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Challenges and Opportunities*

Susan G. Powers, U.S. Bureau of Labor Statistics
Robert E. Yuskavage, U.S. Bureau of Economic Analysis

For additional information please contact:

Susan G. Powers
U.S. Bureau of Labor Statistics
2 Massachusetts Avenue NE
Washington, DC 20212
E-Mail: powers.susan@bls.gov
FAX: (202) 691-5664
Telephone: (202) 691-5894

Robert E. Yuskavage
U.S. Bureau of Economic Analysis
1441 L Street NW BE-40
Washington, DC 20230
E-Mail: robert.yuskavage@bea.gov
FAX: (202) 606-5366
Telephone: (202) 606-9672

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Productivity Measurement in a Decentralized Statistical System: Challenges and Opportunities¹

Susan G. Powers (BLS) and Robert E. Yuskavage (BEA)

I. Introduction

A decentralized statistical system faces many challenges in its efforts to provide consistent, coherent, and reliable economic statistics. Perhaps the area that is most likely to be affected by these challenges is productivity measurement because of the need for consistent measures of both output and input, each of which may come from several different sources. Although the U.S. statistical system is not centralized, the major statistical agencies--the Bureau of Labor Statistics (BLS), the Bureau of Economic Analysis (BEA), and the Census Bureau--work together as partners to provide a complete picture of economic activity and to ensure consistency and reliability.

These three statistical agencies provide nearly all of the data used by the BLS to prepare the official U.S. estimates of productivity growth. A major ongoing challenge for a decentralized statistical system, in addition to insuring reliability and coherence in its economic statistics, is avoiding duplication while meeting the needs of its major customers and fulfilling important agency mandates. For the U.S. statistical system, a more recent additional challenge is the need for a coordinated conversion of historical industry series used for productivity measurement to the North American Industry Classification System (NAICS).

This paper describes a collaborative effort by BEA and BLS aimed at creating integrated "production accounts" for the business sector and for the entire economy that include industry data on a NAICS basis. Developing integrated production accounts is one of several joint BEA-BLS projects that are designed to improve the quality and consistency of the data available for U.S. output and productivity measurement. So far, this effort has focused on better integrating the BEA national income and product accounts, input-output accounts, industry output measures, and the BLS productivity statistics. While the need to convert industry data series to NAICS is an extra challenge,

¹ Portions of the material in this paper were first presented in Fraumeni, Harper, Powers, and Yuskavage (FHPY) and in related presentations by the same authors at the June 10, 2005 meeting of the Federal Economic Statistics Advisory Committee.

it also provides opportunities to incorporate information that reconciles and better integrates the data, providing an improved basis for constructing a production account.

This paper also updates previous empirical work that presented illustrative integrated aggregate production accounts that showed how existing BEA and BLS measures could be better harmonized and that provided a crosswalk to facilitate comprehensive, integrated analysis of growth and productivity. The updated estimates incorporate the most recent data from the comprehensive revisions of BEA's national income and product accounts (NIPAs) and annual industry accounts (AIAs) that were released in December 2003 and June 2004. These estimates also incorporate the most recent revision of the BLS multifactor productivity (MFP) estimates that were released in March of this year. We also present new comparisons of BEA and BLS industry output measures on a NAICS basis and describe improvements that are planned to further reduce differences. Finally, we discuss recent inter-agency efforts to prepare historical industry production accounts on a NAICS basis and recently released historical estimates presented on a NAICS basis.

II. Background on the U.S. Statistical System

The U.S. statistical system is largely decentralized. Production data come from three statistical agencies--BEA, BLS, and the Bureau of the Census (Census)--as well as from other sources. Accordingly, constructing an integrated aggregate production account requires an interagency joint effort, which BEA and BLS have undertaken. Most of the aggregate production data are compiled by BEA and are then used by BLS, along with its own estimates of inputs, for its multifactor productivity estimates. Understanding how the BEA and BLS output and input measures are constructed and how they relate to one another is an important part of developing an integrated set of production accounts for sectors and industries.

This section discusses the productivity-related estimates produced by BEA and by BLS and the source data underlying those estimates. It also discusses differences in agency objectives and priorities, ongoing efforts to coordinate activities, and some of the initial challenges and opportunities associated with the conversion to NAICS. This section starts with a description of the aggregate measures published by BEA and by BLS, moves on to a discussion of industry measures, and then briefly describes the

relationship of the industry estimates to the aggregate estimates. The focus of this section is on the source data used to prepare the estimates and how these estimates relate to one another. A later section discusses sources of differences among the estimates in more detail.

II.a Source Data for Aggregate Measures

BEA prepares the quarterly and annual estimates of gross domestic product (GDP) using a wide variety of source data from several statistical agencies and private organizations. Most of the data are collected by Census, BLS, and the Internal Revenue Service (IRS). GDP is measured as the sum of final uses of goods and services (product side) and as the sum of incomes earned in production (income side). Nominal product-side estimates are primarily based on data collected by Census on manufacturing shipments and inventories, wholesale and retail trade sales and inventories, the value of new construction put-in-place, and sales of services. Both Census data and BEA data are used to measure exports and imports. Government consumption and investment estimates are also based partly on Census data. The income-side measure--gross domestic income (GDI)--is primarily based on BLS data on labor income and IRS data on capital income; Census data on corporate profits are used for the quarterly estimates. Real GDP is computed using price indexes primarily collected by BLS, including the consumer price index (CPI) and the producer price index (PPI).

BLS prepares the quarterly and annual estimates of the output, input, and productivity of major sectors of the economy, such as business, nonfarm business, private business, and private nonfarm business. The BLS sectoral output measures are based on BEA's product-side estimates of GDP adjusted to exclude general government and other sectors for which data are not adequate for productivity measurement. BLS prepares its own estimates of labor input and capital services input for each sector. Labor input estimates are largely based on the same BLS labor data used by BEA for the GDI estimates, supplemented with household survey data for the self-employed and unpaid family workers. The BLS estimates of capital services are prepared partly using BEA data on fixed investment by type of asset; BEA data on labor and capital income by industry are used as weights to combine labor and capital inputs for computing multifactor productivity.

II.b Source Data for Industry Measures

BEA prepares annual input-output (I-O) accounts and related estimates of gross output, intermediate input, and value-added by industry (GDP-by-industry) using largely the same Census, BLS, and IRS source data used for the product and income side estimates of GDP. This is possible because each of these data sources has an industry dimension. Estimates are provided for all private industries at approximately the three-digit NAICS level and for government, and these industry estimates are entirely consistent with GDP in definition and coverage. Nominal value added by industry estimates are initially based on the industry distributions of GDI, but are adjusted in a balanced I-O framework to be consistent with NIPA final expenditure estimates. Separate estimates of labor income and of capital income are also available by industry. BEA's benchmark I-O accounts, which are based on data collected by Census in the five-year economic censuses, are used to benchmark not only the product-side GDP estimates, but also key components of BEA's integrated annual I-O and GDP-by-industry estimates, including intermediate purchases of energy, materials, and services. Both PPIs and CPIs are used for the deflation of gross output and intermediate inputs as part of computing real value added by industry.

BLS prepares quarterly labor productivity estimates for manufacturing sectors, and annual labor productivity estimates for selected detailed manufacturing and non-manufacturing industries. BLS also prepares annual multifactor productivity estimates for manufacturing sectors and is preparing multifactor productivity measures for manufacturing industries at the three- and four-digit NAICS level. The output and input estimates used for these productivity measures are largely based on the same sources used by BEA for comparable components of the GDP-by-industry estimates. Census annual survey data and BLS price index data are used for nearly all of the industry output measures in manufacturing, and for most of the output measures in non-manufacturing. BLS employment data are the starting point for preparing industry labor input estimates. BLS uses BEA's data on fixed investment by type of asset and by industry to prepare its own estimates of capital services for the manufacturing multifactor productivity estimates. Intermediate input estimates are prepared using both BEA and BLS I-O tables.

The BEA/BLS aggregate sectoral output measures are prepared using a top-down approach that starts with product-side GDP from the NIPAs and excludes the value added

of selected sectors, such as government and nonprofit institutions, in order to obtain value-added output for nonfarm business and other sectors appropriate for productivity analysis. Researchers who are interested in studying industry contributions to output and productivity growth, however, often construct sectoral output measures from the detailed industry value-added data in BEA's GDP-by-industry Accounts (e.g., Nordhaus, Triplett and Bosworth). Aggregates constructed from this bottoms-up approach, however, in the past have not necessarily been consistent with those constructed from the top-down approach because of differences in methodology and source data (Moyer, Reinsdorf, and Yuskavage). Recent changes in methodology that were introduced in BEA's integrated annual industry accounts have increased consistency and coherence between the aggregate and industry-based measures, but differences still remain. (See Lawson, Moyer, Okubo, and Planting for more information about the new methodology.)

