

# Are Cities Dying?

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**I**s the city dying? Professional seers, such as Richard Naisbitt and Alvin Toffler, have argued that information technology is rapidly making the need for face-to-face contact and cities obsolete. Experts on the inner city see inevitable urban decay when they note that 16.7 percent of families in cities with greater than one million inhabitants live below the poverty line (compared to 10 percent of families across the entire United States) and that the probability of being victimized by crime within a six-month period is 21.7 percent in a city with more than one million inhabitants (compared to 9.4 percent among cities with less than 10,000 people).<sup>1</sup>

Are they right? Will the 21st century see a decline in urbanization as rapid as the rise in urbanization over the 19th and 20th centuries? Or will breakthroughs in information technology and law enforcement transform the blighted inner city of today into the gentrified *polis* of tomorrow?

Recent trends are not nearly as pessimistic as the prognosticators. Over the past century the rise in U.S. urbanization has been dramatic, from 39 percent in 1890 to 53 percent in 1940 to 73 percent in 1970 to 75 percent in 1990. The share of the population living in the ten largest metropolitan areas has indeed declined from 23 percent to 21 percent since 1970, but the share of the population living in

<sup>1</sup> The relative poverty figures are taken from the 1994 City and County Data Book; Glaeser and Sacerdote (1996) provide the victimization figures.

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metropolitan areas with a population of more than 1 million rose from 41 percent in 1970 to 48.1 percent in 1990. (In general, most of the facts in this paper will stop at 1990, primarily because reliable urban population numbers are only available during census years.) Moreover, there is little general correlation between city size and the expected growth of cities or metropolitan areas either in the United States or elsewhere (Glaeser et al., 1995; Eaton and Eckstein, 1995; Dobkins and Ioannides, 1996), which suggests that there is no inexorable trend towards the decline of bigger cities. Workers who live in metropolitan areas surrounding a city with more than 500,000 workers earn 10 percent more than workers in metropolitan areas without big cities, and 34 percent more than workers outside metropolitan areas altogether (Glaeser and Mare, 1994).<sup>2</sup> About 96 percent of new product innovations occur in metropolitan areas, and 45 percent of these new innovations occur in four metropolitan areas: New York, Los Angeles, Boston and San Francisco (Feldmann and Audretsch, 1996). Twenty-five percent of the winners of the national Kennedy Center lifetime achievement awards for contribution to American culture went to people born in New York City.<sup>3</sup>

Actually predicting the future of the city requires a framework for understanding the costs and benefits of urban life. The end of the city is only likely if we believe that either the benefits of urbanization are disappearing (as the techno-prophets argue) or that the costs of city life are rising astronomically (as the analysts of the inner city sometimes suggest). This paper will summarize what we know about agglomeration economies and congesting forces in order to assess how changes in these forces will affect the demand for cities.

Conceptually, a city is just a dense agglomeration of people and firms. All of the benefits of cities come ultimately from reduced transport costs for goods, people and ideas. The positive impact of agglomeration that comes from reducing the costs of moving goods lost most of its importance over the 20th century as transportation costs fell and large-scale manufacturing declined. The costs of moving people and ideas, however, appear to be as important as ever. The future of the city's productivity depends on whether available substitutes for face-to-face interactions (e-mail, the internet, and so on) will make the need for personal contact obsolete, or whether the new technologies harbor the dawn of a more interactive era where the ability to contact in person easily is particularly prized.

The costs of cities have historically included health costs, pollution, congestion, crime and social problems. Technological advances have eliminated the health and pollution gaps between cities and other areas. However, longer commuting times in cities are still an important cost, and social troubles such as crime remain among

<sup>2</sup> While actually measuring price differences on a micro-level is quite hard, it appears that this wage difference roughly compensates workers for higher prices. Nevertheless, as I discuss later, it also must reflect a higher productivity of labor since otherwise, firms would leave.

<sup>3</sup> Richard Freeman alerted me to this fact and gave me the raw data on which he calculated this figure.

cities' biggest problems. Indeed, poorer individuals fleeing cities are most likely to cite crime as their primary reason for flight (Kling, Liebman and Katz, 1996).

Of course, the future of cities also depends on what governments do. The federal government appears unlikely to favor cities particularly and, if anything, to continue with policies (like agricultural subsidies) that support low density areas that are disproportionately endowed with U.S. senators. Local governments are far more crucial to the fate of cities; cities are now being better governed. The quixotic attempts of localities to redistribute income appear to have finally ended. A variety of further policy changes (particularly school vouchers) could probably do much to save decaying urban areas.

The ultimate prognosis for cities depends on whether the changes in the benefits accruing to cities from informational spillovers and the division of labor will be greater than the changes in the congestion and social costs of cities. I believe that the death of the city is far from imminent. The demand for interaction is certainly rising and face-to-face interaction is not close to being supplanted by its electronic competitors. Few of the costs of urban life appear to be rising too dramatically. However, unless particular policy choices are implemented, it appears likely that many older cities will continue their decline into becoming decrepit centers of poverty.

## What Is a City?

Technically, the Census defines a "city" as a urban political unit that generally contains more than 25,000 individuals. Measured increases in urbanization just mean increases in the share of the population living in these political units. Since these political units are often seen as relatively arbitrary, the Bureau of the Census created the Metropolitan Statistical Area, which is a multi-county unit usually meant to capture a local economic region.<sup>4</sup> Despite certain prominent exceptions such as Boston and San Francisco, in practice there is a strong correlation between the size of metropolitan areas and the size of their largest cities.

Metropolitan areas are also occasionally imprecise and sometimes miss what we are interested in studying, because two metropolitan areas with similar populations, such as Portland and Newark (both have a population of 1.8 million), may still be quite different in their density or proximity to other urban areas. Urban economists have dealt with this problem by forming population potential measures (for example, Alonso, 1973), which capture the population in close proximity to the area weighted by distance. The population potential index is appealing because it corresponds to a natural economic concept: access to potential consumers or

<sup>4</sup> Also, in this paper I employ the primary metropolitan statistical area concept rather than the consolidated metropolitan statistical area concept. Primary metropolitan statistical areas are smaller and there are many within a consolidated metropolitan statistical area.

workers (for example, Krugman, 1991a). Population potential is also correlated with overall population at the county level, and many high population potential areas lie close to the New York City region.

Most theories about agglomeration or congestion economies focus on density. This can be defined simply as population divided by area, or by using a weighted density measure, such as the density of the census tract where the average person lives.<sup>5</sup> The correlation of the density and weighted density across metropolitan areas is .83, while the correlation of density and metropolitan area population is .47. While urban economics has benefited from examining different meanings of the word "city," there appears to be enough similarity across different measures that we can proceed thinking about a unified concept of a city.

