half of the variance of output per worker across states to differences in the density of economic activity, rather than other factors like the size of the cities or public investment levels there.
- **Cervero (2000).** Cervero confirmed these findings and extended them, demonstrating that compact, "accessible" cities with efficient transportation links were more productive than more dispersed places. His analysis consisted of two separate modelings using data from the 1990s—one at the "macro" level, based on cross-comparisons among 47 U.S.

metropolitan areas, and the other at a more “micro” scale, involving comparisons among sub-regions of the San Francisco Bay Area. In each case, the economic benefits of compactness and concentration outweighed such negative impacts as freeway congestion. Focused, accessible cities in which firms lie close to labor markets and the transportation infrastructure works swiftly enjoy greater economic output per worker.

- **Nelson and Peterman (2000).** Nelson and Peterman add another element: They conclude that metropolitan areas that practice growth management actually can improve their economic performance relative to other regions. To do that, their regression analysis of 182 mid-sized metro areas in the 1970s and 1980s assessed changes in the relative share of total personal income garnered by 26 metros that were deemed to utilize some form of growth management, whether urban growth boundaries, urban service limits, or regionalized planning. What they found was a positive association between growth management and improved economic performance. Those communities that engaged in growth management realized about a 1-percent improvement in their market share (as measured by personal income) between 1972 and 1992, relative to other metros, all other things being equal. Apparently restraining sprawl can yield sufficient taxpayer savings, efficiency gains, and quality-of-life benefits to boost economic development.
- **Carlino (2001).** Finally, Carlino links denser local economies to increased patenting activity—a key measure of idea generation and economic vitality. Employing multiple regression analysis, his exploration of 1990s data from 270 metropolitan areas reveals that patenting was significantly greater during the decade in regions with higher employment density. For example, the number of patents per capita rose, on average, 20 to 30 percent in a metro for every doubling of density. Given that local employment density varied by 2000 percent in this sample, Carlino’s results imply that denser places are enjoying significant innovation edges over less-dense competitors.

In sum, significant empirical evidence is beginning to point toward a tantalizing association of economic productivity and compact, centered, and efficient regions. To that extent, a new more positive vision of smart growth as an economic boon should increasingly complement the older claim of fiscal benefits.

C. Smart Growth Benefits Suburbs as Well as Cities

On the link to suburban economic benefits, numerous studies suggest the tie but only a few recent ones do so with unimpeachable rigor.

At least 10 of the 13 city-suburb statistical analyses reviewed by Gottlieb (1998) going back to the 1960s show a link between central city and suburban economic performance, central city and metropolitan economic performance, or greater spatial equality and metropolitan economic performance.

However, as Gottlieb points out many of the studies utilize fairly rudimentary statistical tools, turn on raw correlations of city and suburban health, and fail to prove that suburban prosperity *depends* on city vitality. That is, they prove that city and suburban health tend to move together, but they don't necessarily prove causation. For example, relatively few of these investigations go so far as to ensure that some "exogenous" (outside) variable, such as the emergence of a fast-growing industry in the region, did not trigger growth in both the city and suburbs (Pastor 2000).

More recently, though, a series of more sophisticated econometric investigations have responded to such methodological concerns and provided more rigorous evidence that improving conditions in a regional core can improve performance across the region and in the suburbs. These exercises—most notably by Richard Voith and Manuel Pastor Jr.—indicate that the reinvestment end of smart growth may well help all residents of a region.

