

# Urban Sprawl, Urban Promise

**A Case Study of Memphis, Tennessee**

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## Preface

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As the vice president in charge of Community Affairs for the Federal Reserve Bank of St. Louis, Randall Sumner suggested urban sprawl and its effect on a region's economy as the subject for a research project resulting in this paper. I had studied the problems of urban economic growth in the Memphis area for years, but I had not devoted time looking at the general efficiency or inefficiency of the geographic region. Like many people, I had a concern about the tendency of modern cities to explode in size, creating new neighborhoods and new bedroom cities like mushrooms in the night.

As I began my reading about urban sprawl, I found that most of the writers addressed either (1) the community architecture of the sprawling city or (2) the social inequities that occur between the old city and the new suburbs. Only a few writers were interested in the economic viability of the modern metropolitan area. Does it make sense—from an efficiency point of view—to create the sprawling cities we are building?

The Memphis metropolitan statistical area (MSA) is a good location to study. The majority of the citizens of Memphis are black, while residents of its suburbs are predominantly white.<sup>1</sup> The governmental structure allows a voice for the various segments of the community and forums for reconciling differences. After a decade and a half of decline during the 1970s and the early 1980s, the city of Memphis now is aggressively 'pro' economic development. And, since the mid-1980s, the area has become quite prosperous. At the same time, Memphis, as a region, is spilling over into the counties that border it. Sprawl, a term that really did not apply to Memphis 20 years ago, is now the key feature of its economic development.

This also is a research paper about the Memphis economy. In this paper, I answer the question: Does it make economic sense to grow

this way? The answer that developed was a modest "no." The "whys" of that answer are contained within the body of the paper.

During this study, I was very fortunate to gain the help of a first-rate graduate assistant for this project. Weihong "Lisa" Xu worked hard on the tables in this report. Without her, I could not have estimated the costs of commuting and the problems of governmental infrastructure costs. Carol Ciscel, my wife, worked as my first editor. Her assistance and suggestions were invaluable. I also appreciate the extensive editorial assistance of Alice Dames, Kristi O'Dell and Glenda Wilson.

## Part I

# Urban Sprawl as Inefficiency

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Cities work, but not in the understandable, systematic ways that social scientists prefer. They work on their own terms—in unpredictable, erratic, and energetic ways. One simply has to face the truth up front: cities are wild, dirty, noisy, dangerous, often ugly places. At their best, cities are exciting, fabulous, compelling, hip agglomerations of people. They are channels of upward mobility, the incubators of new businesses, and the cultivators of the arts. They triumph over the drive for orderliness. (Julia Vitullo-Martin 1996, p. 207).

As Ms. Vitullo-Martin suggests, modern cities are both vibrant and chaotic. New businesses rise up. Ideas, scientific research, and commercial innovations are created, and the arts and humanities all pulse within the urban environment.

Unfortunately, there are some problems associated with urban living: health, safety, safe housing, and public education. Sprawl adds to these social problems of city living. The costs of sprawl will require many small reforms during the next decade. The challenge of these reforms will be to limit the chaos of the modern city while leaving the creativity of modern urban environments open for the future.

Memphis provides an interesting study in the conflicted conscience of American cities. This city is noteworthy for its:

- Early attempts to provide and control public sewage,
- Ability to claim new residents through annexation as the geography of the city grew, and
- Agricultural bounty of the Mississippi Delta in the three states (Arkansas, Mississippi, and Tennessee) surrounding it.

Like most urban areas, Memphis has experienced considerable sprawl during the last half of

the 20th century. From the 1950s through the 1990s, the city of Memphis grew east in Shelby County from the Mississippi River, along the Mississippi state line toward the very rural Fayette County. As the city enters the 21st century, the rest of Shelby County is ready to be annexed by the city or one of its smaller urban complements: Bartlett, Germantown, Collierville, Lakeland, Arlington, and Millington. Soon the whole county will be urban; part of a large metroplex that shares the same promises and problems as the city itself.

In addition, urban sprawl now is common in two of the other four counties of the Memphis MSA (DeSoto, Miss., and Crittenden, Ark.) and also is beginning to appear in the last two MSA counties (Fayette and Tipton, Tenn.). A large gambling industry, which provides thousands of jobs to the urban area, is located just outside and south of the metropolitan statistical area (MSA) in Tunica County, Miss. Currently, expansions exist outside both the local and state jurisdictions of the city of Memphis and its older satellite cities. All five of these MSA counties, plus Tunica, is clearly part of the Memphis metroplex.

The hypothesis of the paper is that urban sprawl—the tendency of the modern city to grow geographically more rapidly than it grows in population—creates economic and social burdens for the city. An analysis of urban sprawl, however, does not lead to clear-cut social policies. In addition to the high costs—both current and

future—of urban sprawl, there are clear advantages to today's large urban centers. These social and economic benefits, however, rarely are measured on the same yardstick as the costs. Consequently, for most urban residents sprawl seems to be a natural process in the modern world.

Sprawl is only a part of the underlying process of urbanization. As cities become larger and more complex, rural areas do not become attractive alternatives. Rural life continues to disappear—with falling populations, declining levels of education, and decaying towns—as life and industry in the urban metropolises continue to grow.

Researchers who are interested in the problems of urban sprawl raise two issues: the social inequity and economic inefficiency of the large city. Most critiques of urban sprawl and current community development efforts focus on the unfairness in the delivery of services, jobs, and environmental conditions that the urban elderly, young, and poor suffer from because they live in the older, less maintained parts of the city. Another big issue is the fairness in the distribution of taxes and expenditures. Is it equitable for all urban residents to finance, through their taxes, new suburban subdivisions? Will the most needy residents be able to gain access to the best new exurban facilities and services, such as roads, hospitals, or educational institutions?

These are good questions because, in my analysis, I found that sprawling cities inefficiently use precious resources. Also, the rising costs of urban sprawl are slowly strangling the very creativity that makes a city a more attractive place to live, particularly from an economic point of view.

This paper attempts to answer the questions: Is sprawl the least costly way to build a functioning city? Is society using its limited urban resources to its best advantage? Is a short-run competitive advantage of new suburban malls and neighborhoods a long-run disadvantage in terms of higher maintenance expenses? In particular, are the costs of commuting overwhelming the benefits of expansion?

#### **Research Components and Questions:**

This study examines the regional economy of the Memphis MSA with a focus on today's provision

of the social infrastructure and its impact on the economy of tomorrow. This study of urban sprawl in Memphis also focuses on several components of the modern metropolis:

#### **Jobs, Business and Demographics—**

That which separates jobs and people. New service jobs in the suburbs are often a great distance from the urban service workers employed in them. Likewise, housing for the affluent usually is a great distance from the higher-paying jobs in the core city. Finally, the tendency is for everything (housing/jobs/people) to be in one place and only in that one place. New housing is in suburban developments, retail and commercial campuses are self-contained, and industry is banded to the old city or peripheral (often quasi-rural) places.

**Commuting**—According to the decennial census, 64 percent of workers in the United States used personal cars or trucks to get to work in 1960. By 1990, that had risen to 86.5 percent. In the Memphis MSA, personal vehicles provided transportation for 91.8 percent of the workers in 1990. The automobile is almost the only form of transportation used or available for most intracity trips, whether for work, school, shopping, or leisure. The personal car encourages the low-density, sprawled city. The costs imposed by commuting are three-fold:

- Lost labor income from commuting time,
- High transportation costs, and
- Reduced environmental quality.

#### **Infrastructure Capital and Costs—**

Infrastructure makes sprawl possible. Without expenditures for new roads, utilities, and schools, the city would be forced to remain within its old confines, becoming ever denser. Consequently, the new sprawled city is expensive, both in terms of investment capital and daily maintenance costs.

#### **The Inefficiency of the Modern City:**

The modern metropolis is becoming less efficient

because of urban sprawl. That is, the city consumes resources at higher rates, and this consumption grows more quickly than the city population. Driven by both the marketplace and public policy, the social costs of the sprawling city are rising more rapidly than the social or private benefits.

A city's infrastructure serves both the social and economic needs of its residents. The quality of the infrastructure in a geographically dispersed city influences personal decisions on where to live, how to travel across the city, and where to shop. Ironically, the many choices presented in today's sprawling cities contribute to inefficiency. Residents are tempted to abandon older neighborhoods in favor of new ones, creating a more transient population and a decline in the quality of infrastructure for older parts of the community. Geographic size accumulates social costs that result in diseconomies of scale—each increment in growth increases cost per person. The market choices of many people—for homes, jobs, and shopping—make urban living very expensive.

**The New Urbanism:** The New Urbanism<sup>2</sup> actually consists of recommendations for reforming the sprawling city—it contains several different movements, all of which are concerned with the social and economic impact of the modern city. The New Urbanist agenda was developed by researchers and writers who, through their research or experience, believe the modern city and its widely dispersed suburban companions are not viable for the long run.

The New Urbanists argue there are financial, social, and community development reasons for changing the current course of city growth. The New Urbanists tend to place the blame for many urban problems—the social inequality created by wealth flight, the redundancy in municipal governance and public infrastructure, the lack of community, and the inefficient land use—on the automobile-based sprawling city. As noted by Richard Moe, president of the National Trust for Historic Preservation,

Instead of pastoral vistas enhanced by attractive buildings and awesomely efficient

highways, we have sprawl that makes a mockery of urban vitality and turns countryside into clutter. Instead of comfortable cities that run like clockwork, we have cities that are scattered, clumsy, expensive, and increasingly hard to enjoy or even use. (1996)

Today, many local governments actually create incentives for sprawl. As noted by New Urbanists Bruce Katz and Jennifer Bradley,

Together these [government] policies have set the rules of the development game. They send a clear signal to employers, householders, builders, and political leaders: build out on open, un-urbanized, in some cases untouched land, and bypass older areas. (1999, p. 3)

Katz and Bradley clearly identify the pull and push of urban sprawl. Clean, new suburbs pull out urban residents, which combines with the push of crime, decaying school systems, and high taxes. The New Urbanists have emphasized the holistic aspects of the metropolitan area as one labor market, usually one market or business center and—in spite of numerous political units—often one community. Again, Katz and Bradley explain:

The idea that cities and suburbs are related, rather than antithetical, and make up a single social and economic reality, is called metroplotanism. (1999, p. 4)

While sprawling metropolitan areas may share a feeling of community, economically they do not behave as one. The modern urban city is expensive and inefficient because it is poorly conceived. Of course, this modern metropolitan model—Memphis included—partially is the result of decades of short-sighted urban and regional planning. The New Urbanists hope to avoid the perils of planning that Jane Jacobs detailed in her classic study of the modern city.

If it appears that the rebuilt portions of cities and the endless developments spreading beyond the cities are reducing city and coun-

tryside alike to monotonous, unnourishing gruel, this is not strange. ... No other aspect of our economy and society has been more purposely manipulated for a quarter of a century to achieve precisely what we are getting. (1961, pp. 6-7)

Much of the inspiration of New Urbanism comes from the belief that architectural aesthetics of sprawling cities are not only unsightly but dysfunctional. Indeed, a lot of New Urbanist writing is architectural in origin. Peter Katz (1994) offers many designs to make urban communities more cohesive. The text provides visual evidence of the benefits of high-density housing, integrated commercial establishments, and reduced car use (increased public transportation) as the standard transportation device. In Katz's book, Todd Bressi summarizes the goal for an architectural New Urbanism.

Community planning and design must assert the importance of public over private values. (1994, p. xxx)

One consequence of today's sprawling cities is dependency on the automobile. As noted above, the 1990 census calculates that more than four of five work trips by Americans are by cars. Not only do Americans spend a lot on the operation of cars, modern road design is so focused on accommodating more cars that public transportation alternatives are neglected. In its new book on urban sprawl, the Sierra Club describes the pitfalls of ever expanding infrastructure.

The biggest federal contribution to sprawl is the billions of dollars spent on building roads. Travel by car has become not just another option—in too many places, it has become the only option. Roads are the lifeblood of sprawl. Building new roads encourages sprawling development and, because of the high cost, crowds out other transportation options. (2000, pp. 2-3)

In spite of the harm done by the sprawling city, the New Urbanists recognize that the mod-

ern metropolis is an unintended outcome of many partially related planning decisions. As a society, we mistakenly planned our way into sprawl and, they assert, we can plan our way out.

#### **The Infrastructure Economics of Sprawl:**

Clearly, people are choosing to live farther from the core over living in the central city. For some in the modern age, a strong attraction toward sprawling suburban communities is their newness: homes, infrastructure, schools, landscaping, etc.

There also are economic incentives to encourage young families to relocate to the new booming suburbs. Housing, taxes, and education all seem less expensive in the suburbs. In new suburban communities, shopping often is easier to access as are jobs from employers who have begun to take advantage of tax abatements.

The economics of the New Urbanism questions the economic viability of suburban life. In particular, there are two long-run cost components of sprawl that negate the clear short-run benefits to the residents who flock to these new suburban enclaves.

The first issue is inefficiency. Building large, sprawling metropolitan areas requires the repeated duplication of infrastructure. Basic services—from roads and utilities to modern communications—require huge investments. In turn, the marginal costs of maintaining the city's infrastructure also rise with time. Government leaders who seem to be building expenditure-based empires often are merely trying to keep the enterprise functioning at a minimum level. Like some fast food chains, modern metropolitan areas are too busy expanding to focus on efficiency. While maintaining separate political boundaries can protect people from these rising marginal costs in the short run, depreciation, intersuburban travel, and social consequences of personal consumption habits will invert the temporary benefits of sprawl in the long run.

The second economic issue is that the private and social costs of the modern city are dramatically out of balance. Modern suburbs are constructed on hidden, transferred, and deferred costs. Much of the development of the expanding city is based on expenditures for roads, utilities,



and facilities that are based on public or semi-public taxes or bonds. The terms for paying down most infrastructure projects are so long that it makes the immediate benefits seem larger in relationship to the immediate costs. Of course, new infrastructure requires repair, replacement, policing, and expansion, which compounds costs. These incremental social costs (new taxes) typically are overlooked as key aspects in pricing the social consumption of a new suburb. In short, urban sprawl is a profligate consumer of capital, crowding out other uses of capital that could make the economy more productive and vibrant.

**Commuting and Business Costs:** The car inadvertently is imperial. Cars increasingly have squeezed out other forms of transportation to and from work, shopping, and leisure activities by reducing the need to choose destinations based solely on proximity. In addition to restructuring the physical environment, when used as the primary mode of transportation, the car has more straightforward financial impacts for running a business society: income, operating expenses, and environmental costs.

