U.S. LABOR MARKET DATA AND ISSUES
IN COMPARING GOODS AND SERVICES

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I. INTRODUCTION

In terms of both employment and output, the service-producing sector has been the major sector in the U.S. economy for quite some time. In view of this, the relative lack of data on services compared to manufacturing industries has been troubling to many users. The U.S.'s current service-sector coverage varies considerably by program, reflecting wide differences in conceptual and measurement issues.

While the relative lack of data on services presumably arose due to historical factors, expanding data in this area has been difficult for various reasons. One primary reason is that it has been difficult for statistical agencies to obtain funding for expansions. The second primary reason is that, as is widely recognized, there are particularly difficult conceptual problems. These include problems in defining and measuring output and prices in many service sector industries; see for example Sherwood (1993). When there is no agreement on concepts, it is problematic to begin collecting data. The collection of information on employment and wages is not plagued by the need to define output, and probably as a consequence service sector information is much more prevalent for employment and wages than for output, prices, and productivity. Nonetheless, of course, there are measurement problems, including how to draw the line between goods and services and how to define industries.

The focus of the present paper is limited to the labor data system in the U.S. The second section describes the major U.S. labor data sources, most of which include the service sector. The third section identifies some issues concerning differences in the information available for goods and services. There is one set of labor market issues on which much of what is known for the U.S. relies on data only for the manufacturing sector. There are some differences in concepts, coverage, and timing that complicate comparisons between sectors and that may have implications for uses in the national accounts and in productivity measurement. In some cases there has been additional detail for goods as compared to services industries. The paper points out ongoing Bureau of Labor Statistics (BLS) efforts that may improve services information

II. EXISTING DATA SETS AND MAJOR USES

Although the U.S. statistical system is highly decentralized, the official responsibility for collecting and analyzing labor market data rests with the BLS. Many BLS surveys are collected in cooperation with other organizations, either State Employment Security Agencies (SESAs), the Census Bureau, or private sector organizations. Because of the importance of labor as a factor of production and as a source of households' income and well-being, other data sets whose primary focus is not labor nonetheless contain considerable useful information for analyzing labor markets. This section provides a description of the U.S. strategy for collecting labor market data, including household surveys (all of which include workers in all industries) as well as establishment data. In the U.S., information on demographic characteristics of workers is only available from household surveys. Thus, if information on characteristics of workers (such as age or education) in various industries is needed, we must turn to these surveys.

A. BLS Labor Surveys

The initial focus of the BLS at the time of its establishment in 1886 was on prices and on wages for various occupations and industries. What may seem in more recent years like an overemphasis on certain types of workers--i.e. production--and on certain industries--i.e. manufacturing--probably has its origins in the historical concerns about "working-class" men and women in what were earlier emerging industries.[1] A program to measure employment and payrolls began in 1915 with data published for five manufacturing industries. Recommendations for expansion of the employment data to cover nonmanufacturing industries, to collect information on hours worked and some characteristics of workers, and to improve statistical aspects of the survey were made as early as 1926. Data collection for some nonmanufacturing industries began in 1928. See Goldberg and Moye (1985) for a detailed discussion of the history of BLS data.

Documentation on BLS data is provided in U. S. Department of Labor (1992). Table 1

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[1] A focus on production workers and manufacturing has existed for some other countries as well --for example, Great Britain. Additional study would be needed to see if this is typical.

summarizes the service sector detail available from major BLS establishment surveys.

1. Establishment Data

Employment and Wages Covered by Unemployment Insurance (ES-202 program). This program summarizes data from administrative records of the U.S. unemployment compensation system on employment and wages and salaries for workers covered by the laws, who account for 98 percent of wage and salary civilian employment. This effort is a cooperative endeavor of BLS and the SESAs. Annual average employment and "wages" (a broad measure of cash earnings per employee, which includes tips, commissions, bonuses, and payments in kind) are published for virtually all 4-digit SICs at the national and state levels. Also, monthly employment and quarterly wage data are now available at the national, state, and county levels.

Microdata from the ES-202 program are used as the sampling frame for all BLS establishment surveys except the Current Employment Statistics program (see below). The ES-202 program provides information to the U.S. Department of Labor's Employment and Training Administration and the various SESAs for administering the Unemployment Insurance program. It is used by the Bureau of Economic Analysis (BEA) as the basis for constructing a large part of the wage and salary component of the National Accounts. Estimates from the 202 are now available initially about nine months after the close of the quarter, which is about four months after receipt of the data by BLS; some minor revisions are made to the data. This represents a recent increase in timeliness which has improved their usefulness for the National Accounts. Further improvements in timeliness (a reduction of one week over each of the next four years) are planned.

