Chapter 5

Three Perspectives on Structural Change

CONTENTS

Three Perspectives on Structural Change

Structural changes in the U.S. economy fall into three major categories:

1. changes in the contribution that each major business sector makes to the total value added in the economy, or the gross national product (GNP);
2. changes in the organization of firms measured in terms of their scale of operation and scope of production; and
3. and changes in the location of production.

Changes in these three areas have been underway for some time. Structural change is a dynamic process which reflects the interaction of many forces—primarily new technologies, shifts in consumer demand, the way producers satisfy that demand, increasing competition in international trade, and the introduction of new rules and regulations that govern business enterprises. The discussion that follows attempts to isolate the effects of these principle forces.

Understanding changes in the structure of the U.S. economy is critical for understanding changes in job generation, pay, and regional growth, and for estimating the likely direction of the economy in the future. The dynamics of an economy heavily dependent on natural resources are likely to be very different from one primarily dependent on intellectual resources. An economy consisting of tightly integrated networks of small establishments will behave differently in response to shifting domestic and international markets than one characterized by large, centralized establishments and firms. An economic structure that spreads wealth unevenly around the country, or that places the burden of structural adjustment primarily on a few regions, presents a unique set of problems. In all three cases, policies designed to facilitate growth and mitigate the pain of structural change depend on a clear grasp of the patterns of change and the forces shaping them.

SECTORAL CONTRIBUTIONS TO GNP

Structural change is measured first by the relative contribution each major business sector makes to GNP.[1] Since the 1950s, Natural Resource industries, Construction, and manufacturing (particularly High Wage Manufacturing), have contributed less to GNP, while Transportation & Trade and Transactional Activities have increased their relative contributions. Taken as a whole, the share of service businesses increased from 52 percent of GNP in 1950 to 63 percent in 1984; at the same time, the share of goods—defined as all manufacturing, Natural Resources, and Construction—fell from 48 to 37 percent. The rising share of the service sectors has been due to the strong growth in demand for services and, in the case of Transactional Activities (the fastest growing sector), a sharp increase in the use of this sector's

products as inputs in the production recipe.[2] The opposite holds true for the manufacturing sectors, where demand has risen relatively slowly and production recipes have called for reduced use of manufactured products. Trade has tended to reinforce these trends.

Many of these patterns have been underway for some time. There has been considerable debate over whether the U.S. economy is "deindustrializing" and how such a phenomenon would be defined and

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[1] Unless otherwise noted, all measurements of sectoral share are in constant 1980 dollars.

[2] For a discussion of the impact of technology and the growing complexity of production in the increased use of services, see James B. Quinn and Christopher E. Gagnon, "Will Services Follow Manufacturing Into Decline?" Harvard *Business Review,* November-December 1986: for a description of the role of tastes, incomes, and economic growth in promoting the growth of the service sector, see Robert Lawrence, Can America Compete? (Washington, DC: The Brookings institution, 1984).

measured.3 Some evidence suggests that rates of decline in some manufacturing industries have accelerated since 1972,4 and that some of this accelerated structural change can be attributed to slower economic growths Whether or not rates of change have increased, there is little doubt that the cumulative effect of change over the past two decades has been the creation of an economy where the origins of value are different—in some cases dramatically different—than they were two decades earlier. In the midst of such a process it is difficult to point to a particular moment when a sudden change in structure took place; such things are easier to see in retrospect.

Any attempt to measure changes in the origin of value by business type faces two major dilemmas. First, how should a sector's share be measured—in "constant" dollars—a proxy for share of physical output—or in "current" dollars—the amount of money in which the economic activity actually occurred? Second, do the sectors selected for analysis accurately measure changes in the underlying structure of production, or is change masked by the categories chosen?

Constant and Current Dollars

The distinction between the type of measure used is critical, since measurement in constant dollars indicates that manufacturing's share of value-added has remained relatively constant for many years while this sector's current dollar share has fallen sharply (see figure 5-l). Both current and constant dollar measures provide useful views of the changes underway. The difference is largely due to productivity increases, which allow the same amount of goods and services to be produced for a relatively lower price (see box 5-A).

Measurement of output in current dollars, or the dollars of the day, has strong intuitive appeal, since

Figure 5-1.-Manufacturing's Share of GNP and Jobs (current and constant 1982 dollars and persons)
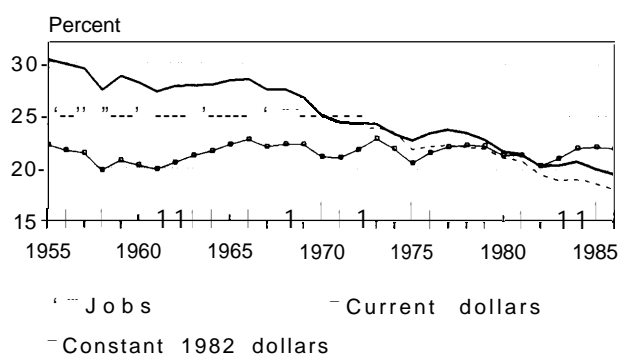
Percent

'¯Jobs   ¯Current dollars

¯Constant 1982 dollars

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, "National Income and Product Accounts. " historical diskettes. tables 6,1,6.2, and 6.10.

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[3]The decline in the current dollar share of manufacturing has led to a controversy over whether the United States is deindustrializing. Bennett Harrison of the Massachusetts Institute of Technology and Barry Bluestone of Boston College, who popularized the term "deindustrialization," argue that the manufacturing sectors in the United States are in decline; see The Deindustrialization of America (Boston, MA: Basic Books, 1982). Charles Schultze and Robert Lawrence of The Brookings Institution argue that deindustrialization has not occurred (see Robert Lawrence, op. cit., footnote 2, and also Robert Lawrence,'The Myth of Deindustrialization,"Challenge, November/December 1983). For a review of the subject, see R.D. Norton, "Industrial Policy and American Renewal," Journal of Economic Literature, vol. XXIV, March 1986, pp. 1-40.

[4]For an analysis which supports this conclusion, see Nicholas S.Perna, "The Shift from Manufacturing to Services: A Concerned View," New England Economic Review, January/February 1987; for an opposing view, see U.S. Department of Commerce, Office of Economic Affairs, "Changes in the Structure of the U.S. Economy Since 1960: A Primer," working paper, Washington, DC, January 1986.

[5]James H. Crossing and Arye L. Hillman, "Shifting Comparative Advantage and Senescent Industry Collapse," The American Economic Review, June 1986, p. 516; and Ronald E. Kutscher and Valerie A. Personick, "Deindustrialization and the Shift to Services, " Monthly Labor Review, vol. 109, No. 6, June 1986, p. 10.

Box 5-A.—Productivity and Constant Dollars

Imagine an island that produced only pizzas and poems and sold equal numbers of both. Suppose that in 1950, 2 minutes of work were needed to produce either a pizza or a poem and that each cost $2. Suppose that thanks to surging innovation in pizza production, by 1980 poems still took 2 minutes of work and cost $2 dollars but pizza required only 1 minute and sold for $1 because prices were set in highly competitive markets.

If demand did not change with price, and if the capital investments needed to increase pizza productivity were negligible, the constant dollar percentage of production in the island would remain the same at 50-50, but the current dollar share of poetry would increase from one-half to two-thirds of the island's GNP.

it uses the prices at which transactions take place.[6] Measured in current dollars, manufacturing's share of GNP fell from one-third in 1950 to less than one-quarter in 1984. The constant dollar measure reflected in the U.S. Department of Commerce's "Gross National Product by Industry" data series, however, reveals no discernible trend—indeed, it indicates a relatively stable share at about 22 percent of total output.[7] Manufacturing's share of GNP measured in current dollars has fallen largely because productivity increases in this sector have been passed on to consumers in the form of comparatively lower prices and demand has not risen enough to offset the price decline. Because increases in productivity frequently result in lower labor requirements, the current dollar measure tends to track employment in an industry (again see figure 5-l), making this a useful tool in analyzing policy considerations focusing on labor.

Constant dollar measures attempt to remove changes attributable to prices, by tracking actual changes in quantities. In theory, this measure provides a more accurate indication of contributions to GNP and thus structural change.[8] In practice, the process hinges on the arcane business of creating "deflators," which convert current dollars to the dollars of a particular year–constant dollars. This task has become increasingly difficult as the economy generates more value in specialized high-technology products and in services. It is particularly difficult during periods of high inflation like the late 1970s.

Accurate conversion from current to constant dollars is only possible where indexes can be based on measurable, fungible commodities like steel and oil.[9]

But the bulk of GNP is composed of goods and services whose various characteristics and specifications do not stay constant over time, making direct comparisons without some type of quality adjustment inappropriate. The question of adjusting for quality becomes extraordinarily complex when diverse products are entering the market and many products are new. Is a computer purchased in 1988 so radically different from one bought in 1960 that it is effectively a different product? This problem is magnified in the case of services, which are in many cases even harder to quantify. Heart surgery might be more expensive today than it was 10 years ago, but the probability of surviving may be much higher.

Even in places where it is possible to develop a good estimate of the constant dollar value of an industry's product (e.g., a deflator for automobiles), developing a deflator for the value-added portion of that product proves to be difficult. Since value-added is primarily composed of compensation paid to workers and income retained by the business, there is no clear and intuitive interpretation for a value-added deflator. A discussion of various techniques used to deflate value-added appears in box 5-B. Given the limitations outlined in the box, it is clear that constant dollar value-added estimates should be interpreted with care.

Selecting the Categories for Measuring Sectoral Share

Chapter 4 pointed to the difficulty of selecting business sectors in a way that revealed rather than obscured the structural shifts underway in the U.S. economy. This problem haunts all attempts to express structural change in a limited number of categories. Observed shifts of economic activity from one sector to another can merely be an artifact of the measurement process, and not a true change. Spurious change can occur because different business types are combined in a single category, definitions have changed, or the measurement process has improved. This problem applies not just to the 9 business categories used here to summarize structural change; it can also apply to the 85 industries that were combined to make the 9.[10] For example, the

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[6] For a description of structural change using a current dollar measure, see U.S. Congressional Budget Office, *The Industrial Policy* Debate, Washington, DC, December 1983, p. 11; and Nicholas S. Perna, op. cit., footnote 4.

[7] Analysts using different data series and methodologies, including the one presented later in this section, find results which conflict with the finding that the manufacturing sector retains a stable share of GNP when measured in constant dollars. See Larry Mishel, "Trends in Manufacturing's Level and Share of Output," Economic Policy Institute, Washington, DC, November 1987, unpublished.

[8] For a more detailed examination of how to define and measure structural change, the strengths and weaknesses of constant versus current measurement, and what role employment measures can or cannot play, see "Changes in the Structure of the U.S. Economy Since 1960: A Primer," op. cit., footnote 4, or Nicholas S. Perna, op. cit., footnote 4.

[9] See A.G. Clem and W.D. Thomas, "New Weight Structure Being Used in Producer Price Index, " *Monthly Labor Review, vol.* 110, No. 8, August 1987, pp. 12-21, for a description of how a new price basis is established.

[10] More than 500 sectors appear in the U.S. Department of Commerce's input/output tables available for the benchmark years. Unfortunately, the most recent year for which data at this level exists is 1977.

Box 5-B.–Deflating Value-Added

Under ideal circumstances, deflators for value-added inputs are calculated using input-output techniques. The inputs purchased by each business are deflated separately and the total is subtracted from a deflated level of industry sales (total output), creating a residual which is deflated value-added. This technique, called "double-deflation," is recognized as a pre~ferred method by the Commerce Department because of its use of a consistent set of price indexes. However, double deflation is only used on the 29 percent of the 1986 GNP generated by the manufacturing, farm, and construction sectors; a variety of scaling techniques and other methods are used for the rest of the economy.1 But even the preferred method is subject to severe problems which limit its usefulness. Errors in the construction of the deflators or the calculation of the inputs or outputs appear in the remainder, which is value-added.

The problems encountered in creating a constant dollar value-added series, even in manufacturing, are made obvious by figure 5-B, where data are particularly good. The figure shows the deflator for the nonelectrical machinery industry (an industty categoty that includes computers), the deflator series for all manufacturing industries, and the deflator for GNP. It is apparent that a new deflator for computers was introduced in 1982.2 Without this change, manufacturing deflators would have increased between 1982 and 1986. With the change, there was no significant difference. Changes in constant dollar manufacturing output for manufacturing are, therefore, partly an ar-

Figure 5-B.-Price Deflatorsfor Various Sectors (1982=1.0)
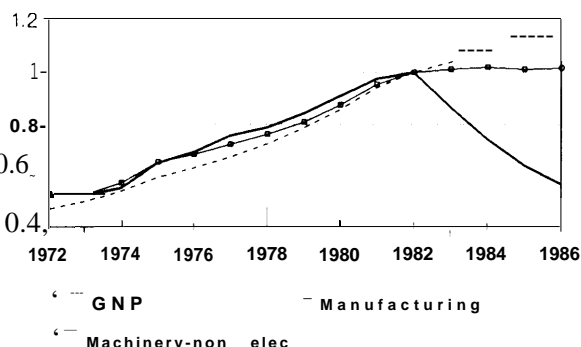
' --- **G N P**   ⁻ **Manufacturing**

' — **Machinery-non elec**

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, "National Income and Product Accounts," historical diskettes, tables 6.1 and 6.2.

tifact of deflation techniques—not real structural change in the economy.

The rise of imports as intermediary inputs in the production process presents another problem, since most deflation techniques use domestically based deflators.3 For example, suppose that General Motors buys its steel for autos from South Korea in both 1972 and 1980. If the price of imported steel grew more slowly than the price of domestic steel, a calculation of the growth in auto value-added using domestic deflators would overestimate real growth in value-added.

The importance of these factors increased during the 1970s and early 1980s, a period of rising imports, huge increases in the price of oil coupled with tremendous decreases in the prices of computers, and sharp growth in services-an activity which is inherently difficult to deflate.

1Milo **Peterson, "**Gross **Product by Industry, "** *Survey of Current Business,* **VOI** *67, No. 4,* **April 1987,**

'**See David W. Cartwright, "Improved Deflation of Purchases of** Com-puters," **Survey of** *Current Business, vol.* **66, No. 3, March 1986**

3A.G. **Clem and** W.D. **Thomas, "New Weight Structure Being Used in the Producer Price Index, "** *Monthly Labor* **Review, vol. 110, No. 8, August 1987, pp. 12-21.**

mix of businesses clustered as the "steel industry" may change as small "mini-mills" producing specialty products increase and the traditional large-scale mills producing bulk products decline.

Aggregation can also affect the analysis of what factors cause a shift in the share of a sector. Shifts that appear to result from changes in the production recipe induced by technological innovation may merely be due to changes in the industrial composition of a broadly defined sector.

Recent Trends in Sector Shares

Figures 5-2a&b, 5-3a&b, and 5-4a&b summarize changes in relative shares of GNP held by the production sectors that have occurred in the U.S. economy over the past 35 years. A discussion of trends appears in box 5-C.

**Figure 5-2a. -Current Dollar Shares of
GNP for Natural Resources, Construction,
and Transportation & Trade**

Percent of GNP

¯Natural Resources   ¯Construction
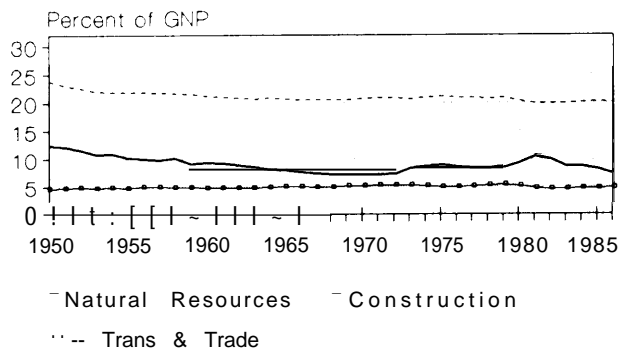
·· -- Trans & Trade

SOURCE: U.S. Department of Commerce, Bureau of Economic Analyses, "Nation-
al Income and Product Accounts, " historical diskettes, table 6.1.

**Figure 5-2 b.-Constant Dollar Shares of
GNP for Natural Resources, Construction,
and Transportation & Trade**

Percent of GNP

¯Natural Resources   ¯Construction

'¯Trans, & Trade

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, "Nation-
al Income and Product Accounts," historical diskettes, table 6,2,

**Figure 5-3a. -Current Dollar Shares of
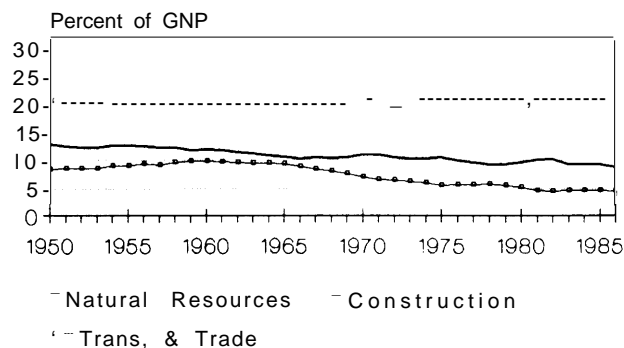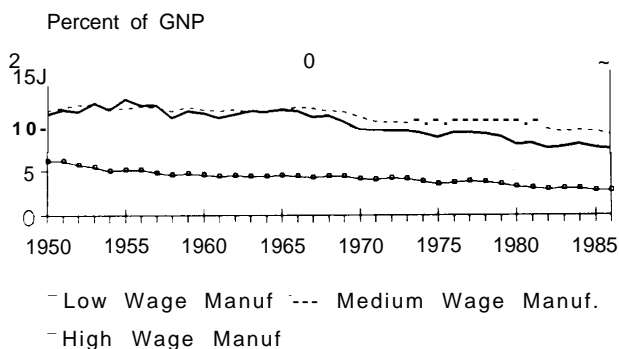GNP for Low Wage, Medium Wage, and
High Wage Manufacturing**

Percent of GNP

¯Low Wage Manuf --- Medium Wage Manuf.