- **Voith (1998).** Controlling for the weaknesses of simple correlational analysis, Voith has shown that income gains in central cities—often resulting from efforts to invest in families and other assets in urban centers—also benefit the entire regional economy. His modeling considered patterns of growth in income, house prices, and population in cities and suburbs between 1970 and 1990 for virtually all metro areas, and found that city income growth positively affected suburban growth in all three indices—at least in larger cities. More specifically, Voith calculated that in the Philadelphia region a 1-percent increase in the 10-year city income rate would result in an additional \$1.2 billion in cumulative suburban income and \$900 million in aggregate house appreciation, for a total benefit of \$2.1 billion (or 2.8 percent) in the suburbs (1982–4 constant dollars). In short, shoring up older urban centers—as smart growth attempts to do—can build wealth for entire metropolitan areas, city and suburbs alike.
- **Pastor and others (2000).** Similarly rigorous regression work by Pastor's group demonstrates that in 74 major metropolitan areas reductions in central city poverty rates led to metropolitan income growth. To paraphrase Pastor, targeted efforts to alleviate central city poverty eventually seem to "trickle up" to improve incomes across the whole region.
- **Haughwout and Inman (2002).** Haughwout and Inman presented strong evidence that the finances of the central city and the welfare of its suburbs are closely related. And they recommend suburban aid in funding anti-poverty programs in the city.

So another line of evidence can be evaluated: To the extent smart growth qualifies as an anti-poverty program with its strong emphasis on urban-core reinvestment and sustaining mixed-income neighborhoods, it appears likely to benefit suburban people too by improving the region's overall economic performance. Again, smart growth appears good for growth, according to significant empirical research. So if suburban interests ask, "What's in it for me?" the answer seems increasingly clear: Boosting the core helps boost whole regions.

V. PULLING IT ALL TOGETHER: SMART GROWTH AS SMART MONEY

The case can be made, then: A portfolio of provocative evidence suggests quite strongly that smart growth has the potential to reduce governments' capital facility costs, reduce their costs of delivering services, and improve regional economic performance as well.

Using the Burchell group's national projections, which reflect a single methodology and a national scope, it appears on the fiscal side that:

- Capital facilities projects offer the largest promise for reducing the fiscal demands of development using smart growth. By the Burchell group's calculations, shifting to a modestly more compact development pattern could yield percentage savings in the low double digits (around 11 percent) from 25-year capital outlay estimates for roads and water/sewer lines. Road building savings are key. Nationally, road building promises almost 10 times the 25-year dollar savings (\$110 billion versus \$12.6 billion) and twice the percentage savings (11.8 percent versus 6.6 percent) of water and sewer link construction.
- Operations/maintenance and service delivery spending, meanwhile, hold the potential for more moderate savings of perhaps \$4 billion a year, or 3.7 percent, according to the same assessments. Over 25 years, however, these operational savings could begin to approach those to be wrung from local infrastructure costs.

Of these savings it can be said that they are solid, but not spectacular; long-term rather than immediate. That the American economy represents an \$11-trillion enterprise (rising to \$20 trillion in 2025) may help to put these meaningful but not massive savings in perspective.

At the same time, econometric work suggests potentially more potent benefits of smart growth may accrue on the wider economic front:

- Productivity and overall economic performance may be improved to the extent smart growth elevates regions' employment density and improves transportation efficiency
- Likewise, regional and suburban prosperity may be increased to the extent smart growth improves the fortunes of the center city by channeling new development into urban cores

These productivity, prosperity, and equity benefits of smart growth will become especially tantalizing as states and regions seek to enhance their competitiveness as the economy picks up.

Suggestions for Future Research

Of course, much more work needs to be done to strengthen the fiscal and economic case for smart growth.

On the fiscal side, while numerous studies suggest the benefits of more compact growth, the evidence remains hard to interpret, and harder to translate.

The primary reason is that modeling dominates the literature and remains heavily determined by the parameters and definitions of the particular study. Case studies bring the models down to earth but remain strongly affected by factors specific to particular localities. Meanwhile, the absence of standardized measures of expenditure, service levels, sprawl, and “smart growth” make it hard to draw universal conclusions beyond the general conclusion that low-density-development is more expensive to support. Generalizations are therefore difficult to make.

For this reason, a crying need remains for a widely publicized, systematic, and authoritative synthesis and comparison of the best studies conducted in different states and regions. Similarly, it must be said that the prominence of modeling brings with it an air of the theoretical. In this connection, Bunnell (1997) has rightly observed that for fiscal impact research to become more meaningful and educationally useful, “greater emphasis needs to be placed on empirical studies that examine actual patterns of development, in actual geographic and fiscal contexts.”