## **Agglomerating Forces**

The benefits of urban life can be seen both in the quantity of people living in those areas and the wage premium paid to workers living in urban areas. Table 1 presents a set of regression results where the logarithm of city size is the sole variable used to explain a variety of patterns; I will refer back to these results throughout the paper. The first row of the table uses the log of city size to explain the log of annual earnings for fulltime workers. Since both variables are in log form, the coefficient implies that the elasticity of annual earnings for full-time workers with respect to city size is .1. Additionally, workers living in a metropolitan area surrounding a city with more than 500,000 people earn 30 percent more than their non-metropolitan counterparts, even if we control for a battery of individual characteristics (including education, industry and occupation controls) and use a variety of instrumental variables estimates to control for the selection of workers into cities (Glaeser and Mare, 1994).

Given standard neoclassical assumptions, higher wages for the same workers in cities must reflect a higher marginal productivity of labor for workers. This remains true even though the higher wages in cities are completely offset, from the workers' point of view, by the higher cost of living in cities. As can be seen by comparing the regression coefficients in the first two rows of Table 1, there is no connection between real wages and city size. Nonetheless, higher wages must also imply greater productivity. After all, if workers weren't more productive, firms would leave cities altogether and hire elsewhere. Since the urban wage premium appears to be a centuries-old phenomenon, we must assume that over the long run, firms are quite willing to pay these higher wages.

In fact, the wage premium may underestimate the benefits created by agglomeration.

<sup>5</sup> Perhaps a more interesting measure is workplace density. While it is possible to generate workplace measures, the population census measures of workplace locations are weak.

**Table 1**  
**City Size and City Attributes**

Variable	Mean (Deviation)	Coefficient of Log (MSA Size)	Adjusted $R^2$	# Observations
Log ( $\Delta$ Annual Earnings)	10.08 (.10)	.10 (.01)	.521	50
Log (Cost of Living)	4.67 (.15)	.16 (.02)	.627	40
Log (Median Housing Rate)	3.93 (.267)	.189 (.042)	.293	50
Time to Work 1990	22.68 (2.77)	2.7 (.36)	.527	50
Time to Work 1980	22.45 (3.09)	2.98 (.41)	.512	50
Sulfer Dioxide	.046 (.033)	.00 (.01)	-.02	47
Particulates 1990 <sup>a</sup>	35.62 (9.70)	4.49 (1.78)	.101	49
Particulates 1980 <sup>a</sup>	95.82 (33.09)	8.65 (6.2)	.02	50
# Non-employment Organizations <sup>b</sup>	1.72 (1.83)	-.033 (.008)		19327
Trust <sup>b</sup>	.407 (.492)	-.051 (.002)		21572
Happy <sup>b</sup>	.879 (.327)	-.004 (.001)		32127

*Sources:* The wage and cost of living information come from the *Statistical Abstract of the United States*. The housing rate information comes from the *State and Metropolitan Area Databook*. The time to work (in minutes) information comes from the Bureau of the Census. The pollution variable data come from the EPA AIRS data set, and the last three variables come from the General Social Survey. The last three regressions are based on individual observations and use city rather than MSA size.

<sup>a</sup> The definition of particulates changed between 1980 and 1990, but this should not change the relationship between particulates and city size.

<sup>b</sup> Questions asked to obtain this information are the following: 1) We would like to know something about the groups or organizations to which individuals belong. Here is a list of organizations. Could you tell me whether or not you are a member of each type? 2) Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people? 3) Taken all together, how would you say things are these days, would you say that you are very happy, pretty happy, or not too happy? Regressions include age dummies, education dummies, time trend, marital status, income, and race. Adjusted  $R^2$ 's are not included for these variables because controls, other than city size, are included in the regressions.

ation, because agglomerative forces can also create non-work related benefits. Indeed, the fact that prices rise faster than wages suggests that cities must also have high substantial nonpecuniary advantages. Shorter distance to goods can mean lower prices (Krugman, 1991a). Lower distances between people may create a more active social environment. The next section explores why theories as to why firms are willing to pay so much more to have workers in cities.

### **Increasing Returns and the Costs of Moving Goods**

Cyrus McCormick invented the mechanical reaper in Virginia in 1831, but he moved to Chicago to set up his factory in 1847, to save transport costs by lessening the distance between his production facility and his customers (Cronon, 1989). The great merchants of the Midwest (Potter Palmer, Marshall Field, Montgomery Ward) followed McCormick because Chicago offered access to eastern goods and western consumers through its network of waterways and rails and because Chicago increasingly had its own home market of producers and consumers. Manufacturers as well as traders were driven by the desire to eliminate distance through agglomeration. For example, Chicago's producers of meat-packing equipment chose to locate near Chicago's meat packing industry.

The role of transport costs in fueling the growth of Chicago illustrates the basic point that firms come to cities to limit the costs of transporting inputs and final goods, both because of reduced costs of dealing with other residents of the same city and because centers are often the hubs of transportation networks. Even today, Garreau (1991) suggests that many of the new edge cities are being built around airports, like the area around Chicago's O'Hare Airport.<sup>6</sup> The bulk of urban and regional economics explains cities and locational choices through transport costs (von Thünen, 1825 [1966]; Alonso, 1964; Fujita, 1988; Krugman, 1991a; Ciccone and Hall, 1996).

The desire to save transport costs does not itself generate urban agglomeration. If there weren't fixed setup costs or increasing returns of some sort, factories would subdivide and locate throughout space to be close to every consumer. As traditional manufacturing is marked by both fixed setup costs and high transport costs (or low value per pound), when the demand for cities was driven by the desire to minimize transport costs, cities were manufacturing centers. Indeed, across states in 1870, the correlation between the percent of the state labor force in manufacturing and the percent of the state that lived in cities was .87 (Ades and Glaeser, 1994). Kim (1995) describes the striking rise in the geographic concentration of industry over the 19th century as manufacturing developed. As late as 1950, seven of the eight largest American cities had a greater share of their workforce in manufacturing than the U.S. average.

Of course, the past 50 years has seen the relative decline of manufacturing and the corresponding rise of services. Increasing returns technologies have lessened in importance as customized production, smaller factories, and an increased emphasis on informational products have shouldered aside many of the giant smoke-stack plants of the earlier industrial era. Transport costs have also declined; the nation's freight bill fell from 9.3 percent of GDP in 1960 to 6.8 percent of GDP in 1985 (Smith, 1989). The geographical concentration of manufacturing industries

<sup>6</sup> Berlant and Wang (1993) model the city as a regional marketplace. Fujita and Mori (1996) and Konishi (1997) also model port cities or cities as hubs.

has fallen significantly over the past 15 years (Dumais, Ellison and Glaeser, 1997), perhaps reflecting the decreased importance of fixed costs and transport costs.

