Better measures of service employment goal of Bureau survey redesign

The volatility and small size of companies,
coupled with nontraditional payroll practices,
complicate efforts to develop more reliable data
on employment, earnings, and hours of work

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The problem of measuring economic activity in the growing service-producing sector of the economy has posed an acute and continuing challenge to those agencies responsible for providing economic data. The service sector is characterized by diverse activities loosely aggregated under the service-producing classification; by a large number of preponderantly small companies that enter and exit the market with some frequency; and, consequently, by a unique set of problems associated with identification, classification, collection, and estimation of economic information.

This article focuses on the challenges in measuring employment, hours, and earnings in this large and dynamic sector of the economy. First, historical trends in the composition of the industrial employment base are discussed to illustrate both the strong growth of this sector and the reason for concern over the adequacy of measurements. A description of the Bureau of Labor

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Statistics' primary sources of current data on employment, hours, and earnings, and their importance in tracking economic developments, sets the stage for exploring, in more detail, the sources of measurement problems. Some problems stem from the nature of employment practices, from the conduct of the surveys, and from employer recordkeeping procedures; others relate to the relative instability of the small establishments that characterize the sector. The final section outlines initiatives which have been undertaken by the Bureau to redesign the Current Employment Statistics Survey, the major source of employment and earnings measures by industry, to ensure that firms in the service sector are appropriately represented by the survey, and that survey operations are tailored to the special needs of service-sector employers in order to gain their cooperation in the survey.

Why the interest in service employment

In the United States, as in other industrialized nations, the long-term shift from an agricultural, to a goods-producing, to a service-producing economic base has emerged. The strength and pervasiveness of this trend, which has particularly accelerated over the last two decades, has been extensively documented else-

where.[1] Nonetheless, some of the highlights of this evolution are quite significant and worth stressing:

● Since 1920, the service-producing share of nonagricultural employment has gone from 53 percent to 72 percent. Two divisions showed significant growth— the service industries and government. (See table 1.)

● This evolutionary shift in the industrial complexion accelerated during the Great Depression, dampened as the Nation turned to hard-goods production during World War II, but has resumed a steady pace since the mid-1940's.

● Over the past two decades, some 86 percent of job growth in the economy has occurred in the service-producing sector. By mid-1982, this sector provided 74 percent of all jobs, up from 62 percent in 1960.

● During recessionary periods, the service-producing sector has shown remarkable resilience while the goods sector has borne the brunt of the economic declines. This relative immunity from downturn has also been evidenced in the most recent recessionary period.[2]

● The shift from a goods to a service economy represents changes in the U.S. economy of historic proportions. It has been influenced by such factors as the increase in demand for consumer services previously produced outside the measured market economy, the increase in the demand for leisure goods, shifts from internal to external sources for business services (such as marketing, accounting, and the like), and the changing nature of international trade. In turn, the shift has had a pronounced influence on the character of the labor force, particularly in opening opportunities for women. Over the past two decades, women's share of service-producing employment has expanded from 40 to 50 percent, accounting for 65 percent of the employment expansion in the sector.

Review of data sources

The Bureau of Labor Statistics maintains three primary sources of data on employment, hours, and earnings in the service sector. Each has its own strengths and weaknesses.

The establishment survey. The Current Employment Statistics Survey, commonly referred to as the establishment survey, collects payroll data from nonagricultural employers for the pay period including the 12th of each month. The survey, conducted by mail, obtains summary data on total numbers of employees, including women workers and production or nonsupervisory workers. In addition, summary data on the payroll and hours (paid for) of production or nonsupervisory workers are collected in order to compute average hourly earnings, and average weekly hours and earnings. Overtime hours data are collected for production workers in manufac-

Table 1. Employment composition of goods- and service-producing sectors, 1920 and 1981 [Numbers in thousands]			
Divisions	1981 employment	Percent distribution	
		1920	1981
Nonfarm economy	91,543	100.0	100.0
Goods-producing sector	25,672	46.7	28.0
Mining	1,104	4.5	1.2
Construction	4,307	3.2	4.7
Manufacturing	20,261	39.0	22.1
Service-producing sector	65,871	53.3	72.0
Transportation and public utilities	5,151	14.6	5.6
Trade	20,738	16.3	22.7
Wholesale	5,343	—	5.8
Retail	15,395	—	16.8
Finance, insurance, and real estate	5,331	4.3	5.8
Services	18,598	8.6	20.3
Government	16,054	9.5	17.6
Federal	2,772	—	3.0
State and local	13,282	—	14.5

turing. Employer participation in the survey is voluntary.