*Income Costs*—The most important cost that comes from commuting is the lost time for productive activities. From a worker's point of view, the drive to and from work is part of the business day. It is not family or leisure time, and it usually is stressful and somewhat dangerous. In most instances, employers do not reimburse employees for their commutes. It is unpaid work time—a time when either income could have been earned (had the place of employment been closer) or other social activities could have been enjoyed.

*Operating Costs*—Automobiles are expensive to operate, and most families own two or three. While most people think about gas prices, it is the fixed costs of owning and operating a car—monthly loan or lease payments, insurance, and depreciation—that cause automobile use to be the most expensive financial decision a family can make after the purchase of a home. Paradoxically, automobile-based cities increase the cost of operating a car as roads become more congested and ill-maintained.

*Environmental Costs*—Cars, like all machinery, are big polluters. They add smog, green-

house gases, and particulate materials to the local environment. Between 10 to 20 million new cars hit the road each year in the United States exacerbating air, water, and noise pollution. This makes the cumulative effect of commuting huge. Each car may seem inconsequential, however, the incremental effects of every car on the road represent a large tax on the implicit and explicit costs for operating a society.

## Agglomeration and Network Externalities

*Agglomeration.* Agglomeration is the process of exploiting both private (internal) and social (external) transcompany economies of scale. It can contribute to regional economic development. The existence of several firms in the same industry that are located near one another results in better suppliers, labor and more sophisticated customers. F.M. Scherer and David Ross note that the economic benefits enjoyed by the firm spill into the marketplace.

...Some of the cost reduction benefits associated with cumulative experience are likely to spill over to other firms as skilled employees are lured away, patents expire, and production techniques become public knowledge. (1990, p. 371)

Socially, the infrastructure (energy, utilities, transportation, and education) can be tailored to enhance the economies of industrial agglomeration. The combination of private and social economic specialization often increases regional economic productivity. The result is that a regional comparative advantage is created and economic growth is enhanced.

Importantly, economic agglomeration (transcompany efficiencies) primarily is an urban phenomenon. Almost by definition, rural areas lack the requisite levels of agglomeration to perform the tasks of a modern city. It may be argued that just as the modern corporation tends to grow over time, the minimum efficient scale of urban agglomeration increases.

Sprawl and economic agglomeration seem to be partners in urban economic specialization and growth. While it has been long recognized that congestion can bring about the private and social diseconomies associated with agglomeration, these negative effects of market organization clearly have been overwhelmed by the efficiencies of complex urban markets.

The growth of the sprawling city tends to diminish the benefits of agglomeration, making it more difficult to achieve economies of scale. The physical growth and disconnectedness of metropolitan areas have expanded incremental costs of building a large market. The growing city does not expand to accommodate new industry or new workers, that is, to take advantage of the benefits of economic agglomeration. Rather, the evolution of the city segregates living, producing and spending activities from one another.

The key to the inefficiency argument is that urban sprawl actually creates a need for new private and public infrastructure, schools, and businesses to serve the new residents. The costs of new construction often subtract from maintenance of the old infrastructure, schools, and business. The old city, however, does not just evaporate into the ether; it remains and becomes a physical and geographic blight that is more costly to fix, police, and maintain as a social commodity. In addition, the sheer size of the modern metropolitan area becomes costly to run—too much depreciation for the tax revenues or the business revenues to cover effective replacement.

Two key elements complicate analysis of urban sprawl. First, part of the urban sprawl is based on population growth. Suburbs and new towns are built to accommodate population growth and net migration. Second, the private and social economies of rapid economic growth can ameliorate the accumulating costs of suburban development.

With additional wealth from growth, a low-density, segregated residential environment may be the choice for spending funds from higher incomes. Nonetheless, the growing city slowly is fighting a losing battle for economic efficiency. Because growth is created through urban sprawl,

the benefits of economic agglomeration are consumed by the rising costs of a large, functionally segregated urban economy.

*Network Externalities.* A network externality is a consumption decision that is physically or psychologically linked to prior decisions by other people. For example, once a company decides to make its operating system Microsoft Windows, then reversing or changing that decision is very difficult. Computer machinery, other software, and other computer users all use Microsoft, so it is a very risky and difficult decision to use a different operating system. Bottom line, network externalities impact efficiency over time. As Michael L. Katz and Carl Shapiro note:

In markets with network effects, there is a natural tendency toward de facto standardization, which means everyone uses the same system. Because of the strong positive-feedback elements, systems markets are especially prone to ‘tipping,’ which is the tendency of one system to pull away from its rivals in popularity once it has gained an initial edge. (1994, pp. 105-106)

There is considerable economic controversy over whether network effects have negative effects on the market. For example, see S.J. Liebowitz and Stephen E. Margolis (1994). The long-run impact of standardization on efficiency and future technological changes, however, is both uncertain and controversial in economic analysis.

It will be argued that urban sprawl is an example of social network externalities. Modern cities are perceived to be fairly standardized as they grow. New Urbanist policymakers view this standardization as inefficient and inequitable but, because the market has tipped in favor of sprawl, the trend is hard to reverse. The force of current decisions and current growth patterns is difficult to battle because it is hard for civic planners to imagine other alternatives. In their argument for a New Urbanism, Mark Eppli and Charles Tu present their alternative:

Proponents of the New Urbanism believe that denser, more compact forms of develop-

ment are a cure for urban sprawl. The New Urbanists favor a concept of residential development that includes small lots, short housing setbacks, alleys, front porches, compact, walkable neighborhoods with abundant public space, mix of land uses and activities near each other and narrow interconnected streets. (1999, pp. 1-2)

But Eppli and Tu's description of the solution is almost the opposite of what the typical, successful suburban community looks like.<sup>3</sup> The superiority of a planned, compact community necessarily shifts the whole market. Similar to the challenge of newer DVD vs. the old VHS format, the conversion process takes time. Not only will the public policies that favor sprawl have to shift, so will the consumer preferences for current suburban structure. That process requires a significant change in consumer perceptions about the risks of living in a nonsuburban community environment.

In summary, urban sprawl has been closely associated with the economies of growth through agglomeration. As the automobile-based, low-density population, and large geographic city has replaced the more compact city architecture, the resulting social diseconomies are hard to identify because of the separation of costs or benefits, the mix of sprawl with agglomeration, and the impact of network externalities.

One of the key points of contention for understanding urban sprawl is the public perception that current cities are the outcome of personal choice. The movement to the suburbs is a long-term trend, spanning most of the 20th century, and reflects the value Americans place on upward mobility. Suburbs, therefore, offer a sense of stability and security. Alternative concepts about the city and its economy require taking great risks.

Experiments with high-density urban developments look Utopian. While they integrate residents with shopping and a few governmental functions, these communities usually shun the heavy-industrial, large commercial developments and the unpleasant aspects of government services, such as sewer treatment and bus barns.

Nonetheless, the future of maintaining the viability of metropolitan areas clearly is on the side of containing urban sprawl. The balance of this research examines the current system costs to the Memphis MSA economy. As you will see, the costs of sprawl that can be shed, while retaining an environment of economic growth, are substantial.



## Part II

# An Overview of Memphis Sprawl

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They [developments] adhere to the modern notion of segregation of land use. Offices are kept separate from retailing. Retailing is kept separate from housing. The housing frequently is divided into mutually exclusive tracts. Detached houses are built in one tract, townhouses in a second tract, garden apartments in a third, with further subdivision by economic status. Manufacturing, no matter how clean and quiet ... is kept away from residential areas or excluded from the community entirely. Street layouts in new developments enforce apartness. To unlock the rigid geographic segregation, an individual needs to obtain a key—which is a motor vehicle. (Philip Langdon 1994, p. xi)

The Memphis MSA is a sprawling community, typical in many ways of cities in the New South. But, the sprawl in Memphis is relatively new. Population density is low throughout the MSA. It is a relatively clean city with a tradition of high-quality basic infrastructure components—sewers, roads, utilities, water, and garbage collection.

Today, the Memphis metropolitan area spans into three states—Arkansas, Mississippi, and Tennessee. During the later decades of the 19th century, Memphis grew as a trade and transportation center focused on the agricultural production of the Mississippi Delta. The city also had a fairly large manufacturing sector that served these agricultural needs. The area was poor, education was not a high priority, and the culture was somewhat insular. Still, Memphis was a tight-knit community, or actually two—one white and one black. Until the 1970s, segregation was a key feature of Memphis' social and economic structure.

As the city changed over time, Memphis began to sprawl like other new cities in the South and Southwest. Initially, the city expanded eastward, growing geographically into the rest of Shelby County away from the Mississippi River. Fed by moderate population growth, new industry, and white flight in the 1970s and 80s, new suburbs and new towns such as Germantown and Bartlett grew quite rapidly. Unlike many

other growing cities, however, the city of Memphis was able to annex many of the new suburbs.

During the 1990s, sprawl moved beyond the confines of the city of Memphis and its older suburbs. The fuel was still new industry and white flight; however, much of the sprawl came from major road expansion in the MSA:

- Country lanes in the eastern and southern parts of the county were expanded into four- to six-lane commercial roads.
- Interstate connections and loops were expanded and improved.
- An interstate quality spur into the southeast corner of the county opened former wetlands to development and led to explosive commercial and residential growth in three small towns of eastern Shelby County: Collierville, Lakeland, and Arlington.

Simultaneously, the warehouse industry spilled over the state line into Mississippi just as riverside gambling also developed south of the MSA into neighboring Tunica County, Miss. Likewise, during the 1990s, DeSoto County—the Mississippi part of the MSA—also grew rapidly because of the addition of major four-lane high-

ways to Birmingham in the east of the county, the gaming centers in the west, and the long-term interstate link to New Orleans.

Although white flight is no longer as important a factor in the growth of sprawl as it was thirty years ago, the desire to move to newer and safer communities is still driven by the perception that crime is greater and education weaker in the city of Memphis than in its sprawling suburbs. Over the past two decades, much of this suburbanization has occurred so quickly that the old city did not have a chance to decay before the problems of sprawl were noticed. Indeed, the city still has many vibrant residential communities. Its business core is solid, and downtown remains the center of governmental activities. Also, new residential communities, focused initially on working professionals without children, have begun to revitalize the downtown area.

Cars represent the only viable transportation system within Shelby County and among the five counties of the MSA. Although the city has maintained a small, heavily subsidized public transportation system, buses represent only a partial alternative for the poor, elderly, and disabled. The scope of the public transportation system is limited and workers/shoppers do not use it in large numbers. Additionally, while the old city is somewhat walkable—that is, residences and commercial areas are geographically connected—the new suburbs absolutely require a car. Intersections are too large to negotiate on foot, parks are too distant to walk to, and commercial strips are surrounded by large parking lots that limit foot access.

**Industrial Structure.** The Memphis economy is a part of the new economy; that is, service-producing companies dominate the economy. The largest private-sector companies are Federal Express Corporation, an air cargo company, and two not-for-profit hospital chains—Baptist Memorial and Methodist Hospitals. For many of Memphis' major industries, the company headquarters are local. In an earlier study, Thierry Noyelle and Thomas Stanback (1984) place Memphis as a subregional nodal city. That is, a city with a diversified economy that provides a variety of intermediate services including distri-

bution and complex corporate services. The authors use location quotients, or the relative percentage of employment in an industry, to explain regional specialization. Speaking of Memphis in 1976, Noyelle and Stanback explain,

Thus, if wholesaling accounts for 8.7 percent of employment and manufacturing for 17.6 percent in the Memphis SMSA, while wholesaling accounts for 5.5 percent and manufacturing for 22.8 percent of U.S. employment, the location quotients for wholesaling and manufacturing are 158.2 and 77.2, respectively. Memphis is considered to be relatively specialized in wholesaling; not in manufacturing (1984, p. 52).

Similar to 25 years ago, the Memphis regional economy is specialized in businesses that make it a unique market center. Table 2.1 provides current location quotients for Memphis industry relative to the economy of the state of Tennessee. Memphis amounts to about one-fifth of the Tennessee economy, providing 586,300 jobs in 1999. Relative to the rest of the state, it is low on goods-producing jobs, (a location quotient of 64.5 percent) and high on service-producing jobs (111.1 percent). The location quotients verify the clear commercial advantage of the Memphis economy. Transportation has a location quotient of 186.5 percent and wholesale trade is 126.6 percent. Interestingly, while Memphis always has considered itself a center for health services and retail trade, location quotients do not show the city to be especially endowed in these industries relative to the rest of the state: health services was at 103.5 percent and retail trade was at 99.8 percent. Memphis is very light in manufacturing, at 56.7 percent, and fairly typical in finance, at 100.9 percent. Overall, the numbers confirm Noyelle and Stanback's earlier analysis. Memphis is a diversified economy with a strong focus in transportation and wholesale trade.

In its core industrial sectors, the economic output of the area tends to be located in the city of Memphis. The next three tables (Tables 2.2 through 2.4) provide alternate definitions of the old city and suburbs. In each case, the old or

central city remains the center of the region's economy with the greater number of firms and larger payrolls. By contrast, the suburban businesses tend to be smaller, service-oriented firms and have smaller payrolls.

Table 2.2 illustrates the 1992 economic structure of the Memphis MSA for four important sectors of the regional economy (transportation was unavailable from this source), separating the city from the rest of MSA. In each sector, the city has the majority of the establishments and sales in the MSA relative to the suburbs, which include the four rural counties outside Shelby County:

- 64.8 percent of establishments and 68.4 percent of the value of the shipments in manufacturing;
- 74.6 percent of establishments and 66.1 percent of sales in wholesale trade;
- 59.6 percent of establishments and 67.6 percent of sales in retail trade; and,
- 58.2 percent of establishments and 77.6 percent of receipts in services.

Payroll numbers indicate that per-employee pay results in annual earnings where urban jobs pay significantly more than suburban jobs. For wholesale trade, the earnings per employee are very similar in the city and the suburbs; however, for manufacturing, retail trade and services, city earnings per job are higher. It is important to note that if these jobs are assumed to be full-time (a poor assumption for retail trade), then the hourly wage ranges from \$10 to \$14 per hour—not high wages for leading sectors of the economy.