These changes have ended the powerful connection of cities and increasing returns/high transport costs industry. In fact, manufacturing disappeared from cities faster than it did from the United States as a whole. By 1990, only two out of the eight largest cities had a larger share of their workforce in manufacturing than the U.S. average. In 1990, while 17.7 percent of all U.S. workers were in manufacturing, only 13.8 percent of workers in cities with more than 1,000,000 inhabitants were in manufacturing (County and City Databook, 1994). Manufacturing cities have particularly collapsed. A 10 percent increase in the share of a city's labor force involved in manufacturing reduced that city's population growth rate between 1960 and 1990 by 8 percent (Glaeser, Scheinkman and Shleifer, 1995).

While transport costs for goods continue to matter, they have become much less important. Dumais, Ellison and Glaeser (1997) use the Longitudinal Research Database to show that while new plants still locate near suppliers and consumers, this effect is now tiny. An increase of one standard deviation in proximity to suppliers increases the rate of new plant births by less than 1 percent of a standard deviation. Today, the costs of urban location for most manufacturing industries are clearly much higher than the benefits. If cities' only advantage was eliminating transport costs for manufactured goods, then cities would indeed cease to exist.

### **The Costs of Moving People: The Division of Labor, Insurance and Bargaining**

New York City's theater industry began when London actors (such as the legendary Edmund Kean) first performed to American audiences in the 18th and early 19th centuries and then moved to New York to avoid the extraordinary costs of the transatlantic journey. Since 1800, New York's large audiences have attracted the best stage actors who were interested in reaching as many people as possible. After all, acting is among Rosen's (1981) primary examples of a "superstars" technology where the highest quality producers want access to the largest markets. The success of the theater spilled over into the early film and television industries, which were tied to New York because of the concentration of performing talent in the theater industry (although New York would eventually lose the film industry because of the ability to shoot movies outdoors year round in southern California). The New York theater industry produced innovations ranging from the music of Tin Pan Alley to Lee Strasberg's Actor's Studio. All of the forces that led to the theater industry in New York stem from the ability of dense cities to eliminate distance between people.

A primary advantage of market size created by producers' access to many people is the division of labor. Adam Smith (1776 [1976]) wrote "in the Highlands of Scotland, every farmer must be butcher, baker and brewer for his own family," but as market size expands, urban residents are able to reap the many benefits created by a finer division of labor. In the theater industry, this force means that New York actors specialize in very particular roles, while in small towns actors are far more often generalists who play multiple parts (even in a single production). At a casual

level, the connection of the division of labor and city size can be seen by perusing the Yellow Pages of different-sized cities, where odd, specialized occupations, such as individuals who specialize in restoring neckties, are seen only in the largest cities (Glaeser, 1996). Baumgartner (1988) presents a more scientific analysis showing the connection between city size and specialization in the medical profession. Ades and Glaeser (1994) find a high correlation between an index meant to capture the fineness of the division of labor at the state level and the level of urbanization in states in 1870.<sup>7</sup>

Alfred Marshall suggested a second urban advantage that stems from lower transport costs of people—thick labor markets insure workers against firm- or industry-specific shocks. New York's actors not only have a wide range of different theaters to attempt to get jobs in, but also have numerous other employers outside of the theater industry. Indeed, the aspiring actor working in a restaurant is so common that it has become a cliché. The advantages from “labor market pooling,” as this force is called, does not require risk-averse workers. Even risk-neutral workers prefer being able to switch from low productivity firms to high productivity firms (Krugman, 1991b). While this theory has trouble explaining why urban areas rarely have lower unemployment rates, it still remains a plausible source of the demand for agglomeration (Diamond and Simon, 1992).<sup>8</sup>

A final advantage of eliminating transport costs for workers is that when workers have many prospective employers, then they have more bargaining power (Rotemberg and Saloner, 1991). This bargaining power is important because when workers are sure that they will reap the benefits of their human capital investments, then workers will invest more in their human capital. Effectively, geographic proximity can transform what was firm-specific human capital into general human capital.

Dumais, Ellison and Glaeser (1997) provide evidence for the importance of these views. Over the past 20 years, sharing a common labor pool is the most important determinant of which industries locate together. There is little reason to suspect that this force will decline in importance. The gains from specialization or insuring workers against firm or industry specific shocks are, I suspect, increasing. Moreover, despite improvements in transport technology, the basic cost of transporting people is usually the opportunity cost of time and this cost is likely to rise secularly with income. As a result, the role that cities play in eliminating the distance between people seems to me likely to increase in importance.

<sup>7</sup> Becker and Murphy (1992) argue that the connection between city size and the division of labor has more to do with lower coordination costs in cities and less to do with the extent of the market *per se*.

<sup>8</sup> It could be, for example, that cities often have higher unemployment rates because they attract people who are prone to frequent unemployment—precisely because cities feature labor market pooling.

## Informational Spillovers

Saxenian (1993) describes how Silicon Valley began with the students of Stanford Professor Frederick Terman.<sup>9</sup> Terman supported his glittering roster of protégés (including Hewlett and Packard, Charles Litton and the Varian brothers) with both ideas and finances. The area around Stanford had other advantages—like proximity to military installations that provided demand for new technology, especially during World War II—but it was really the intellectual atmosphere that was special. At first, this atmosphere was mainly created by Stanford itself (Jaffe, 1989, discusses evidence on locational spillovers from university research), but eventually the firms in the area developed their own mass of ideas and expertise. The sharing of ideas across firms was accommodated both by the movement of workers across firms (the spread of former employees of Fairchild Semiconductor into other Silicon Valley firms is now local legend) and the sharing of ideas in both formal and informal settings. Indeed, since many ideas are carried by workers shifting firms, the urban advantages in moving ideas is quite close to the urban advantage in reducing mobility costs for workers, and in some senses my distinction between the two is artificial.

More generally, the geographic proximity created by cities allow ideas to travel more rapidly, which is to say that cities reduce the cost of moving ideas. This idea has appealed to a variety of authors. Marshall (1890) wrote that in dense areas “the mysteries of the trade become no mystery but are, as it were, in the air . . .” Jacobs (1968) and Lucas (1988) connect cities with the production of ideas which lie behind economic growth.

The empirical evidence on this process is less commanding. Jaffe, Trajtenberg and Henderson (1993) present the best evidence showing that a new patent is much more likely to cite a patent that is close spatially, even controlling for firm effects. Their methodology of examining patent citations gets as close as we can get to observing the flow of ideas across space. Less direct evidence, also using cross-industry patent citations, is provided by Dumais, Ellison and Glaeser (1997) who find some support that new plants are more likely to locate near industries that are linked intellectually. Ultimately, our belief in the intellectual role of cities comes mainly from case studies and anecdotes rather than overwhelming hard evidence.

Even if we accept that cities have a role as centers of intellectual flows, two empirical issues remain. First, ideal industrial environments may be either diversified cities or concentrated industrial parks. Glaeser et al. (1992) examine employment growth across city industries (like steel in Pittsburgh or retail trade in New York) and find that less concentrated industries in diversified areas grow more rapidly. Feldmann and Audretsch (1996) find similar results examining new product introductions. Conversely, Miracky (1992) finds little evidence for the diversity

<sup>9</sup> Saxenian (1993) provides a superb discussion of Silicon Valley and this paragraph draws very strongly on her work.

hypothesis in a particularly wide scale investigation of city-industry growth, and Henderson, Kuncoro and Turner (1995) argue that their investigation of firms in high technology industries shows a positive connection between concentration and later growth. A possible reconciliation of the results is that scale and concentration may have value for smaller firms; however, diversity has more value for long term growth.

