

Producer services industries: why are they growing so rapidly?

Does the hefty postwar growth of some service industries mean that manufacturers are cutting overhead by farming out activities once performed in house? Analysis of data shows this to be an unlikely explanation for the growth of producer services industries

JOHN TSCHETTER

Economists continue to search for the causes of the dramatic post-World War II growth in service-producing industries.¹ Some claim that the growth simply reflects changes in the way U.S. companies are doing business, according to the following argument:² To be competitive in domestic and international markets, manufacturing companies need to reduce their overhead costs. To do this, companies are transferring service-type activities formerly performed by in-house staff to firms which specialize in those activities. Persons subscribing to this hypothesis believe that these simple transfers of activities—called “unbundling”—account for a significant proportion of the output and employment growth in the service-producing industries, but contribute little to the total economy.

This article examines producer services industries, an important subset of the service-producing industries. We want to review several possible explanations for the growth of this important group of industries, particularly the unbundling hypothesis. Producer services include advertising, computer and data processing services, personnel supply services, management and business consulting services, protective and detective services, services to dwellings and other buildings, legal services, accounting and auditing services, and engineering and architectural services.³ In 1986, producer services industries employed about 6.8 million wage and salary workers, or 6.8 percent of nonagricultural workers.

Certain common threads unite these very diverse industries. Producer services industries perform activities that are usually classified as overhead in other companies. They have grown faster than the total economy, in terms of both output and employment, for several decades. In fact, their performance has outpaced that of the service-producing industries as a group. However, based on the evidence presented in this article, the unbundling explanation accounts for a *very small portion* of the recent employment growth of producer services industries.

Overview of producer services

The industries as a group. Wage and salary employment growth in the producer services industries has been rapid relative to total nonagricultural employment and to total employment in the service-producing industries for several decades.⁴ The following tabulation contrasts average annual rates of change (in percent) for selected economic sectors and periods:

	1959-72	1972-82	1982-86	Numerical change, 1982-86 (thousands)
Nonagricultural industries	2.5	2.0	2.7	10,044
Service- producing	3.3	2.8	3.3	9,177
Producer services	6.2	6.2	8.5	1,886

John Tschetter is an economist in the Office of Economic Growth and Employment Projections, Bureau of Labor Statistics.

Self-employment is growing faster in producer services industries than in either the total nonagricultural economy or service-producing industries. In 1986, 15 percent of the self-employed persons in the nonagricultural economy were found in producer services:

	<i>Self-employed persons</i>	
	<i>1986 level (thousands)</i>	<i>Average annual change, 1982-86 (percent)</i>
Nonagricultural industries	7,881	2.0
Service-producing industries	6,116	1.5
Producer services	1,184	4.3

During the 1982-86 span, wage and salary employment in the U.S. nonagricultural economy increased by 10 million persons. The producer services industries employed 1.9 million of these additional workers. This increase represents 19 percent of the nonagricultural employment change.

As shown in the next tabulation, output of producer services industries also has grown several percentage points faster than that of the total economy.⁵ In 1986, 6 percent of the United States' gross product originating or value added occurred in producer services. (Levels are in billions of 1982 dollars; changes are average annual rates, in percent.)

	<i>1986 level</i>	<i>Change</i>	
		<i>1972-82</i>	<i>1982-86</i>
Total economy	\$3,713	2.0	4.1
Service-producing industries	2,495	2.5	4.2
Producer services	220	4.9	7.2

Finally, the number of establishments classified in the producer services industries increased more rapidly between 1982 and 1986 than the number in either the total economy or in the service-producing industries. As indicated below, about 10 percent of all reporting units covered by State unemployment insurance laws in 1986 were in producer services. (Levels are in thousands of units; changes are average annual rates, in percent.)

	<i>1986 level</i>	<i>Change, 1982-86</i>
All industries	5,426	2.7
Service-producing industries	4,288	2.8
Producer services	568	6.4

Individual industries. Although we are studying producer services industries in the aggregate, they are by no means a homogeneous group. They range in size from personnel supply services (1 million wage and salary workers in 1986) and services to buildings (681,000) to credit reporting and collection agencies (98,000) and photofinishing laboratories (80,000). (See table 1.)

There is considerable variation in the employment trends among individual producer services industries but most have expanded faster than the total economy in recent years. During the 1982-86 period, the most rapidly growing activities in this group of industries were personnel supply and computer and data processing services. The dramatic growth in personnel supply occurred in temporary help agencies. The expansion in computer and data processing services occurred in both software and data processing. The largest numerical growth during the 1982-86 period also occurred in these two industries.

Can we explain the rapid growth?

Several explanations have been offered for the rapid growth of the producer services industries. We will briefly review these explanations using input-output methodology as a framework for the analysis.⁶

GNP growth. One obvious explanation for the industries' growth is the expansion of the total economy. Over the 1972-85 period, output of producer services (in real terms) grew about 6 percent per year while the total economy grew 2.6 percent per year. (See table 2.) Thus, for those 13 years at least, GNP growth explains only about 40 percent of growth for the producer services industries. By comparison, GNP change explains about 50 percent of the communications industry's output growth, 65 percent of the medical services industry's growth, and about 90 percent of the growth for eating and drinking establishments.

