

Houston Business

A Perspective on the Houston Economy

Industries as City Builders: What the Economist Knows

Does industrial specialization promote strong regional growth, or is local expansion better served by industrial diversity? Is city growth accelerated by the presence of highly competitive local industries or of large local firms that wield significant market power? This article briefly surveys several economic theories advanced to explain the dynamics of urban industrial growth, as well as recent efforts to test the validity of these theories.

Across the landscape of American cities, one economic feature stands above the rest—many industries locate most of their activity in a few cities. Indeed, some industries are synonymous with their chief city: financial services in New York, autos in Detroit, entertainment in Hollywood and oil in Houston.

Firms in the same industry cluster together primarily to achieve economies that are internal to that industry, economies that are often independent of the city that is their home. For example, by attracting many firms from the same industry, the city develops a pool of specialized labor specific to the industry's needs. This pool benefits workers as well as businesses, as it expands the range of local job opportunities. A similar argument holds for intermediate goods suppliers, who develop greater local expertise and specialization, as well as enjoy higher capacity utilization, than firms outside the pool. Finally, proximity eases the flow of information through the industry, making it easier for firms to keep track of new technology and the competition.

Cities may draw a cluster of similar firms for other reasons as well as, such as the size of a large city's market, extensive local infrastructure, or urban cultural and social amenities. Studies confirm that productivity is higher for firms inside these clusters than outside, and that economies generated inside the industry—labor and supplier pools and information flows—typically outweigh any advantages offered by city size or specific urban amenities.

These clusters largely explain regional industrial specialization, how cities form and where industries locate. Once such clusters are in place, however, the next important question concerns the growth of the

city over time. Does industrial specialization promote strong regional growth, or is local expansion better served by industrial diversity? Is city growth accelerated by the presence of highly competitive local industries or of large local firms that wield significant market power? This article briefly surveys several economic theories advanced to explain the dynamics of urban industrial growth, as well as recent efforts to test the validity of these theories.

GROWTH AND KNOWLEDGE

A 1992 article by Edward Glaeser¹ and several coauthors identified three theories of city growth. These theories describe a city's development through time; all feature industry clusters as a central element; and each has a special focus on the transmission and sharing of information within these clusters. New knowledge or innovation *must* play a special role in any modern theory of economic growth. Economic studies that began in the 1950s found that new machinery and factories put into service could account for only a small part of past U.S. productivity increases, measured by the growth of output per hour. In place of capital, technological change was moved to the forefront as the primary force in economic growth and development. In recent years, the pendulum has swung back the other way, and recent studies now find a larger role for additions of machinery and equipment than before. However, one-third (and perhaps more) of productivity growth still results from additions to our stock of knowledge—to technical innovation and the diffusion of these ideas through the economy. This fact suggests another perspective on clusters of firms; perhaps firms are attracted to the fountainhead of industry growth and profit and come together to share ideas and innovations.

One way to think about city growth is to apply the standard economic growth model, as developed from the initial work of Joseph Schumpeter and refined extensively by the modern economist. The key feature of Schumpeter's model is that firms that successfully invent and innovate can achieve market power and monopoly profits. Adam Smith's atomistic and perfectly competitive markets may provide allocative efficiency, but they don't offer the incentive needed to take risks or engage in forward-looking activities such as research. Monopoly or market power may result in allocative ineffi-

ciency, but either is effective in rewarding the risk-taker and innovator with large profits. Indeed, a patent is nothing but the formation of a legal monopoly, created under the law, to reward inventive activity.

Thus, we must recognize a trade-off between the allocative efficiency of perfect competition and the need for large profits as a reward for risk-takers who generate growth through innovation. However, the existence of such profits becomes a target for others, inviting further inventive activity to undermine and share monopoly profits. As competitors adopt the new technology, improve on the latest innovation or seek a new technological path to the same end, they attack market power and monopoly profits through what Schumpeter called a "perennial gale of creative destruction." Profits disappear from the individual firm's point of view but do not really disappear at all. The diffusion of the innovation spreads its benefit throughout the economic system, and we all see economic welfare rise with no additional effort within the productive system.

