The Importance of the Central City to the Regional and National Economy: A Review of the Arguments and Empirical Evidence

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In the postwar period, population and employment have been growing rapidly in suburban areas, whereas in most central cities they have been declining or growing slowly. Fifty-seven percent of metropolitan statistical area (MSA) residents and 70 percent of MSA jobs were located in central cities in 1950. Today central cities contain only about 37 percent of MSA residents and 45 percent of MSA jobs (Mieszkowski and Mills, 1993).

The rapid suburbanization of jobs and people and, in particular, the maturation of "edge cities" (Garreau, 1994) have led to a debate, which started in the popular press and spread to the academic community, over the importance of the central city to the regional economy. A number of journalists (Turque and Washington, 1991; *Louisville Courier-Journal*, 1991; *Philadelphia Inquirer*, 1991; Garreau, 1991) and academics (Hartshorn and Muller, 1989; Fishman, 1987) have argued that suburbs are no longer dependent on central cities. The relationship between central cities and their suburbs is seen as competitive rather than complementary. The implication is that the destiny of suburban communities is not tied to the fortunes—or more appropriately, the misfortunes—of their central cities. Others (Persky et al., 1991; Savitch et al., 1993; Voith, 1992; Ledebur and Barnes, 1992) have argued that central cities and their suburban areas remain closely interconnected. The fortunes of suburban communities are tied to those of their central cities, and the policy implication is that both cities and suburbs could improve their welfare through cooperative actions to arrest urban decline.[1]

This article reviews the arguments that have been made on both sides of the debate. Evidence that has a bearing on the validity of each argument is also reviewed.

Before outlining the contents of this article, it is beneficial to identify the five sources of interdependence that allegedly link the economies of central cities and their suburbs. First, the fortunes of suburbs may be tied to those of their central cities to the extent that outsiders' perceptions of the region are influenced by conditions prevailing within the core. Second, because of their location or history, central cities may contain amenities

that are valued throughout the region. Third, individual central cities may provide a "sense of place" that is valued not only by their residents but also by outsiders. Fourth, the fiscal problems endemic to a declining central city may raise tax burdens in suburban areas and thereby retard economic development. Finally, central cities may offer unique agglomeration economies that define an important and specialized role for the central city in the regional economy.

The first four sources of central city-suburb interdependence are dealt with in the next section of this article, and the issue of agglomeration economies is treated separately in the second section. Agglomeration economies receive special attention for three reasons. First, much more has been written on agglomeration economies than on other factors. Second, these economies are commonly identified as the primary factor that defines the economic importance of central cities. Third, empirical evidence on agglomeration economies exists, although no evidence was found either pro or con that relates to the quantitative significance of the other possible sources of interdependence. The third section of this article reviews a number of statistical studies which purport that central cities and suburbs are interdependent, although they make no attempt to identify the source(s) of this interdependence. The article concludes with a summary and suggestions for future research.

Image Effects, Tax Burdens, Amenities, and Sense of Place

A declining central city may reduce employment and population growth in suburban areas if the image that outsiders have of the region is molded by their knowledge of social problems prevailing within the core. Voith (1992) quotes from *The Economist* (November 2, 1991) to illustrate this position:

> Nowhere is the separation of [the city and suburbs] so destructive. . .as in Detroit. . .It is becoming obvious that Detroit's troubles cannot be contained. Company headhunters, even in the distant suburbs, find it difficult to lure top-notch talent to a place with such a negative image.

Negative image effects may arise for two distinct reasons. First, people may ascribe central-city problems to suburban areas, either out of ignorance or in the expectation that the problems will eventually spread beyond central-city boundaries. Second, outsiders may anticipate that sooner or later, if they move to a region whose central city is plagued by significant problems, they will be required to pay more taxes.[2] This expectation may have grown in recent years as the Federal Government has shifted more responsibility to State and local governments for solving their own social problems.

Unfortunately, there is no empirical evidence (other than anecdotal) on the quantitative significance of image effects. This lack of evidence is somewhat surprising, since existing data and methods could be used to relate the population or employment growth of suburbs or regions to measurable central-city problems. In particular, it would be of considerable interest to determine the impact of high central-city crime rates on the growth of suburban counties located various distances from the center of the metropolitan area.

In addition to being related to image effects, the possibility that a higher level of government (that is, the county or the State) will be required to play a larger role in addressing the fiscal and social problems of the central city implies not only higher taxes for suburban residents but also less economic development in suburban areas. After conducting an extensive review of the empirical literature on the location of firms, Bartik (1991) con-

cludes that higher State and local taxes discourage economic growth. The literature suggests that this is especially true if higher taxes are used for welfare expenditures.

In regard to amenities as a source of interdependence, the historical development of central cities has frequently left them with natural or man-made assets that may be valued throughout the region or even the Nation. For example, virtually every central city has either a waterfront park or a historic district that could not easily be reproduced in the suburbs. As noted by Voith (1992), "If a declining city provides fewer or less attractive regionally valued amenities, it will render the entire region less desirable." He emphasizes that an erosion in the value of central-city amenities may cause suburban properties, especially those with good accessibility to the central city, to appreciate less in value. In the jargon of economists, unique central-city amenities are public goods which yield benefits that spill over into the suburbs. Once again, although this source of central city-suburban interdependence is plausible, if not obvious, no one has estimated interarea hedonic wage or housing price equations that would reveal its quantitative significance (that is, the value that suburbanites place on these amenities). Moreover, central-city amenities have not been included as independent variables in migration or quality-of-life studies, at least not those that would be considered unique to the central city.

The amenities identified above are considered tangible in nature. Another type of central-city amenity that may have value to people living elsewhere is intangible. Bolton (1989, 1992) has argued that people attach value to a "sense of place," which he defines as "a sense of community and cooperation that is shaped by a particular geographical setting, including the natural and built environment, culture, and past history." A recognition of this sense of place leads to two arguments in favor of arresting central-city decline. First, population out-migration accompanying central-city decline erodes the sense of place; thus, the exiting individuals produce negative externalities on those central-city residents who are left behind. Second, the sense of place that exists within a particular central city—Atlanta, for example—may have value not only to Atlantans but also to people elsewhere. Bolton suggests that outsiders may be willing to pay for the preservation of this sense of place because they want the option of moving to Atlanta. In addition to this "option value," he identifies "pure existence value" and "donor preferences" as other reasons why outsiders may have an interest in preserving Atlanta's sense of place. Pure existence value is a concept popular in environmental economies and, in the present context, refers to the value people may attach to a sense of place for no other reason than that they believe it is worthwhile. Donor preferences may be relevant to the sense of place if "donors put a positive value on the recipients continuing to consume in their existing place, and on their enjoying the benefits of an ongoing community."