Table 1. Employment trends in producer services industries, selected periods, 1972-86
(Numbers in thousands)

Industry	1986 level	Annual percent change		Numerical change, 1982-86
		1972-82	1982-86	
Producer services ¹	6,791	6.2	8.5	1,886
Business services	4,781	6.3	9.8	1,495
Advertising	202	2.8	5.8	41
Credit reporting and collection	98	-0.2	6.9	23
Mailing, reproduction, stenographic	195	5.1	9.6	60
Services to buildings	681	4.5	6.8	158
Personnel supply services	1,017	9.6	16.3	461
Computer and data processing services	591	13.1	12.8	227
Research and development laboratories	191	(2)	3.0	21
Management and public relations	550	(2)	10.7	184
Detective and protective services	445	(2)	6.3	96
Equipment rental and leasing	208	(2)	12.1	76
Photofinishing laboratories	80	(2)	1.8	5
Legal services	748	7.6	7.2	182
Miscellaneous professional services	1,262	5.2	4.6	209
Engineering and architectural	678	5.4	4.3	106
Accounting, auditing, and bookkeeping	433	5.6	5.3	81

¹ Includes industries not listed separately below.

² Data not available.

NOTE: Data are from the Current Employment Statistics survey.

Table 2. Sources of industry output growth, selected service-producing industries, 1972–85

[Average annual change, in percent]

Industry	Actual change	Output change explained by— ¹		
		GNP growth	Composition of—	
			Final demand	Business practices
Service-producing	2.9	2.6	0.1	0.2
Producer services	6.0	2.6	0.1	3.3
Communications	5.5	2.6	1.1	1.8
Eating and drinking places	2.9	2.6	.0	.3
Medical services	4.0	2.6	1.4	.0

¹ The model for these calculations is described in the appendix.

Final demand composition. Why have some industries, particularly producer services, grown faster than GNP? One possibility is that shifts in the composition of final demand within GNP have occurred over time. Does an economy that consumes more personal and medical services and relatively less cars and food generate more employment among lawyers, guards, and computer programmers, and less employment among farmers and assembly line workers?

Over the 1972–85 period, the composition of final demand changed modestly. In 1972, consumer expenditures for durable goods accounted for about 8 percent of total GNP, compared with 10 percent in 1985. (GNP is measured in real 1982 dollars.) Expenditures for nondurable goods accounted for about 26 percent of GNP in 1972, and for 24 percent in 1985. Consumer outlays for services accounted for 29 percent of GNP in 1972, and for 32 percent in 1985. Expenditures for investment and foreign trade as a proportion of GNP increased over the 1972–85 period while those for total government declined (although the share devoted to defense increased).

To isolate the impact of the changing composition of final demand on producer services output growth, we need to estimate what the industries' output growth would have been if the composition of final demand had changed while both the GNP level and business practices *had not*. Here, business practices—the manner in which goods and services are assembled and delivered to final demand—are measured with input-output coefficients. (The model used for this analysis is described in the appendix.) The difference between the estimated output growth and actual growth is the effect of changing final demand composition on the output of producer services industries.

In the analysis, final demand includes 82 consumption groups, producers' durable equipment, residential and non-residential structures, inventory change, exports, imports, Federal Government defense and nondefense expenditures, and State and local government expenditures. The changing final demand composition includes the shifts between personal consumption expenditure categories, such as medical services and food, as well as the shifts among investment,

total personal consumption, and other aggregate categories. The period covered is 1972 to 1985. (Data availability limits the analysis throughout this article to selected periods. For the following discussion, the input-output data are available only for selected years.)

According to this calculation, changes in final demand composition alone boosted the demand for producer services by only 0.1 percent per year over the 1972–85 period. (See table 2.) Thus, the changing composition of final demand had only a very slight impact on the very rapid growth of the producer services industries, explaining less than 2 percent of the increase. (Recall that GNP growth explained about 40 percent of the growth.) The size of this effect varies little with the choice of years studied.

The changes in final demand composition did affect some service-producing industries during the 1972–85 period, causing medical services and communications industries in particular to grow faster than GNP. However, these changes had little impact on the broad service-producing sector.

For two reasons, the small effect of changing final demand composition on producer services (0.1 percent per year) might have been anticipated. First, these industries usually sell their outputs to many other industries, and the distribution of their sales for the most part parallels the size of the purchasing industries. Two exceptions are purchases of engineering and architectural services by the construction industry and purchases of legal services by consumers. Second, the purchased producer services usually account for only 3 to 7 percent of the total costs of production in other industries.

The effect of changing final demand composition on medical services and communications also might have been anticipated. These industries sell much of their output to consumers, and consumer expenditures for medical services and for communications grew faster than GNP over the 1972–85 period. The effect on eating and drinking industries is modest because consumer expenditures for food purchased off-premises grew at about the same rate as GNP over the study period.

Business practices. Changes over time in business practices is another potential explanation for the above average growth of the producer services industries. Business practices concern the inputs that companies require to assemble and deliver their products. For example, companies require material inputs such as plastics, steel, aluminum, glass, and packaging materials. They also require other inputs, such as transportation services, financial services, communications, maintenance, and repair. These other inputs also include producer services-type activities.

An illustration is useful here. A consumer buying a new car sees only the car in a dealer's showroom, but has actually purchased an array of goods and services. The consumer purchases the tires, glass, paint, and other materials required to produce a car; the energy needed to assemble

the car; the shipment of the car from the manufacturing plant to the dealer's showroom; the inventory expense dealers incur to keep cars in the showroom to attract customers; and the overhead expenses, such as accounting, legal, or advertising services, incurred at each step of the assembly and delivery.

