

# Review of Location Factor Literature



This appendix includes an annotated bibliography of key articles in the literature, and a complete list of the studies reviewed. Appendix 2-3, Location Factors, summarizes the key points from the literature.

ECONorthwest searched university periodical indices to identify recent studies that explain why firms locate where do. ECO also contacted experts in the field, the economists who regularly study the issue, to help identify important articles and themes.

Several themes are prevalent in recent literature about firm location factors. The most dominant is that the labor force, both its cost and quality, is the most important location factor to a firm. Quality of life factors, such as climate, recreational opportunities, low crime, and a clean environment, are seen as key attributes for attracting and retaining a skilled workforce.

Another key factor is the presence of agglomerative economies, or industry clusters. An existing cluster of related firms in an industry indicates the presence of a qualified labor pool, required infrastructure, input suppliers, potential customers, and the potential for strategic alliances at all levels. Those are the factors that attract a new or expanding firm.

Traditional infrastructure, such as highways, water, sewer, and energy, remain important to firms. A firm's infrastructure needs vary with the type of firm.

The literature generally agrees that economic development policies, such as tax rebates, enterprise zones, and other incentives designed to lure firms to the region, are not very effective (and rarely *cost* effective) at the *inter-regional* level (e.g., in trying to get a firm to locate in Portland rather than, say, San Diego). These factors make up a small portion of a firm's total expenses, and other factors, such as labor, swamp the effects of a tax break. However, at the *intra-regional* level (e.g., for a firm trying to make a decision between Portland and, say, Gresham), these incentives may affect a firm's location decision. Once a firm has decided upon a metropolitan region, the firm can shop among the various local jurisdictions for the best incentive package.

The remainder of this appendix is organized into two sections. The first is an annotated bibliography of key articles in the firm-location literature. The second section is a complete bibliography of all the articles we reviewed.

## ANNOTATED ARTICLES

We begin the annotated bibliography with a "general" section, which includes articles that discuss many location factors. After the general section,

we've organized the articles by direct factors of production and indirect factors of production.

## GENERAL

**Atkinson, Robert D. and Paul D. Gottlieb. 2001. *The Metropolitan New Economy Index: Benchmarking Economic Transformation in the Nation's Metropolitan Areas*. Progressive Policy Institute and the Center for Regional Economic Issues, Case Western Reserve University. April.** “In the old economy, the preconditions for economic success were things like low costs; abundant, basically skilled labor, and good transportation and other physical infrastructures, including a preexisting economic base stemming from natural-resource advantages such as waterways and coal. In order to avoid the ups and downs of the business cycle, regions sought to diversify their economies.”

“The New Economy is a knowledge- and idea-based economy where the keys to wealth and job creation are the extent to which ideas, innovation, and technology are embedded in all sectors of the economy. Economic growth is determined by the extent to which innovative ideas and technology are embedded in services and manufactured products. As a result, metropolitan areas' success will increasingly be determined by how effectively they can spur technological innovation, entrepreneurship, education, specialized skills, and the transition of all organizations—public and private—from bureaucratic hierarchies to learning networks.”

“The discriminating factor determining success is increasingly whether professionals want to live in a place, suggesting that ‘natural resources’ such as a good climate and outdoor recreation will become more important than the ‘natural resources’ that built the Industrial Revolution. As a result, the nation's largest metro areas can no longer take it for granted that they will be the natural home for most economic activity. To succeed, they will need to ensure that people enjoy living and working there.”

“Finally, in the New Economy, where business cycles are less important and regional ‘clusters’ of firms in the same or similar industries drive innovation, successful regions specialize and gain ‘critical mass’ in key sectors.”

The author offers seven key strategies for economic development:

- Know your region's economic function in the global economy
- Create a skilled workforce
- Invest in an infrastructure for innovation
- Create a great quality of life
- Foster an innovative business climate

- Reinvent and digitize government
- Take regional governance seriously.

**Bartik, T.J. 1991. *Who Benefits from State and Local Economic Policies?* Kalamazoo, Michigan: W.E. Upjohn Institute for Employment Research.** This book includes a review of econometric studies examining how state and local characteristics affect economic growth. The topic is complicated by a host of methodological and data problems that can be put into five categories.

1. Difficulty of modeling complex individual decisions using aggregate data, which may not be appropriate because regional growth is the result of individual decisions about firm expansion, contraction, location, or abandonment.
2. Current economic conditions are often the result of past activities. It is necessary to control for past conditions, but many studies have neglected to do this.
3. It is difficult to accurately measure key influences on economic development. For example, wages are measured at the average, but this fails to control for labor quality. A well-crafted study would control for labor quality. Another example is the relationship of taxes and public expenditures. While business decision-makers wish to minimize their tax burdens, they are also attracted by the benefits of public services. A study that only considers one side of the fiscal equation runs the risk of attributing to taxes what is the result of expenditures.
4. It is impossible to control for each factor that affects business decision-making. To minimize the problem, researchers should control for 'fixed effects' either by including dummy regional variables or by differencing all variables from the previous period's value of the sample mean.
5. Feedback between the control variables and the growth variable, or the use of endogenous independent variables. It may be that lower wages promote growth, higher economic growth leads to higher wages, confounding the statistical estimation of the relationship between the two variables.

Statistical models generally support the economic theory that higher wages depress a region's job growth. A review of the literature suggests that the elasticity of business activity with respect to wages lies between  $-0.2$  and  $-1.0$ . Put differently, a 10 percent reduction in local wages induces between a 2 percent and 10 percent increase in local business activity. This is a surprisingly small finding given the importance of wages in a business' cost structure. Economists generally believe that the models understate somewhat the importance of wages because they can not precisely account for the cost of labor for specific industries or the quality of the labor supplied.

Recent studies indicate that for *interstate* business location decisions, the elasticity of employment with respect to state and local taxes falls between –

0.1 to -0.6. Economists consider size of effect to be relatively *inelastic* (i.e., on the low end of responsiveness). By contrast, for *intrametropolitan* decisions, the elasticities range from -1.0 to -3.0. Therefore, if Oregon increases taxes by 10 percent, statewide employment would likely fall by 1 percent to 6 percent in the long-run. But if a small Portland suburb in the raises its taxes by 10 percent, it can expect an employment decline of between 10 percent to 30 percent. The higher elasticities for intrametropolitan suggest that executives are less likely to shop for tax advantages across regions or states. Put differently, it appears executives typically choose a region first and then explore favorable tax policies.

**Bradbury, K.L., Y.K. Kodrzycki, and R. Tannenwald. 1997. "The Effects of State and Local Public Policies on Economic Development: An Overview." *New England Economic Review* (March/April): 1-12.** In November 1996, the Federal Reserve Bank of Boston convened a symposium of experts to examine and critique existing theoretical and empirical evidence concerning the efficacy of state and local tax, spending, and regulatory policies as instruments of economic development. The participants generally agreed that policies pursued by subnational governments do affect the pace of economic development within their borders. However, they concluded that these effects are generally modest. Evidence is inconclusive about which policies exert the greatest effects and under what circumstances. The conditions under which state policies can significantly influence business location and economic growth are limited, mainly because the most important determinants of a jurisdiction's relative rate of economic growth are largely beyond the control of state and local governments, for example, labor costs, the availability of appropriately skilled labor, energy costs, climate, and the availability of natural resources. Competitive forces have narrowed differences among states in both business tax burdens and business incentives, dampening the efficacy of any new measures. Participants concluded that public policy differences between jurisdictions are most likely to affect business location when those differences are large, but the jurisdictions are otherwise very similar. For this reason, public policy is a more effective instrument of economic competition within metropolitan areas than between them, or between states or regions.