¯High Wage Manuf

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, "Nation-
al Income and Product Accounts," historical diskettes, table 6.1.

**Figure 5-3 b.-Constant Dollar Shares of
GNP for Low Wage, Medium Wage, and
High Wage Manufacturing**

Percent of GNP

¯Low Wage Manuf   '¯Medium Wage Manuf

¯High Wage Manuf

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, "Nation-
al Income and Product Accounts, " historical diskettes, table 6.2.

**Figure 5-4a. -Current Dollar Shares of
GNP for Transactional Activities,
Personal Services, and Social Services**

Percent of GNP

¯Transactional   ¯Personal Services

---·Social Services

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, "Nation-
al Income and Product Accounts," historical diskettes, table 6.1.

**Figure 5-4 b.-Constant Dollar Shares of
GNP for Transactional Activities,
Personal Services, and Social Services**

Percent of GNP
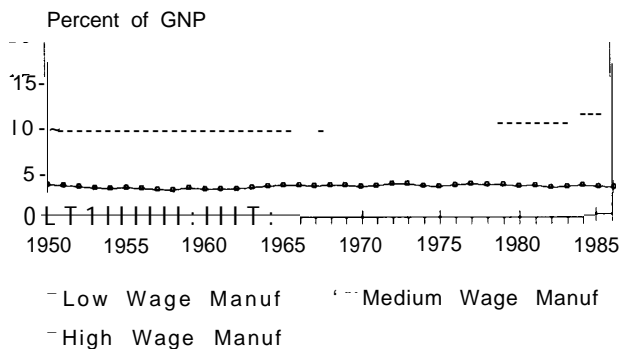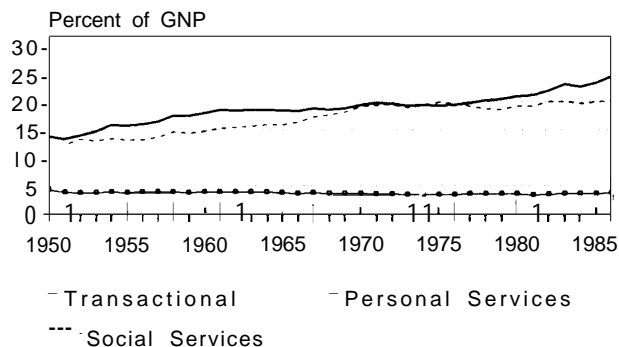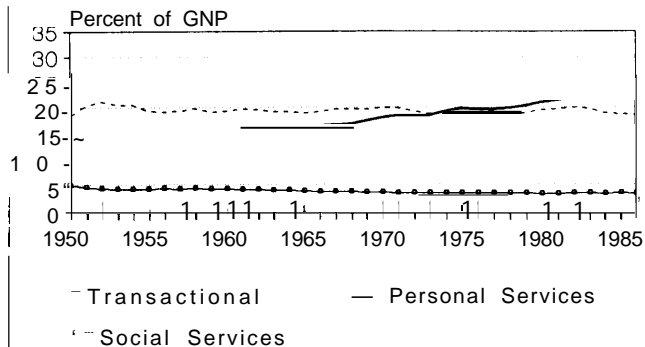

¯Transactional   — Personal Services

'¯Social Services

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, "Nation-
al Income and Product Accounts," historical diskettes, table 6.2.

Box 5-C–Shifting Shares of Value-Added in the U.S. Economy

Natural Resource Industries

One of the clearest structural trends in the U.S. economy has been the relative decline of the Natural Resource sector. This decline is reflected in both current and constant dollar shares of GNP.

The current dollar share has fallen from more than 12 percent to less than 9 percent—a **29** percent loss since 1950 (see figure 5-2a). This loss would probably have been much greater had oil and gas prices not quadrupled in the 1970s. The constant dollar share also declined steadily. Over three-quarters of the loss from 1950 to 1984 is attributable to the farm industry. Between 1972 and 1984, however, the constant dollar share of the farm industry remained unchanged; nearly 90 percent of the sectoral loss was due to declines in crude petroleum & natural gas and electric, gas, water, & sanitary services, reflecting the conservation and substitution of energy products.

Construction

The constant dollar share of Construction increased slightly more than 1 percent during the 1950s (see figure 5-2 b). Because this was matched by gains in productivity, the current dollar share held steady. Since the mid 1960s, productivity growth has been small, and in some cases even negative. As a result, the current share has remained relatively stable while the constant share has declined, mainly in line with recent economic downturns; about one-fifth of the 30-year decrease occurred from 1973 to 1975, and another quarter occurred from 1979 to 1982.

Low Wage Manufacturing

Low Wage Manufacturing held a relatively stable share in constant dollars between 1950 and 1984, but lost half its share in current dollars (see figures 5-3a and 5-3 b). The difference between constant and current share is attributable to the fact that Low Wage Manufacturing had strong productivity gains—gains driven in part by intense foreign competition.

Between 1972 and 1984, Low Wage Manufacturing's share of constant dollar GNP remained largely unchanged because of offsetting trends in different industries. Footwear and miscellaneous manufacturing (mainly composed of the jewelry and toy industries) declined, while lumber & wood products and apparel grew. The relatively large rubber & plastics and furniture & fixture industries kept a constant share.

Medium Wage Manufacturing

Medium Wage Manufacturing has lost nearly a quarter of its share measured in current dollars since 1950, but gained over a quarter in constant dollars (see figures 5-3a and 5-3b). As with the low wage sector, this discrepancy is due to steady gains in productivity. The three leading industries of this sector-non-electrical machinery, electric industrial equipment, and food & kindred products—experienced respective price increases that were 10, 28, and 27 percent below the 1970 to 1983 U.S. average. [1]

During the 1972-84 period, the increase in the constant dollar share of this sector resulted from industries characterized as "high-tech": electronic components, optical equipment, scientific instruments, and office, computing, & accounting machines. These four accounted for 73 percent of the growth of all industries in this sector that rose in share; office, computing, & accounting enterprises increased their share by a factor of almost 6 over the 12-year time period.

High Wage Manufacturing

The fate of High Wage Manufacturing is particularly important for the U.S. economy since, as the name suggests, it has long been a source of well-paid jobs. Its importance also lies in its strong links to the rest of the economy (see ch. 4). Nevertheless, the sector lost both constant and current dollar share of GNP (see figures 5-3a and 5-3 b). The bulk of High Wage Manufacturing's loss in constant dollars occurred during the 1970s, a period of weak productivity growth for this sector and of increasing competition from foreign firms. The petroleum refining, primary iron & steel manufacturing, and motor vehicle industries were the major sources of this decline. Of the 20 industries included in this sector, only one, drugs, cleaning, & toilet preparations, witnessed any substantial growth, with most of that occurring between 1972 and 1977. Productivity in many high wage sectors has increased in the past few years, but average growth during the 1972-1984 period was slow. [2] The discrepancy between the shares reported in figure 5-3b and the share shifts calculated using the input/output methods described in chapter 4 is particularly great for this sector.

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[1] U.S. **Bureau of the Census,** *Statistical Abstract of United* **States, 1985 (106th cd.), Washington, OC, 1984, table 783.**

[2] Ibid.

Transportation & Trade

Transportation & Trade is one of the largest sectors in the economy, responsible for approximately one-fifth of the Nation's GNP over the past 35 years. The sector's current dollar share has declined gradually since the mid 1950s, while the constant share has tended to rise (see figures 5-2a and 5-2 b).

Individual industries, however, have experienced significant changes. Of the sector's 5-percent gross decline in current dollar share from 1950 to 1984, more than half was attributable to railroad transportation enterprises. On the other hand, air transportation enterprises were responsible for half of the gross increase. From 1972 to 1984 there was little change, although nearly all of this sector's growth in constant dollar share has come from the wholesale & retail trade industry. Wholesale & retail trade's contribution to GNP has historically been the largest of any industry; by 1984, its share was more than that of all industries contained in the Low and High Wage Manufacturing sectors combined.

Transactional Activities

No other sector has experienced the dramatic growth generated by the group of industries characterized as "transactional. " The growth of this sector has been rapid and continuous since 1950, with both the current and constant share rising in unison until 1980 (see figures 5-4a and 5-4 b). After 1980, however, the constant share leveled off while the current share continued to climb. This has probably been due to the escalation in real estate prices since 1979.[3]

Since 1972, the dominant growth industry within this sector has been business services, responsible for more than 40 percent of the increase in sectoral share. Real estate & rental also grew, contributing more than one-quarter of the constant share increase; this development made real estate the second largest industry, after wholesale & retail trade, in the 1984 U.S. economy.[4]

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[3]Ibid., **table 790.**
[4]The National **Income Accounts also impute a rental-equivalence value for home owners that is allocated to the real estate industry.**

Personal Services

Losing share in both constant and current dollar terms, Personal Services are the exception to an otherwise dramatic shift towards a service-oriented economy (see figures 5-4a and 5-4 b). The largest decline is located in the household services industry (domestic services), much of which has fallen prey to the introduction of labor-saving household appliances.[5]

Since 1972, the sector has maintained a stable constant dollar share. This balance was achieved through gains in the automobile repair& services and amusements industries, offsetting a continued decline in household services.

Social Services

The Social Service sector is comprised of the public and private health and education industries, as well as Federal and State government. This sector has grown dramatically over the past 35 years; in fact, it has the fastest current dollar growth rate of any sector, increasing by 70 percent between 1950 and 1984 (see figure 5-4a). State and local government enterprises were the main contributors to this current dollar growth, generating about half of the increase since 1950. The constant dollar share, however, only grew at the same rate as the economy. Part of this dichotomy can be attributed to weak gains in productivity; only the Personal Services and Construction sectors have shown less productivity growth than Social Services. The other factor involved is a sharp increase in prices.

Between 1972 to 1984, the combination of Federal, State, and local government decreased their share in constant dollars. Most of this loss was compensated for by a gain in share from private health, education, & social services.

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[5]Joe Schwartz, "The Goods Life," *American Demographics,* December 1987

can be isolated from other factors, by using 1980 production recipes to estimate industry output given patterns of final demand occurring in 1972, 1977, 1980, and 1984. In other words, the effects of final demand can be separated from those brought about by new recipe patterns, which tend to reflect changes in the technology of production. Table 5-2 details these changes.

Changes in the composition of final demand from 1972 to 1984 had a significant impact on the output produced by industries in several sectors, especially

The changes may seem small at first. The share of Natural Resources, for example, fell from 13 percent in 1950 to about 9 percent in 1984—hardly a dramatic decline. It must be recognized, however, that given the size of the U.S. economy, even a one percent shift in GNP share is significant. In 1984, a 1 percent change in share meant $38 billion gained or lost. For comparison, the total compensation paid to al] of the employees of the motor vehicle industry was $35 billion, and businesses spent $34 billion on computers, in 1984.[11]

Explaining the Changes

Which of the factors listed at the beginning of this chapter were responsible for the sectoral shifts described in figures 5-2, 5-3, and 5-4? Methods introduced in chapter 4 can be used to distinguish between changes resulting from new patterns of demand, new production recipes, and new patterns of international trade.[12]

In brief, changes in demand, both domestic and international, and changes in production recipes have had almost equal effects on the overall shift in share during the past decade, but the impact on individual sectors and industries varies widely. Not surprisingly, demand changes tend to have their greatest effect on industries that sell final, finished products, such as motor vehicles and real estate. Recipe changes affect industries such as oil, steel, chemicals, and business services, which typically supply goods or services that are then used as ingredients in a finished product. International trade has reinforced the changes generated by domestic demand and production recipes, but its effects were not pronounced until after 1980.

The period 1972 to 1984 was chosen for in-depth analysis. This is the most recent time frame for which

consistent and detailed information could be assembled. It was an interesting period, characterized by major structural movements. Between 1972 and 1984, for example, oil and gas prices more than tripled, steel production fell by 30 percent, information processing equipment grew from 13 percent to over 40 percent of all durable equipment expenditures, and the ratio of imports and exports (gross) to GNP nearly doubled.

Table 5-1 summarizes the analysis of shifts in the share of constant dollar value-added contributed by ten sectors between 1972 and 1984, showing the extent to which the shifts were attributable to changes in production recipes as opposed to foreign and domestic demand.[13] The table is not intended to describe exact movements between sectors resulting from different factors, but to exhibit the relative magnitude of the different factors as part of sectoral change. In this sense, the table provides a sensitivity analysis and not a precise mapping of cause and effect.

Of the 8.9 percentage points of GNP that was exchanged between sectors gaining share and sectors losing share from 1972 to 1984, roughly half was attributable to changes in the production recipe and half was connected to changes in final demand. Within the broad category of final demand, the impact of domestic demand on changes in economic structure was-for the economy as a whole—more than twice as large as the impact of trade. Nevertheless, the impact of trade was still impressive, because most trade effects occurred over a relatively brief period-after 1980—while the effects of domestic demand have been relatively constant since 1972.

The **Impact of Trade and Domestic Demand on Economic Structure**

The effects of changing patterns of final demand on the changing shares of different business sectors

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[11]U.S. Department **of Commerce, Bureau of Economic Analysis, "National Income and Product Accounts,"** *Survey of Current Business, vol.* **67, No. 7, July 1987, tables 5.6 and** 6.4B.

[12] **"Demand" refers to final demand, or the purchase of goods and services for final consumption (see chs. 2 and 3). "Recipe" represents the intermediate demand for goods and services ("ingredients") that will be combined to create a final product (see ch. 4). For examples of using demand as a factor of change, see Robert Lawrence,** *Can America* **Compete? op. cit., footnote 2, and U.S. Department of Commerce, Office of Economic Affairs, "Trade Ripples Across U.S. Industries," Washington, DC, 1986. For analyses that focus on the role of "recipe," or technical coefficients in the process of structural change, see Anne Carter,** *Structural Change in the American Economy* **(Cambridge, MA: Harvard University Press, 1970) and** W**assily Leontief and Faye** Duchin**, "The Impacts of Automation on Employment, 1963-2000," contract report for the National Science Foundation, Washington, DC, April 1984.**

[13]The selection **of any one year for a comparison point is fraught with the peculiarities of that particular year. This analysis uses 1972 and 1984 because they offer the widest time range given the available data, and because they are close to being the end points of their respective business cycles, effectively eliminating cyclical factors. Different endpoints can yield different effects attributable to "demand" and "recipe." See Stanley J. Feldman, David McClain, and Karen Palmer, "Sources of Structural Change in the United States, 1963-1978: An Input-Output Perspective," The Review o/Economics** and *Statistics, 1987.* **The 1984 endpoint uses 1984 demand in conjunction with the 1980 Input-output tables, and therefore does not completely reflect the 1984 economy.**

.Table 5.1 .—The Sources of Structural Change:
Change in Percentage of Constant Dollar Share of GNP From 1972 to 1984 by Sector (1980$)
(numbers will not necessarily add due to rounding and interactive effects)

	Natural Resources	Construction	Low Wage Manufacturing	Medium Wage Manufacturing	High Wage Manufacturing	Transportlon & Trade	Transactional Actlvltles	Personal Services	Social Services	Federal Defense	Other a
All	−2.3	−1 3	0.2	06	−3.3	2.0	55	0.1	0.4	−0.9	−1 1
Production reclpe[b]	−0 9	−0 5	04	03	−2.3	06	26	0.2	−0.4	−0.0	0.0
Final demand	− 1,4	−o 7	−0.3	05	−o 9	12	2.9	−0, 1	0.8	−0.9	−1,1
Domestic demand[c]	**−1,1**	**−0.8**	0.1	0.7	−0.5	0.7	24	−0.2	0.6	−0.9	−1 o
Trade[c]	− 0 4	01	−0,4	−0.3	−0.4	0.5	0.5	00	0.3	00	00
Interactive	−0.0	01	−0.0	0.2	0.1	−0.2	−0.0	−0.0	−0.1	0.0	0.0

How To **Read This** Table: Between 1972 and 1984, the percentage of all value-added in the economy generated by Natural Resource businesses fell 2.3 percentage points. This is equivalent to saying that Natural Resource contribution to GNP fell 2.3 percentage points. The decline resulted from new patterns of domestic demand (responsible for a 1.1 percentage point decline in the Natural Resource share), trade (0.4 percentage point), and production recipes (0.9 percentage point).

a Includes non-production, accounting industries such as **non-comparable imports,** scrap, rest **of the world industry, and** inventory valuation adjustment.

b Production recipe refers **only to 1972 to 1980 change.**

c **Estimated** from the 1984 National Income and Product Accounts (U.S. Department of Commerce)

d 1984 Trade data are estimated and rebased into 1980 dollars from data provided by the U.S. Bureauof **Labor** Statistics.

