

**Annual
Report
1986**



**Federal
Reserve
Bank of
Cleveland**

The illustrations used
in the 1986 annual
report were created
by a Cleveland
artist using color
xerography. The
watches on the cover
are a reminder that
economic systems
are constantly
changing over time.

Our 1986 annual report examines the economies of the four largest cities in the Fourth Federal Reserve District - Cincinnati, Cleveland, Columbus, and Pittsburgh. ■■■ These cities began the nineteenth century with similar advantages - natural resources, skilled labor, transportation routes - but they have followed dramatically different economic paths. Today, the four economies range from struggling to successful. ■■■ In this essay, we discuss how cities within a relatively small geographical area can experience such economic diversity. We consider the significance of comparative advantage and the aging of dominant industries in explaining economic disparities across regions. We also suggest ways in which we can affect our own economic future.

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Karen N. Horn, President

The President's Foreword

Our nation's economy showed many signs of strength in 1986. The economic expansion continued and interest rates remained low. Perhaps one of the most impressive aspects of the past two years is the enormous restructuring that has taken place in our economy during a period of overall stability and growth.

Although this process began long ago, it is difficult, even for those of us who have been close to the process, to comprehend the extent and scope of these changes. Once-prominent industries have declined, in absolute or in relative importance. Under the pressure of competition, nationally and locally important firms have been forced to alter operations and restructure facilities. Economic restructuring is usually painful for the people and the communities involved, but if change is inevitable and leads to a better world, then much has been accomplished.

The results of restructuring are evident in the emerging economic structure of the Fourth Federal Reserve District. An assessment of the ultimate outcome for area industries has been greatly complicated by large swings in the exchange rate of the dollar, but two observations can be made concerning the future of the Fourth District and the United States economies. First, the manufacturing sector will probably remain strong but will employ a smaller proportion of the labor force and, second, the service sector will continue to grow, as measured both by employment and by output.

These likely outcomes raise several issues for management, labor, and education. But perhaps the central issue facing us is, how can we as a people better adapt to economic change? The 1986 annual report essay, "Common Bonds, Divergent Paths," analyzes how four cities within the Fourth District have been affected by the forces of economic change, and we hope that it will provide some insights into the process of change.

As many of you may know, I will be resigning as president of the Federal Reserve Bank of Cleveland in early April to accept a position in the private sector. My five years with the Bank have been extremely rewarding, and I leave

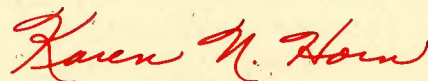
with the satisfaction of having achieved many goals. I will miss the energy, creativity, and commitment of this Bank's directors, officers, and staff.

This Bank has been most fortunate in having the leadership of William H. Knoell (president and chief executive officer of Cyclops Corporation), who retired from our Board of Directors after serving as a member since 1981 and as chairman and Federal Reserve Agent since 1984. Special thanks go to the directors on our Cleveland Board who have completed their terms of service: J. David Barnes (chairman and chief executive officer, Mellon Bank), who has served since 1981; and John R. Hall (chairman of the board and chief executive officer, Ashland Oil, Inc.), who has served since 1984.

We are also grateful for the contributions of Dr. Robert E. Boni (chairman of the board and chief executive officer, Armco Inc.), who has served as chairman of the Cincinnati Board since 1984; Vernon J. Cole (executive vice president and chief executive officer, Harlan National Bank), who has served on our Cincinnati Board since 1984; and G.R. Rendle (president and chief executive officer, Gallatin National Bank), who has served on our Pittsburgh Board since 1984. Their valuable and dedicated service and guidance, as well as that of all the directors and the members of the 1986 Small Bank and Small Business Advisory Councils, are certainly appreciated.

I greatly enjoyed being a part of this organization, and I will miss my association with the many fine people in the Federal Reserve System and in the Fourth District communities.

Sincerely,



Karen N. Horn
President
March 12, 1987

"It was the best of times, it was the worst of times ... it was the spring of hope, it was the winter of despair."

Charles Dickens, A Tale of Two Cities, 1859

Dickens's saga *A Tale of Two Cities* is a reminder that cities with seemingly common bonds of history and commerce can follow divergent paths. The same is true in our present-day economy.

The United States is often portrayed as a monolithic economy, within which various regions march in step. This is far from the truth. The country is a patchwork of different regional economies, linked by a market system, through which people, capital, ideas, and technology move back and forth. A similar type of diversity and interconnectedness exists within the Fourth District.

The Fourth District covers a relatively small geographical area. It includes all of Ohio, western Pennsylvania, eastern Kentucky, and the West Virginia panhandle. Yet, much like the cities of London and Paris during the time of Dickens's novel, the four largest cities of the Fourth District - Cincinnati, Cleveland, Columbus, and Pittsburgh - stand in stark contrast to each other. Cincinnati and Columbus are keeping pace with or surpassing national employment and population growth rates, while Cleveland and Pittsburgh have fallen behind.

What caused some of the cities within the District to fare better at times than others? There is no simple answer, but economists traditionally have focused on resource endowment and cost factors, especially the cost of labor and capital. Another part of the explanation lies in the region's historical development and the industries that came to dominate the local economies.

The Rise and Fall of a Region The rise of the Midwest as an industrial center is relatively easy to understand. During the late 1800s, the "industrial belt" cities had a comparative advantage in the production of steel, automobiles, and machine tools because of their nearness to iron ore and other raw material inputs, as well as their easy access to the Great Lakes and the Ohio River.

Equally important was the frontier-

like spirit of the region. Unlike the East Coast, the Midwest had no prior experience with industrialization and consequently no existing institutions or norms to stand in the way of change. Instead, the area was ripe for new ventures and offered opportunities for individuals to pursue their dreams.

Many of the natural resources available to the entrepreneurs of a century ago can still be found here. In fact, the range of available resources has expanded to include the capital stock and infrastructure of a high-income society, cultural amenities, skilled labor, and well-developed educational systems.