The establishment survey is conducted as a cooperative Federal-State program with State Employment Security Agencies collecting most of the data. The employer's microdata can thus be used by the States to prepare local estimates (currently available for 50 States and more than 200 Standard Metropolitan Statistical Areas) and, at the same time, by the Bureau of Labor Statistics to prepare national estimates. Duplication of data collection at the Federal and local levels is avoided through this cooperative arrangement.

The establishment survey is the largest monthly survey in the field of economic statistics, with an active sample of 180,000 establishments reporting data covering about 35 percent of total nonagricultural employment in the United States. Data are published for more than 500 separate industries at the national level, and in varying degrees of industry detail at the State and Standard Metropolitan Statistical Area levels. The survey provides monthly measures of total employment and numbers of women and nonsupervisory workers for 155 service-producing industries at the national level. This represents 30 percent of the 567 service-producing industries designated in the U.S. Office of Management and Budget's 1972 Standard Industrial Classification System. Estimates of average weekly earnings, average weekly hours, and average hourly earnings are produced for nonsupervisory workers in most of these industries.

The data collected in the Bureau's monthly survey of employment, hours, and earnings have served as a primary source for tracking the growth of the service-producing sector. Thus, in and of themselves, these data are called upon to portray trends with accuracy and timeliness as a basis for economic decisionmaking. However, the data have critical secondary uses which also fuel the demand for reliable reporting and accurate

measurement of employment, hours, and earnings in the service sector.

Within the Bureau, for example, the data have the following major uses:

- *In productivity measurement:* Monthly total hours by industry detail and production-worker employment data are key inputs to productivity measurement and the quarterly productivity estimates. The annual employment and hours data for detailed industries are used for developing labor inputs for measures of output per employee hour.
- *In occupational employment projections:* National employment data by industry detail are projected forward and occupational staffing patterns of the industries are applied to those projected industry levels to produce projected occupational patterns.
- *In economic growth studies:* A key input into the BLS economic growth model is annual employment data by detailed industry.
- *In development of subnational unemployment statistics:* The monthly employment data are used both by the BLS and the State agencies as the source of employment data for those subnational areas for which the household survey, discussed below, fails to provide reliable estimates. Currently, the unemployment rates for 40 States and about 200 areas are computed using these survey results as a key input.
- *In occupational health and safety statistics:* Detailed annual industry employment levels are used for computing total injury rates, with actual injury experience based on an annual survey and administrative records.

Other Federal agencies also use the service sector data extensively:

- *In personal income and gross national product estimation:* The U.S. Department of Commerce's Bureau of Economic Analysis uses the monthly employment and earnings series as a key input for estimating the wage component of these economic measures.
- *In management of trade policy:* Detailed industry employment trends are used to determine job loss associated with increased imports.

In addition to these critical, continuing government uses of the data, the private and public sectors also rely on the survey results for: marketing studies; economic research and planning; government funding and policy analysis; regional analysis; industry studies; plant location planning; wage negotiations; and adjustment of labor costs in escalation of long-term contracts.

The Current Population Survey. This monthly survey collects data on employment status directly from individuals in households and provides information on the demographic, occupational, and other characteristics of the employed, the unemployed, and persons not in the labor force. The household survey is conducted by the Bureau of the Census each month for BLS, providing data for the Nation and the 10 largest States.

Each month, 60,000 housing units are eligible for interview, by personal visit or by telephone. Information is gathered on the personal characteristics of all members of the household 16 years of age and over and on their labor force status during the survey week (week including the 12th of the month). This makes possible detailed tabulation and publication of labor force data by demographic characteristics.

The results of the establishment and household surveys are published and analyzed together each month, 3 weeks after the survey reference week. Estimates from both surveys generally show the same trends in employment. By publishing the results of both surveys together, the current analysis of the Nation's employment situation is greatly enhanced, with the household survey providing demographic detail and the establishment survey providing industry detail.

Each month, the household survey provides employment, unemployment, and labor force data for nine service-producing industries. The emphasis of the monthly data is to provide the basic types of estimates on labor force status by an extensive array of demographic characteristics. On an annual basis, employment data from the household survey are published for 116 service-producing industries along with the percentages of employed women and members of racial minorities.

Administrative establishment files. Unemployment insurance (UI) laws administered by State Employment Security Agencies cover almost every employer unit. The States require each unit (establishment) to provide a quarterly report on employment and wages of its work force and to pay a tax into the unemployment trust fund. As a byproduct of this administrative reporting system, and the Federal-State cooperative relationship, BLS obtains from each State a virtual census of establishments, and their employment and wages, on a quarterly basis. By assigning industry and location (county) codes to each establishment's record, the employment and wage data can be summarized by size-of-employment class, within industry and county, and through successive aggregations, to Standard Metropolitan Statistical Area, State, regional, and national totals.