Other cost variations are almost certain to swamp the effects of tax differentials on business location. The quality of the available work force is the single most important factor in site selection today. Site selection is highly firm-specific. Responsiveness to differential taxes or public services varies considerably across sectors, industries, and firms.

**Cohen, Natalie. 2000. *Business Location Decisions-Making and the Cities: Bringing Companies Back*. Washington, D.C.: The Brookings Institution. April.** The author includes three sections that describe why firms locate where they do. The first describes business aspects linked to a firm's geographic choice, the second describes the top three reasons a firms chooses a particular city, and the third explains the difference between location and site selection.

**1. Business aspect and geographic choice.** There are five fundamental components of business that help determine where a company or firm may locate: business sector; business function; product maturity; competitive strategy; and business culture.

The *business sector*, such as manufacturing or retail, is a fundamental determinate of a firm's location choice. Manufacturing companies, for example, need to balance proximity to end-user markets against supplier resources. A retail company, in contrast, is more likely to focus on maximizing sales revenues than minimizing transportation costs.

The *business function*, be it headquarters, research and development, a back office, or manufacturing and distribution, places different demands on geographic choice.

- (1) Headquarters' location priorities include accessible international air service, high-end hotels, restaurants, entertainment, cultural events, major league sports team/stadium with skyboxes to facilitate heavy inter-company face-to-face interaction. They want professional support services, good choice of office space or availability of land to build-to-suit, diverse professional employee base, attractive housing for executives, affordable housing for managers and support staff within reasonable commute, and a strong educational system for employee's children and continuing adult education. Cost sensitivity is less important than availability of key requirements.
- (2) Research and Development requires proximity to concentration of universities, clusters of highly educated workers, or alternatively, lifestyle amenities that are attractive to this pool of talent. Some R&D firms want control over their physical environment, to buffer company from nosy neighbors and to prevent the sharing of secrets by employees. Cost sensitivity is less important than the availability of talent and other requirements. However, R&D may be more sensitive to cost than headquarters.
- (3) A back office requires state-of-the-art telecommunications capacity, affordable housing costs, quality labor force with technical skills, good schools for employee recruitment and their children, and on-going available adult education and training. A back office is sensitive to costs of real estate, telecommunications, housing, and taxes.
- (4) A manufacturing and distribution firm needs to be near major interstates, they need strong utility systems, including electric, water, wastewater, and gas. These firms also want a well-educated workforce and strong specialized training programs. Manufacturing and distribution firms are sensitive to housing costs, taxes, and utility rates.

Location requirements differ depending on the company's *product maturity*. A cost structure that works well for a company at the early stages of product development will not necessarily support its competitiveness as

the product matures. At the research and development phase for example, a company may be less sensitive to real estate costs but quite sensitive to the availability of sophisticated labor markets and talent. At stages of rapid product growth, maturity and decline, businesses become more cost sensitive and have different labor market needs. Low-cost regions at the periphery of metropolitan areas or even offshore locations may provide more cost advantages for labor and real estate.

A company's *competitive strategy* determines the location choice. A company trying to reposition itself in a significant way may "pick up and go" or search for "new horizons". A number of these decisions are motivated by a company's desire to have greater control over the company's operating and physical environment or over the employees. Public officials often shower "pick up and go" and "new horizons" movers with lots of government incentives, since these companies are considered prizes in their new communities. However, companies making such moves do not necessarily choose the lowest cost locations. A community's underlying characteristics—labor rates, housing, and ease of living—are more important. Moving to a brand new campus facility may also involve a strategy to gain greater control over employees as well as neighbors.

The fifth fundamental component that determines a firm location choice is its *business culture*. Companies that have great need for lots of face-to-face interaction but also have sensitivity to a location's cost are more likely to favor intermediate-sized metropolitan areas, exurban areas, or redeveloping urban sites. In Chicago, for example, a number of high-tech companies are discovering that the cost of "brownfield" cleanup in a depressed inner city location was outweighed by proximity to good restaurants, hotels and convenient transportation. Companies with a high sensitivity to cost but low face-to-face needs are more likely to move to small cities, offshore locations or unusual locations within expensive real estate markets.

## **2. The top three reasons a firm choose a particular city.**

- **Education, Education, Education.** With demand for skilled labor so high today, a good location must have a critical mass of employable persons or be attractive to the kinds of employees a company needs to recruit. In the past, location decision-makers put more emphasis on land, buildings and transportation networks. As we evolve into a more knowledge-based economy, virtually every company requires technical literacy at all skill levels. In fact, the minimum reading skill level required of new factory workers has risen from the 10th grade reading level to the equivalent of two years of college or more.

Given the clout that technology workers have today, cities can also build their economic base by focusing on what is attractive to these workers. Desirability includes a good elementary and secondary school system for employees' children (and future employees) as well as resources that support continuing adult education and training. Recreational activities, natural amenities, safety, and affordable

housing are also attractive draws for sought-after employees in the late 1990s.

- **Speeding-Up the Permitting Process and Simplifying Bureaucracy.** Shorter product life cycles have put pressure on companies to bring new products to market quickly in order to remain competitive.
- **The (Un)Importance of Tax Incentives.** Tax incentives and tax packages are uniformly viewed as low priorities by location consultants, relatively unimportant to the basic decision. Tax rates are considered after the more basic location analysis—and then only to rule out places that are “out of line” on key factors such as corporate income taxes, personal income taxes, unemployment tax, and workers compensation. The only other time taxes figure heavily into the equation is when a company is choosing among sites within a metropolitan area, where all the other factors are equal.

Unfortunately, tax incentives have become what real estate executives call “table stakes”. There is great pressure for communities to participate in the incentive game. As a result, location decision-makers can use tax incentives as “tie breakers” when more than one community fits all of the other location needs.

High taxes or an insufficient tax package may also be used as the excuse for a move when other reasons are really at play. For example, a CEO is unlikely to state publicly that he or she is moving the company to flee organized labor; it is more politically acceptable to say that taxes are too high.

**3. Location vs. Site.** To understand the location decision-making process it is important to distinguish location from site. A location refers to the general region and its characteristics. Basic location factors include:

- skill level and suitability of the labor market;
- availability and cost of housing;
- adequacy of transportation systems;
- access to suppliers and contractors;
- proximity to natural resources;
- presence of competitors;
- positioning within the market for the company’s product;
- general taxation levels and tax policies of the state;
- workers’ compensation costs.

Once a location is found that fits the company’s strategy and cost structure, a site within the location is sought. A site is a specific parcel of land and/or building(s). Sites too, have specific characteristics:

- road/train/truck access;
- the presence or absence of tax liens;

- title complexities on the property;
- cost and availability of water, sewer, solid waste disposal;
- telecommunications capacity;
- possible environmental remediation.

Unfortunately, policy-makers have confused the two concepts, thus falling short of their announced legislative or regulatory goals. Brownfield redevelopment is a site-related issue rather than a location-related one. Brownfield sites may be attractive to companies that are bound to the local market by the nature of their business. A company may wish to remain in its general location, but need to expand, modernize its facilities or lower its costs. In this case, a package of public subsidies may help reduce costs and tip the balance in favor of using an urban site.

**Cortright, Joseph. 2001. *New Growth Theory: Some Thoughts and Implications for Economic Development*. Impresa, Inc.** New technological advances are evidencing the advantages innovative technology plays in practically all that is produced in our modern society. A higher standard of living is achieved not from the production of more goods and services, but from more efficient production and more effective management of scarce resources. There are four main implications for economic development.