Current Employment Statistics (CES or 790) survey. The CES is an establishment survey conducted monthly in cooperation with the SESAs. It provides very timely data for the pay period including the 12th of the month on employment, payrolls, and hours. More specifically, employment data are collected for all employees and women workers and, separately, for production workers in goods-producing industries and nonsupervisory workers in service-producing industries. Data on payrolls and hours paid are collected for production and

nonsupervisory workers only (about 81 percent of workers). Information on overtime hours is collected for manufacturing industries. Data are collected from about 390,000 reporting units, permitting publication of current data for the U. S. as a whole, for all states, and for 275 metropolitan areas, with extensive industry detail. Preliminary monthly estimates are released very soon after collection, usually on the first Friday of the following month. The CES payroll and hours data are used to construct an average hourly earnings (AHE) measure.

These series serve as the U.S.'s first major economic indicator with industry detail, and as a consequence they are widely used by the policy and business communities. In addition, the data are used extensively by state governments and analysts who need the timely geographic detail. I believe it is unusual for a country to have such detailed current data. Because of their timeliness, they are used in preliminary estimates of the National Accounts and for tax revenue projections. The CES is the primary source of the hours data used in constructing the overall U.S. labor productivity measures for the business sector and major subsectors. These data also are used in constructing the industry productivity measures.

National estimates from the CES are published at the 4-digit SIC level for most manufacturing industries. A recent expansion of service sector detail was completed last year, when published series for 55 additional industries were added. Data are now provided for all 2-digit services SICs, 61 percent of 3-digit services SICs, and 30 percent of 4-digit services SICs. The focus of the recent expansion was on adding detail for the larger industries. Examples of newly published industries are: child day care and custom computer programming software. Examples of industries not published are: motorcycle dealers in retail trade and secretarial and court reporting.

The CES is beginning a major revision to move to a probability sample.[2] As a part of the

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[2]The CES sample is unique among BLS surveys in not being probability based. Formerly, this was not seen as a problem by the program, given the focus on aggregate estimates, for two reasons. First, the sample size has been extremely large; it was about doubled during the late 1970's and mid-1980's, and now the reporting units include 40 percent of all persons on nonfarm payrolls. Second, the employment data are benchmarked to the ES-202 (although the payroll and

revision, concepts will also be examined.

Occupational Employment Statistics Survey (OES). The OES was begun in 1971 in cooperation with the Employment and Training Administration and the SESAs to obtain national, state and area occupational employment estimates, by industry. Recently, 15 SESAs have begun also collecting occupational wage distributions. The OES presently surveys about 725,000 establishments on a 3-year cycle. Surveys are conducted in alternating years for manufacturing and hospitals; some nonmanufacturing industries (mining; construction, finance, insurance, and real estate, and services); and the balance of service industries (wholesale and retail trade; transportation, communications, and public utilities; state and local government, and educational services). The OES provides detailed information on employment by occupation at the 3-digit industry level for services as well as goods. Plans are to expand this to the 4-digit level.

Employment Cost Index (ECI). The ECI was developed in response to the need for a broad measure of the change in labor costs. First published in 1976 for wages and salaries and in 1980 for total employee compensation, it measures the rate of change in employee compensation, which includes wages, salaries, and employers' costs for employee benefits. The ECI is published quarterly, one month after the reference date. The sample is comprised of about 4,200 establishments in the private sector and 1,000 establishments in state and local government.

As a fixed-weight, Laspeyres index of the change in the price of labor, the ECI provides an important picture of compensation changes which eliminates the effects of employment shifts among industries and occupations. That is, it provides a measure of the change in the "price" or "cost" to the employer of a unit of labor. Thus, the ECI series is preferable to an AHE-type measure for many analytic purposes. But for some important purposes, such as analyzing wages received by the typical worker, use of an index which measures changes in the cost of a fixed basket of labor services is not appropriate. Industry and occupational detail are not extensive.

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hours estimates are not benchmarked). An American Statistical Association panel (1994) recommended that the BLS should implement probability sampling for this survey.

The ECI is more comprehensive in terms of benefit costs than are other U.S. series. Since 1987, annual estimates of compensation cost levels have been published; this series is constructed using the ECI cost change data and current weights for industry employment from the CES and for occupations from the ECI.

Expansion efforts for the ECI have been driven by the need to acquire industry detail. Quarterly change measures and annual levels are published for all major services industry divisions. Indexes have been published for about eight 2-digit and 2 component 3-digit services industries since the mid-1980's. One new 3-digit industry (nursing homes) was added in 1992.

Employee Benefits Survey (EBS). The present annual data collection effort began in 1980, in response to the Office of Personnel Management's desire for data on benefits. Expansion of coverage has taken place since then. In 1990, the Employee Benefits Survey (EBS) was expanded to the service sector as a result of an integration with the ECI. Presently, data on the incidence and characteristics of employee benefits are collected in odd-numbered years for medium and large private establishments and in even-numbered years for small private establishments and state- and local-governmental units; the sample includes 4,400 establishments in the private sector and 1,300 governmental units.