What these data lack in timeliness, they make up for in comprehensiveness. Because of the large number of UI reporting units (4.5 million), coupled with the lag in the required payment of taxes, and associated data entry, correction, and tabulation workloads, the UI data are generally not available in summary form until 6 to 9

months after the end of each quarter. Nevertheless, because of the comprehensive nature of the data and the potential for dissaggregation to complete industry and county detail, this data base is extremely important. It serves as the foundation of the establishment survey— first, as the sample frame from which States solicit survey respondents and second, as a benchmark to adjust national and subnational employment levels annually.

Because the UI data represent nearly a universe of wage and salary workers in nonagricultural industries, employment (for each month of the quarter), number of reporting units, and total quarterly wages can be tabulated for each quarter and presented in complete industry detail (567 industries in the service-producing sector) at all levels of geographic aggregation from the county (3,100) level up to national totals. The industry statistics can be tabulated by size of firm and type of ownership (private, and Federal, State, and local government) as well. The only limit to disaggregation of the UI data base is the requirement that confidentiality be provided for any reporting unit. Therefore, publication rules to prevent disclosure are rigorously adhered to.

While the focus of the analysis in this article is primarily on measures of employment, hours, and earnings on a current basis in industry detail, it is the availability of the UI administrative record of all employing units in the Nation—tracking their birth, growth, and demise— that provides us with the information to both design the Current Employment Statistics Survey and to adjust that design as the nature of the economy changes. Very little nonagricultural wage and salary employment escapes coverage under the UI laws. Of almost equal importance, the UI reporting system is able to identify establishment deaths and purge the appropriate records from the files on a timely basis.

Measurement problems

The unique measurement problems of the service-producing sector stem both from the nature of the establishments and from the types of survey operations used to gather data in the Current Employment Statistics program. As previously indicated, the industry statistics on employment, hours, and earnings are gathered monthly on a voluntary basis, using a mail questionnaire to obtain data from establishment payroll records.

Sampling difficulties. For a variety of reasons, the one characteristic of an establishment that appears to be most telling of its likelihood to voluntarily respond in a government survey is its size, in terms of the number of employees on the payroll. As a consequence, experience has shown that it is more difficult to implement optimal sample designs, which require certain response rates, in those industries which are characterized by small firms. Small firms predominate in many of the industry divi-

sions in the service sector, as shown by the distribution of the survey's sample by size of establishment and sample coverage by industry division in table 2. With the exception of government, portions of transportation and public utilities, and a few individual service industry groupings, such as banks and hospitals, the sample in the service sector falls short of representation in the smallest size categories.

Historically, this has been more of a problem in the service-producing sector than in the goods-producing sector. The reasons are shown in table 3, which arrays total employment by size class for these sectors. Using 250 employees as a cutoff point to distinguish between small and large employers, employment in the goods-producing sector was split 49 to 51 percent in 1980. In the service-producing industries, the split between small and large was 70 to 30 percent, reflecting the greater proponderance of small employers. Data from the UI administrative data base, shown in table 4, provides further evidence of the concentration of employment in the smaller firm classes in selected service industries.

Employment practices. The establishment survey of employment, hours, and earnings currently is designed to portray the level of and change in activity in establishments which have fairly traditional employment practices. The assumptions incorporated into the survey design and estimation procedures include a relatively stable work force that expands or contracts with the pace of economic activity in the short term, and with technological innovations in the long term; a normal pattern of regular hours and overtime payment that expands or contracts in the short term with the level of economic activity; and a standard work force composition which assumes that the worker has some permanent attachment to the employing establishment.

Analysis of the employment practices of service industries indicates a number of departures from traditional employment practices. For example, statistics on labor turnover rates by industry indicate that turnover is highest among those industries that are characterized by a preponderance of small firms with relatively large numbers of easy entry, low-skill occupations. According to a 1980 study by Malcolm Cohen and Arthur Schwartz, the service-producing industries with the highest labor turnover rates were: automotive dealers and service stations; automotive repair, services, and garages; water transportation; real estate; business services; motion pictures; hotels and other lodging places; amusement and recreation services; and eating and drinking places.[3] These industries rank among the lowest in terms of average earnings, which is consistent with their high proportions of low-skill jobs.

Average weekly hours have generally been declining for these industries for many years, and are very low

relative to those in most other industries. This largely reflects a growing practice of part-time employment in these industries. Data from the household survey, shown in table 5, provide direct evidence of the dramatic growth in part-time employment in many of the service-producing industry divisions relative to the goods-producing divisions. (In the household survey, a person is counted as part time if he or she normally works less than 35 hours.) The proportion of part-time workers in the goods-producing industries has hardly changed over time, averaging a low 4.5 percent in 1981. In contrast, the proportion of part-time workers has increased for

almost all of the service-producing industries, and averaged 20.7 percent in 1981. The highest rates are in retail trade (36.0 percent), personal services (27.2 percent), entertainment and recreation services (35.0 percent), and medical, except hospital, services (26.1 percent).