- Knowledge matters. A well-educated work force is at the core of developing economies. However, Cortright states that “regions with great educational systems (and little else) may simply end up exporting their best and brightest and indirectly subsidizing the economic development of other areas.”
- Place matters. While information can flow in bits and bytes to the outer reaches of industrialized society, knowledge is different and still requires some “face-to-face” experiences for it to be effectively transmitted.
- History matters. Local and regional economies can and do lock in certain technological and competitive advantages that make it difficult for all region’s to compete on a level playing field at any given point in time. This is apparent in the emergence of technological clusters and spin-off creation of high-tech industries.
- Institutions matter. Cortright states that “economic change does not occur by the gradual transformation of existing businesses, but by the revolutionary displacement of whole new technologies and enterprises: creative destruction. Societies and institutions that cherish stability and eschew change are at a disadvantage in economic competition.”

**Cortright, Joseph. 2001. *Transportation, Industrial Location, and the New Economy: How Will Changes in Information Technology Change the Demand for Freight Transportation and Industrial Location?* Impresa, Inc. March.** Economy: The traded sectors, including

manufacturing, have the most intra-metropolitan clustering. There is a “lock-in effect”: “Even new industries are more likely to represent outgrowths of older existing strengths than they are to be an entirely new pattern.” The availability of specially skilled labor is a decisive locational factor. Quick reactions and flexibility are also key.

Transportation: There is a move away from vertical integration to outsourcing. Trucking dominates the freight transportation system in the U.S. and in Oregon. The highest-value goods move by air; the lowest value move by ship. “Just-in-time” production increases the need for timeliness. Proximity to suppliers’ manufacturing is less important than being close to suppliers’ personnel, but it is more important in “high-tech” industries. The certainty of time is as or more important than the shortness of time. There is less long-haul trucking as warehousing is regionalized. There is a move to direct shipment, bypassing warehouses. The warehouses have smaller, more frequent shipments. Warehousing is becoming more value-added. There is a declining importance of freight transportation due to less weight per dollar. There is a growth in logistics providers.

Industrial Location: Access to employees is now critical, as the proximity of information is less relevant due to improved communication, and the proximity of other things is less relevant due to improved transportation. There are increasing returns to technology that get locked into regions. Clusters have great importance for access to workers and firms. “Agglomerative economies overwhelm other factors like transportation costs.” Long-term capital investments lead to high sunk costs. Transportation has a fixed infrastructure, but there are other variable costs in it. The sensitivity to transportation costs depends on the industry, especially the weight of product or inputs. Energy/minerals/stone/wood/chemicals all have high pounds per worker. Apparel/electronics/machinery/printing all have high output per pound. There is an increased maximum scale of economic activity resulting from declining transportation and information costs, so more centralization has occurred in manufacturing in the past century.

E-Commerce: Two-thirds of manufacturers do not do their business electronically. It is still a poor substitute for face-to-face and personal interaction. Transportation costs are still important, even if information costs are less so. High-value goods are better candidates for e-commerce, because they are less sensitive to transportation costs.

Portland Evidence: The most clustered in the region are car/truck/bus manufacturing, instruments, electronics, and electric utilities and telephone companies. Manufacturing is the most clustered sector, especially high-tech. Printing and publishing is less clustered. Wholesale apparel is concentrated; smaller scale sectors like food and machinery are dispersed. The tech sector is driven mostly by the availability of labor. But many firms are rooted in their current locations. The center of the metropolitan area has good access to freeways and LTL (less-than-truckload) terminals.

Conclusions: There is an advantage now in moving people and ideas in addition to goods. Knowledge workers are attracted by a unique mix of

diverse consumption opportunities, and opportunities for recreation and leisure. Lower transportation costs and information costs allow for centralization of some activities (e.g., goods-producing industries like bakeries) and the decentralization of others.

**Cortright, Joseph. 2002. “The Economic Importance of Being Different: Regional Variations in Tastes, Increasing Returns, and the Dynamics of Development.” *Economic Development Quarterly* 16 (1): 2-16.** A region’s distinctive social and cultural characteristics, measured by the behaviors of its residents, represent an important source of knowledge and innovation that drive economic development. Local tastes and attitudes can trigger the experimentation and innovation that cause clusters to form and grow, energizing the positive feedbacks of knowledge creation. Each region has its own unique set of opportunities, shaped by its residents’ tastes and previous development. Policy implications include the following.

- Don’t regress to the mean. Not every community can be the optimal or lowest-cost location for every industry. For example, it has been argued that Oregon’s businesses would be advantaged by so-called ‘stringency’ legislation, which would provide that state laws and regulations could be no more stringent than minimum federal requirements. In fact, Oregon requirements that generally anticipate national trends in environmental, health, safety, and quality regulations are likely to prod Oregon businesses to be early innovators in compliance technologies. This is especially likely to be the case when regulation gives firms incentives and opportunities to devise new solutions to the problems the regulations seek to solve.
- Build on a region’s distinctiveness. To thrive in an economy in which creating new knowledge is increasingly important, being different is an essential source of innovations.
- Cultivate a culture of innovation. The risk in celebrating the distinctiveness of today is that it may tend to lead to the ossification of tomorrow. Economic development policies should encourage innovation and adaptation to change.

**DeVol, Ross C. 1999. *America’s High-Tech Economy: Growth, Development, and Risks for Metropolitan Areas*. Santa Monica: Milken Institute. July 13, 1999.** This paper analyzes the effects of information technology on the nation’s long-run potential growth and the relative growth of metropolitan areas. The author explores key issues, including factors that determine where high-tech is concentrated and where the greatest growth is occurring, multiplier impacts from technology industries on local non-high-tech sectors, and a comparison of agglomerative and disagglomerative economies on the location of high-tech industries.

The factors that appear to contribute the most to high-tech firms’ location decisions include: access to a trained/educated workforce, close proximity to excellent educational facilities and research institutions, an existing network

of suppliers, availability of venture capital, climate and other quality-of-life factors, and the general cost of living.

**Glaeser, E. and J. M. Shapiro. 2001. *City Growth and the 2000 Census: Which Places Grew, and Why*. Brookings Institution. May.** A survey of 2000 census data reveals that, among U.S. cities with 1990 populations greater than 100,000:

- The median growth rate for cities in the 1990s was 8.7 percent—more than double the median growth rate of the 1980s. However, there is an extremely strong correspondence between an individual city’s growth rate in the 1980s and its growth in the 1990s.
- Western cities grew the fastest, with an average growth rate of 19 percent. Northeastern cities, on average, declined. Southern cities grew substantially, but at about half the rate of Western cities, while Midwestern cities grew at 3 percent on average.
- “High human capital” cities grew. The level of residents’ education and income are consistent predictors of urban growth.
- Cities with large manufacturing bases grew much more slowly than cities with strong service industries. Also, cities with high unemployment rates grew more slowly than those with low unemployment rates.
- Cities built for pedestrians and mass transit shrunk (with a few exceptions), while auto-dependent cities grew. Similarly, older cities declined and younger cities grew.
- Foreign-born residents contributed to strong city growth rates. Cities with more foreign-born residents in 1990 grew more quickly than other cities, up to a point.

**Haug, Peter. 1991. “The Location Decisions and Operations of High Technology Organizations in Washington State.” *Regional Studies* 25 (6): 525-541.** Supporting previous research on high technology regional development theories and companies, survey results on location decisions show that Washington’s high technology industry has been primarily locally grown and attracted to the state by founder preferences, quality of life features, and labor agglomeration factors. Findings reveal that state government agencies and programs have had no significant effect on establishment location and investment activities, and the major academic-establishment relationships were access to library resources, recruitment of graduates, seminars, and employee degree programs.

**Rondinelli, Dennis A. 1998. “The Changing Forces of Urban Economic Development: Globalization and City Competitiveness in the 21st Century.” *Cityscape* 3 (3).** The author defines a New Urban Development Strategy.