Such “reality-based” research—especially comparing differently planned neighboring communities operating under similar fiscal, tax, and service structures—would “tell the story” in a more tangible way. Especially useful for those concerned with smart growth would be detailed fiscal studies comparing paragon smart growth communities with nearby traditional ones operating within similar tax, regulatory, and service structures. Clearly a shortcoming of this essay has been its reliance on studies assessing such proxy characteristics as density or compactness in lieu of the full panoply of “smart growth” characteristics, ranging from centeredness and walkability to mixed uses and transportation choice.

Similarly, the state of knowledge on aggregate economic impacts remains suggestive, but far from decisive. Complex statistical and mathematical analysis comes into play even more in this field, making its conclusions less satisfying. Some “findings” feel more like mathematical exercises than real-world empirical discoveries. And many studies—while intriguing—lack rigor.

Cases in point are some of the studies asserting an association between smart growth-type urban interventions and enhanced economic growth on the basis of simple correlations. As Pastor and Gottlieb caution, simple correlations cannot confirm the order of events. Already noted was the possible intrusion on such correlations of outside effects like a region-wide economic boom that lifted multiple cities *and* their suburbs. So too might a booming *suburban* economy drag a sagging center out of the doldrums and improve prosperity across the region, even though it might appear that core enhancement boosted the suburbs. Clearly the possibility of a relationship between urban form and character and overall economic performance must remain a major area of concerted investigation.

Moreover, the fiscal and economic benefit of numerous other aspects of alternative growth patterns remains unquantified. Suffice it to say that much more work needs to be done to evaluate the real fiscal and economic value of redevelopment and reinvestment; transit investment as

compared to highway construction; mixed-use versus single-use development; conservation; and historic preservation.

VI. CONCLUSION

And yet, the dollarwise benefits of smart growth can clearly be affirmed.

With governments, regions, and states under increased pressure to reduce costs and reenergize slumping economies, abundant evidence confirms that embracing smart growth can help on both scores.

Best known are the fiscal benefits. By concentrating households nearer existing infrastructure and service networks, the adoption of smart growth by municipalities and regions can reduce the costs of providing new roads, new water lines, and fire protection to a given number of new residents. Communities should in this fashion recognize that sprawl contributes to budgetary distress and that better managing development patterns can play a role in controlling rising costs and framing long-term solutions.

At the same time, though, newer research points beyond these likely incremental cost savings to a more speculative, more exciting, benefit. Smart growth, it seems, may also hold some power to enhance the performance of whole economies, as well as incomes across whole regions, including in the suburbs.

In this fashion, advocates of smart growth have before them a powerful insight that well complements their longstanding fiscal claims with a more alluring vision of enhanced prosperity.

More and more, it looks they can answer the business elite's question, "What's in it for me?" with a confident "Plenty!"

REFERENCES

- American Farmland Trust. 1986. *Density Related Public Costs*. Northhampton, MA. As discussed in Freedgood 2003.
- American Farmland Trust. 1992. *Does Farmland Pay? The Cost of Community Services in Three Massachusetts Towns*. Lancaster, MA. Massachusetts Department of Food and Agriculture. As discussed in Freedgood, 2003.
- American Planning Association. 2002. *Growing Smart Legislative Guidebook: Model Statutes for Planning and the Management of Change*. Chicago. Available at www.planning.org/guidebook/Guidebook.htm
- Benfield, F. Kaid, Matthew D. Raimi, and Donald D.T. Chen. 1999. *Once There Were Greenfields: How Urban Sprawl Is Undermining America's Environment, Economy, and Social Fabric*. Washington: Natural Resources Defense Council and Surface Transportation Policy Project.
- Binkley, Christina, Jon E. Hilsenrath, and Charles Forelle. 2003. "States Confronting Budget Deficits Make Long-Shot Bets on Gambling," *The Wall Street Journal*, March 14. p. A1.
- Bogart, William T. 1998. *Economics of Cities and Suburbs*. Upper Saddle River, NJ: Prentice Hall.
- Bollinger, Christopher R., Mark Berger, and Eric Thompson. 2001. "Smart Growth and the Costs of Sprawl in Kentucky: Phase I & II." University of Kentucky Center for Business and Economic Research.
- Bunnell, Gene. 1997. "Fiscal Impacts Studies as Advocacy and Story Telling." *Journal of Planning Literature* 12 (2): 136–152.
- Burchell, Robert. 1992. *Impact Assessment of the New Jersey Interim State Development and Redevelopment Plan—Executive Summary*. Trenton: New Jersey Office of State Planning. Available at www.nj.gov/dca/osg/docs/iaexecsumm022892.pdf
- Burchell, Robert. 1997a. *Fiscal Impacts of Alternative Land Development Patterns in Michigan: The Costs of Current Development Versus Compact Growth*. As discussed in Burchell and others 1998.
- Burchell, Robert. 1997b. *South Carolina Infrastructure Study: Projection of Statewide Infrastructure Costs 1995–2015*. As discussed in Burchell and others 1998.