Occupational Pay Surveys. Over the years, data on wages for selected occupations and industries have been collected in a variety of surveys. The effort was restructured in 1990, with a focus on data collection for the Office of Personnel Management's use in Federal pay setting, where in addition to a general pay change there is a provision for adjustment in pay by area. The Occupational Compensation Survey Program (OCSP) presently collects information on wages in 46 selected occupations, by work level, from about 18,000 establishments in about 160 localities. Locality data, where published, include separate broad estimates for goods-producing and service-producing industries. Areas with large concentrations of Federal workers are surveyed annually; other areas are surveyed once every two years.

Looking to the future, BLS is just beginning an effort, called "Comp 2000", which is considering possibilities for integrating the ECI and EBS with the OCSP. The program hopes to

expand publication of information for services occupations. BLS also hopes to pull out some more detail for the ECI but that is unclear at this point.

Special Surveys. Beginning in the late 1980's, some special establishment surveys and pilot studies have been conducted by BLS. The first were surveys of contracting-out practices in selected industries. Most recently, an establishment Survey of Employer-Provided Training (SEPT1) has been conducted, and planning is underway for a second survey. Although small, SEPT1 provides some interesting perspective on training practices in goods versus services industries.

2. Household Surveys

Current Population Survey (CPS). The CPS is a monthly survey of about 60,000 households collected by the Census Bureau for the BLS. This survey is extremely timely: information on labor force status--employment, unemployment, out of the labor force--for the week of the 12th of the month is collected the week of the 19th. The official monthly unemployment rate is calculated from this information and is released along with the CES information, usually on the first Friday of the following month. Tabulations of labor force status for various demographic groups are also regularly provided based on CPS data. Although establishment surveys are understood to yield better-quality measures of industry and occupation, the CPS is the primary source for research on employment or wages by occupation and/or industry whenever demographic information is needed as well.

National Longitudinal Surveys of Labor Market Experience (NLS). The NLS provides data over a long period of time for the same individuals for selected cohorts of the population. These surveys contain a rich body of labor market and related information and permit analyzing issues that cannot be explored with cross-sectional or short-term longitudinal surveys. Data are collected and disseminated through contracts with private sector organizations. Data are currently collected biennially for the Mature Women's cohort and the Young Women's cohort, which were begun in the late 1960's, and for a Youth cohort (NLSY) begun in 1979. Data collection will begin for a new youth cohort early in 1996. Data will be collected annually for a

sample of about 12,000 youths aged 12-17 as of January 1, 1996.

B. Other Labor Market Information

Major sources of information relating to labor markets collected by other agencies are briefly described in this section.

1. Establishment Surveys

Censuses, Annual Surveys, and the Longitudinal Research Datafile (LRD). The Census Bureau conducts a quinquennial Census of Manufactures. The sample for a parallel survey, the Annual Survey of Manufactures (ASM), is drawn from the preceding census. Generally speaking, both the census and ASM contain data on firms with five or more employees. Information is collected on revenues, number of products sold, and costs of about ten broad classes of inputs, including labor. Two types of employment data are available. Data on total employment and on production worker employment are available for the payroll period including March 12. Data on production worker employment only are available for payroll periods including the 12th day of February, May, August, and November. Data on the average establishment production-worker wage are also available. The Census Bureau, beginning in the 1970s, has developed and maintained a longitudinal file, now called the Longitudinal Research Database (LRD). The LRD file contains census data beginning for 1963 and ASM data for all manufacturing establishments sampled in the ASMs beginning in 1972. The LRD file has been used for many research studies that could not have been done with other types of U. S. data.

Data for services industries are much more limited. In 1992, all previously uncovered services industries were added to the economic censuses. Not all industries are presently covered in annual surveys, and content varies by industry. Only two of the annual surveys for services (for SICs 42 and 48) collect information on payrolls, and none on employment.

County Business Patterns (CBP). This program provides annual information from Internal Revenue Service administrative records. Outside the Census Bureau, information is available on the number of establishments, employment the week including March 12, and first-quarter and annual payroll for states and counties by 2-digit SIC and by more detailed SIC where

publication/confidentiality rules are met.

2. Household Surveys

The Panel Study of Income Dynamics (PSID). The PSID, presently funded by the National Science Foundation and conducted by the University of Michigan Survey Research Center, began in 1968. Individuals from these households have been followed over time with annual interviews. Children born to the sample members become part of the sample. In addition, data have been collected for a supplemental national sample of Latino households beginning in 1990. The PSID has focused primarily on economic well-being and provides a rich body of information including considerable employment-related information.

Survey of Income and Program Participation (SIPP). SIPP and its predecessor, the Income Survey Development Program data, were developed primarily to provide improved and expanded short-term information on participation and turnover in government programs and on sources of income. In the early 1980's, the Census Bureau was given responsibility for the program. SIPP data, collected every four months, provide considerable information on employment and related variables and also on various special topics. SIPP data are less timely than CPS and the labor force concepts differ between the two surveys. SIPP has recently been undergoing a redesign; plans call for a four-year panel survey. Design work is underway for a separate annual follow-on survey.