II.c Agency Objectives and Priorities

The BEA and BLS economic accounts and related programs have evolved over time to meet particular needs. BLS primarily seeks to achieve maximum reliability in its various measures of productivity and can focus on those industries for which measures are quite robust. BEA strives to provide complete and consistent coverage of the entire economy. These objectives are not necessarily inconsistent but they can lead to different choices about source data and methodology. Each agency thus publishes a variety of measures, and each follows procedures that balance a variety of customer requirements. These include the need for timely release of detailed information, for long historical time series, to use the best data sources, and to use assumptions that are consistent with economic theory. In addition, each agency's programs have unique needs, such as the need for national accounting measures that aggregate consistently and the need for productivity statistics that match the coverage of input and output data.

The growth and improvement in each agency's programs, coupled with differences in objectives, have led to cases of overlapping and sometimes conflicting measures for the same industry or sector, both between and within BEA and BLS.²

² Differences between the BEA and BLS data have led some researchers to construct their own sets of measures, particularly for studying the "new economy" of the late 1990's. For example, Jorgenson (2003) used a hybrid of BEA and BLS data to construct estimates of productivity. Nordhaus (2002) showed that the use of income-side measures instead of product-side measures can lead to a different attribution of

These differences hinder integrated analysis of the sources of productivity growth and force researchers to either choose one set of estimates over the other, or to develop their own estimates. In theory, consistency is possible but source data fall far short of what would be required. Source data deficiencies are typically resolved by using different assumptions in different measurement programs, which often leads to inconsistencies. While the agencies have worked hard to avoid duplicative efforts and differences in measures, the competing customer requirements have tended to frustrate efforts to eradicate differences. The differing purposes sometimes lead to differences in definition (such as value added or gross output), coverage (government is omitted from the featured aggregate productivity measures because output is based on inputs) or methodology (index number formulas used in each program have evolved progressively but sporadically³). Differences also arise from choices among alternative and inconsistent sources of underlying data, especially at detailed industry levels.

II.d NAICS Conversion Challenges

Several years ago the U.S. statistical system started the process of converting its industry series from the Standard Industrial Classification (SIC) system to the new NAICS. In general, NAICS improves on the SIC as an industry classification system because it more consistently classifies establishments into industries on the basis of similar production processes, it recognizes new and emerging industries, and it provides greater detail for the services sector. This conversion process started with the primary data collection agencies--Census and BLS--assigning new industry codes to respondents in the 1997 economic census and in the monthly, quarterly, and annual surveys that collect the source data needed for both aggregate and industry output and input measures.

Each of the three agencies has either completed or is nearing the completion of a major effort to provide both near-term and historical industry statistics on a NAICS basis. Now that survey data are available on a NAICS basis, the final step has been to convert “downstream” programs that use tabulated raw data from a variety of data sources to create more intricate measures. Examples are the BEA programs on national accounts,

productivity to industries. Triplett and Bosworth (2004) documented how productivity estimates may differ significantly for broad sectors depending upon whether BEA or BLS data are used.

³ In 1983, BLS introduced a superlative index formula (the Tornqvist) to aggregate components of its multifactor productivity estimates. In 1996, BEA introduced a Fisher index-number formula to aggregate components of the NIPAs. Research has consistently shown that the choice between these two superlative price and quantity index formulations makes little difference in practice.

industries, and states and the BLS programs on productivity and employment projections. However, the ability of statistical agencies to provide NAICS-based industry time series has been hampered by the lack of NAICS source data for years before 1997. Conversion to NAICS has raised new challenges for developing industry time series and historical production accounts, but it has also presented some opportunities for improving methodologies and changing procedures to incorporate better source data. The timing of the NAICS conversion of these downstream programs coincides with the collaborative effort to better integrate the BEA national accounts, input-output accounts, industry output measures, and the BLS productivity statistics.

III. Integrated Aggregate Production Account

Production accounts that are suitable for studies of economic growth, productivity, and structural change match outputs with the inputs used to produce them, typically both at the aggregate and industry levels and frequently for large sector sub-aggregates. These accounts must consist of both nominal (current-price) and real (constant-price) accounts. Aggregation over the cells of the real account is performed using index number formulas with weights from the nominal account. The general formulation, which was presented in considerable detail in Chapter 2 of FHPY, is an elaboration and refinement of the production account proposed by Jorgenson, Gollop, and Fraumeni (1987). It is general enough to examine issues related to the scope of the accounts, such as which inputs and outputs to exclude in moving from the aggregate level to a large sector sub-aggregate.

Input-output supply and use tables play an important role in organizing the detailed data on industry and commodity output, imports, price indexes, labor and capital inputs, and returns to labor and capital into a coherent methodological framework. None of the production accounts that underlie the BLS productivity measures use this general formulation because the large database needed to implement it is unavailable and constructing that database would require many assumptions and additional resources. BEA has recently taken some steps in that direction through the development of its integrated annual industry accounts program, which includes GDP-by-industry estimates prepared on a NAICS basis in a balanced I-O supply and use framework. Many of the source data and methodology issues discussed above, however, would still need to be

resolved before these accounts could be used to develop multifactor productivity estimates.

III.a Aggregate Production Account

Table 1 presents an updated version of the illustrative integrated aggregate production account for 2000 that was first presented in FHPY for 1996. This production account depicts the relationship between GDP and the two major sectors for which BLS provides estimates of multifactor productivity: Private business and private nonfarm business. In addition to providing data for 2000 rather than for 1996, the contents and structure of this table differ from table 1 in FHPY because it incorporates the changes in concepts, definitions, and terminology that were introduced in the 2003 NIPA comprehensive revision and in the March 2006 revision of the BLS MFP estimates. All of the entries in the table, with the exception of lines 9b-iv and 13b-iv, can be derived from BEA or BLS data available on each agency's website

Perhaps the most important change in table 1, and one that highlights the high priority that both BEA and BLS place on developing an integrated production account, is BEA's redefinition of the business sector to match the BLS definition. Before the December 2003 NIPA comprehensive revision, BEA defined the business sector to include owner-occupied housing and the rental value of nonresidential assets owned and used by non-profit institutions serving individuals. BLS excluded these sectors and used BEA data to make the necessary adjustments. Now both agencies define the business sector the same way so BLS no longer needs to make adjustments. BEA's estimate for the household sector (line 2a in table 1) now includes the gross value added of farm and nonfarm owner-occupied housing plus the compensation of household workers. As before, the business sector for both BEA and BLS excludes the gross value added of nonprofit institutions serving households (line 2b) and the gross value added of general government (line 3.) Because of the changes in definition, gross domestic business product (line 4) is now equivalent to BEA/BLS business sector output (line 7).

BLS provides multifactor productivity estimates only for the private business sector because of the difficulty with estimating output independently of inputs for the household, nonprofit institutions, and government sectors. The gross value added of federal and state and local government enterprises from BEA's GDP-by-industry Accounts program is deducted from business sector output to arrive at private business

| Table 1 Aggregate Production Account, 2000 (Billions of dollars) | |
|--|---------------|
| 1. Gross Domestic Product (NIPA Table 1.3.5, line 1) | 9817.0 |
| 2. - Households and Institutions (NIPA Table 1.3.5, line 5) | 1080.7 |
| 2a. Households (NIPA Table 1.3.5, line 6) | 615.6 |
| 2b. Nonprofit Institutions Serving Households (NIPA Table 1.3.5, line 7) | 465.1 |
| 3. - General Government (NIPA Table 1.3.5, line 8) | 1069.6 |
| 4. = Gross Domestic Business Product (NIPA Table 1.3.5, line 2) | 7666.7 |
| 5. - Owner-occupied Housing (included in line 2a) | NA |
| 6. - Rental Value of Nonresidential Assets Owned and Used by Nonprofit Institutions Serving Individuals (included in line 2b) | NA |
| 7. = BEA/BLS Business Sector Output | 7666.7 |
| 8. - Government Enterprises | 133.1 |
| 8a. Federal (BEA Value Added by Industry Table 1, line 85) | 63.4 |
| 8b. State & Local (BEA VA by Industry Table 1, line 88) | 69.7 |
| 9. = BEA/BLS Private Business Sector Output | 7533.6 |
| 9a. Statistical and Other Discrepancies | 19.5 |
| 9b. BLS Total Factor Costs plus Taxes (MFP Table PG1a, Current Dollar Output) | 7514.1 |
| 9b-i. BLS Cost of Capital Services (MFP Table PG1a, Capital Income) | 2061.5 |
| 9b-ii. Adjustment to property income for finance & insurance | 106.5 |
| 9b-iii. BLS Labor Compensation (MFP Table PG1a, Labor Compensation) | 4786.6 |
| 9b-iv. Taxes on Production & Imports, Less Portion Assigned to Capital Services, Less Subsidies | 559.5 |
| 10. - Farm Business (NIPA Table 1.3.5, line 4) | 71.5 |
| 11. + Farm Space Rent, Owner-occupied Housing (inc. in line 2a) | NA |
| 12. - Farm Intermediate Input, Owner-occupied Housing (inc in line 2a) | NA |
| 13. = BEA/BLS Private Nonfarm Business Sector Output | 7462.1 |
| 13a. Statistical and Other Discrepancies | 13.5 |
| 13b. BLS Total Factor Costs plus Taxes (MFP Table XG1a, Current Dollar Output) | 7448.6 |
| 13b-i. BLS Cost of Capital Services (MFP Table XG1a, Capital Income) | 2006.8 |
| 13b-ii. Adjustment to property income for finance & insurance | 106.5 |
| 13b-iii. BLS Labor Compensation (MFP Table XG1a, Labor Compensation) | 4756.1 |
| 13b-iv. Taxes on Production & Imports, Less Portion Assigned to Capital Services, Less Subsidies | 579.2 |

sector output (line 9). Gross value added for the private nonfarm business sector (line 13) is obtained by subtracting the gross value added of the farm sector (line 10). The deductions for farm owner-occupied housing that were previously made on lines 11 and 12 are no longer needed.