NOTE: All = Recipe + Final Demand + Interactive: Final Demand = Domestic Demand + Trade

SOURCE Office of Technology Assessment. 1988

**Table 5-2.—U.S. Structural Change Resulting
From Changes in Final Demand**
(constant dollar GNP"share for selected years of final demand;
value-added shown by production sector and
calculated using the 1980 1.0)

Production sectors	1972	1977	1980	1984'
Natural Resources . .	10.7	9.4	8.8	9.3
Construction	6.9	6.4	5.9	6.2
Low Wage Manufacturing	3.6	4.2	3.4	3.3
Medium Wage Manufacturing	9.5	10.0	**9.8**	10.0
High Wage Manufacturing	9.9	9.9	9.3	9.0
Transportation & Trade	18.2	18.9	19.5	19.4
Transactional Activities	20.7	23.1	23.3	23.6
Personal Services . . .	3.8	4.0	3.7	3.7
Social Services	13.5	15.0	14.5	14.2
Federal Defense	3.0	2.3	1.9	2.1
Other.	0.2	−3.2	0.0	−0.9
Total	100.0	100.0	100.0	100.0

aOutput derived from demand estimated from the National Income and Product
Accounts
NOTE: Totals may not add to 100 due to rounding.

SOURCE Office of Technology Assessment, 1988.

Natural Resources, High Wage Manufacturing, and
Transactional Activities.

In the case of the Natural Resource sector, most
of the shift due to final demand occurred between
1972 and 1977. Not surprisingly, the two industries
affected were crude petroleum & natural gas and
electric, gas, water, & sanitary services. For crude
petroleum, most of the decrease was attributable to
trade as imported oil replaced the output originat-
ing from domestic companies. In the case of elec-
tric, gas, & water services, nearly all the decrease
was traced to lower domestic demand from domes-
tic consumers.

The High Wage Manufacturing sector also experi-
enced a significant reduction in share due to final
demand. Half of this sector's loss in GNP share due
to shifts in final demand came from the motor vehi-
cle, iron & steel, and petroleum refining industries.
The motor vehicle industry didn't start to lose share
until after 1977, at which point the decline was pri-
marily due to slack domestic demand from consum-
ers and business. Trade was a relatively small fac-
tor for this industry until after 1980, when its
negative effect almost eliminated what could have
been a relatively large gain in share achieved
through strong domestic demand. The iron & steel

industry has suffered a fate similar to that of motor
vehicles: the decline in share from 1977 to 1980 was
of domestic origin; after 1980, domestic demand
would have slightly increased this industry's share
of GNP if not for a detrimental trade balance.

Although these are the major declining sectors,
another sector, Low Wage Manufacturing, registered
a small decline and is of interest because of the dom-
inant effect trade has had on this sector. In a no-
trade environment, five out of the twelve Low Wage
Manufacturing industries would have gained in GNP
share, resulting in a net gain for the sector over the
period from 1972 to 1984. But the addition of trade
reverses the trend, resulting in a decline in GNP for
three-quarters of the industries. The industries that
experienced the most dramatic turnaround in share
due to trade were fabrics, textile goods, apparel, foot-
wear, and miscellaneous manufacturing (which in-
cludes the production of jewelry, toys, and writing
implements). By and large, these trade impacts have
been felt since 1972, but they are most pronounced
in the period from 1980 to 1984.

Construction's share of GNP fell over the 1972-
84 period, due to declines in domestic demand for
new construction. The defense sector also lost GNP
share between 1972 and 1977, in part because of
the end of the Viet Nam war. (The "value-added"
in defense consists entirely of compensation paid to
military employees.)

Balancing the decline of these sectors are four sec-
tors that gained in GNP share as a result of changes
in final demand: Transactional Activities, Transpor-
tation & Trade, Social Services, and Medium Wage
Manufacturing. Of the four, Transactional Activities
was responsible for gaining over 50 percent of the
total share that shifted between 1972 and 1984 due
to final demand. Four-fifths of this sector's gain can
be credited to domestic demand, primarily consumer
demand, the bulk of which has been fueled by con-
sumer demand for the products of the real estate &
rental and finance & insurance industries.[14]

Transactional Activities also benefited the most
from international trade; about one-fifth of the sec-
tor's total gain due to demand came from trade. The
industries that increased their GNP share because
of trade were similar to the industries that benefited

[14]The real estate & rental industry includes a Commerce Department
imputation for owner-occupied housing.

from domestic demand: real estate & rental and business services.

The Transportation & Trade sector gained share because of both trade and comparatively rapid growth in domestic demand. The wholesale & retail trade industry was responsible for most of the growth. Within this sector, eating & drinking places increased share particularly rapidly, primarily because of rapid growth in final demand.

Social Services also gained share because of changes in final demand. Most of the increase resulted from growing demand for the health, education, & social services industry. These increases offset a large decline in demand for the services of Federal, State, and local activities that occurred between 1972 and 1984. Ninety percent of this loss occurred after 1980.

Most of Medium Wage Manufacturing's increase derived from final demand came from industries that can be characterized as high technology: office, computing, & accounting machines; radio, TV, & communication equipment; and optical, ophthalmic, & photographic equipment. Domestic demand for these products, particularly from the business sector, was strong, but the negative effect of trade dampened what could have been impressive gains. Trade also contributed to a loss in GNP share for less technologically oriented industries like metalworking machinery and electronic components. Nearly all of this loss of GNP share due to trade occurred between 1980 and 1984, reversing a positive impact from trade achieved from 1972 to 1977.

The **Impact of Production Recipes on Economic Structure**

If changes in demand, including trade, account for roughly half of the total structural change in the economy, the other half can presumably be explained by changes in intermediate demand—the demand for goods and services used as ingredients in making a product for final consumption, a major component in the production recipe. Chapter 4 explained how this recipe changed between 1972 and 1980, revealing that service sector inputs had increased while inputs from the natural resource and manufacturing sectors decreased. How has this change in recipe affected GNP share?

The impact of changes in the production process can be seen by estimating how the output from different industries would change when production recipes vary-using those of 1972, 1977, and 1980—but leaving demand as it was in 1984. What would GNP look like if the production recipe of 1972 were used to satisfy demand for a car, compared to the recipe used in 1980? It must be recognized, of course, that the process of producing 1984 demand using a 1972 production recipe is highly artificial. For example, most industries would have used a dramatically different amount of oil in 1972 if the the price of oil in 1972 was as high as in 1980.

The procedure reveals that the impact of recipe on structural change was roughly the same as that of demand.[15] As table 5-3 shows, three of the five sectors with increasing share due to changes in recipe were the same three sectors that benefited from changes in demand—Transactional Activities, Transportation & Trade, and Medium Wage Manufacturing—although within these sectors, the individual industries that benefited differed widely from those gaining share due to final demand. Sectors losing share due to changes in both recipe and demand were High Wage Manufacturing, Natural Resources, and Construction. Most changes were therefore reinforcing rather than offsetting, although Low Wage Manufacturing and Personal Services proved to be exceptions; these sectors experienced a gain in share due to recipe, but lost as a result of demand. Social

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[15] The time span is restricted to an 8-year period, 1972 to 1980, because of the availability of data.

Table 5.3.—U.S. Structural Change Resulting From Changes in the Production Recipe
(constant dollar GNP share derived from 1984 total final demand; by production sectors, using the 1972, 1977 and 19801-0 adjusted to 1980$)

Production sectors	1972	1977	1980
Natural Resources	10.1	9.7	**9.3**
Construction	6.8	6.6	**6.2**
Low Wage Manufacturing.	2.9	3.3	**3.3**
Medium Wage Manufacturing . . .	9.7	10.0	10.0
High Wage Manufacturing	11.3	9.7	9.0
Transportation & Trade	18.8	19.4	19.4
Transactional Activities	21.0	22.0	23.6
Personal Services	3.5	3.6	3.7
Social Services. , ...	14.7	14,4	14,2
Federal Defense	2.1	2.1	
Other	−0.9	−0.9	−0.9
Total	100.0	100.0	100.0

NOTE: Totals may not add to 100 due to rounding.

SOURCE: Office of Technology Assessment, 1988.

Services lost share because of recipe shifts, but gained share because of demand.

The sector which lost the most due to changes in recipe was High Wage Manufacturing, Approximately 70 percent of the decline occurred between 1972 and 1977, and can be traced to three industries: petroleum refining, chemicals, and primary iron & steel manufacturing. These industries account for more than four-fifths of the 1972 to 1980 drop in High Wage Manufacturing's GNP share due to recipe changes. Unlike the situation resulting from changing demand, the motor vehicle industry experienced only a small reduction in share because of changing production recipes.

The changes in High Wage Manufacturing's share of GNP seem to have resulted from the increased availability of new materials, such as plastics, which can act as substitutes for steel;[16] the sharp increase in crude oil prices, which pushed up the price of chemicals and refined petroleum products and thus forced a recipe change; and the influx of foreign intermediate inputs as ingredients in the production recipe.

The share lost by High Wage Manufacturing due to recipe changes was primarily absorbed by Transactional Activities. The Transactional sector picked up nearly two-thirds of the shift in share that occurred between 1972 and 1980 due to recipe change. Growth was strong from 1972 to 1977, but even stronger from 1977 to 1980; presumably, a 1984 recipe would indicate that this sector gained even more. The business services industry, which includes activities such as advertising, legal services, and computer and data processing services, was responsible for nearly 70 percent of the sectoral increase;[17] the finance & insurance industry came in a distant second.

Production recipe changes resulted in a sharp increase in demand for Transactional Activities—business services in particular. As discussed in chapter **4,** more complex business networks seem to require larger numbers of transactions, resulting in more demand for services like those provided by lawyers and consultants. Decisions to contract out services that were previously done "in-house" and increasing geographic dispersion of production also result in an increase in Transactional Activities.[18] For example, many manufacturing firms now contract out for janitorial services that had been performed internally. Although the actual amount of this work has not necessarily increased, it appears to grow because it is now counted as an "arms-length" market transaction.[19]

The impact of changed production recipes on sectors other than High Wage Manufacturing and Transactional Activities is rather small. Most of the decline among Natural Resource industries was located in agricultural products (non-livestock), and in electric, gas, water, & sanitary services. Changes in recipe also had a negative effect on the share of Construction, particularly in the new construction industry. The last sector to experience a loss of share due to recipe changes was Social Services, with most of the loss attributable to the health, education, & social service industry.

After Transactional Activities, the sector that gained the most in terms of share due to recipe changes was Transportation.& Trade. The wholesale & retail trade industry was responsible for most of the increase gained by this sector. This is not surprising, considering the increased role that marketing now plays in the delivery of a product, and the fact that constant dollar per capita retail sales grew by 23 percent between 1972 and 1984.[20]

Unlike the situation in High Wage Manufacturing, both Low and Medium Wage Manufacturing benefited from changes in the recipe of production. In the low wage sector, the industries devoted to apparel and lumber & wood products achieved the greatest gains. For Medium Wage Manufacturing, the principle industries behind the gain in sectoral share were office, computing, & accounting machine~ and electronic components (mostly semiconductors).

[16]Stanley J. Feldman and Karen Palmer, "Structural Change in the United States: Changing Input-Output Coefficients," *Business Economics,* January 1985, p. 43.

[17]For a more detailed analysis of the changing role of the business services industry in the recipe of production, see Feldman and Palmer, op. cit., footnote 13; Bobbie H. McCrackin, "Why Are Business and Professional Services Growing so Rapidly?" *Economic Review,* Federal Reserve Bank of Atlanta, August 1985; and John Tschetter, "Producer Services: Why Are They Growing So Rapidly?" *Monthly Labor* Review, vol. 110, No. 12, December 1987, pp. 31-41.

[18]McCrackin, op. cit., footnote 17, and Tschetter, op. cit., footnote 17.

[19]Richard B. McKenzie, "The Emergence of the Service Economy: Fact or Artifact?" policy analysis No. 93, Cato Institute, Washington, DC, Oct. 27, 1987.

[20]U.S. Bureau of the Census, *Statistical Abstract of the* United States, 1986 (106th cd.), Washington, DC, 1985, table 1388.

In the case of computers and electronic components, the reasons for an increase in share due to recipe change are apparent. During the 1970s, the computer became an accepted element in the production process; as time goes on, adoption, adaptation, and implementation of computer technologies in the workplace is certain to increase. The reason behind the growth of apparel as an intermediate input is less obvious, except perhaps for the fact that the Multifiber Arrangement, which allows for trade agreements that restricted fiber imports into the United States (and other developed nations), took effect in 1974; some researchers have found that these trade restrictions had a positive effect on domestic output.[21] The increase in the output of the lumber industry is probably due to the role lumber plays as an input in housing production, and the fact that new housing starts for the 1972-84 period peaked in 1972-73 and 1977-78.[22]

Tracing the Significance of Structural Change

It is difficult to pass judgement about whether changes in sectoral share of GNP are desirable or undesirable. Much of the remainder of this document is devoted to tracing the way shifting production recipes effect U.S. responses to trade, opportunities for employment, and the net productivity with which the economy delivers amenity to consumers. Chapter 7 traces the relationship between trade and sector contributions. Chapter 10 shows how changing production recipes affect demand for different kinds of jobs.

Patterns of change in sector shares (including the surprisingly constant share of manufacturing) have not changed radically for many decades. On the other hand, a prolonged period of slow change can have a major cumulative effect. After reaching a threshold, what seemed like a gradual process may suddenly be seen as a transition. This threshold is more likely to be perceived in periods of slow economic growth than in periods of strong growth, where downward fluctuations are masked by general prosperity .23

The issue is not whether structural change is occurring at any greater or lesser rate that it has in the past. In some areas it has and in others it has not. The critical point is that the collective effect of three decades of change has left the United States with a much different economy.

21 *u.s. Congressional Budget* **office, Has Trade** *Protection Revitalized Domestic Industries?* **(Washington, DC: U.S. Government Printing Office, November 1986), p. 32.**

22 Statistical Abstract of *the United States 1986,***op.** cit., **footnote 20, table 1297.**

23 James H. Crossing and Arye **L. Hillman, Op. cit., footnote 5.**

CHANGES IN SCALE AND SCOPE

The second kind of structural change to be examined involves the way business networks are owned and managed, in terms of the size, or scale, and the product mix, or scope, of their operations. This analysis is critical because different patterns of scale and scope shape the ability of a business to compete in international markets, dictate the quality and stability of the jobs offered, and determine the success with which new technologies can be exploited.

One of the difficulties in any discussion of this kind is that there is no good vocabulary for describing the variety of ways that business networks in an economic sector are organized. One source of confusion is the distinction between an "establishment" and an "enterprise." The word enterprise (sometimes also called a firm) indicates an independently owned corporate entity. An establishment is a specific plant, branch, or subsidiary within an enterprise. A large enterprise may consist of many small establishments.

Beyond this distinction, there are a variety of patterns in which business networks can be organized. The following is a partial list:

- Sectors dominated by a small number of large firms that either:
    —concentrate their activities in a single plant or a comparatively small number of plants (e.g., the old Ford Motor Co. Rouge River Plant);
    —maintain tightly managed subsidiaries and branch offices, where managers of distinct components are not given appreciable flexibility (e.g., branches of major insurance companies); or

—have the dominant form of organization through loosely controlled establishments, subsidiaries, or franchises, in which the establishment's management is given considerable autonomy and is compensated primarily on the basis of decisions made as an independent agent (e.g., a branch bank manager with freedom to establish his or her own loan criteria).

- Sectors dominated by one or more large firms that effectively regulate a market for a large collection of small, independent firms (e.g., IBM sets de-facto standards for a wide variety of personal computer equipment and software systems produced by many different firms; similarly, the firms formerly part of the old Bell system set standards for a host of other communications suppliers).

- Sectors dominated by small firms operating independently, which are either:
  —nominally independent, but constrained by their product or by a lack of research to behave as though they were producing mass-produced commodities (e.g., farms, teaching, and home construction); or
  —independent entrepreneurs, providing imaginative responses to new markets and new production technologies. Such firms may pool research or marketing through trade associations (an example might be the semiconductor industry in Silicon Valley).

Given the difficulty of developing an acceptable taxonomy, there is no easy way to trace patterns of change. Moreover, firms in traditionally fragmented sectors (e.g., farms, physicians, and home builders) are amalgamating into larger units, while sectors that were traditionally highly concentrated (e.g., automobile production) are turning to networks of small and medium-size suppliers for a greater share of parts and engineering services.[24]

It appears extremely unlikely that the new form of industrial organization will bear much resemblance to the "new industrial state" that seemed so inevitable a generation earlier.[25] While small firms may provide invaluable sources of innovation, it appears equally unlikely that significant growth will originate from small firms unless they are able to work together in a way that at least approximates the economies of larger enterprises-small firms now command a declining share of output in virtually every sector of the economy. However, they play an important role by providing employment when few other alternatives are available, and provide a large share of jobs added during economic recessions (e.g., as carpenters and machinists become self-employed repairmen or work in retail stores).[26]

Under current circumstances, small firms are able to provide growing employment opportunities by offering comparatively low wages, few if any non-wage benefits, comparatively poor working conditions, and weak job security. While parts of Italy and West Germany may have created an environment where networks of small firms can avoid many of these liabilities, the growing share of U.S. employment in smaller businesses, coupled with a shrinking share of assets, profits, and sales, may lead to the growth of a two-tier system in the United States. Workers finding stable employment in comparatively productive large firms may do increasingly well, while their counterparts in small firms do increasingly poorly.