Decennial Censuses. The Decennial Census of Population obtains basic information for the entire U.S. population. Smaller samples of the population have received long-form questionnaires which provide more detailed demographic, socioeconomic, and housing data. The size of the samples has varied over time. Microdata from the decennial Censuses are available on various public use tapes for 1940 and later years. These data have been particularly useful for studies where a very long time period is of interest or where a very large sample is required. Planning is underway at the Census Bureau for the 2000 Census.

III. ISSUES IN ANALYZING SERVICES DATA

As can be seen from the previous summary of U.S. labor data sources, most do include

data on services industries. This section considers instances where services data are lacking and other instances where differences in survey design or data collection may affect comparisons of employment or compensation in goods- versus services-producing industries. It also addresses issues relating to the use of labor data in the national accounts and for productivity measurement.

A. A Case of Lack of Data: Gross Job Creation and Destruction

In recent years, there has been considerable interest in measuring and analyzing job gains and losses within firms and establishments. As Hamermesh (1994) points out, this is an area where the availability of data for the U.S. has lagged behind that of many other countries. Only recently have government data for the U.S. (from the Census Bureau's LRD file) been used for this purpose by Davis and Haltiwanger (1990) and others at the Census Bureau. Unfortunately, those data refer only to manufacturing.[3] Is this an instance where a new paradigm will be established based only on manufacturing that will not apply to the U.S. as a whole? Information from the Organization for Economic Cooperation and Development (1994, pp. 114-5) suggests the answer is likely to be yes unless suitable information is developed for services. Data they present for countries other than the U.S. show that turnover (the sum of gross job gains and gross job losses) was higher in services than in manufacturing for all of the seven countries considered except for Italy. Controlling for differences in net employment change between manufacturing and services by looking at excess job turnover (the difference between job turnover and net employment changes) reduces the differences between manufacturing and services in most of the countries. But excess job turnover is also greater for services than for manufacturing for all the countries except Italy. A more complete analysis would require looking at more detailed industries, since the amount of job churning in general will be expected to be greater the more diverse the establishments or firms included.

Currently there is an effort underway at BLS to develop longitudinal microdata files of

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[3]Information collected in the private sector by the Dun and Bradstreet Corporation that does include services industries was developed into a database by the U.S. Small Business Administration and has been used in some studies. Major problems with the quality of these data are summarized in O.E.C.D. (1994, p. 108)

ES-202 data and to publish information on gross employment flows and other new measures for all industries. In addition to the importance of making available high-quality gross flows measures for services industries, a major benefit of this effort is that information on subannual flows, probably quarterly flows, will be provided.

Also, there has been discussion of a proposal to create a wage records data base from the Unemployment Insurance system administrative records. This would provide information on workers within the establishment which is currently lacking for the U.S. for both goods and services industries.

B. Differences in Concept and Coverage: Are Earnings and Hours Comparisons Affected?

The CES program provides series on earnings, hours, and average hourly earnings that are much watched in the U.S. because of their timeliness and industry detail. Comparisons between goods- and services-producing industries appear to be problematic because the stated concept differs between these sectors. In manufacturing, "production" workers are included, and similarly in mining and construction, but in services, "nonsupervisory" workers are included. For example, secretaries and non-supervisory accountants would be included in service sector industries but not in goods-producing industries. The fraction of employees for whom earnings and hours are available differs considerably between goods and services: 70.1 percent in goods and 85.2 percent in services in 1993. The following three subsections explore whether using these data to compare the situation in manufacturing and services provides a different picture than if measures with more comparable coverage were used. The uses of these data in the National Accounts and in productivity measurement are also considered. To help assess differences in series due to which employees are covered, the analysis utilizes series constructed from the CPS by Abraham, Spletzer, and Stewart (1994) for their paper assessing differences in wage series. It is important to note that there are differences in earnings and hours concepts between the CPS and the CES.[4] But using a single data source should help isolate the effect of

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[4]For one thing, the CPS measures earnings and hours on the main job, while the CES includes all jobs. But Abraham, Spletzer, and Stewart note that there have not been significant changes in

different decisions regarding what workers to compare. Other types of coverage differences that may affect comparisons between the goods and services sectors are briefly noted in the fourth subsection.

1. Earnings Comparisons and Uses in the National Accounts

Three earnings series constructed by Abraham, Spletzer, and Stewart using the CPS are presented in Figure 1 for both goods and services. Government workers are excluded from calculation of these CPS series to make them comparable to the CES, which collects earnings and hours data only for private industries. Thus, the most comprehensive CPS series shown here includes all private industry workers. The series attempting to replicate the stated CES concept with the CPS data is termed the "CES replication"; this series uses the ECI-identified comparable definition to the CES concept. The series for non-exempt workers attempts to include all workers who are covered by ("non-exempt" from) the laws concerning overtime pay and for which businesses need to be able to provide information.[5] Use of a different concept between goods and services (in the CES replication series) distorts the comparison of sectoral trends as compared to comparisons based on the other two CPS series, which use the same concept. That is, the CES replication series shows a sizeable decline in the upward trend of earnings for goods but not for services, whereas the series for all private industry workers does not show this decline for either major sector, and the non-exempt series shows this decline for both sectors.