A second issue is whether the production of new ideas is more abundant in an environment of many small firms or a few large ones: does competition generate growth? A relatively small number of firms may be preferable if internalizing the benefits from innovations is a major priority. When many firms are borrowing ideas, then the incentive to innovate may be low. Alternatively, competition between many small firms may act as a spur for new ideas. Chinitz (1961) emphasized the importance of a culture of entrepreneurship in spurring innovation at the city level. The evidence on this point is clear: there is a strong positive connection between the number of firms per worker (in a given U.S. industry) and growth in a given area (Glaeser et al., 1992; Miracky, 1995).

### **Learning in Cities**

While much more attention has been paid to knowledge externalities and their effect on new ideas at the firm level, productivity gains at the worker level may be even more important. Indeed, Silicon Valley's strength occurs in part because young specialists learn in that dense agglomeration; Saxonian (1993) describes how Fairchild Semiconductor is referred to as "Fairchild University" because of its role in training workers. Glaeser (1997) argues that urban density speeds up that rate of interaction between people and that when people learn through their interactions, human capital accumulation is faster. Cities are even more effective in training workers when they are particularly full of knowledgeable or successful people and if cities offer a particularly wide range of "educational" experiences.

There are a number of pieces of evidence that cities are places where young people go to learn skills. First, young, college-educated individuals are disproportionately represented in large metropolitan areas. For example, 17.5 percent of those in the metropolitan areas surrounding cities of more than 500,000 people are college graduates under the age of 35, while only 13.2 percent of the U.S. population is in that category. Second, Glaeser and Mare (1994) examine wage dynamics and find that individuals who come to cities do not immediately receive the urban wage premium (defined again as the premium for living in a metropolitan area surrounding a city with more than 500,000 residents); instead, their wages grow at a somewhat faster rate over the next five years. Individuals who leave cities do not experience major wage declines. Third, the urban wage premium is much higher for older urban workers, who have presumably had a greater time period to learn in cities (Glaeser and Mare, 1994).

Fourth, workers are paid higher wages (and are presumably more productive) in cities with higher levels of human capital, even holding constant the human capital of individual workers (Rauch, 1993; Mare, 1994). Finally, cities with higher

levels of human capital have had faster growth in income and in population since 1950, and particularly since 1970 (Glaeser et al., 1995). The fact that there is a growing demand for living in high skill cities, especially during the period when the returns to skill rose, is compatible with the view that workers learn more in high skill cities. While these facts are not conclusive, they can be interpreted to mean that young workers learn faster in cities and experience higher wage growth as a result, which they can take with them when they leave.

### **The Future of the Informational City**

Popular futurists argue that information technology is making face-to-face contacts and, therefore, cities obsolete. While this is a theoretical possibility, there are several reasons why the ongoing changes in communications may help, or at least not hurt, cities.

Mills (1992) argues that some types of contact are too subtle to be performed electronically and cities will remain to facilitate those contacts. For example, telecommunications devices only allow for information connections that are planned on at least one end, which means that cities will continue to exist to facilitate the unplanned idea combinations which Jacobs (1968) argues are particularly important for growth. Sassen (1993) argues that some cities have technological infrastructure which will give them a comparative advantage at exploiting these new technologies. Gaspar and Glaeser (1997) argue that electronic and face-to-face contacts may be complements, not substitutes. As telecommunications becomes more efficient, within each relationship, electronic communications will replace face-to-face contact. However, as electronic communications becomes more efficient, the overall number of relationships (many of which will include both telecommunications and personal contact) will also rise and the overall effect of telecommunications on face-to-face contact is ambiguous.

The empirical evidence on this point does not suggest that telecommunications is a substitute for face-to-face contact and cities. People in cities are much more likely to use telecommunications devices such as telephones; people who are close physically are much more likely to call one another (Imagawa, 1996). Business travel, which reflects the demand for face-to-face contact, has risen significantly (even holding prices constant), since the late 1980s. Even though the futurists of 100 years ago suggested that the telephone would make the city obsolete, there is no negative correlation between the rise in telephones and urbanization.<sup>10</sup>

The location decisions of high technology industries, which presumably have the best access to the new technologies, also provides us with evidence of whether telecommunications will eliminate agglomeration. The fact that Silicon Valley is now the quintessential example of industrial agglomeration suggests that the most

<sup>10</sup> Not all evidence suggests that cities are prone to using the new technologies. Kolko (1997) finds that industries that have concentrated on adopting new technologies are likely to leave both rural areas *and* the biggest cities—and move to smaller cities.

cutting edge technology encourages, rather than eliminates, the need for geographic proximity. Despite having no pre-existing agglomeration in computer technology, New York City has recently become a major center for software, and has its own "Silicon Alley." Ellison and Glaeser (1997) report that high technology industries such as semiconductors or guided missiles and space vehicles are highly concentrated industries, even when we control for concentration of production within large plants.

Even if new substitutes for face-to-face contact are being developed, the rising demand for contact and information may still increase demand for cities. The current economy seems to value particularly access to the latest technologies which may be best accommodated by geographic proximity to firms that are developing and using those technologies. The rise in returns to skill is a well-established feature of modern labor markets, and this rise should increase the value of cities as centers of learning. The future of the informational city looks much brighter to me than it does to some other soothsayers.

## Congesting Forces

The largest cities do eventually stall in attracting populations. At some point, the benefits of agglomeration are overwhelmed by the costs of congestion (Tolley, 1974), and cities stop growing, at least when there is not a central government subsidizing their continued expansion (Ades and Glaeser, 1995). Cities will indeed perish if these forces of congestion rise extraordinarily.

### **The Cost of Living and Commuting**

Transportation costs and housing costs should be considered simultaneously. The Alonso-Muth model describes an equilibrium where prices are higher nearer the center of town to offset lower costs of commuting (Alonso, 1961; Muth, 1969). According to this model, the costs of urban density can be found by examining housing costs exclusively (and ignoring commuting), if we examine a house with zero commuting costs. The costs of urban density can also be found by examining commuting costs exclusively (and ignoring housing prices), if we examine the commuting costs of individuals who live farthest from the city center. While the logic of this point is correct, we usually examine aggregate values of either housing or commuting costs, and as such, we need to consider both of them simultaneously.

The observed cost of living rises dramatically with city size. The second row of Table 1 shows an elasticity of the costs of living on a metropolitan area population of .16 (which falls to .11 when we exclude New York City).<sup>11</sup> The third row of Table

<sup>11</sup> Local cost of living indices are created by the American Chambers of Commerce Research Association and are taken from the 1993 *Statistical Abstract*.