Economic success now appears to depend increasingly on technical innovation, but little is known about how the scale and scope of businesses influence rates of innovation. Entrepreneurs may alone be able to grasp a truly revolutionary concept; the merits of semiconductors were almost universally ignored by firms with a large stake in the manufacture of vacuum tubes, and the merits of microcomputers were not initially recognized by firms with large interests in mainframes. But groups of entrepreneurs are able to manage large markets only in exceptional cases. In the semiconductor and microcomputer "shake-out," survivors have typically grown to become large enterprises or have been absorbed by large firms.

Industrial structure in major sectors clearly results from private management decisions, but these de-

[24]Michael S. Flynn, "out-sourcing Rediscovered," *IEEE Spectrum*, vol. 24, No. 10, October 1987, pp. 46-49.

[25]See John Kenneth Galbraith, *The New Industrial State* (New York, NY: New American Library, 1971).

[26]Bruce E. Kirchhoff and Bruce D. Phillips, "Examining Entrepreneurship's Role in Economic Growth," paper delivered at the Seventh Annual Babson Entrepreneurship Research Conference, Malibu, CA, April 30, 1987.

cisions are strongly influenced by public policy and in many cases are the conscious result of public policy. Private decisions about mergers, pooling of research, foreign marketing, adoption of communications and other standards, contributions to retraining programs, and other actions that shape the way large business networks are managed, are all strongly influenced by Federal and State policy—directly through formal regulation, and indirectly through tax laws and other macroeconomic decisions.

Describing Changes in Scale and Scope

Changes in scale and scope affect both individual firms and the establishments of which they are composed. For example, insurance firms are delegating more authority to small sales offices located throughout a region, while they are consolidating record keeping and other functions. Large construction firms are combining property development, mortgage financing, factory construction of components, and site erection. General Motors has a finance division, GMAC, that provides loans for buyers of GM cars. Even though the creation of this division is an expansion of scope, because it is directly tied to new car sales, it does little to insulate GM from falling sales. To counter this problem, GM has proposed another expansion of scope by which it will begin to offer home equity loans—a business divorced from cars. This diversification of products can lower costs, as fixed investments are amortized over a broader base of products.

There is clear evidence that the growth of large firms is increasingly built around the aggregation of many comparatively specialized small establishments. As a result of these developments, many large firms claim that they are reorganizing operations to encourage more entrepreneurial behavior on the part of individuals and establishments. Techniques range from large rewards for inventors and patents (IBM can award $10,000 or more for an important innovation) to the AT&T system for encouraging venture business, in which employees can earn both salary and profits from new projects and can even invest personal funds or defer part of salaries. The firm reports that it has already received 2,000 proposals.[27]

Obviously, a radical change in corporate philosophy is needed before established, hierarchical firms will be willing to tolerate real entrepreneurial behavior. While GM claims to have encouraged its production establishments to shop for price and quality, in practice the assembly operations appear to be forced to give preference to Central Foundry Division for castings, Rochester Products Division for fuel systems, and Delco Moraine Division for brakes. These GM subsidiaries regularly win long-term contracts because they are allowed to bid without including overhead, capital, and other fixed expenses. GM's inability to escape rigid vertical integration, and the comparative flexibility of Ford and Chrysler, has been cited as an explanation for GM's recent loss of market share.[28]

A large firm, or a set of firms, can also provide a de facto set of standards and regulations to organize the activity of a large number of smaller "satellite" enterprises.[29] The dominating firm can operate at a variety of places in the system, tying resources to final markets, and can be a producer, such as IBM, a retailer, such as Safeway, or a mixture of both, such as health maintenance organizations. Other examples include large hospital chains and group practices, which are capturing markets once enjoyed by fragmented private practices and local unaffiliated hospitals; these firms are often innovators in medical practices designed to reduce costs. Small community banks, caught in a changing regulatory environment that has spurred the need to broaden their product mix and enhance their technical expertise, are forming partnerships with larger regional banks.[30]

Small, independently owned firms can form effective networks through a series of free market contracts, but their performance can often be enhanced by cooperating in areas of mutual interest such as research and development, training, and overseas marketing. The ability to create some of these consortia is difficult for U.S. firms because of antitrust laws and entrenched business cultures, but they have

[27]R.M. Kanter, "The Attack on Pay, " Harvard Business Review, vol. 65, No. 2, March-April 1987, pp. 60-67.

[28]W. Hampton and J.R. Norman, "General Motors: What Went Wrong," Business Week, No. 2990, Mar. 16, 1987, p. 102.

[29]The term is used by Michael Piore and Charles Sable, The Second Industrial Divide (New York, NY: Basic Books, 1984).

30 Dwight B. Crane and Robert C. Eccles, "Commercial Banks: Taking Shape for Turbulent Times," Harvard Business Review, vol. 65, No. 6, November/December 1987, pp. 94-100.

been used effectively in Japan, West Germany, and Northern Italy[31]

The problem of defining "large" and "small" firms or "concentrated" and "competitive" sectors has become increasingly difficult given the growth of national and international production networks. While antitrust considerations were formerly needed to consider whether a firm monopolized regional markets, should they now consider the scale of firms with respect to international markets?

Forces of Change

Changes in scale and scope are driven by the same four forces that lead to changes in sectoral contributions to GNP: technology, rules and regulations, patterns of domestic demand, and international competition.

Technology

Changes in industrial organization are made possible by radical improvements in the way information can be communicated among firms and establishments, and by changes in technology that greatly reduce the size at which economies of scale become important. The availability of inexpensive computer-assisted design (CAD) and computer-assisted manufacturing (CAM) technologies operating on personal computers has allowed even small machine shops to adopt these innovations, reducing waste, errors, and down time. The time to convert a customer's drawing to a cutting die, for example, has fallen by a factor of seven.[32] Even small metal fabrication facilities can make use of technologies such as Flexible Manufacturing Systems, which operate at a minimum scale of six machines and a half dozen people.[33] Large data entry and typing pools are disappearing as data entry is integrated into other functions distributed throughout the firm.

Communications technologies have rewritten many rules, providing unprecedented opportunities for uniting small enterprises into a dynamic framework.[34] Production technologies capable of tailoring products to specialized markets without a significant sacrifice in productivity or increase in cost can vastly diminish the value of economies of scale.[35] Of course, small subsidiaries of large firms may still be favored over independent firms that lack access to sophisticated communication networks. But there are instances where smaller enterprises, tied to an independently operated information network, can enjoy new life because of a close relationship with national and international markets. A national data network, for example, may help small-scale U.S. farmers who produce high value products, such as fruits or specialized vegetables, to bid on the international market. Advances in telecommunications allow companies like American Airlines to take advantage of cheap labor in Barbados for data entry, saving the company about $3.5 million per year.[36]

Regulation

Formal changes in regulations have had a profound effect on patterns of business organization throughout the economy, particularly in transportation, health, and communications. Changed regulation in transportation created an explosion (possibly of short duration) of independent owner-operators, as well as the formation of integrated transportation firms such as Federal Express—which combines truck pickup and delivery, air freight, and telecommunications. Health regulations have encouraged the formation of health maintenance organizations and consortia of physicians. The breakup of AT&T has, of course, fragmented a sector once organized exclusively under a regulated monopoly.

The interpretation of antitrust regulation (the Sherman Act, the Clayton Act, and the Federal Trade Commission Act) is also in flux (see box 5-D). These rulings plainly have a strong influence on business structure. Rapid growth in conglomerate as opposed to horizontal mergers undoubtedly resulted in part

31 Danielle Mazzonis and Mario Pianta, "An Innovation Strategy for Traditional Industries," draft report prepared for the industrial association of Prado, Italy, September 1986.

32 *Mechanical Engineering,* January 1987, **P.** 6.

33 See R. Jaikumar, "Postindustrial Manufacturing," *Harvard Business Review, vol. 64, No. 6,* **November/December 1986, p. 76; and** *Mechanical Engineering,* op. cit., footnote 32. This issue is discussed at greater length in the manufacturing section of ch. 6.

34 Werner Neu, Karl-Heinze Neuman, and Thomas Schnoring, "Trade Patterns, Industry Structure, and Industrial Policy in Telecommunications," *Telecommunications Policy,* **March 1987.**

35 The advent of "mini-mills" in the steel industry is a good example of this phenomenon. See Bela Cold, "Technological Change and Vertical Integration," *Managerial* and *Decision Economics, vol. 7, 1986.*

36 Bruce Stokes, "Beaming Jobs Overseas," *National Journal,* vol. 17, No. 30, July 27, 1985, p. 1726.

Box 5-D.–Anti-Trust Regulation Affecting Mergers and Acquisitions

"That no person engaged in commerce or any activity affecting commerce shall acquire, directly or indirectly, the whole or any part of the stock or other share capital [where] . . . the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly."
The Clayton Act, Sec. 7 (15 U. S. C., Sec. 18 (1980))

"Every contract, combination in the form of trust or otherwise, or conspiracy in restraint of trade or commerce among the several states, or with foreign nations, is hereby declared to be illegal. "
The Sherman Act, Sec. 1 (15 U. S. C., Sec. 1 (1975))

"Unfair methods of competition in or affecting commerce, and unfair or deceptive acts or practices in or affecting commerce are hereby declared illegal. "
Federal Trade Commission Act, Sec. 5 (15. U.S. C., Sec. 435 (1982))

SOURCE: Compiled in W. D. Appler, "Mergers m the Food Industry The impact on FTC Regulation, " paper delivered at the The Food Update Conference of the Food and Drug Law Institute, "Mega-Mergers The Impact of Consolidation Tampa **FL, April 1987**

from the Cellar-Kefauver Act.[37] Antitrust law has been amended to permit research consortia designed to promote U.S. competitiveness, though the act has failed to stimulate much real collaborative research.

Liberal interpretations of anti-trust statutes have virtually eliminated formal barriers to mergers during the Reagan administration. In 1986, for example, 2,406 pre-merger filings were made pursuant to the Hart-Scott-Rodino (HSR) Act, three times the rate of applications in 1979. Of these, 2,108 were approved without further inquiry by granting requests for early termination of the statutory waiting period, The rest were issued letters requesting further information, and 25 HSR filings were made. The Federal Trade Commission filed court papers in only three cases between 1979 and 1985—Pepsico's proposed acquisition of Seven-Up, Kidde's proposed acquisition of Horneschfeger (mobile hydrolic cranes), and Conoco's proposed acquisition of Asamera. And

in one of these cases, a consent order settled the issue before a suit was filed.[38]

Demand

If changes in scale and scope are made possible by new regulations and new technologies, they have also been made necessary by both dramatic changes in domestic demand and a massive invasion of imported products. There may once have been a period when large U.S. manufacturers could in effect ignore market dynamics by creating markets for their products, through advertising in a product market (like automobiles) dominated by a small number of domestic firms. This pattern of performance was encouraged by a long period of post-war business successes and government programs designed to create a climate favorable for growth built around oligopolistic activity. To some extent, the emergence of large manufacturing firms meeting relatively homogeneous markets resulted from the limitations of production technology; they may also have been encouraged by a political process that equated this form of industrial organization with progress and growth.[39] Organized labor shared this vision, since large, centrally managed firms and predictable markets provided a sound basis for stable employment. However, high levels of concentration can be justified by the economies of scale derived from large-scale operations in only a few industries.[40]

Times have changed. Growing affluence and new technologies make it necessary to substitute niche markets for relatively homogeneous ones for products ranging from automobiles to health care (see ch. 3). Firms that ignore how their products connect with the consumer are increasingly at peril. If nothing else, the demand for dynamic performance (an ability to react quickly to both opportunity and disaster) has outstripped the importance of static performance (low cost in a predictable environment) .[41]

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[39]W.D. Appler, "Mergers in the Food Industry: The Impact on FTC Regulation," paper delivered at the The Food Update Conference of the Food and Drug Law Institute, "Mega-Mergers. The Impact of Consolidation," Tampa, FL, April 1987.

39 Piore and Sable, op. cit., footnote 29.

[40]Bruce E. Kaufman, "Scale of Plant Relative to Market Size in U.S. Manufacturing," *Southern Economics Journal,* October 1979, vol. 46, No. 2.

[41]Burton Klein equates **dynamic productivity with an ability to** take advantage of good luck and recover from bad luck. See Burton Klein, Dynamic Economics (Cambridge, MA: Harvard University Press, 1977).

[37]John M. Connor, "Mergers in the Food Industry: Trends, Effects, and Policies, " staff paper No. 87-9, Department of Agricultural Economies, Purdue University, March 1987, p. 2.

Radically changed perceptions about the desirable scale of electric power-generating facilities provides a particularly clear example. Large 1,000-MWe plants may have been able to produce power less expensively when they were commissioned in the 1970s, but their economic success depended critically on levels of demand for electricity projected over a 20-year period. Massive mistakes in estimates have left many regions with large, unused generating capacity. Few utilities are now willing to gamble on 20-year forecasts, and are willing to pay a premium for small units that can be added to as needed. At the same time, advances in electric generating technology like steam-injected gas turbines may make it possible for 100- to 200-MWe plants to compete with larger plants without incurring the risks associated with uncertainty.[42]

Foreign firms have called into question traditional patterns of domestic business management never seriously questioned by domestic competition. Dynamic, entrepreneurial firms making semiconductors in California's "Silicon Valley" find themselves overwhelmed by oligopolies managed by greying bureaucrats in Japan. Large U.S. manufacturers of automobiles find themselves with lower productivity than Japanese production facilities one-third their size. Large U.S. textile machinery firms find their markets picked to pieces by an invasion of aggressive producers from West Germany that work harder to identify market niches. US. farmers find their export surplus overwhelmed by imports of such products as Italian tomatoes and Brazilian orange juice.

With the exception of declines in farming (a sector dominated by small businesses) each of the forces at work would tend to increase the role of comparatively small establishments if past trends continue. There are now more points of entry for smaller, specialized enterprises; small firms have moved alertly into businesses such as software development, maintenance and repair of communication and computational equipment, and computer-generated graphic design. Such firms traditionally flourish during periods of rapid transition, since the bureaucratic inertia of large firms may blind them to opportunities

in places where none were expected. Who could have imagined a business built around graphics for personal computers a decade ago? The rules of the game are changing rapidly.

Measuring Changes in Scale and Scope

Scale

Small employers appear to be providing an increasing fraction of jobs but a declining fraction of output.[43] The largest firms, however, appear to be expanding mainly by aggregating large numbers of comparatively small branches, or subsidiaries, which are typically involved in different kinds of businesses,

Small businesses, defined here as employing 100 people or less, accounted for 98 percent of all U.S. business enterprises and 34 percent of all employment in 1984.[44] The average firm size dropped from 26.2 employees in 1976 to 21.7 in 1982. Although large firms created 1 million more jobs than small firms between 1976 and 1984, table 5-4 indicates that in relative terms most growth occurred in mid-size firms, those employing between 20 and 500 people. The smallest firms (less than 20 employees) maintained their share of U.S. employment while the largest firms (more than 500 employees) lost share.

The role of small business depends heavily on the sector examined. An auto plant employing only several hundred workers would be considered small, whereas several hundred lawyers would represent

[42]Eric D. Larson and Robert H. Williams, "Steam-Injected Gas Turbines," *Journal of Engineering for Gas Turbines and Power,* **January 1987**; Eric D. Larson and Robert H. Williams, "Steam-Injected Gas Turbines and Electric Utility Planning," **Technology and Society, March 1986.**

43 Measuring the scale of a firm involves relying on empirical measures like jobs, assets, or output—all of which are very sensitive to definitions of "small" or "large," the data source used and its coverage, and the methodology employed. In particular, some controversy has arisen over the role small business plays in the job generation process and the accurate classification of a business as a small *establishment* or a small *enterprise. See* **Catherine Armington and Marjorie Odle, "Sources of Job Growth: A New Look at the Small Business Role,"** *Economic Development Commentary vol.* **6, No. 3, fall 1982; David L. Birch, "The Job Generation Process," MIT Program on Neighborhood and Regional Change, Cambridge, MA, 1979; Candee S. Harris, "Small Business and Job Generation: A Changing Economy or Differing Methodologies," working paper prepared for the Brookings Institution, February 1983; Sue Birley, "Finding the New Firm," 1984** *Proceedings of the Academy of Management,***Boston, MA, August 1984; A.L. Walton, "How Small Businesses Contribute to Job Generation–The Pitfalls of a Seemingly Simple Question," paper presented at the 1983 Conference on Industrial Science and Technological Innovation, Evanston, IL, May 1983.**

44 Nearly all of the data in this discussion come from various editions of **U.S. Small Business Administration,** *The State of Small Business* **(Washington, DC: U.S. Government Printing Office, 1984 and 1986 editions).**

Table 5-4.—U.S. Employment by Firm Size: 1975-84 (percent of all jobs)

Firm size (number employed)	1975	1978	1980	1982	1984
Under 20.......	27.l%	26.6%	26.0%	26.8%	27.1%
20 - 99	26.9	27.9	28.3	28.5	28.8
100 - 499	22.6	23.2	23.8	23.5	23.5
500 - 999	**8.0**	**7.9**	**7.6**	**7.3**	**7.2**
Over 1,000	15.4	14.4	14.3	14.0	13.4
Total	100.0	100.0	100.0	100.0	100.0
Number of jobs	60,565	70,289	74,836	74,297	77,996a

NOTE: Totals may not add to 100 due to rounding.