An analysis of establishments and earnings by zip code shows a similar result for all industry by area of the city. From Table 2.3, it is clear that the largest payroll per employee is located in the oldest part of the city, while the next highest level is in the areas south and north of the old city, areas with predominately minority populations. The lowest earnings per

employee are outside Shelby County; that is, areas that will be the focus of future growth and sprawl. Similarly, the size of typical business establishments is larger in the older areas of the city than in the newer suburban areas.

Finally, Table 2.4 adds information from zip codes to the business structure of the Memphis MSA. The central city and the old city have a majority of the private-sector jobs (66.7 percent) and an even greater share of the payroll (70.4 percent). The central and old city still have a vibrant business sector, controlling 56.1 percent of all manufacturing establishments, 61.1 percent of all transportation establishments, and 57.9 percent of all service establishments. Finally, the central and old city have 65.6 percent of establishments with more than 100 employees.

Clearly, the population of Memphis has sprawled, but its jobs have not. Most of the jobs (and the best-paying ones) are still located in the older parts of the city while most of its workers reside in the suburbs. Likewise, because a majority of the poor reside in the older part of the city, and their jobs are often in the suburbs, two-way automobile commuting between geographically diverse locations is essential.

**Housing and Demographics.** A key feature to the argument over the economics of sprawl is the location and development of housing. Large-lot private homes and newer neighborhoods outside the city require a lot of infrastructure: utilities, sewers, roads, and schools.

The U.S. Department of Housing and Urban Development (HUD) does regular surveys of housing. For the purposes of this analysis, HUD's 1984 and 1996 surveys provide snapshots of the city during a period of significant economic growth. This data set, like most data sets concerning the city, is defined in a slightly different manner than the data used above to explain the industrial structure of the area. Still, irrespective of the definition of the old city and its suburbs, the data illustrate the profound differences between the two parts of the metropolitan area. In contrast to the industrial structure data, the housing data show the relatively larger, newer homes and higher incomes that exist for residents of the suburbs.

The housing data are organized into three areas: the city of Memphis, Shelby County outside the city of Memphis, and DeSoto County in Mississippi. Two problems arise with the data set. First, the city grew slightly through annexation between 1984 and 1996. While the change was small, it absorbed new suburbs from east Shelby County into the city; therefore, the 1984 and 1996 data are not strictly comparable. Second, three rural counties, Fayette and Tipton in Tennessee and Crittenden in Arkansas, are not included. Regardless, during this time period these counties are not very important to housing trends.

Using 1984 as a base year, Table 2.5 paints a picture of greater Memphis in terms of housing and people. Most of the housing, owner- and renter-occupied, is in the city of Memphis. Because the number of apartments is relatively larger in the city, however, the home ownership rate is smaller. The greatest difference within the city is racial: nine out of 10 blacks live in the city while only six out of 10 whites live there. The suburbs and DeSoto County are largely white enclaves of the region. The suburban homes, which were built more recently, were larger (except for DeSoto) and had more square footage per person. Suburban Shelby County had much higher levels of education, greater median household incomes, and fewer households living in poverty or receiving food stamps. Finally, city homes were less expensive to operate on a monthly basis. An interesting exception to these generalities is DeSoto County, the Mississippi suburb in the southern part of the MSA. While largely white in racial demographics, the housing and population of DeSoto County are less affluent than in the Shelby suburbs.

Table 2.6 reflects the same housing data 12 years later (1996). The number of homes in suburban Shelby and DeSoto counties has grown significantly, so that the percentage of urban owner-occupied homes is reduced to 54.5 percent; however, the city retains three-fourths of the apartments. As the number of whites living in the city fell, the number rose in the suburbs. Interestingly, the percentage of blacks living in the suburbs grew even as the city residents became

majority black. Housing was newer in both the city and the suburbs, but the median home was 26 years older in the city than in the Shelby County suburbs. Square footage per person also is greater in the Shelby suburbs than in the city.

In 1996, education attainment is still lower in the city than in the Shelby suburbs, while DeSoto County looks more like the city. Income differences are dramatic between the city and the suburbs with median family income at:

- \$25,050 in the city,
- \$52,263 in the Shelby suburbs, and
- \$39,710 in DeSoto County.

Furthermore, slightly more than 80 percent of the households with incomes of less than \$25,000 per year live in the city, as do 90.4 percent of food stamp recipients. Housing costs are distributed so that almost 80 percent of housing that costs less than \$450 per month is in the city, while almost 70 percent of housing costing over \$1,000 per month is in suburban Shelby County.

Finally, Table 2.7 provides data on housing-related changes in the city and in suburban Shelby County. While owner-occupied housing grew by only 7.8 percent in the city, it grew by 60.4 percent in the Shelby County suburbs. The number of white residents fell by 14.4 percent in the city but grew by 35.1 percent in the suburbs. Blacks grew in number by 24.6 percent in the city and, from a fairly small base, by 122.9 percent in the suburbs. In the suburbs, all sizes of homes grew in number while, in the city, small- and moderate-sized homes fell in number as the number of large homes increased.

Likewise, household or family income grew more rapidly in the suburbs than in the city. The number of low-income households and the number of people on food stamps fell in both the city and in the suburbs, but the decrease was more dramatic in the suburbs. Finally, while the number of homes with housing costs of more than a \$1,000 a month rose more rapidly in the suburbs than in the city, it is interesting that the median mortgage payment and real estate tax bill, while still less, rose more rapidly in the city.



The city and suburban housing structure outlines the urban sprawl in the Memphis area. New homes were built in the suburbs. Eastern Shelby County became an enclave of new, expensive homes for high-income whites and a growing number of high-income blacks. DeSoto County became an enclave for working class whites with a very small black population. The city gained a majority black population with a lower income base and older, less expensive, smaller homes.

**The Changing Configuration:** While local residents often remark on the physical racial segregation of the Memphis MSA, the metropolitan area actually is segregated by many social and demographic factors. Almost by definition, a sprawling city is a functionally segregated city—racial segregation may be one of its more minor features. The demographics, level of crime, jobs, and income are all quite different in the city than in the suburbs.

Table 2.8 helps delineate some of the differences between the city and the suburbs. In this table, the suburbs are defined as the balance of the MSA outside the city, which includes not only the real suburbs, but the very rural portions of the MSA in Tipton and Fayette counties. The population in the MSA is divided fairly evenly, even though the land area outside the city is roughly 10 times larger. Clearly, population density is far less in the suburbs. Again, the racial demographics show that the suburbs are mostly white, while the city has a majority of blacks. Interestingly, the suburbs are only slightly more youthful than the city (portion of population under 18 years old), but the city has a much larger portion of the elderly population (portion of population over 65 years old).

A critical test of the difference between the city and the suburbs is in crime. Since seven of eight crimes were committed in the city during 1996, the result is significantly lower crime rates in the suburbs. Crime rates are almost two-and-a-half times higher in the city than in the suburbs, whether one measures violent crimes or property crimes.

In 1989, per-capita income was \$1,654 less in the city than in the suburbs. Note that these

suburbs include several predominantly white areas not included in the analysis in Tables 2.5 to 2.7. Finally, while most workers live in the city, they have a significantly higher unemployment rate relative to workers who live in the suburbs. However, unemployment rates for the city, the whole MSA, and the suburbs all indicate that the region had a full-employment economy during 1997.

Table 2.9 looks at regional government planning districts for Shelby County. By dividing the city into the old central city, the somewhat newer west Shelby County and the suburban east Shelby (which actually has portions of new suburbs annexed by the city), yet another picture shows the changes in population and housing from 1980 to 1990. The central city lost both population and housing, while the western portion of the area grew moderately and the east Shelby suburbs grew very rapidly.

Finally, Table 2.10 details construction in Shelby County during 1995 by the same planning districts. The fully developed central city has a small portion of all new construction, particularly residential units, except office buildings. The west Shelby planning districts dominated office, commercial, and industrial construction while east Shelby had three-fourths of the new residential construction (and a significant share of commercial construction).

By now, the basic picture should be complete. A sprawling city is functionally segregated or segmented. The best jobs are urban jobs, and most of these jobs are still in the older part of the city. But the high incomes and the construction of new homes are in the suburbs. The result is heavy cross traffic. Managers, professionals, and sales representatives drive into the core of the old city to earn their incomes, but they report them from their suburban enclaves. In terms of housing, less affluent clerical and retail clerks often live in the less expensive, old city and commute to suburbs to work in the growing commercial (retail and service industries) enterprises of the suburbs. Living near the factory gates is unheard of since there are few real factories these days. High-end shopping centers follow the higher-income residents

to the suburbs, and the inner-city residents also commute to the suburbs for the best stores.

The concentration of higher-paying jobs within the city of Memphis limits is different from the analysis of many New Urbanists. This makes Memphis unique from other sprawling cities. Nevertheless, its housing, job patterns, industrial plant locations, and racial diffusion all provide indications of a functionally segregated metropolitan area. The chapters that follow estimate the costs of building this type of city.

## Part II

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Table 2.1

**Industrial Location Quotients for the Memphis MSA  
1999**

	Tennessee		Memphis		Location Quotient Ratio
	Jobs (000)	Percent	Jobs (000)	Percent	
Nonagricultural Employment	2,674.2	100.0%	586.3	100.0%	100.0%
Goods Producing	637.2	23.8%	90.1	15.4%	64.5%
Manufacturing	509.1	19.0%	63.3	10.8%	56.7%
Durable Goods	298.6	11.2%	29.3	5.0%	44.8%
Nondurable Goods	210.5	7.9%	34.0	5.8%	73.7%
Food and Kindred Pds	38.2	1.4%	7.1	1.2%	84.8%
Apparel/Other Textiles	26.2	1.0%	1.7	0.3%	29.6%
Construction/Mining	128.1	4.8%	26.9	4.6%	95.8%
Service Producing	2,037.0	76.2%	496.2	84.6%	111.1%
Trans, Comm, & Public Utilities	171.4	6.4%	70.1	12.0%	186.5%
Trade	628.1	23.5%	146.1	24.9%	106.1%
Wholesale Trade	148.1	5.5%	41.1	7.0%	126.6%
Durable Goods	86.4	3.2%	24.4	4.2%	128.8%
Nondurable Goods	61.7	2.3%	16.7	2.8%	123.5%
Retail Trade	480.0	17.9%	105.0	17.9%	99.8%
Eating/Drinking Places	165.8	6.2%	33.6	5.7%	92.4%
Financial Services, Insurance & Real Estate	130.6	4.9%	28.9	4.9%	100.9%
Services	716.0	26.8%	169.3	28.9%	107.8%
Health Services	198.8	7.4%	45.1	7.7%	103.5%
Government	391.0	14.6%	81.8	14.0%	95.4%
Federal	51.6	1.9%	15.9	2.7%	140.5%
State	94.4	3.5%	15.6	2.7%	75.4%
Local	244.9	9.2%	50.3	8.6%	93.7%

Source: *The Labor Market Report*, Tennessee Department of Labor and Workforce Development, March 2000.

Table 2.2

**A Comparison of Business Features**  
The City of Memphis, The Memphis MSA, and its Suburbs

Business Features	City of Memphis	Memphis MSA	Suburbs*
<b>Manufacturers 1992 - establishments</b>	836	1,290	454
Value of Shipments (million dollars)	\$8,831.3	\$12,897.9	\$4,066.6
Employees	40,100	62,200	22,100
Production Workers	24,400	39,700	15,300
Earnings/Production Worker	\$24,332	\$22,821	\$20,412
<b>Wholesale Trade 1992 - establishments</b>	1,723	2,311	588
Sales (million dollars)	\$16,452.7	\$24,892.5	\$8,439.8
Paid Employees	27,531	35,584	8,053
Annual Payroll (million dollars)	\$795.2	\$1,017.4	\$222.2
Earnings/Paid Employee	\$28,884	\$28,592	\$27,592
<b>Retail Trade 1992 - establishments</b>	5,595	9,390	3,795
Sales (million dollars)	\$5,408.3	\$8,000.8	\$2,592.5
Paid Employees	52,534	77,631	25,097
Annual Payroll (million dollars)	\$635.6	\$879.0	\$243.4
Earnings/Paid Employee	\$12,099	\$11,323	\$9,698
<b>Services 1992 - establishments</b>	15,621	26,841	11,220
Receipts (million dollars)	\$3,847.9	\$4,960.8	\$1,112.9
Paid Employees	61,841	78,884	17,043
Annual Payroll (million dollars)	\$1,298.5	\$1,618.7	\$320.2
Earnings/Paid Employee	\$20,997	\$20,520	\$18,788

\* The suburbs are computed as the MSA minus the city of Memphis.

Source: *State and Metropolitan Area Data Book 1997-1998*, U.S. Department of Commerce and U.S. Census Bureau, August 1999, CD-COMP-SMADB98.

Table 2.3

**Business Size and Imputed Labor Earnings  
in Memphis MSA by Area**

Area	Payroll per Employee	Employees per Establishment
Central City – inside I-240 Loop	\$28,423	20
Old City – South & North	\$28,132	27
East Shelby County	\$25,171	15
MSA Outside Shelby County	\$20,888	15
Total Metropolitan Area	\$26,801	19

Source: *ZIP Code Business Patterns 1996*, U.S. Department of Commerce, Bureau of the Census, Compact Disc: CD-ZBP-96, Washington, D.C., issued August 1999.

Table 2.4

**Business Activity in the Memphis MSA by Area  
Employees, Payroll, and Industries in 1996**

Area	Employees	Annual Payroll (000)	Number of Business Establishments				
			Total	Mfg	Transport	Services	>100 employees
Central City – inside I-240 Loop	184,708	\$5,249,869	9,061	409	299	7,747	300
Percent	39.2%	41.6%	37.1%	32.7%	21.3%	40.0%	37.0%
Old City – South & North	129,584	\$3,645,480	4,777	293	561	3,473	232
Percent	27.5%	28.9%	19.6%	23.4%	39.9%	17.9%	28.6%
East Shelby County	106,689	\$2,685,468	7,176	300	347	5,771	184
Percent	22.6%	21.3%	29.4%	24.0%	24.7%	29.8%	22.7%
MSA Outside Shelby County	50,438	\$1,053,569	3,382	249	200	2,365	95
Percent	10.7%	8.3%	13.9%	19.9%	14.2%	12.2%	11.7%
Total	471,419	\$12,634,386	24,396	1,251	1,407	19,356	811
Percent	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: *ZIP Code Business Patterns 1996*, U.S. Department of Commerce, Bureau of the Census, Compact Disk: CD-ZBP-96, Washington, D.C., issued August 1999.