1 shows that the elasticity of median housing values with respect to city size is .18. There is no question that houses in cities cost more, reflecting the willingness to pay to reap the advantages of urban life. This cost is likely to remain, and it will serve to repel individuals increasingly if higher incomes lead to bigger demand for space and land consumption in housing. However, improvements in building technology and commuting technologies will also continue and probably offset any demand shifts of this sort.

The fourth row of Table 1 shows the correlation between the log of metropolitan area population and the minutes of an average commute in that area. The coefficients shown imply that the average commute time in cities of less than 100,000 is 20.5 minutes each way, while in cities of more than 1,000,000 it is 31.9 minutes each way. This represents a substantial cost of urban living of approximately 93 hours per year or more than two normal work weeks. If this cost is valued at \$10 per hour, it reflects a cost of urban living of almost \$1,000 annually. This cost will increase in importance as the value of time rises. However, as the fifth row of Table 1 illustrates, the connection between city size and commuting time has been declining slightly over time (although the change over this time period is not statistically significant), so perhaps improvements in traffic technology (particularly pricing congestion efficiently) and public transportation will offset this increasing cost.

### **Pollution Costs**

Pollution is a cost often associated with cities because the refuse from human activity can overwhelm the air and water supply, if that activity is sufficiently dense. Some pollutants, like sulfur dioxide, are not affixed to the area that creates them, and therefore, are not correlated with city size, as shown in the sixth row of Table 1. Ozone is also barely correlated with city size—and that correlation is largely driven by Los Angeles. Other pollutants, mainly particulates, are correlated with city size. The seventh row of Table 1 shows that levels of particulates do indeed increase with city size. The elasticity shown implies that the difference in particulates between a metropolitan area of 500,000 and 5 million inhabitants is 10.4 micrograms per cubic meter. According to Smith and Huang's (1995) meta-analysis of hedonic estimates of the cost of particulates, the annual cost of this quantity of particulates is \$38 per person annually using their median estimates of the costs of pollution, or \$185 per person annually using their mean estimate of pollution costs—but the mean estimate is driven by some extraordinarily large estimates.

These costs seem small relative to the costs of commuting and are likely to become even more so. Comparing rows 6 and 7 of Table 1 shows a declining connection of cities and particulates due to better emissions controls, changes in automobile technology and the decline of urban manufacturing (Kahn, 1996).<sup>12</sup> Just

<sup>12</sup> In the mid-1980s the definition of particulates was changed, but this change can be corrected for by multiplying the new particulates measure by a constant. As such, this change will not in any sense artificially alter the connection of particulates and city size.

as technology improvements and government action in the 19th and early 20th centuries eliminated the age old health problems of urban residents, government and technology also seem to have created a situation where residents of big cities face almost the same level of pollution as residents of small towns.<sup>13</sup>

### **Crime and Urban Anonymity**

The connection between crime rates and urban size is a well-established fact. The rate of violent crime in cities with more than 250,000 population is 346 per 100,000 inhabitants; for places with less than 10,000 inhabitants, the rate of violent crime is just 176 per 100,000. For property crimes, the parallel comparison is a crime rate of 1144 per 100,000 in cities over 250,000 in population, and 875 per 100,000 in places under 10,000 in population (County and City Databook, 1994). The elasticity of crimes per capita with respect to city (not MSA) size is approximately .15 using either reported crimes or victimization surveys (Glaeser and Sacerdote, 1996).<sup>14</sup>

In general, the same models that predict that cities are good for legal activities suggest that cities will be centers for crime as well, because criminals can also benefit from various agglomeration effects. Glaeser and Sacerdote (1996) find that 25 percent of the urban crime effect can be attributed to higher returns to crime in cities, perhaps due to scale economies in stolen goods or a greater market of potential victims. Social interactions are important in criminal behavior (Case and Katz, 1991; Sah, 1991; Glaeser, Sacerdote and Scheinkman, 1996), and just as urban density permits the dense social networks that allow new technologies to spread, these same social networks also seem to support the transmission of information about crime or the values which condone crime.

We find that 10 to 15 percent of the urban crime effect can be attributed to a lower probability of being arrested for crime in a city. This effect may occur because as the number of potential culprits rises, police work becomes harder or because cities are intrinsically more anonymous and have weaker social groups (Wirth, 1932). Weaker social groups in cities may result from greater urban mobility and the fact that community sanctions become much less powerful when an individual can easily move to another location or social group that is a few blocks away. Indeed, evidence from the General Social Survey (also shown in Table 1) illustrates that people in cities are less likely to be members of non-professional organizations or to trust people.

Almost 50 percent of the urban crime effect can be attributed to a greater

<sup>13</sup> Even though I give credit to the government for effecting these changes, I am making no claims about the efficiency or competence of the government action.

<sup>14</sup> Riots are also associated with city size both within the U.S. and across countries, especially when cities contain heterogeneous ethnicities (DiPasquale and Glaeser, 1996). While riots may not seem that important in the past 20 years in the United States, even one event the size of the Los Angeles riots in 1991 serves as a reminder that rioting can be a large social cost of big cities.

concentration of female-headed households in cities. This fact is perhaps best interpreted as meaning that crime in cities occurs because cities attract individuals in poverty who are more likely to be prone towards criminal activity. The next section addresses the general issue of problems that occur when cities differentially attract the poor.

A variety of attempts have been made to assess the costs of crime for urban residents. Such attempts begin with an estimate of the higher amount of crime in urban areas, like those given earlier, and then make various estimates of the cost of crime. For example, property values and occasionally wages have been used in hedonic analyses to determine the willingness to pay to avoid crimes (Thaler, 1978; Roback, 1982; Cohen, 1990), or the value of a life. If the cost of a property crime for an individual is taken to be from \$1000 to \$5000, which is the range of plausible estimates, then the extra crime cost of living in a city of 5 million as opposed to one of 500,000 lies between \$28 and \$138 per year using crime rates based on reported crimes, or between \$80 and \$400 dollars annually using crime rates based on victimization figures. If one uses \$4 million as the estimated value of one's life, the murder costs of increased city size from 500,000 to 5 million is over \$500 per person. Of course, the expected costs would be lower for groups who are able to protect themselves from urban crime.

The connection between cities and rates of crime has decreased since 1970 (Glaeser and Sacerdote, 1996). Current improvements in law enforcement and stunning declines in big city crime rates (especially in New York City) suggest that this trend will continue. However, the social costs of crime may be rising, since the willingness to pay to avoid crime (especially murder) seems to rise with income. Thus, the negative effect of crime on urban areas will probably be neutral as increases in the importance placed on crime are offset by decreases in the connection between crime and urban size.

### **The Problem of Differential Selection**

American cities contain a strikingly high concentration of poverty and broken households. In the country as a whole, 10 percent of families are below the poverty line; in cities of over 1 million, the poverty rate for families is 16.7 percent. The share of children living with families below the poverty line is 17.9 percent for the United States as a whole, but 30.2 percent for cities of more than a million.