But, while these resources are still attractive to firms, the problems of industrial-belt cities seem to outweigh the advantages. High wage rates, unions, high energy prices, cold winters, high taxes, and a deteriorating infrastructure are all cited as contributors to an unfavorable business climate.

The Curse of Success It can be argued that the industrial empires forged during the early years stand in the way of future progress. This was not intentional. Rather, according to the industrial life cycle theory, the sheer size of these industries and their dominance of the region significantly affected their local economies in ways that produced resistance to change.

The industries' demand for labor drove up wages and employed the best and the brightest workers and managers. Their desire to build new plants tied up financial resources. Their large scale of operation cornered resources and markets. Moreover, as these dominant industries matured, institutions and coalitions formed to preserve the industries that had brought employment and prosperity to the region. These forces created a barrier to the development of new economic activities and weakened the comparative advantage of doing business in these areas.

This theory of the natural evolution of an industry and a community sheds light on several things that are puzzling about the Fourth District economy.



First, it helps to explain why many industries within the region have lost their comparative advantage. Second, it provides a better understanding of the economic diversity among various cities in the Fourth District.

Common Bonds, Divergent Paths This essay examines the diversity of four major cities within the Fourth District - Cincinnati, Cleveland, Columbus, and Pittsburgh. Each city, at some time in its history, shared many of the same basic manufacturing industries. However, as locational advantage and his-

torical accident favored some industries more than others, these cities began to take divergent paths.

We will look first at the economic heritage of each city, and then discuss how it helps to explain present employment patterns. Using both the locational advantage and the industrial life cycle theories, we explain how such diverse growth trends can exist within a relatively small geographical area. Finally, we describe the potential growth sectors and the conditions that are necessary to launch regions into a new economic era.

“Although the rich woodland was probably among the greatest forests ever to grace the earth, the settlers were more interested in other riches.”

Ohio's Natural Heritage, 1979

Past Advantages

The Fourth District experienced its industrial renaissance during the early part of this century, primarily because of the comparative advantages the region offered at that time in the production of steel, automobiles, and machine tools. As one might expect, the major cities in the Fourth District had similar characteristics, such as an abundance of raw materials and well-developed transportation systems.

As a result of these similarities, many of the same industries emerged in each city during the region's initial development. Over a relatively short period of time, however, a weeding-out process left some industries more heavily entrenched in certain parts of the District than in others. This subsequently led to the development of different industrial structures in the major cities.

Pittsburgh The comparative advantages of Pittsburgh were apparent early in its development. The city's access to abundant natural resources led to the rapid expansion of its manufacturing base during the late 1800s.

The region offered great reserves of high-quality coking coal, local deposits of iron ore, and valuable deposits of sands and clays for use in glass and clay products. Natural routes of transportation were provided by several major waterways leading into Pittsburgh. The convergence of three major river valleys allowed easy access to the city.

Cleveland Cleveland's prominence as an early nineteenth-century trade and commerce center developed from its position on the Ohio and Erie Canal, which was completed in 1832. Cleveland's strategic location made it a way station to the West and, with the development of ports, a leading shipping center on Lake Erie.

In the mid-1800s, Cleveland also benefited from the opening of the railroads, from the discovery of vast iron ore resources in the neighboring Lake Superior region, and from the development of the coal and petroleum industries. These factors encouraged industrial diversity in Cleveland and made the city a center for mercantile activity.

Cincinnati Cincinnati was also strategically located near a major waterway - the Ohio River. However, because the city had a greater abundance of agricultural resources than mineral resources, it followed a different path from Cleveland and Pittsburgh. The economy initially developed around agriculture and livestock. Canals and a major railroad were built to facilitate transportation of wheat, corn, and other farm produce.

For many years, Cincinnati was the most important milling center west of the Appalachians. It was also nicknamed "Porkopolis" because the pork-

packing business was very prosperous. Livestock also supplied the material for the food, lard, soap, candle, and leather industries.

After the Civil War, the character of Cincinnati's industries changed. The devastation of the South eliminated the once-flourishing southern market for Cincinnati's whiskey, salt pork, corn meal, and textiles. Also, heavy industries, notably steel and iron, suddenly became a mainstay of the American economy, but Cincinnati had neither the iron ore nor the coal that was needed to smelt it.

Consequently, the cities along Lake Erie, such as Cleveland, or near the coal fields, such as Pittsburgh, surpassed Cincinnati in population and industry. Instead of specializing in one or two dominant industries, Cincinnati expanded into a variety of industries, including machine tools and consumer products.

Columbus The early economic development of Columbus was influenced by the decision to locate the state's capital there and, later, the state's largest university. One of the reasons for locating the capital high on the east bank of the Scioto River was its central location within the state, a feature that has contributed to its prosperity today.

At first, Columbus's manufacturing

was constrained by the relatively limited resources available nearby and by the small size of the markets it served. Most of the businesses catered primarily to the needs of the region. Binderies were opened to serve the trade generated by the state and county governments, and foundries and handicraft shops catered to the farm market.

Local transportation and trade institutions began to flourish as the capital city grew in size and influence. Initially, processing agricultural raw materials was the city's principal industrial activity. As the city developed further, manufacturing gradually replaced much of the processing of agricultural raw materials. Beginning in 1819, the carriage and buggy industry began its long and famous development in Columbus.

After 1830, the city's position was greatly enhanced by the opening of the Ohio and Erie Canal and by the extension westward of the National Road. Later, the construction of railroads provided even greater access to resources and markets, which gave rise to a host of new activities within the community. The expansion of trade, especially with southeastern Ohio communities, led to the development of an extensive merchandising system within the region, which has not changed appreciably since then.

“Economic progress, in a capitalist society, means turmoil.”

Joseph A. Schumpeter, 1942

Present Diversity

A century and a half of economic metamorphosis has created four unique metropolitan areas. Today, Cincinnati, Cleveland, Columbus, and Pittsburgh account for more than 40 percent of the Fourth District's 16 million inhabitants. Among these metropolitan areas, population ranges from 1.3 million for Columbus to 2.2 million for Pittsburgh.