Table 2.5

**City and Suburban Housing Characteristics 1984**

(Numbers in thousands of units unless otherwise noted.)

Housing Characteristics	Areas			Percent of Total		
	Memphis City	Shelby, not Memphis	DeSoto MS	Memphis City	Shelby, not Memphis	DeSoto MS
<b>Tenure</b>						
Owner occupied	117.3	50.7	12.8	64.9%	28.0%	7.1%
Renter occupied	94.1	21.4	3.8	78.9%	17.9%	3.2%
<b>Race and Origin</b>						
White	114.6	63.3	15.3	59.3%	32.8%	7.9%
Black	95.8	8.3	1.2	91.0%	7.9%	1.1%
Other	1.1	0.5				
<b>Units in Structure</b>						
Single family	139.1	56.5	14.5	66.2%	26.9%	6.9%
2 to 9	49.1	12.0	0.7	79.4%	19.4%	1.1%
10 or more*	23.1	2.4	0.0	90.6%	9.4%	0.0%
Mobile home or trailer	0.1	1.2	1.2	4.0%	48.0%	48.0%
<b>Year Structure Built</b>						
Median	1956	1973	1972	x	x	x
<b>Square Footage of Unit</b>						
Single detached and mobile homes	133.6	55.6	15.7	65.2%	27.1%	7.7%
less than 999	25.2	3.6	2.5	80.5%	11.5%	8.0%
1000 to 1999	73.4	33.1	10.1	63.0%	28.4%	8.7%
2000 or more	23.4	17.6	2.2	54.2%	40.7%	5.1%
Median square footage	1,402.0	1,710.0	1,395.0	31.1%	37.9%	31.0%
<b>Square Feet Per Person</b>						
Median square footage	572	586	485	x	x	x
<b>Educational Attainment of the Householder</b>						
Percent high school graduate or higher	67.3%	86.1%	72.7%	x	x	x
Percent bachelor's degree or higher	17.3%	29.1%	10.9%	x	x	x
<b>Household Income</b>						
Median income	\$16,573	\$32,126	\$23,314	x	x	x
<b>Income of Families and Primary Individuals</b>						
Median income	\$15,804	\$31,313	\$22,700	x	x	x
<b>Food Stamps</b>						
Household incomes of \$20,000 or less	129.6	21.8	7.4	81.6%	13.7%	4.7%
Family members received food stamps	31.5	3.1	1.8	86.5%	8.5%	4.9%
<b>Monthly Housing Costs</b>						
Less than \$449	165.9	29.7	9.3	81.0%	14.5%	4.5%
\$450 to \$999	30.6	31.0	5.3	45.7%	46.3%	7.9%
\$1000 or more	2.6	4.1	0.3	37.1%	58.6%	4.3%
<b>Owner-occupied Units</b>	117.3	50.7	12.8	64.9%	28.0%	7.1%
<b>Monthly Payment For Principal and Interest</b>						
Median payments	\$201	\$375	\$268	x	x	x
<b>Average Yearly Cost Paid for Real Estate Taxes</b>						
Median payments	\$492	\$588	\$300	x	x	x
<b>Owner Occupied – Year Structure Built</b>						
Median	1955	1974	1972	x	x	x

Source: U.S. Department of Commerce and U.S. Department of Housing and Urban Development. *American Housing Survey: 1984*. Memphis TN-AR-MS MSA. Current Housing Reports H170-84-08, issued September 1988.

\*Large apartments not reported for DeSoto County.



Table 2.6

**City and Suburban Housing Characteristics 1996**

(Numbers in thousands of units unless otherwise noted.)

Housing Characteristics	Areas			Percent of Total		
	Memphis City	Shelby, not Memphis	DeSoto MS	Memphis City	Shelby, not Memphis	DeSoto MS
<b>Tenure</b>						
Owner occupied	126.4	81.3	24.4	54.5%	35.0%	10.5%
Renter occupied	95.2	25.3	5.3	75.7%	20.1%	4.2%
<b>Race and Origin</b>						
White	98.1	85.5	27.5	46.5%	40.5%	13.0%
Black	119.4	18.5	2.2	85.2%	13.2%	1.6%
Other	4.1	2.5				
<b>Units in Structure</b>						
Single family	148.8	86.5	25.0	57.2%	33.2%	9.6%
2 to 9	48.7	11.2	2.0	78.7%	18.1%	3.2%
10 or more	22.6	6.3	0.3	77.4%	21.6%	1.0%
Mobile home or trailer	1.6	2.6	2.3	24.6%	40.0%	35.4%
<b>Year Structure Built</b>						
Median	1966	1985	1981	x	x	x
<b>Square Footage of Unit</b>						
Single detached and mobile homes	140.7	83.6	27.2	55.9%	33.2%	10.8%
less than 999	9.6	4.0	1.8	62.3%	26.0%	11.7%
1000 to 1999	50.0	34.4	17.3	49.2%	33.8%	17.0%
2000 or more	25.4	37.8	7.8	35.8%	53.2%	11.0%
Median square footage	1,583.0	1,992.0	1,550.0	30.9%	38.9%	30.2%
<b>Square Feet Per Person</b>						
Median square footage	697	750	662	x	x	x
<b>Educational Attainment of the Householder</b>						
Percent high school graduate or higher	76.5%	92.3%	82.6%	x	x	x
Percent bachelor's degree or higher	18.8%	36.0%	12.7%	x	x	x
<b>Household Income</b>						
Median income	\$26,173	\$54,082	\$40,488	x	x	x
<b>Income of Families and Primary Individuals</b>						
Median income	\$25,050	\$52,263	\$39,710	x	x	x
<b>Food Stamps</b>						
Household incomes of \$25,000 or less	115.0	18.6	8.8	80.8%	13.1%	6.2%
Family members received food stamps	29.2	2.0	1.1	90.4%	6.2%	3.4%
<b>Monthly Housing Costs</b>						
Less than \$449	108.7	17.7	10.6	79.3%	12.9%	7.7%
\$450 to \$999	94.9	54.0	16.0	57.6%	32.7%	9.7%
\$1000 or more	13.0	33.8	2.4	26.4%	68.7%	4.9%
<b>Owner-occupied Units</b>	126.4	81.3	24.4	54.5%	35.0%	10.5%
<b>Monthly Payment For Principal and Interest</b>						
Median payment	\$397	\$693	\$492	x	x	x
<b>Average Yearly Cost Paid for Real Estate Taxes</b>						
Median payment	\$804	\$888	\$396	x	x	x
<b>Owner Occupied – Year Structure Built</b>						
Median	1960	1986	1983	x	x	x

Source: U.S. Department of Commerce and U.S. Department of Housing and Urban Development. *American Housing Survey for the Memphis Metropolitan Area in 1996*. Current Housing Reports H170/96-8.

Table 2.7

**City and Suburban Housing Characteristics  
Change from 1984 to 1996**

(Numbers in thousands of units unless otherwise noted.)

Housing Characteristics	Memphis City 1984	Memphis City 1996	Twelve Year Change	Shelby, not Memphis 1984	Shelby, not Memphis 1996	Twelve Year Change
<b>Tenure</b>						
Owner occupied	117.3	126.4	7.8%	50.7	81.3	60.4%
Renter occupied	94.1	95.2	1.2%	21.4	25.3	18.2%
<b>Race and Origin</b>						
White	114.6	98.1	-14.4%	63.3	85.5	35.1%
Black	95.8	119.4	24.6%	8.3	18.5	122.9%
Other	1.1	4.1	272.7%	0.5	2.5	400.0%
<b>Units in Structure</b>						
Single family	139.1	148.8	7.0%	56.5	86.5	53.1%
2 to 9	49.1	48.7	-0.8%	12.0	11.2	-6.7%
10 or more	23.1	22.6	-2.2%	2.4	6.3	162.5%
Mobile home or trailer	0.1	1.6	1500.0%	1.2	2.6	116.7%
<b>Year Structure Built</b>						
Median	1956	1966	10	1973	1985	12
<b>Square Footage of Unit</b>						
Single detached and mobile homes less than 999	133.6	140.7	5.3%	55.6	83.6	50.4%
1000 to 1999	25.2	9.6	-61.9%	3.6	4.0	11.1%
2000 or more	73.4	50.0	-31.9%	33.1	34.4	3.9%
Median square footage	23.4	25.4	8.5%	17.6	37.8	114.8%
Median square footage	1,402.0	1,583.0	12.9%	1,710.0	1,992.0	16.5%
<b>Square Feet Per Person</b>						
Median square footage	572.0	697.0	21.9%	586.0	750.0	28.0%
<b>Educational Attainment of the Householder</b>						
Percent high school graduate or higher	67.3%	76.5%	9.2%	86.1%	92.3%	6.2%
Percent bachelor's degree or higher	17.3%	18.8%	1.5%	29.1%	36.0%	6.9%
<b>Household Income</b>						
Median income	\$16,573	\$26,173	57.9%	\$32,126	\$54,082	68.3%
<b>Income of Families and Primary Individuals</b>						
Median income	\$15,804	\$25,050	58.5%	\$31,313	\$52,263	66.9%
<b>Food Stamps</b>						
Household incomes of \$25,000 or less	129.6	115.0	-11.3%	21.8	18.6	-14.7%
Family members received food stamps	31.5	29.2	-7.3%	3.1	2.0	-35.5%
<b>Monthly Housing Costs</b>						
Less than \$449	165.9	108.7	-34.5%	29.7	17.7	-40.4%
\$450 to \$999	30.6	94.9	210.1%	31.0	54.0	74.2%
\$1000 or more	2.6	13.0	400.0%	4.1	33.8	724.4%
<b>Owner-occupied Units</b>	117.3	126.4	7.8%	50.7	81.3	60.4%
<b>Monthly Payment For Principal and Interest</b>						
Median payment	\$201	\$397	97.5%	\$375	\$693	84.8%
<b>Average Yearly Cost Paid for Real Estate Taxes</b>						
Median payment	\$492	\$804	63.4%	\$588	\$888	51.0%
<b>Owner Occupied -- Year Structure Built</b>						
Median	1955	1960	5	1974	1986	12

Source: U.S. Department of Commerce and U.S. Department of Housing and Urban Development. *American Housing Survey: 1984*. Memphis TN-AR-MS MSA. Current Housing Reports H170-84-08, issued September 1988, and *American Housing Survey for the Memphis Metropolitan Area in 1996*. Current Housing Reports H170/96-8.

Table 2.8

**A Comparison of Demographic and Economic Features**

The City of Memphis, the Memphis MSA, and its Suburbs

Economic Features	City of Memphis	Memphis MSA	Suburbs*
Land Area in 1990 (sq km)	663	7,790	7,127
Population 1997	596,725	1,083,186	486,461
Population per sq km	900	139	68
Percent Black 1996-1997	54.8%	42.1%	26.5%
Percent White 1996-1997	44.0%	56.6%	72.1%
Percent Ages 0-17	26.9%	27.8%	28.9%
Percent Ages 65+	12.2%	9.9%	7.1%
Serious Crimes 1996	70,281	80,138	9,857
Violent, rate/100,000	1,985	1,419	725
Property, rate/100,000	9,142	6,832	3,998
Civilian Labor Force 1997	306,270	530,477	224,207
Unemployment	17,312	24,448	7,136
Unemployment Rate	5.7%	4.6%	3.2%
Money Income 1989, per capita	\$12,108	\$12,851	\$13,762

\*The suburbs are computed as the MSA minus the city of Memphis.

Source: *State and Metropolitan Area Data Book 1997-1998*, U.S. Department of Commerce and U.S. Census Bureau, August 1999, CD-COMP-SMADB98.

Table 2.9

**Population and Housing Units - 1980 and 1990**  
By Urban and Suburban Planning Districts

Planning Districts	1980		1990		1980-1990 Change	
	Population	Housing Units	Population	Housing Units	Population	Housing Units
Central City Planning Districts	369,779	145,590	332,325	140,667	-37,454	-4,923
Percent of Total	47.6%	50.8%	40.2%	42.9%		
West Shelby County Planning Districts	235,816	84,444	255,264	100,040	19,448	15,596
Percent of Total	30.3%	29.5%	30.9%	30.5%		
East Shelby County Planning Districts	171,518	56,347	238,741	87,089	67,223	30,742
Percent of Total	22.1%	19.7%	28.9%	26.6%		

Notes: The central city includes all the planning districts inside the I-240 loop, plus downtown. The west Shelby area includes the areas north and south along the river, plus the Oakhaven/Parkway Village area. The east Shelby County area includes the incorporated and unincorporated areas, plus suburban parts of Memphis in the Raleigh and Cordova areas. The six incorporated towns in east Shelby County are Arlington, Bartlett, Collierville, Germantown, Lakeland, and Millington.

Source: *Shelby County 1995 Urban Development Report*, Memphis and Shelby County Office of Planning and Development.

Table 2.10

**New Construction in Shelby County - 1995**  
By Urban and Suburban Planning Districts

Planning Districts	Residential units	Office sq. ft.	Commercial sq. ft.	Industrial sq. ft.
Central City Planning Districts	304	327,076	191,747	97,729
Percent of Total	7.2%	34.5%	5.7%	4.9%
West Shelby County Planning Districts	747	490,889	1,711,539	1,831,820
Percent of Total	17.6%	51.8%	50.8%	92.3%
East Shelby County Planning Districts	3,194	130,148	1,465,123	54,558
Percent of Total	75.2%	13.7%	43.5%	2.7%

Notes: The central city includes all the planning districts inside the I-240 loop, plus downtown. The west Shelby area includes the areas north and south along the river, plus the Oakhaven/Parkway Village area. The east Shelby County area includes the east Shelby unincorporated areas, plus suburban parts of Memphis in the Raleigh and Cordova areas. Of the six incorporated towns in east Shelby County, data for commercial industrial permits does not include Bartlett, Collierville, and Millington.

Source: *Shelby County 1995 Urban Development Report*, Memphis and Shelby County Office of Planning and Development.

## Part III

# The Costs of Commuting

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Modern urbanites have created nonspatial communities—viable relations dispersed in space. City dwellers have not lost the capacity for deep, long-lasting relationships; rather they have gained the capacity for surface, fleeting relationships that are restricted. (Robert J. Sampson 1999, p. 246)

The modern sprawling metropolitan area simply is a car-based city. Clearly, a city developed for the use of automobiles cannot be operated without a comprehensive infrastructure of high-quality roads, acres of parking lots, excellent telecommunications, reliable energy sources, and a complex law enforcement system. Almost everyone owns or has access to a car; and, every trip to work, to shop, or for leisure requires one.