Business practices—or the composition of material and nonmaterial inputs—change over time for several reasons. For example, new technologies and innovations, such as computer hardware and software, fiber optics, composite materials, and plastics are introduced. Relative prices of inputs may change, as did energy prices during the 1970's and 1980's. There may be shifts in political, social, or demographic phenomena, such as deregulation or altered industrial relations practices. And finally, another potential reason is unbundling. The changes in material inputs are easier to visualize than those in the other inputs, but both types of change can have dramatic implications even in the short term.

What would producer services' output growth have been if business practices had changed but both the level of GNP and the composition of final demand had remained constant? The answer may be estimated by examining the changes in input-output coefficients for 156 industries.

Changes in business practices added about 3.3 percentage points per year, or about 55 percent, to output growth of the producer services industries over the 1972–85 period. (See table 2.) Such changes added very little to the output growth of some other industries, explaining only 0.0 to 0.3 percentage points for service-producing industries as a group and for the medical services and the eating and drinking establishments industries. However, the changes did add 1.8 percentage points per year to the output growth of the communications industry.

The exact proportion of the producer services industries' output growth explained by the changes in business practices could be sensitive to developments peculiar to the period analyzed. However, the estimate would always be meaningful because these industries usually sell their outputs to many different industries.

Unbundling

Hypothesis. Which changes in business practices have caused the output and employment of the producer services industries to grow at above average rates? Some argue that the employment growth of producer services industries reflects simply the shifting of existing legal, accounting and auditing, janitorial, or clerical activities from one industry classification to another. The usual anecdotal reference for this shift, or unbundling, is a manufacturing company which previously provided its own producer services activities, but which now purchases these activities.

All else held equal, unbundling implies several things. First, the absolute numbers of employees involved in producer services-type activities within manufacturing indus-

tries would decline over time as the functions performed by these employees are transferred to the producer services industries. Second, the volume of producer services activity throughout the total economy would not increase; only the location of the activity would change. Finally, unbundling would be a significant source of increasing demand for the producer services industries.

In discussions of unbundling, there often is confusion between unbundling and increased contracting out. Unbundling implies increased contracting out, but increased contracting need not imply unbundling. Strictly speaking, unbundling implies that the location of producer services activities has changed for the total economy, but not the volume. Increased contracting out implies that manufacturing industries are purchasing more from the producer services industries, but the increased purchases could result from unbundling, from new needs for producer services-type activities, or from both.

Why would companies be switching from in-house staff to outside suppliers? If the unbundling hypothesis holds, perhaps it is because many businesses find it cheaper to purchase producer services from another establishment than to perform the activities with in-house staff and capital.⁷ The supplying establishments offer specialization and economies of scale in providing overhead inputs. Manufacturing companies have long made similar cost decisions for the materials, energy, and other inputs used in the production process.

Unbundling also concerns how companies cope with fluctuating work force requirements.⁸ They can staff their operations with enough permanent employees for their peak production loads. Or they can staff their operations with just enough permanent employees for their average production loads and hire temporary workers (or contract for other producer services) for peak production periods. In recent years, companies have adopted "just-in-time" inventory practices in their manufacturing processes. If the unbundling hypothesis is correct, perhaps they have also adopted "just-in-time" personnel practices to meet overhead requirements.

To trace the progress of the practice of unbundling, we review employment trends by industry and occupation for the 1977–86 period. A more in-depth review would focus specifically on the purchases of producer services by manufacturing industries. However, such data are not collected in the U.S. Department of Commerce Census of Manufactures or other surveys. Because of this, it is extremely difficult to isolate the unbundling phenomenon itself or to control for other factors which affect employment trends. We can isolate only several broad factors affecting employment.

The employment estimates used here are from BLS' Occupational Employment Survey (OES).⁹ This survey is designed to collect data on employment of wage and salary workers by occupation and industry in nonagricultural establishments. Each industry is surveyed every 3 years. We

use the surveys of manufacturing conducted in the spring of 1977, 1980, 1983, and 1986.

Two limitations of the OES data should be noted before we proceed with the analysis. First, a major new occupational classification system was introduced in the 1983 survey. Because of this, the 1977–80 employment estimates are *not comparable* to the 1983–86 estimates. For example, the 1977 and 1980 estimates counted first-line supervisor as a managerial occupation; the 1983 and 1986 estimates counted the first-line supervisor as a production occupation. This shift creates the incorrect impression that employment among managers declined between 1980 and 1983. Second, the OES is conducted during April, May, and June. Thus, the employment estimates are not annual averages, but estimates for selected months.

Broad occupational trends, 1977–86. We first simply track the numbers of wage and salary workers in broad occupational groups in manufacturing for the 1977–86 period. These employment trends are the net effect of changes in GNP, final demand composition, business practices, and staffing patterns. (Staffing patterns are the percentages of an industry’s employment accounted for by particular occupations.) The trends do not provide specific information on unbundling. However, the observations are useful because they are the longest available trends.

Among the broad occupational groups, the number of managers employed in manufacturing increased between 1977 and 1980, and again between 1983 and 1986. (See table 3.) (Managerial occupations include financial, purchasing, personnel, marketing, and administrative managers.) The number of managers increased by 201,000 between 1977 and 1980 and by 131,000 between 1983 and 1986. As noted above, the 1980–83 decline is largely the

result of new occupational definitions. Further, the share of all manufacturing jobs held by managers increased from 5.7 percent of all wage and salary workers in 1977 to 6.6 percent in 1980, and from 5.8 percent in 1983 to 6.4 percent in 1986. These increasing employment levels and shares suggest that the unbundling of managerial-type producer services by manufacturing industries has not occurred.