The actual CES series for average weekly earnings are also presented in Figure 1. For goods, the actual CES series tracks the CPS all private industry worker series very well until about 1985, when it begins rising more slowly. Over the whole period, for this sector, the trends from both the CES replication series and the non-exempt workers series are quite similar to the

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the extent of multiple-jobholding, so trends should not be affected.
[5] Abraham, Spletzer, and Stewart's non-exempt sample consists of hourly paid workers plus workers who have little or no discretion in how they do their jobs. For workers who were not paid hourly, the authors made a judgment as to whether or not workers exercised discretion based on their CPS occupation. Household measures of occupation are understood to involve error, but unless there is systematic error these comparisons will not be affected.

actual CES trends, although the levels are different. For services, the actual CES series looks most like the non-exempt series, although the rate of increase in the former becomes notably slower in more recent years. Abraham, Spletzer, and Stewart concluded that for services the non-exempt sample replicates the actual CES average hourly earnings series much better than does the CES replication sample. This suggests that to some extent the CES may be capturing non-exempt workers rather than all nonsupervisory workers.

As noted above, the CES earnings data are used by BEA in preliminary estimates of the National Income Accounts. How does the restriction of earnings data to production and nonsupervisory workers affect this use?[6] A detailed analysis of this issue, which would include looking at ES-202 data and the Censuses and Annual Surveys of manufacturing industries is beyond the scope of this paper. However, examining the weekly earnings series constructed by Abraham, Spletzer, and Stewart using CPS data allows us to compare movements of series for various groups of workers. For both the goods and services sectors, it appears that for many periods a simple extrapolation to account for the different trends between all employee earnings and either the CES replication series or the non-exempt series would work reasonably well. But this would not appear to be the case around 1983 when the trend for all workers changed less sharply than the trend for both of the other CPS series for goods and the trend for all workers in services changed much less sharply than the non-exempt series. The downswing (from the upward trend) in all employee earnings in 1989 is not captured in either of the other CPS series for goods or in the non-exempt series for services. An examination of complex adjustment methods is beyond the scope of this paper. However, it is important to note that a dynamic economy is constantly changing and even if successful methods for estimating all employee earnings using data on a subset of workers exist at present this would not guarantee that such methods would be as successful in the future.

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[6]In a response to the recommendations in the American Statistical Association (1994) report, BEA has stated its desire that the CES program collect information on earnings, including nonproduction bonuses, for all workers that cover the entire month.

Another major use of the CES earnings data is by state governments for estimating income and sales tax receipts they will receive from their residents; such estimates are particularly important given the obligation of state governments to balance their budgets. These state estimates will confront the same problems as BEA's preliminary estimates due to incomplete coverage of earnings.

A major redesign of the CES is beginning and an important issue concerns whether to continue the present earnings measure, to add an all employees measure, or to change the measures in some other way.

2. Hours Series and Uses in Productivity Measurement.

Figure 2 presents information from Abraham, Spletzer, and Stewart's dataset based on the CPS for various groups of workers and from the CES on average weekly hours in both goods and services industries. In general, for each major sector, while the levels are different, the movements of the various CPS series are quite similar even though different workers are included. While 1982-83 is a notable exception, it should be noted that new industry and occupational coding went into effect in the CPS in 1983 which may cause spurious movements from 1982-83 in the CES replication series and the non-exempt series. For goods-producing industries, the various CPS series move notably differently from 1991 to 1992 but this is not the case for services. The actual CES hours series are quite different than any of the CPS hours series. For goods, hours estimates from the CES are lower and show greater movements than do any of the CPS series for the period 1973-83, while after 1983 the actual CES series is similar on average in level to the non-exempt series but sometimes moves in a different direction than do the CPS series. For services, the difference is striking, with the CES hours estimates generally falling throughout the period while the CPS estimates have do not have this strong trend and fluctuate more. Because the hours differences between the CES and all the CPS series are so dramatic, and differ so much between the first half and the second half of the period, it does not appear that different coverage of workers could account for the difference.

Robinson and Bostrom (1994) analyze the precision of hours data from CPS-like

questions as compared to time-diary reports. They conclude that the former may involve some overstatement of hours and that this overstatement may have grown over time. Yet the fact that the CES and CPS series diverge over the period after 1982 for services but not for goods calls into question whether the CPS is really overstating hours and doing so increasingly. One possibility that needs to be explored further is the impact of multiple job-holding on differences between the CPS and CES hours series.