*Improve and Leverage Education to Increase Work-Force Productivity and Attract Investment.* The most competitive cities recognize that global enterprises must be located near or have access to knowledge centers that can generate or stimulate innovation and provide a reliable source of skilled workers, technically trained supervisors, scientists, engineers, and managers. Among the most important knowledge-based organizations on which globally oriented businesses depend are R&D laboratories engaged in technology development, colleges and universities providing trained personnel and research capacities, and consultant organizations that develop new products to help commercialize technology and manage international activities more effectively. Globally competitive companies also depend heavily on data-gathering and data-analysis units and on training and continuing education facilities that help them become and remain learning organizations.

Internationally oriented businesses consider not only the cost of labor but also the quality of the labor force. A city's public and private educational institutions must not only develop literacy and numeracy but also challenge students to attain high levels of competency in math, science, and liberal arts at the primary and secondary levels. Beyond these requirements, though, if urban businesses are to become more competitive in response to the demand for technological and organizational innovation, schools must teach in a way that fosters innovation and creativity. At both the secondary and higher education levels they must focus on teaching how to learn, because knowledge of the learning process will become far more important to students in a globally competitive world.

*Improve Quality of Living Conditions.* A recent study concluded that "a good deal of evidence gathered over the last 15 years from several regions of the United States suggests that least-cost location criteria may now have given way to quality of life considerations in industrial location preferences" (Hart, Denison, and Henderson, 1989). The crucial aspects of a community's quality of life included the quality of education at all levels; the quality and diversity of cultural, artistic, and recreational resources; environmental quality; and physical security. High-technology plants located in communities that rank low on the "livability scale" have difficulty attracting technical and managerial personnel or moving them from other plants in the company (Rees, 1986).

*Develop Stronger Entrepreneurial and Technological Capacities.* Increasing evidence suggests that a culture promoting innovation, creativity, flexibility, and adaptability will be essential to keeping U.S. cities economically vital and internationally competitive in the future.

*Enhance Civic Leadership and Community Action.* To attract and sustain technology-based manufacturing and services activities that are internationally competitive, urban leaders must promote a common civic perspective in the public and private sectors and a positive attitude about a city's or metropolitan area's comparative advantages.

*Expand and Modernize Urban Infrastructure.* Economically vital and competitive American cities must have modern and efficient physical

infrastructure—roads, bridges, highways, energy systems, telecommunications, and airport and cargo facilities—that facilitate international trade and investment.

## LABOR FORCE

**Dumais, G., G. Ellison, and E.L. Glaeser. 1997. *Geographic Concentration as a Dynamic Process*. Cambridge, MA: National Bureau of Economic Research. Working Paper 6270. November.** Labor market suitability is the most important predictor of new plant locations. New plants seem to have a very strong tendency to locate where there are other industries using the same kind of workers. New plants are more likely to be located in areas with more potential input suppliers and more potential downstream customers.

The effect of the integration variable, which is meant to be a proxy for some kinds of intellectual spillovers, is quite significant. The effect of the integration variable is indeed stronger in those industries which employ more workers in occupations requiring a college education, suggesting that intellectual spillovers may be a more important determinant of location choices in idea-oriented industries.

**Fulton, William and Paul Shigley. 2001. “Little Chips, Big Dreams.” *Governing*.** For high-tech, the big draw is not tax incentives or free land. It’s a solid labor pool, critical mass (including proximity to university-based research) and support for young entrepreneurs. While the old saw about “location-location-location” applies to high-tech companies, their location criteria tends to differ dramatically from manufacturing companies. “They need to be where the action is so they can be on top of the latest ideas and have access to skilled labor.” They desire to be proximate to university-based research and/or a place that is “well wired” for internet information exchange. They also wish to be in a place that “means something to them,” like proximity to a critical mass of related business clusters, recreational amenities, or other quality of life attributes.

## INFRASTRUCTURE

**Eberts, Randall W. 1991. “Some Empirical Evidence on the Linkage between Public Infrastructure and Local Economic Development.” In *Industry Location and Public Policy*. Knoxville, TN: University of Tennessee Press.** Results show that infrastructure development has the greatest effect on employment change during a recession. Most of the overall effect of infrastructure comes through the decisions of small businesses. Openings of businesses affiliated with large firms are not significantly influenced by infrastructure growth. Results show that public capital and private capital are complements. That is, an increase in public capital induces an increase in private capital. Public investment was more likely to influence private investment in cities outside the South and in cities that experienced much of their population growth before 1950. On the other hand, private investment was more likely to influence public outlays in cities located in the South and which grew substantially after

1950. Public infrastructure has been shown to stimulate economic growth through a number of channels.

**Fisher, R.C. 1997. “The Effects of State and Local Public Services on Economic Development.” *New England Economic Review* (March/April): 53-82.** Fisher summarized the literature concerning the relationship between public services and economic development. He found that some public services clearly have a positive effect on some measures of economic development in some cases. He focused on three types of public services: transportation, public safety, and education. The positive relationship is strongest for transportation services, especially highway facilities. The results for public safety spending are less consistent, and the evidence for a link between education spending and economic development is weakest.

A key difficulty in the public services literature is that spending measures may bear little relation to the actual service levels that businesses care about in making their location decisions, and service levels are notoriously difficult to measure.

Equally competent research projects may get widely divergent estimates of the economic development effects of fiscal variables. Those fiscal variables are difficult to measure. Measured fiscal variables are often endogenous, in that they might be affected by economic development.

## **TAXES**

**Buss, Terry F. 2001. “The Effect of State Tax Incentives on Economic Growth and Firm Location Decisions: An Overview of the Literature.” *Economic Development Quarterly* 15 (1): 90-105.** In this article, the author reviewed economic literature on the effectiveness of tax incentives. He states that tax literature, now in hundreds of publications, provides little guidance to policy makers trying to fine-tune economic development. Taxes should matter to states, but researchers cannot say how, when and where with much certainty. Firms may need tax incentives to increase their viability in some locations, but researchers cannot definitively say which businesses or which locations. Studies have shown that taxes seemed to matter at least at the margins, once corporations have made decisions on labor, transportation, raw materials, and capital costs. Criticisms of tax studies suggest that many correlations of taxes and economic growth are very likely artifacts of data sources, time periods, variable selection, measurement, and methods. The authors categorized the literature by type of study, including intra-regional effects, business climate studies, and the hypothetical firm approach.

Researchers conducted at least 11 studies on the intra-regional effects of taxes on business location decisions. In smaller geographic areas, factors of production—labor costs, services, transportation, markets—are likely to be similar, so differences in tax levels across communities become more important in the location decision.

The author reviewed business climate studies that weight state and local taxes heavily in computing state rankings used to recruit business. Critics contend that these rankings should not be taken seriously.

He reviewed studies that employ the hypothetical firm approach, where analysts take an industrial sector, then build models of what they believe are average firms. Researchers found that manufacturers were more oriented toward national markets than non-manufacturers were and tended to be more capital intensive than non-manufacturers. Also, manufacturing location decisions appeared more sensitive to taxes than did non-manufacturing location decisions.

A 1996 study by Washington's Department of Revenue analyzed three tax incentives—distressed area sales tax deferral and/or exemptions, jobs tax credits, and manufacturing sales tax deferrals—that act as long-term, interest free loans or outright grants to firms. Overall, the State of Washington concluded that there appears to be little correlation between the amount of tax benefit received by participants in the tax incentive programs and the growth in employment which resulted. Therefore, these tax incentives may not be a major factor in influencing the location process for businesses. In addition, declining companies tended to take advantage of programs targeted toward distressed areas, whereas growth companies tended to locate in non-distressed counties.