Cities could potentially cause poverty, possibly because of greater segregation (Cutler, Glaeser and Vigdor, 1997) or because social interactions in dense areas can be particularly deleterious (see Benabou, 1991, for models of this sort). However, since recent migrants to cities are just as poor as long term residents, it seems more likely that higher poverty in cities is best seen as the result of differential movement of the poor into cities. For example, the poverty rate among migrants in cities with more than one million inhabitants was 19 percent in 1980 (where migrants are defined as having moved counties in the past five years)—which is exactly the same as the poverty rate among non-migrant city residents. The poverty

rate among migrants who move into cities of less than 100,000 people was 11 percent, which is close to the 9 percent rate for long term residents of those cities. The share of large city migrant families which are headed by women was 31 percent in 1980, almost the 33 percent of long term residents. The small city migrant and small city non-migrant families were headed by women 19 percent of the time. More recent data also confirm these facts. Cities are filled with poor people not because the cities make people poor, but rather because cities attract poor people.

Why might the poor be particularly attracted to cities, or equivalently the rich repelled from cities? Basic urban theory implies that the rich leave cities because they have a greater demand for physical space which is cheaper outside of cities. Wheaton (1977), however, documents that income elasticity of demand for space is not large enough for this theory to explain differential selection.

Cities are particularly attractive to the poor apparently because of transportation costs, the public goods bundle and social networks (Glaeser, Kahn and Rappaport, 1997). Transportation in cities differentially attracts the poor because public transportation saves them the costs of purchasing a car (this affects the wealthy less because they are much more likely to own a car regardless of the availability of public transport) and because higher urban commuting times are less costly to people with lower wages. The bundle of public goods in cities attracts the poor in part because welfare spending and public housing is much higher in cities. For example, the average U.S. city spends 2.1 percent of its budget on social welfare, but cities under 100,000 in size spend just .3 percent, while cities over 1 million in size spend 6.1 percent (County and City Databook, 1994). Cities also provide worse public schools and less safety, which the rich appear willing to pay more to avoid; for example, Berry and Levitt (1996) show that the rich particularly flee crime-filled cities. Finally, urban density supports the creation of social networks which are particularly valuable to people in poverty, which explains why immigrant ghettos are disproportionately in cities.

The fact that cities attract poor people would not matter to this essay, except that the poor are associated with social problems that then may lower overall city populations. Higher initial poverty rates in cities repel population (Glaeser et al., 1995), and statistical estimates strongly suggest people are willing to pay less to live in high poverty areas. If cities continue to disproportionately attract the poor, the urban future may be one of crowded ghettos rather than diversified metropolises.

But many of the newer and growing cities of the south and west are not particularly poor at all (Glaeser et al., 1995; Glaeser, Kahn and Rappaport, 1996). Perhaps the right view is that new cities initially attract all income groups, possibly because of their economic opportunities or because higher migration costs for the poor slow their coming to new cities (Cutler and Glaeser, 1997). Eventually, the poor do come to the city, create social problems which stem the city's growth, and induce the wealthier members of the city to move. These wealthier members then start a new urban area which will eventually follow the same pattern. If this view is correct, we will always observe declining older cities which are mired in poverty,

even though cities on the whole are still strong. While further evidence is needed to confirm this basic view of the urban life-cycle, we do know that even though the extreme concentration of the poor may doom certain cities (East St. Louis may be an example), many cities are basically unaffected by this problem.

## **What Government Does and What Government Should Do**

The problems of cities have often been greatly exacerbated by the choices made by local governments. We can usefully separate the mistakes that localities tend to make into three basic categories. First, cities build large, permanent structures or systems that are highly visible and tend to be extreme monuments to their builders. For more than 30 years, economists have urged pricing congestion properly or using cost-efficient express bus routes to handle urban congestion (Vickrey, 1963; Meyer, Kain and Wohl, 1965). However, local governments still evince a strong predilection for building large (and preferably high tech) subway systems, even when the best evidence continues to show that subway systems rarely, if ever, provide enough social surplus to pay for their construction (Kain, 1988).

This problem of excess infrastructure seems to have become even more acute when less corrupt bureaucrats replaced corrupt urban machines (Rauch, 1995). Machines were much more closely tied to their voters, and while they often created ridiculously costly projects (like the infamous Tweed Courthouse), the long time horizons of machines and their ability to appropriate much of the excess wealth of the city government directly limited the tendency to overbuild. The political machine projects were also probably less costly in a social sense because they often represented pure transfers to machine supporters in the form of higher wages to workers or higher payments to firms (Menes, 1997). But the bureaucrats that replaced the bosses, such as the legendary road-builder Robert Moses of New York City, often strove to build as many large projects as possible, especially if these projects bore their names (Caro, 1973).

Second, urban governments (like governments throughout the world) have often used quantity controls (like zoning ordinances and rent control) rather than explicit taxes and transfers to handle externalities and redistribution. These controls are popular because they do not require financial outlays and because they often enable a differential treatment of current and future voters. For example, ordinances requiring a minimum lot size will often grandfather in existing properties and rent control, sometimes enabling current, but not future, residents to have low rents. These controls appear to be quite costly and more deleterious than comparable taxes or transfer policies would be, especially since the controls often are imposed without any attempt at assessing costs and benefits.

Third, local governments often favor redistributive activities rather than productive efficiency. The optimal level of redistribution is usually found by trading

the efficiency losses that most redistributive actions create against the gains from equity, where the benefits of equity come not from economics but from some deeper philosophical or moral basis. To argue for local redistribution, one needs to have an ethical system that emphasizes local equity, which does not spring naturally out of most ethical systems.<sup>15</sup> Furthermore, redistribution at the local level causes major distortions to locational choices of both the rich and the poor; Rapaport (1997) documents that cities that engage in large welfare spending repel population. In the limit, a local redistribution policy can repel all the rich entirely and therefore lead only to excess segregation without any redistribution whatsoever.<sup>16</sup> As George Stigler argued 40 years ago, local redistribution makes little sense even (or especially) if you do believe in the importance of equity.

In the 1960s and 1970s, a variety of local governments led by old-line white liberals (like New York's John Lindsay) and new non-white leadership (like Detroit's Coleman Young) undertook policies that rapidly increased the commitment of big city government to the poor. City welfare rolls burgeoned and local services such as police and schooling de-emphasized traditional goals (such as preventing crime) and focused more on eliminating "injustice" within the system. While this shift is described in many anecdotal accounts (Auletta, 1979), there is no dominant theory for why it occurred. One explanation, suggested by the work of Alessina and Easterly (1997), is that rising ethnic division within the cities eliminated the cooperation needed to stop rampant rent-seeking by the group in power. Alternatively, old-line political party machines may have had longer time horizons; therefore, they internalized the long run negative effects created by excessive local redistribution more than their non-machine successors.