The detail shown under lines 9 and 13 comprise the input side of the production account for the two major sectors for which BLS prepares annual multifactor productivity estimates. As explained in Chapter 2 of FHPY, the nominal value of output (gross value added) must be completely accounted for by some category of production cost. BEA's GDP-by-industry accounts program provides nominal estimates of compensation of employees, gross operating surplus (formerly property-type income), and taxes on production and imports less subsidies (formerly indirect business taxes less subsidies). From these estimates, BLS determines the allocation of proprietor's income between capital and labor income in order to derive estimates of labor compensation and nominal capital services. In addition, BLS determines the portion of taxes on production and imports that should be treated as part of the cost of capital services, such as business property taxes and business motor vehicle licenses.

Two entries under lines 9 and 13 require further explanation. Statistical and other discrepancies (lines 9a and 13a) arise because the major sector multifactor productivity estimates are calculated from the bottom up, (i.e., from more detailed industry data), while the estimates shown in this table are calculated from the top down (i.e., starting with GDP).⁴ BLS also adjusts the property income of the NAICS finance and insurance sector so that the nominal return to capital does not include returns to the intangible financial assets that are very large in this sector. Otherwise, the calculation of rental prices for aggregating capital services would give too much weight to the types of assets used in this sector. BLS has a long history of estimating both capital and labor inputs within a production account framework. It should be noted that the measurement of capital services in an aggregate production account was recently endorsed as a concept for the next revision of the System of National Accounts (SNA). BLS was one of the first statistical agencies in the world to estimate capital services, and would like to work

⁴ The NIPA statistical discrepancy is no longer a component of this line because the nominal GDP by Industry estimates are now consistent with GDP rather than GDI. This change was introduced in the June 2004 comprehensive revision of the annual industry accounts.

with BEA to expand capital services to the total economy, including government and nonprofit institutions.

III.b Major Components of the Aggregate Production Account

Table 2 shows the shares of nominal GDP and the real growth rates for selected components and major sectors (shown in italics) of the illustrative aggregate production account. The periods shown in table 2 correspond to periods with changes in productivity trends. Between 1948-1973 and 1973-1990, the shares of the business sector and the private business sector declined because of growth in non-business sectors such as households and institutions and general government. The share for households and institutions continued to increase through 2004 because of strong growth for nonprofit institutions serving households. General government's share continued a decline that had started in the 1990-1995 period.

The share of the private nonfarm business sector in GDP declined less than the shares of the other major sectors during 1973-1990, and was larger in 2000-2004 than in 1948-1973. This is because the farm share of GDP decreased from 5.8 percent in 1948-1973 to 0.8 percent in 2000-2004, which offset the increases in the other excluded components. The drop in the farms share is very significant between 1948-1973 and 1973-1990. While the farm share continued to decline at a rapid rate after 1990, it had become so small that it no longer had much impact on the private nonfarm business sector's share. The share of the private business sector in GDP continued to decline between 1973-1990 and 1990-1995, but then returned to its earlier level after 1995.

Real growth rates for the three major sectors are very similar for the entire period and for each sub-period, differing by at most 0.2 percentage points. Real growth rates for the major sectors are higher than real GDP growth for the entire period and for each of the sub-periods. This is largely because of the lower real growth rates for general government and government enterprises, which are always less than those for real GDP. In 1948-73, major sector real growth rates are very similar to real GDP growth; the largest differences were in the 1995-2000 period, when business sector real growth rates exceeded real GDP growth by 0.7 points. The real growth rate of nonprofit institutions

Table 2
Output Measures in the Aggregate Production Account
Nominal Shares and Real Growth Rates

| | 1948 - 2004 | | 1948 - 1973 | | 1973 - 1990 | | 1990 - 1995 | | 1995 - 2000 | | 2000 - 2004 | |
|---|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|
| | Share of GDP | Growth Rate (%) | Share of GDP | Growth Rate (%) | Share of GDP | Growth Rate (%) | Share of GDP | Growth Rate (%) | Share of GDP | Growth Rate (%) | Share of GDP | Growth Rate (%) |
| <i>Gross domestic product</i> | 1.000 | 2.9 | 1.000 | 4.0 | 1.000 | 2.9 | 1.000 | 2.5 | 1.000 | 4.1 | 1.000 | 2.3 |
| Households and institutions | 0.084 | 3.4 | 0.070 | 5.3 | 0.097 | 3.4 | 0.108 | 2.4 | 0.110 | 2.7 | 0.113 | 2.0 |
| Households | 0.052 | 3.3 | 0.047 | 5.4 | 0.059 | 3.1 | 0.063 | 2.0 | 0.063 | 2.9 | 0.063 | 2.0 |
| Nonprofit institutions serving households | 0.033 | 3.4 | 0.023 | 4.9 | 0.038 | 3.9 | 0.046 | 2.8 | 0.047 | 2.5 | 0.049 | 2.1 |
| General government | 0.108 | 1.7 | 0.117 | 3.0 | 0.128 | 1.7 | 0.122 | 0.3 | 0.114 | 0.9 | 0.112 | 1.5 |
| <i>BEA/BLS business sector</i> | 0.808 | 3.0 | 0.813 | 4.0 | 0.775 | 3.1 | 0.770 | 2.8 | 0.776 | 4.8 | 0.776 | 2.5 |
| Government enterprises | 0.011 | 1.4 | 0.012 | 2.3 | 0.014 | 1.7 | 0.015 | -0.6 | 0.014 | 3.2 | 0.013 | -1.6 |
| <i>BEA/BLS private business sector</i> | 0.797 | 3.1 | 0.801 | 4.0 | 0.761 | 3.1 | 0.755 | 2.9 | 0.762 | 4.8 | 0.763 | 2.5 |
| Farms | 0.046 | 2.1 | 0.058 | 1.2 | 0.024 | 3.8 | 0.011 | 0.1 | 0.008 | 7.6 | 0.008 | 1.5 |
| <i>BEA/BLS private nonfarm business</i> | 0.751 | 3.1 | 0.743 | 4.2 | 0.737 | 3.1 | 0.744 | 2.9 | 0.753 | 4.8 | 0.754 | 2.6 |

Note: Shares of GDP are the average of the shares for the first and last years of the period.

serving individuals is consistently strong compared to GDP, except in 1995-2000 and 2000-2004. The real growth rate for farms in 1995-2000 was the highest for any sector in that period.

III.c BLS Major Sector Multifactor Productivity Accounts

Table 3 provides, for the same periods shown in table 2, real growth rates for the BEA/BLS private business sector output measures, the BLS measures of capital services and labor input, and the BLS estimates of multifactor productivity (MFP). The output shares of capital services and labor input are also provided for these sectors.⁵

As expected, the capital services share of nominal output is usually about one-third and that of labor input is about two-thirds, but there is some variation in the shares across major sectors and over time. The capital services share is always slightly lower for the private nonfarm business sector than for the private business sector. The trends are similar, though, for the major sectors including and excluding farms. Between 1948-1973 and 1973-1990 the shares were essentially stable; they increased significantly between 1973-1990 and 1990-1995, but then fell back to the earlier level during the 1995-2000 period and remained at that level in the 2000-2004 period. Changes in the labor input shares show the opposite pattern because these shares always sum to 1.0.