Bolton relates his sense-of-place concept to the debate over "place prosperity" versus "people prosperity." He laments the fact that place-specific policies have become less popular and argues that such policies are justified to help preserve a sense of community in places where it already exists (for example, in central cities).

As in the case of tangible amenities, empirical work on the importance of a sense of place to either insiders or outsiders does not exist. Bolton explores the measurement problems associated with the latter at length, acknowledging the difficulties. Nevertheless, he remains optimistic and offers excellent suggestions for empirical research.

In summary, all of the sources of central city-suburban interdependence discussed in this section undoubtedly play a role in linking the welfare of people residing in the two areas. The unresolved issues are the importance of these links in both an absolute and relative sense and the way this importance has changed over time in response to the suburbanization phenomenon.

Agglomeration Economies

This section is divided into two parts. The first part presents the arguments—both pro and con—related to the proposition that central cities provide unique agglomeration economies which define an important and highly specialized role for these cities in the regional and national economy. The second part reviews the empirical evidence that has a bearing on the arguments presented in the first part.

The Arguments

Pro. The source of potential interdependence between central-city and suburban economies that has received the greatest attention among urbanologists is agglomeration economies. One of the best definitions of agglomeration economies has been provided by Nickolas Kaldor (1970), who states that they are:

> . . .nothing else but the existence of increasing returns to scale—using that term in the broadest sense—in processing activities. These are not just the economies of large-scale production, commonly considered, but the cumulative advantages accruing from the growth of industry itself—the development of skill and know-how; the opportunities for easy communication of ideas and experience; the opportunity of ever-increasing differentiation of processes and of specialization in human activities.

Agglomeration economies are commonly divided into two types: localization economies and urbanization economies. Localization economies are those in which production cost savings accrue to firms from locating close to other firms in the same, or a related, industry. Urbanization economies occur when the production costs of firms decline as the aggregate level of economic activity expands within an area. Urbanization economies differ from localization economies in that urbanization economies generate benefits for all firms, not just those in a particular industry. Because of their more compact development, central cities are thought to have an advantage over suburban areas in both localization and urbanization economies.

Regardless of their type, agglomeration economies have three principal causes: labor market economies, scale economies in the production of intermediate inputs, and communication economies (O'Sullivan, 1993). Labor market economies cause localization economies because when firms in a given industry concentrate within an urban area, they have access to a common pool of trained labor and are able to reduce the search and training costs associated with hiring new workers. In the case of urbanization economies, big city labor markets are so large that they can support not only a number of employment agencies but also some that specialize in finding particular kinds of personnel. However, since workers are generally highly mobile within metropolitan areas, firms can realize labor market economies regardless of whether they locate in the central city or the suburban ring. Therefore, it is hard to make the case that agglomeration economies arising from labor assembly particularly favor central cities.[3]

In contrast to labor market economies, the other two causes of agglomeration economies may clearly favor central cities. The locational advantage of central cities arises from the fact that both scale economies in intermediate inputs and communication economies involve interfirm face-to-face contact, which can occur at lower cost in the central city where, especially in the central business district, physical distances between firms are the shortest. By clustering around a common supplier with a level of output high enough to achieve scale economies, firms can save on input costs. The classic example of agglomeration economies due to scale economies in the production of intermediate inputs is

provided by the concentration of the ladies' garment industry in New York City. "The industry in New York is large enough to provide a profitable local market for a host of specialized suppliers. Thus, without incurring the risks and costs of carrying large inventories, the garment manufacturer who locates in New York gains ready access to a full line of the inputs needed in a trade where style requirements change rapidly and speed and flexibility are crucial" (Heilbrun, 1987). As this example suggests, demanders and suppliers frequently must interact face to face in the design or fabrication of the intermediate input. Hence central cities are said to have a locational advantage.

Scale economies in intermediate inputs also help to explain urbanization economies. For example, manufacturing companies may choose to locate their headquarters in downtown central business districts (CBDs) or edge cities in order to minimize the cost of face-to-face contacts with suppliers of their corporate services, such as lawyers, bankers, and accountants.

Communication economies are those in which the exchange of ideas, augmentation of human capital, and diffusion of technology come from face-to-face interactions, both formal and informal, among workers from different firms. Communication economies are considered to be related to the rate of technical change:

> To the extent that proximity increases the rate at which new technologies are developed, the agglomeration of economic activity may generate productivity growth through its effect on the rate of technical change. It is in this way that Jacobs (1969) suggests that cities may serve as the engines of growth—the endogenous source of productivity growth—for nations (Beeson, 1992).

The importance of physical proximity to intellectual progress, and thereby to economic growth, has recently resurfaced in the "new regional economies" literature (Glaeser, 1993). This literature is in the tradition of neoclassical growth theory, which holds that economic growth depends on the quality and quantity of labor, the quality and quantity of capital, and technical knowledge. Cities are hypothesized to expedite the transfer of knowledge and the creation of knowledge that affects the growth factors identified by the neoclassical model, in particular the quality of labor and technical change. Much of this literature follows Jacobs (1969) by emphasizing that dense urban environments can lead to unexpected combinations of seemingly unrelated ideas that may provide important leaps forward in knowledge.

According to some authors (Persky et al., 1991), the importance of communication economies as a source of economic growth is magnified by the shift from "goods-producing" to "information-processing" industries at the national level. This theory is the basis for the argument that central cities are making an increasing contribution to the growth of the national economy, despite the massive suburbanization of jobs and people described at the beginning of this article.

Face-to-face interactions associated with communication economies and scale economies in intermediate inputs are believed to be especially important in office industries. "The convenience of face-to-face contacts for the exchange of limited, ephemeral information has long been recognized by geographers and planners as an important force shaping the location and construction of office employment" (Clapp, 1993). However, the importance of face-to-face contact is believed to vary among different types of offices and, within an office, among different types of activities. Regarding the former, urban economists have argued that higher order offices will outbid lower order offices for the most central locations. Higher order offices include corporate headquarters, banks and other

financial service providers, and accounting and law firms, all of which are complementary in providing high-level business services that require frequent daily contact between firms. Lower order offices, which are less dependent on face-to-face interaction, include small firms and branch offices catering to local businesses and individual households. Because higher order offices have historically concentrated in central cities and CBDs, these locations are sometimes said to be the command and control centers of their regional economies.