Employment Trends Three distinct employment trends characterize the development of these four cities over the last two decades. Between 1964 and 1985, Columbus outperformed the national growth rate for total employment, Cin-

cincinnati lagged slightly behind, and Cleveland and Pittsburgh fell far behind.

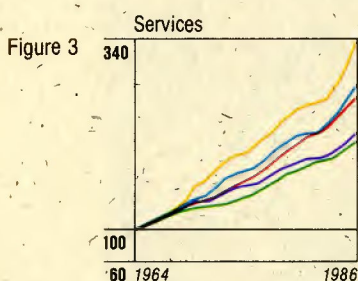
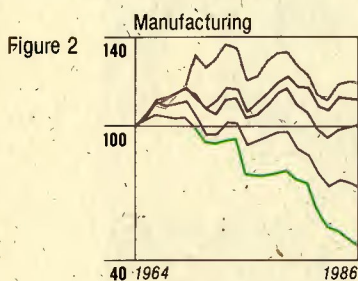
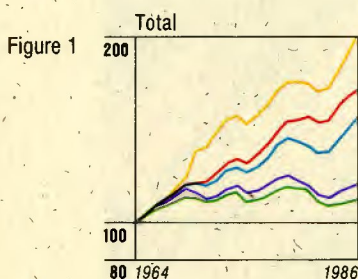
Over this period, total nonfarm employment in Columbus rose by more than 90 percent, while total employment in Cincinnati grew nearly 50 percent (see figure 1). Total employment in Cleveland and Pittsburgh increased by only 18 percent and 11 percent, respectively.

These differences in trends are even more striking over the last two business cycles. Since the business cycle peak of 1980, Cincinnati's employment has grown at a rate almost equal to the national rate of 12.4 percent, and Columbus has substantially surpassed it. During the same period, Cleveland



Growth Trends for Employment

(Percent of 1964 employment)



has struggled to return to its 1980 employment level, while Pittsburgh remains 4 percent below its 1980 level.

Not only do the total employment trends of each city differ, but employment patterns also vary substantially across broad economic sectors within each city. Between 1964 and 1985, Cincinnati experienced a 1.6 percent reduction in manufacturing employment, while service sector employment rose 162 percent (see figures 2 and 3). Columbus experienced expansion in all of its broad sectors, but its most impressive growth was in services, where employment rose 205 percent.

Employment patterns in Cleveland's and Pittsburgh's manufacturing and services industries have diverged dramatically. Pittsburgh lost half of its manufacturing jobs between 1964 and 1985, but doubled its service jobs. Cleveland lost 26 percent of its manufacturing jobs, but more than doubled its service jobs.

Employment Composition Because of the uneven growth rates across sectors, the economic composition of these metropolitan areas changed considerably between 1964 and 1985. Each city followed more or less the national transition from manufacturing to services, but each changed at a different pace.

In 1964, Cincinnati, Cleveland, and Pittsburgh had very similar economic structures. Manufacturing's share of total employment averaged about 37 percent, services accounted for about 14 percent, and wholesale and retail trade claimed 20 percent. Columbus differed from the other three with a smaller manufacturing base and a larger government sector.

But since 1964, the composition of each city's economy has changed considerably. Pittsburgh experienced the most dramatic transformation. Its manufacturing base fell from 37 percent in 1964 to 16 percent in 1985, while its service industry rose from 16 percent to 29 percent (see figure 4). As a result, instead of being the most industrialized city, Pittsburgh has now become the least industrialized of all four cities - with an

even smaller concentration of manufacturing employment than that of Columbus.

Columbus, Cincinnati, and Cleveland experienced similar, but less dramatic, compositional change. Today, Pittsburgh and Columbus show strong similarities, as do Cincinnati and Cleveland, based on the distribution of employment across broad industrial categories.

Manufacturing Employment The composition of the manufacturing sector provides further evidence of the similarities between Columbus and Pittsburgh, as well as some of the dissimilarities among all four cities. An analysis of employment patterns across industries shows that Pittsburgh's reliance on primary metals has fallen dramatically. A decade ago, more than 40 percent of Pittsburgh's manufacturing employment was in primary metals, particularly blast furnaces; today, that percentage has dwindled to 15 percent.

The shift away from primary metals has left Pittsburgh with a much more diversified manufacturing base. Pittsburgh ties Columbus for the most diversified manufacturing sector among the four cities.¹ Cincinnati has the highest concentration of manufacturing activity, while Cleveland has the highest concentration of employment in any one manufacturing industry, machinery.

The diversity among the four cities is further illustrated by the relative concentrations of specific industries within each city. We measure a city's degree of specialization by comparing the percentage of a city's employment within a particular industry to the percentage of total employment of the four cities within that industry.

Using this definition, we find that within the manufacturing sector, Cleveland specializes in machine tools and dies and measuring and analyzing equipment; Columbus produces leather, clay, and glass products, and electrical equipment; and Cincinnati is noted for automobile assembly and chemicals, mostly soap and household products. Pittsburgh still specializes in primary metals, although certainly not as much as in past years.

The dominance of certain industries in the four metropolitan economies reflects, to a large extent, the historical development of the region. Today, Pitts-

burgh's roster of largest companies still includes industrial giants that were established during the industrial boom. But alongside these companies stand more service-oriented companies.

Cleveland's present industrial base also reflects, to a large extent, its early roots. But, like Pittsburgh, Cleveland can boast that a few service organizations, such as health-care centers, are moving into its top ranks. Cincinnati's local economy, though changing, is

still associated with companies that produce consumer nondurable products.

Even though Columbus companies manufactured, at various times, everything from steam locomotives to automobiles, no one industry dominated the economy. Like Cincinnati, Columbus's industrial base remains much more diversified than that of Cleveland or Pittsburgh. Public and private service-related institutions predominate, including research centers and a major university.

“The veil of macroeconomic aggregates ‘conceals ... all the drama of the events - the rise and fall of products, technologies, and industries, and the accompanying transformation of the spatial and occupational distribution of the population.’”

William Nordhaus and James Tobin, 1972

The Determinants of Growth

The economic histories of the four cities reveal that, in the early stages of development, each city fostered many of the same industries. However, over time, many of these industries tended to concentrate in just one or two of the four cities.