Over the entire period 1948-2004, capital services have increased much faster than labor input for both sectors. For the private business sector, capital services increased 3.9 percent while labor input increased only 1.4 percent. This difference of about 2.5 percentage points also occurs in the private nonfarm business sector (4.1 percent vs. 1.6 percent). These real input growth rate differences did not change much during the 1948-1973 and 1973-1990 sub-periods. During the 1990-1995 period, however, the difference narrowed considerably for both sectors primarily because of a sharp slowdown in capital services growth. During the 1995-2000 and 2000-2004 periods, the differential increased sharply to more than 3 percentage points in both sub-periods. In the 1995-2000 period, the increase was primarily due to very strong growth in capital services; growth rates fell about the same amount for each input category during the 2000-2004 period. An unusual feature of the 2000-2004 period for

⁵ BLS has not released revised productivity and cost data for years before 1987. Estimates for those years were obtained by extrapolating the revised estimates for 1987 back to 1948 using the previously-published nominal values and quantity indexes.

Table 3
Private Business and Private Nonfarm Business Sectors
Output, Inputs, and Multifactor Productivity
Nominal Shares and Real Growth Rates

| | 1948 - 2004 | | 1948 - 1973 | | 1973 - 1990 | | 1990 - 1995 | | 1995 - 2000 | | 2000 - 2004 | |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | Share of Sector | Growth Rate (%) | Share of Sector | Growth Rate (%) | Share of Sector | Growth Rate (%) | Share of Sector | Growth Rate (%) | Share of Sector | Growth Rate (%) | Share of Sector | Growth Rate (%) |
| <i>BEA/BLS private business output</i> | n.a. | 3.6 | n.a. | 4.0 | n.a. | 3.1 | n.a. | 2.9 | n.a. | 4.8 | n.a. | 2.5 |
| BLS private business input | n.a. | 2.2 | n.a. | 1.8 | n.a. | 2.6 | n.a. | 2.3 | n.a. | 3.4 | n.a. | 0.7 |
| BLS capital services | 0.325 | 3.9 | 0.319 | 3.7 | 0.318 | 4.2 | 0.327 | 3.0 | 0.315 | 5.5 | 0.312 | 2.9 |
| BLS labor input | 0.675 | 1.4 | 0.681 | 1.0 | 0.682 | 1.9 | 0.673 | 2.0 | 0.685 | 2.4 | 0.688 | -0.3 |
| BLS multifactor productivity | n.a. | 1.4 | n.a. | 2.1 | n.a. | 0.5 | n.a. | 0.5 | n.a. | 1.4 | n.a. | 1.9 |
| <i>BEA/BLS private nonfarm business output</i> | n.a. | 3.7 | n.a. | 4.2 | n.a. | 3.1 | n.a. | 2.9 | n.a. | 4.8 | n.a. | 2.6 |
| BLS private nonfarm business input | n.a. | 2.4 | n.a. | 2.2 | n.a. | 2.7 | n.a. | 2.3 | n.a. | 3.5 | n.a. | 0.7 |
| BLS capital services | 0.319 | 4.1 | 0.306 | 4.0 | 0.305 | 4.4 | 0.321 | 3.2 | 0.311 | 5.6 | 0.308 | 2.9 |
| BLS labor input | 0.681 | 1.6 | 0.694 | 1.5 | 0.695 | 2.0 | 0.679 | 1.9 | 0.689 | 2.6 | 0.692 | -0.3 |
| BLS multifactor productivity | n.a. | 1.3 | n.a. | 1.9 | n.a. | 0.4 | n.a. | 0.6 | n.a. | 1.2 | n.a. | 1.9 |

Note: n.a. = not applicable.

both sectors is that labor input *declined* at an average annual rate of 0.3 percent while capital services increased at an average annual rate of 2.9 percent.

The rate of multifactor productivity change shows trends and relationships that have been documented elsewhere by BLS and by others.⁶ For the entire period 1948-2004 MFP increased at an average annual rate of 1.4 percent in the private business sector and 1.3 percent in the private nonfarm business sector. The sharp drop between 1948-1973 and 1973-1990 is often called the “productivity slowdown.” The resurgence in 1995-2000 occurs in the sub-period associated with the new economy and is often called the “productivity revival.” MFP growth continued to accelerate in the 2000-2004 period, which is somewhat surprising because of the downturn in output that occurred in 2001. The acceleration for the private business sector was less than in the 1990-1995 period (0.5 vs. 0.9 percentage points), but in the private nonfarm business sector it was slightly larger than in the earlier period (0.7 vs. 0.6 percentage points).

IV. Output Comparisons

BEA and BLS both provide output measures for broad sectors and for industries that are widely used to study economic growth, productivity, and structural change. Although these output measures are fairly consistent with one another, and usually tell similar stories about trends in economic growth, there are some differences. BEA and BLS have worked closely to achieve consistency. For example, around 1996 BEA and BLS worked together closely to develop a common set of output price indexes for all manufacturing industries.⁷ Each year, BLS sends BEA a table of price deflator series for every 7-digit product class in manufacturing. While progress has been made, differences remain, especially outside of manufacturing.

Differences in output measures reflect differences in definition, coverage, and methodology that are primarily due to different purposes for the measures. For example, BEA strives to provide complete and consistent coverage of the entire economy in the NIPAs, whereas BLS primarily seeks maximum reliability in its various measures of

⁶ The rate of MFP change is equal to the growth rate of output minus a weighted growth rate of inputs. The weights are computed from the BLS Factor Cost of Capital Services and BLS Labor Compensation time series, e.g., in Table 1 lines 9b-i and 9b-iii, and 13b-i and 13b-iii. Accordingly, the other BLS components of total cost are not used in the calculation.

⁷ BEA and BLS also met in 2001 to discuss reducing differences for non-manufacturing industries.

productivity. These differing goals are not necessarily inconsistent with one another, since both require reliable output measures, but they can lead to differences in definition and coverage as well as in methodology. A part of the differences, especially at detailed industry levels, reflects different choices for underlying source data and aggregation techniques. This section describes the major sources of difference among the output measures for industry groups and for detailed industries classified on a NAICS basis in both manufacturing and non-manufacturing. We also present some preliminary findings about opportunities for reducing differences in BEA and BLS industry output measures.

This paper does not update the comparison of broad sector output measures that was presented in FHPY, partly because the recent changes in methodology have reduced the size of these differences. For example, because BEA and BLS now use the same definition of the business sector, real output measures for these major sectors are the same. Annual differences between real GDP growth from the NIPAs and aggregate real value added for “all industries” from the industry accounts do not usually exceed 0.1 percentage points. Differences still arise from these two approaches because of differences in source data and deflation procedures (Moyer, Reinsdorf, and Yuskavage). These differences are not as significant as before, however, because of changes in methodology introduced in BEA’s integrated annual industry accounts.

Estimates of industry value added are now prepared within the framework of balanced commodity supply and use tables that are consistent with the NIPA estimates of final expenditures (Lawson, Moyer, Okubo, and Planting). Among other changes, this means that the NIPA statistical discrepancy is no longer treated as a separate “industry” for balancing purposes in BEA’s industry accounts. This treatment was cited in FHPY as a significant contributor to observed differences in real output growth acceleration between 1995-2000 and 1990-1995. Differences remain, however, because it is not currently possible to construct an aggregate measure from BEA’s industry accounts data that exactly matches the BEA/BLS definition of the business sector. Owner-occupied housing is included in the real estate industry and nonprofit institutions serving households are embedded in the source data for several industries and cannot be identified separately. Both of these sub-sectors are excluded from the BEA/BLS business sector and appear in the BEA households and institutions sector.

IV.a Detailed Industry Output Comparisons

FPHY presented comparisons of BEA and BLS output measures for detailed industries, constructed using SIC-based data, and discussed the sources of differences in these measures.⁸ These comparisons found that while BEA and BLS manufacturing output measures tended to be similar, in part due to BEA and BLS collaboration on these measures, it may be important to address some differences in current dollar source data and agency-specific adjustments in order to improve consistency among these measures. Non-manufacturing output measures produced by BEA and BLS often differ and sometimes to a large extent. These differences were generally found to result from differences in the underlying data sources, price index choices and deflation methods.

With statistical agencies now well into the process of shifting to NAICS-based measures, comparison of recently available NAICS-based output measures produced by BEA and BLS is a necessary next step in enhancing our understanding of the differences and sources of differences among the various output measures available to data users. In this paper, comparisons of BEA and BLS output measures for detailed industries are extended to include the relatively new BEA and BLS output measures constructed using NAICS-based data.

Historically, each agency has had differing purposes for their production of these output measures. In general, BEA and BLS output measures have been developed separately. Many of the differences result from agency-specific choices regarding underlying data sources; price deflation procedures, including source data, deflation level of detail, and aggregation methods; data adjustment choices such as inventory change, resales, misreporting, coverage, own-account production and commodity taxes; and output measure concept, such as gross, value-added or sectoral output definitions. In addition, as BEA and BLS have made the transition from the use of SIC-based data to NAICS-based data, somewhat different approaches were used to create NAICS-based estimates for years prior to 1997, the only year for which complete Census data were available on both a NAICS and SIC basis.⁹

⁸ See Section 9.4.3 in FPHY.