SOURCE: U.S. Bureau of the Census, Statistical Abstract of the United States, 1987 (107thed), Washington, DC, 1986, table 858.

a very large law firm. Figure 5-5 indicates, for example, that manufacturing and transportation industries have a comparatively large share of firms with more than 500 employees while natural resource businesses, retail &wholesale trade, and "other services" have a comparatively large share of business with fewer than 20 employees.

With the exception of the retail industry, the rate of job growth in firms with fewer than 20 workers was faster than average during the period when the economy was entering the recession of the early 1980s, while growth was slower in firms with more than 500 (see table 5-5). Indeed, 56 percent of all manufacturing jobs added between 1976 and 1982 were found in firms with fewer than 20 workers, even though such firms represented only 7 percent of all employment in 1976 (the average number of employees per establishment, however, remained roughly the same for all sizes). And more than 46 percent of jobs added in the finance industry were

in firms with less than 20 employees, despite the fact that these firms represented only 19 percent of all employees in 1976.

There were two important exceptions. The market share of builders with volumes greater than 100 housing units per year grew from 6.9 percent in 1959 to 67 percent in 1986, while the share of builders with volumes less than 25 units per year fell from 70 to 11 percent during the same period.[45] Similarly, more than 50 percent of all jobs added in retailing between 1976 and 1982 appeared in firms with more than 500 employees, even though such firms employed less than one-third of all retail employees in 1976.

Changes in patterns of self-employment also illustrate the changing scale of American enterprises. Table 5-6 documents a steady decline in self-employment, with the most significant changes occurring between 1950 and 1970. This drop was led by sharp losses in self-employment in retail trade. Self-employment in agriculture remains relatively high, but is steadily declining. The creation of owner-operator trucking and bus companies, made possible by deregulation, has presumably been responsible for the recent increases in self-employed transportation workers. The decline of self-employment in business and social services seems to have halted, but recent gains must be viewed with caution since they may represent a response to the most recent business cycle and not a long-term trend. Surprisingly, self-employment has increased in manufacturing since 1970, although the share of self-employed persons in manufacturing remains low.

In terms of assets, sales, and creation of GNP, large businesses continue to dominate and gain share. In

Figure 5-5.-Employment by Establishment Size and Industry in 1984
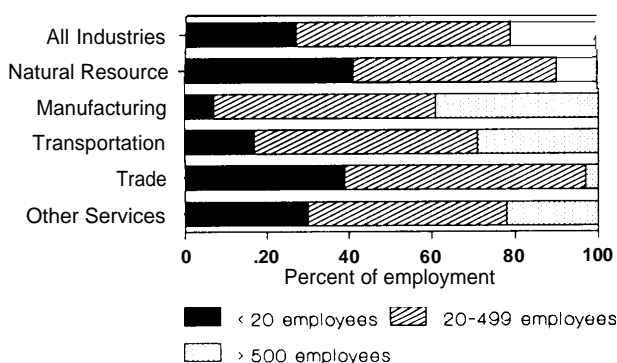
NOTE: Natural Resources includes Construction.

SOURCE: U.S. Bureau of the Census, Statistical Abstract of the United States: 1987 (107th ed.), Washington, DC, 1986, table 859.

45 National Association of Home **Builders,** *Profile of the Budder, Wash-*ington, DC, 1979; and "Housing Focus, " November 1987.

Table 5-5.—Percent Change in U.S. Employment (by size of firm, 1976.82)

	Total change	Change by number employed:			
		1-19	20-99	100-499	500 +
Agriculture, Forestry, & Fishing	4.9%0	21 .80/0	−7.70/0	− 10.90/0	− 13.80/o
Mining	37.6	72.1	52.3	59.2	24.1
Construction.	7.9	24.8	−2.1	− 14.1	− 1.4
Manufacturing	5.3	42.7	10.7	2.1	1.1
Transport, Communication & Utilities	13.0	33,9	11.4	8.1	10.3
Wholesale trade	15.2	28.8	8.2	12.7	4.7
Retail trade	15.6	9.5	10.7	20.4	24.6
Finance, Insurance & Real Estate.	19.3	46.6	14.3	7.6	13.9
Services.	29.3	52.6	26.2	19.6	26.2
All Industries	15.6	29.3	13.1	10.7	12.2

SOURCE: U.S. Small Business Administration, The State *of* Small *Business* (Washington, DC: U.S. Government Printing Office, 1985), table AI .21.

Table 5-6.—U.S. Self-Employment by Industry (percent of all full-time equivalent employment in that Industry)

Industry	1950	1960	1970	1975	1980	1986
Agriculture, Forestry, & Fishing	67.7	61.3	58.9	54.9	52.4	50.1
Mining	3.4	4.0	2.2	2.1	2.7	3.3
Construction	29.4	19.7	16.7	19.9	22.0	22.8
Manufacturing	2.6	1.9	1.4	1.5	1.8	2.0
Durable goods	2.8	2.0	1.5	1.7	1.8	2.0
Nondurable goods	2.3	1.7	1.2	1.4	1.8	2.0
Transport, Communications & Utilities	4.8	4.5	4.2	5.0	5.5	6.0
Wholesale trade	9.2	8.4	6.3	5.8	5.4	5.1
Retail trade	25.5	21.8	13.3	12.3	11.6	9.2
Finance, Insurance, & Real Estate	10.3	8.8	6.9	7.7	8.4	8.4
Services	19.5	18.5	15.9	14.7	14.0	13.9
Total	19.6	15.3	11.1	11.1	10.9	10.7

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, "National Income and Product Accounts;'historical diskettes, tables 6.7b and 6.10b.

1977, firms employing more than 500 people represented only 0.4 percent of all businesses but were responsible for 53 percent of all value-added in the economy.[46] In 1985, manufacturing firms with more than $l billion in assets held nearly 70 percent of all corporate assets and firms with more than one billion dollars in annual profits enjoyed nearly 70 percent of all U.S. corporate profits.[47] Moreover, the Nation's largest businesses had sales that grew faster than the sales of small businesses between 1976 and 1982 in spite of the increase in small business employment. Firms with more than 10,000 employees produced sales growth of 16 percent annually from 1976 to 1982,[48] while firms with between 10 and 19 employees saw their sales grow an average of14 percent and other businesses with fewer than 500 employees averaged between 4.3 and 9.0 percent sales

growth, This continued a trend already evident between 1958 and 1977.49

Most of the expansion of large businesses, however, appears to have occurred through net creation of new establishments rather than expansions of old ones. Seventy percent of the new jobs emanating from large businesses originated from net additions of establishment startups minus closings, and not from expanding existing establishments.[50] From 1976 to 1984, small businesses (under 100 employees), commonly thought of as the source of new establishments, derived only 60 percent of their (net) new jobs through this source (see figure 5-6).[51]

Figure 5-7 shows the dramatic growth in the number of establishments owned by large firms. This

[46] See "The Changing Industrial and Size Composition of U.S. Business," *The State of Small Business*, op. cit., footnote 44, 1984. p. 118.
[47] *Statistical* Abstract *of the United States 1987*, op. cit., footnote 20.
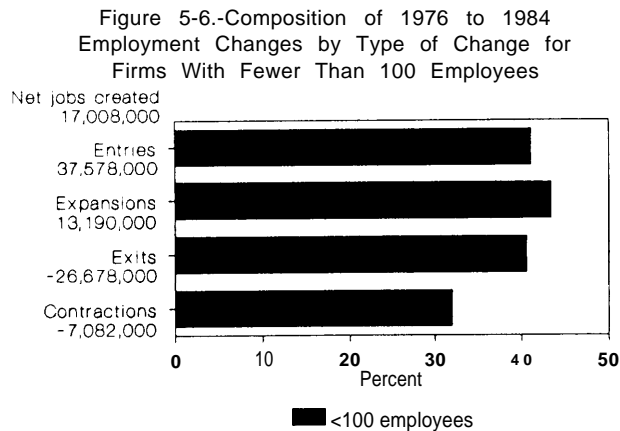[48] *The* State of Small *Business*, op. cit., footnote 44, 1984, p. 67.

[49] Ibid., p. 134,
[50] u.s. Small Business Administration, Office of Advocacy, Small Business Data Base, USEEM File, table 4, unpublished data, April 1987.
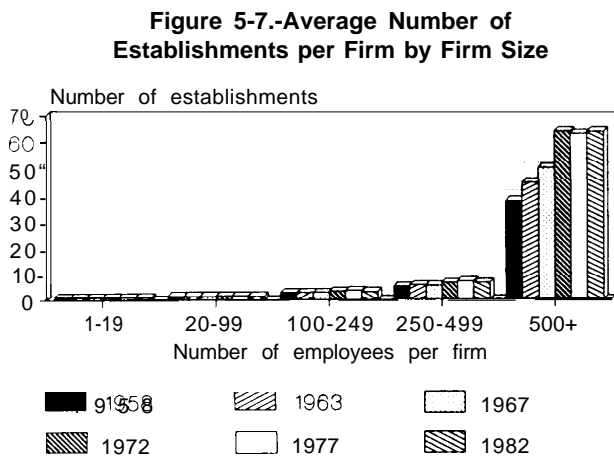[51] Bruce E. Kirchhoff and Bruce D. Phillips, op. cit., footnote 26.

addition of establishments corresponds to the fact that the largest increase in the share of jobs was not in small establishments owned by small firms, but in small establishments owned by large firms.[52]

[52]Growthrates were calculated for the 1978 to 1982 time period. The *State of Small Business,* op. cit., footnote 44, 1984, p. 15.

Figure 5-6.-Composition of 1976 to 1984 Employment Changes by Type of Change for Firms With Fewer Than 100 Employees

Net jobs created
17,008,000

Entries
37,578,000

Expansions
13,190,000

Exits
-26,678,000

Contractions
-7,082,000

<100 employees

How To Read This Figure: Of all the jobs created by new firms that started businesses between 1976 and 1984, about 40°/0 were created in firms with less than 100 employees.

SOURCE: U.S. Small Business Administration, Office of Advocacy, "Small Business Data Base," USEEM File, unpublished data, 1987.

Figure 5-7.-Average Number of Establishments per Firm by Firm Size

Number of establishments

Number of employees per firm

1-19   20-99   100-249   250-499   500+

91958 1963 1967
1972 1977 1982

How To Read This Figure: In 1958, the average firm with 500 or more employees owned 37 establishments ("firms" indicate ownership, "establishments" are separate plants). By 1972, firms with more than 500 employees owned more than 60 establishments, and owned approximately the same number in 1982.

SOURCE: U.S. Small Business Administration, The *State of Small Business: A Report of the President* (Washington, DC: U.S. Government Printing Office, March 1984), table A2.20.

scope

While large firms may be producing many different products, individual establishments within these firms, as well as small independent establishments, appear to be specializing rather than diversifying. Independent manufacturing establishments showed particularly strong movement toward specialization.[53]

It is difficult to determine whether large firms are assembling specialized operations in order to achieve economies of scale, for reasons having to do with the investment interests of owners, or for the way the component establishments work together. Most recent mergers in manufacturing and mining are classified as "conglomerates" (see table 5-7); the heterogeneity of the firms being assembled into large businesses could suggest that mergers are not being undertaken to improve integrated efficiencies.[54] On the other hand, firms might be diversifying into different components of their respective systems or networks (buying an airline as well as holding a rental-car company and a hotel chain) while retaining economies of scale at the establishment level .[55] Several manufacturers have begun to sell intermediate products like machine tools and software, in addition to using them in their own operations.

Rather than fitting into the traditional notion of forward or backward integration, this spinning-off of new products reflects a diagonal movement that crosses traditional technological and industry boundaries.[56] It has been noted, for example, that "per dollar spent, airlines make more money on reservation systems than they do on flying passengers."[57] An analysis of the food industry, which has experienced more than 5,000 mergers and acquisitions from 1975 to 1985, concluded that most of the mergers were undertaken to " . . . market complementary products, create new products from combined know-how, and distribute the weaker merger partner's products through a stronger sales network."[58] Given the com-

53 Frank M. Gollop and James L. Monohan, "From Homogeneity to Heterogeneity: A Proper Index of Diversification," *Technical Notes,* U.S. Department of Commerce, Bureau of the Census, Washington, DC, October 1986, p. 22.

[54]Ibid., p. 2 .

"Ibid., p. 29.

[56]Bela Gold, op. cit., footnote 35.

57 Helen Wheeler, "Air Reservations: New Savvy in the Skies," High *Technology Business, vol. 7, No. 11,* November 1987, pp. 36-40.

58 William D, Appler, op. cit., footnote 38.

Table 5.7.–Merger Trends in Manufacturing and Mining, 1948-79

	1948-53	1956-63	1963-72	1973-77	1978	1979
Horizontal	36.8	19,2	12.4	15.1	28.5	2.3
Vertical	12.8	22.2	7.8	5.8	15.1	7.3
Conglomerate.	50.4	58.6	79.8	79.1	56.4	90.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: Frank M. Gollop and James L. Monohan, "From Homogeneity to Heterogeneity: A Proper Index of Diversification," Bureau of Census Technical Notes, U.S. Department of Commerce, Washington, DC, September 1984.

plex assembly of service and production operations that must be combined to deliver products to markets, traditional definitions of vertical integration are difficult to apply and may be inappropriate.

In manufacturing enterprises, it is clear that firms are diversifying production through holding a more varied portfolio of establishments that are producing a more homogeneous mix of products. Using an index that measures the number of different products produced by an establishment, it can be shown that manufacturing establishment diversification fell by a factor of nearly 3 from 1963 to 1982.[59] The diversity of products made by individual *establishments* fell in 17 of 20 major manufacturing categories examined.[60] In contrast, diversification of manufacturing *enterprises* increased during the period in 14 of 20 industries. Since 1963, this level of diversification has increased by 15 percent.[61]

By 1984, 12 percent of manufacturing employment was in establishments not classified as manufacturing. These non-manufacturing establishments owned by manufacturing firms had an employment growth rate of 6 percent between 1982 and 1984, compared to a loss of 1 percent in the manufacturing establishments.[62]

Consequences of Changes in Scale and Scope

There is a rich literature describing the relationship between business size, management strategies, and dynamic performance, and a small theoretical literature covering economies of scope is beginning

to appear.[63] Unfortunately, most of this developing work deals with manufacturing firms, not with enterprises whose primary output is information or other "non-products."

The following discussion will concentrate on how new technologies may act to challenge the rules that have governed forms of business organization. Three classes of implications are considered:

- Will the emerging structures be more aggressive in their pursuit of invention and innovation, and will they be more likely to adopt innovations when they occur?
- Will they be more or less likely to efficiently match resources to amenity needs?
- Will the new systems be more attractive to employees in that they permit greater stability, higher pay, or more unpaid benefits?

Are Smaller Firms More Inventive?

Are smaller firms more likely to exploit the advantages of innovation and force changes in market structures because larger firms are too sluggish or are immobilized by institutional inertia and complacent management? Or are large firms more likely to take advantage, since they are better able to un-

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59 Gollop and Monohan, op. cit., footnote 53, P. 29.

60 Ibid., p. 25

61 Ibid., pp. 25, 26, 29.

62 Marjorie Odle and Catherine Armington, *"is* American Manufacturing Creating Jobs Again?" unpublished working paper, Applied Systems Institute, p. 3.

[63]See C. Freeman, J. Clark, and L.L.G. Soete, *Unemployment and Technical Innovation* (Westport CT: Greenwood Press, 1982); J.K. Galbraith, op. cit., footnote 25; Morton L Kaimen and Nancy L. Schwartz, *Market Structure and Innovation* (Cambridge, England: Cambridge University Press, 1982); F.M. Scherer, "Firm Size, Market Structure, Opportunity, and the Output of Patented Inventions," *American Economic Review, vol. 55, No. 5, 1965,* p. 1097; and L.L.C. Soete, "Firm Size and Inventive Activity: The Evidence Reconsidered," *European Economic* Review, No. 12, p. 319; Woodward, Lawrence, and Lorsch, Organization and Environment (Boston, MA: Harvard University Press, 1967); T. Burns and G.M. Stalker, *The Management of Innovation* (London: Tavistock, 1961); E.F. Fama, "Agency Problem and the Theory of the Firm," *Journal of Law and Economics, 1980, vol. 88,* pp. 288-307.