Industries naturally took hold in regions where they had cost advantages resulting from various locational characteristics. Today, cost advantages are still important in the location decisions of firms.

Location Determinants According to recent surveys, the factors businesses consider most in deciding where to locate plants are low labor costs, productivity of workers, favorable labor climate, proximity to markets and suppliers, and efficient transportation facilities.²

These survey responses are supported by recent statistical analysis of location determinants of both small businesses and branch plants of large firms done by Randall W. Eberts and Joe A. Stone in “Labor Cost Differentials: Causes and Consequences.”³ They find that openings of manufacturing firms in a national sample of 50 metropolitan areas reveal that three factors dominate the location decision: labor costs, the concentration of union representation, and the user cost of capital. Factors that do not significantly affect firm location include local tax rates, metropolitan population, and energy prices.⁴

Although differences in the traditional components of cost - wages, unions, capital costs - help to explain location decisions on a national scale, they do not lend as much insight into what goes on within regions. In particular, cost differences do not explain the divergent employment trends among the four cities considered. Cost differences also do not explain why regions lose their comparative advantage in the production of certain goods and services.

Unexplained Employment Changes There are two problems with relying solely on cost differences to explain the employment patterns among the four cities. First, there is simply not enough variation among the production costs to account for the large differences in employment growth rates. The magnitude of these cost differences among the four cities is small compared to the variation across the country. For example, in 1983, labor costs among the four cities ranged from 5.1 percent above the national average for Cleveland to 2.2 percent below the national average for Columbus. In contrast, labor cost differentials for a sample of the 43 largest metropolitan areas throughout the country ranged from 18.1 percent above the national average for New York to 10.7 percent below the national average for Tampa.

The second problem is that the differences in costs between cities do not correspond to expected differences in employment changes. Because labor costs make up a large share of total costs, neoclassical economics would suggest that employment growth would be greatest where labor costs are lowest. This, however, does not appear to be the case within the District. For example, among our four cities, Columbus showed the largest employment growth between 1964 and 1985, but it also had the second-highest labor costs in 1974.

Pittsburgh, on the other hand, had the lowest labor costs of the four cities and had the lowest employment growth. By 1983, some of these anomalies between costs and employment growth were corrected, presumably due to the market forces that created them: wages in Pittsburgh increased, while those in Columbus fell. Nevertheless, the correlations are still inconclusive, and it is unclear whether cost differences are causing employment changes or whether employment changes are causing cost differences.

Other Locational Determinants A complete list of characteristics that are in-

tegrated into a firm's location decision would include a broader range of considerations, such as the skill level of the labor force and local amenities. While these locational determinants are very difficult to measure, it appears that the relationship between these factors and employment change is often not what we would expect. For instance, highly skilled labor is considered a positive factor in firm location decisions. But, despite Pittsburgh's high percentage of scientists and engineers, it still has the lowest employment growth rate among the four District cities.

Overall attractiveness of the area, which may include not only favorable climate, but also amenities such as cultural attractions, affordable housing, and good medical facilities, is also important to location decisions. According to a recent edition of *Places Rated Almanac*, which takes into account these attributes and others, Pittsburgh is rated first in the country, Cleveland seventeenth, Cincinnati thirty-first, and Columbus seventy-fifth.⁵ If we accept this ranking system, the current employment growth rates of these cities run counter to their relative attractiveness.

“And when giant new industries have spent their force, it may take a long time before something else of equal magnitude emerges.”

Alvin Hansen, 1949

The Long Wave of Change

Cost differences and amenity differences explain some of the variation in employment change across regions, but they do not help much in explaining the divergent paths of our four cities. The question remains, why are regions that were once attractive to young, innovative firms less attractive today?

The theory of industrial life cycles, or industrial aging, picks up where the locational advantage theory leaves off by explaining why a region's comparative advantage may change over time. The driving force of change, according to this theory, is an industry's natural evolution from invention to innovation to mass production. Each stage of development is characterized by different growth rates, different levels of innova-

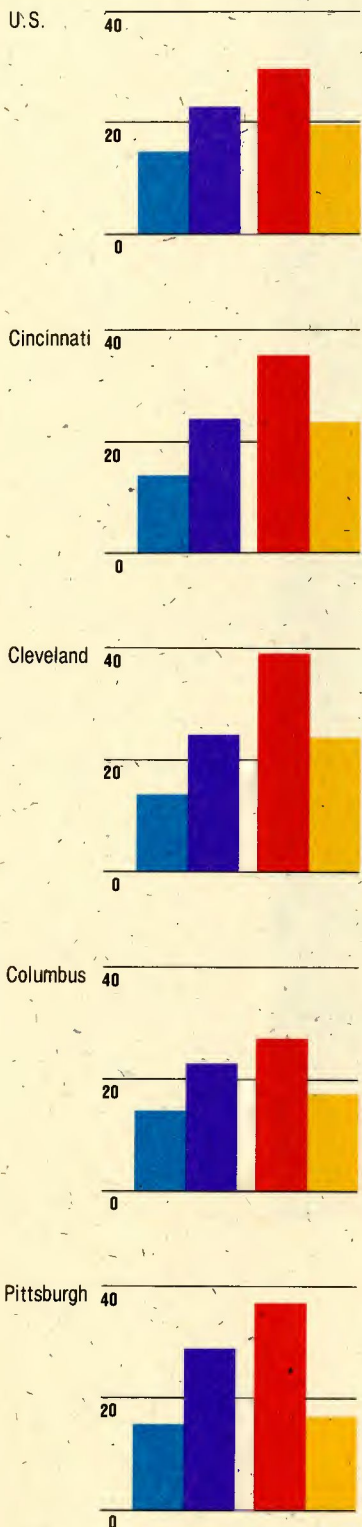
tion, and different labor requirements and organizational structures.