Activities within offices can also be differentiated according to their need for interfirm face-to-face contact. On this basis, office activities are dichotomized into front- and back-office components. According to the "decoupling hypothesis," advances in communication technology (in particular, electronic mail) have enabled firms to split their operations spatially. Back-office operations involving paper processing rather than face-to-face contact have moved to the suburbs where rents and wages are lower, whereas executives remain in the central city.

Based on these arguments, the central-city and suburban office markets are distinct, with high-level corporate activities concentrated in the city and low-level business and consumer services, as well as back-office operations, relegated to the suburbs. Therefore, the functional division of economic responsibility between the two areas makes them highly complementary and interdependent.

Con. Those who argue against the proposition that central cities play a unique role in the regional economy based on agglomeration economies make two points. First, that the widespread suburbanization of office development during the last 15 years signals the completion of an economically autonomous outer city, or edge city, that provides the same (if not better) opportunities for agglomeration economies as the central city. The following statements were made by an urban historian, two urban geographers, and an urban economist, respectively. Although the quotes express substantially the same sentiment, they complement one another and enrich our understanding of the independent central city and suburbs theory, because each reflects a different disciplinary perspective. Fishman, the urban historian, states:

> Without anyone planning or forecasting it the simultaneous movement of housing, industry, and connected development to the outskirts has created perimeter cities that are functionally independent of the urban core. In complete contrast to the residential or industrial cities of the past, these new cities contain along their superhighways all the specialized functions of a great metropolis (1987).

Hartshorn and Muller (1986) write:

> During the past two decades, as the nation's postindustrial economy and society emerged and began to mature, American metropolitan regions experienced a profound transformation in their structural and functional organization. The industrial-era metropolis, characterized by a dominant central-city core and a girdling ring of residential suburbs, turned inside out and split asunder in this period. With surprising speed in the 1970s and 80s, suburbs have evolved from a loosely-organized "bedroom community" into a full-fledged "outer city," characterized by metropolitan-level employment and activity concentrations and functional shifts that amount to nothing less than the achievement of suburban economic, social, and geographic independence from the nearby central city that spawned these satellite settlements several decades ago.

Hicks (1987) writes:

> The 1980s, however, has seen the economic bases of suburbs develop and diversify. As a result, suburbs are increasingly successful in attracting the full range of advanced services away from central cities. Everything from corporate headquarters and urban universities to centers of high culture and sports and entertainment complexes gravitate easily to new suburban locations. Viewed as an economic landscape, we find a restructuring of the economies within many central cities that has left them simply one among several nodal points in a dispersed metropolitan economy. As central cities now compete with their suburbs for the full range of advanced services, modern suburbs can no longer be regarded as derivative and dependent.

The second argument made against the proposition that central cities offer unique agglomeration economies is that advances in telecommunications technology will soon eliminate the need for central cities, since technology makes it possible to transact business without face-to-face contact. The following quote from Pascal (1987) is representative of this position:

> The era of the computer and the communications satellite is inhospitable to the high-density city. Clerical and record keeping functions have already begun to deurbanize. The distant suburbs and small towns of the U. S. are dotted with highly computerized complexes performing bookkeeping, billing, and archival tasks for banks and insurance companies. The newly emerging technologies will soon begin to provide excellent substitutes for face-to-face contact, the chief remaining raison d'etre for the traditional city.

Pascal applied the law of entropy and concluded that there will be a tendency toward complete areal uniformity in employment and population density. A similar theme was expressed earlier by Webber (1968), who believed that as a result of technical changes ". . .the glue that once held the spatial settlement together is now dissolving, and the settlement is dispersing over ever widening terrains."

The telecommunications argument, however, has two counterarguments. First, Clapp (1983) has identified several problems that must be addressed before assuming that telecommunications can be substituted for face-to-face contact:

> The social and psychological acceptance of two-way video communication is far from assured (Short et al., 1976); there may well be a long process of change in human behavior as this new technology is integrated. The preliminary evidence suggests that face-to-face contact is viewed as warmer (that is, more enjoyable) than telecommunications. Therefore, a certain amount of spatial clustering is virtually assured as man, a social animal, elects to enjoy proximity to his own kind.
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> Existing technology cannot reproduce all of the nuances of facial expression, body attitude, and ambiance which are routinely part of face-to-face contact. This suggests that some personal contact for high-level negotiation and planning meetings will always be necessary; however, the bulk of office jobs probably do not depend on these nuances. They may, however, depend on lines of authority or personal suasion which will be difficult to reproduce with telecommunications. One of the grave difficulties for public policy toward office

> relocation is how to hold constant the quality and quantity of the output of office activities.
>
> Another problem is related to the capital equipment necessary for extensive use of telecommunications. Many firms must have receiving/sending facilities. Furthermore, transmission infrastructure (for example, satellites and associated facilities) must be put in place. These capital investments will delay extensive implementation of telecommunications.
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> Legal problems also hamper the introduction of telecommunications. Many economic transactions are evidenced by signed documents (for example, bank drafts); original signatures are often required by law. The transportation of these documents is a major spatial problem. For example, banks and brokerage houses cluster around clearing facilities, which rapidly exchange financial documents. The time value of money provides an incentive for proximity to the clearinghouse.

Mills (1992) has questioned whether conveying information electronically will ever be an adequate substitute for face-to-face information exchange. He draws a distinction between unambiguous and ambiguous information: "Ambiguous information is information that requires an interactive and convergent set of exchanges before the final exchange can be consummated." Although the final exchange or agreement can be efficiently transmitted electronically, the interactive convergence to a solution requires face-to-face exchange.

The second counterargument to the notion that telecommunications will reduce the economic importance of the central city maintains that some central cities will prosper in the transformed environment. According to Moss (1987), ". . .cities that are centers for information-intensive services (for example, accounting, advertising, banking, law, management consulting, publishing) are likely to benefit from the greater use of sophisticated information and telecommunications technologies." He predicts that these cities will become international information centers providing business services to a global marketplace: "The face-to-face activities that occur in these cities have not been made obsolete by new technology; rather, technology has extended the geographic reach of the individuals and firms that transact business in these world capitals." However, although this may be true, there is the issue of how many cities are destined to become communication centers. On this point Netzer (1977) has argued that:

> . . .face-to-face contact demanding activities will concentrate in a few cities: there will be winners and losers, as some cities fare very badly indeed while some hold their own, or better. Clearly, cities that are located in regions that are expanding are likely to do better than cities located in declining regions, other things being equal. Also, within a given region, those face-to-face activities are likely to flourish in places that are perceived to be congenial places to live: Boston and San Francisco thus have an advantage over most other large cities for this reason.