Similar changes occurred among the professional, paraprofessional, and technical occupations within manufacturing. (Included here are accountants, engineers, scientists, computer scientists and programmers, and engineering and science technicians.) The number of professional and technical workers increased by about 336,000 between 1977 and 1980, and by 239,000 between 1983 and 1986. As a result, the share of manufacturing employment accounted for by professional, paraprofessional, and technical occupations increased from 8.4 percent in 1977 to 9.9 percent in 1980, and from 11.0 percent in 1983 to 11.8 percent in 1986. As for managers, these increasing levels and shares suggest that an unbundling of activities related to professional and technical occupations in manufacturing industries has not occurred.

A different picture emerges for clerical and administrative support occupations. (Clerical workers include secretaries, computer operators, bookkeepers, and dispatching and inventory clerks.) The number of clerical workers employed in manufacturing increased between 1977 and 1980 (162,000 wage and salary workers), and again between 1983 and 1986 (49,000 persons). (The 1980 and 1983 estimates shown in table 3 are not comparable because of changes in the coding structure.)

However, the importance of clerical occupations to manufacturing peaked in the early 1980’s. Wage and salary workers in such occupations accounted for 11 percent of total manufacturing employment in 1977 and 11.5 percent in 1980. Between 1983 and 1986, however, the share of clerical occupations within manufacturing declined from 11.7 percent of the total to 11.6 percent. The increasing employment level but declining share for the 1983–86 period suggests a structural change affecting clerical workers which warrants further exploration.

Further study of developments among service occupations in manufacturing also is suggested by the results of this analysis. (Such occupations include guards and janitors.) The number of service workers employed in manufacturing decreased over the 1977–80 period (–17,000 persons). From 1983 to 1986, the number of service workers again declined (–23,000 persons). The importance of service occupations to manufacturing industries has declined since 1977; these occupations accounted for 2 percent of manufacturing employment in 1977 and 1.8 percent in 1980. The share declined again, from 1.8 percent in 1983 to 1.6 percent in 1986.

For completeness, employment estimates for sales and production occupations also are shown in table 4. However,

Table 3. Employment trends for selected broad occupational groups within manufacturing, selected years, 1977–86

Occupation	Numbers (in thousands)		Percent distribution		Numbers (in thousands)		Percent distribution	
	1977 ¹	1980 ¹	1977 ¹	1980 ¹	1983	1986	1983	1986
Total employment	19,722	20,228	100.0	100.0	18,369	19,042	100.0	100.0
Managers and administrative workers	1,127	1,328	5.7	6.6	1,062	1,193	5.8	6.4
Professional, paraprofessional, and technical workers ..	1,662	1,998	8.4	9.9	2,013	2,252	11.0	11.8
Clerical and administrative support workers ...	2,160	2,322	11.1	11.5	2,151	2,200	11.7	11.6
Service occupations ...	390	373	2.0	1.8	326	302	1.8	1.6
Sales workers	419	439	2.1	2.2	541	611	2.9	3.2
Production and related workers ²	13,964	13,767	70.8	68.1	12,277	12,484	66.8	65.6

¹Because of revisions in occupational definitions introduced with the 1983 data, the 1977 and 1980 estimates are *not comparable* to the 1983 and 1986 estimates. For 1977 and 1980 estimates, professional and technical occupations were combined.

²For the 1983 and 1986 estimates, production and agricultural workers were combined.

NOTE: Data are from the Occupational Employment Survey. The 1986 data are unpublished, and are subject to revision.

they are not discussed here, for they are seldom the focus of the unbundling argument.

Further exploration of 1983–86 period. To determine the extent of possible unbundling of clerical and service occupations by manufacturing industries, we need to isolate the sources of the occupational employment changes. If we can estimate the effects of changes in final demand composition, business practices, and labor productivity on the employment trends of clerical occupations within manufacturing, then we can finally focus on the unbundling phenomenon. For example, if we can explain the declining share of manufacturing employment accounted for by clerical occupations for the 1983–86 period by the changing composition of final demand, then we can argue that unbundling is not occurring.

This analysis is limited to the 1983–1986 period because of the changes in occupational definitions introduced in the 1983 OES. However, this is not a major problem, for manufacturing employment trends since the 1981–82 recession are the chief concern of the analysis at this point. Manufacturing employment did not recover as quickly from the last recession as from earlier recessions. Unbundling is one of several explanations given for the slow recovery.

One explanation for the continued employment growth of clerical occupations over the 1983–86 period is the total employment growth of manufacturing industries. According to the data from the OES, wage and salary employment in manufacturing employment increased by 673,000 over the 3 years. (Recall that the OES is measuring from the spring of 1983 to the spring of 1986. Thus, any estimates are affected by the fact that the two surveys were conducted at different points in the business cycle.) Other things equal, this growth would have boosted employment of wage and salary workers in clerical occupations by 79,000 persons. This estimate is derived simply by multiplying the increase in total manufacturing employment by the 1983 proportion of manufacturing employment accounted for by clerical occupations (11.7 percent). (See table 4.) However, because the actual change in clerical occupations in manufacturing was only 49,000 between 1983 and 1986, we must conclude that something caused the employment of clerical workers to lag total manufacturing employment.