The Aging of An Industry There are three ways in which the aging of a region's dominant industry may lead to a region's economic decline. First, as an industry ages, it tends to lose its entrepreneurial energy and imagination. Studies have shown that the number of innovations per employee is larger for small, and usually younger firms, than for larger firms.⁶

One reason for this is the changing character of a firm's management as it follows the aging process. Early stages of development are marked by innovations and by trial and error - thus, the need for a flexible management structure and attitude. Later stages of development involve mass production and the standardization of the production pro-



Figure 4
Share of Employment (Percent of total)



cess. At this point, management may become less concerned with creation of new products and technologies and more concerned with the successful large-scale production of existing products.

In addition to management's change in emphasis, there is a change in organizational structure of the firm. Douglas E. Booth, in "Long Waves and Uneven Regional Growth," argues that some organizational structures, prevalent in mature firms, keep managers and workers ignorant of how various aspects of the production process fit together.⁷ Without this involvement, they have no incentive or ability to take the necessary risks involved in adopting innovations.

A second way in which the industrial life cycle may hamper a region's growth is that a few industries may dominate the local marketplace. Dominant industries may keep skilled labor and entrepreneurial motivation in short supply. As long as these industries offer sufficiently high-paying, secure job opportunities to area workers, there is little unemployed talent and little incentive to start up new ventures.⁸

A third effect of dominant industries on a region's economy involves the proliferation of local special-interest groups. These groups, which include labor unions, trade associations, and political coalitions, have an interest in preserving the benefits they derive from the mature industries.

Mancur Olson points out in his thesis of "institutional sclerosis" that these groups can contribute to the decline of their region.⁹ One way they do this is to lobby for favorable legislative and administrative rules, or to act in collusion to influence prices and wages. Resultant higher costs reduce the competitiveness of existing firms and discourage the entrance of new firms.

Much of the evidence to support this theory is rooted in the economic histories of regions. Among nations, Great Britain relinquished its lead in manufacturing around the turn of the century to rapidly developing Germany and the United States. Now the manufacturing sector in the United States and other developed countries is facing intense competition from East Asian countries.

The Steel Industry Example The evolution of steel production offers an interesting example of the effect of product cycles on various regional economies.

During its initial development, the steel industry did not have a primary location; instead, steel firms could be found operating throughout the country.

Probably the first blast furnace to be put in operation in the American colonies was at Saugus, Massachusetts, in 1645.¹⁰ This was followed within a very few years by several other furnaces and forges built in various parts of New England. In 1675, the first iron works outside New England was erected in New Jersey.

Pennsylvania, which would eventually become the leading iron and steel manufacturing state in the nation, did not have its first iron enterprise until 1716. The ore deposits found in eastern Pennsylvania and New Jersey were much richer and more extensive than those of New England, and provided the basis for the expansion of the colonial iron industry after 1730. Between 1716 and 1776, 60 blast furnaces and forges were built in the colony of Pennsylvania.

After 1800, the industry expanded substantially. It spread westward and to some southern states so that by 1860, there were iron works of one type or another in almost every state. However, as firms began expanding their operations, competition increased, and the pressure to find cheap raw materials and labor gave producers in and around Pennsylvania a clear advantage. This advantage lasted until the 1960s, when foreign imports from developing countries began to enter the United States.

Because New England did not concentrate its resources in steel production, the movement of steel out of the region appears not to have had such a devastating effect on its local economy. In contrast, as the steel industry came to dominate the economy of western Pennsylvania, labor, capital, and public resources were all geared toward producing steel. During steel's heyday, workers, managers, and government officials positioned themselves to extract as much as possible from the industry. As the industry declined, resources were slow to move away from what had been a stable source of income and support.



Fourth Federal Reserve District employment is shifting from manufacturing to services.

Industrial Cycles Long waves of development for each of the Fourth District cities under discussion provide insight into the present economic conditions of these areas. Comparing each city's manufacturing employment growth rates with the nation's from 1899 to the present reveals industrial cycles that characterize each city's development.

For example, throughout this period, the growth rate of Pittsburgh's manufacturing sector consistently trailed the nation's growth rate, except for a brief spurt in the 1920s and the mid-1950s. Cleveland's manufacturing employment grew faster than the nation's throughout the first third of the century, and then lagged behind thereafter. On the other hand, Columbus showed higher-than-average growth between 1909 and 1970, with only a slight setback during the Great Depression.

Another indication of differences in industrial cycles is the date in which manufacturing employment peaked in each

city: For Pittsburgh, the zenith came in 1947; for Cleveland, it came in 1969; and for Cincinnati and Columbus, the years were 1974 and 1973, respectively.

It is possible that employment changes within the District may offer too pessimistic a view of manufacturing. Over time, technological improvements in production processes are expected to reduce the amount of labor required to produce a unit of output. A better indicator of manufacturing activity is value added - the value of the goods produced, minus the cost of materials.

We find that growth rates of manufacturing value added for the four cities (adjusted by the GNP price deflator) show trends similar to those found in employment changes. These trends support the conclusion that the decline in Pittsburgh's manufacturing sector occurred before the other cities' decline. Furthermore, it suggests that Columbus's industrial cycle may not yet have reached the mature stage.

“Progress in industry depends very largely on the enterprise of deep-thinking men, who are ahead of the times in their ideas.”

William Ellis, 1818

Future Growth Prospects

When considering a region's future growth prospects, one usually rattles off a litany of comparative advantages and disadvantages of doing business in the area. However, we have found that focusing on a checklist of pros and cons of the four Fourth District cities under consideration does not satisfactorily explain their different growth paths.

The notion that an industry's life cycle affects a region's economy offers an interesting point of departure from the usual way of thinking about a region's future. One lesson drawn from this view is that if a region ties its fate too closely to a particular industry, then it will follow the cycle of that industry. This inference can be stated in a different way: a region may need to sever its past dependence on a few mature industries in order to position itself for future development.

There is some historical precedent for this view. Boston's economy had to be virtually purged of its reliance on the textile industry before it was ready to nurture new, innovative firms. If

such a decline of a region's base industries is a necessary precondition for advancing to another wave of development, then the erosion of Pittsburgh's manufacturing base (primarily in basic steel production) is setting the stage for Pittsburgh's renaissance.