**Helms, Jay L. 1985. "The Effects of State and Local Taxes on Economic Growth: A Time Series-Cross Section Approach." *Review of Economics and Statistics*: 574-82.** The author found that investments in health, highways, schools, or higher education caused growth in state personal income. Results based on pooled time series and cross section data are presented, which indicate that state and local tax increases significantly retard economic growth when the revenue is used to fund transfer payments. However, when the revenue is used instead to finance improved public services (such as education, highways, and public health and safety) the favorable impact on location and production decisions provided by the enhanced services may more than counterbalance the disincentive effects of the associated taxes. These findings underscore the importance of considering the incentives provided by a state's expenditures as well as its taxes.

**Phillips, Joseph M. and Ernest T. Goss. 1995. "The Effect of State and Local Taxes on Economic Development." *Southern Economic Review* 62: 320-333.** Econometric studies of the effect of state and local taxes on economic development have given conflicting results, but more recent evidence using improved data and techniques indicate that taxes can affect business location decisions.

The authors use a meta-analysis to sort out the multi-dimensional nature of the relationship between taxes and economic development and minimize the problems noted by Bartik (1991). Their results support the conclusions reached by Bartik. The estimated tax elasticity for studies examining differences across states or metro areas tend to fall on the high side of what Bartik estimated, while the estimated within-metro areas elasticity is on the

low side of that estimated by Bartik. They found that studies that fail to control for public service effects will underestimate the tax elasticity and those measuring growth as aggregate income or investment growth will find a lower tax elasticity.

**Wasylenko, Michael. 1997. "Taxation and Economic Development: The State of the Economic Literature." *New England Economic Review* (March/April): 37-52.** Taxes do not appear to have a substantial effect on economic activity among states. In part, states, and regions have acted to neutralize the effect of taxes by adopting tax systems that are more alike. States appear to overestimate the degree to which taxes affect economic outcomes and hence are not very receptive to the finding that taxes have little effect. State policymakers feel pressure to keep the state economy growing and producing jobs for its citizens.

Taxes have a small, statistically significant effect on inter-regional location behavior. The central tendency of tax elasticity estimates is around -0.2, implying that a 10 percent reduction in taxes would be associated with about a 2 percent increase in economic activity. However, the effect of a specific state's taxes depends not only on the elasticity, but also on the extent to which the state's overall (state and local) tax levels are significantly different from the average of the states it competes against. Intra-regional studies produce tax elasticities that are quadruple or more those found in the inter-regional studies. With other cost and market variables very similar among different locations within a region, fiscal differences within the region play a more significant role in location choice.

One key difference among studies is whether measures of government service levels are included along with taxes; excluding them from the equation causes an underestimate of the tax elasticity because services may attract economic activity and service levels tend to be higher where the taxes that finance them are higher.

## **INCENTIVES AND ENTERPRISE ZONES**

**Bartik, T.J. 1994. "Jobs, Productivity, and Local Economic Development: What Implications Does Economic Research Have For the Role of Government?" *National Tax Journal* 47 (4): 847-861.** Economics research suggests that traditional economic development policies of "buying growth" have a high cost per job created. Around one in five of the new jobs created go to the original local residents, and the other four go to in-migrants.

**Bartik, T.J. 1995. "Economic Development Incentive Wars." *Employment Research* (Spring): 1-5.** Econometric research suggests that effects of incentives on business location and expansion decisions are modest. Many location and expansion decisions are unchanged by incentives. The cost of incentives to businesses whose location decisions are unchanged exceeds the taxes from businesses whose location decisions are changed. The average net governmental cost per job created by incentives is equivalent to around \$4,000 annually for the life of the plant.

Increasing a metropolitan area's employment by 10 percent raises the average real earnings of local residents by 4 to 7 percent. About half of the increase in real earnings results from higher employment rates of local residents. The other half occurs because local residents move up to better-paying jobs.

Four out five new jobs in a local economy will go to people who otherwise would have lived elsewhere. Additional population requires spending on schools and infrastructure that is unlikely to fully recovered from household taxes.

**Buss, Terry F. 1999. "The Case Against Targeted Industry Strategies." *Economic Development Quarterly* 13 (4): 339-356.** Local and state practitioners have widely used targeted industry strategies in economic development. This article concludes that targeting is based on poor data, unsound social science methods, and faulty economic reasoning and is largely a political activity.

**Engberg, John and Robert Greenbaum. 1999. "State Enterprise Zones and Local Housing Markets." *Journal of Housing Research* 10 (2).** Although nearly two decades have passed since zone programs were first implemented, there has been little systematic evaluation of the impact of the state programs. Typically, the evaluations try to estimate how many businesses and jobs the programs create. If zones are successful, the local real estate market should reflect the increased desirability of areas for living and working. The demand shock should raise the market value of housing and rental rates and decrease vacancy rates.

Theory suggests that the response to a policy-induced demand increase will vary with the tightness of the housing market. Housing markets with low vacancy rates will have an inelastic supply curve, prompting a price rise from an increase in demand. Markets with high vacancy rates, on the other hand, will exhibit little price response but experience a reduction in vacancy rates. In order to investigate this variation in zone impact, we interact vacancy rates with our variable that represents the zone program intervention.

We find that enterprise zones increase the growth rate of housing values in places that began the decade with low vacancy rates. Our analysis of the growth in vacancy rates is less definitive. We do not find a significant impact of zone programs on the growth in vacancies nor do we find that the impact varies with the initial vacancy rate. We find that, on average, zones do not increase housing values, although they do have a positive impact in tight housing markets.

**Fox, William F. and Matthew N. Murray. 1998. "Incentives, Firm Location Decisions and Regional Economic Performance." In *Local Government Tax and Land Use Policies in the United States: Understanding the Links*. Edited by Helen F. Ladd. Northampton, Massachusetts: American International Distribution Corporation. Pgs. 168-181.** Large incentive packages granted to new firms are typically

predicated in anticipation of substantial economic and fiscal gains for the host government. In general, while there are some specific instances of positive impacts on regional economies, the evidence points to complete or more-than-complete displacement of other economic activity. While large new plants may add visibility to the region and may cause restructuring of regional economies, there is little evidence of improved aggregate economic conditions following sitings.

**Green, Gary P., Arnold Fleischmann, and Tsz-Man Kwong. 1996. "The Effectiveness of Local Economic Development Policies in the 1980s." *Social Science Quarterly* 77 (3): 609-625.** Local governments in the United States have adopted a wide variety of policies to stimulate their local economies, but there is still debate over the effectiveness of such efforts. This paper examines the relationship between local development policies and changes in the number of jobs in both the manufacturing and service sectors during the mid-1980s.

The findings indicate that local economic development policies had a limited effect on employment from 1982-1987. For both manufacturing and service employment, market factors had the strongest effect on employment growth. Local investment in infrastructure and education, however, may enhance employment growth in both the manufacturing and service sectors.

Overall, the results do not offer much comfort to city officials who tend to adopt a laundry list of economic development programs as a promise to constituents to generate jobs in their community. Local and regional market structures were the primary determinants of employment growth in the 1980s, particularly in the service sector, which seems especially driven by demographic trends.

**Ladd, Helen F. 1998. "Tax Policies to Promote Economic Development." In *Local Government Tax and Land Use Policies in the United States: Understanding the Links*. Edited by Helen F. Ladd. Northampton, Massachusetts: American International Distribution Corporation. Pgs. 116-130.** Enterprise zones are typically established in depressed or blighted areas to achieve two primary goals: revitalization of the local economy and the provision of employment to local residents. To achieve these goals, a typical enterprise zone provides a combination of tax and financial subsidies for firms.

In practice, it is difficult for enterprise zones to meet both goals. A program that successfully revitalizes the local economy may provide jobs to non-residents rather than to low-skilled residents of the zone. To counter this possibility, some zones require that a firm hire 50 percent of its employees from the local area to be eligible for the tax concessions. Because zones are small and do not have the diversity of potential workers of larger areas, this requirement often puts too large a burden on firms and keeps them from participating.