The Evidence

Empirical investigations of these arguments are sparse, and there has been insufficient research to settle the debate over the uniqueness of central-city agglomeration economies. Nevertheless, enough evidence exists to reach some tentative conclusions, and it falls into two categories. First are the results that pertain to specific hypotheses. Second, various

data sources can be used to investigate the spatial distribution of different types of jobs between central-city and suburban areas. If central cities offer unique agglomeration economies that cause them to specialize in performing certain functions for the regional economy, then the industrial and occupational mix of employment should differ between cities and their suburbs.

Regarding specific hypotheses, there is evidence of the importance of face-to-face contacts as a locational determinant. For the other hypotheses, there is little or no evidence available. The latter will be considered first.

Two of the most significant, and divergent, hypotheses related to the economic importance of central cities are that central-city agglomeration economies represent a unique source of economic growth and that advances in telecommunications technology render central cities obsolete. Regarding the former, there are studies that have empirically investigated the relationship between agglomeration economies and productivity growth, but none tests the hypothesis that the agglomeration economies offered by central cities represent a unique source of growth. Beeson (1987) finds that technological change and productivity growth are higher in States that contain one of the Nation's 20 largest standard metropolitan statistical areas (SMSAs). Fogarty and Garofalo (1988) conclude from their study of manufacturing industries that productivity growth is higher in large SMSAs. Finally, Henderson's (1988) results indicate that labor productivity within selected industries increases with the volume of the industry's output produced within the metropolitan area. Although none of these studies focuses explicitly on central cities, all suggest that agglomeration economies do contribute to economic growth. This finding is at least consistent with the possibility that central cities make an important contribution to growth, and are perhaps even engines of growth, because their compact development allows for particularly strong agglomeration economies.

Although many authors have speculated on the impact of telecommunications on urban form (Chinitz, 1984; Downs, 1985; Kellerman, 1984), empirical evidence is virtually nonexistent. Only Kutay (1986) has provided such evidence, and his results are of limited value. After examining a survey of the 50 largest firms headquartered in downtown Pittsburgh, he finds that these firms are more likely to have decentralized their office activities if they use sophisticated telecommunications technology and if they indicate that telecommunications will have an influence on their future location decisions.

If face-to-face meetings are not an important determinant of office location, the premise that central cities offer unique agglomeration economies is severely weakened. Long et al. (1984) include face-to-face contacts as an independent variable explaining office location. The number of face-to-face meetings by professional employees (but not other employees) is found to influence location in the expected way. Ihlanfeldt and Raper (1990) argue that if face-to-face contacts are important, then proximity to support services (that is, financial, legal, and business services) should exert a stronger locational pull on new independent office firms than on new branches, since the former are more dependent on outside suppliers. Using information on the location of new office firms in Atlanta, they find that among 20 explanatory variables the strongest predictor of the location of independents is proximity to support services, whereas for branches such proximity is unimportant.

Whether or not office firms prefer CBD locations because of superior communication economies has been investigated by Clapp (1980) and Ihlanfeldt (1992). Clapp found that office rents declined with the distance between the office and the downtown area, after controlling for other factors. One interpretation of this result is that firms are willing to

pay more for close-in locations because they offer savings on face-to-face contacts. Clapp (1993) notes, however, that distance might proxy for other factors, such as the availability of land for commercial construction. Ihlanfeldt provides a similar piece of evidence that may be more definitive. He finds that for the Pittsburgh, Detroit, and Boston metropolitan areas, the wages of workers increase as the distance between the CBD center and the job site declines, after controlling for many individual characteristics related to worker productivity. This evidence lends support to the hypothesis that firms which locate closer to the CBD can afford to compensate their workers for higher commuting costs because of savings that result from communication economies.

In summary, the findings on face-to-face contacts are consistent with two conclusions: (1) the need for face-to-face contacts influences office location and (2) the costs of making these contacts are lower for firms within or close to the CBD.

The argument that central cities perform a specialized function in the regional economy based on communication economies implies that the mix of jobs in central cities differs from that of their suburbs. If head offices and higher order corporate services are assumed to be the most dependent on face-to-face contacts, then information-processing jobs should be concentrated in central cities. A number of sources of data are relevant to this premise and worth considering: (1) the 1980 *Journey-to-Work*, (2) *County Business Patterns*, (3) the Atlanta Regional Commission's *Annual Employment Survey*, and (4) data from the Bureau of Economic Analysis.

The 1980 *Journey-to-Work* census data provides the distribution of employment between central cities and suburbs by type of employment (see table 1). Of the 11 sectors represented, finance, insurance, and real estate (FIRE) has the largest number of workers who could be considered "information-processors." FIRE, therefore, is expected to have the strongest locational orientation in favor of central cities. Indeed, the FIRE sector is found to have more of its jobs located in central cities (63 percent) than any other sector. Also, FIRE accounts for a higher percentage of the jobs in central cities than those in the suburbs: 8.2 percent of city jobs are in FIRE, whereas only 5.3 percent of suburban jobs are in this sector.

Table 2 presents data compiled by Mills and Hamilton (1994) from the Census Bureau's *County Business Patterns* on central-city employment in New York, Philadelphia, and Boston for selected years up to 1989. These cities were selected because their boundaries are the same as, or similar to, those of the central county. Although this table cannot be used to make central city-suburbs comparisons, it does show how the composition of central-city employment has changed over time. The columns for the various years clearly document the massive losses of manufacturing jobs suffered by these cities. Largely offsetting the losses, however, have been gains in the number of information-processing jobs. Among the five sectors represented, information-processing was by far the largest employment sector in all three cities in 1989.

Although table 3 covers only one metropolitan area, the employment data from the Atlanta Regional Commission—the regional planning body for the central-Atlanta region—are unique in that employment is broken down by industry and by area (the CBD, the rest of the central city, and the suburbs) for 1980 and 1990. Thus the changes in the spatial distribution of jobs that occurred during the 1980s can be studied. Atlanta is an interesting case to consider since it is frequently identified as a command and control center, not only for the metropolitan area but also for the southeast region. As the table indicates, FIRE employment increased in both the CBD (+441 jobs) and the rest of the central city

(+3,308 jobs) between 1980 and 1990. However, the growth in FIRE employment outside the city was many times larger (+37,964), causing the percentage of the metropolitan area's FIRE employment located in the central city to decline from 43.6 percent in 1980 to 30.9 percent in 1990. Even with the possibility that many of the FIRE jobs located in the suburbs represent routine consumer banking and real estate services, the phenomenal suburban growth of this sector suggests a substantial increase in information processing.