GROWTH IN CITIES

How does this theory apply to cities? It suggests that market power and limited competition might be good for growth. Perhaps cities with a few large firms, firms better able to internalize and protect their innovations from competitors, should see faster growth than other far-flung companies in the same industry. The presence of fewer firms limits the spillover of proprietary knowledge through gossip or employees' moving from company to company.

Harvard business professor Michael Porter has popularized a different view in recent years.² Porter's book colorfully documents small and highly *competitive* clusters of firms as a global phenomenon. Hundreds of firms cluster together under conditions of fierce competition; Madison Avenue and advertising, Swiss pharmaceuticals and German cutlery provide examples. Porter argues the key to growth is the pressure to innovate, as any firm that fails to respond quickly to innovations in the market simply won't survive. Competitors soon follow any new technological lead and eliminate excess profits and market power. City growth results from constant competition among small local firms.

An alternative source of growth in these competitive clusters is technological change that

works against traditional assembly line methods of production. As production moves toward nonstandard output, we see the development of many small and competitive subcontractors in a production system that becomes vertically disintegrated.

Hollywood and the film industry provide an example, as assembly line sound stages gave way 50 years ago to shooting movies on location around the world. Despite closing its soundstages, Hollywood has remained the heart of the movie business. The studios have kept creative and financial control of the industry but now rely on hundreds of highly specialized contractors to provide the inputs needed to make each movie. No longer the place where almost all movies were shot, Hollywood became an assembly point for specialists, a place for face-to-face meetings and keeping track of an evolving decision-making network, and where studios hire contractors and monitor their performance. Thus, competitive clusters may result from the development of any nonstandard product and the flexible specialization among contractors that follows. Many high-tech industries, and even Houston's oil service industry, can be described this way.

The theories discussed so far favor industrial specialization by cities, but there are also advocates of industrial diversity as a key to city growth. Historian Jane Jacobs has provided dozens of concrete examples of how innovation in one industry jumps to another, and how diversity helps cities grow.³ Economist Nathan Rosenberg has been a persistent critic of Schumpeter's focus on big inventions at the expense of small innovations that move across industry lines.⁴ In a well-known study of 19th century machine tools, Rosenberg shows how an invention from the firearms industry was adopted, refined and advanced by other industries—embodied in sewing machines, clocks, instruments, hardware, bicycles, locomotives and automobiles. There are many common processes among industries, what Rosenberg calls a “technological convergence,” and innovation at these convergence points will quickly cross industry lines. Surely two of the fastest growing industries in the United States today are such convergent technologies—information processing and telecommunications. Perhaps diversified cities provide the best mixing bowl for innovation and growth.

IMPLICATIONS

Glaeser specifically tests these theories by looking at employment growth rates from 1956 to 1987 among the six largest industries in each of 170 U.S. metropolitan areas. Controlling for differences such as wage rates and a Sun Belt location, he asks if we find industries that grow faster than their national counterparts in industrially diversified or nondiversified cities, or in cities that do or do not provide a competitive local market for their core industry. The study measures competition within industries by average establishment size. Glaeser finds statistically significant results that favor faster growth in cities that are industrially diversified and offer local competition; the quantitative effect of diversity was small, however, while the effect of competition on city growth was large. His focus on large or mature industries creates a bias against emerging industries (and early monopoly) as a source of growth.