Generally, the characteristics of high labor turnover, low earnings, low skill requirements, and high proportions of part-time workers seem to depict a rather loose or casual bond between the employer and employee in the service sector. This loose bond, in turn, contributes to deviations from traditional payroll practices which are assumed in survey definitions, and undoubtedly

Table 2. Distribution of the Current Employment Statistics sample by employment size of establishment, and sample coverage by division, March 1980

[Employment in thousands]

Item	Total	Establishment employment size							
		Under 10	10 to 19	20 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1000 and over
Total nonfarm economy[1]									
Universe:									
Establishments	4,529,799	3,400,161	514,257	356,138	131,762	80,161	26,421	12,378	8,521
Employment	89,718	10,323	7,103	11,054	9,250	12,392	9,306	8,677	21,613
Percent employment distribution	100.0	11.5	7.9	12.3	10.3	13.8	10.4	9.7	24.1
CES sample:									
Establishments	166,330	24,103	24,272	40,008	27,395	26,528	11,937	6,459	5,628
Employment	33,502	123	345	1,289	1,939	4,153	4,174	4,493	16,986
Percent employment distribution	100.0	.4	1.0	3.8	5.8	12.4	12.5	13.4	50.7
Percent sample coverage	37.3	1.2	4.9	11.7	21.0	33.5	44.9	51.8	78.6
Private sector[1]									
Universe:									
Establishments	4,350,562	3,303,179	491,885	332,805	118,763	68,369	20,823	9,015	5,723
Employment	73,185	10,000	6,787	10,296	8,310	10,488	7,281	6,262	13,761
Percent employment distribution	100.0	13.6	9.3	14.1	11.4	14.3	9.9	8.6	18.8
CES sample:									
Establishments	147,973	22,101	23,178	37,472	24,871	22,616	9,387	4,705	3,643
Employment	23,536	114	329	1,205	1,756	3,511	3,271	3,268	10,082
Percent employment distribution	100.0	.5	1.4	5.1	7.5	14.9	13.9	13.9	42.8
Percent sample coverage	32.2	1.1	4.8	11.7	21.1	33.5	44.9	52.2	73.3
Mining									
Universe:									
Establishments	31,388	19,531	4,629	4,020	1,505	1,060	325	193	125
Employment	990	58	64	123	103	164	113	132	233
Percent employment distribution	100.0	5.9	6.5	12.4	10.4	16.6	11.4	13.3	23.5
CES sample:									
Establishments	2,123	308	346	505	310	322	167	92	73
Employment	369	2	5	16	21	51	58	63	153
Percent employment distribution	100.0	.5	1.4	4.3	5.7	13.8	15.7	17.1	41.5
Percent sample coverage	37.3	3.4	7.8	13.0	20.4	31.1	51.3	47.7	65.7
Construction									
Universe:									
Establishments	527,892	440,087	48,148	27,890	7,663	3,181	663	170	90
Employment	4,087	1,063	644	829	519	468	225	116	223
Percent employment distribution	100.0	26.0	15.8	20.3	12.7	11.5	5.5	2.8	5.4
CES sample:									
Establishments	16,101	4,307	3,558	4,687	2,112	1,114	222	71	30
Employment	739	20	50	147	146	164	78	48	86
Percent employment distribution	100.0	2.7	6.8	19.9	19.7	22.2	10.6	6.5	11.6
Percent sample coverage	18.1	1.9	7.8	17.7	28.1	35.0	34.7	41.4	38.6
Manufacturing									
Universe:									
Establishments	322,994	158,164	54,585	54,842	27,491	22,480	8,928	3,979	2,525
Employment	20,722	576	752	1,712	1,920	3,490	3,104	2,725	6,443
Percent employment distribution	100.0	2.7	3.6	8.3	9.3	16.8	15.0	13.2	31.1
CES sample:									
Establishments	44,205	2,410	3,764	9,272	8,645	10,585	5,122	2,563	1,844
Employment	11,175	13	55	309	620	1,684	1,792	1,772	4,930
Percent employment distribution	100.0	.1	.5	2.8	5.5	15.1	16.0	15.9	44.1
Percent sample coverage	53.9	2.3	7.3	18.0	32.3	48.3	57.7	65.0	76.5

Table 2. Continued—Distribution of the Current Employment Statistics sample by employment size of establishment, and sample coverage by division, March 1980

[Employment in thousands]