A useful review of all this literature is provided by Ronald W. Cotterill, "The Economic Efficiency of Alternative Forms of Business Enterprise," Storrs Agricultural Experiment Station, Staff Paper No. 85-10, U.S. Department of Agriculture, 1985.

dertake long-term research and transform the pay-off from innovation into a cycle that produces more innovation? Both may be correct. Periods dominated by entrepreneurial activity may alternate with periods dominated by large firms.[64] It is also possible that both trends occur simultaneously in different parts of the economy. The critical question for this analysis is whether the U.S. economy is moving into a period where research is unusually beneficial to large, bureaucratic firms, or unusually likely to depend on and encourage the emergence of small, innovative ones.

Michael Piore and Charles Sable argue that the pendulum has swung back to a situation favorable to the entrepreneurial model.[65] This argument suggests that the conventions which formed the basis for prosperity under the "Fordist" model of industrial structure—and the entire structure of private and public regulation that supported it—have been fatally eroded by new technology and the challenge of foreign trade. As a result, the system must move either in the direction of smaller, more flexible, more entrepreneurial institutions that are regulated by the market, or toward greater international regulation of concentrated markets. A number of factors can act as barriers to innovation in large-scale operations: top management isolation, intolerance of eccentric ideas, short-time horizons, narrowly defined accounting objectives, and inappropriate incentives.[66] Large U.S. firms have also been accused of lethargy, inattentiveness to the market, and a bureaucratic structure that prevents flexibility and innovation.[67]

Large firms may go through periods of stagnation and renewal without the challenge of entrepreneurial firms. The U.S. automobile industry, for example, was challenged not by small entrepreneurial competitors but by foreign competition. After a period of relative complacency, this industry has recently been forced to re-examine an enormous range of accepted conventions, and may soon enjoy a "renaissance" unshaken by domestic competitors.[68]

Another complication is posed by several qualitative factors that defy precise measurement. Technologies developed by small firms tend to move rapidly into the hands of larger enterprises, whose ongoing research establishments—and possibly better management, marketing, and production engineering capabilities—are able to translate innovation into business success. And as chapter 9 will show, many of the large firms capitalizing recently on the ideas of small, innovative U.S. businesses have been foreign-owned.

Small companies face particularly serious problems during periods of generally poor business performance. As Piore and Sable argue, while smaller firms may be in a better position to respond quickly to new market conditions by adjusting output and wages—sometimes because they face little or no union opposition—they also face formidable obstacles. Small manufacturing firms tend to have relatively high capital costs;[69] the U.S. Small Business Administration estimates that on average, small businesses pay a premium that is 2 to 3 percent higher than capital rates charged to larger firms.[70] Combined with external debt, high capital costs often make operating a small enterprise particularly difficult during bad times. Entrepreneurs may be tempted to react by selling intellectual assets, which can constitute the core of their comparative advantage.

As has been noted, a "large firm" covers an enormous variety of management styles and structures. Some are collections that are in essence financial portfolios, others are combinations with a functional theme. Networks of specialized enterprises may provide the basis for real flexibility,[71] and enhanced flexibility is a crucial ingredient in fostering innovation.[72]

[64] A. Phillips, *Technology and Market Structure* (Lexington, MA: Lexington Books, 1971); Christopher Freeman, *The Economics 01 Industrial Innovation* (Cambridge, MA: The MIT Press, 1982), 2d cd., p. 210. Even Schumpeter seems to have changed his mind on the subject. Drawing on the experience of 19th century capitalists, his 1912 book emphasized the importance of the entrepreneur for bringing inventions to the market. His revised view published in 1943 emphasized the importance of large firms.

[65] Piore and Sable, op. cit., footnote 29.

[66] James Brian Quinn, "Managing Innovation," *Harvard Business Review,* vol. 63, No. 3, May-June 1985, pp. 76-77.

[67] See interview with Malcolm Baldrige, "Despite Barbs, Baldrige Hopeful on U.S. Business, " *Washington Post,* Dec. 7, 1986; Quinn, op. cit., footnote 66; and Charles Sabel, "How To Keep Mature industries Innovative," *Technology Review,* vol. 90, No. 3, April 1987, pp. 27-35.

[68] William Abernathy, *Industrial Renaissance: producing a Competitive Future in America* (New York, NY: Basic Books, 1983).

[69] W. M. Cohen, R.C. Levin, and D.C. Mowery, "Firm Size and R&D Intensity: A Re-examination," National Bureau of Economic Research, Cambridge, MA, working paper No. 2205.

[70] The State of Small Business, op. cit., footnote 44, 1986.

[71] See Peter B. Doeringer, "Make Way for Mature Industries," unpublished paper delivered at the 1987 IRRA Spring Meeting; and Quinn, op. cit., footnote 66, p. 4.

[72] L. Balcerowicz, "Organization] Structure of the National Economy and Technological Innovations," *Acta Oeconomica,* No. 24., 1980.

On the other hand, a "boutique" structure may prove too fragmented to be efficient.[73]

An argument can also be made that the continual process of reshuffling national assets through mergers can drain talent and capital from more productive investments.[74] From 1980 to 1985, the amount spent on mergers and acquisitions was more than double the level of industry financed research and development. In the last 6 years, General Electric has spent more than $12 billion acquiring 325 new businesses while divesting itself of 225 businesses for a sale price of $8 billion.[75] There is a danger that firms with a comparatively long-term planning horizon—large investments in research and development, and comparatively heavy capital investment—may be the targets of take-overs by firms attempting to realize short-term gains. If so, such mergers could be disastrous to any national strategy built around long-term commitment to innovation and worker training.[76] The key question is whether the transactional costs associated with forming new business structures lead to long-term savings, in the form of both lower transaction costs as a result of greater economies of scale and scope and more productive use of capital.

Empirical support for any of these theories has been difficult to develop. Some data suggest an inverse relationship between innovation and formalization (the number of rules and specified procedures).[77] Clearly, larger firms are responsible for the lion's share of all research conducted in industrial nations. Some experts argue that there are "irreversible dynamic scale economies''—once a technology begins to return significant income, firms that benefit initially can then re-invest their profits and multiply their initial advantage, set de facto standards, and effectively dominate the market.[78] Nearly 60 percent of all the research reported in the United States during the 1970s was conducted by the Nation's 20 largest firms; more than 90 percent was conducted by firms with more than 5,000 employees.[79] On the other hand, there is only a weak correlation between research intensity and firm size as measured in employment or sales. Small firms apparently generate more patents per R&D dollar than larger ones, and small entrepreneurs are more likely to patent an idea than large enterprises.[80] And a study looking for correlations between firm size and R&D intensity determined that most differences between firms can be explained by factors unrelated to size. Some manufacturing sectors pursue research aggressively while others failed to do so.[81]

Studies of the correlation between productivity and firm size yield similarly ambiguous results. An extensive analysis of labor productivity and multi-factor productivity gains between 1947 and 1972 indicates that larger firms' productivity growth has increased more rapidly that smaller firms.[82] Another study concludes that the rate of earnings per dollar of assets decreases as the size of the firm increases.[83] Moreover, empirical explanations of correlations between firm size, market concentration, and productivity growth provide few insights into how each of these variables affects the ability of firms to conduct research, invest in new plant and equipment, and train employees.

Table 5-8 suggests that if innovation is measured by the number of new products produced in a specific year per million dollars' worth of sales or R&D, then small firms are the most innovative. However, this measure assumes that all new products are equally important, and fails to adjust for the fact that many small business innovations (particularly "high-tech" developments) are spin-offs from large businesses.[84] The National Science Foundation states that the " . . . popular notion of the solo inventor operating in a basement is largely fiction; ''[85] that those innovations having a significant social impact will

[73]"Can America Compete?" *Business Week, No. 2995,* Apr. 20, 1987.
[74]See James W. Brock, "Bigness Is the Problem, Not the Solution," *Challenge*, vol. 30, No. 3, July-August 1987, pp. 11-25.
[75]Tom peters, "Business in the Future Sense," Washington *Post,* Oct. 4, 1987.
[76]"Debate Between T. Boone Pickens and Lester C. Thurow," *The Energy Journal, vol. 8, No. 2, 1986.*
[77]J. Rothman, P/arm@ and *Organizing for Social Change: Action Principles from Social Science Research (New York, NY: Columbia University Press, 1974).*
[78] Paul David, Presentation at the Symposium on Economics and Technology, Mar. 17-19, National Academy of Sciences, Palo Alto, CA, 1985.

[79] Freeman, op. cit., footnote 64, p. 132.
[80] Ibid., p. 136.
[81] W. M. Cohen, R.C. Levin, and D.C. Mowery, op. cit., footnote 69.
[82] Steven Lustgarten, Final *Report to U.S. Small Business Administration on Firm Size and Productivity* (Washington, DC: U.S. Government Printing Office, September 1982), pp. 16-17.
[83] Stahrl W. Edmunds, "organizational Size and Efficiency in the U.S.," *The Antitrust Bulletin,* fall 1981.
[84] L. Tornatzky, et al., *The Process of Technological Innovation: Reviewing the Literature* (Washington, DC: U.S. Government Printing Office, 1983), p. 178.
[85]Ibid.

Table 5-8.—New Products First Marketed in 1982 by Size of Firm

Firm size ($ millions of net sales)	Number of products per $ million of net sales	Number of products $ million of R&D
Less than 100	0.113	3.76
100 - 350.	0.067	2.17
350-1,000	0.027	1.49
1,000 - 4,000	0.010	0.66
4,000 and more	0.007	0.59
All firms	0.045	1.75

SOURCE: National Science Foundation, Science *Indicators:* 1985 (Washington, DC: U.S. Government Printing Office, 1987), p 262

probably require a concentration of experts; and that the implementation of that technology will require a centralized means of production.

It is virtually impossible to measure gains resulting from mergers, or to distinguish mergers motivated by tax advantages or managerial hubris from those designed to provide real gains in productivity or production flexibility.[86] A review of recent literature concluded that there was not sufficient empirical evidence to support or refute the notion that mergers result in efficiency gains.[87] Nevertheless, the number and value of both friendly and hostile mergers have increased dramatically in the 1980s (see figure 1-16 of ch. 1). While the effect of friendly mergers on employment and wages appears to be **benign,**[88] **and while** mergers can play a useful role as a catalyst for restructuring an industry, forcing managers to be responsive to shareholder interests,[89] the effect of hostile takeovers can also shift wealth from stakeholders (communities and employees) to shareholders with little net gain to society.[90]

A study of recent takeovers could not demonstrate that the takeover targets were more likely to be those with a long-term planning horizon, high cash flows, or low debt. In fact, the statistics indicated that compared with average firms, takeover targets had low investments in R&D, low capital/earnings ratios, and were virtually indistinguishable from the average firm in terms of cash flows and debt/equity ratios.[91]

Meeting Amenities

The relationship between the size and scope of enterprises in a sector and the facility with which firms can identify and reach new markets with new products in some ways mirrors the relationship between structure and innovation. But innovation in production technology by individual firms neither guarantees that the firms in a sector will work effectively together in marketing products, nor assures that they will be effective in discovering new consumer markets. Chapter 6 will address this issue in detail.

Employment

The discussion of large versus small firms also overlooks the quality of jobs associated with different levels of scale. Large businesses typically provide better wages, better non-wage compensation, and greater job stability.[92] Sectors characterized by a few dominant firms supported by a series of satellite firms can achieve great flexibility by forcing smaller firms to absorb gains and losses. Ways of achieving flexibility without such a high human cost are discussed in chapters 11 and 12.

Firms employing more than 500 workers pay 41 percent of their workers $10.00 or more per hour, compared to the U.S. average of 30 percent and the

86 J.M. Connor, op. cit., footnote 37.

87 David J. Ravenscraft and E.M. Scherer, "Life After Takeover, " Federal Trade **Commission Working Paper No. 139, Washington, DC, February 1986; Julian Allen, "Mergers and Their Impact on Today's Economy: A Survey, " U.S. Congressional Research Service, Report No. 82-118E, Washington, DC, 1982; and Julian Allen, "Corporate Takeovers: A Survey of Recent Developments and Issues," U.S. Congressional Research Service, Report No. 87-726E, Washington, DC, 1987.**
   *Gail McCallion, "Mergers and Acquisitions: The Impact on Labor," U.S. Congressional Research Service, Report No. 87-705E, Washington, DC, 1987.
   [89]Michael C. Jensen, "Takeovers: **Their Causes and Consequences, "** working paper, Harvard Business School, Cambridge, MA, August 1987.
   [90]Andrei Shleifer and Lawrence H. Summers, "Breach of Trust in Hostile Takeovers," National Bureau of Economic Research, working paper No. 32, Cambridge, MA, August 1987.

91 J. Pound, K. Lehn, and G. **Jarrell, "Are Takeovers** Hostile to Economic **Performance?" Regulation, vol. 10, No. 1, September/October 1986, p. 23.**
   [92]See **Edward M.** Miller, "Large **Firms Are Good for Their Workers: Manufacturing Wages as Function of Firm Size and Concentration, " The** Antitrust Bulletin, **spring 1981.**

small business (25 to 99 employees) rate of only 23 percent.[93] In respect to providing health benefits to workers, firms with less than 25 workers provided this benefit to only 39 percent of workers, compared to the economy-wide average of 67 percent and the

large business (more than 500 employees) rate of 85 percent. The probability of a worker becoming unemployed and remaining unemployed from a small firm (less than 100 employees) is higher than that of an employee of a large firm.[94]

[93]*The State of Small Business*, **op. cit., footnote 44, 1986,** Table C.18, **p. 248.**

[94]Ibid., **table C.17, p. 247.**

THE GEOGRAPHY OF ECONOMIC ACTIVITY

The growth of complex production networks is also reshaping the location of America's economic activity. In the 1930s, it was still possible to predict the location of most economic activity by looking at a map of the United States showing only major geological and topographic features. Manufacturing was clustered around sources of raw materials, energy, and access to heavy transportation. Service activity was centered at the transfer points connecting transportation systems—river junctions and ports. Very little economic activity in the United States is now limited by such constraints.

Improved communications technology and the declining significance of natural resources increases options for both manufacturing and service establishments. Instead of spreading wealth and economic activity more evenly around the country, however, the changes appear to have resulted in a greater concentration of economic activity. Growth has been particularly rapid in regions immediately surrounding major coastal cities. Only scattered empirical evidence exists to explain these phenomena. It appears that concentration results from:

- a sustained need for personal (rather than electronic) communication;
- relatively rapid transportation within metropolitan areas, and comparatively easy access to other regions if needed or desired;
- a continuing interest in the comparatively good educational institutions often associated with major cities; and
- the fact that people seem to prefer the cultural opportunities and variety of living near a major metropolitan center.[95]

The forces that would lead to greater concentration in an economy where services play a large role have been known for some time. Writing in 1960, Raymond Vernon noticed that:

The most probable outcome of the increased freedom offered by swifter air travel will be the further concentration of the office elite at a few headquarters cities. This tendency will be fortified by the use of high-speed electronic data-processing machines. For these machines will contribute to the centralization of data-processing and decision-making at fewer points in the structure of the giant company.[96]

Some service activities, such as health, education, and food service, are necessarily spread in rough proportion to population density, though chapter 6 documents a number of cases where even this tradition is changing: health care industries may centralize the sophisticated "tertiary care" hospitals while decentralizing out-patient services; technology may also permit greater geographic decentralization of large university campuses.

Transactional services and manufacturing, however, are now able to become more footloose. Transactional service industries, which provide a growing share of all employment, appear to have used the potential of communications technology to decentralize most of their activities, giving rise to a complex structure of enterprises. Insurance firms are centralizing functions ranging from record-keeping to processing such relatively undifferentiated products as home and auto insurance, but are decentralizing other work to local sales offices capable of conducting sophisticated analysis and underwriting with

[95] M.L. Moss, "TeleCOrnrnUnj..tj..S **Shaping the Future, " paper prepared for the Conference on America's New Economic Geography, Washington, DC, Apr. 29-30, 1987.**

[96] **Raymond Vernon,** *Metropolis* **1985 (Cambridge, MA: Harvard University Press, 1960), p. 84, cited in M.L. Moss, op. cit., footnote 95. See also J. Gottman, "Megalopolis and Antipolis: The Telephone and the Structure of the City," in Ithia de Sola Pool, (ed.),** *The* **Social** *Impact of the Telephone* **(Cambridge, MA: The MIT Press, 1977).**

computer terminals. The dispatching of trucks may be centralized, while the ability to serve geographically dispersed freight customers increases.

In manufacturing, the emergence of comparatively small batch production, just-in-time inventory systems, and a need to participate in tightly linked networks supplying goods for retail outlets may encourage greater decentralization of activity. At the same time, these factors can lead to more centralized control over production, since sophisticated communications systems and comparatively lightweight products make it possible to operate a geographically dispersed network with increasing efficiency. The ability of multinational firms to build responsive production networks around the world is a case in point. (See discussion in ch. 7.)

Changes in the geography of economic activity have a number of indirect effects on the operation of the U.S. economy, including:

- influencing the price and quality of housing, since decentralization of employment can lower the cost of housing within a reasonable commuting range of work;
- changing options for improving productivity in transportation-with few exceptions, job growth has been highest in suburbs and geographic regions poorly served by public transportation;
- affecting opportunities for career growth, to the extent that "back office" functions are geographically segregated in suburbs while opportunities for advancement are most likely to be found in central offices located elsewhere; and
- undermining job stability and making union organization-more difficult, as more and more jobs appear in service and manufacturing firms able to move locations with comparative ease in search of attractive labor pools.