Stanback (1991) analyzes Bureau of Economic Analysis data for 14 large metropolitan areas. His results lead him to conclude that "employment gains in central cities have tended to focus on FIRE and other services, whereas gains in the suburbs have taken place over a broader front. Nevertheless, suburban employment gains have also been substantial in FIRE and other services. . ." He also finds that in the magnet suburban counties located in his sample of metropolitan areas there were significant agglomerations of corporate service activity by 1986. In fact, corporate services account for a higher proportion of total employment in these suburban counties than in their respective central cities. Moreover, wage levels in corporate services tend to be higher in the suburbs than in the central cities, suggesting that a greater amount of information processing, in comparison to routine back-office operations, is occurring in the suburbs.

What conclusions can be drawn from the above evidence on types of jobs located in cities and suburbs that have a bearing on the proposition that central cities offer unique agglomeration economies? Clearly, information-processing jobs are attracted to central cities, suggesting, at a minimum, that these economies exist within central cities. If not, why would firms be willing to incur the otherwise high production costs associated with a central-city location? Nevertheless, the growth of information-processing employment in the suburbs indicates that central cities may be losing their locational advantage over time. As Stanback (1991) notes:

> But the growth and maturation of the suburbs—especially insofar as the suburban development process has been strengthened by the development of magnet centers—must, of necessity, alter the relationship between central city and suburbs. In the new relationship, it would appear that central cities may become more vulnerable to competition, at least in those activities for which their comparative advantage is marginal.

Additional evidence that would be useful in resolving the debate over the uniqueness of central-city agglomeration economies would flow from an analysis of the corporate (that is, financial, business, and professional) services obtained by central city and suburban companies. If suburban companies rely on central city-based corporate services, it would suggest that the suburbs are not independent of the central city and that central cities do provide agglomeration economies not matched in suburban settings. Recently Swartz (1992) completed the first analysis of corporate service linkages in large metropolitan areas. He focused on major companies located within the New York, Chicago, and Los Angeles consolidated metropolitan statistical areas (CMSAs), using data from the *Corporate Finance Bluebook*. The *Bluebook* includes the name and location of the outside service providers of major U.S. companies. Swartz restricted his investigation to five services: actuarial consulting, auditing, banking, investment banking, and legal services. The results of his study, presented in table 4, show that the companies located in central cities rely heavily on service providers within the same city. The reliance of central-city companies on central-city service firms varies from 67 percent for investment banking to 90 percent for legal counsel. But what about suburban companies? *They also depend primarily on their region's central city for corporate services.* The services that come

least frequently and most frequently from the central city are actuarial consulting and legal services, respectively. Fifty-three percent of the suburban firms use central-city actuarial consultants, whereas 71 percent of these firms go to central cities for legal services. Based on these and other results, Swartz reaches the following conclusion:

> Despite their ample supplies of office space, the suburbs of the nation's three largest CMSAs—New York, Los Angeles, and Chicago—do not constitute a self-sufficient outer city economically autonomous from the central city. Suburban office centers do not house the full range of business activities found within the central city. Although suburbia contains more major companies than the central cities contain, these companies tend to be smaller and more likely to be in manufacturing when compared to their central city counterparts. A majority of these suburban companies remain dependent on their metropolitan area's central city for financial and professional services. Reliance on the central city increases with the size of the suburban companies. Conversely, extremely few companies from the central city go to the suburbs to obtain these services.
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> These findings from a study of intrametropolitan linkages do not, however, suggest that the suburbs are simply low-cost areas for basic data-processing and other back-office functions. Except for the Chicago area, where suburban companies rely almost exclusively on the city of Chicago for corporate services, a significant proportion—usually 15% to 35%—of suburban-based companies do depend on suburban-based firms for their service needs. Such intrasuburban linkages are especially common for smaller companies.

Swartz's conclusions are consistent with those drawn from the employment-by-location data sources: namely, that the central city has the advantage in providing communication economies, but the "uniqueness" of these economies seems to be eroding over time.

Additional Statistical Studies

In addition to the evidence on agglomeration economies reviewed above, four other types of evidence can be found in the literature that has considered whether central cities and suburbs are independent or interdependent: (1) correlations between central-city and suburban growth rates, (2) estimates of a structural model that relates city and suburban growth, (3) earnings of suburban residents working in central cities, and (4) estimates of the relationship between city employment growth and the value of suburban housing.

Central-City and Suburban Growth Rates

Correlations have been estimated between central cities and their suburbs for population growth, income growth, employment growth, and the growth in house values. A positive correlation would suggest that central cities and their suburbs are interdependent, whereas no correlation or a negative correlation would suggest that suburbs are essentially independent of the central city. All of the correlations that have been estimated between city and suburban growth rates using data from the last two decades have been positive. These results, however, should be interpreted as only weakly suggestive of interdependence and not very informative. First, positive correlations may arise if central cities and their suburbs are subject to common external forces. For example, a city and its suburbs are undoubtedly influenced by regional factors, such as climate, input costs, and product demands. Second, even if the positive correlations are not a statistical artifact and are the result of some type of causality, neither the direction nor the magnitude of the effect can

be determined. Hence, correlative evidence cannot be used to address the fundamental issue of the importance of the central city to the regional economy.

Savitch and his colleagues present correlations in two separate articles (1992, 1993). In the first article, only scatterplot diagrams are presented, based on data from 22 MSAs. From the plots the authors conclude that population growth (measured between 1980 and 1990) and per capita income (measured in 1987) are correlated between central cities and their suburbs. They also plot suburban population growth against the ratio of suburban to central-city per capita income. A negative relationship is observed, which suggests that population growth is greater in suburbs with a smaller income disparity between the city and the suburbs.[4] The regression line, however, does not fit the data very well. In their second article, the authors use a larger sample of MSAs (56) and report estimated correlation coefficients and R^2s along with the scatterplot diagrams. They find that the correlation between the level of suburban per capita income and central city per capita income is .32 (R^2 = .10) and .46 (R^2 = .21) in 1979 and 1987, respectively. The use of levels rather than changes is problematic, since nominal rather than real income is used. The observed positive correlations, therefore, may simply reflect inter-regional differences in the cost of living. Savitch et al. (1992) also present a scatterplot which shows that the price of office space is highly correlated between central cities and their suburbs. According to the authors, "With a correlation of nearly .86, we can appreciate how a rise or fall in downtown office space can impact suburban economies." In light of the limitations of correlation analyses cited above and the fact that nominal rents are used, this statement is unwarranted.