Item	Total	Establishment employment size							
		Under 10	10 to 19	20 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1000 and over
Transportation[1]									
Universe:									
Establishments	171,646	118,449	22,892	17,525	6,588	3,945	1,196	562	489
Employment	4,592	355	312	531	453	602	416	387	1,536
Percent employment distribution	100.0	7.7	6.8	11.6	9.9	13.1	9.1	8.4	33.4
CES sample:									
Establishments	7,611	884	1,046	1,966	1,375	1,179	473	284	404
Employment	2,623	5	15	64	97	183	166	198	1,895
Percent employment distribution	100.0	.2	.6	2.4	3.7	7.0	6.3	7.5	72.2
Percent sample coverage	57.1	1.4	4.8	12.1	21.4	30.4	39.9	51.2	123.4[2]
Trade									
Universe:									
Establishments	1,553,714	1,143,202	210,164	136,434	40,685	16,951	3,917	1,565	796
Employment	20,068	3,733	2,827	4,104	2,746	2,490	1,332	1,054	1,782
Percent employment distribution	100.0	18.6	14.1	20.4	13.7	12.4	6.6	5.3	8.9
CES sample:									
Establishment	41,147	7,630	8,872	12,463	6,091	3,996	1,246	494	355
Employment	3,288	42	125	392	421	596	428	338	946
Percent employment distribution	100.0	1.3	3.8	11.9	12.8	18.1	13.0	10.3	28.8
Percent sample coverage	16.4	1.1	4.4	9.6	15.3	23.9	32.1	32.1	53.1
Finance									
Universe:									
Establishments	387,292	319,337	30,111	22,226	8,380	4,858	1,412	590	378
Employment	5,090	808	413	691	590	748	498	417	925
Percent employment distribution	100.0	15.9	8.1	13.6	11.6	14.7	9.8	8.2	18.1
CES sample:									
Establishments	11,241	1,671	1,499	2,699	2,102	1,874	715	396	285
Employment	1,826	8	21	89	150	290	247	281	740
Percent employment distribution	100.0	.4	1.2	4.9	8.2	15.9	13.5	15.4	40.5
Percent sample coverage	35.9	1.0	5.1	12.9	25.4	38.8	49.6	67.4	80.0
Services									
Universe:									
Establishments	1,345,636	1,104,409	121,356	69,868	26,451	15,894	4,382	1,956	1,320
Employment	17,636	3,407	1,775	2,306	1,979	2,526	1,593	1,431	2,619
Percent employment distribution	100.0	19.3	10.1	13.1	11.2	14.3	9.0	8.1	14.9
CES sample:									
Establishments	25,545	4,891	4,093	5,880	4,236	3,546	1,442	805	652
Employment	2,516	24	58	188	301	543	502	568	1,332
Percent employment distribution	100.0	.7	1.6	5.3	8.6	15.4	14.3	16.2	37.9
Percent sample coverage	19.9	.7	3.3	8.2	15.2	21.5	31.5	39.7	50.9
Government									
Universe:									
Establishments	179,237	96,982	22,372	23,333	12,999	11,792	5,598	3,363	2,798
Employment	16,533	323	316	758	940	1,904	2,025	2,415	7,852
Percent employment distribution	100.0	2.0	1.9	4.6	5.7	11.5	12.2	14.6	47.5
CES sample:									
Establishments	18,357	2,002	1,094	2,536	2,524	3,912	2,550	1,754	1,985
Employment	9,966	9	16	84	183	642	903	1,225	6,904
Percent employment distribution	100.0	.1	.2	.8	1.8	6.4	9.1	12.3	69.3
Percent sample coverage	60.3	2.8	5.1	11.1	19.5	33.7	44.6	50.7	87.9

[1] Excludes railroads.
[2] Sample total in large size class includes combined units of telephone companies reporting to BLS under special arrangements.

NOTE: Because of rounding, sums of individual items may not equal totals. Data are classified according to the U.S. Office of Management and Budget's 1972 Standard Industrial Classification system.

adds to the difficulties that employers have in reporting in government surveys.

Data collection problems. In the final analysis, the kind of data that might be obtained in a survey operation is constrained by the amount of information that the respondent has at ready access. This is certainly the case with the establishment survey of employment, hours, and earnings, which has historically been keyed to the type of information readily available from the payroll

records of responding firms. The experience of the Bureau and the cooperating State agencies is that establishments will report, under our strict pledges of confidentiality, information that would normally be considered privileged and proprietary, but only if it is conveniently and readily accessible. If the information request goes much beyond the normal recordkeeping practices of the firm, both overall response rates and responses to particular data items will suffer.

As a part of an overall review of the establishment

payroll survey, BLS conducted two interview surveys with employers during 1981. The first sought to determine what data elements are readily available from employer payroll records on a monthly basis, while the second concerned itself with the reasons why employers are unable or reluctant to provide the requested data.