BLS's series on labor productivity in the business sector and its major components as well as the series on labor productivity for individual industries rely on various BLS sources for data on total employee hours (which is the measure of labor input used). CES data on hours of production and nonsupervisory workers are used in constructing the productivity measures but because neither the CES nor other establishment sources provide hours estimates for nonproduction and supervisory workers, hours for these workers must be estimated.[7] For manufacturing, estimates of hours of nonproduction workers have been developed from BLS studies of wages and supplements in manufacturing. For nonmanufacturing, hours are assumed to be the same for supervisory workers as for nonsupervisory workers as measured in the CES. To the extent that assumptions made in productivity measurement about hours of workers excluded from the CES data distort the true measures, comparisons of productivity growth between goods and services of course will be affected, but given the dramatic differences between the CPS and CES hours data further analysis is needed to reach any firm conclusions about the likely effect, if any on comparisons between these sectors. It does appear from the CPS calculations that supervisory hours are higher than nonsupervisory hours for services. The trends are roughly the same, but the ratio of nonsupervisory to all private employment in services has changed (fallen) only slightly, from 87.7 percent in 1973 to 85.2 percent in 1993. Therefore, the assumption that hours are the same for supervisory as for nonsupervisory workers is not

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[7]CPS data are used for farm employment; proprietors, unpaid family workers, and paid employees of private households; and average weekly hours only in government enterprises. In addition, a separate survey, The Hours at Work Survey, is used to convert the hours paid of nonagricultural production and nonsupervisory workers to an hours-at-work basis.

likely to have had a great impact on conclusions regarding productivity change in services industries for the period considered here.

3. Analyzing Trends in Wage Rates

For the last ten years in the U.S., there has been widespread attention to the issue of the lack of growth in real wages and changing relative wage and income distributions. Related to this has been concern about the decline of manufacturing jobs and growth of such stereotypical poor-quality service-sector jobs as hamburger flippers. Clearly, analyzing such issues requires comparable data for goods and services. Most of the research on these questions has been based on household data, primarily CPS data, where comparability is not an issue. However, precision of industry classification is poorer in household surveys than in establishment data, and household surveys provide much less industry detail. Therefore, it is desirable to be able to look at these topics using establishment data.

Table 2 presents information on the growth of real hourly earnings in the U.S. from 1973 to 1993 based on the series Abraham, Spletzer, and Stewart constructed using the CPS; it also presents the actual CES data. All of these series are converted to measure real average hourly earnings in 1993 $ using the CPI-U-X1 series. The first three rows of Table 2 present the series constructed from the CPS; the averages are hours-weighted as is done in the AHE series (i.e. total wages for a group of employees are divided by total hours of that group of employees.) These series will be affected by changes in employment of less experienced workers, in occupations, and in differences in full-time/part-time status (to the extent such workers are paid at different rates) that occur over the business cycle or over time.

For goods-producing industries, there is relatively little difference in real hourly earnings growth between the CES replication sample and the sample of non-exempt workers, but for services the difference is quite large. In fact, for services the CES replication series moves very much like the series for all workers although the levels are different. Using any of these series, we conclude that the growth of real wages in service-producing industries has been greater than in goods-producing industries. However, the magnitude of the differences varies considerably

among the definitions, and the CES replication series which uses concepts which are noncomparable between sectors (which is what the CES states is done) exaggerates the difference as compared to series using the same concept for the goods and services sectors. For goods, the movements of the actual AHE series from the CES (but not the level) are somewhat similar to the movements of both the CES replication series and the non-exempt workers series. This is not the case for services (and the differences would be even greater if it were not for the relative decline in CES hours). However, the non-exempt series is more similar to the actual AHE series than is the CES replication series.

Table 3 presents these data in a different way, showing the ratio of real wages in the service-producing sector to real wages in the goods-producing sector in 1973 and 1993. Using the stated CES concept with the CPS data results in a conclusion that real hourly earnings in 1993 were as high in services as in goods, but looking at rows 1 and 3 shows that this is not the case when included workers are defined in a comparable way across sectors. The ratio of hourly earnings in services relative to goods from the CES is closest to the CPS nonexempt series ratios. Thus, the AHE does not actually provide the misleading view of wages in services versus goods industries that would be provided if the stated concept were measured precisely.

4. Coverage of All Workers

In addition to sometimes focusing on only production and nonsupervisory workers, various countries' establishment surveys occasionally exclude workers in small firms and typically exclude the self-employed. This latter omission, as noted by Orchard and Stibbard (1993), affects different sectors of the economy differently; notably, certain services industries will be greatly underrepresented. For understanding the labor market situation, it is critical to have at least some data that cover all of these workers. For instance, for analyzing whether real earnings are declining and what is happening to low-paid workers relative to the more highly paid, it is important to have complete coverage. This is a major advantage of household data.

C. Aspects of Data Collection

Even when the same information is collected for goods and services, various aspects of

survey design may complicate comparisons. As already noted, the OES explicitly surveys different industries in different years, making short-term comparisons difficult. While the OES industry-based rotation may not be particularly problematic for its uses in vocational and educational planning, it would complicate analytic comparisons among industry groups. The EBS strategy of surveying large and medium-sized establishments one year and small establishments the next year would clearly complicate overall comparisons across industries since the size of establishments differs considerably among industries.

Even when surveys collect comparable information on both goods- and services-producing industries for the same time period, there may be aspects of survey design that may affect comparisons. A primary example of this is the use of sample rotation plans that differ by industry. In the ECI program, sample replacement for different industries has occurred on different cycles. Although this would be expected to have negligible impact on comparisons of compensation between industries over long periods of time, it could have notable impacts for shorter-term comparisons. The program is planning to drop industry as the primary basis for sample replacement.