This analysis was repeated for other occupations. If total manufacturing employment growth were the only change between 1983 and 1986, the number of persons in managerial occupations in manufacturing would have increased by 39,000 compared with actual growth of 131,000. Similarly, the number of persons in professional, paraprofessional, and technical occupations would have grown by 74,000 rather than the increase of 239,000 actually noted. Thus, manufacturing job growth explains only part of the growing numbers of managers and professional and related workers in manufacturing.

Finally, the number of persons in service occupations would have increased by 12,000 if the only change over the

1983–86 span had been the level of manufacturing employment. The actual change was a decrease of 23,000 persons. Thus, something is causing employment of service workers to lag.

Industrial composition, 1983–86. Another potential source of employment growth among clerical occupations is a changing mix of manufacturing industries. Industry mix is defined as the numbers of persons employed in particular industries as percentages of total manufacturing employment. For example, the motor vehicles industry accounted for 4.1 percent of manufacturing workers in 1983, and for 4.6 percent in 1986. The construction machinery industry accounted for 1.4 percent of all manufacturing workers in 1983, and for 1.2 percent in 1986.

The effect of changing industry mix may be gauged by determining what the change in clerical employment between 1983 and 1986 would have been if industry employment shares had changed, but both the level of manufacturing employment and the proportion of clerical workers within the individual manufacturing industries had not. The difference between this employment estimate and the actual number of clerical workers in total manufacturing in 1983 measures the impact of the changing mix of manufacturing industries. This portion of the analysis is based on employment trends for 143 manufacturing industries. The industries are defined at the 3-digit level of the Standard Industrial Classification (SIC).

Changes in industry mix are the result of other developments, including relative productivity trends among the detailed industries, changes in the composition of final demand, and changes in the business practices. Both the level of total manufacturing employment and staffing patterns by detailed industry are held constant in this analytical step.

The changing mix of manufacturing industries was found to have caused the number of clerical workers in total manufacturing to increase 17,000 between 1983 and 1986. By

Table 4. Sources of occupational change in manufacturing employment, 1983–86
[Numbers in thousands]

Occupation	Actual change	Employment change explained by—			
		Total manufacturing employment growth	Composition of—		
			Industry mix	Staffing patterns	Other ¹
Managers and administrative workers	131	39	9	81	2
Professional, paraprofessional, and technical workers	239	74	36	118	11
Clerical and administrative support workers	49	79	17	-44	-2
Service occupations	-23	12	-1	-33	-1
Sales workers	70	20	5	43	2
Production and related workers	207	450	-66	-166	-12

¹ Residual effects.

comparison, the industry mix effect explains 9,000 of the actual 31,000 increase in the number of managers, and 36,000 of the 39,000 increase in professional, paraprofessional, and technical workers. Finally, industry mix alone would have caused employment among service workers to decline by 1,000.

Industry staffing patterns. A final possible explanation for the employment growth of clerical workers in manufacturing during the 1983–86 period is changing staffing patterns among the detailed manufacturing industries. For this purpose, then, the staffing pattern is the proportion of employment accounted for by clerical occupations within a particular industry. Following the procedure outlined above for the testing of other possible explanatory variables, we attempt to determine what the change in occupational employment would have been if staffing patterns had changed between 1983 and 1986, but both total manufacturing employment and the composition of industries had not. Holding these last two elements constant implicitly holds final demand composition and industry productivity constant over the 3-year study period. (Changes in staffing patterns are the result of other developments including changes in technology and in business practices, both of which also affect industry mix.) The difference between the resulting employment estimates and actual 1983 employment isolates the effect of changing staffing patterns.

If staffing patterns among the detailed manufacturing industries were the only change for the 1983–86 period, then employment of clerical workers for total manufacturing would have declined by 44,000. (See table 4.) This means that most manufacturing industries employed proportionately fewer clerical workers in 1986 than in 1983. However, the growth of total manufacturing employment more than offset the changes in staffing patterns for the clerical occupations among the detailed industries, resulting in the actual net increase of 49,000 noted earlier.

By comparison, employment in managerial and professional, paraprofessional, and technical occupations would have grown by 81,000 and 118,000, respectively, if staffing patterns had been the only change during the 1983–86 period. These estimates imply that the individual manufacturing industries employed proportionately more persons in these occupations over the 3 study years. Finally, employment of service workers would have declined 33,000 because of the changes in staffing patterns alone over the 1983–86 period—that is, individual industries employed proportionately fewer persons in this occupational group.

Three factors combined. We can now combine the three employment estimates to understand the changes occurring in clerical employment within manufacturing over the years 1983–86. The number of clerical workers would have increased by 79,000 based on total manufacturing employment growth alone. It would have increased 17,000 based

on changing industry mix alone. And it would have declined by 44,000 based on changes in industry staffing patterns alone. As noted, the actual change was an increase of 49,000. The decline isolated by changing staffing patterns alone was the only estimate that even suggests possible unbundling. (Earlier, we defined unbundling as an absolute employment decline.)

Similar conclusions hold for service workers employed in manufacturing. Unbundling could be occurring: The number of service workers did decline by 23,000 between 1983 and 1986. The changes in staffing patterns among the detailed industries alone would have caused a 33,000 decline. (The effect of changing staffing patterns was offset by the total employment change in manufacturing.) The effect of changing industry mix was slightly negative, –1,000.