There is a growing body of literature on the impact of sprawl on urban commuting. Clifford Cobb (1998) develops a comprehensive estimate of the subsidies provided for automobiles in today's urban economy. After subtracting user fees and tolls, Cobb estimates that total subsidies for the automobile amount to \$184 billion including environmental costs. He constructs a model for gasoline taxes that indicates a \$1.60 per-gallon tax would largely eliminate the subsidy. A large gasoline tax would increase fuel economy and reduce automobile use significantly. (Cobb 1998, p. 25)

Elvin Wyly's (1999) analysis of sex segregation in the Minneapolis/St. Paul metropolitan area illustrates that jobs are segmented by location and industry with respect to gender, but travel-to-work patterns reinforce the occupational segregation by gender. He finds that new jobs in the suburbs are least affected by gender-based segmentation.

John Holtzclaw's (1994) study of northern California for the Natural Resources Defense Council examined five communities in the San Francisco area. He studied the impact of several

variables on driving, including population density, shopping, and pedestrian accessibility. Holtzclaw's study found:

...that doubling residential or population density reduced the annual auto mileage per capita or per household by 20 to 30 percent. (1994, p. 8)

Causation clearly flows in both directions. Automobile ownership makes it easier for sprawl to occur, and sprawl accentuates the need for automobiles. The Sierra Club emphasizes this feedback system in its analysis of sprawl and taxes.

Transportation is both the key cause of sprawl and potential cure—depending on how we spend our money. Breaking this vicious cycle is easy: All we have to do is spend more on public transportation and less on new roads. (2000, p. 8)

Of course, this solution is not easy. The benefits of the automobile are legion: flexibility, personal freedom, transportation on demand, and personal ownership. In addition, it is fully consistent with the existing sprawling city structure. These benefits are difficult to measure monetarily, but they are recognizable.

The nonmonetary costs of the automobile are less difficult to perceive, such as road congestion, accident potential, or unsafe driving conditions. Unfortunately, these problems usually are perceived as the result of poor individual

choices rather than endemic social problems.

This analysis focuses on the monetary costs and environmental impact of commuting to and from work in Memphis during the 1990s.<sup>4</sup> The implication is that commuting is an inefficient use of resources. The data on work-related commuting, however, provide for the absolute costs of commuting. The evidence of external diseconomies of commuting only is implied.

The most important evidence of car dominance is the clear ‘technological tipping’ previously indicated. Between 1960 and 1990, the car became the dominate means of transportation rising from 64 percent to 86.5 percent of all work-related commuting in 1990. But work-related driving makes up only a minor portion of overall driving in the typical urban area. From the 1990 National Personal Transportation Survey (NPTS), the distribution was:

- 27.9 percent for work-related trips (35.6 percent of miles),
- 50.7 percent for shopping and personal business (37.8 percent of miles), and
- 21.4 percent for leisure (26.6 percent of miles) (DOT 1990).

The relative number of trips and the relative number of miles driven related to work have fallen since the 1960s. The growth area for car use has been in shopping and personal business, with large growth in both the number of trips and the number of miles driven. Leisure use for cars has remained fairly stable.

**Automobile Costs:** This analysis calculates three automobile-use costs in the sprawling city: labor, operating, and environmental impact. Labor costs and the environmental impact are implicit costs, unmeasured by the marketplace. Because drivers have to pay the costs of operating a car, operating costs are explicit; however, many of the costs are hidden from the consumer’s own view. Commuting to and from work makes up less than half of the time that people spend in their cars; but, it is the most studied

and measured form. Nonetheless, urban sprawl means that cars are necessary for all transportation needs, not only for work commutes, but also for shopping and leisure.<sup>5</sup>

The labor costs of commuting represent the lost work time that occurs as the worker travels to and from the workplace. Commuting time lengthens the workday, adding time to labor that makes the workday much longer than it would be otherwise. Workers regard their commute time as part of their work. However, for many occupations that require continuous site-to-site commuting during the day, such as construction and sales, the invention of the cellular phone has been a boon. No longer is the intrawork-drive period unproductive, because the car can become a mobile office.

The opportunity cost of commuting is the lost potential income of the worker. For most workers, the drive to work is unpaid time, and no production occurs for the employer. Not only does the employee lose wages, the employer gets a worker who has already used up a portion of his/her day’s potential productivity. It is a lose-lose environment. Shortening a worker’s commute could increase work productivity, increase workers’ daily wages, and leave more leisure time.

The operating costs are fairly straightforward—they are made up of the variable and fixed costs for owning and maintaining a car. For the typical driver, the variable costs of driving are obvious. They are the routine expenditures on gasoline, oil, and maintenance it takes to keep a car on the road, but they only represent a small portion of the actual costs for running a car. Insurance, taxes, licenses, car payments, interest, and/or depreciation all are incurred costs whether or not the car is operated. These fixed costs are factored in this analysis, because they represent such a large portion of the investment in the automobile’s dominance in transportation infrastructure. While a reduction in commuting initially would not affect the fixed costs of cars—because it would raise the

fixed costs per mile of shopping and leisure—a long-run trend away from automobile commuting would reduce the overall need for and cost of car ownership.

It is hard to monetize the costs of all the automobile-based pollution. Automobiles are the major source of mobile pollutants into the environment. According to the Environmental Protection Agency (EPA) in 2000, an average passenger car that is driven 12,500 miles per year has annual emissions of 80 lbs. of hydrocarbons (smog), 606 lbs. of carbon monoxide, 41 lbs. of nitrogen oxides (smog and acid rain), and 10,000 lbs. of carbon dioxide (greenhouse gases). Light trucks—including vans, pickups and SUVs—emit significantly more pollutants than the typical passenger car.

Cars are now far cleaner in their emissions than they were 30 years ago. The emission control devices have cleaned urban air and raised the cost of producing a car. Regardless of these environmental controls, there are now many more cars than in the past, and people are driving more miles each year. This analysis uses EPA estimates for dumping these emissions into the atmosphere through commuting. The quantities of automobile-based pollutants are not translated into dollar figures. Likewise, other environmental costs—noise, congestion, and pollution-related illness—are not estimated either.

These three costs (labor, operating and environmental) make up the cost of commuting to work in the Memphis MSA. The analysis is separated by:

- The city of Memphis in Shelby County—referred to as the city—and the rest of the MSA—referred to as the suburbs—and,
- Length of commute—a short commute is 19 minutes or less (each way) and a long commute is 20 minutes or greater (each way).

**Labor Costs.** This study uses 1990 travel times. The labor costs of commuting are estimated using the information available from the 1990 census. During 1990, the typical U.S. driver commuted for 23.2 minutes to work. For Memphis, it was 21.6 minutes. Less than 10 percent of

these commutes used vehicles other than private cars. Nationally, the percent using private cars has risen for every decennial census since 1960, and the mean travel time increased from 1980 to 1990.

The 1990 U.S. census estimated that there were 438,153 commuters each day in the Memphis MSA. The city/suburb breakdown was 62 percent and 38 percent, respectively. By occupation, more white-collar commuters originated in the suburbs (Table 3.1). Commuting workers in the professions (teaching, medicine, etc.) were more likely to live in the city than managerial, technical, and sales workers. Clerical workers also tended to live in the city. Likewise, except for craft workers, blue-collar occupations also tended to live in the city. Workers in service occupations lived in the city by the largest percentage, 74 percent. City commuters are fairly evenly split between short and long commutes, while suburban commuters tend to have slightly longer commutes.

The labor costs of commuting are affected by several factors:

**1. Occupational earnings:** Workers in different occupations earn different wages per hour depending on the market's evaluation of the occupation's labor power. This analysis used the median occupational earning, by sex, for 1997. An average hourly wage was computed for the whole occupation by calculating a weighted average of men's and women's earnings. Wages ranged from \$20.84 per hour for professional workers to \$5.90 per hour for household service workers. For yearly costs of commuting, this analysis assumes 260 days of work (a 2080-hour work year) per commuter, per year. Each commuter is assumed to drive his/her car without other working passengers (no carpooling).

**2. Commuting times:** Commuting by occupation is available from the 1990 census. Each occupation has a different number of people commuting for different times each day. Commuting is collected by the ranges of time it takes to get from residence to



work. This analysis uses the midpoint of each commute range. For example, a 15- to 19-minute commute would be treated as a 17-minute commute. This analysis also assumes that the commute home takes the same time as the commute to work. Commutes by residents of the suburbs tend to be longer than those by city residents. But, because population is so much larger in the city, the number of commutes originating in the city is larger than in the suburbs.

The cost of commuting is calculated in Table 3.2. Total labor costs of commuting are \$4.9 million per day or \$1,278 million per year for the Memphis MSA.<sup>6</sup> The greatest costs of commuting occur in the higher-wage occupations. The costs of commuting are borne by both city and suburban residents. In the city, the occupations with greatest total costs of commuting each year are:

- (1) Managerial, \$111.7 million per year;
- (2) Professional, \$134.6 million per year; and
- (3) Clerical, \$113.2 million per year.

In the suburbs, the same three occupations also had the largest labor costs of commuting:

- (1) Managerial, \$118.5 million per year;
- (2) Professional, \$90.6 million per year; and
- (3) Clerical, \$74.7 million per year—but, two other occupations were also very high:
- (4) Sales, \$71.8 million per year; and
- (5) Craft, \$66.9 million per year.

For both the suburbs and the city, the significant burden of the labor costs of commuting are incurred during the long commute. In the city, \$538 million of the \$741 million of yearly labor commuting costs (72.6 percent) were spent in long commute costs, while in the suburbs \$441

million of \$537 million (82.1 percent) of yearly costs were spent in the long commute costs.

Table 3.3 reduces the labor costs of commuting to a per-person basis. While occupational costs of commuting are impacted by both length of commute and by earnings per occupation, the comparisons between urban and suburban commuters are interesting. The typical city commuter spends \$10.41 in labor time in daily commuting while the typical suburban resident spends \$11.11 in labor time. Similarly, the average city worker spends \$2,707 annually on commuting while the average suburban worker spends \$2,889. According to the State and Metropolitan Data Book (1998), the average annual pay for an employee in the Memphis MSA was \$27,912 in 1996.

Managerial, professional and craft workers spend the greatest amounts commuting each year. Interestingly, transportation workers, many of whom also drive for a living, spend a considerable amount of money each year getting to and from their places of employment. If a technical worker earns \$32,421 per year (our assumption from 1997 earnings tables), then the typical technical worker in the city spends 9.7 percent of his/her income on work-related commuting. Comparably, a suburban service worker spends 9.3 percent of his/her income on commuting. In general, the opportunity cost per worker for commuting represents about 10 percent of a person's annual income.

Commute time also makes a major difference in the opportunity costs of commuting. On average, in the city the short commuter has a daily opportunity cost of \$5.92 compared to \$14.59 for the long commuter. For the suburban commuter, the ratio is \$3.95 per short commute to \$23.75 per long commute. The long commute for the high-wage occupations—managerial, professional, and craft—is high but, interestingly, the long commutes also are expensive for the lower-wage white- and blue-collar occupations. On a yearly basis, the typical long commuter has opportunity costs of \$3,793 in the city and \$6,175 in the suburbs.

In summary, there are two important points about the opportunity costs of commuting. First,

urban sprawl does not increase commuting costs just for suburbanites: Everyone commutes in the sprawling city. For Memphis, the total commuting labor costs for city residents are higher than those of suburban commuters. There are more city commuters, and the commutes of city residents are not that much shorter than suburban commuters.

Second, the total labor opportunity costs of commuting are significant. Workers would not be able to capture all of their costs if their commutes were reduced. If commuting were reduced by 25 percent, however, then Memphis-area workers potentially would earn \$319 million per year in income. The typical worker potentially would increase his/her income by close to \$700 per year. Those savings would increase significantly if the reduced commuting times were among long-distance commuters.

**Operating Costs.** The number of urban miles driven by U.S. drivers grew from 1,277 billion miles in 1990 to 1,589 billion miles in 1998 (Wards 1999). That represents a compound annual growth rate of 2.77 percent per year.

Obviously, each mile a car is driven costs a commuter money. However, large portions of the costs of commuting are hidden; that is, they are not associated with the day-to-day operation of the automobile. According to Ward's Communications *Motor Vehicle Facts and Figures* (1999), the cost of operating a passenger car has risen quite rapidly during recent years. While variable costs (gas, oil, and maintenance) have risen slowly, fixed costs (insurance, registration, taxes, finance, and depreciation) have risen rapidly. In 1985, the variable costs per mile for a passenger vehicle were \$0.084 per mile. By 1999 that had risen to \$0.1070 per mile; however, the fixed costs rose from \$0.1916 in 1985 to \$0.4446 per mile in 1999. Together, the increased miles driven and the increased costs per mile have amplified.

Table 3.4 estimates the operating costs of work-related commuting for the Memphis MSA. The costs of operating a car in Memphis for work-related commuting are substantial. Variable costs per day are over \$1.2 million. The total cost of commuting each day exceeds \$6.4 million. When the trips are divided between short commutes (19 minutes or less) and long commutes

(20 minutes or more), the majority of the commuting costs are clearly paid by the long-distance commuters. About 76 percent of the variable costs of commuting are attributable to the long commute even though only 55 percent of the commutes took over 20 minutes. Bottom line: The longer the commute, the greater the costs.

To get a sense for how large these operating costs are, let's compare total costs using a familiar annual yardstick. The variable costs per year are \$326.2 million and total costs are \$1,684.8 million per year. In 1992, the cost of running all the local governments was \$1,716 million—almost the same amount as operating cars for work-related commuting.

**Environmental Emissions.** The automobile is the main mobile source of air pollution in our economy. While cars are much more efficient and far less polluting than they were a few years ago, there are more on the roads today and they are driven more miles each year. No matter how clean the automobile engine, the sheer volume of automobile use results in greater pollution. Using 1990 commuting data, it is possible to compute the volume of pollution that is emitted from cars during work-related commutes in the Memphis MSA.

Table 3.5 lists the estimated automobile emissions in Memphis using 1997 emissions from an average passenger car. Light-duty trucks, which are common in Memphis, emit considerably more pollutants than passenger cars. The data in Table 3.5 represents a *minimum* of pollutants that come from work-related commuting because it assumes all vehicles are passenger cars.