In addition, many analysts have observed that, given the goal of increasing local employment, subsidies to capital make less sense than

subsidies to labor. A capital subsidy is attractive to capital-intensive firms and encourages firms to substitute away from labor in favor of capital.

The experience to date with enterprise zones provides a reasonably clear indication that the zones have not proven to be a cost-effective means of providing jobs.

**Schwartz, Amy Ellen and Ingrid Gould Ellen. 2000. *Cautionary Notes for Competitive Cities*. Brookings Institution. May.** Enterprise zones have yielded disappointing results. The subsidies offered tend not to be large enough to dramatically alter business location decisions. Interviews of firms in enterprise zones suggest that incentives are only a small part of the reason they decided to locate there. Indeed, one study found that nearly half of firms in enterprise zones do not even take advantage of the available incentives.

To the extent that subsidies are effective, they are most likely to draw firms who would have located nearby in any case. Indeed, many charge that enterprise zones succeed only in relocating business activity from neighboring locations. The evidence is somewhat mixed here, and ultimately, it may be impossible to satisfactorily distinguish between “new” jobs and jobs that would have arisen elsewhere if the zone did not exist.

A third potential concern is that even if a zone succeeds in generating new investment, it may not produce new jobs. If subsidies are targeted to capital, for instance, firms may shift to more capital-intensive production and even perhaps, reduce employment. Similarly, if there is not a ready supply of workers to meet the increased demand, the end result may simply be an increase in wages. Finally, even if new jobs are created in a zone, they may not go to residents. The most sophisticated studies, in fact, have found that zones have no effect on the income and employment of zone residents.

Enterprise zone designation is unlikely to radically change the rate of economic growth in a local area. Second, policymakers should understand that zones are likely to redirect economic activity from areas outside the zone.

**Wassmer, Robert W. 1994. “Can Local Incentives Alter a Metropolitan City’s Economic Development?” *Urban Studies* 31 (8): 1251-1278.** Cities in the U.S. and Europe have chosen increasingly to offer incentives designed to attract and retain local economic development. The increased use of local incentives has occurred with little or no empirical test of their effectiveness. This paper contains a statistical method that can be applied to any group of cities to measure the “additive effect,” or lack of it, that incentives exert on local economic development. Regression analysis applied to cities in the Detroit metropolitan area indicates that incentive efficacy depends on city-specific characteristics and how economic development is measured. Although there are situations where incentive offers exert an additive effect on local economic development, in a majority of situations this is not the outcome. In fact, the results indicate that city incentives exert no effect, or are only positively associated with further economic decline.

Evaluated at the mean value of local characteristics, there were no statistically significant effects in four of the 16 possibilities (25 percent) in regression estimation where an incentive could exert an influence on economic development. Of the remaining 12 significant cases, there were seven instances (44 percent) of a negative relationship between an incentive offer and local development. It is unlikely that a negative relationship indicates that the incentive caused a decline in economic activity, but only that it was correlated with it. In only five instances (31 percent), the incentive, evaluated at the mean, caused the desired additive effect on local economic development.

## REGULATIONS

**Goodstein, Eban. 1999. *The Trade-Off Myth: Fact and Fiction about Jobs and the Environment*. Washington, D.C.: Island Press.**

Environmental regulatory costs are a small portion of total business costs. The main influence of environmental regulations is said to come through difficulties in getting construction permits. Several survey respondents said they would rather have strict regulations that were clearly specified so that they could be incorporated in the design of the new facility, raising costs somewhat but not delaying the project.

Communities with clean water and air are nice places to live. These environmental amenities attract in-migration. Because there is a larger than normal supply of talented workers, firms that are located in the area can pay somewhat lower wages than in other regions. A stable supply of talented workers, lower average wages, a consumer base with a steady inflow of nonlabor income, and the quality-of-life appeal for business owner—all of the factors attract ‘footloose’ new industry to areas, that, by virtue of their amenities, are attracting in-migration of people. Amenities include not only environmental assets, but also more traditional public goods, such as quality schools, low crime rates, and nice weather. Sunny southern California is the classic example of a region that has prospered from amenity-based growth. The Los Angeles basin also illustrates how the process can be self-limiting. As people flood into an area in search of amenities, it becomes congested, and without good, planning, many of the amenities become degraded. Schools get overcrowded; crime, traffic congestion, and pollution all rise; once pristine natural environments become over-crowded.

**Jaffe, Adam B., et al. 1995. “Environmental Regulation and the Competitiveness of U.S. Manufacturing: What Does the Evidence Tell Us?” *Journal of Economic Literature* 33 (1): 132-163.** This survey assesses evidence on the linkage between environmental regulation and competitiveness, and finds little support for the hypothesis that environmental regulations have large adverse effects on competitiveness. Studies examining the effects of environmental regulations on net exports, overall trade flows, and plant-location decisions have produced estimates that are small, statistically insignificant, or not robust. For most industries, the cost of complying with environmental regulations is a relatively small fraction of the total cost of production. The authors also found no systematic evidence supporting the revisionist hypothesis that environmental

regulations stimulate innovation and improved competitiveness. Overall, the evidence suggests that the truth regarding the relationship between environmental protection and international competitiveness lies in between the extremes of the current debate.

**Tannenwald, R. 1997. “State Regulatory Policy and Economic Development.” *New England Economic Review* (March/April): 83-99.** Tannenwald finds little consistent evidence that regulatory policies significantly affect firm location, the rate of business formation, or the rate of growth in employment and income. The lack of evidence may be due to the ambiguous nature of regulations: while they usually raise the cost of doing business in a particular jurisdiction, often they also enhance the jurisdiction’s attractiveness as a place in which to live, work, and vacation. Furthermore, the stringency of regulatory enforcement, a potentially important locational factor, is often difficult to measure.

Regarding environmental regulation, Tannenwald notes that most econometric studies find a negative relationship between a jurisdiction’s regulatory stringency and its economic performance. The estimated effects end to be small, however, and the models generally explain little of the inter-jurisdictional variation in economic performance.

Regarding state regulation of financial institutions, Tannenwald finds evidence that the relaxation of regulatory constraints on banks by Delaware and South Dakota brought large positive employment and income effects in both states. However, other states trying to emulate their success have not enjoyed comparable results.

## LAND

**Brennan, John and Edward W. Hill. 1999. *Where Are the Jobs?: Cities, Suburbs, and the Competition for Employment*. Washington, D.C.: The Brookings Institution. November.** An analysis of a new data set that covers private sector job growth in the cities and suburbs of 92 large metropolitan areas between 1993 and 1996 found that more than half (52) of the cities had an increase in jobs, but their growth rates trailed the growth rates of their suburbs. Even though most of the central cities gained new jobs during this period, the vast majority of them—75 central cities, or 82 percent—lost private sector employment market share to their suburbs.

The problem of decentralization, or cities’ loss of market share, is not confined to older industrial cities of the Northeast and Midwest. Cities in the South and West that are rapidly gaining jobs—Austin, Phoenix, Charlotte, Nashville—are losing out to their suburbs, which have even faster growth rates and are increasing their market share of jobs.

Portland, Oregon experienced less growth disparity than most U.S. cities. Employment grew in the central city 15.8 percent, compared to 17.4 percent growth in the suburbs.

## QUALITY OF LIFE

Florida, R. 2000. *Competing in the Age of Talent: Environment, Amenities, and the New Economy*. prepared for the R.K. Mellon Foundation, Heinz Endowments, and Sustainable Pittsburgh. The key findings of the study confirm that amenities and environmental quality matter in the attraction of talent and development of high technology regional economies, as follows.