Voith also presents correlations in two separate papers (1992, 1994). In the first he correlates central-city and suburban population growth, income growth, and employment growth. The population and income growth rate correlations are computed for the 1960s, 1970s, and 1980s. In the case of both variables, he finds that the correlations have increased over time. For example, the correlation between city and suburban population growth is -.57 for the 1960s, .57 for the 1970s, and .51 for the 1980s. His explanation for this change is that ". . .suburbanization became increasingly difficult as development drove up land and public infrastructure costs and as congestion became a problem in the suburbs as well as the city. Continued suburban growth has become increasingly dependent on the overall desirability of the region, rather than simply the lower cost associated with moving into underdeveloped and uncongested areas." However, in his second paper he acknowledges that the increases in the correlations over time might also imply greater independence. If suburbs have changed to become more like central cities, it is likely that the two areas are similarly affected by external forces. The correlation coefficient reported between central-city and suburban employment growth (measured over the period 1976–86) is .70. The correlations reported in his second paper are for population growth, real per capita income growth, and the growth in real average house prices. These correlations are estimated from a much broader sample than those in his first paper, but the results are qualitatively the same.

The correlation evidence presented by Mills (1990) provides stronger support for the interdependence hypothesis than the simple correlations discussed above. To investigate whether the central city and its suburbs have something in common, Mills addresses the following question: "Suppose one knows the national population growth rate, whether an SMSA component is in the central city or suburbs, and the region in which the SMSA is located, then would the ability to explain the component's population growth rate be improved by knowing which SMSA the component is in?" His estimation involves regressing the population growth rate in a component on the national population growth rate (a dummy variable indicating whether the component is a central-city or suburban area), regional dummies, and a set of dummies indicating the SMSA of the component. His

results strongly suggest that there is an SMSA effect on component population growth (that is, central city and suburban growth are correlated), at least over the years (1960–80) represented by his data.

A Structural Model That Relates City and Suburban Growth

Voith (1994) attempts to go beyond correlations between central-city and suburban growth rates to determine causality. He estimates structural models by nonlinear two-stage least squares that relate city income growth to suburban growth in income, population, and home values. He finds that city income growth has a strong positive effect on income growth, house value appreciation, and population growth of suburban counties. The strength of the effects of city income growth on suburban home values and income growth (but not population growth) are found to increase with the population size of the central city. For example, if the central city has a population of 500,000, a 1.0 percent increase in city income growth is found to cause a .45 percent increase in suburban income growth and an .89 percent increase in suburban house value appreciation. However, if the city has a population of 3 million, a 1.0 percent increase in income growth results in a .60 percent increase in suburban income growth and a 1.39 percent increase in suburban house value appreciation. These effects of city size are intuitively appealing, since one would expect larger cities to exert a greater influence than smaller cities on their suburban areas.

Unfortunately, Voith is not able to identify his central-city equations, so whether suburban income growth similarly affects central cities is unknown. Moreover, to augment his sample size he uses growth rates calculated over the last two decades in one specification and the last three decades in another specification, but he does not investigate whether the strength of the central-city effects on the suburbs have changed over time. Few people would maintain that suburbs were independent of their central cities in the 1960s, or even in the 1970s. The issue is whether this is true today, in light of the relatively recent maturation of edge cities (Garreau, 1994). Despite these shortcomings, Voith's results are the strongest evidence to date in favor of the interdependence hypothesis.

Earnings of Suburban Residents Working in Central Cities

Information on the earnings of suburban residents working in central cities has been provided by Persky et al. (1991) and Savitch et al. (1993). Table 5 reproduces the table presented by the first group of authors. For the seven cities studied, suburban commuters' earnings as a percentage of all income earned within the central city range from 45 percent for New Orleans to 70 percent for Washington, D.C. (see column 2). Based on these numbers, Persky et al. conclude that "Cities remain of fundamental importance as a source of income to suburban residents." But in a strict sense, this inference cannot be drawn from the numbers in column 2. If the city's economy is small relative to the suburban economy, suburban commuters may earn a high percentage of city income but a small percentage of the total earnings of all suburban residents. The correct numbers to look at are those in column 3, which gives suburban commuters' earnings as a percentage of the earnings of all suburban residents. Here the percentages are much smaller, ranging from a high of 46 percent for San Francisco to a low of 19 percent for St. Louis. Nevertheless, these numbers still suggest that the city is important to the suburbs. The more interesting issue, however, is how the percentages in column 3 might be changing over time. Another issue is what would happen to commuters' jobs if the central city were left to decline. Would they disappear or simply move to the suburbs?

Savitch makes the same error as Persky by focusing on the percentage of income earned in central cities that goes to suburban residents. Only those numbers are presented as he and his coauthors make their case in favor of suburban dependence on the central city.

City Employment Growth and the Value of Suburban Housing

In addition to the work reviewed above, Voith has estimated hedonic price equations using a sample of single-family dwellings located in a suburban county (Montgomery) of the Philadelphia MSA (1993b). Separate equations are estimated for the years 1970 to 1988. The equations include a dummy variable for whether the dwelling is located in a census tract offering CBD-oriented train service. He finds that large premiums are associated with such service and that the premiums are highly correlated with lagged employment growth in the city of Philadelphia. These results lead him to conclude that the central-city economy is an important factor in the overall wealth of suburban communities: "From a policy perspective, these findings suggest that suburban communities may not be able to isolate themselves from the consequences of central-city decline and, in fact, that suburban communities may benefit substantially from a growing central city." This conclusion may be too strong, however, since Voith's results show only that suburban properties with rail access are affected by the health of the central city. In most suburbs the value of these properties would represent a small percentage of the aggregate value of housing.

Conclusions

What conclusions can be drawn from this review of the literature dealing with the issue of whether suburbs have become independent of their central cities? First, it is clear that there are significant linkages between central cities and their suburbs. Suburb-based companies depend heavily on central-city suppliers of corporate services, and many highly paid suburban professionals earn their livings from central-city jobs. Face-to-face interactions influence a firm's location decisions, and central cities—especially CBDs—have an advantage over suburban areas in offering communication economies. Second, the maturation of the suburbs, especially as manifested in edge cities, has made these areas more competitive with central cities and less dependent and derivative. Third, even without supporting evidence, the arguments against the proposition that telecommunications will severely erode the role of the central city in the regional economy are persuasive. The future, as envisioned by Pascal and others, of areal uniformity in population and employment density is a long way off and, in fact, may not materialize unless the cost of transporting people becomes trivial. Fourth, the hypothesis that cities make an important contribution to regional and national economic growth is attractive. Information exchange can occur more efficiently in dense urban environments, and there is evidence that the spatial concentration of economic activity is related to technological progress. Unfortunately, however, there is no empirical research that has focused explicitly on central cities as possible engines of growth. Finally, it is obvious that much more work needs to be done. The most promising subject for future inquiry would be an explicit focus on the relationship(s) between central-city decline and metropolitan or suburban growth. Voith (1994) has already demonstrated that structural models which test for causality can be constructed and estimated. Much can be learned by refining these models to capture causal flows in both directions between cities and suburbs, changes in the relationships over time, and differences among metropolitan areas.