Similar to the other operating costs for commuting, the difference between city dwellers and suburban residents is small. The difference between short and long commutes, however, is significant. Each day three-fourths of the pollutants come from long commutes.

The emissions turn into substantial quantities of pollutants over a year's time. Each year, there are:

- 19.5 million pounds of hydrocarbons,
- 147.7 million pounds of carbon monoxide,

- 10.1 million pounds nitrous oxides, and
- 5.4 million pounds of carbon dioxide

emitted from cars in the Memphis area. Between 1990 and 1998, the carbon monoxide emissions of light-duty vehicles were reduced from 1.81 grams per mile to 1.45 grams per mile, a 20 percent improvement over the decade. But urban miles driven rose 24 percent, negating the improvement. Sprawl increases the number and the use of cars so that car-sourced emissions are difficult to eliminate. Reducing pollution from automobiles will require not only cleaner but fewer cars and fewer miles driven.

**Cost of All Driving.** The typical work-related commute represents 35.6 percent of all driven miles.<sup>7</sup> Assuming the costs of shopping, personal business, and leisure are similar to those for work-related commuting, we can estimate the total cost of driving cars in the Memphis MSA. The annual costs for all car use are:

- \$3,589.7 million in forgone labor income,
- \$4,732.7 million in operating costs,
- 54.7 million pounds of hydrocarbons,
- 415.0 million pounds carbon monoxide,
- 28.3 million pounds of nitrous oxides, and
- 15.1 million pounds carbon dioxide.

**Summary.** Are sprawling cities increasing commuting costs? Is car use inefficient? The answer to both questions is yes, but this analysis cannot completely answer either question. Clearly, the typical commuter has become more dependent on the automobile for transportation to work, shopping, personal business and leisure. The number of miles driven by urban drivers has increased significantly over the 1990s, and cars have become more expensive to operate per mile than in the past. All of these factors point to inefficiencies. By using a car as the sole means of transportation, society has

specialized its transportation capability. This analysis indicates that there is tentative evidence that this specialization results in rising costs associated with commuting.

In addition, the city of Memphis is just as affected by the problems of sprawl as its suburbs. City residents travel in patterns that are not significantly different from suburbanites. Regardless of where someone lives, it is the long commute—the most visible sign of sprawl—that is responsible for a large portion of the three costs of commuting for both city and suburban residents.

This analysis has shown that owning and operating a car is expensive. By itself, however, this may reflect only the choices of an affluent and rational set of consumers. Nonetheless, the automobile also consumes a huge percentage of local resources: labor, energy, and environmental. This analysis has clearly implied that a car is too large an expenditure for the services rendered. Clearly, from the data available, that opinion cannot be proven with complete certainty. Still, circumstances point to an inefficient use of limited resources for transportation in the metropolitan Memphis area.

Part III

Tables

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Table 3.1  
**Commuting in the Memphis MSA by Occupation 1990**

Table 3.2  
**Total Labor Costs of Commuting to Work: Memphis MSA**

Table 3.3  
**Labor Costs of Commuting to Work Per Person: Memphis MSA**

Table 3.4  
**Automobile Costs of Work-Related Commuting: Memphis MSA**

Table 3.5  
**Environmental Emissions of Commuting: Memphis MSA**

Table 3.1

**Commuting in the Memphis MSA by Occupation**  
1990

Occupation	Central City Residents		Suburban Residents	
	Number	Percent of Occupation	Number	Percent of Occupation
Managerial	29,881	54%	25,067	46%
Professional	35,831	63%	20,757	37%
Technicians	9,928	57%	7,486	43%
Sales	32,803	57%	25,155	43%
Clerical	50,703	63%	29,373	37%
Craft	24,225	57%	18,131	43%
Operative	17,073	68%	7,999	32%
Transportation – drivers	12,770	66%	6,473	34%
Laborers	15,097	71%	6,085	29%
Service – except private household	40,193	74%	14,487	26%
Service – private household	2,629	82%	569	18%
Agriculture	2,698	50%	2,740	50%
<b>Total</b>	<b>273,831</b>	<b>62%</b>	<b>164,322</b>	<b>38%</b>

Note: This analysis uses the local 1990 census commuting data for the Memphis MSA.

Sources: *Journey to Work in the United States*, 1990 Census of Population and Housing, Subject Summary Tape File #20, C3.286: CD90 SSTF20.

Table 3.2

**Total Labor Costs of Commuting to Work: Memphis MSA**

Occupation	Central City Residents						Suburban Residents					
	Cost per day			Cost per year			Cost per day			Cost per year		
	Short Commuting	Long Commuting	Total	Short Commuting	Long Commuting	Total	Short Commuting	Long Commuting	Total	Short Commuting	Long Commuting	Total
Managerial	\$128,095	\$301,640	\$429,735	\$33,304,722	\$78,426,501	\$111,731,223	\$69,228	\$386,547	\$455,776	\$17,999,403	\$100,502,309	\$118,501,713
Professional	\$159,322	\$358,301	\$517,622	\$41,423,694	\$93,158,131	\$134,581,825	\$65,573	\$282,960	\$348,533	\$17,049,069	\$73,569,489	\$90,618,558
Technicians	\$29,975	\$90,366	\$120,341	\$7,793,524	\$23,495,261	\$31,288,785	\$13,311	\$98,130	\$111,441	\$3,460,966	\$25,513,820	\$28,974,787
Sales	\$105,351	\$210,913	\$316,263	\$27,391,177	\$54,837,254	\$82,228,431	\$66,220	\$210,028	\$276,247	\$17,217,097	\$54,607,172	\$71,824,269
Clerical	\$118,512	\$316,686	\$435,198	\$30,813,007	\$82,338,439	\$113,151,446	\$53,501	\$233,853	\$287,354	\$13,910,202	\$60,801,713	\$74,711,915
Craft	\$63,092	\$225,994	\$289,086	\$16,403,920	\$58,758,353	\$75,162,273	\$32,198	\$225,182	\$257,380	\$8,371,497	\$58,547,233	\$66,918,730
Operative	\$35,604	\$127,788	\$163,392	\$9,256,984	\$33,224,932	\$42,481,916	\$14,517	\$65,343	\$79,860	\$3,774,548	\$16,989,157	\$20,763,705
Transportation – drivers	\$32,117	\$105,412	\$137,529	\$8,350,491	\$27,407,127	\$35,757,618	\$13,087	\$67,066	\$80,154	\$3,402,735	\$17,437,275	\$20,840,011
Laborers	\$27,855	\$94,133	\$121,988	\$7,242,252	\$24,474,537	\$31,716,789	\$10,173	\$42,421	\$52,594	\$2,644,979	\$11,029,422	\$13,674,400
Service – except private household	\$74,845	\$208,736	\$283,581	\$19,459,581	\$54,271,394	\$73,730,975	\$24,022	\$75,690	\$99,712	\$6,245,625	\$19,679,465	\$25,925,091
Service – private household	\$1,596	\$16,151	\$17,747	\$414,987	\$4,199,165	\$4,614,152	\$631	\$1,630	\$2,261	\$164,012	\$423,803	\$587,815
Agriculture	\$4,533	\$13,430	\$17,963	\$1,178,490	\$3,491,761	\$4,670,251	\$4,152	\$9,219	\$13,371	\$1,079,444	\$2,397,034	\$3,476,478
<b>Total Labor Costs</b>	<b>\$780,895</b>	<b>\$2,069,549</b>	<b>\$2,850,445</b>	<b>\$203,032,829</b>	<b>\$538,082,854</b>	<b>\$741,115,684</b>	<b>\$366,614</b>	<b>\$1,698,069</b>	<b>\$2,064,683</b>	<b>\$95,319,577</b>	<b>\$441,497,894</b>	<b>\$536,817,471</b>

Note: This analysis uses the local 1990 census commuting data, 1997 national wage and earnings, and national 1995 average speed of driving to work to compute the labor costs associated with work commuting.

Sources: *Journey to Work in the United States*, 1990 Census of Population and Housing, Subject Summary Tape File #20 (C3.286: CD90 SSTF20), *Statistical Abstract of the United States 1999*, U.S. Census Bureau and the U.S. Department of Commerce, Table, and *Our Nations Travel*, 1995 NPTS Early Results Report, webpage: <[http://www.cta.ornl.gov/npts/1995/Doc/NPTS\\_Booklet.pdf](http://www.cta.ornl.gov/npts/1995/Doc/NPTS_Booklet.pdf)>.

Table 3.3

**Labor Costs of Commuting to Work Per Person: Memphis MSA**

Occupation	City Commuters						Suburban Commuters					
	Cost per day			Cost per year			Cost per day			Cost per year		
	Short Commuting	Long Commuting	Average	Short Commuting	Long Commuting	Average	Short Commuting	Long Commuting	Average	Short Commuting	Long Commuting	Average
Managerial	\$8.32	\$20.83	\$14.38	\$2,162.64	\$5,415.82	\$3,739.21	\$5.34	\$31.96	\$18.18	\$1,387.34	\$8,310.78	\$4,727.40
Professional	\$8.33	\$21.45	\$14.45	\$2,165.61	\$5,577.33	\$3,756.02	\$5.49	\$32.07	\$9.73	\$1,428.61	\$8,338.38	\$2,529.05
Technicians	\$6.82	\$16.34	\$12.12	\$1,772.87	\$4,247.15	\$3,151.57	\$4.18	\$22.82	\$11.22	\$1,086.30	\$5,933.45	\$2,918.49
Sales	\$5.65	\$14.90	\$9.64	\$1,468.62	\$3,874.88	\$2,506.74	\$4.06	\$23.79	\$8.42	\$1,054.58	\$6,184.98	\$2,189.56
Clerical	\$4.97	\$11.79	\$8.58	\$1,292.49	\$3,065.12	\$2,231.65	\$3.26	\$18.02	\$9.78	\$848.44	\$4,684.98	\$2,543.56
Craft	\$6.30	\$15.91	\$11.93	\$1,637.44	\$4,135.87	\$3,102.67	\$3.78	\$23.41	\$14.20	\$983.49	\$6,086.62	\$3,690.85
Operative	\$5.13	\$12.61	\$9.57	\$1,334.44	\$3,277.91	\$2,488.25	\$3.21	\$18.77	\$9.98	\$835.63	\$4,879.14	\$2,595.79
Transportation – drivers	\$5.96	\$14.28	\$10.77	\$1,549.26	\$3,713.70	\$2,800.13	\$3.98	\$21.04	\$12.38	\$1,035.84	\$5,469.66	\$3,219.53
Laborers	\$4.34	\$10.84	\$8.08	\$1,129.13	\$2,818.67	\$2,100.87	\$2.79	\$17.40	\$8.64	\$725.25	\$4,523.96	\$2,247.23
Service – except private household	\$3.80	\$10.19	\$7.06	\$986.99	\$2,650.36	\$1,834.42	\$2.52	\$15.28	\$6.88	\$655.16	\$3,972.44	\$1,789.54
Service – private household	\$2.13	\$8.60	\$6.75	\$553.32	\$2,234.79	\$1,755.10	\$1.58	\$9.59	\$3.97	\$411.06	\$2,492.96	\$1,033.07
Agriculture	\$3.48	\$9.63	\$6.66	\$903.75	\$2,504.85	\$1,731.00	\$1.95	\$15.14	\$4.88	\$506.54	\$3,936.02	\$1,268.79
<b>Average per person</b>	<b>\$5.92</b>	<b>\$14.59</b>	<b>\$10.41</b>	<b>\$1,539.20</b>	<b>\$3,793.40</b>	<b>\$2,706.60</b>	<b>\$3.95</b>	<b>\$23.75</b>	<b>\$11.11</b>	<b>\$1,027.00</b>	<b>\$6,175.00</b>	<b>\$2,888.60</b>

Note: This analysis uses the local 1990 census commuting data, 1997 national wage and earnings, and national 1995 average speed of driving to work to compute the labor costs associated with work commuting.

Sources: *Journey to Work in the United States*, 1990 Census of Population and Housing, Subject Summary Tape File # 20 (C3.286:CD90 SSTF20). *Statistical Abstract of the United States 1999*, U.S. Census Bureau and the U.S. Department of Commerce, Table. *Our Nations Travel*, 1995 NPTS Early Results Report, webpage: [http://www-cta.ornl.gov/npts/1995/Doc/NPTS\\_Booklet.pdf](http://www-cta.ornl.gov/npts/1995/Doc/NPTS_Booklet.pdf).

Table 3.4

**Automobile Costs of Commuting: Memphis MSA**

	Commuting Type	Variable Costs per day	Variable Costs per year	Total Auto Costs per day	Total Auto Costs per year
Central City Residents	Short Commuting	\$198,116	\$51,510,288	\$1,023,170	\$266,024,160
	Long Commuting	\$543,005	\$141,181,265	\$2,804,341	\$729,128,666
Suburban Residents	Short Commuting	\$100,535	\$26,139,218	\$519,214	\$134,995,625
	Long Commuting	\$413,098	\$107,405,451	\$2,133,438	\$554,693,945
Total Memphis MSA Automobile Costs		<b>\$1,254,755</b>	<b>\$326,236,222</b>	<b>\$6,480,163</b>	<b>\$1,684,842,395</b>

Note: These costs are based on local 1990 commuting time, average miles per hour of commuting nationally, and variable and total costs of operation an automobile nationally.

Sources: *Journey to Work in the United States* , 1990 Census of Population and Housing, Subject Summary Tape File #20, (C3:286 CD90 SSTF20). *Our Nation's Travel* , 1995 NPTS Early Results Report, webpage: [http://www-cta.orl.gov/npts/Doc/NPTS\\_Booklet.pdf](http://www-cta.orl.gov/npts/Doc/NPTS_Booklet.pdf). *Motor Vehicle Facts and Figures 1999* , Ward's Communications: Southland, MI 1999.