- Burchell, Robert, and David Listokin. 1996. "Land, Infrastructure, Housing Costs, and Fiscal Impacts Associated with Growth." Paper prepared for the conference *Rail-Volution '96: Building Successful Communities with Rail*. Washington: September 8, 1996. As cited in Benfield, Raimi, and Chen 1999.
- Burchell, Robert, David Listokin, and Catherine Galley. 2000. "Smart Growth: More Than a Ghost of Urban Policy Past, Less Than A Bold New Horizon." *Housing Policy Debate* 11 (4): 821–879.
- Burchell, Robert, William R. Dolphin, and Catherine Galley. 2000. *The Costs and Benefits of Alternative Growth Patterns: The Impact Assessment of the New Jersey State Plan*. Trenton: New Jersey Office of State Planning. Available at <http://www.nj.gov/dca/osg/plan/impact.html>
- Burchell, Robert, and others. 1998. *The Costs of Sprawl—Revisited*. Washington: National Academy Press.
- Burchell, Robert, and others. 2002. *Costs of Sprawl—2000*. Washington: National Academy Press.
- Carlino, Gerald. 2001. "Knowledge Spillovers: Cities' Role in the New Economy." *Business Review* Q4: 17–24. Available at www.phil.frb.org/files/br/brq401gc.pdf
- Carruthers, John and Gudmundur F. Ulfarsson. 2003. "Urban Sprawl and the Cost of Public Services." *Environment and Planning B: Planning and Design* 20 (4): 503–522.
- Cervero, Robert. 2000. "Efficient Urbanization: Economic Performance and the Shape of the Metropolis." Working Paper. Lincoln Institute of Land Policy.
- Ciccone, Antonio, and Robert E. Hall. 1996. "Productivity and the Density of Economic Activity." *American Economic Review* 86 (1): 54–70.
- Cisneros, Henry. 1995. *Regionalism: The New Geography of Opportunity*. Washington: U.S. Department of Housing and Urban Development.
- Downs, Anthony. 2002. "Have Housing Prices Risen Faster in Portland than Elsewhere?" Fannie Mae Foundation. *Housing Policy Debate* 13 (1): 7–31. Available at www.fanniemaefoundation.org/programs/hpd/v13i1-downs.shtml
- Duncan, James, and others. 1989. *The Search for Efficient Urban Growth Patterns: A Study of the Fiscal Impacts of Development in Florida*. As discussed in Office of Technology Assessment. 1995.