Two kinds of change are discussed in the following section: first, relative changes in population, employment, and income growth in different parts of the country; and second, a continued economic movement to a constellation of population centers roughly associated with major cities, though not to urban centers themselves.

Regional Movements

Defining the Change

Measured in terms of population growth rates, table 5-9 indicates that cities on or near the east and west coast and in the southwest dominated U.S. urban growth during the period 1970-86 as well as 1985-86. Indeed, coastal metropolitan areas appear to be drawing the greatest benefit from the increasing importance of transactional services to total U.S. output (outlined earlier in this chapter), a development that has been reinforced by the relative rise of the transactional sector as a source of U.S. jobs (see ch. 10).[97] New York City, for example, continues to act as an international center for finance, tising, and the arts, while Los Angeles is also coming a major center for finance and trade its easy access to Asia and Latin America.

At the the same time, sharp population decl continued in the major manufacturing centers midwest, particularly those affected by autom and steel manufacturing. This development have been expected since the share of U.S. ou generated by manufacturing industries paying wages—which contribute a large share of empl ment throughout the midwest—has dropped co erably over the past 15 years. (Again, see discu of changes in value-added share by production tor earlier in this chapter.)

Looking at developments throughout the Un States in terms of personal income, the converg of regional income that characterized the 19 period appears to have stopped, and in some has been reversed, during the 1980-85 period. the east and west coasts continue to dominate jor transactional services, States along the A coast have regained their advantage in incomes 1980—a reversal of the trend during the prev decade (see figure 5-8). Moreover, the south Atl tic region has joined the northeast and Califor a relative growth region; it appears that the Bo Washington corridor is spreading south.

Personal income per capita in New England the middle eastern States—which fell relative t

[97]See discussion of the impact of both trade and transactional services on metropolitan areas in Thierry Noyelle, "A New Economic Order," *Forum for Applied Research and Public Policy, vol. 2, No. 1,* winter 1987, pp. 97-105.

Table 5-9.—Population Growth of Major U.S. Metropolitan Areas

Population growth 1970-1986	Thousands	percent	Population growth 1985-86	Thousands	Percent
Largest gains:			**Largest gains:**		
Los Angeles-Anaheim-Riverside, CA CMSA	3,094	1.70	Los Angeles-Anaheim-Riverside, CA CMSA	337	2.65
Houston-Galveston-Brazoria, TX CMSA	1,465	3.28	Dallas-Fort Worth, TX CMSA	143	4.07
Dallas-Fort Worth, TX CMSA	1,303	2.79	Atlanta, GA MSA	89	3.60
San Francisco-Oakland-San Jose, CA CMSA	1,125	1.34	Phoenix, AZ MSA	83	4.57
Miami-Fort Lauderdale, FL CMSA	1,024	2.75	Washington, DC-MD-VA MSA	73	2.09
Phoenix, AZ MSA	929	4.28	San Francisco-Oakland-San Jose, CA CMSA	70	1.21
Atlanta, GA MSA	877	2.65	San Diego, CA MSA	68	3.19
San Diego, CA MSA	843	3.06	Philadelphia-Wilmington-Trenton, PA-NJ-DE-MD	57	0.99
Tampa-St. Petersburg-Clearwater, FL MSA	808	3.49	New York-Northern New Jersey-Long Island, NY	50	0.28
Denver-Boulder, CO CMSA	609	2.53	Tampa-St. Petersburg-Clearwater, FL MSA	45	2.41
Washington, DC-MD-VA MSA	523	1.00	San Antonio, TX MSA	40	3.24
Seattle-Tacoma, WA CMSA	448	1.37	Seattle-Tacoma, WA CMSA	38	1.69
Orlando, FL MSA	445	4.37	Miami-Fort Lauderdale, FL CMSA	34	1.18
Sacramento, CA MSA	443	2.66	West Palm Beach-Boca Raton-Delray Beach, FL MSA	33	4.56
West Palm Beach-Boca Raton-Delray Beach, FL MS	407	4.95	Sacramento, CA MSA	33	2.62
Largest losses:			**Largest losses:**		
Pittsburg-Beaver Valley, PA CMSA	-240	-0.61	Pittsburgh-Beaver Valley, PA CMSA	-21	-0.90
Cleveland-Akron-Lorain, OH CMSA	-234	-0.51	Cleveland-Akron-Lorain, OH CMSA	-10	-0.36
New York-Northern New Jersey-Long Island, NY	-225	-0.08	Peoria, IL MSA	-8	-2.30
Detroit-Ann Arbor, MI CMSA	-187	-0.25	Davenport-Rock Island-Moline, IA-IL MSA	-6	-1.59
Buffalo-Niagara Falls, NY CMSA	-167	-0.82	Buffalo-Niagara Falls, NY CMSA	-6	-0.51
Dayton-Springfield, OH MSA	-41	-0.27	Beaumont-Port, LA MSA	-5	-1.31
Youngstown-Warren, OH MSA	-27	-0.32	Huntington-Ashland, WV-KY-OH MSA	-4	-1.29
Utica-Rome, NY MSA	-25	-0.48	Utica-Rome, NY MSA	-3	-0.94
Milwaukee-Racine, WI CMSA	-23	-0.09	Youngstown-Warren, OH MSA	-3	-0.58
Flint, MI MSA	-11	-0.16	Saginaw-Baw City-Midland, MI MSA	-3	-0.74
Springfield, MA MSA	-10	-0.12	Rochester, NY MSA	-2	-0.20
Johnstown, PA MSA	-9	-0.22	Erie, PA MSA	-2	-0.71
Binghamton, NY MSA	-6	-0.14	Knoxville, TN MSA	-2	-0.34
Peoria, IL MSA	-2	-0.04	Charleston, WV MSA	-2	-0.74
Saginaw-Baw City-Midland, MI MSA	3	0.05	Johnstown, PA MSA	-2	-0.72

Figure 5-8.-Per Capita Income of Coastal States (percent above national average)
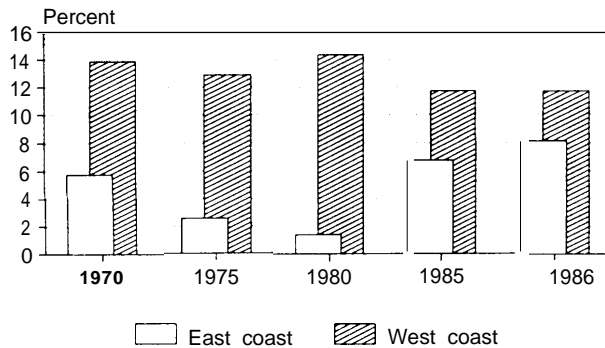
How To Read This Figure: People living in States on the U.S. east coast in-l 970 averaged nearly 6°/0 more income than the national average per capita income. By 1980 per capita income in these States was only 1.8°/0 above the national average, but by 1986 it had increased so that the east coast averaged 8% more income per capita than the national average.
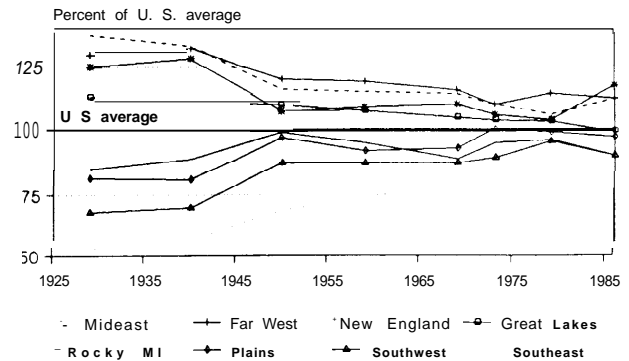
SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, "Regional Economic Information System, " tables SA1, SA2, and SA3, unpublished, August 1987

national average during the 1970s—rose sharply in the early 1980s and is now significantly above the national average (see figure 5-9). The far west has maintained a comparatively high level of per capita income through the period. Incomes in the major manufacturing centers of Ohio, Illinois, Indiana, Michigan, and Wisconsin (the Great Lakes region), which were above the national average in 1970, fell below the national average in 1985 for the first time. Incomes in Texas, Oklahoma, Arkansas, and Louisiana (the southwest), which had begun to approach the national average, fell sharply during the 1980s—largely as a result of the declining fortunes of the domestic oil industry-while those of Kentucky, Tennessee, Alabama, and Mississippi remain 20 to 25 percent below national averages. The only region to show continuous growth between 1970 and 1985 is the southeastern coast, stretching from Maryland to Florida.[98]

In citing these figures, of course, it should be noted that personal income as an indicator of economic

98 U.S. Department of Commerce, Bureau of Economic Analysis, "Regional Economic Information System," tables SA1, SA2, SA3, Washington, DC, unpublished.

Figure 5-9.-Convergence and Divergence of Regional Income (per capita personal income as percent of U.S. average)

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, "Regional Differences in Per Capita Personal Income Widen in the 1980s, " news release No. BEA 87-39, Washington, DC, Aug. 20, 1987.

vitality can be misleading when separated from other indicators. Costs of living can vary according to region, and regional aggregations mask important movements on a local level.[99] Nonetheless, the trends revealed in figures 5-8 and 5-9 are reinforced by trends in earnings (compensation paid to employees) over the past decade. Earnings in the far west remain far above the national average, while States along the Atlantic coast have enjoyed rising relative earnings. [100] Indeed, the one-third of all 50 States located along both coasts have generated roughly three-quarters of real U.S. growth in wages and partnership income during the 1980s. [101]

Explaining the Change

The changes now underway in the geography of U.S. economic activity are being driven by several forces:

● Information and transportation technologies—ranging from nationwide computer networks to inexpensive, fast air freight services-allow easier movement of the goods and information flows needed for efficient management of activ-

99 Linda LeGrande and Mark Jickling, "Earnings as a Measure of Regional Economic Performance," U.S. Congressional Research Service, Report No. 87-377E, Apr. 27, 1987, p. 2.

100 Ibid, p. 8. See also Lynn E. Browne, "Too Much of a Good Thing? Higher Wages in New England," New *England Economic Review,* January/February 1987, pp. 39-51.

101 Daniel Bell, "The World **and the United States in 2013,"** Daeda-*/us,* vol. 16, No. 3, summer 1987, p. 20.

ities in diverse areas.

- The growing contribution of transactional service industries, where many activities do not require physical proximity to clients or raw materials, permits a mobility not available in heavy manufacturing.

- Within manufacturing, growth has been largely in goods with a high value per unit weight, particularly the products of many of the newer enterprises located in the northeast.[102] Such firms can transfer production facilities more rapidly than those involved in traditional "heavy" manufacturing, which still provide a comparatively large share of the economic base in midwestern States.

- Declines in natural resource inputs throughout the economy increase the comparative importance of market access, transportation networks, economic base, labor quality and cost, tax environment, and even climate and "quality of life" in the selection of location.

- Air-conditioning and enlightened governance in the sun belt (improving schools, roads, and other infrastructure) have made the region increasingly attractive for retirement, recreation, and enterprise location. The population shifts that ensued have carried a second wave of economic activity with them.

- Geographic movement can also be strongly affected by Federal, regional, and State policies. Subsidized transportation and water helped accelerate development in many regions. State efforts to attract industry through attractive tax or regulatory programs can also play a role.

While they once concentrated on efforts to attract manufacturing enterprises, States are now competing for transactional service businesses that may be comparatively footloose, Citicorp, for example, agreed to build a back office facility in Hagerstown, Maryland in order to earn the right to enter the Washington/Baltimore market. Delaware offers attractive locations for data processing and credit card centers; Marine Midland and Morgan Guaranty have established computer centers in that State.[103]

Many States are also attempting to establish environments conducive to high-technology enterprises, attracting private firms with promises of additional public assistance; 35 such State efforts were operating in 1985, compared to 4 in 1979.[104] A recent program in Pennsylvania involving public allocation of $26.4 million over a 3-year period is credited with encouraging 500 business startups and expansions in that State.[105]

When all factors are accounted for, however, it appears that a region capable of providing well educated people has an advantage that is difficult to overcome through other incentives.

Southern and western metropolitan areas attracted many new firms, expansions, and regional transplants during the post-war era. The west continues to grow, while the southwest has suffered somewhat due to changing conditions in the oil industry. An improved interstate highway system, the maturing of the U.S. trucking industry, and innovations in air transportation provided new forms of access to regions with lower labor costs, playing a major role in attracting business to the south and west.[106]

Rapid business growth in these regions created jobs that were filled quickly—even in tight labor markets—as workers from depressed areas took advantage of faster and cheaper means of transportation in order to arrive at areas with employment opportunities. Population growth followed. This, in turn, was followed by yet more employment growth. To support the larger numbers of enterprises and workers—as well as the influx of retirees to the southern regions, who were now able to move to warm climates without breaking ties to their former places of residence—demand for service industries rose dramatically.[107] Of course, services were also a significant part of the initial movement away from the in-

102 See Daniel Bell, Op. cit., footnote 101; and Benjamin Chinitz, "The Regional Transformation of the American Economy," paper delivered to the American Economic Association, May 1986.

103 M. Moss and A. Danau, "Will the Cities Lose Their Back offices?'" Real Estate Review, vol. 17, No. 1, spring 1987.

104 Edward J. Malecki, "Hope or Hyperbole? High Tech and Economic Development," Technology Review, vol. 90, No. 7, October 1987, p. 45.

105 W. John Moore, "High-Tech Hopes," National Journal, vol. 18, No. 46, Nov. 15, 1986, pp. 2769-2773.

106 Mark Perlman, Patterns of Regional Economic Decline and Growth (Washington, DC: American Enterprise Institute, 1982). For more on this subject, see R.D. Norton and J. Rees, "The Product Cycle and the Spatial Decentralization of American Manufacturing," Regional Studies, vol. 13, 1979, pp. 141-151.

107 See Lynn E. Browne, op. cit., footnote 100; and Richard J. Rosen, "Regional Variations in Employment and Unemployment During 1970-82," Monthly Labor Review, vol. 107, No. 2, Feuary 1984, pp. 34-35.

dustrial north, due to the ability of service enterprises to transfer operations with comparative ease. [108]

The pattern of decline that characterized many northeastern cities during the 1970s has been slowed and in some cases reversed, buoyed by sharp growth in transactional service employment and "high technology" (largely medium-wage) manufacturing. The northeast, and the middle Atlantic States to a lesser extent, now enjoy economic growth rates as good or better than the U.S. average. In some cities, this has been reflected through recent population gains; as table 5-9 shows, the Philadelphia area grew by 57,000 people and the New York City area grew by 50,000 between 1985 and 1986, while the Washington, DC area continues to rank among the Nation's population growth leaders. On the other hand, job growth in much of New England has been greater than the rise in population. [109]

More than three-quarters of new jobs result not from moves, but from startups or expansions. [110] New England enjoyed rapid rates of growth of new business and comparatively low rates of business failures during the 1980s. [111] For many companies, the theoretical advantages of moving a facility to a low-wage region appears to have been offset by the advantages of a good educational system and other critical infrastructure. New England's stubborn maintenance of high-tax and extensive business regulation proved less of a barrier, given highly rated State and local educational systems and other infrastructures purchased from these taxes [112]-as well as highly respected private educational institutions enjoying indirect public support through tax exemptions.

Ironically, the comparative resurgence of northeastern States over the past decade may have been spurred in part by the recessions of the early 1980s. [113] New England, which had been in relative decline prior to that time, was affected less severely than other regions. Moreover, these recessions

brought real interest rates to historically high levels, leading to a sharp increase in the cost of housing in the south and west—regions which depended heavily on new construction and suffered from spiraling land costs. [114]

Companies making high-technology products, contacted in a 1982 survey, did not feel particularly constrained by access to raw materials, energy, or climate—none of which are at a premium in the northeast-in selecting a site (see table 5-10). Access to raw materials was consistently at the bottom of the priority list, with only 27.5 percent of the respondents saying that such access was "significant or very significant" in their choice of a site. Instead, companies tended to choose locations on the basis of skills, labor costs, tax climate, costs of living, and several categories—academic institutions, transportation, and access to markets—generally associated with metropolitan areas. [115]

High-technology firms can generally move with comparative freedom from. one region to another. Given the greater relative growth of the U.S. east and west coasts during the 1980s, this has led to a preponderance of high-technology activity around urban centers in these regions. Such a trend is reinforced by recent patterns of concentration among U.S. research and development (R&D) facilities, which tend to require higher levels of capital investment than do high-technology manufacturing enterprises. [116] Ranking the number of leading R&D centers by metropolitan area in 1987, one study has found that only one of the top eight (Chicago, ranked fifth) was not located on or near either coast. [117] The same study concludes that "the prominence of the California and East Coast core areas in R&D facilities was even more pronounced in terms of high-tech and microcomputer firms." [118]

While job-related moves have not been the only reason for these regional shifts, table 5-11 suggests that nearly half of all interregional moves are job-

[108] R. D. Norton, op. cit., footnote 3.

[109] This has led to some concern that New England's economy may soon be constricted by a shortage in the supply of labor. See "New England Warned of a Labor Shortage," *The New York Times, sec.* 1, Dec. 2, 1987; and Lynn E. Browne, op. cit., footnote 100.