There are already signs of Pittsburgh's rebirth. As we pointed out earlier, Pittsburgh's economy is looking more and more like Columbus's, with the nonmanufacturing sectors, especially services, increasingly dominating the economy. As Pittsburgh's share of these higher-growth sectors increases, its entire economy may begin to turn around.

Of the four cities considered in this region, Columbus has been the least dominated by a few industries. Although this may have slowed its growth in the past, now Columbus is free to devote its resources to high-growth industries. This is already apparent in its successful spawning of business services.

The Emergence of Services As services and other service-producing industries (wholesale and retail trade; transportation and public utilities; finance, insurance, and real estate; and government) continue to increase in importance, there is some question whether these activities can sustain a local economy. Some of the major concerns are:

1. Can the service sector maintain its growth unaffected by manufacturing's decline?
2. Can the service sector increase its productivity?
3. Can the service sector pull "new" dollars into the local economy, in the same way the manufacturing sector has traditionally done?

Service Sector Growth There are several reasons to expect growth in the service-producing sector - despite declines in manufacturing. Much of the growth in services is occurring as businesses increase their outside purchases of services, such as accounting, advertising, engineering, and law. If a non-service business, such as a manufacturing plant or a construction firm, contracts out its service jobs instead of providing them in-house, the jobs move from being classified as nonservice jobs to service jobs. Also, the difficulty of operating sophisticated new information and production facilities has made it more economical for many businesses to contract out services rather than train workers or hire highly skilled workers to provide these services internally. In other instances, services are direct substitutes for manufacturing products. For example, some firms have found that it makes more financial sense to rent equipment than to buy it.

There is some concern that the recent increases in the demand for services by businesses may be only a temporary adjustment phenomenon. But many of the forces causing the increased demand for services are unlikely to disappear in the near future. Many firms are finding it too difficult or expensive to provide the necessary services themselves. In addition, many types of services, such as medical, financial, and transportation

services, appear to benefit from economies of scale or scope. As these service providers expand, the prices for their services may fall, which may further boost the demand for their products.

Service Sector Productivity Contrary to the common perception that there is little room for productivity growth within the service sector, some services appear to be experiencing sizeable productivity gains. For example, a study done by James Brian Quinn and Christopher E. Gagnon, "Will Services Follow Manufacturing into Decline?" finds that substitutions of services for manufacturing goods may increase productivity and value added in real terms.¹¹ According to their findings, measured value added in some service sector industries is at least as high as in manufacturing.

It is likely that the use of high-tech manufacturing products in services has led to productivity gains in the service sector. Recent studies show that service firms are heavy users of sophisticated manufacturing goods. Some 80 percent of the computing, communications, and related information technologies equipment sold in the United States in 1982 went to the service sector, and in Great Britain 70 percent of all computer systems sold in 1984 went to the service sector.¹²

Large service firms (e.g., insurance companies, airlines, utilities, communications companies, banks, hospitals, and retail chains) may also encourage the development of new manufacturing technology. Many service industries have the resources and the rationale not only to purchase technology, but also to help manage its conception, design, and development.¹³

Service Sector Exportability Finally, the conventional view of the service-producing sector (particularly the service and retail industry) was that it grew only as a result of a healthy manufacturing sector, and did not generate wealth for an area. This perception of the service sector has changed recently. The service-producing sector is an exporting sector, and therefore does have the potential to directly spur local economic expansion. There are basically two ways to export services: activities may be transported and sold to persons outside the area (e.g., an insurance carrier), or individuals may



travel to the city to purchase services (e.g., a regional medical facility).

The exportability of many services has been enhanced by developments in communication, information, and transportation technologies. For example, with the relative decrease in the costs of these technologies, it is no longer necessary for essential components of management to be located near the scene of production.

Technological innovations and the increasing integration of the world economy have caused many types of services to be traded not only across the country, but across the world. International trade in services (excluding returns from foreign investment) reached more than 20 percent of merchandise trade by 1980 and has continued to go up.¹⁴

There remains, however, the question concerning the export potential of service-producing firms in this District. One way to get a sense of the export potential of the service producers in this area is to look at how successful we have been in the past. A way of measuring whether services are exported from or imported into a region is to determine the location quotient for an area's service-producing industries. The location quotient is the share of employment in an industry in a specific region divided by the national share of employment in that industry. Barring major differences in demand for services among cities, cities with larger location quotients are probably exporting that industry's services to cities with smaller quotients.

According to a recent study, the service-producing sectors within the Fourth District cities appear to be concentrated in slightly to moderately exportable services.¹⁵ One striking exception is Pittsburgh, with its concentration of engineering services - a moderately to highly exportable service. The exporting of engineering services generated an estimated 13,000 jobs for the Pittsburgh economy in 1982.

In some Fourth District cities, there also appears to be a concentration of industries that have not been characterized by export activity. In particular, Cleveland shows evidence of having a concentration of accounting, audit, and book-keeping services - industries that are ranked the lowest of all of the 53 industries examined in export activity. Perhaps

this reflects the beginning of a trend toward the exportation of these industries.

The Future of Manufacturing The service sector's dramatic rise does not necessarily mark the deindustrialization of the nation or of the Fourth District. In fact, as mentioned previously, the relationship between manufacturing growth and service sector growth is often complementary. The two sectors may work together to create a healthy, vibrant economy.

Manufacturing will continue to be a basic component of the nation's economy and the Fourth District's. In fact, it still claims roughly the same percentage of GNP that it did after World War II, even though its employment share has plunged sharply. Furthermore, the four cities' share of national manufacturing output has fallen only 1.5 percentage points between 1947 and 1982, from 5.8 percent to 4.3 percent.

Future manufacturing will more than likely take two divergent paths, simultaneously. The two paths for future manufacturing involve the increased mechanization of production processes and an increased use of highly skilled labor.