Another recently identified source of differences by industry occurred in the way SIC refiling was done by BLS. Industry classification was done on a three-year cycle by industry. This resulted in apparant changes in net employment flows by industry. Beginning in 1996, this will no longer be done on an industry basis.

D. Detail for Goods versus Services

Because the present U.S. Standard Industry Classification (SIC) system has less detail for services than for goods-producing industries, even when data are provided for all 4-digit industries there is necessarily less detail on services. The U.S. statistical agencies (BEA, BLS, and the Census Bureau) have joined with Statistics Canada and INEGI to develop an improved industry classification system, termed the North American Industry Classification System (NAICS). NAICS will group establishments into industries based on similarities in production process. This effort should expand the service sector detail in the classification system and

improve its usefulness for many important purposes such as productivity measurement.

In addition, BLS has been spearheading an ongoing effort to revise the U. S. Standard Occupational Classification system.

IV. CONCLUDING REMARKS

We are fortunate in the U. S. that labor data are provided for both goods-producing and services-producing industries and that these data provide timely, detailed, monthly or quarterly information. But in some cases data have been provided for proportionally fewer detailed services industries and in addition the existing classification system has less detail for services. For some specific purposes, comparisons across sectors are less than ideal for other reasons as well. Efforts are underway at present to address a variety of needs, as noted above.

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TABLE 1

SERVICE SECTOR COVERAGE IN SELECTED
BLS LABOR DATA SERIES

Data Series	Frequency	Service Sector Coverage
Employment and Wages Covered by UI (ES-202)	Monthly employment; quarterly wages	All 4-digit SICs
Current Employment Statistics Program (CES)	Monthly	All 2-digit SICs; most 3-digit SICs; some 4-digit SICs
Occupational Employment Survey (OES)	Every 3 years	All 3-digit SICs
Employment Cost Index (ECI)	Quarterly	All major industries; 8 2-digit SICs; 3 3-digit SICs

TABLE 2

Percent Change in Real Hourly Earnings in Goods-
Vs. Services-Producing Industries, 1973-1993

Series	Goods	Services
Private Industry Workers	- 1.0%	4.5%
CES Replication	- 9.6%	4.3%
Non-exempt Workers	- 8.1%	-2.8%
Actual CES	-10.2%	-6.3%

SOURCE: See text.

TABLE 3

Real Hourly Earnings in Services-Producing Industries as a Share of
Real Hourly Earnings in Goods-Producing Industries

Series	1973	1993
Private Industry Workers	.86	.90
CES Replication	.87	1.01
Non-exempt Workers	.82	.86
Actual CES	.80	.83

SOURCE: See text.

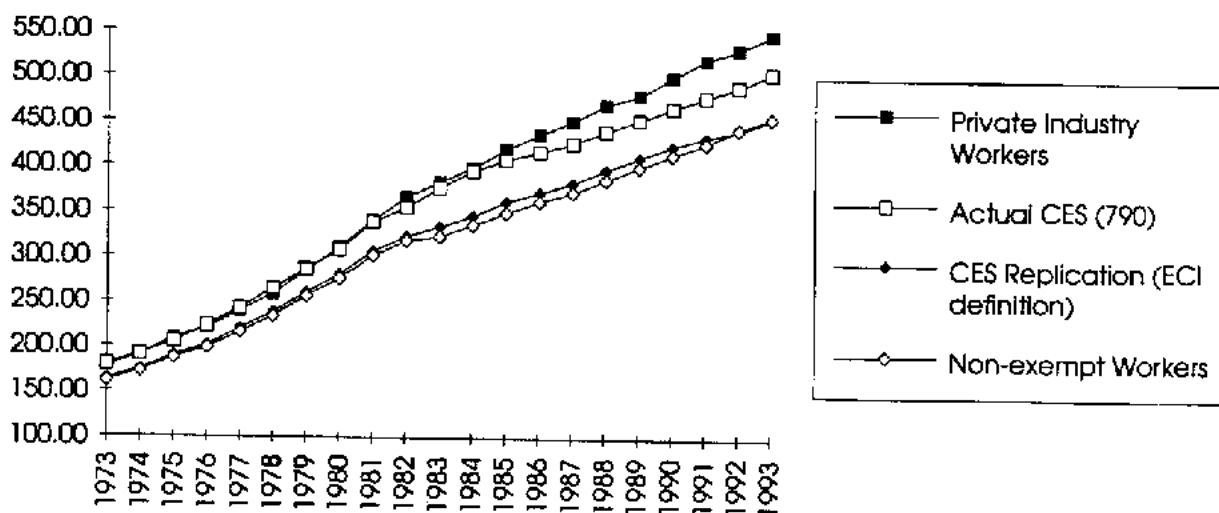## Figure 1a: Average Weekly Earnings in Goods-Producing Industries (in current dollars)