The estimates for professional, paraprofessional, and technical occupations yield a different picture. The three effects were all positive. The change in the level of manufacturing employment alone explained 44,000 of the actual 239,000 increase in the number of professional workers. The change in industry mix alone explained 36,000. And, the change in staffing patterns alone explained 118,000. We conclude from these three positive effects that unbundling of professional-type activities did not occur.

Impact on producer services industries. What does the 44,000 decline in employment among clerical occupations explained by changing staffing patterns mean? One possibility is that individual manufacturing industries are employing proportionately fewer clerical workers because of unbundling. Unfortunately, available data do not permit us to isolate the causes of changing staffing patterns. This estimate represents the net effects of many factors, such as technology and the business cycle, as well as possible unbundling.

If unbundling were the sole explanation for the changes in staffing patterns, then the 44,000 estimate would be equivalent to about 2.8 percent of the employment growth of producer services industries. The number of workers in those industries increased by 1,544,000 between 1983 and 1986. (The 44,000 estimate could, of course, explain a larger proportion of the employment of clerical workers in producer services.) For the 44,000 estimate to reflect unbundling would require all the producer services activities related to these jobs to be simply transferred from manufacturing industries to producer services industries.

However, we do not know whether a direct transfer of clerical activities from manufacturing to producer services has even occurred. We do know that unbundling did not alter the staffing patterns in the producer services industries. According to the Current Population Survey, the proportion of producer services employment accounted for by clerical workers changed very little between 1983 and 1986. This fact strongly suggests that all activities within producer services grew, and not just those of a clerical nature.

The analysis presented earlier indicated that the employment of service workers within manufacturing declined 33,000 because of changes in staffing patterns alone. This estimate would be equivalent to about 2.1 percent of the actual employment growth of the producer services industries.

According to the above calculations, unbundling is not even a possible explanation for the trends of managerial and professional, paraprofessional, and technical employment within the producer service industries, because changes in staffing patterns alone caused employment in these occupations to increase within manufacturing industries.

Conclusions for unbundling. We conclude from the evidence presented above that unbundling has been a very small factor in the employment growth of producer services. Occupational employment trends within manufacturing show that unbundling is not occurring for managerial, professional, and technical occupations within manufacturing, for employment in these occupations is increasing. Unbundling is potentially a factor in employment trends for the clerical and service occupations within manufacturing if the changes in staffing patterns demonstrated earlier were related to unbundling. However, those employment shifts for the broad clerical and service occupations that were due to changing staffing patterns could account for only a small proportion of the total employment growth of producer services.

A question not addressed here is whether unbundling could be occurring within individual firms.¹⁰ The analysis was conducted only for total manufacturing, and the trends observed were the net effects of decisions by all the individual firms at the industry or sector level. Thus, considerable unbundling at some firms could have been offset by the employment growth in the same occupation at other firms.

Other reasons to purchase producer services

Why have businesses demanded more producer services inputs over time to make their products? We established that changes in business practices explain a large proportion of output growth of producer services. However, we have demonstrated that unbundling is not important among those changes. Thus, the increased contracting out must be for new services. The remainder of this article lists possible explanations for the increased contracting out but does not attempt to review their merits.¹¹

Information. The employment growth of producer services may be a response to increasing demands for information as the cost of purchasing information declines.¹² The computer and data processing services industry has spread the costs of the computer-related technologies over many users. Similarly, management and business consulting services, engineering and architectural services, and other producer services have spread the costs of acquiring technical knowledge in demography, economics, marketing, engineering, and other fields among many customers.

Higher level corporate services. The increasing number of large companies and conglomerates may have created a demand for producer services.¹³ According to this argument, today's corporation is probably involved in many more fields or industries—manufacturing, retail trade, transportation, personal services, and so on—than its 1960's counterpart. Thus, managers now must increasingly rely on experts in sophisticated producer services, such as business management and consulting, to ensure efficient operations.

Government regulations and laws. Some argue there are more lawyers, accountants, and other technical experts today than in the 1950's and 1960's simply because of the number of laws passed in recent years by Congress, State legislatures, and city councils.¹⁴ Because many of these regulations and laws deal with banking, construction, environment, labor relations and safety, transportation, and other fields that touch on business interests, it seems logical that the modern firm would periodically seek expert advice and assistance by purchasing producer services.

International trade. The growth of producer services industries may be explained by the expansion of foreign trade, especially to the extent that producer services themselves are being exported.¹⁵

Unbalanced growth. So far, we have focused on the demand side of the demand/supply scissors to offer explanations for the rapid employment trends for producer services. However, the explanation may lie on the supply side of the scissors.

One supply argument is that service-producing workers and industries resist innovations over time.¹⁶ According to this explanation, the economy is divided into two types of industries—stagnant industries that resist innovations, and progressive industries that readily incorporate change. Over time, the stagnant industries would absorb more and more of the economy's inputs. According to this argument, lawyers, janitors, and computer programmers are performing their tasks about as efficiently today as they did 10 or 20 years ago.

Data issues. Data problems and issues also affect any analysis of employment and production trends. It is difficult to measure outputs and prices. Collecting these data requires defining what is being produced or serviced and determining how to measure the activity. These problems are readily apparent in the case of services, such as legal services, automobile repair, or bank services, where there is little in common from one transaction to the next in terms of either quality or quantity.¹⁷ And such problems are particularly acute in producer services. In contrast, transactions for goods, such as automobiles or wheat, are more likely to be well-defined and to occur in large volumes.