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Notes

1. Since disparities in the economic growth of central cities and suburbs have existed for some time, it is interesting to speculate as to why it took so long for the independent-interdependent city-suburb debate to emerge. One possibility is that big city mayors have used the interdependence argument in their appeal for the restoration of Federal aid to central cities (see, for example, the *Louisville Courier-Journal*, November 18, 1991), a tactic which may have stimulated journalists to think about the issue. Another possibility is suggested by Garreau (1994), who has argued that it was not until the 1980s that edge cities began to rival central cities as employment centers.

2. Theories of cumulative causation (Bradbury et al., 1980) imply that a declining central city will eventually impose costs on suburban residents. According to these theories, as cities decline there are self-aggravating forces set in motion that reinforce the original decline. Initially, cities may be able to handle their own burdens, but as the downward spiral continues, help from the outside becomes necessary.

3. Even if labor market economies do favor central cities, some economists—for example, Mills (1992)—have questioned their importance as a source of agglomeration economies. Labor market economies may be significant only in urban areas that have unemployed or underemployed workers with the needed skills.

4. A similar result is reported by Ledebur and Barnes (1992), who found that the employment growth of the metropolitan area is positively correlated with city per capita income as a percentage of suburban per capita income.

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Table 1

Distribution of Employment Between Central Cities and Suburbs by Type of Employment, 1980 (Figures in Thousands)

	Number Employed in SMSAs	Number Employed in Central Cities	Percent in Central Cities	Percent in Suburbs
Total	67,729	35,698	53	47
Manufacturing	15,190	7,060	46	54
Professional and related services	14,067	7,966	57	43
Retail trade	10,905	5,330	49	51
Transportation, communication, utilities (TCU)	5,083	3,095	61	39
Finance, insurance, and real estate (FIRE)	4,634	2,926	63	37
Public administration	3,780	2,343	62	38
Construction	3,673	1,716	47	53
Business and repair services	3,124	1,700	54	46
Whole trade	3,069	1,706	56	44
Other industries	2,173	779	36	64
Personal services	2,031	1,077	53	47

Source: U.S. Bureau of the Census, *Journey to Work,* PC80-2-6D (Washington, DC: U.S. Government Printing Office, 1984), Table 1.

Table 2

Central-City Employment in Three U.S. Cities, by Sector, for 1953, 1970, 1980, and 1989 (Figures in Thousands)

	Number of Jobs				Percentage of Total			
Central City and Sector	1953	1970	1980	1989	1953	1970	1980	1989
New York								
Total Employment[a]	2,977	3,350	2,866	2,048	100	100	100	100
Agriculture and mining	5	5	5	3	..*	..*	..*	..*
Mfg. and construction	1,176	971	650	268	40	29	23	13
Retail and wholesale	805	779	596	355	27	23	21	17
Selected services Information processing[b]	646	1,172	1,302	1,284†	22	35	45	63
Other services	344	424	314	138†	12	13	11	7
Philadelphia								
Total Employment[a]	788	772	628	614	100	100	100	100
Agriculture and mining	0.7	0.7	0.5	0.8	..*	..*	..*	..*
Mfg. and construction	398	291	171	111	51	38	27	18
Retail and wholesale	206	180	134	136	26	23	21	22
Selected services Information processing[b]	98	220	271	323†	12	28	43	53
Other services	85	81	52	42†	11	10	8	7
Boston (Suffolk County)								
Total Employment[a]	402	465	437	520	100	100	100	100
Agriculture and mining	2	0.9	0.5	0.5	..*	..*	..*	..*
Mfg. and construction	130	105	77	53	32	23	18	10
Retail and wholesale	132	111	82	85	33	24	19	16
Selected services Information processing[b]	87	194	232	341†	22	42	53	66
Other services**	51	55	46	41†	13	12	11	8

[a]Total classified employment and industry subcategories, excluding government employees and sole proprietors.

[b]Service industries (excluding government, retail, and wholesale) in which more than one-half of the employees hold executive, managerial, professional, or clerical positions.

*Less than 1.

†Finance, Insurance, and Real Estate (FIRE); and "Services."

**Transportation and public utilities and unclassified establishments.

Sources: U.S. Department of Commerce, Bureau of the Census, *County Business Patterns*, selected years; *Occupation by Industry*, Statistics 1970, 1980 (Washington, DC: U.S. Government Printing Office).

Table 3

Employment Within the Atlanta Region, 1980 and 1990

	Central City	CBD	Rest of Central City	Suburbs	Region[1]
Total Employment					
1980	355,526	93,029	262,497	538,106	893,632
	(39.8)[2]	(10.4)	(29.4)	(60.2)	
1990	391,812	104,149	287,663	1,018,188	1,410,000
	(27.8)	(7.4)	(20.4)	(72.2)	
Construction					
1980	12,831	2,712	10,119	35,437	48,268
	(26.6)	(5.6)	(21.0)	(73.4)	
1990	11,859	1,607	10,252	50,841	62,700
	(18.9)	(2.6)	(16.4)	(81.1)	
Manufacturing					
1980	48,986	6,721	42,265	84,437	133,423
	(36.7)	(5.0)	(31.7)	(63.3)	
1990	36,054	6,227	29,827	114,346	150,400
	(24.0)	(4.1)	(19.8)	(76.0)	
Retail					
1980	30,155	9,366	20,789	114,199	144,354
	(20.9)	(6.5)	(14.4)	(79.1)	
1990	32,906	8,927	23,979	224,894	257,800
	(12.8)	(3.5)	(9.3)	(87.2)	
Wholesale					
1980	46,020	4,134	41,886	36,305	82,325
	(55.9)	(5.0)	(50.9)	(44.1)	
1990	48,692	6,624	42,068	89,508	138,200
	(35.2)	(4.8)	(30.4)	(64.8)	
Services					
1980	84,694	22,150	62,544	96,155	180,849
	(46.8)	(12.2)	(34.6)	(53.2)	
1990	119,131	32,735	86,396	228,169	347,300
	(34.3)	(9.4)	(24.9)	(65.6)	

Table 3

Employment Within the Atlanta Region, 1980 and 1990 (continued)

	Central City	CBD	Rest of Central City	Suburbs	Region[1]
TCU[3]					
1980	32,430	10,726	21,704	50,049	82,479
	(39.3)	(13.0)	(26.3)	(60.7)	
1990	29,644	6,290	23,354	96,456	126,100
	(23.5)	(5.0)	(18.5)	(76.5)	
FIRE[4]					
1980	31,181	12,029	19,152	40,306	71,487
	(43.6)	(16.8)	(26.8)	(56.4)	
1990	34,930	12,470	22,460	78,270	113,200
	(30.9)	(11.0)	(19.8)	(69.1)	
Government					
1980	68,627	25,069	43,558	78,836	147,463
	(46.5)	(17.0)	(29.5)	(53.5)	
1990	77,869	29,267	48,602	127,931	205,800
	(37.8)	(14.2)	(23.6)	(62.2)	

[1] The region is the city of Atlanta plus nine inner suburban counties. This region accounted for 92 percent of all jobs located in the 20-county MSA in 1990.