⁹ See Russell, Matthew, Takac, Paul and Lisa Usher, "Industry productivity trends under the North American Industry Classification system," *Monthly Labor Review*, November 2004, pp. 31-42; Robert E. Yuskavage and Yvon Pho, "Gross Domestic Product by Industry for 1987-2000: New Estimates on the

Real and nominal output measures and related output price deflators are compared for 3-, 4-, and 5-digit NAICS industry aggregates, using data from BEA's Annual Industry Accounts program and from the BLS' Division of Industry Productivity Statistics (DIPS) program. For the 3-digit NAICS subsectors, BEA gross output measures are compared to BLS sectoral output¹⁰ measures in nineteen subsectors, including fourteen manufacturing and five non-manufacturing subsectors. BEA gross output measures and BLS sectoral output measures at the 3-digit NAICS subsector level are available for 1987-2004. For the 4-digit NAICS industry groups and 5-digit NAICS industries, BEA gross output measures are available for 1998-2004 and the BLS-DIPS sectoral output measures are available for 1987-2004. Comparisons are possible for eighteen NAICS 4-digit industry groups including eleven manufacturing and seven non-manufacturing industry groups, and for fifty-eight NAICS 5-digit industries including fifty-two manufacturing industries and six non-manufacturing industries.¹¹

For the 3-digit NAICS subsectors, BEA and BLS output series are compared using two different approaches. The first approach is to calculate the difference in the acceleration of the average annual growth rate in two time periods, such as 1990-1995 and 1995-2000, for the BEA and BLS-DIPS output measures. The difference in acceleration rates reflects differences in the change in the growth rate trends of the output measures between these two time periods. In general, if the output series are similar, the difference between the acceleration rates of the two output measures will be quite low. Dissimilar series will have larger absolute differences in the acceleration rates of the two measures. In those industries where the BEA and BLS-DIPS output measures exhibit a substantial difference in acceleration, further review of underlying data sources and

North American Industry Classification System," Survey of Current Business, November, 2004, pp. 33-53; and Harper, Michael, Fraumeni, Barbara, Powers, Susan, and Robert Yuskavage, "Progress Toward Completing Historical Production Accounts using the North American Classification System," discussion paper, Federal Economic Statistics Advisory Committee (FESAC), June 10, 2005.

¹⁰ Sectoral output excludes those intermediate inputs purchased from within the sector.

¹¹ The BEA output measures are based on the 1997 NAICS while the BLS-DIPS output measures are based on the 2002 NAICS. This potential source of difference is noted in the comparisons, and is an issue for only a few industries. The majority of the industries impacted by the 1997 to 2002 NAICS changes have only a BEA output measure or a BLS output measure available, and so comparisons of the two output measures are not possible in those industries. NAICS industries where the 1997 to 2002 classification changes are reflected in the output comparisons include 511, Publishing Industries; 5112, Software Publishers; 51111, Newspaper Publishers; 51112, Periodical Publishers; 51113, Book Publishers; and 51121, Software Publishers.

methods is considered to be advisable. In this paper, the 3-digit NAICS output measures are compared over the 1990-97 and 1997-03 time periods to investigate the possible impact of differences in NAICS conversion methods underlying the BEA and BLS output measures; and also over the 1990-95, 1995-00, and 2000-04 time periods because of the interest in aggregate productivity growth acceleration during those periods.

For the purposes of these comparisons, a critical value of (+ or -) .9 percentage points is used to establish the level of difference in the acceleration rates where further review of a particular industry's output measures is merited. This value is selected to maintain consistency with the SIC-based output measure comparisons presented in FPHY. The use of a value of ".9" percentage points as the value for selecting industries evolved from the pattern of differences in acceleration found between BEA and BLS output measures for the SIC industries.¹²

The second approach is to examine how closely the average annual growth rates of any two output series are correlated. The correlation coefficient, computed for the average annual growth rate of the output series over all available years of data, reflects the consistency in the annual movements of the output measures over this time period. In addition, correlation of the two measures may be used to examine how closely the series move together on a year-to-year basis.

For the 4- and 5-digit NAICS industry groups and industries, a limited number of years of data, 1998-2004, are available for comparison. Rather than select two time periods within this limited range of years and compare differences in acceleration of average annual growth rates within these two time periods, comparisons for the 4- and 5-digit NAICS industries are simply differences in average annual growth rates for the

¹² The difference in acceleration of the BEA and BLS output measures, constructed using SIC-based data, tends to be either well below .9 percentage points or .9 or above. A difference in acceleration of .9 percentage points or greater appeared to be a natural breaking point for distinguishing industries where output measures differ markedly. Similarly, in the NAICS-based output measure comparisons, the difference in acceleration of the BEA and BLS output measures tends to be either well below .9 or .9 or above. Using a difference in acceleration of 1.0 as the critical value would result in very little difference in the set of industries considered for further review. Most of the differences in acceleration of .9 percentage points or higher either round up to 1.0 or are greater than 1.0. percentage points. The purpose of this critical value is simply to distinguish industries where the BEA and BLS output measures have relatively little difference and industries where BEA and BLS output measures appear to have larger differences meriting additional investigation.

available years. In addition, the BEA and BLS output measures for each industry are correlated to look at the similarity of the year to year movements of the measures.

Table 4 presents an overall summary of these comparisons. Three additional sets of tables provide detailed industry comparison results for BEA and BLS real output, nominal output, and output price deflators. Tables 5A, 5B, and 5C present detailed results of BEA and BLS real output, nominal output, and output price deflator comparisons respectively for the NAICS 3-digit subsectors. Similarly, tables 6A, 6B, and 6C present real output, nominal output, and output price deflator comparisons for the NAICS 4-digit industry groups, and tables 7A, 7B, and 7C present comparison results for the NAICS 5-digit industries.

IV a.1 Results of Comparisons¹³

NAICS 3-Digit Subsectors

Manufacturing

Of the nineteen 3-digit NAICS subsectors where BEA and BLS output measures are available for comparison, significant differences in acceleration of the real output measures were found for nine subsectors. These nine subsectors include seven of the fourteen manufacturing subsectors and two of the five non-manufacturing subsectors where comparisons are possible. The manufacturing subsectors *NAICS 322, Paper Manufacturing; 325, Chemical Manufacturing; 326, Plastics and Rubber Product Manufacturing; 333, Machinery Manufacturing; 334, Computer and Electronics Product Manufacturing; and 339, Miscellaneous Manufacturing* exhibit differences in acceleration of the BEA and BLS real output measures between the 1995-2000 and 2000-2004 time periods. BEA and BLS real growth rates for *NAICS 334* also exhibit differences in acceleration between the 1990-95 and 1995-00 time periods. For *NAICS 322, 326, 333, 334, and 339*, the BEA real output measures have a greater rate of acceleration than the BLS real output measures. In *NAICS 325*, the BEA real output measure has a slower rate of acceleration than the BLS real output measure. *NAICS 324, Petroleum and Coal Products Manufacturing*, shows a difference in acceleration of real output growth between the 1990-97 and 1997-03 time periods, with the BLS real output

¹³ Detailed spreadsheets containing the original data compared as well as data comparisons are available upon request.

measure having a greater rate of acceleration than the BEA real output measure. The BEA and BLS real output growth rates are also very poorly correlated in this industry. Note that where the BEA and BLS average annual growth rates are quite large, as in *NAICS 334*, the percentage point difference between the BEA and BLS accelerations is small relative to these large growth rates. On the other hand, if productivity measures are computed using these alternative output measures, a small difference in output growth rates will translate into a substantial difference in productivity.

BEA and BLS nominal output measures for these manufacturing subsectors also differ, with greater rates of acceleration in the BEA nominal output measures for *NAICS 322, 326, 333, 334, and 339* between the 1995-2000 and 2000-2004 time periods. For *324*, BLS nominal output measures accelerate faster than the BEA output measures between the 1990-1997 and 1997-2003 time periods. For *325*, BLS nominal output measures accelerate faster than the BEA measures over the 1990-1997 and 1997-2003 time periods and also between the 1995-2000 and 2000-2004 time periods. At the 3-digit NAICS level, the BEA and BLS manufacturing industry nominal output measures appear to be closely correlated.

In part, these differences in real and nominal output measures for the manufacturing subsectors may result from differences in output concept. The BLS output measure is adjusted to remove intrasectoral transactions while the BEA output measure is a gross output measure. In some industries, such as *NAICS 334*, this adjustment may result in different nominal output growth rates.¹⁴ Other adjustments to nominal output measures for these industries are also being investigated as possible sources of these differences. BEA and BLS rely on a common set of price deflators in developing output measures for the manufacturing sector and little difference in acceleration of price deflators is noted in the manufacturing subsectors.

Non-manufacturing

Of the five 3-digit NAICS non-manufacturing subsectors where BEA and BLS output measures are available for comparison, two have differences in acceleration of real output measures and three have differences in acceleration of nominal output measures.