The majority of respondents indicated that the information requested each month was readily available. However, the proportion of manufacturing respondents who had easy access to such records was higher than the proportion of service respondents. This shows up in a rather significant difference between the service and manufacturing employers regarding their willingness to cooperate with the survey. For example, 45 percent of service-industry employers cited lack of time or resources to complete the BLS 790 survey form, compared with 19 percent of manufacturing employers.

The BLS 790 questionnaire requests a count of nonsupervisory workers, together with their payroll and paid hours. The interviews revealed that 31 percent of the service-industry employers who are reporting monthly information to BLS do not differentiate between supervisory and nonsupervisory workers in their payroll records. Because many of these establishments are small, the respondents are able and willing to make the necessary adjustments for BLS. However, 64 percent of employers who refused to cooperate in the survey claimed that they maintain only one payroll figure for all their employees and are unable to provide the requested nonsupervisory breakouts.

Another problem encountered in the interviews was that a significant proportion—19 percent—of service industry employers use an outside accounting service for preparing payrolls and payroll summaries, while only 5 percent of manufacturing employers do so. The accounting services generally handle only mandatory government reports for their clients, and this would have a negative impact on responses to a voluntary questionnaire like the BLS 790.

Table 3. Distribution of employment by establishment size class, and sector, 1980

[Employment in thousands]

Size class	Private nonfarm sector		Goods-producing sector		Service-producing sector	
	Employment	Percent of total	Employment	Percent of total	Employment	Percent of total
Total	72,249.8	100	26,041.6	100	46,208.2	100
0–3	3,278.9	5	515.2	2	2,763.7	6
4–9	6,493.7	9	1,190.7	5	5,303.0	12
10–19	6,604.7	9	1,469.4	6	5,135.3	11
20–49	10,100.8	14	2,687.4	10	7,413.4	16
50–99	8,196.1	11	2,571.6	10	5,624.5	12
100–249	10,392.2	14	4,172.1	16	6,220.1	13
250–499	7,225.4	10	3,483.6	13	3,741.8	8
500–999	6,234.3	9	2,999.0	11	3,235.3	2
1000+	13,723.7	19	6,952.6	27	6,771.1	15

NOTE: Based on coverage under State Unemployment Insurance Laws. Excludes railroads, some nonprofit institutions, and commission insurance salesworkers.

Table 4. Selected service industries with large concentrations of small establishments, 1980

Industry	Total employment	Percentage of employment in firms with			
		Under 10 workers	10 to 49 workers	50 to 249 workers	More than 250 workers
Gasoline service stations	554,000	53	29	14	4
Eating and drinking places	4,481,000	14	42	28	16
Real estate agents	344,000	40	30	24	6
Laundry, cleaning, and garment services	356,000	28	36	30	6
Beauty shops	284,000	64	27	7	2
Automotive repair shops	351,000	62	33	4	1
Offices of physicians	739,000	56	31	9	4
Offices of dentists	336,000	80	18	1	1

In sum, many of the reservations voiced by respondents to the interview surveys related to the fact that small establishments, already burdened with mandatory government reporting, simply are unable or unwilling to add to their paperwork by filling out voluntary survey forms. Some large service-industry employers which might otherwise be willing to cooperate—such as hospitals or schools—frequently do not maintain records according to BLS definitions, and thus are unable to report the requested information.

New business formations. In the establishment survey, the direct measurement of employment growth due to new business formations is exceedingly difficult. The lead time necessary to prepare the universe listing of establishments from which to select new sample respondents practically assures that any new business establishment will be several months old before it has a chance of being in the sample. In most instances, the new business will have completed its initial hiring before it becomes a sample member. Once the new establishment is a sample member and has reported for 2 consecutive months, its month-to-month employment change will contribute to the calculation of the "link relative" that is applied to the previous month's employment estimate to derive the current month's estimate. The problem is that the initial hiring that occurred before the new business became a sample member is never reflected in the "link relative" calculation.

The inability to properly measure employment growth from business births creates a downward bias in the employment estimates, which accumulates each successive month after the most recent benchmark to employment levels from the UI administrative data base. The extent of the bias is directly proportional to the contribution of business births to the employment in a given industry.