[110] Development *Report Card for the States* (Washington, DC: Corporation for Economic Development, March 1987).

[111] The State of Small Business, op. cit., footnote 44, 1984, PP. 16-17, 20-21.

[112] Development *Report Card for the* States, op. cit., footnote 110.

[113] Mark Perlman, op. cit., footnote 106.

[114] Ibid., p. 302.

[115] U.S. Congress, Joint Economic Committee, "Location of High Technology Firms and Regional Economic Development, " Washington, DC, 1982.

[116] Edward J. Malecki, op. cit., footnote 104, p. 46.

[117] Michael ()' Condor, "Many Prominent R&D Centers Favored by Facility Planners Continue 25-Year Dominance," *Site Selection Handbook, vol* 32, No. 3, June 1987, pp. 564-572.

[118] Ibid.

**Table 5-10.—Factors that Influence Location
Decisions of High-Technology Companies
(percent responding that the factor was
"significant" or "very significant")**

Choices among different regions	Percent
1. Labor skills/availability	89.3
2. Labor costs.	72.2
3. Tax climate in the region	67.2
4. Academic institutions.	58.7
5. Cost of living	58.5
6. Transportation	58.4
7. Access to markets	58.1
8. Regional regulatory practices	49.0
9. Energy costs/availability.	41.4
10. Cultural amenities	36.8
11. Climate	35.8
12. Access to raw materials.	27.6

NOTE: High-technology Industries were taken from the following Standard Indus-
trial Classifications: drugs, ordinance and machine, electrical and electronic
machinery, equipment parts, miscellaneous transportation equipment, and
measuring, analyzing and controlling instrument, photographic, medical,
and optical goods, watches and clocks. Most respondents were semicon-
ductor or telecommunication firms located in Massachusetts and
California.

SOURCE: U.S. Congress, Joint Economic Committee "Location of High Tech-
nology Firms and Regional Economic Development," Washington, DC,
1982.

related; 60 percent are either directly job-related or
are associated with retirement, the armed services,
or education. [119] Within this overall structure, priori-
ties for moving differ widely according to age. Youn-
ger people tend to move to attend school or look
for work more than other age groups; middle-age
Americans move as a result of job transfer more than
their younger and older counterparts; and the vast
majority of older people relocate for retirement, cli-
mate, or family considerations. It is interesting to note
that this pattern may change somewhat as the baby-
boom generation moves through middle age. Since
two-earner families are more likely to be found
among baby-boom households, more two-earner
families will move into middle age. Two-earner fam-
ilies are less likely to relocate for employment rea-
sons than other household types,[120] suggesting that
the rate of job-related movement among middle-age
Americans may decline over the next several
decades.

The Move to the Urban Fringes

Defining the Change

A move of population and employment from cen-
tral cities to nearby suburbs has been underway for

many years. Increasing incomes have allowed
Americans to escape the congestion and high cost
of urban centers and to search for the amenities of
suburban living, while remaining close to the cul-
tural and economic opportunities associated with cit-
ies. In the northeast and west, much suburban
growth has occurred in small areas adjacent to large
metropolitan centers, while exurban growth in the
south and north central regions has occurred near
small and intermediate-sized metropolitan areas.[121]

In the 1960s, all regions exhibited more rapid met-
ropolitan growth than non-metropolitan growth (see
table 5-12), and much of the non-metropolitan move-
ment came from population increases in counties
adjacent to metropolitan areas. The differences nar-
rowed during the 1970s, although non-adjacent
counties still grew less rapidly than adjacent ones.
Nonetheless, non-adjacent counties were growing
more rapidly than urbanized counties for the first
time, in all regions except the south. Indeed, the
1970s saw non-adjacent rural areas of less than 2,500
people grow by 14.6 percent, after such areas had
decreased in population by 4.2 percent during the
1960s.

On a regional basis, these smallest-sized areas
grew more rapidly than did larger non-adjacent coun-
ties in the northeast, south, and west. Such a remark-
able change in population growth suggested further
non-metropolitan population reconcentration, rep-
resenting a break with past trends.[122]

While the population of all central cities grew by
only 0.1 percent during the 1970s, central cities in
SMSAs (standard metropolitan statistical areas) with
populations of less than half a million grew 10.6 per-
cent. Central cities in SMSAs with a population of
more than 1 million declined by 4.2 percent or
more.[123]

[119] Larry H. Long, Migration and Residential Mobility in the United
States (New York, NY: The Russell Sage Foundation, 1988).

[120] "Job Seekers Stay Put," The New York Times, p. D1, Oct. 4, 1987.

[121] Larry Long and Diana DeAre, "The Economic Base of Recent Pop-
ulation Growth in Nonmetropolitan Settings," U.S. Department of
Commerce, Bureau of the Census, Washington, DC, 1982.

[122] D. R. Vining, Jr. and A. Strauss, "A Demonstration That the Cur-
rent Reconcentration of Population in the United States is a Clean Break
With the Past," Environment and P/arming A, vol. 9, 1977, p. 751.

[123] John F. Long, "Population Reconcentration in the United States,"
U.S. Department of Commerce, Bureau of the Census, Washington, DC,
1981.

Table 5-11.—Reasons for Inter-Regional Moving, 1979-1981 (in percent, by age of household reference person)

		Age of reference person:										
	All ages	Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+
Job transfer	22.2%	14.8%	25.0%	28.4%	32.6%	30.2%	24.7%	23.7%	15.4%	9.7%	0.0%	0.0%/0
Look for work	6.3	9.7	5.9	5.6	6.7	4.4	5.0	6.2	6.6	1.5	0.0	2.9
Take new job	18.7	21.8	21.7	21.6	19.3	18.7	19.1	16.0	9.0	6.5	0.5	0.8
Armed Forces.	3.4	6.9	5.2	2.5	0.8	3.5	1.1	0.0	0.0	0.0	0.0	0.0
Retirement	2.4	0.0	0.0	0.1	1.4	2.9	3.8	2.8	10.7	23.3	14.9	6.2
Attend school	5.6	15.4	6.9	2.9	2.4	0.0	0.6	0.0	0.7	0.0	0.0	0.0
Closer to relatives	8.6	4.2	6.9	7.2	6.0	5.7	8.6	12.8	13.7	14.9	21.5	44.7
Change climate	6.0	2.9	4.7	3.2	5.3	4.6	3.6	13.2	15.0	14.1	30.2	13.4
All other.	26.8	24.4	23.8	28.5	25.5	30.0	33.5	25.3	29.0	30.0	32.8	32.0
Total (percent)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total (000's).	6,250	1,362	1,352	988	694	471	338	252	235	203	143	211

NOTE: Total percent may not add to 100 due to rounding.

SOURCE: Larry H. Long, *Migration and Residential Mobility in the United States (New* York, NY: The Russell Sage Foundation, 1988), table 7-2.

**Table 5-12.—Population Growth by Region by Metropolitan and Non-Metropolitan Counties
(1960=70 and 1970-80, in percent)**

County population change	Total	Northeast	North-central	South	West
1980-70:					
Total.	**13.4%**	**9.80/o**	**9.60/o**	**14.3%**	**24.20/o**
Metropolitan	17.1	10.0	13.1	22.2	28.4
Non-metropolitan					
Total	3.9	8.4	2.0	2.6	9.0
Adjacent to metro area	6.2	10.0	**4.4**	4.3	13.3
Nonadjacent to metro area	1.0	3.5	−0.9	0.8	5.0
1970-80:					
Total.	**11.4**	0.2	4.0	20.0	23.9
Metropolitan	10.0	− 1.8	2.6	21.5	22.1
Non-metropolitan					
Total	15.4	12.8	7.4	17.3	31.6
Adjacent to metro area	16.7	13.1	8.6	19.6	34.4
Not adjacent to metro area	13.8	11.8	6.0	14.7	28.8

NOTE: SMSA/NECMA boundaries as of January 1, 1980.

SOURCE: Larry Long and Diana DeAre, "The Economic Base of Recent Population Growth in Nonmetropolitan Settings," U.S. Bureau of the Census, 1982.

The trend toward suburbanization among U.S. metropolitan areas as a whole slowed between 1980 and 1984, while central cores actually gained population share.[124] Nonetheless, it still appears that urban fringe areas are alive and well, expanding in every region of the country-from Tyson's Corner, Virginia to the South Coast Metro Center in Orange County, California.[125]

Jobs have followed the population to the suburbs and smaller cities. Between 1967 and 1977, suburban employment growth accounted for 81.7 percent of all job growth in the 50 largest SMSAs, while central city shares of total metropolitan employment in the 50 largest SMSAs fell from 63.6 to 53.4 percent.[126] Total central city employment grew 7 percent over this period, while suburban employment grew 59.2 percent. And between 1970 and 1980, the most pronounced declines in the number of people commuting from homes in central cities were found in the 25 largest cities (see table 5-13).

In smaller SMSAs, though most suburban growth rates again exceeded those of central cities, average growth rates were less divergent. Central city employment for 50 selected small and midsized SMSAs increased by 23.7 percent between 1967 and 1977, as opposed to the 7 percent growth of the 50 largest SMSAs.[127] Moreover, between 1970 and 1980 there was a sharp increase in the number of people living in suburbs of major cities and commuting to jobs outside the city center. (Again, see table 5-13; for more on this subject, see discussion of transportation in ch. 3.)

Metropolitan areas gained much of their job growth between 1975 and 1979 as a result of increases in service employment (see table 5-14). The dependency on services was even more pronounced in the largest metropolitan areas. For those with 3 million or more in population, services accounted for 41 percent of all jobs generated between 1975 and 1979. While Citicorp moved some of its back office functions to the Dakotas, this appears to be an exception rather than a rule. Of the top nine banks contacted in a regional survey, seven had located operations for high-volume check processing and credit card operations in suburban or satellite cities but most were within 60 miles of a city center.[128]

Securities firms originally concentrated in downtown Manhattan because of the need to physically

[124]Charles L. Leven, "Post-Industrialism, Regional Change and the New Economic Geography," paper prepared for the Conference on America's New Economic Geography, Washington, DC, Apr. 29-30,1987.
[125]William K. Stevens, "Defining the 'Outer City': For Now, Call It a Hybrid," *The New York Times*, sec. 1, Oct. 12, 1987, reporting a conference of the Urban Land Institute,
[126]Robyn S. Phillips and Avis C. Vidal, "The Growth and Restructuring of Metropolitan Economies," *Journal of the American Family Planning Association*, summer 1983, p. 295.

[127]Ibid.
128 M. Moss and A. Danau, op. cit., footnote 103.

Table 5.13.—Changes in the Location of U.S. Jobs and Homes

	Workers living in the largest 25 urbanized areas		Workers living in other urban areas	
	1970	1980	1970	1980
Living in a central city and working in:				
—CBD[a]	6.6"/0	4.7"/0	5.60/o	6.50/o
—Non-CBD portion of central city	30.0	24.7	45.9	40.1
—Outside of a central city	8.9	6.8	12.9	10.7
Living in the suburbs and working in:				
–CBD	3.2	3.7	1.7	2.8
—Non-CBD portion of central city	13.1	14.3	13.4	16.4
–Outside of a central city	30.0	45.7	20.4	23.4
Total (percent)	100.0	100.0	100.0	100.0
Total (millions)	25.5	30.7	17.0	25.3

°CBD = Central Business District.

SOURCE: U. S. Department of Energy, Urban Mass Transportation Administration, Demographic Change and Recent *Worktrip Travel Trends* (UMTA-DC-09-7009), Washington, DC, February, 1985

deliver certificates. Although only one of the Nation's top 10 securities firms has back offices and headquarters in same buildings, and only 2 have data processing in their corporate headquarters complex, most of these firms are not moving out of the New York metropolitan area.[129] Rather, they are moving to New Jersey or other close sites in New York metropolitan area—Morgan Stanley moving to Brooklyn, or Paine Webber to Weehauken, New Jersey. Dean Witter was an exception, moving to Dallas.

Significant differences exist in geographic employment shifts within industries (again see table 5-14). Much of the decentralization of manufacturing, such as IBM to rural Vermont, has resulted from decentralized management (described earlier in this chapter). Branch plants are often located in suburban areas distant from a company's main plants or headquarters; one study found that most branch plants were spawned from corporate headquarters in the manufacturing belt, even in the southwest.[130] Thus, part of non-metropolitan industrial growth seems to occur with the decentralization of production processes into peripheral areas of the manufacturing belt.[131] Similarly, data-processing and client-aid services, which can be transferred from central offices in order to save on labor and real estate costs, can move easily because of advanced telecommunications networks. '[32]

129 Ibid.
[130]Rodnev A. Erickson and Thomas R. Leinbach. "Characteristics of Branch Plants Attracted to Nonmetropolitan Areas," *Nonmetropolitan Industrialization,* R.E. Lonsdale and H.L. Seyler (eds.) (Washington, DC: V.H. Winston & Sons, 1579).
[131]R.D. Norton and J. Rees, op. cit., footnote 106.
[132]M. Moss and A. Danau, op. cit., footnote 103.

Explaining the Change

At the turn of the century, elevators, telephones, indoor plumbing, and other technologies made high-rise office buildings and apartments possible, thereby opening possibilities for highly concentrated urban centers. The national highway system, built during the 1950s, literally paved the way to suburban development, just as railroads had opened the West to development two generations earlier. In each case, regulations and public action played a major role. Western development was a conscious act of public policy encouraged by subsidies to transportation systems, free land, rural electrification, and a variety of other programs. Suburban development was shaped by highway policy and zoning. Undoubtedly, the desire to escape the problems of urban centers also played a major role.

One of the features of the emerging U.S. economy is that the rules governing the shape of American cities and towns may be changing. An economy increasingly dependent on transactional services, and a manufacturing system where rapid growth can occur in relatively small facilities or facilities with relatively modest freight requirements, allows greater flexibility in locating businesses close to areas where employees can find attractive housing, schools, and recreational facilities. (Again, see ch. 3 for a discussion of changing patterns of transportation between work and living.)

Relocation along these patterns, however, may be contributing to a dilemma of major proportions (discussed further in ch. 11). Suburban movement can

Table 5.14.—Change in Employment for Metropolitan and Non-Metropoiitan Counties and Types of Non.Metropolitan Settings, 1975.79 (In percent, by major industry group)

Industry	Metro	Non-metro	Non-adjacent	Adjacent
Agriculture, forestry, and fisheries	45.7	28.1	35.9	18.5
Mining	21,8	13.5	14.0	13.1
Contract construction	34.8	44.2	48.1	40.1
Manufacturing	15.8	20.7	20.1	21.5
Transportation and public utilities	14.5	30.9	31.2	30.5
Wholesale trade	19.4	21.4	21.0	21.8
Retail trade	22.2	26.6	26.7	26.6
Finance, insurance, and real estate	20.0	29.6	31.0	28.0
Services	32.9	32.6	33.2	31.9
Total employment.	22.5	25,2	25.8	25.6

NOTES: SMSA/NEGMA boundaries as of January 1, 1980; employment data from County *Business* Patterns; non-adjacent means not adjacent to SMSA; adjacent means adjacent to SMSA.

SOURCE: Larry Long and Diana DeAre, "The Economic Base of Recent Population Growth in Nonmetropolitan Settings," U.S. Bureau of the Census, 1982.

leave behind the significant share of a region's population living in central cities, where attaining a job often requires the mobility provided by a car due to the limited nature of public transportation from cities to suburbs. Moreover, in the sense that the new employment opportunities within coastal cities are largely related to transactional services, and require higher levels of education than traditional manufacturing jobs, the comparatively low educational standing of inner-city residents—many of whom are minorities—may preclude them from these positions. [133]

Nonetheless, much suburban activity continues to be tied to the cultural and economic opportunities afforded by cities. And it appears that a significant amount of the movement away from urban centers has resulted from the increased merger activity discussed earlier in this chapter. Following the opportunities for growth in suburban and exurban areas, many firms have not only expanded the scale of their operations and the scope of their products—they have branched out physically as well. [134]

Recent patterns of suburban investment may arise from a variety of other factors: [135]

- the availability of low-cost labor;
- employers' perceptions that worker productivity and dependability are greater outside urban areas;
- lower unionization levels, and a perception that workers are less likely to unionize;
- non-economic reasons, such as the simple desire to relocate, that are often given as preferences for less urbanized areas; and
- policy decisions—rural areas enjoy a variety of subsidies relative to more densely populated regions, as highways, telephone service, electric service, police, fire, and other services in rural areas are often heavily subsidized; prices would rise sharply if low-density areas were forced to pay the real marginal costs of these services.

[133]William J. Wilson, *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy* (Chicago, IL: University of Chicago Press, 1987). See also Truman A. Hartshorn and Peter O. Muller, "Suburban Business Centers: Employment Implications," U.S. Department of Commerce, Economic Development Administration, Washington, DC, 1987.

[134]Milford B. Green, "Corporate-Merger-Defined Core-Periphery Relations for the United States," *Growth and Change, vol. 18,* summer 1987, pp. 12-35.

[135] Some of these factors are discussed in L.Steven R. Kale and Richard E. Lonsdale, "Factors Encouraging and Discouraging Plant Location in Nonmetropolitan Areas," *Nonmetroplitan Industrialization,* op. cit. 130.