[2] Numbers in parentheses are the percentage of the region's jobs located in the designated area.

[3] TCU = Transportation, communication, and utilities.

[4] FIRE = Finance, insurance, and real estate.

Source: Author's calculations, based on data from the Atlanta Regional Commission's *Annual Employment Survey*.

Table 4

Service Provider Locations for Companies in New York, Los Angeles, and Chicago: Percentage of Companies Using Selected Financial and Professional Services

	Client Location							
	Total		New York CMSA		Los Angeles CMSA		Chicago CMSA	
Service Provider Location	Central City	Suburbs/ Satellite Cities	Central City	Suburbs/ Satellite Cities	Central City	Suburbs/ Satellite Cities	Central City	Suburbs/ Satellite Cities
Actuarial Consultant								
Within central city	73.9	53.1	69.2	39.2	88.9	71.4	73.9	73.8
Within same suburban/ satellite city municipality	NA	4.9	NA	6.3	NA	5.7	NA	1.5
Elsewhere within same suburban/satellite city/county	NA	7.0	NA	10.5	NA	2.9	NA	1.5
Elsewhere within metropolitan area	14.1	16.9	13.7	21.0	2.8	5.7	23.9	13.8
Outside metropolitan area	12.1	18.1	17.1	23.1	8.3	14.3	2.2	9.2
(Number of companies)	199	243	117	143	36	35	46	65
Auditor								
Within central city	88.2	56.4	84.5	37.7	95.5	61.8	91.4	88.4
Within suburban/satellite city municipality	NA	7.3	NA	11.4	NA	5.1	NA	1.2
Elsewhere within same suburban/satellite city/county	NA	13.2	NA	14.7	NA	22.8	NA	2.9
Elsewhere within metropolitan area	5.1	14.5	6.4	24.9	3.3	3.7	3.6	2.9
Outside metropolitan area	6.6	8.6	9.1	11.4	1.1	6.6	5.0	4.6
(Number of companies)	527	643	297	334	90	136	140	173
Bank								
Within central city	86.0	67.1	89.1	55.9	69.0	62.0	92.8	91.2
Within suburban/satellite city municipality	NA	7.8	NA	11.5	NA	6.6	NA	1.9
Elsewhere within same suburban/satellite city/county	NA	5.8	NA	7.7	NA	6.6	NA	1.9
Elsewhere within metropolitan area	3.0	7.4	2.5	13.3	5.7	3.3	1.8	0.0
Outside metropolitan area	11.0	11.8	8.4	11.5	25.3	21.5	5.4	5.0
(Number of companies)	437	566	239	286	87	121	111	159
Investment Bank								
Within central city	67.4	67.0	96.1	91.1	26.9	27.0	42.2	54.0
Within suburban/satellite city municipality	NA	2.1	NA	3.0	NA	2.7	NA	0.0
Elsewhere within same suburban/satellite city/county	NA	0.6	NA	0.0	NA	2.7	NA	0.0
Elsewhere within metropolitan area	2.7	1.5	1.3	3.0	11.5	0.0	0.0	0.0
Outside metropolitan area	29.9	28.9	2.6	3.0	61.5	67.6	57.8	46.0
(Number of companies)	147	188	76	101	26	37	45	50

Table 4

Service Provider Locations for Companies in New York, Los Angeles, and Chicago: Percentage of Companies Using Selected Financial and Professional Services (continued)

	Client Location							
	Total		New York CMSA		Los Angeles CMSA		Chicago CMSA	
Service Provider Location	Central City	Suburbs/ Satellite Cities	Central City	Suburbs/ Satellite Cities	Central City	Suburbs/ Satellite Cities	Central City	Suburbs/ Satellite Cities
Legal Counsel								
Within central city	89.7	70.7	92.6	67.8	81.4	57.3	89.1	87.2
Within suburban/satellite city municipality	NA	3.5	NA	4.9	NA	1.8	NA	2.3
Elsewhere within same suburban/satellit city/county	NA	8.6	NA	5.3	NA	23.6	NA	2.3
Elsewhere within metropolitan area	2.0	4.9	0.9	8.2	7.1	3.6	1.0	0.0
Outside metropolitan area	8.3	12.3	6.5	13.9	11.4	13.6	9.9	8.3
(Number of companies)	387	488	216	245	70	110	101	133

Source: National Register Publishing Co. (1990).

Note: NA is an abbreviation for not applicable.

Table 5

Earnings of Suburban Residents Working in Central Cities, 1989

Metropolitan Area	Suburban Commuter Earnings (millions, 1989 $)	Suburban Commuter Earnings All City Earnings*	Suburban Commuter Earnings All Suburban Resident Earnings**
Baltimore	$7,938	59.2%	31.4%
Denver	7,609	60.8	40.8
New Orleans	3,521	45.2	39.1
Philadelphia	11,333	46.4	21.4
St. Louis	5,920	66.5	19.3
San Francisco	11,011	48.1	46.0
Washington, DC	18,402	70.5	22.0

Source: U. S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Measurement Division, unpublished data. These metropolitan areas are chosen because each has a central city that coincides with its central county boundaries. "Suburban Commuter Earnings" measures the *gross* outflow of earnings from the central city; that is, earnings from jobs located in the central city held by residents of the suburbs and other noncity residents. Note that some "commuter earnings" may accrue to individuals living outside the metropolitan area altogether.

*"All City Earnings" includes earnings from all jobs located in the central city, regardless of who holds them.

**"All Suburban Resident Earnings" are the earnings of residents of the suburban ring of the metropolitan statistical area (MSA) or primary metropolitan statistical area (PMSA), regardless of where they work.

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