¹⁴ John Duke, formerly of BLS, has prepared an analysis of the impact of the BLS adjustment for intrasectoral transactions on the BLS output measure for NAICS 334 which is available upon request.

NAICS 481, Air Transportation, and NAICS 511, Publishing Industries exhibit differences in real output measures.¹⁵ In both of these industries, BEA and BLS real output measures for the 1990-1997 and 1997-2003 time periods and the 1995-00 and 2000-2004 time periods have differences in acceleration, with the BEA real output measure having a greater acceleration than the BLS real output measures. In *NAICS 481*, BEA nominal output measures also have a greater acceleration than BLS nominal output measures for the 1990-1997 and 1997-2003 time periods and the 1995-2000 and 2000-2004 time periods. In *NAICS 511*, BEA nominal output accelerates faster than BLS nominal output over the 1995-2000 and 2000-2004 time periods. These differences in the nominal output measures suggest differences in underlying data sources may be partly responsible for divergences in the BEA and BLS output measures.

BEA and BLS real output measures for *NAICS 211, Oil and Gas Extraction*, have similar rates of acceleration among the 1990-95, 1995-00, and 2000-04 time periods, but low correlation. *NAICS 211* has differences in acceleration of nominal output measures, with BLS nominal output accelerating more than BEA nominal output between 1990-1997 and 1997-2003; and also between 1990-1995 and 1995-2000.

BEA and BLS have greater variation in the selected price deflators used to develop output measures for non-manufacturing industries. Of the five 3-digit NAICS non-manufacturing subsectors where comparisons are possible, differences in acceleration of price deflators occur in four subsectors: *NAICS 211, Oil and Gas Extraction; 212, Mining (except Oil and Gas); 481, Air Transportation; and 511, Publishing Industries*. Price deflators for *NAICS 511, Publishing Industries*, show low correlation, with the growth rate of the BLS price deflator diverging upwards relative to the growth rate of the BEA price deflator from 1999 forward.

Differences in acceleration rates for real and nominal output measures and price deflators over the 1990-97 and 1997-03 time periods are found to be greater than .9 for

¹⁵ Note that comparison of BEA and BLS output measures for 511, Publishing Industries, is complicated by differences in the 1997 and 2002 NAICS classification which impacted this industry group. The 2002 NAICS includes a new industry, 516, Internet Publishing and Broadcasting, which groups establishments that publish and/or broadcast content exclusively for the Internet. Under the 1997 NAICS classification, these establishments are included in NAICS 511. How much of the difference might be due to classification changes as compared to other data differences has not yet been determined.

only two of the manufacturing subsectors (*NAICS 324 and 325*) and three of the five non-manufacturing subsectors (*NAICS 211, 481, 511*). This suggests little impact of differences in conversion methods on the divergence of the BEA and BLS output measures for manufacturing. For non-manufacturing, real and nominal output differences persist in other time periods, suggesting these differences may be attributable to differences in underlying source data rather than to conversion issues.

NAICS 4-Digit Industry Groups

For the NAICS 4-digit real output measures, twelve of the eighteen industry groups compared had differences in the BEA and BLS average annual growth rates of real output for 1998-04 in excess of (+ or -).9. These industry groups include nine manufacturing industry groups: *NAICS 3152, Cut and Sew Apparel Manufacturing; 3159, Apparel Accessories and Other Apparel Manufacturing; 3161, Leather and Hide Tanning and Finishing; 3162, Footwear Manufacturing; 3169, Other Leather and Allied Product Manufacturing; 3254, Pharmaceutical and Medicine Manufacturing; 3325, Hardware Manufacturing; 3343, Audio and Video Equipment Manufacturing; 3365, Railroad Rolling Stock Manufacturing;* and three non-manufacturing industry groups: *2121, Coal Mining, 2211, Electric Power Generation, Transmission and Distribution; and 5112, Software Publishers.*¹⁶ The manufacturing industry groups *NAICS 3152, 3161, 3169, 3325, 3343, and 3365* have low rates of correlation between the BEA and BLS real output growth rates, as do the non-manufacturing industry groups *NAICS 2211 and 2212*.

In addition, twelve industry groups had notable differences between the BEA and BLS nominal output measures. These include most of the industries noted above (*NAICS 3152, 3159, 3161, 3162, 3169, 3254, 3325, 3343, 3365, and 2211*) and also *3326, Spring and Wire Product Manufacturing; and 2212, Natural Gas Distribution*. Manufacturing industries *NAICS 3152, 3161, 3169, 3325, and 3343* have low correlation rates between the BEA and BLS nominal output growth rates, as do non-manufacturing industries *2211 and 4911*.

¹⁶ Note that comparison of BEA and BLS output measures for 5112, Software Publishers, is complicated by differences in the 1997 and 2002 NAICS classification which impacted this industry group. How much of the difference might be due to classification changes as compared to other data differences has not yet been determined.

For the 4-digit NAICS manufacturing industry groups, no large differences in growth rates were noted between the BEA and BLS price deflators, as might be expected given BEA and BLS efforts to coordinate on manufacturing price deflators. For a few industry groups (*NAICS 3152, 3159, 3169 and 3254*), the BEA and BLS price deflators have low correlation coefficients. For non-manufacturing, four of the five industry groups (*NAICS 2121, 2211, 2212, and 5112*) exhibit large growth rate differences between the BEA and BLS price deflators.

NAICS 5-Digit Industries

For the NAICS 5-digit real output measures, thirty-four of the fifty-eight industries where BEA and BLS output measures were compared have differences in average annual growth rates from 1998-04 of greater than .9. These industries include thirty-one manufacturing industries and three non-manufacturing industries: *NAICS 31123, 31131, 31152, 31321, 31412, 31491, 31519, 32192, 32513, 32518, 32541, 32551, 32611, 32612, 32629, 33121, 33151, 33251, 33291, 33312, 33421, 33422, 33431, 33451, 33511, 33612, 33651, 33711, 33992, 33993, 33994, 51111, 51121, and 53223.*¹⁷ Low correlation rates exist between BEA and BLS real output growth rates for twenty-two of these industries.¹⁸

Of the thirty-four industry groups where real output growth rate differences existed between the BEA and BLS output measures, twenty-eight had notable differences in growth rates between the BEA and BLS nominal output measures and seven (including five manufacturing industries) showed growth rate differences between the BEA and BLS price deflators. Low correlation coefficients are found between BEA and BLS nominal output growth rates for seventeen manufacturing industries. BEA and BLS price deflator growth rates are poorly correlated for thirteen of these industries, including 3 of the 6 non-manufacturing industries compared. This suggests that differences in output concept, underlying data sources, and price deflation procedures account for the real output differences.

¹⁷ Please refer to table 7A for industry titles.

¹⁸ The correlations are computed using data for a very limited number of years, including only 6 average annual growth rate years for the NAICS 4- and 5-digit comparisons.

IV a.2 Conclusions

From these comparisons, it appears that BEA and BLS output measures remain quite similar in the manufacturing sector when comparing the 1990-97 and 1997-03, and 1990-95 and 1995-00 time periods. This is consistent with comparisons of SIC-based output measures presented in FPHY. However, when the 1995-00 and 2000-04 time periods are compared, a number of manufacturing industries show differences in both real and nominal output measures. These differences track from the NAICS 3-digit subsectors down through those NAICS 4- and 5-digit industries where both BEA and BLS output measures are available for comparison.

Very few comparisons are possible for the NAICS non-manufacturing industries because of the lack of overlap of the BEA and BLS output measures for these industries. However, substantial differences are noted between the BEA and BLS output and price deflator measures for most of the non-manufacturing industries where comparisons are possible. Most of these non-manufacturing output differences occur at the NAICS 4-digit industry group and 5-digit industry levels and appear to be subsumed at the higher 3-digit subsector level.

Identifying and where possible eliminating unnecessary inconsistencies among the BEA and BLS detailed industry output is a priority for both agencies. BEA and BLS plan to identify the industry groups with the largest differences, or with the greatest impact on industry productivity measures, in order to determine how to reduce the differences. These actions will assist data users who otherwise are faced with selecting among data sets offering contradictory results rooted solely in differences in underlying data sources, price deflation procedures, agency-specific data adjustments, and output concepts. Some industries from the manufacturing sector have already been identified above, most notably Petroleum and Coal Products Manufacturing. Larger improvements or improvements with a greater impact are likely to occur in the non-manufacturing sector for industries such as Publishing and Air Transportation. Given the greater significance of the non-manufacturing sector in the economy, as reflected by NAICS, an expansion of the BEA and BLS output series available for the detailed non-manufacturing industries, as well as of the data years available, would also be helpful.