Another data issue is the relative durability and portability of goods and services. As a rule, goods are thought to be more durable, more portable than services. But, computer software programs are both durable and portable. Some producer services such as temporary help or janitorial services are neither durable nor portable. Other services such as legal, engineering, and management consulting services are portable via telecommunications and air travel. And the technical expertise of a lawyer or engineer is as durable as the output of many manufacturing industries.

Summary

In this article, we reviewed several explanations for the rapid relative growth of the producer services industries

over the postwar period. The most telling of these involved changes in how our economy produces goods and services. Based on the evidence presented here, unbundling accounted for at best only a small portion of producer services industries' above average growth.

Nevertheless, unbundling certainly could be occurring in individual firms. The unbundling for individual firms could be overwhelmed by the growth of in-house employment for these activities in other firms. And in the individual unbundling situations, there may be displacement—as opposed to the transfer—of individual workers. Thus, the possibility that such unbundling is adversely affecting individuals must always be recognized. □

FOOTNOTES

¹ Recent BLS studies analyzing broad employment shifts include Michael Urquhart, "The employment shift to services: where did it come from," *Monthly Labor Review*, April 1984, pp. 15–22; and Ronald E. Kutscher and Valerie Personick, "Deindustrialization: the shift to services," *Monthly Labor Review*, June 1986, pp. 3–13. Recent studies on individual industries include Max Carey and Kim Hazelbaker, "Employment growth in the temporary help industry," *Monthly Labor Review*, April 1986, pp. 37–44; and Wayne Howe, "The business services industry sets pace in employment growth," *Monthly Labor Review*, April 1986, pp. 29–36.

Other recent articles include Bobbie H. McCrackin, "Why are business and professional services growing so rapidly?" *Economic Review* (Federal Reserve Bank of Atlanta), August 1985, pp. 15–28; Lynn E. Browne, "High technology and business services," *New England Economic Review*, July/August 1983, pp. 5–17; and Lynn E. Browne, "Taking in each other's laundry—the service economy," *New England Economic Review*, July/August 1986, pp. 20–31.

² See Garth Mangum, Donald Mayall, and Kristin Nelson, "The temporary help market," *Industrial and Labor Relations Review*, vol. 38, no. 4, pp. 599–611; Ronald C. Henson, "Coping with fluctuating work-force requirements," *Employment Relations Today*, Summer 1985, pp. 149–56; and Michael J. Piore, "Perspectives on Labor Market Flexibility," *Industrial Relations*, vol. 25, no. 2, pp. 146–66.

No economist is directly identified with the unbundling explanation, although many allude to the economic, accounting, and organizational theories that underlie the thesis.

³ In this article, producer services includes business services (SIC 73), legal services (SIC 81), and miscellaneous professional services (SIC 89). This group of industries—along with other groups—have been singled out in studies such as Harry I. Greenfield, *Manpower and the Growth of Producer Services* (New York, Columbia University Press, 1966); and Thomas M. Stanbeck, Jr., *Understanding the Service Economy* (Baltimore, Johns Hopkins University Press, 1979).

⁴ This article uses numerous data sources. When describing employment trends in the nonagricultural industries and producer services, we use the Current Employment Statistics (CES) survey. When describing the occupational employment for manufacturing industries, we use the Occupational Employment Survey (OES).

An alternative industry data source is the Current Population Survey (CPS) which is compiled from the household interviews. There are important differences among the surveys. In particular, the CPS counts the number of persons who are employed; the CES and OES count jobs. Because of this difference, a person holding two or more jobs would be counted two times in the CES and OES, but only once in the CPS. Another difference is that the CPS includes estimates of self-employed workers, unpaid family workers, and wage and salary workers; the CES and OES cover only wage and salary workers.

⁵ The source of these estimates is the National Income and Product Accounts, developed by the Bureau of Economic Analysis, U.S. Department of Commerce.

⁶ When viewed in a descriptive sense, as a system of data classification and accounting, input-output is generally acceptable to all economists. However, here we use input-output as a theory of production with the assumption that the coefficients comprise a set of technological parameters in a linear homogeneous production function with fixed proportions among the various inputs. For another example of the analysis used in this article, see *Bureau of Labor Statistics employment projections: detailed analysis of selected occupations and industries*, Report No. GAO/OCE-85-1 (Washington, U.S. General Accounting Office, April 1985).

The input-output tables used in this article are developed by the Bureau of Labor Statistics and are based on tables prepared by the U.S. Department of Commerce, Bureau of Economic Analysis. See "The Input-Output Structure of the U.S. Economy, 1977," *Survey of Current Business*, May 1984, pp. 42–79, for a description of input-output tables.

In the Department of Commerce's input-output tables, industrial purchases of producer services are usually based on occupational employment patterns. Total receipts of a particular service are usually distributed to the purchasing industry based on the number of persons in a particular occupation in the purchasing industry. See U.S. Department of Commerce "Definitions and conventions of the 1972 input-output study" (Washington, Bureau of Economic Analysis).

⁷ See footnote 2.

⁸ See Mangum, Mayall, and Nelson, "The temporary help market"; and Henson, "Coping." Also see Michael J. Piore, "Perspectives."

⁹ The Occupational Employment Statistics (OES) survey is designed to collect data on occupational employment of wage and salary workers by industry in nonagricultural establishments. The Bureau of Labor Statistics provides the procedures and technical assistance for the survey, and State employment security agencies collect the data. Employment is based upon survey results adjusted to reflect total industry employment. (See *Occupational Employment in Manufacturing Industries*, Bulletin 2248 (Bureau of Labor Statistics, 1985)).