Table 3.5

**Environmental Emissions of Commuting: Memphis MSA**  
(in pounds)

Pollutants		Central City Residents		Suburban Residents		Total Memphis MSA Emissions
		Short Commuting	Long Commuting	Short Commuting	Long Commuting	
Emissions per day (lbs)	Hydrocarbons	11,827	32,416	6,002	24,661	74,906
	Carbon Monoxide	89,723	245,916	45,530	187,084	568,253
	Nitrogen Oxides	6,117	16,767	3,104	12,756	38,745
	Carbon Dioxide	3,263	8,942	1,656	6,803	20,664
Emissions per year (lbs)	Hydrocarbons	3,075,051	8,428,212	1,560,454	6,411,870	19,475,587
	Carbon Monoxide	23,327,974	63,938,158	11,837,927	48,641,770	147,745,829
	Nitrogen Oxides	1,590,544	4,359,420	807,131	3,316,484	10,073,579
	Carbon Dioxide	848,290	2,325,024	430,470	1,768,792	5,372,576

Notes: These costs are based on local Memphis MSA 1990 commuting time, average miles of commuting nationally in 1995, and annual emissions for a passenger car nationally in 1997.

Sources: *Journey to Work in the United States*, 1990 Census of Population and Housing, Subject Summary Tape File #20, (C3:286 CD90 SSTF20). *Our Nation's Travel*, 1995 NPTS Early Results Report, webpage: <[http://www.cta.ornl.gov/npts/Doc/NPTS\\_Booklet.pdf](http://www.cta.ornl.gov/npts/Doc/NPTS_Booklet.pdf)>. Motor Vehicle Facts and Figures 1999, Ward's Communications: Southland, MI 1999. *Annual Emissions and Fuel Consumption for an "Average" Passenger Car*, webpage: <<http://www.epa.gov/otap/ann-emit.htm>>.

## Part IV

# The Impact of Infrastructure

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**Sprawl subsidies are also built into the development process itself. Most new, sprawling development costs more to build and service than the taxes and fees it generates. The bottom line is that development is costing us money. (Sierra Club 2000, p. 3)**

Inefficiency in government is defined here as rising cost per capita. Of course, over time, rising costs reflect not only the potential for diseconomies of scale but also for shifts in quality. If roads, police and fire, education, and the other services that are provided by local government jump in quality due to popular demand, then increasing costs are merely the outcome of shifting tastes. During the last two decades in the Memphis MSA, however, there has been little shift in quality. The emphasis has been both on creating havens for new suburban residents and expanding services to meet their needs.

**Annexations:** The major county in the Memphis MSA is Shelby County, where most of the growth for the metropolitan part of the area has occurred. Memphis usually is thought to have benefited from a liberal state annexation law. The city of Memphis has been able to capture new parts of the county as the suburbs expanded over the last century, moving east away from the bluffs of the Mississippi River. Initially, the city expanded during the last two decades of the 19th century. After World War I, the city expanded eastward into Shelby County. Between 1950 and 1970, the city expanded south and east to capture new suburbs. Since then, the expansion of the city has slowed. There are three reasons for the slowed expansion of the city through annexation.

1. The city is now bordering the other small towns in Shelby County. These towns, together with the Memphis and Shelby County Division of Planning and

Development, have divided up the rest of the county for future annexation.

2. The suburbs have increasingly resisted annexation, politically and legally, fearing becoming part of the city.
3. Though growth is embryonic for most of the rural MSA counties, DeSoto County is urbanizing rapidly.

The sprawl in the Memphis area is beginning to resemble that of other metropolitan areas. The city of Memphis still controls most of the urban area; however, that will not be true in a couple of decades if growth continues.

**Government Debt.** Local governments issue bonds for several reasons. Generally, they are issued to cover the costs of public infrastructure investment. For the Memphis MSA, most government debt is contained in the one urban county, Shelby. From the *City and County Data Book 1999*, the governments in Shelby County issued 94.1 percent of the five-county Memphis MSA governmental debt.<sup>8</sup>

Table 4.1 provides a 1989 to 1999 overview of long-term debt in Shelby County. These data, compiled by the Memphis Chamber of Commerce, reflect a different database than that contained in fiscal year-end data by the specific governments in the other tables of this section. Nevertheless, the levels of government debt seem to support the idea that government obligations are growing quickly, more quickly than population growth or inflation would indicate. From 1988 to 1999,

local governmental debt rose rapidly. In particular, while total long-term debt rose 189.3 percent from \$824.9 million to \$2,386.7 million,

- City and county school debt rose 367.5 percent to \$550 million,
- County government debt rose 309.8 percent to \$1,200 million, and
- City government debt rose only 53.6 percent to \$636.7 million.

On a per-capita basis, this growth in governmental debt does not look much different. School and county debt rose most rapidly—from \$144 per capita in 1988 to \$632 per capita in 1999 for the two public school systems; and, from \$358 to \$1,378 per capita for the county government throughout the same time period. On a nominal basis, total debt per capita in Shelby County rose by 9.51 percent per year from \$1,009 in 1988 to \$2,741 in 1999. When these data are reduced to real (1999) dollars to correct for inflation, the growth rate of governmental debt per capita was still 6.14 percent per year.<sup>9</sup>

In terms of size, growth has brought rising costs. Given its current configuration in terms of social debt, the population growth and the economic growth in Shelby County have not allowed for more efficient government. In fact, the Memphis city schools continue to rank low on the annual education score card issued by Tennessee state government. In addition, while the regional business community views both the city and county governments as pro development, neither has been noteworthy in reducing crime or managing the development process.

Sprawl is fundamental to the way we manage current population and business expansion. While there may be room for blame because of the excesses by public officials, the more likely explanation for rising costs is that financing new infrastructure in a sprawling city is very expensive. More importantly, these expenses rise more rapidly than the growth of the regional economy, so that government debt becomes a bigger burden every year. Local government

attempts to provide the foundation for future economic and business growth, but finds it increasingly expensive using current land expansion policies.

These data indicate why it has been so difficult to contain government expenditures during the past decade or two. The path of growth for the past decade should inform us of the path for the next decade. As we attempt to finance more new schools, roads, and basic infrastructure for the rest of (currently) rural Shelby County and expand into the other counties of the MSA, the costs (in terms of debt) will rise in such a manner that government will become increasingly less cost-efficient.

**Debt and Expenditures:** Tables 4.2 and 4.3 allow for a slightly different analysis of debt and expenditures for the two primary governmental entities in Shelby County—the city of Memphis and Shelby County government.<sup>10</sup> Using data sets from their annual reports, total debt for these two governments rose from \$720.9 million in 1990 to \$1,626.3 in 1999. City debt was older than county debt, so that debt service for the city includes more payments on principal. Consequently, while debt service for the county was considerably less than the city's in 1990, by 1999 they were almost equal.

These tables provide a slightly different view of the inefficiency problems in how regional government provides infrastructure. Also reflected in Table 4.1, during the 1990s, debt rose in the city. But, most importantly, running city government became more expensive as the physical size grew through minor annexations and the population remained the same. Debt service per capita was more expensive, but it was only the tip of the rising costs for city government. Overall, city government expenditures rose from \$284 million in 1990 to \$416 million in 1999. With a stable population, per capita expenditures by the city rose from \$466 in 1990 to \$637 in 1999. Expenditures have almost doubled and are growing more rapidly than the price level.

Shelby County government did not follow the exact same path. While its debt rose dramatically in size, debt service expenditures grew slowly from \$72 per capita to \$85 per capita.

Overall county government expenditures per capita grew less rapidly than the prices in general. However, these optimistic expenditure numbers for county government hide the growth in expenditures for critical services.

**Critical Services:** The growth of social services—public safety, roads, and public schools—is closely connected to urban sprawl. In each case, sprawl requires considerable expansion of services to connect the growing metropolitan area. Table 4.4 provides data on public safety and road maintenance.<sup>11</sup> The story for public safety is quite clear—the increase in expenditures in this area has been quite dramatic. The two governments are spending close to twice as much in 1999 as they did in 1990. Per capita, police and judicial enforcement rose from \$161 in 1990 to \$287 in 1999, a 6.6 percent per-year growth rate.

The sprawling city requires an expanding system. In 1990, the Memphis MSA had 3,107 miles of roads. Most of those roads were local, neighborhood roads—2,415 miles (77.7 percent). The area also had 72 miles of interstate and 716 miles of arterial and collector roads for intra-area transportation. In 1990, these roads carried 16.1 million miles of driving per day, 86.6 percent of which were on the interstate, arterial, and collector portion of the road system. (DOT, 1990) The road system followed the 80/20 rule of thumb—approximately 80 percent of the traffic occurs on 20 percent of the roads.

Interestingly, the expenditures on road maintenance did not rise during the 1990s. In fact, the dollar volume peaked during the early 1990s, fell dramatically and then rose slowly to slightly more than \$40 million in 1999. State of Tennessee expenditures for roads in Shelby County also followed an episodic pattern, rising from \$20 million in 1990 to \$40 million in 1995, and then falling back to \$20 million by 1999. Of course, road projects are inherently episodic, and the state and the federal governments financed the major arterial roads. In addition, longitudinal data sets on road and highway expenditures, particularly by area, are very difficult to construct for Shelby County.

Expenditures for education also are rising for the growing urban area (Table 4.5). From 1988 to 1999, city schools have seen their budget increase from \$345.5 million to \$627.7 million, while the number of schools has declined slightly and the expenditure per pupil increased from \$3,472 to \$6,189. During the same time period, the county public school system increased the number of schools by 11 to 47 schools, they also more than doubled their expenditures and increased expenditures per pupil from \$2,752 to \$4,832.

Primary and secondary schools have been a major political issue in the area.<sup>12</sup> Students in the city school system are predominantly black, while those in the county are mostly white. Movement to the suburbs by middle class parents—both black and white—is precipitated partially by the perception that the city schools are inferior. During the past decade, however, the main factor for both systems is that they have become considerably more expensive to operate. Both systems experienced expenditure growth in excess of inflation—5.40 percent per year for the city schools and 5.25 percent per year for the county schools.

**Summary:** The cost of running regional government, without noticeable increases in quality, has risen rapidly during the 1990s. The most straightforward measure of this rising inefficiency of regional government is the quantity of debt issued by the three largest government systems: the two operating governments (the city and Shelby County) and the combined public school systems. The story of Memphis, as it grew and prospered during the 1990s, also is a story of rising costs per capita for governmental infrastructure.

If Memphis continues to prosper in the first decade of the 21st century, the problem will worsen. To live in urban sprawl, citizens must be willing to transfer larger shares of their growing incomes to the government.

Part IV

Tables

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Table 4.1  
**General Long-Term Debt of Schools, County and City Government in  
Shelby County**

Table 4.2  
**City of Memphis Debt and Expenditures**

Table 4.3  
**Shelby County Government Debt and Expenditures**

Table 4.4  
**Local Government Expenditures for Critical Services**

Table 4.5  
**Local Government Expenditures for Education**

Table 4.1

**General Long-Term Debt of Schools, County and City Government in Shelby County**

	1988	1990	1992	1994	1996	1998	1999
County Population	817,583	827,868	841,610	854,312	864,947	867,804	870,786
Schools	\$117,648,000	\$150,199,018	\$195,195,418	\$250,376,076	\$320,483,309	\$380,772,904	\$550,000,000
Per Capita	\$144	\$181	\$232	\$293	\$371	\$439	\$632
County Total	\$292,830,000	\$413,906,086	\$493,654,562	\$664,595,176	\$740,358,967	\$902,396,669	\$1,200,000,000
Per Capita	\$358	\$500	\$587	\$778	\$856	\$1,040	\$1,378
City Total	\$414,435,000	\$403,171,805	\$412,665,363	\$437,822,000	\$435,289,000	\$507,747,000	\$636,689,000
Per Capita	\$620	\$661	\$656	\$697	\$689	\$840	\$974
Total City & County Debt	\$824,913,000	\$967,276,909	\$1,101,515,343	\$1,352,793,252	\$1,496,131,276	\$1,790,916,573	\$2,386,689,000
Total Debt per Capita	\$1,009	\$1,168	\$1,309	\$1,583	\$1,730	\$2,064	\$2,741
Purchasing Power 1999	1.410	1.277	1.189	1.125	1.064	1.022	1.000
Real Debt per Capita	\$1,423	\$1,492	\$1,556	\$1,781	\$1,840	\$2,109	\$2,741

Sources: City of Memphis Finance and Administration, Shelby County Dept. of Finance, City of Memphis School Board, and Shelby County School Board. All data on debt compiled by the Memphis Area Chamber of Commerce. In 1988 through 1992, city of Memphis debt includes city school debt. County population data is from two web pages: <<http://fisher.lib.virginia.edu/cgi-local/reisbin/county2.cgi/>> and <<http://www.memphischamber.com/economy/met.html>>.

Table 4.2

**City of Memphis Debt and Expenditures**  
1988-1999 Total and Per Capita

Fiscal Year	Population	Total Debt (000)	Debt per Capita	Debt Service (000)	Debt Service per Capita	Gen Fund Exp (000)	Expend per Capita
1999	653,507	\$593,193	\$908	\$74,639	\$114	\$416,246	\$637
1998	604,242	\$458,419	\$759	\$67,819	\$112	\$387,384	\$641
1997	637,492	\$420,216	\$659	\$67,254	\$105	\$356,832	\$560
1996	631,626	\$381,874	\$605	\$64,539	\$102	\$328,427	\$520
1995	623,902	\$347,662	\$557	\$65,613	\$105	\$318,848	\$511
1994	628,375	\$370,825	\$590	\$64,808	\$103	\$308,695	\$491
1993	618,981	\$344,950	\$557	\$66,667	\$108	\$298,456	\$482
1992	628,865	\$330,940	\$526	\$64,712	\$103	\$307,538	\$489
1991	619,981	\$321,510	\$519	\$64,786	\$104	\$289,380	\$467
1990	610,337	\$309,974	\$508	\$63,550	\$104	\$284,526	\$466
1989	651,081	\$324,392	\$498	\$63,214	\$97	\$272,823	\$419
1988	668,935	\$351,430	\$525	\$57,753	\$86	\$265,965	\$398

Source: The debt data is from *Operating Budget*, City of Memphis, Fiscal Year 1994, population for 1998 through 1998 is from *Uniform Crime Reports*, other data are from two web pages: <<http://www.memphischamber.com/economy/met.html>> and <[http://www.ci.memphis.tn.us/finace\\_dic/x\\_statistical\\_information.pdf](http://www.ci.memphis.tn.us/finace_dic/x_statistical_information.pdf)>.