In industries characterized by large employers, new entries are very rare and therefore contribute little if

Table 5. Percentage of part-time workers[1] by industry, selected years			
Industry	1962	1972	1981
Total goods producing	4.4	2.1	4.5
Mining	3.6	1.4	2.3
Construction	5.8	5.2	7.1
Manufacturing	4.1	1.4	4.0
Total service producing	14.3	17.2	20.7
Transportation and public utilities	4.6	6.6	8.0
Trade	19.7	23.2	30.1
Wholesale	6.6	6.5	6.7
Retail	23.2	27.3	36.0
Finance, insurance, and real estate	9.3	9.1	11.0
Miscellaneous services	17.3	19.9	22.0
Business and repair	11.7	14.9	16.7
Personal	18.6	26.7	27.2
Entertainment and recreation	34.7	36.8	35.0
Medical, except hospital	([2])	19.4	26.1
Hospitals	([2])	14.7	16.2
Welfare and religious	([2])	22.0	26.1
Education	18.4	22.1	24.8
Other professional	15.4	12.7	14.0
Forestry and fisheries	4.9	5.9	8.9
Public administration	5.1	6.2	6.6

[1] Voluntary part-time workers, plus workers on part time for economic reasons who usually work part time.
[2] Data not available.

anything to employment trends. Many of the service-producing industries, however, are characterized by small employers, with large numbers of business births and deaths. While the deaths are measured by the establishment survey, the births are not, and an adjustment to the sample trend must be made each month to correct for the bias. These "birth bias" adjustment factors may account for a large part of the estimated long-term employment growth of many of the service-producing industries.

The calculation of birth bias adjustment factors is straightforward. For each of the most recent 3 years, the employment estimate derived from the sample link relatives (with no bias adjustment) is compared to the benchmark level. An adjustment factor is then calculated so that its application each month thereafter will cumulatively add to the average amount that the three previous benchmarks were underestimated. For example, if the sample-derived employment estimate for an industry was lower than the employment benchmarks by 1.6, 0.8, and 1.2 percentage points for the most recent 3 years, the average downward bias is 1.2 percent. A factor of 1.0010 will then be applied to the link relative for each of the next 12 months so as to adjust by 1.2 percent over the year.

Because of the availability of annual benchmark employment levels, it is possible to measure the extent of the bias for each industry over time. We have observed that the contribution of the bias can change at different stages of the business cycle. The bias also has seasonal swings in certain industries, and can be sensitive to

shocks to the economy, such as the 1973–74 oil embargo and the abnormally high interest rates of recent years. However, despite an ability to identify bias, the Bureau has not been able to develop procedures to fine-tune the bias adjustments on a current basis except in the construction division, which behaves with somewhat more predictability over the business cycle.

Redesigning the establishment survey

A review of the published output of the establishment survey as it is currently designed and operating puts into perspective the structural problem with the survey. As indicated in table 6, only 30.4 percent of the published industries are service producing, although 72.0 percent of the Nation's jobs are in these industries. A large part of this disparity arises because the Standard Industrial Classification system provides for more detail on goods-producing industries than on service-producing.

In addition to the problem of the coding structure, however, the establishment survey has been unable to produce data of publishable quality for much of the service-producing area because of the difficulty in obtaining employer responses and maintaining regular month-to-month reporting for a sufficiently large and representative sample in many of the component industries. The Bureau of Labor Statistics is now launching a major redesign of the survey which will deal directly with the problems that have prevented us from providing more reliable employment, hours, and earnings data for specific service-producing industries.

The sample frame. Because the UI administrative data base is unique in providing universal coverage of employers, we plan to continue and strengthen the link between the establishment survey and the administrative

Table 6. Distribution of industries by sector, according to SIC coding structure and as published by BLS					
	1972 SIC structure		Published by BLS		
Divisions	Number of industries	Percent distribution	Number of industries	Percent distribution	Percent published
Total nonagriculture	1230	100.0	510	100.0	41.5
Goods producing	663	53.9	353	69.2	53.2
Mining	58	4.7	13	2.5	22.4
Construction	36	2.9	15	2.9	41.7
Manufacturing	569	46.3	324	63.5	56.9
Service producing	567	46.1	155	30.4	27.3
Transportation and public utilities	98	8.0	24	4.7	24.5
Wholesale trade	80	6.5	20	3.9	25.0
Retail trade	82	6.7	33	6.5	40.2
Finance, insurance, and real estate	95	7.7	19	3.7	20.0
Services	174	14.1	35	6.9	20.1
Government	38	3.1	23	4.5	60.5

data base. Initially, for example, testing of alternative sample designs will be done by retrospective cross tabulation of employer data from the UI files. In this manner, we can evaluate the representativeness of various designs for estimating employment and wages by industry without having to collect additional data.

We also plan to review carefully the completeness of the UI data base by comparisons with other listings of employers, such as the Census Bureau's Standard Statistical Establishment List and the files maintained by Dun and Bradstreet as part of its credit rating operations. And, particularly because of the volatile nature of many of the small establishments in the service sector, we want to review and document the procedures used by the State Employment Security Agencies for processing establishment births and deaths.

Bias adjustment. As part of the redesign effort, we will attempt to reduce the amount of bias adjustment for establishment births required in the employment estimates. This will be accomplished through additional stratification of the estimating cell structure. In addition, we will be reviewing potential sources of new-firm data and testing the use of such information in our estimation system. We know that new business formations and their impact on current employment trends vary significantly during a business cycle for many industries. Further work will be done to document this and to arrive at an appropriate means of varying the bias adjustment factors on a current basis according to the stage of the cycle.