The first path is toward more mechanized processes, which rely on robotics and other high-tech, labor-saving devices. In this field, the Fourth District enjoys two major advantages. First, the Fourth District has been a pioneer in the development and manufacturing of robotic equipment. Second, its industries, in particular steel and automobile manufacturing, are heavy users of robotics, and will increase their dependence on mechanization as they attempt to streamline production costs. As a result, even though steel and automobile manufacturing may be considered mature industries from the point of view of products, they may be advancing to another generation of production techniques that place them on the innovation phase of the industrial cycle.



The second path for future manufacturing development involves very labor-intensive processes that require the craftsmanship of skilled technicians. This type of activity is also related to the innovation phase of product and process development. For example, high-tech products, such as satellites, aircraft, and even robotics, are not assembled on an assembly line, but by teams of highly skilled technicians. Although the Fourth District engages in some of this type of manufacturing, these industries are still concentrated in the Northeast and Southwest.

Experience with High Tech Even in areas that have a high concentration of mature industries, there are new, high-tech firms emerging. The opening of new firms in cities within the Fourth District may indicate the imminent replacement of the more traditional, maturing industries.

Columbus and Cleveland are contrasting examples of high-tech employment change among our four cities. At the low end, Cleveland lost 22 percent of its high-tech workers between 1980 and 1982, while Columbus gained 12 percent over the same period. These aggregate numbers do not tell the full story, however.

First, Cleveland's high-tech employment is still much higher than Columbus's. Cleveland boasted 37,000 high-tech jobs in 1982, while Columbus had 25,000. Second, the percentage increase in high-tech employment due to the openings of new firms was not that different between the two cities from 1980 to 1982. Cleveland experienced an 11 percent increase; Columbus had a 14 percent increase. The increase in employment due to the expansion of existing firms was approximately the same for the two cities, at around 4 percent.

Where Cleveland loses out is in the closings of high-tech firms. Cleveland lost 15,000 jobs from closings during the 1980-1982 period; Columbus lost

only 334 jobs. In percentage terms, this was a loss of 31 percent for Cleveland, compared with only 2 percent for Columbus. Employment losses due to contractions, on the other hand, are roughly the same for the two cities.

Columbus and Cleveland also differ significantly in the performance of small versus large high-tech firms. For example, during the 1980-1982 period, several large, high-tech firms headquartered outside Ohio pulled their operations out of Cleveland, resulting in a 56 percent decline in the city's employment in large, high-tech firms. In contrast, Columbus had virtually no change in employment by large, out-of-state, high-tech firms.

There are at least three possible explanations for the high number of high-tech employment losses in Cleveland. The first is that Cleveland's business environment is not conducive to sustaining new businesses. The second is that the new ventures are tied to old product lines that have run their course. The third, which is less regionally specific, is that the new firms are engaged in untried products and technologies with high failure rates. All three illustrate the effect of product cycle and industrial aging on a region's future growth potential.

The Benefits of Diversity It is a fact of industrial life that as industries age and struggle to remain competitive, they cut costs by shedding workers. For a region to experience steady or increasing employment growth, either new, innovative firms must be nurtured while older, larger-scale firms are sustained; or product and process innovations must be continually developed by older firms. But not all regions can easily foster this type of economic diversity. A concentration of older firms may develop, which would have a tendency to reduce innovative activities.

Diversity, either within a region or among regions, has several benefits for promoting future economic growth. For example, growing industries in one area can absorb the resources released from declining industries in other areas. As companies within one part of the



Products, technologies, and industries rise and fall in relative importance as economies change over time.

region grow and demand more products, suppliers from neighboring areas may also grow.

For instance, the decline of the steel industry in Cleveland and Pittsburgh, and the move to make it more efficient, have left many workers without jobs. At the same time, Columbus's expansion has absorbed some of the displaced workers. Migration statistics show that Columbus was one of the largest recipients of individuals leaving

the Cleveland area between 1975 and 1980. The growing Columbus economy may later serve as a major market for Cleveland's companies - and engender future employment growth in Cleveland.

Finally, the entry of new firms into a closely knit economy creates a competitive environment. This may induce the more entrenched firms to adopt cost-saving innovations at a faster rate than if they remained isolated by distance from their nearest competitors.

“There is nothing more dangerous to manage than the creation of a new order of things ... the initiator has the enmity of all who would profit by the preservation of the old institution, and mere lukewarm defenders of those who would gain by the new ones.”

Niccolo Machiavelli, c. 1520

The Lesson of Risk

In this essay, we highlighted the diversity within the Fourth District and considered some explanations for the divergent employment growth paths of its four largest cities. We found that at this point in the region's economic development, Columbus is growing most quickly, and has replaced Cleveland and Pittsburgh as the region's growth leader.

Columbus's growth is buoyed primarily by business services, while Cincinnati and Cleveland continue to rely to a large extent on their traditional industries. Pittsburgh, on the other hand, is experiencing a dramatic transformation from a manufacturing-dominated economy to a service-oriented one.

We presented two complementary explanations of the observed differences in the employment growth rates of the four Fourth District cities. The first explanation is based on locational advantages, with specific references to differences in factor costs and locational amenities. This explanation provides insight into why various industries originally concentrated in certain areas.

To explain why cities appear to lose their comparative advantage, we

looked at the second theory, the natural aging process of industries. This industrial life cycle explanation suggests that, as industries mature, they shift their energies from developing new products and technologies to cutting costs. At the same time, they monopolize resources that otherwise would be directed to more innovative, but riskier, ventures.

One lesson from this exploration into the economic development of these four cities is that a prerequisite for future growth is the ability to break with the apparent security of the past and a willingness to assume the risks of the future. Too many regions have learned this lesson the hard way by tying their future to familiar but declining industries.

Perhaps the success of the United States in generating more than 30 million new jobs since 1970 rests with its regional diversity. This diversity offers ample opportunities for the kind of industrial restructuring necessary to promote future growth. One of the bright points on the Fourth District's horizon is that it, too, has this diversity. Whether this will lead to future growth depends, in part, on the willingness of its managers and work force to rekindle an entrepreneurial spirit and to be receptive to change.