- Eppli, Mark J., and Charles C. Tu. 1999. *Valuing the New Urbanism: The Impact of the New Urbanism on Prices of Single-Family Homes*. Washington: Urban Land Institute.
- Fausold, Charles, and Robert Lilieholm. 1999. "The Economic Value of Open Space: A Review and Synthesis." *Environmental Management* 23 (3): 307–320.
- Fischel, William. 1990. "Do Growth Controls Matter? A Review of Empirical Evidence on the Effectiveness and Efficiency of Local Land Use Regulation." Working Paper. Cambridge: Lincoln Institute of Land Policy.
- Florida, Richard. 2000. "Competing in the Age of Talent: Quality of Place and the New Economy." Pittsburgh: R.K. Mellon Foundation, Heinz Endowments, and Sustainable Pittsburgh.
- Frank, James E. 1989. *The Costs of Alternative Development Patterns: A Review of the Literature*. Washington: Urban Land Institute.
- Freedgood, Julia. 2002. "Cost of Community Services Studies: Making the Case for Conservation." Washington: American Farmland Trust.
- Glaeser, Edward L.. 2000. "The New Economics of Urban and Regional Growth." In Gordon L. Clark, Maryann P. Feldman, and Meric S. Gertler, eds., *The Oxford Handbook of Economic Geography*. New York: Oxford University Press.
- Glaeser, Edward L.. and Joseph Gyourko. 2002. "The Impact of Zoning on Housing Affordability." Cambridge: Harvard Institute of Economic Research Discussion Paper Number 1948
- Greenstein, Rosalind and Wim Wiewel, eds. 2001. *Urban-Suburban Interdependencies*. Cambridge: Lincoln Institute of Land Policy.
- Gottlieb, Paul D. 1998. "The Effects of Poverty on Metropolitan Area Economic Performance: A Policy-Oriented Research Review." In Rosalind Greenstein and Wim Wiewel, eds., *Urban Suburban Interdependencies*. Cambridge: Lincoln Institute of Land Policy.
- Greenwood, Daphne. 2003. "Does Growth 'Pay for Itself' Through Increased Revenues or Decreased Costs per Person?" Center for Colorado Policy Studies, University of Colorado at Colorado Springs.
- Grow Smart Rhode Island. 1999. "The Costs of Suburban Sprawl and Urban Decay in Rhode Island" (Executive Summary). Providence: The Rhode Island Foundation. Available at www.growsmartri.com/pdfs/costs_of_sprawl.pdf

- Haughwout F. Andrew and Robert P. Inman. 2002. "Should Suburbs Help Their Central City?" In William G. Gale and Janet Rothenberg Pack, eds., *Brookings-Wharton Papers on Urban Affairs 2002*. Washington: Brookings Press.
- Kain, John F. 1967. "Urban Form and the Costs of Urban Services." Cambridge.: Massachusetts Institute of Technology / Harvard Joint Center for Urban Studies.
- Katz, Lawrence and Kenneth T. Rosen. 1987. "The Interjurisdictional Effects of Growth Controls on Housing Prices." *Journal of Law and Economics* 30:146–160.
- Knaap, Gerrit, and Arthur C. Nelson. 1992. *The Regulated Landscape: Lessons on State Land Use Planning from Oregon*. Cambridge: Lincoln Institute of Land Policy.
- Ladd, Helen. 1992. "Population Growth, Density, and the Costs of Providing Public Services." *Urban Studies* 29: 273–295.
- Ladd, Helen. 1994. "Fiscal Impacts of Local Population Growth: A Conceptual and Empirical Analysis." *Regional Science and Urban Economics* 24: 661–686.
- Ledebur, Larry, and William R. Barnes. 1993. *All In It Together: Cities, Suburbs, and Local Economic Regions*. Washington: National League of Cities.
- Lillydahl, Jane H. and Larry D. Singell. 1987. "The Effects of Growth Management on the Housing Market: A Review of the Theoretical and Empirical Evidence." *Journal of Urban Affairs* 9 (1): 63–77.
- Maryland Office of Planning. 2003. "Smart Growth Background." Available at www.mdp.state.md.us/smartintro.htm
- McGee, M. Kevin. 2002. "County Spending and the Implicit Subsidy to Urban Sprawl." Presented at the MidContinent Regional Science Association Annual Meeting: Kansas City.
- Muro, Mark, Jun Onaka, and Rob Melnick. 2002. "The Economics of Large-Scale Conservation: A Framework for Assessment in Pima County." Tempe: Morrison Institute for Public Policy, Arizona State University.
- Nelson, Arthur C., and David Peterman. 2000a. "Does Growth Management Matter: The Effect of Growth Management on Economic Performance." *Journal of Planning Education and Research* 19: 277–285.
- Nelson, Arthur C. 1986. "Using Land Markets to Evaluate Urban Containment Programs." *Journal of the American Planning Association* 52 (22): 156–71.