Legend:
- Private Industry Workers
- Actual CES (790)
- CES Replication (ECI definition)
- Non-exempt Workers

Figure 1b: Average Weekly Earnings in Service-Producing Industries (in current dollars)

Legend:
- Private Industry Workers
- Actual CES (790)
- CES Replication (ECI definition)
- Non-exempt Workers
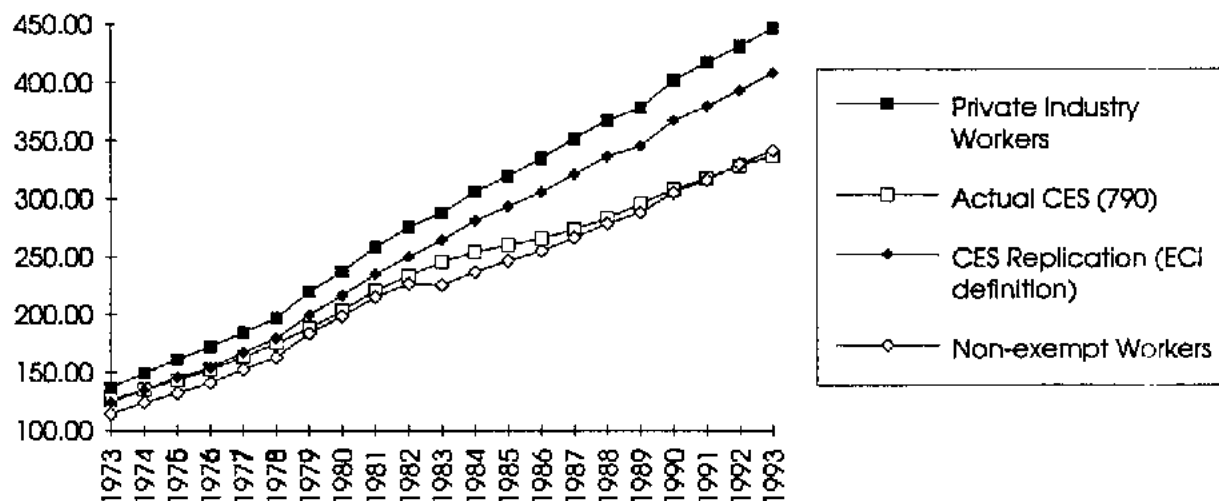
Figure 2a: Average Weekly Hours in Goods-Producing Industries

Legend:
- ■ Private Industry Workers
- □ Actual CES (790)
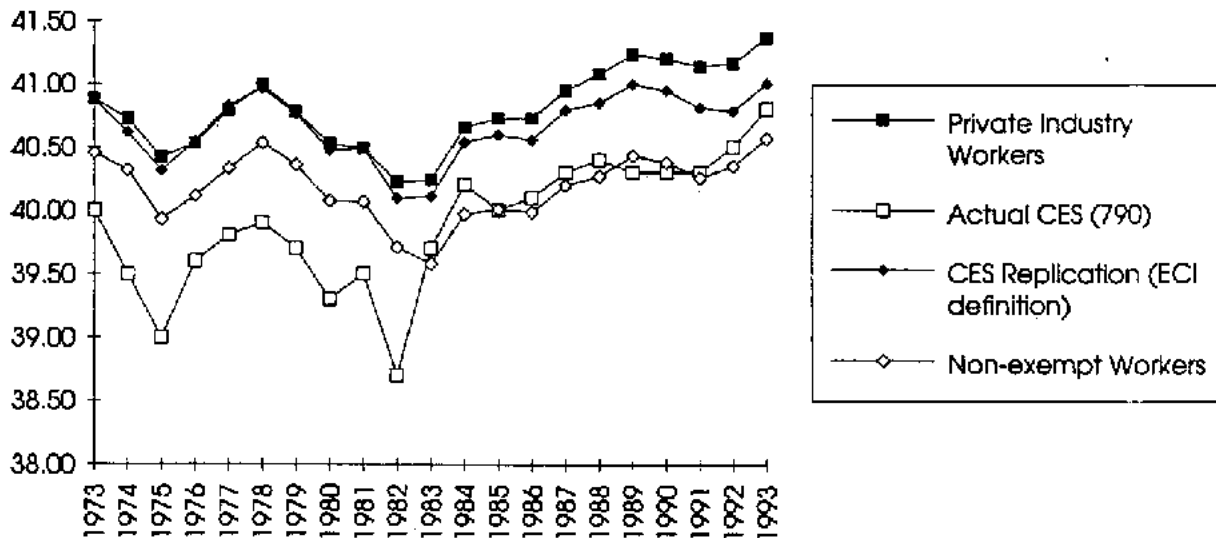- ◆ CES Replication (ECI definition)
- ◇ Non-exempt Workers

Figure 2b: Average Weekly Hours in Service-Producing Industries

Legend:
- ■ Private Industry Workers
- □ Actual CES (790)
- ◆ CES Replication (ECI definition)
- ◇ Non-exempt Workers