The analysis presented in this section was repeated with data from the Current Population Survey. The results from the CPS analysis were virtually identical—that is, some unbundling might be occurring, but it would explain very little of the employment growth in the producer services industries. The CPS provides information on staffing patterns that is similar to that from the OES. But the OES, unlike the CPS, is designed specifically to collect data on occupational employment and is based on a substantially larger sample.

¹⁰ Another question that will not be addressed in this article is the implications of increasing employment in manufacturing of persons in occupations closely identified with producer services. It would be interesting in these instances to determine whether the proportion of total producer services activities demanded by manufacturing industries was being shifted significantly from in-house staff to producer services industries. The answer to this question for the 1972–77 period is that the proportion did not change for most activities. This conclusion is based on information from the Bureau of Economic Analysis' 1972 and 1977 input-output tables,

combined with employment trends for selected occupations in both manufacturing and producer services industries. This analysis cannot be extended through 1982 or later until independently estimated input-output tables are available for these recent years.

¹¹ For more information on the extent of contracting out by businesses, see *Business Contracting-Out Services*, Summary Report 87-8 (Bureau of Labor Statistics, 1987).

¹² Browne, "High technology."

¹³ Stanbeck, *Understanding the Service Economy*, pp. 18-21. Also see Donald J. Cocheba, Robert W. Gilmer, and Richard S. Mack, "Causes and consequences of slow growth in the Tennessee Valley's service sector," *Growth and Change*, January 1986, pp. 51-65.

¹⁴ There is no specific proponent of this explanation, but it is reviewed in many studies of producer services. See McCrackin, "Why are business and professional services growing so rapidly?" p. 23.

¹⁵ Office of Technology Assessment, *Trade in Services: Exports and Foreign Revenues-Special Report*, OTA-ITE-316 (Washington, U.S. Congress, September 1986).

¹⁶ See William J. Baumol, "Macroeconomics of unbalanced growth," *American Economic Review*, June 1967, pp. 415-26; William J. Baumol, Sue Anne Batey Blackman, and Edward N. Wolff, "Unbalanced growth revisited; asymptotic stagnancy and new evidence," *American Economic Review*, September 1985, pp. 806-17; Lester C. Thurow, "Pruning our white-collar ranks: a key to productivity," *Technology Review*, November/December 1985, pp. 14-15; and Center for Democratic Policy, *Strengthening the economy* (Washington).

See Martin Neil Bailey, "What has happened to productivity growth?" *Science*, October 1986, pp. 443-52, for a summary of this explanation.

¹⁷ See chapter 7 of *BLS Handbook of Methods*, Bulletin 2134-1 (Bureau of Labor Statistics, 1982) for a discussion the Producer Price Index and issues concerning price indexes.

APPENDIX: Description of the model

In this article, three factors or determinants of output and employment trends are considered. In the input-output section, the analysis focuses on output trends. In the unbundling section, the emphasis is on occupational employment trends. This appendix describes the model on which the analysis is based. However, to keep the mathematics simple, a model for only two factors is shown. A three-factor model would be more complicated but similar.

Based on two factors, the analysis can be represented as follows:

In year T 1, the dependent variable is expressed:

$$D_T = A_T * B_T \tag{1}$$

where: D = dependent variable;
 A = first factor or explanatory variable;
 B = second factor or explanatory variable; and
 T = time.

The change in output between two periods is:

$$D_T - D_0 = (A_T * B_T) - (A_0 * B_0) \tag{2}$$

Adding and subtracting several expressions on the right-hand side of equation (2) yields:

$$\begin{aligned} D_T - D_0 = & (A_T * B_T) - (A_0 * B_0) & (3) \\ & + (A_T * B_0) - (A_T * B_0) \\ & + (A_0 * B_T) - (A_0 * B_T) \\ & + (A_0 * B_0) - (A_0 * B_0) \end{aligned}$$

Rearranging the terms yields:

$$\begin{aligned} D_T - D_0 = & (A_T * B_0) - (A_0 * B_0) & (4) \\ & + (A_0 * B_T) - (A_0 * B_0) \end{aligned}$$

$$\begin{aligned} & + (A_T * B_T) - (A_0 * B_T) \\ & - (A_T * B_0) - (A_0 * B_0) \end{aligned}$$

Combining the terms yields:

$$\begin{aligned} D_T - D_0 = & (A_T - A_0) * B_0 & (5) \\ & + (B_T - B_0) * A_0 \\ & + (A_T - A_0) * (B_T - B_0) \end{aligned}$$

where the first term on the right-hand side of equation (5), $(A_T - A_0) * B_0$, is the contribution of factor A to total change of variable D ; the second term, $(B_T - B_0) * A_0$, is the contribution of factor B to total change of variable D ; and the third term, $(A_T - A_0) * (B_T - B_0)$, is the residual change of variable D which is due to the interaction of factors A and B .

The individual terms of equation (5) were used in the article to determine or isolate factors. For example, in the section on final demand, the following question was asked: "What would the estimated change in the output for producer services have been if the composition of final demand alone had changed and the GNP level and business practices had not changed?" The answer to this question (shown in table 2 of the text) was based on either the first or second term of equation (5).

In the unbundling section, the interaction component is shown. In the input-output section, the interaction component is combined with the effect of changing business practices. This choice reflects the difficulties of measuring changes in business practices (or input-output coefficients) over time.