Examination of seasonality. Seasonal adjustment of the establishment data is performed annually using the X-11 ARIMA model. The model options for projecting the data series 1 year ahead were used for the first time in 1981. Each year, the seasonal adjustment is updated at the time the establishment series are adjusted to new benchmark levels, usually in July.

Additional research will be undertaken as part of the redesign to test various X-11 options for making better seasonal adjustments for industries that are periodically affected by strikes, product model changeover, holidays, and so forth. We will also try to determine whether the seasonal adjustment should be updated every 6 months rather than annually.

Data collection techniques. Because we know that our traditional method of solicitation and collection of data by mail does not provide sufficient sample representation in many of the service-producing industries, we will be experimenting with other means of obtaining employer cooperation and collecting monthly data. Our goal is to arrive at the least costly mix of mail, telephone, and personal visit to satisfy our sample design.

Estimation process. In recent years, research by David Birch of the Massachusetts Institute of Technology and others has indicated that it is the small, young, volatile service-producing firms that are responsible for nearly all of the net creation of new employment opportunities.[4] Unfortunately, these are the firms which are least likely to be adequately represented in the establishment survey as now designed. We plan to test additional size and regional stratification of our sample to improve our employment estimates for industries with large proportions of such firms; heretofore, extensions of the sample stratification system were generally intended to improve estimates of hours and earnings, rather than employment.

Hours and earnings estimation. Because of the changing mix of full- and part-time workers in many service-producing industries, coupled with problems in defining a "nonsupervisory worker," we plan to test several alternative hours and earnings measures. We hope to demonstrate an ability to collect an "all-employee" earnings measure that can be benchmarked annually to the wage data from the UI administrative data base. To obtain better and more meaningful hours measures, we will try to collect information separately for "permanent," versus "all other," employees. The relationship between hours worked and hours paid, which is especially important for the construction of the Bureau's productivity measures, will also be studied.[5]

IN VIEW OF BOTH the increasing importance of the service-producing sector and the shortcomings in the current statistical measurement system, improvement in the data for this sector takes on a very high priority in the Bureau's plans for survey modernization. Such improvement, however, constitutes a formidable challenge, given the preponderance of hard-to-measure smaller establishments and the attendant reporting difficulties.

The path to improvement is threefold: a fine-tuning of the data collection process to ease the response burden and extend coverage; a reconsideration of the sample design in order to better focus survey coverage; and a review and extension of procedures for generating estimates based on the survey responses. The initial research on improving data collection is complete, while development of sample design and estimating procedures continues. Over the next 3 years, as resources permit, the findings of the initial research will be evaluated and, if cost-effective, will be integrated into the survey operations. ☐

————— *FOOTNOTES* —————

[1] Among the several sources that extensively document the shift from goods- to service-producing are: Victor R. Fuchs, *The Service Economy* (New York, National Bureau of Economic Research, 1968); Harley L. Browning and Joachim Singelman, *The Emergence of a Service Society: Demographic and Sociological Aspects of the Sectoral Transformation of the Labor Force in the U.S.A.* (Population Research Center, University of Texas at Austin, 1975); Thomas M. Stanback, Jr., *Understanding the Service Economy: Employment, Productivity, Location* (Baltimore, Johns Hopkins University Press, 1979); Eli Ginsberg and George J. Vojta, "The Service Sector in the U.S. Economy," *Scientific American*, March 1981, pp. 48–55; and Michael A. Urquhart, "The services industry: is it recession proof?" *Monthly Labor Review*, October 1981, pp. 12–18.

[2] Marillyn A. Hewson and Michael A. Urquhart, "The Nation's employment situation worsens in the first half of 1982," *Monthly Labor Review*, August 1982, pp. 3–12.

[3] Malcolm S. Cohen and Arthur R. Schwartz, "U.S. labor turnover: analysis of a new measure," *Monthly Labor Review*, November 1980, pp. 9–13.

[4] A review of the work by David Birch and others appears in Richard Greene, "Tracking job growth in private industry," *Monthly Labor Review*, September 1982, pp. 3–9.

[5] For a more complete discussion of this issue, see Jerome A. Mark, "Measuring productivity in service industries," *Monthly Labor Review*, June 1982, pp. 3–8.

A note on communications

The *Monthly Labor Review* welcomes communications that supplement, challenge, or expand on research published in its pages. To be considered for publication, communications should be factual and analytical, not polemical in tone. Communications should be addressed to the Editor-in-Chief, *Monthly Labor Review*, Bureau of Labor Statistics, U.S. Department of Labor, Washington, D.C. 20212.