Amenities and the environment, particularly natural, recreational, and lifestyle amenities, are necessary to attract knowledge workers and in supporting leading-edge high technology firms and industries. Knowledge workers essentially balance economic opportunity and lifestyle in selecting a place to live and work. Thus, lifestyle factors are as important as traditional economic factors such as jobs and career opportunity in attracting knowledge workers in high technology fields. Given that they have a wealth of job opportunities, knowledge workers have the ability to choose cities and regions that are attractive places to live as well as work. The new economy dramatically transforms the role of the environment and natural amenities from a source of raw material and a sink for waste disposal to a key component of the total package required to attract talent and in doing so generate economic growth.

Knowledge workers prefer places with a diverse range of outdoor recreational activities (e.g., rowing, sailing, cycling, rock climbing) and associated lifestyle amenities. Access to water and water-based recreation is of particular importance to these workers. Knowledge workers prefer regions where amenities and activities are easy to get to and available on a “just-in-time” basis. Due to the long hours, fast-pace, and tight deadlines associated with work in high technology industries, knowledge workers require amenities that blend seamlessly with work and can be accessed on demand. They favor cities and regions that offer a wide range of experiences, and are somewhat less concerned with “big ticket” amenities such as “high” arts and culture or professional sports. Knowledge workers also express a strong preference for progressive regions that are youth-oriented and supportive of demographic diversity.

Leading high technology regions are also high amenity regions with high levels of amenities and environmental quality. Austin, Texas; Seattle, Washington; the San Francisco Bay area; the greater Boston region; and Washington, D.C. score consistently high across virtually every measure of natural amenities, lifestyle amenities, and overall environmental quality. There is a strikingly strong correlation across the board between regions that are home to large concentrations of knowledge workers, amenities, and the environment. In this regard, amenities and the environment are part of a total package of factors required to become a successful technology-based region with a large pool of knowledge workers.

Leading high technology regions have aggressively pursued strategies to bolster their environmental quality, natural amenities, and lifestyle offerings to attract and retain talent. Austin and Seattle have placed high priority on

recreational amenities such as bike paths, mountain bike trails, parks and recreational areas, and accessibility to water for rowing and sailing. These regions have cultivated thriving music scenes and are also known for their youth-oriented cultures that are open and supportive of diversity. Both regions are among the national leaders in smart growth and sustainable development, and both try to involve their young residents in civic affairs. Leading high technology regions have also supported the development of extensive lifestyle and recreational amenities around major university districts where knowledge workers reside.

**Gottlieb, Paul D. 1995. “Residential Amenities, Firm Location and Economic Development.” *Urban Studies* 32 (9): 1413-1436.** Amenities are regarded as increasingly important to the location decisions of certain types of firm. Yet they are often ignored in economic development research because of the assumption that they attract only workers, and that this workforce, in turn, attracts firms. This paper argues for a reduced form model of the impact of amenities on corporate location. When testing such a model at the intra-metropolitan scale, it will be necessary to measure amenities not only at the potential worksite, but also where employees are likely to live. This paper tests such a firm location model using a sample of municipalities in northern New Jersey. Results support the hypothesis that firms evaluate certain amenities with respect to the likely residential locations of their employees.

Gottlieb measures a variety of amenities at both the potential site of the firm and the residential area where potential employees are likely to live. Results of the study suggest that firms in the high-tech sector are repelled by disamenities like violent crime and high municipal expenditures at the work site. However, Gottlieb finds weak evidence to support his hypothesis that residential amenities, such as recreation, low traffic congestion, and strong public education, affect the locational decisions of high-tech firms.

**Granger, Maury D. and Glenn C. Blomquist. 1999. “Evaluating the Influence of Amenities on the Location of Manufacturing Establishments in Urban Areas.” *Urban Studies* 36 (11): 1859-1873.** This paper investigates the notion that amenities influence manufacturers’ location choices in urban areas. If amenities affect wages, land values and other costs, then amenities will influence location decisions. Using urban, county-level, Census data, regression models were estimated for the location of small and medium-sized manufacturing establishments. Holding constant scale and agglomerative economies, amenities, measured by a quality-of-life index, are found to influence manufacturers’ location with the effects varying by industry. Labor-intensive industries are more strongly attracted to high-amenity urban locations.

## **AGGLOMERATIVE ECONOMIES**

**Arend, Mark. 1999. “Survey Reveals New Factors Behind Site Location Decisions.” *Site Selection Magazine*.** Site seekers still desire skilled labor and access to global markets, but now they require more data for operations-cost analysis, and a shorter start-up cycle. Development time is

now 6 to 18 months, not 18 to 24 months, as it was in the past. Companies expect and get details via the internet to short-list communities prior to making site visits. They need to know work-force characteristics, site location/size/cost, commuting patterns near site, and business costs. Locating proximate to competitors or industry clusters helps take some of the risk out of site location decisions.

**Audretsch, D.B. and M.P. Feldman. 1996. “R&D Spillovers and the Geography of Innovation and Production.” *The American Economic Review* 86 (3): 630-640.** The authors empirically test for the importance of geographic location to different types of industries by linking the geographic concentration in manufacturing industries to industry specific characteristics, most notably the relative importance of knowledge spillovers. They find that a key determinant of the extent to which the location of production is geographically concentrated is the relative importance of new economic knowledge in that industry. Even after controlling for the concentration of production we find evidence that industries in which knowledge spillovers are more prevalent—where industry R&D, university research, and skilled labor are the most important—have a greater propensity for innovative activity to cluster than industries where knowledge externalities are less important.

**Clapp, John, Henry O. Pollakowski, and Lloyd Lynford. 1992. “Intrametropolitan Location and Office Market Dynamics.” *American Real Estate and Urban Economics Association Journal* 20 (2): 229-257.** Theory and evidence point to interdependency between office location decisions and dynamic growth paths. For example, clerical and administrative support employees are suburbanizing relatively rapidly in most markets in response to changes in technology and transportation. This paper tests the hypothesis that both cross-sectional and dynamic variables are important determinants of dynamic patterns and office market forecasts. County Business Patterns data at the county and town levels indicate substantial spatial specialization (i.e. agglomeration) by type of office activity. But these agglomerations do shift over time as indicated by the maintained hypothesis. Their estimates suggest that the demand for office space in sub-markets is responsive to agglomerations by type of industry as well as to growth in FIRE employment. The supply of office space is responsive to lagged expected demand.

**Cortright, Joseph and Heike Mayer. 2001. *High Tech Specialization: A Comparison of High Technology Centers*. Washington, D.C.: The Brookings Institution. January.** In most high-tech regions, high-tech employment is concentrated in only a few industry segments. The majority of patents issued in any given metropolitan are granted to only a handful of firms specializing in one or more related technologies. Venture capital flows not only to a few high-tech metropolitan areas, but also to a specific set of technologies within those areas. Building on the findings about high technology specialization, the study also offers recommendations for regional economic development strategies.

There is no universal recipe for high technology success. The survey findings also underscore the difficulty of generating a new high technology cluster where none previously existed. Because new high-tech clusters build on the knowledge base of current workers and firms, metropolitan areas with weak technological endowments are greatly handicapped in creating new ones.

Economic development efforts should be tailored to build on extending existing strengths or emerging local competence; trying to create a totally new high-tech center where none currently exists is likely to be a lengthy, and probably fruitless, endeavor.

**Feldman, M.P. and D.B. Audretsch. 1999. "Innovation in Cities: Science-based Diversity, Specialization and Localized Competition." *European Economic Review* 43 (2).** The purpose of this paper is to identify the extent to which the organization of economic activity is either concentrated, or alternatively consists of diverse but complementary economic activities, and how this composition influences innovative output. The evidence provides considerable support for the diversity thesis but little support for the specialization thesis.

We find a tendency for innovative activity in complementary industries sharing a common science-base to cluster together in geographic space. Industries which use the same base of scientific knowledge exhibit a strong tendency to locate together for both the location of production and the location of innovation.