Footnotes

1. The degree of manufacturing concentration is measured by the percentage of total employment in the four largest two-digit SIC categories of manufacturing industries, divided by total employment.
2. *Fortune* Market Research Survey, *Why Corporate America Moves Where* (Time Inc., 1982), p. 9; Joint Economic Committee, *Location of High Technology Firms and Regional Economic Development* (Government Printing Office, 1982), p. 25.
3. Randall W. Eberts and Joe A. Stone, "Labor Cost Differentials: Causes and Consequences," Federal Reserve Bank of Cleveland, *Economic Commentary*, December 1, 1986.
4. Labor costs in this analysis include the hourly wage paid to workers within a metropolitan labor market. The user cost of capital is a composite measure of interest costs, depreciation, and local taxes and is best described as the current dollar price of renting a unit of capital for a single period.
5. Richard Boyer and David Savageau, *Places Rated Almanac* (Rand McNally, 1985).
6. Mort I. Kamien and Nancy L. Schwartz, *Market Structure and Innovation* (Cambridge University Press, 1982).
7. Douglas E. Booth, "Long Waves and Uneven Regional Growth," *Southern Economic Journal*, vol. 53, no. 2 (October 1986), pp. 448-460.
8. For example, a number of "back-alley" entrepreneurs sprang up in the Pittsburgh area after long layoffs of steelworkers prompted them to find other ways of making a living without leaving the area.
9. Mancur Olson, *The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities* (Yale University Press, 1982).
10. William T. Hogan, *Economic History of the Iron and Steel Industry in the United States*, vol. 1, parts I and II (Lexington Books, 1971).
11. James Brian Quinn and Christopher E. Gagnon, "Will Services Follow Manufacturing into Decline?," *Harvard Business Review*, no. 6 (November-December 1986), p. 96.
12. Richard Kirkland, "Are Service Jobs Good Jobs?" *Fortune* (June 10, 1985), p. 38; and "Information Makes the Money Go Round," City of London survey, *The Economist* (July 6, 1985), p. 5.
13. Quinn and Gagnon, "Will Services Follow Manufacturing into Decline?," p. 97.
14. *U.S. National Study on Trade in Services: A Submission by the United States Government to the General Agreement on Tariffs and Trade, 1984* (Government Printing Office, 1984).
15. Erica Groshen, "Service Industry Employment: Is the Fourth District Becoming Service-Intensive?" Federal Reserve Bank of Cleveland, *Economic Commentary* (forthcoming).

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Comparative Financial Statement

For years ended December 31

Statement of Condition

Assets	1986	1985
Gold certificate account	\$ 650,000,000	\$ 635,000,000
Special drawing rights certificate account	314,000,000	270,000,000
Coin	33,248,199	32,826,806
Loans and securities:		
Loans to depository institutions	205,960,000	153,376,400
Federal agency obligations bought outright	459,763,588	480,954,538
U.S. government securities:		
Bills	6,094,013,060	4,993,731,997
Notes	4,000,564,839	3,954,442,018
Bonds	1,510,589,056	1,445,438,895
Total U.S. government securities	11,605,166,955	10,393,612,910
Total loans and securities	12,270,890,543	11,027,943,848
Cash items in process of collection	375,305,015	431,748,745
Bank premises	31,540,886	28,367,930
Other assets	771,968,876	660,983,418
Interdistrict settlement account	247,216,013	215,098,992
TOTAL ASSETS	\$14,694,169,532	\$13,301,969,739
Liabilities		
Federal Reserve notes	\$12,482,060,679	\$11,341,421,849
Deposits:		
Depository institutions	1,527,564,394	1,125,625,795
Foreign	9,000,000	9,600,000
Other deposits	26,903,549	43,575,363
Total deposits	1,563,467,943	1,178,801,158
Deferred availability cash items	297,722,195	434,129,847
Other liabilities	128,290,115	133,616,285
TOTAL LIABILITIES	\$14,471,540,932	\$13,087,969,139
Capital accounts		
Capital paid in	\$ 111,314,300	\$ 107,000,300
Surplus	111,314,300	107,000,300
TOTAL CAPITAL ACCOUNTS	\$ 222,628,600	\$ 214,000,600
TOTAL LIABILITIES AND CAPITAL ACCOUNTS ..	\$14,694,169,532	\$13,301,969,739

**Income and
Expenses**

	1986	1985
Current income		
Interest on loans	\$ 674,180	\$ 2,106,227
Interest on government securities	941,194,643	964,682,089
Earnings on foreign currency	23,594,141	14,566,789
Income from services	38,173,955	36,425,345
All other income	415,209	498,154
Total current income	\$1,004,052,128	\$1,018,278,604
Current operating expenses	61,298,377	58,961,748
Cost of earnings credits	9,581,389	8,534,049
CURRENT NET INCOME	\$ 933,172,362	\$ 950,782,807
Profit and loss		
Additions to current net income		
Profit on foreign exchange transactions	\$ 118,237,824	\$ 77,442,770
Profit on sales of government securities	3,918,560	5,627,610
All other additions	9,134	5,239
Total additions	\$ 122,165,518	\$ 83,075,619
Deductions from current net income		
Loss on foreign exchange transactions	\$ -0-	\$ -0-
All other deductions	5,032,520	434,824
Total deductions	\$ 5,032,520	\$ 434,824
Net additions or deductions	\$ 117,132,998	\$ 82,640,795
Assessments by Board of Governors		
Board of Governors expenditures	\$ 5,865,800	\$ 4,902,500
Federal Reserve currency costs	11,299,418	10,450,559
Total assessments by Board of Governors	\$ 17,165,218	\$ 15,353,059
NET INCOME AVAILABLE FOR DISTRIBUTION	\$1,033,140,142	\$1,018,070,543
Distribution of net income		
Dividends paid	\$ 6,590,413	\$ 6,349,649
Payments to U.S. Treasury (interest on Federal Reserve notes)	1,022,235,729	1,008,680,244
Transferred to surplus	4,314,000	3,040,650
Total distributed	\$1,033,140,142	\$1,018,070,543

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Reserve
Bank of
Cleveland
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As of December 31, 1986

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