It appears that voters now seem to believe that local redistribution is futile and have moved towards leadership that focuses more on quality service provision and less on transfers. The archetypal mayors of the 1990s are Richard M. Daley of Chicago and Rudy Giuliani of New York City, who at least sell themselves as purveyors of competence, not economic justice. Observers who care deeply about the plight of the urban poor may indeed hope that states will make up for the decline in local commitment to redistribution, but the move away from local redistribution can only be good for cities.

The welfare of cities also depends on the actions of non-local governments. In most countries, the physical proximity of urban residents to the centers of government create incentives for governments to favor their large cities (Ades and Glaeser, 1995). Central governments often transfer excessively to big cities, especially when those cities are political capitals. Americans who marvel at the glories of Paris would do well to remember that the City of Light was built on centuries of forced redistribution from the hinterland to the capital. This political tendency to

<sup>15</sup> Of course, it may be true that voters care primarily about the poor in their own areas.

<sup>16</sup> Indeed, Cutler and Glaeser (1997) document the connection between racial segregation and either political fragmentation at the MSA level or local control over finances.

favor certain cities shows itself within the United States in the growth of state capitals and even more vividly in the serious discussion that took place about solving Washington D.C.'s social problems by eliminating the income tax there. No one ever talks about eliminating the federal income tax for, say, Detroit! However, the structure of the U.S. Senate (and indeed the presidential electoral college) tends to favor low density areas by design, probably because the founders understood the tendency of capital cities to attract government rents. As Gerald Ford showed New York City during its fiscal crisis of the mid-1970s, American cities cannot expect a bailout from the federal government.

The previous discussion of how local and federal governments relate to cities suggests a few normative prescriptions. City governments should avoid redistribution, most quantity controls, and white elephant infrastructure projects, such as subways. National governments should follow a policy of spatial neutrality, neither artificially supporting nor taxing cities disproportionately. Even the seemingly benign attempts at place-based redistribution (such as enterprise or empowerment zones) create spatial distortions that limit the healthy tendency of the poor to exit declining areas. However, advice of this sort is futile unless the incentives facing government are themselves changed as well. Economists would do well to focus more attention on designing institutional changes that create better incentives for governments.<sup>17</sup>

## Conclusion

This paper has presented a panoramic view of the primary economies and diseconomies of urban size. Even though the advantages that cities once gained from being manufacturing centers have disappeared, I believe that agglomeration economies will ultimately continue to be large. Information spillovers will continue to be important and telecommunications may end up helping, rather than hurting, cities.

Nevertheless, cities have major costs and some of these may significantly increase. The likeliest possibility is that the future will be bright for the relatively homogeneous and low density agglomerations of the western United States, which can offer many of the economic advantages of agglomeration while also reducing the costs of congestion and crime. The poorer, more heterogeneous, older cities, however, will have more of a struggle. The future may be one where very specialized agglomerations filled with very particular income groups are the norm. If this vision comes to pass, then I am also sure that our society and economy risks losing a great

<sup>17</sup> For example, Glaeser (1996) argues that since property values reflect long run expectations about the prospects of the city, even though population adjusts slowly, ensuring that government revenues continue to be tied mainly to local property values creates some incentives for local government to focus on the long-run economic outlook for the city, especially when property values are appraised regularly.

deal. If it is true that the innovation and growth potential of cities depends on unplanned contacts between diverse individuals, these homogenous cities may prove much less innovative. Moreover, cities already have considerable segregation, and decentralized cities may lead to even less contact between different income and racial groups.

Beyond analyzing trends that affect the cities, economists do have some policy advice they can add. Most cities are far from pricing congestion effectively. Most cities still have land use and building regulations that are completely unconnected with any clear externalities. Many cities still try to redistribute income, despite the costs in terms of attracting the poor and repelling the rich that redistribution at such a micro-level within a metropolitan area can precipitate. A city which wishes to prosper should focus on pricing externalities correctly, protecting property rights and ensuring that human capital can be developed within its borders.

## References

- Ades, A. and E. Glaeser,** "Evidence on Growth, Increasing Returns and the Extent of the Market," NBER Working Paper, 1994.
- Ades, A. and E. Glaeser,** "Trade and Circuses: Explaining Urban Giants," *Quarterly Journal of Economics*, 1995, 110:1, 195–228.
- Alesina, A. and W. Easterly,** "Public Goods and Ethnic Divisions," mimeographed, 1997.
- Alonso, W.,** "Markets and Planning Regions for Transportation." In J. DeSalvo, Ed., *Perspectives on Regional Transportation Planning*. Lexington: Lexington Books, 1973.
- Alonso, W.,** *Location and Land Use: Toward a General Theory of Land Rent*. Cambridge: Harvard University Press, 1964.
- Auletta, K.,** *The streets were paved with gold*. New York: Random House, 1979.
- Baumgardner, J.,** "The Division of Labor, Local Markets and Worker Organization," *Journal of Political Economy*, 1988, 96:3, 509–27.
- Becker, G. and K. Murphy,** "The Division of Labor Coordination Costs and Knowledge," *Quarterly Journal of Economics*, 1992, 107:4, 1137–60.
- Benabou, R.,** "Workings of a City: Location, Education, and Production," *Quarterly Journal of Economics*, 1993, 108:3, 619–52.
- Berry, J. and S. Levitt,** "Crime and Migration from Cities," mimeographed, 1996.
- Berlant, M. and P. Wang,** "Endogenous formation of a city without agglomerative externalities of market imperfections: Marketplaces in a regional economy," *Regional Science and Urban Economics*, 1993, 23:1, 121–44.
- Caro, R.,** *The Power Broker: Robert Moses and the Fall of New York*. New York: Knopf, 1974.
- Case, A. and L. Katz,** "The Company You Keep: The Effect of Family and Neighborhood on Disadvantaged Youth," NBER Working Paper # 3705, 1991.
- Chinitz, B.,** "Contrasts in Agglomeration: New York and Pittsburgh," *American Economic Review*, May 1961, 51, 279–89.
- Ciccone, A. and R. Hall,** "Productivity and the Density of Economic Activities," *American Economic Review*, 1996, 82:1, 54–70.
- Cohen, M.,** "A Note on the Cost of Crime to Victims," *Urban Studies*, 1990, 27:1, 139–46.
- Cronon, W.,** *Nature's Metropolis: Chicago and the Great West*. New York: W.W. Norton, 1991.
- Cutler, D. and E. Glaeser,** "Are Ghettos Good or Bad?" *Quarterly Journal of Economics*, August 1997, 112:3, 827–73.
- Cutler, D., E. Glaeser, and J. Vigdor,** "The Rise and Decline of the American Ghetto," NBER Working Paper #5881, 1997.
- DiPasquale, D. and E. Glaeser,** "The L.A. Riot and the Economics of Urban Unrest," *Journal of Urban Economics*, 1997, forthcoming.