The importance of location to innovation in a world increasingly relying upon e-mail, fax machines, and electronic communications superhighways may seem surprising, and even paradoxical at first glance. While the costs of transmitting information may be invariant to distance, presumably the cost of transmitting knowledge rises with distance. Highly contextual and uncertain knowledge is best transmitted via face-to-face interaction and through frequent contact. Proximity matters in transmitting knowledge because such sticky knowledge is inherently non-rival in nature and knowledge developed for any particular application can easily spill over and be applied to different use and applications.

We find compelling evidence that specialization of economic activity does not promote innovative output. The results indicate that diversity across complementary economic activities sharing a common science base is more conducive to innovation than is specialization. In addition, the results indicate that the degree of local competition for new ideas within a city is more conducive to innovative activity than is a local monopoly.

**Head, Keith, John Ries, and Deborah Swenson. 1995. "Agglomeration Benefits and Location Choice: Evidence from Japanese Manufacturing Investments in the United States." *Journal of International Economics* 38 (3-4): 223-247.** This paper examines the location choices of 751 Japanese manufacturing plants built in the U.S. since

1980. The results support the hypothesis that industry-level agglomeration benefits play an important role in location decisions.

**Porter, Michael E. 2000. "Location, Competition, and Economic Development: Local Clusters in a Global Economy." *Economic Development Quarterly* 14 (1).** In this article, the author describes "clusters", geographic concentrations of inter-connected companies. The author defines clusters, describes how clusters affect competitive advantage, and explains the role of government in encourage the growth and development of clusters.

**What is a cluster?** A cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. The geographic scope of a cluster relates to the distance over which informational, transactional, incentive, and other efficiencies occur.

Clusters encompass an array of linked industries and other entities important to competition. They include, for example, suppliers of specialized infrastructure. Clusters also often extend downstream to channels or customers and laterally to manufacturers of complementary products or companies related by skills, technologies, or common inputs. Many clusters include governmental and other institutions (e.g., universities, think tanks, vocational training providers, standards-setting agencies, trade associations) that provide specialized training, education, information, research, and technical support.

Drawing cluster boundaries often is a matter of degree and involves a creative process informed by understanding the linkages and complementarities across industries and institutions that are most important to competition in a particular field. Cluster boundaries rarely conform to standard industrial classification systems. Clusters are defined too broadly if they are aggregates, such a manufacturing, services, consumer goods, or high-tech. Here, the connections among included industries are weak at best, and discussion about cluster constraints and potential bottlenecks will tend to gravitate to generalities. Conversely, equating a cluster with a single industry misses the crucial interconnections with other industries and institutions that strongly affect competitiveness.

**Clusters and Competitive Advantage.** Clusters affect competition by increasing productivity, increasing innovation, and stimulating new business formation that further supports innovation.

- *Productivity.* Location within a cluster can provide superior or lower cost access to specialized inputs such as components, machinery, business services, and personnel compared to vertical integration. Clusters improve access to information, including market technical, and other specialized information. They enable complementarities for buyers, marketing, and suppliers. Clusters often enable access to institutions and public goods. The ability to recruit employees already

trained in local training programs, for example, eliminates or lowers the cost of internal training.

- *Innovation.* Firms within a cluster often are able to more clearly and rapidly perceive new buyer needs. Cluster participation also offers advantages in perceiving new technology, operating, or delivery possibilities. Under certain circumstances, however, cluster participation can retard innovation. When a cluster shares a uniform approach to competing, a sort of ‘group-think’ often reinforces old behaviors. Clusters also might not support truly radical innovation, which tends to invalidate the existing pools of talent.
- *New Business Information.* Many, if not most, new businesses are formed in existing clusters rather than in isolated locations. There is better information about opportunities in clusters, inducing new firms to enter the market. Barriers to entry are lower in clusters: assets, skills, inputs, and staff often are readily available.

**Role of Government.** An important role of government is to improve general microeconomic capacity by improving the quality and efficiency of general-purpose inputs to business and the institutions that provide them, such as an educated workforce, an appropriate physical infrastructure, and accurate and timely economic information.

Market forces—not government decisions—should determine which clusters will succeed or fail. Government should reinforce and build on established and emerging clusters rather than attempt to create entirely new ones.

**Sommers, Paul and Daniel Carlson. 2000. *Ten Steps to a High Tech Future: The New Economy in Metropolitan Seattle*. Washington, D.C.: The Brookings Institution. December.** Firms within a sector tend to be clustered in certain locations, based on staff and entrepreneur’s preferences, infrastructure requirements, transportation needs, environmental factors, and land costs.

High-tech manufacturers are more likely to be found in suburban industrial parks than older in-city industrial districts, due to cost factors or the difficulty of assembling sufficient land to accommodate future expansion, or simple entrepreneurial preference. High-tech manufacturers, as a group, favor suburban locations. Land and buildings are available at lower cost per square foot in suburban manufacturing parks. In addition, the suburban locations are better tailored to their needs and desired images than industrial districts.

Biotechnology firms need to be located near research institutions and hospitals for research and development activities, but have tended to put manufacturing facilities in suburban industrial parks. Biotech jobs are far more concentrated than high-tech jobs in general. Frequent meetings among scientists, along with visits to patients undergoing experimental therapeutic procedures, require tight geographic concentration of the companies, research

organizations, and hospitals to minimize travel times. A study of the biotechnology industry in Washington State found that the single most important factor in locating biotech firms was that the CEO or founder wanted to live in the area.

New telecommunications companies tend to prefer downtown locations, along with internet content and e-commerce firms. Internet content and commerce firms need ready access to high bandwidth telecommunications systems such as fiber-optic cable.

Software entrepreneurs have shown up all over the urban area, although the competition for talent has driven an increasing number in attractive redeveloped quarters in and adjacent to downtown. Software firms require redundancy in power sources and access to telecommunication lines, back up power, and space to expand their operations.

Generally, urban firms expand or change facilities in urban areas, and suburban firms expand or change facilities in suburban areas.

## INNOVATION

**Collaborative Economics. 1999. *Innovative Regions: The Importance of Place and Networks in the Innovative Economy*. The Heinz Endowments; Innovation Works, Inc.; and The Pittsburgh Regional Alliance. October.** Productivity growth is the basis for rising real wages for workers, increasing returns to shareholders, and increasing per capita income for a region and the nation. The basis for increasing productivity in innovation. In successful regions, business and civic leaders set the stage for entrepreneurs to do what they do best. Because innovation is place-based social progress, regional leaders can promote social interactions and shape regional institutions and context that affect the innovation process. The authors recommend four strategies:

- Build fundamental economic assets: education, research, and financial platforms.
- Connect entrepreneurs and companies to assets.
- Promote a culture of innovation: actions which create a more supportive regional climate for building and leveraging innovation assets, including quality of life.
- Make quality of life an innovation asset: vital downtown center, schools, environmental preservation, and transportation.

**Florida, Richard. 2001. *Technology and Tolerance: The Importance of Diversity to High-Technology Growth*. Washington, D.C.: The Brookings Institution. June.** An analysis comparing measures of tolerance, diversity, and high-technology success in 50 metropolitan areas found:

- The leading indicator of a metropolitan area's high-technology success is a large gay population. The five metropolitan areas with the highest concentration of gay residents are all among the nation's top 15 high-technology areas.
- Metropolitan areas with high concentration of foreign-born residents also rank high as technology centers. Eight out of the top ten metropolitan areas with the highest percentage of foreign-born residents were also among the nation's top 15 high-technology regions.
- Overall diversity is a strong indicator of a metropolitan area's high-technology success. Eleven metropolitan areas with the highest levels of overall diversity (based on gays, bohemians, and foreign-born people) are among the top 15 high-technology areas.

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