- Nelson, Arthur C. 2001. "How Do You Know Smart Growth When You See It?" In Terry Szold and Armando Carbonell, eds., *Smart Growth: Form and Consequences*. Cambridge: MIT Press and Lincoln Institute of Land Policy.
- Nelson, Arthur C. 2000. "Effects of Urban Containment on Housing Prices and Landowner Behavior." Cambridge: Lincoln Institute of Land Policy.
- Nelson, Arthur C. and others. 2002. "The Link Between Growth Management and Housing Affordability: The Academic Evidence." Washington: Brookings Institution. Available at www.brook.edu/es/urban/publications/growthmanagexsum.htm
- Office of Policy, Planning, and Evaluation; U.S. Environmental Protection Agency. 1998. "Smart Investments for City and County Managers: Energy, Environment, and Community Development." Publication No. EPA-231-R-98-004. Washington.
- Office of Technology Assessment, Congress of the United States. 1995. *The Technological Reshaping of Metropolitan America*. Publication No. OTA-ETI-643. Washington: U.S. Government Printing Office. Available at www.wws.princeton.edu/~ota/ns20/year_f.html
- Orfield, Myron. 1997. *Metropolitics: A Regional Agenda for Community and Sustainability*. Washington: Brookings Institution Press.
- Pastor Jr., Manuel, and others. 2000. *Regions that Work: How Cities and Suburbs Can Grow Together*. Minneapolis: University of Minnesota Press.
- Peirce, Neal R., Curtis Johnson, and John Stuart Hall. *Citistates: How Urban America Can Prosper in a Competitive World*. Washington, DC: Seven Locks Press. 1993.
- Real Estate Research Corporation (RERC). 1974. *The Costs of Sprawl: Environmental and Economic Costs of Alternative Residential Development Patterns at the Urban Fringe.*" As discussed in Burchell and others. 1998.
- Savitch, H.V. and others. 1993. "Ties That Bind: Central Cities, Suburbs, and the New Metropolitan Region." *Economic Development Quarterly* 7 (4): 341–357.
- Segal, David and Philip Srinivasan. 1985. "The Impact of Suburban Growth Restrictions on U.S. Residential Land Value." *Urban Geography* 6 (1):14–26.
- Siegel, Michael. 1998. "Another Cost of Sprawl: The Effects of Land Use on Wastewater Utility Costs." Washington: Natural Resources Defense Council.
- Skaburskis, Andrejs. 2000. "Housing Prices and Housing Density: Do Higher Prices Make Cities More Compact?" *Canadian Journal of Regional Science* (Autumn): 455–488.

- Smart Growth Network. 2002. "About Smart Growth." Available at www.smartgrowth.org/about/principles/principles.asp?prin=2
- Speir, Cameron and Kurt Stevenson. 2002. "Does Sprawl Cost us All? Isolating the Effects of Housing Patterns on Public Water and Sewer Costs." *Journal of the American Planning Association* 1 (68): 56–70.
- Titman, Sheridan. 1985. "Urban Land Prices Under Uncertainty." *American Economic Review* Vol. 75 (3): 505–514.
- Tu, Charles C., and Mark J. Eppli. 1999. "Valuing New Urbanism: The Case of Kentlands." *Real Estate Economics* 27 (3): 425–451.
- Voith, Richard. 1992. "City and Suburban Growth: Substitutes of Complements?" *Business Review* (September-October): 21–33.
- Voith, Richard. 1996. "The Suburban Housing Market: The Effects of City and Suburban Job Growth." *Business Review* (November-December): 1–13.
- Voith, Richard. 1998. "Do Suburbs Need Cities?" *Journal of Regional Science* 28 (3): 445–464.
- Wheaton, William L., and Morton J. Schussheim. *The Cost of Municipal Services in Residential Areas*. Washington, DC: U.S. Department of Commerce. 1955.