In a future issue of this newsletter, we will look at implications for Houston and, more specifically, at the oil industry as a city builder. However, we know Houston is not industrially diversified. A quick comparison of Houston with other large U.S. cities (New York, Los Angeles, Chicago or Atlanta) and regional cities (Dallas, New Orleans, Oklahoma City or San Antonio) shows it to be the least diversified in this group—indeed, to be *much* less diversified than these other cities. Oil, chemicals and construction make Houston unique among large cities. Looking at internal competition, large firms dominate our industrial clusters in oil, construction and transportation, and these clusters are not internally competitive in the sense Glaeser defined and measured them. Outside these clusters, however, Houston's average establishment size in manufacturing, finance, services and trade is smaller than in diversified cities such as Dallas, Atlanta or Chicago.

¹ Edward L. Glaeser, Hedi D. Kallal, Jose A. Scheinkman and Andrei Shleifer, “Growth in Cities,” *Journal of Political Economy* 100 (1992, 6): 1126–1152.

² Michael E. Porter, *The Competitive Advantage of Nations* (New York: Free Press), 1990.

³ Jane Jacobs, *Cities and the Wealth of Nations* (New York: Vintage), 1969.

⁴ Nathan Rosenberg, *Perspectives on Technology* (Armonk, N.Y.: M.E. Sharpe), 1976.

The news on the Houston economy remains upbeat, with encouraging numbers for jobs, oil profits, telephone connections, new houses and anything else that can be counted. Moderate but healthy economic growth continues.

RETAIL AND AUTO SALES

Both September and October brought improved retail sales activity, and retailer optimism improved accordingly. Home goods and clothing have led recent sales and kept inventories under control. Plans for the holiday season are conservative, often flat compared with last year. No one wants to guess too high and lose holiday profits to excess inventory.

Auto sales were flat in September compared with a year earlier, and October sales were reported as being in line with seasonal expectations. The critical summer season was a success, and sales for the first nine months of 1995 were 3 percent ahead of last year.

CRUDE OIL AND NATURAL GAS PRICES

Crude oil prices have remained firmly between \$17 and \$18 for three months, and the market is now looking ahead to the November meeting of OPEC. Prices continued to firm throughout October, however, with low inventories of both crude oil and heating oil and with the early arrival of cold weather in the Midwest.

Natural gas prices continue their seasonal upswing. Helped by early cold weather, spot prices along the Gulf Coast have improved from \$1.60 in mid-September to \$1.85 in late October. Even without cold weather, however, natural gas prices are now running ahead of prices at this time in 1994.

The market for oil services and machinery is slightly weaker than a year ago, with domestic activity slow onshore and Canadian activity down sharply. Canadian drilling remains at historically high levels, but there is limited pipeline capacity to move new supplies to U.S. markets. International drilling and strong activity in the Gulf of Mexico continue to carry the market.

Shortages of offshore equipment are growing around the world, and offshore rigs and drill ships are now in strong demand.

OIL PRODUCTS AND CHEMICALS

Refiners saw their margins weaken seasonally, as the driving season ends and the heating season has not yet arrived. Seasonal shutdowns for maintenance reduced demand for crude and kept product inventories low. Prices of gasoline and heating oil were seasonally weak, although low inventories and early cold weather quickly pushed up the price of heating oil in late October.

The chemical market continues to weaken, with prices down for many products, shipments falling in some product lines, and inventories now too high. A Chinese embargo on petrochemical imports due to a shortage of foreign exchange has hurt the market for propylene and related products. Weaker domestic homebuilding and auto production have hurt the market across the board. Profits are down from the market peak early this year but still are higher than at this time last year.

REAL ESTATE AND CONSTRUCTION

Both new and used home sales have responded strongly to lower mortgage rates and a growing job market. Sales of new homes this summer were up 20 percent from a year earlier, and starts were up about 12 percent. Used home sales similarly surged over the summer, and the sales pace stayed ahead of 1994 in September. Low inventories in both markets should encourage builders to increase construction in coming months.

Apartment construction has cooled off slightly, reducing concerns about the number of new units under construction getting ahead of the market. Retail construction is expected to remain strong. Some small contractors report their once-healthy backlogs have slipped, but a better homebuilding market should provide more work in weeks ahead.

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