Table 4.3

**Shelby County Government Debt and Expenditures**  
1990-1999 Total and Per Capita

Fiscal Year	Population	Total Debt (000)	Debt per Capita	Debt Service (000)	Debt Service per Capita	Gen Fund Exp (000)	Expend per Capita
1999	870,786	\$1,033,072	\$1,186	\$74,441	\$85	\$522,606	\$600
1998	867,804	\$887,994	\$1,023	\$65,539	\$76	\$482,885	\$556
1997	865,970	\$893,797	\$1,032	\$67,095	\$77	\$464,252	\$536
1996	864,947	\$725,285	\$839	\$59,093	\$68	\$448,261	\$518
1995	860,911	\$743,715	\$864	\$52,912	\$61	\$431,184	\$501
1994	854,312	\$663,595	\$777	\$49,076	\$57	\$404,226	\$473
1993	846,597	\$565,270	\$668	\$51,711	\$61	\$552,859	\$653
1992	841,610	\$491,654	\$584	\$50,981	\$61	\$542,125	\$644
1991	834,791	\$442,324	\$530	\$45,020	\$54	\$456,810	\$547
1990	827,868	\$410,906	\$496	\$59,993	\$72	\$440,524	\$532

Source: *Comprehensive Financial Report*, Shelby County, Tenn., June 30, 1999, Population data are from *USA Counties 1998*, <<http://www.memchamber.com/economy/met.html>> and <<http://fisher.lbb.virginia.edu/cgi-local/reisbin/county2.cgi>>.



Table 4.4

**Local Government Expenditures for Critical Services**1990-1999  
(thousand dollars)

Fiscal Year	City of Memphis		Shelby County		Total *	
	Police	Transportation & Environment	Law Enforcement & Judicial	Roads & Public Works	Law Enforcement	Road Maintenance
1999	\$128,968	\$26,444	\$121,212	\$14,330	\$250,180	\$40,774
1998	\$116,752	\$23,930	\$108,836	\$16,625	\$225,588	\$40,555
1997	\$105,330	\$23,763	\$98,779	\$16,542	\$204,109	\$40,305
1996	\$95,773	\$22,663	\$91,973	\$13,041	\$187,746	\$35,704
1995	\$90,371	\$16,915	\$88,409	\$13,339	\$178,780	\$30,254
1994	\$88,828	\$17,028	\$79,966	\$18,548	\$168,794	\$35,576
1993	\$79,479	\$16,824	\$77,322	\$17,659	\$156,801	\$34,483
1992	\$80,411	\$45,302	\$75,301	\$18,454	\$155,712	\$63,756
1991	\$75,659	\$42,426	\$68,087	\$17,879	\$143,746	\$60,305
1990	\$70,985	\$41,978	\$61,994	\$11,716	\$132,979	\$53,694
1989	\$65,688	\$42,806	\$53,819	\$14,304	\$119,507	\$57,110

\* Does not include the suburban towns in Shelby County.

Source: *Comprehensive Annual Financial Report*, City of Memphis, Tenn., June 30, 1998, and *Comprehensive Annual Financial Report*, Shelby County, Tenn., June 30, 1999.

Table 4.5

**Local Government Expenditures for Education**  
1988-1998

Fiscal Year	City of Memphis			Shelby County		
	No. of Public Schools	Total Current Expenditures (000)	Expenditure per Pupil in ADA*	No. of Public Schools	Total Current Expenditures (000)	Expenditure per Pupil in ADA*
1999	161	\$627,671	\$6,189	47	\$221,797	\$4,832
1998	164	\$583,657	\$5,855	46	\$204,895	\$4,616
1997	164	\$565,169	\$5,712	44	\$191,191	\$4,392
1996	163	\$539,877	\$5,418	44	\$177,213	\$4,140
1995	164	\$501,804	\$5,079	41	\$162,050	\$3,923
1994	164	\$472,400	\$4,836	41	\$146,581	\$3,706
1993	164	\$446,724	\$4,598	42	\$138,943	\$3,582
1992	162	\$420,228	\$4,366	39	\$122,560	\$3,276
1991	161	\$391,554	\$4,081	39	\$115,096	\$3,250
1990	163	\$371,527	\$3,831	38	\$103,583	\$3,038
1989	165	\$358,068	\$3,657	36	\$95,045	\$2,923
1988	165	\$345,489	\$3,472	36	\$86,505	\$2,752

\* ADA = average daily attendance

Source: *Annual Statistical Report*, Tennessee Department of Education, <<http://www.state.tn.us/education/>>.

## Part V

# Inefficiency and Urban Growth

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With the present possibilities of technical advance, the communication and transportation problems that once made cities essential can be solved outside an urban context.  
(Margaret Mead, 1957)

Ms. Mead's prediction of the obsolescence of the urban environment has not proven true. Modern culture and, more importantly, modern market capitalism have remained primarily an urban phenomenon. The benefits of this type of city are numerous. Much of modern urban economics, as a discipline, is devoted to listing the efficiency virtues of this geographic creation.<sup>13</sup>

But urban sprawl was created at a cost, and those costs are quite large. More importantly, the data imply an alarming characteristic of the modern metropolitan area—it is becoming less efficient. Growth brings a long-term condition of geographic diseconomies of scale, notably in commuting and infrastructure provision.

**Key Findings:** Urban sprawl usually is addressed as an issue of poor urban design or as a source of rising social inequities in the modern urban areas. This analysis has focused on the costs of urban sprawl. We asked the question: Is sprawl inefficient? While it is difficult to argue an emphatic “yes,” given the lack of evidence from a compact urban model, the spiraling cost of sprawl suggests it is a model whose useful life is on the wane. In the process, this paper reviewed three components of sprawl in the Memphis MSA: jobs, business and demographics; commuting; and governmental infrastructure costs.

The New Urbanism is presented as a possible alternative to the sprawling metropolitan model. This social agenda calls for a new physical design for the city. Specifically, the New Urbanism identifies the car and the vast road system it requires as a problem. In structural terms, the primary problem that our transporta-

tion brings to society is a highly decentralized city with functional segregation of housing, commercial, and industrial activities with further segmentation by race and income class.

This paper's hypothesis is that sprawl also brings economic inefficiency to the organization of the modern city. While business agglomeration enhances the efficiency of operating an urban economy, the low-density, sprawled city suffers from diseconomies of scale where each new geographic expansion raises the costs of providing the social infrastructure necessary for the functioning of a metropolitan area. Finally, the process of sprawl is very hard to stop because of the existence of network economies. That is, once citizens, business, and government understand how to operate and build a sprawling city based on the automobile, no alternative structural organization seems possible or practical.

The findings of this study of urban sprawl in the Memphis MSA are listed below:

- Memphis has a diversified economy with a significant focus on transportation and wholesale trade.
- Memphis industry—particularly manufacturing, trade, and services—tends to be located in the city where the number of jobs, the size of business establishments, and the earnings per employee are higher than in the suburbs.
- Housing data indicate that the suburbs are growing more rapidly than the city, attract

more white than black residents; have far less poverty; and, generally, have higher incomes per household.

- The residents of the city of Memphis are mostly black. It is also older, has lower per-capita incomes, and suffers from far higher crime rates than the rest of the MSA (the suburbs).
- New construction helps identify the functional segregation of the metropolitan area. While three-fourths of the new residential units built in 1995 were in the suburbs, more than half the commercial construction, and over 95 percent of the industrial construction, were in the city of Memphis.
- The implicit labor costs of commuting are extremely high. Long commutes (20 minutes or longer each way) make up the largest portion of the cost of work-based travel. In the Memphis MSA, commuting costs add up to \$1,278 million per year in lost labor time, a figure that breaks down to \$10.41 per day for the typical city commuter and \$11.11 per day for the typical suburban commuter.
- The explicit costs of operating a car for commuting also are large. Again, long commutes are responsible for the largest portion of automobile operating costs. Memphis commuters spend approximately \$1,685 million per year to drive to and from work.
- Cars are major sources of mobile pollution. Each year, commuting automobiles in the Memphis area place millions of pounds of pollutants into the environment.
- Commuting makes up only a minority of all miles driven in the urban economy. The costs of maintaining an urban transportation network based solely on the

automobile are at least three times the costs of commuting.

- The costs of financing public infrastructure for the Memphis MSA have risen rapidly. As an indication of diseconomies of urban scale, during the past decade, debt per person for the three major governments in the area has risen rapidly in real dollars.
- Expenditures for the city of Memphis and Shelby County government also have risen on a real dollars per-capita basis.
- While there is no clear pattern of expenditures for road maintenance and construction in Shelby County during the 1990s, expenditures for law enforcement have risen dramatically during a time when local crime rates have not fallen significantly.
- While the number of schools has declined in the city and risen in the suburbs, during the 1990s, education expenditures per pupil for primary and secondary schools have risen dramatically.

Each individual piece of data on urban sprawl is certainly explainable by a number of reasons other than a car-based, functionally segregated urban economy. However, as a whole, the numbers point to one conclusion. The Memphis MSA is an expensive city to operate in terms of sprawl. Unless action is taken, Memphis' rising costs for operating the basic infrastructure operating system will continue.

**Alternatives to Urban Sprawl:** New Urbanist recommendations tend to be straightforward. They recommend the replacement of cars with rapid transit, construction of high-density housing, integration of social classes, and mixing of commercial/residential buildings. For the Memphis MSA, those alternatives seem somewhat far-fetched. In addition, urban sprawl in the Memphis metropolitan area is now crossing county and state boundaries so that future

regional development planning will become more difficult.

The first step that needs to be accomplished is increasing awareness. Currently, government decisions and development planning ignore the costs of sprawl. Recognizing that geographic expansion has high costs is imperative to future urban design and planning. As long as the community only notices the benefits of sprawl, consideration of alternatives is unlikely.

The second step is to recognize that most of the important decisions regarding the structure of the metropolitan area are outside the marketplace of individual decisions. Current governmental policies encourage building new roads, new schools, and new infrastructure to facilitate residential and commercial development in new urban areas. These social decisions then facilitate individual decisions that encourage sprawl. Additional sprawl will accommodate further decentralization, more road construction, and more functional segregation of living and working places.

Some economists have long argued that many of the features of infrastructure, education, and government services do not need to be offered to the public on a “free-use” basis—paid for only through taxes that are not directly related to the services provided. Economists have recommended that we institute a fee-for-service approach for using most governmental services, particularly roads. However, these pricing proposals have had almost no resonance with the general public. Consequently, the reduction of urban sprawl probably will be a long-term process of persuading the public that sprawl is inequitable, inefficient, and a poor organizational technique for a city. Public decisions to stop financing the engine of sprawl will have to occur before change really can occur at the neighborhood level.

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## Endnotes

- 1 Race and national origin classifications follow designations of the U.S. Bureau of the Census: white, black, Asian, American Indian/Eskimo, and Hispanic.
- 2 The New Urbanism is easiest to research on the Internet. The web page for the Brookings Institution devoted considerable space to the issue. The Smart Growth and Institute for Urban Land Policy also have useful web sites carrying news articles and research papers. Finally, the Sierra Club has a new document on urban sprawl. See References for web addresses.
- 3 But, in their analysis of "New Urbanist" housing relative to suburban housing, Eppli and Tu conclude that single-family homes in new urbanist communities sell for significantly more than homes in conventional neighborhoods. Using sophisticated statistical techniques on a fairly small sample of communities (where comparable housing sales were available), they found in the late 1990s that a New Urbanist community house sold for \$20,189 (11 percent) more than a comparable home in the suburbs (1999, pp. 73).
- 4 This analysis on commuting is based on the 1990 census data on commuting. Even though the Memphis MSA has grown dramatically during the 1990s, the number of commutes has not been adjusted upward. The various costs reflect surveys done during the 1990s. Earnings are for 1997. Emissions reflect 1997 estimates by the EPA for driving on a summer day. The speed (mph) of commuting is from a survey done in 1995. Consequently, the costs of commuting reflect an estimate of conditions during the 1990s. They are not for any one year. Finally, every effort was made to use conservative assumptions, so that costs reflect minimums, not maximums.
- 5 The word "car" is used interchangeably with automobile and passenger car. In this analysis, I have used numbers in terms of speed of travel, costs of operation or environmental emissions that come from passenger cars or light-duty vehicles. That is, the analysis uses very fuel-effi-

- cient and new car assumptions. The actual costs of commuting would be far higher if the data were adjusted for trucks, SUVs and older cars. No estimates of the costs of operating commercial vehicles in a sprawling city were attempted.
- <sup>6</sup> The calculations assume a full-time job for each commuter working 2080 hours per year or 260 eight-hour work days. Each commuter is assumed to only commute once—each way—per day.
- <sup>7</sup> The estimates for the amount of time spent on the road vary depending on the variable (trips, miles and time) measures and the type of survey used to collect the data. John Robinson and Geoffrey Godley (1997) estimate for 1985 that women spend 35.4 percent of their work time commuting while men spend 23.9 percent. Another study by Expectancy Data (1998) estimates that men and women spend over half of their travel time commuting and 5 to 7 percent of waking hours commuting.
- <sup>8</sup> Consistent data on governmental debt or expenditures are very difficult to accumulate. Each agency that collects or issues data on local government has different numbers, sometimes significantly different.
- <sup>9</sup> The county government officially represents the entire population of the county. However, it is perceived as the government that represents the 25 percent of the population outside the city of Memphis. If per capita ratios were calculated on this smaller population base, county government debt per capita would have risen from \$1,970 in 1988 to \$5,523 in 1999.
- <sup>10</sup> These two governments carry on most of the functions of local government. However, the six smaller cities each have a governmental structure, regulate land use, and enforce local ordinances with local police. The combined expenditures of these six towns were approximately \$56 million in 1995. Good historical data were unavailable for these cities. These expenditures of the small towns only reinforce the general conclusions of this part of the analysis.
- <sup>11</sup> These data do not include public safety expenditures for the six suburban towns in Shelby County. Data for these suburban cities were not available in a consistent manner. In addition, developers are responsible for initial infrastructure development in many neighborhoods. These expenditures do not seem to be available over time. Finally, I was unable to find quality data on basic water and sewage expenditures by area of the city.
- <sup>12</sup> The suburban towns in Shelby County do not have independent school systems. The city school system enrolls all students in the city, and the county school system enrolls all students in the rest of Shelby County. Private and parochial schools represent about 10 percent of primary and secondary school enrollment in the area.
- <sup>13</sup> See, for example, the two long review articles by Glaeser (2000) and Mills (2000). Both of these articles see the suburbanized city as natural outcomes of consumer choice and the free market. Public policy that would reverse current trends toward sprawl is perceived as undemocratic and inefficient.