- Durais, G., G. Ellison and E. Glaeser, "Geographic Concentration as a Dynamic Process," mimeographed, 1996.
- Eaton, J. and Z. Eckstein, "Cities and Growth: Theory and Evidence from France and Japan," Boston University Working Paper # 25, 1993.
- Ellison, G. and E. Glaeser, "Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach," *Journal of Political Economy*, 1997, forthcoming.
- Fujita, M., *Urban Economic Theory*. Cambridge: Cambridge University Press, 1988.
- Fujita, M. and T. Mori, "The role of ports in the making of major cities: self-agglomeration and hub effects," *Journal of Development Economics*, 1996, 49:1, 93-120.
- Garreau, J., *Edge City*. New York: Anchor Books, 1991.
- Gaspar, J. and E. Glaeser, "Information Technology and the Future of Cities," *Journal of Urban Economics*, 1997, forthcoming.
- Glaeser, E., "Learning in Cities," mimeographed, 1997.
- Glaeser, E., "Why Economists Still Like Cities," *City Journal*, 1996a, 6:2, 70-77.
- Glaeser, E., "The incentive effects of property taxes on local governments," *Public Choice*, 1996b, 89:1-2, 93-111.
- Glaeser, E., M. Kahn, and J. Rappaport, "Why Do Poor People Live in Cities?" mimeographed, 1997.
- Glaeser, E., H. Kallal, J. Scheinkman, and A. Shleifer, "Growth in Cities," *Journal of Political Economy*, 1992, 100:6, 1126-52.
- Glaeser, E. and D. Mare, "Cities and Skills," Hoover Institution Working Paper E-94-11, 1994.
- Glaeser, E. and B. Sacerdote, "Why is there more crime in cities?" NBER Working Paper # 5430, 1996.
- Glaeser, E., B. Sacerdote, and J. Scheinkman, "Crime and Social Interactions," *Quarterly Journal of Economics*, 1996, 111:2, 508-48.
- Glaeser, E., J. Scheinkman, and A. Shleifer, "Economic Growth in a Cross-Section of Cities," *Journal of Monetary Economics*, 1995, 36:1, 117-43.
- Henderson, V., A. Kuncuro, and M. Turner, "Industrial Development in Cities," *Journal of Political Economy*, 1995, 103:5, 1067-90.
- Imagawa, T., "Essays on Telecommunications, Cities and Industry in Japan," Harvard Ph.D. Dissertation, 1997.
- Jacobs, J., *The Economy of Cities*. New York: Vintage Books, 1968.
- Jaffe, A., "Real Effects of Academic Research," *American Economic Review*, 1989, 79:5, 957-70.
- Jaffe, A., M. Trajtenberg, and R. Henderson, "Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations," *Quarterly Journal of Economics*, 1993, 108:3, 577-98.
- Kahn, M., "The Silver Lining of Rust Belt Decline: Killing off Pollution Externalities," mimeographed, 1996.
- Kain, J., "Strategic misrepresentation in the promotion and evaluation of rail transit," Harvard Institute of Economic Research Discussion Paper # 1420, 1988.
- Kim, S., "Expansion of Markets and the Geographic Distribution of Economic Activities: The Trends in U.S. Regional Manufacturing Structure: 1860-1987," 1995, 110:4, 881-908.
- Konishi, H., "Hub Cities: City Formation Without Economies of Scale," mimeographed, 1996.
- Kling, J., J. Liebman, and L. Katz, "Bullets Ain't Got No Name," mimeographed, 1996.
- Krugman, P., "Increasing Returns and Economic Geography," *Journal of Political Economy*, 1991a, 99:3, 483-99.
- Krugman, P., *Geography and Trade*. Cambridge: MIT Press, 1991b.
- Lucas, R., "On the Mechanics of Economic Development," *Journal of Monetary Economics*, July 1988, 22, 3-42.
- Marshall, A., *Principles of Economics*. London: Macmillan, 1890.
- Menes, R., "Public Goods and Private Favors: Patronage Politics in American Cities During the Progressive Era 1900-1920," Harvard Ph.D. Dissertation, 1997.
- Meyer, J., J. Kain, and M. Wohl, *The Urban Transportation Problem*. Cambridge: Harvard University Press, 1965.
- Mills, E., "Sectoral clustering and metropolitan development." In Mills and McDonald, eds., *Sources of Metropolitan Growth*. Rutgers Center for Urban Policy Research: New Brunswick, 1992.
- Miracky, W., "Cities and the Product Cycle," M.I.T. Ph.D. Dissertation, 1995.
- Muth, R., *Cities and Housing*. Chicago: University of Chicago Press, 1969.
- Rappaport, J., "Local Government and Economic Growth," mimeographed, 1997.
- Rauch, J., "Bureaucracy and economic growth: theory and evidence from U.S. Cities during the Progressive Era," *American Economic Review*, 1995, 85:4, 968-79.
- Rauch, J., "Productivity Gains from Geographic Concentration of Human Capital: Evidence from the Cities," *Journal of Urban Economics*, 1993, 34:3, 380-400.

- Roback, J.**, "Wages, Rents, and the Quality of Life," *Journal of Political Economy*, 1982, 90:6, 1257-78.
- Rosen, S.**, "The Economics of Superstars," *American Economic Review*, 1981, 71:5, 854-58.
- Rotemberg, J. and G. Saloner**, "Competition and Human Capital Accumulation: A Theory of Interregional Specialization and Trade," MIT mimeographed, 1991.
- Sah, R.**, "Social Osmosis and Patterns of Crime," *Journal of Political Economy*, 1991, 99:6, 1272-95.
- Sassen, S.**, *The Global City: New York, London, Tokyo*. Princeton: Princeton University Press, 1991.
- Saxenian, A.**, *Regional Advantage: Culture and Competition in Silicon Valley and Rte. 128*. Cambridge: Harvard University Press, 1994.
- Smith, A.**, *An Inquiry into the Nature and Causes of The Wealth of Nations*. Chicago, IL: The University of Chicago Press, 1976.
- Smith, F.**, *Transportation in America*. Washington, D.C.: Eno Foundation, 1989.
- Thaler, R.**, "A Note on the Value of Crime Control: Evidence from the Property Market," *Journal of Urban Economics*, 1978, 5:1, 137-45.
- von Thünen, J.**, *The Isolated State*. Oxford: Pergamon Press, 1966.
- Tolley, G.**, "The Welfare Economics of City Bigness," *Journal of Urban Economics* 1974, 1:3, 325-45.
- Vickrey, W.**, "Pricing in Urban and Suburban Transport," *American Economic Review*, 1963, 53:2, 452-65.
- Wheaton, W.**, "Income and Urban Residence: An Analysis of Consumer Demand for Location," *American Economic Review*, 1977, 67:4, 620-31.
- Wirth, L.**, "Urbanism as a Way of Life," *American Journal of Sociology*, July 1938, XLIV, 1-24.