V. Other Initiatives

BEA and BLS recently have recently agreed to expand the scope of their collaboration on several other projects that are designed to improve the quality of data available for productivity measurement. This section describes on-going or proposed projects that are designed to further improve data quality. These collaborative efforts will provide benefits for both BEA and BLS by improving the accuracy and consistency of both agencies' data. Data users will also benefit by being able to effectively more of the data provided by the decentralized statistical system, including output, employment, capital, and prices.

Capital Services Expansion

The measurement of capital services in a production account framework has been endorsed by the System of National Accounts (SNA) Advisory Expert Group, which is making recommendations for the 2008 version of the System of National Accounts (SNA). This opens the possibility that multifactor productivity estimates could be prepared by more countries but does not mandate their development. At the same time, BLS is interested in expanding the scope of its productivity estimates to include the total economy along with the private business.

This expansion would require developing capital services estimates for nonprofit institutions and for government. Priority would be placed on developing such estimates for the entire economy and for major sectors before developing industry-specific measures. BEA and BLS have started work on this project by reviewing each other's methodologies and data sources, including the differences in capital stock concepts used by the two agencies. BEA would like to incorporate the resulting BLS estimates into the standard NIPA presentation. BEA would rely as much as possible on BLS concepts, methods, and data and would only make adjustments when needed for consistency with the NIPAs.

Hours Worked Reconciliation

Hours worked is a key input for calculating quarterly and annual aggregate labor productivity. The BLS measure of total hours worked is a more comprehensive measure than the BEA measure because the BLS measure includes self-employed persons and

unpaid family workers. However, it does not include hours worked for the employment associated with the underreporting or non-reporting of wages and salaries. Perhaps the most complete hours worked measure for calculating the productivity of the entire U.S. economy would be a combination of BLS and BEA data. BEA and BLS staffs are discussing possibilities for developing such a measure. BLS is also considering extending its measure of hours worked to the entire economy by including government.

Historical Production Accounts

Industry analysts have requested NAICS-based industry production accounts that go back at least to 1972. BEA has developed estimates of gross output, intermediate inputs, value added, and capital stock for 65 NAICS sectors going back to 1987. These data are important ingredients into preparing such accounts. BEA has also developed NAICS-based value added by industry estimates for 1947-86. BLS is working to develop detailed manufacturing sector data for production accounts back to 1987. Extending production accounts to the non-manufacturing sector and to years before 1987 requires joint work between BEA and BLS. As a first step, BEA has initiated work to develop gross output estimates back to 1972 that could be used to prepare integrated input-output use tables. BLS also plans to develop output measures for non-manufacturing industries on a NAICS basis as part of the effort to extend production accounts, and will work closely with BEA to insure consistency in these historical industry output measures.

Historical Industry Employment

Now that BEA has provided real value added by NAICS industry group going back to 1947, industry analysts have requested consistent employment data on the same basis. BLS has provided NAICS-based national industry employment estimates back to 1990 and is investigating possibilities for providing these estimates for earlier years. BEA's methodology for preparing industry output estimates on a NAICS basis for years before 1997 can be adapted to provide consistent employment estimates back to 1947. BEA plans to prepare these employment estimates for release in spring 2006 as interim measures until BLS is able to provide its own estimates.

VI. Summary and Conclusion

Although the U.S. statistical system is not centralized, the major statistical agencies--the Bureau of Labor Statistics (BLS), the Bureau of Economic Analysis (BEA), and the Census Bureau--work together as partners to provide a complete picture of economic activity and to ensure consistency, coherence, and reliability. This is especially important in the area of productivity measurement, which depends critically on consistent measures of both output and input at aggregate levels and for industries. Often, these output and input measures are obtained from different sources.

This paper updates previous empirical work that presented illustrative integrated aggregate production accounts that showed how existing BEA and BLS measures could be better harmonized and that provided a crosswalk to facilitate comprehensive, integrated analysis of growth and productivity. The updated estimates in this paper are based on the comprehensive revisions of BEA's national and industry economic accounts that were released in 2003-2004 and the most recent revision of the BLS multifactor productivity estimates that were released earlier this year. The most important change in the revised estimates was agreement by BEA and BLS on a common definition of the business sector. Differences in aggregate real output measures have been further reduced by changes in the methodology for BEA's annual industry accounts.

The conversion of industry data in the U.S. from the SIC system to NAICS is nearing completion for current estimates, but considerable work remains for historical estimates. Conversion to NAICS has raised new challenges for developing industry time series and for preparing historical production accounts, but it has also presented some opportunities for improving methodologies and changing procedures to incorporate better source data. This paper includes new and updated comparisons of BEA and BLS industry output measures on a NAICS basis. Analysis of the sources of the differences has revealed opportunities for reducing some of the largest differences in real growth rates.

Developing aggregate integrated production accounts is one of several joint BEA-BLS projects that are designed to improve the quality and consistency of the data available for U.S. output and productivity measurement. One of the most important of these new projects is the development of capital services measures and multifactor

productivity estimates for the total economy, including government and nonprofit institutions. Other projects include the expansion and reconciliation of aggregate hours worked measures, the extension of historical industry-level production accounts on a NAICS basis before 1987, and the provision of NAICS-based historical employment estimates that are consistent with the historical real value added by industry estimates.

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Table 4. Summary of NAICS Industries Exhibiting Differences in BEA and BLS Measures

| NAICS Industry | Difference in Real Output (BEA and BLS) | Difference in Nominal Output (BEA and BLS) | Difference in Price Deflator (BEA and BLS) | Correlation (.8 or less) Real Output | Correlation (.8 or less) Nominal Output | Correlation (.8 or less) Price Deflator |
|--|--|---|---|--|---|---|
| NAICS 3-digit Subsectors | | | | | | |
| 211, Oil and Gas Extraction | | X | X | X | | |
| 212, Mining | | | X | | | |
| 322, Paper Manufacturing | X | X | | | | |
| 324, Petroleum and Coal Products Manufacturing | X | X | | X | | |
| 325, Chemical Manufacturing | X | X | | | | |
| 326, Plastics and Rubber Product Manufacturing | X | X | | | | |
| 333, Machinery Manufacturing | X | X | | | | |
| 334, Computer and Electronic Product Manufacturing | X | X | | | | |
| 339, Miscellaneous Manufacturing | X | X | | | | |
| 481, Air Transportation | X | X | X | | | |
| 511, Publishing Industries | X | X | X | | | X |
| NAICS 4-digit Industry Groups | | | | | | |
| 2121, Coal Mining | X | | X | | | X |
| 2211, Electric Power Generation, Transmission and Distribution | X | X | X | X | X | |
| 2212, Natural Gas Distribution | | X | X | X | | |
| 3152, Cut and Sew Apparel Manufacturing | X | X | | X | X | X |
| 3159, Apparel Accessories and Other Apparel Manufacturing | X | X | | | | X |
| 3161, Leather and Hide Tanning and Finishing | X | X | | X | X | |
| 3162, Footwear Manufacturing | X | X | | | | |
| 3169, Other Leather and Allied Product Manufacturing | X | X | | X | X | X |

Table 4. Summary of NAICS Industries Exhibiting Differences in BEA and BLS Measures

| NAICS Industry | Difference in Real Output (BEA and BLS) | Difference in Nominal Output (BEA and BLS) | Difference in Price Deflator (BEA and BLS) | Correlation (.8 or less) Real Output | Correlation (.8 or less) Nominal Output | Correlation (.8 or less) Price Deflator |
|--|--|---|---|--|---|---|
| 3254, Pharmaceutical and Medicine Manufacturing | X | X | | | | X |
| 3325, Hardware Manufacturing | X | X | | X | X | |
| 3326, Spring and Wire Product Manufacturing | | X | | | | |
| 3343, Audio and Video Equipment Manufacturing | X | X | | X | X | |
| 3365, Railroad Rolling Stock Manufacturing | X | X | | X | | |
| 4911, Postal Service | | | | | X | X |
| 5112, Software Publishers | X | | X | | | |
| NAICS 5-digit Industries | | | | | | |
| 31123, Breakfast Cereal Manufacturing | X | X | | X | X | X |
| 31131, Sugar Manufacturing | X | X | | X | | |
| 31141, Frozen Food Manufacturing | | | | X | X | |
| 31142, Fruit and Vegetable Canning, Pickling, and Drying | | | | X | X | X |
| 31152, Ice Cream and Frozen Dessert Manufacturing | X | X | | | | |
| 31211, Soft Drink and Ice Manufacturing | | | | X | X | |
| 31321, Broadwoven Fabric Mills | X | X | | X | X | |
| 31412, Curtain and Linen Mills | X | X | | | | X |
| 31491, Textile Bag and Canvas Mills | X | X | | X | X | |
| 31519, Other Apparel Knitting Mills | X | X | X | X | X | X |

Table 4. Summary of NAICS Industries Exhibiting Differences in BEA and BLS Measures

| NAICS Industry | Difference in Real Output | Difference in Nominal Output | Difference in Price Deflator | Correlation (.8 or less) | Correlation (.8 or less) | Correlation (.8 or less) |
|--|---------------------------|------------------------------|------------------------------|--------------------------|--------------------------|--------------------------|
| | (BEA and BLS) | (BEA and BLS) | (BEA and BLS) | Real Output | Nominal Output | Price Deflator |
| 32192, Wood Container and Pallet Manufacturing | X | | | | | |
| 32221, Paperboard Container Manufacturing | | | | X | | |
| 32411, Petroleum Refineries | | | | X | | |
| 32513, Synthetic Dye and Pigment Manufacturing | X | X | | X | X | |
| 32518, Other Basic Inorganic Chemical Manufacturing | X | X | | X | | |
| 32541, Pharmaceutical and Medicine Manufacturing | X | X | | | | X |
| 32551, Paint and Coating Manufacturing | X | X | | | | |
| 32562, Toilet Preparation Manufacturing | | | | X | X | |
| 32611, Plastics Packaging Materials and Unlaminated Film and Sheet Manufacturing | X | X | | X | X | |
| 32612, Plastics Packaging Materials and Unlaminated Film and Sheet Manufacturing | X | X | | | | |
| 32629, Other Rubber Product Manufacturing | X | X | | X | X | |
| 33121, Iron and Steel Pipe and Tube Manufactured from Purchased Steel | X | | X | X | | |
| 33151, Ferrous Metal Foundries | X | | X | | | X |
| 33251, Hardware Manufacturing | X | X | | X | X | |
| 33261, Spring and Wire Manufacturing | | X | | | | |
| 33272, Turned Product and Screw, Nut, and Bolt Manufacturing | | | | | | X |

Table 4. Summary of NAICS Industries Exhibiting Differences in BEA and BLS Measures

| NAICS Industry | Difference in Real Output | Difference in Nominal Output | Difference in Price Deflator | Correlation (.8 or less) | Correlation (.8 or less) | Correlation (.8 or less) |
|--|---------------------------|------------------------------|------------------------------|--------------------------|--------------------------|--------------------------|
| | (BEA and BLS) | (BEA and BLS) | (BEA and BLS) | Real Output | Nominal Output | Price Deflator |
| 33291, Metal Valve Manufacturing | X | X | | X | | |
| 33312, Construction Machinery Manufacturing | X | X | | | | |
| 33421, Telephone Apparatus Manufacturing | X | X | | | | |
| 33422, Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing | X | X | | | | |
| 33431, Audio and Video Equipment Manufacturing | X | X | | X | X | |
| 33451, Navigational, Measuring, Electromedical, and Control Instruments Manufacturing | X | X | X | X | X | X |
| 33511, Electric Lamp Bulb and Part Manufacturing | X | X | | | | |
| 33612, Heavy Duty Truck Manufacturing | X | X | | | | |
| 33651, Railroad Rolling Stock Manufacturing | X | X | | X | | |
| 33711, Wood Kitchen Cabiner and Countertop Manufacturing | X | | | | X | X |
| 33992, Sporting and Athletic Goods Manufacturing | X | X | | | | |
| 33993, Doll, Toy, and Game Manufacturing | X | X | X | | | X |
| 33994, Office Supplies (except Paper) Manufacturing | X | X | | X | X | |
| 49111, Postal Services | | | | | X | X |
| 51111, Newspaper Publishers | X | | X | | | X |
| 51113, Book Publishers | | | | | | X |

Table 4. Summary of NAICS Industries Exhibiting Differences in BEA and BLS Measures

| NAICS Industry | Difference in Real Output (BEA and BLS) | Difference in Nominal Output (BEA and BLS) | Difference in Price Deflator (BEA and BLS) | Correlation (.8 or less) Real Output | Correlation (.8 or less) Nominal Output | Correlation (.8 or less) Price Deflator |
|-----------------------------------|--|---|---|--|---|---|
| 51121, Software Publishers | X | | X | | | |
| 53223, Video Tape and Disc Rental | X | | | | | |

Table 5A. Comparison of Real Output Series: NAICS 3-Digit Subsectors

| NAICS 3-Digit Subsector | Output Series | Average Annual Growth Rate (1990-97) (1) | Average Annual Growth Rate (1997-03) (2) | Acceleration (2) - (1) | Difference in Acceleration | Average Annual Growth Rate (1990-95) (3) | Average Annual Growth Rate (1995-00) (4) | Average Annual Growth Rate (2000-04) (5) | Acceleration (4) - (3) | Difference in Acceleration | Acceleration (5) - (4) | Difference in Acceleration | Correlation Coefficient |
|--|-------------------------|--|--|---------------------------|----------------------------|--|--|--|---------------------------|----------------------------|---------------------------|----------------------------|-------------------------|
| 211, Oil and Gas Extraction | BEA ¹ | -0.327 | -0.783 | -0.456 | -0.161 | -0.469 | -0.506 | -0.722 | -0.037 | -0.087 | -0.216 | 0.202 | 0.75 |
| | BLS (DIPS) ² | -0.490 | -0.785 | -0.295 | | -0.693 | -0.643 | -1.061 | 0.050 | | -0.418 | | |
| 212, Mining (except Oil and Gas) | BEA | 1.508 | -1.000 | -2.508 | 0.217 | 0.907 | 0.874 | -0.459 | -0.032 | 0.016 | -1.333 | -0.848 | 0.95 |
| | BLS (DIPS) | 1.086 | -1.638 | -2.724 | | 0.268 | 0.220 | -0.265 | -0.048 | | -0.485 | | |
| 321, Wood Product Manufacturing | BEA | 2.150 | 0.311 | -1.839 | -0.213 | 1.400 | 3.012 | 0.302 | 1.612 | 0.750 | -2.710 | 0.110 | 0.94 |
| | BLS (DIPS) | 2.063 | 0.437 | -1.626 | | 1.592 | 2.454 | -0.365 | 0.862 | | -2.819 | | |
| 322, Paper Manufacturing | BEA | 1.180 | -1.637 | -2.817 | 0.016 | 1.777 | -0.343 | -0.930 | -2.120 | -0.443 | -0.587 | 1.715 | 0.82 |
| | BLS (DIPS) | 1.621 | -1.211 | -2.832 | | 2.010 | 0.334 | -1.969 | -1.677 | | -2.303 | | |
| 323, Printing and Related Support Activities | BEA | 0.896 | -2.055 | -2.952 | -0.290 | 0.669 | 1.031 | -3.804 | 0.362 | 0.249 | -4.835 | -0.791 | 0.98 |
| | BLS (DIPS) | 0.916 | -1.746 | -2.662 | | 0.803 | 0.916 | -3.128 | 0.114 | | -4.044 | | |
| 324, Petroleum and Coal Products Manufacturing | BEA | 1.455 | -0.970 | -2.425 | -1.091 | 0.862 | 1.346 | 1.304 | 0.484 | 0.216 | -0.042 | 0.585 | 0.11 |
| | BLS (DIPS) | 1.870 | 0.536 | -1.334 | | 1.340 | 1.608 | 0.981 | 0.268 | | -0.627 | | |
| 325, Chemical Manufacturing | BEA | 1.903 | 0.523 | -1.380 | -0.864 | 1.132 | 2.047 | 0.877 | 0.915 | 0.371 | -1.170 | -1.374 | 0.92 |
| | BLS (DIPS) | 1.637 | 1.121 | -0.516 | | 1.136 | 1.679 | 1.883 | 0.543 | | 0.204 | | |
| 326, Plastics and Rubber Products Manufacturing | BEA | 4.556 | 0.859 | -3.698 | -0.385 | 4.493 | 3.733 | 0.648 | -0.760 | -0.059 | -3.084 | 1.472 | 0.87 |
| | BLS (DIPS) | 4.526 | 1.213 | -3.313 | | 4.551 | 3.850 | -0.706 | -0.701 | | -4.556 | | |
| 327, Nonmetallic Mineral Product Manufacturing | BEA | 2.235 | 0.646 | -1.589 | 0.071 | 1.089 | 3.353 | -0.457 | 2.265 | 0.323 | -3.811 | -0.138 | 0.99 |
| | BLS (DIPS) | 2.234 | 0.574 | -1.660 | | 1.277 | 3.219 | -0.453 | 1.942 | | -3.672 | | |
| 331, Primary Metal Manufacturing | BEA | 2.209 | -2.677 | -4.886 | -0.187 | 1.842 | 0.639 | -1.856 | -1.203 | -0.316 | -2.495 | -0.245 | 0.94 |
| | BLS (DIPS) | 2.026 | -2.672 | -4.699 | | 1.719 | 0.831 | -1.418 | -0.887 | | -2.249 | | |
| 332, Fabricated Metal Product Manufacturing | BEA | 3.366 | -0.593 | -3.959 | -0.416 | 3.065 | 3.193 | -2.061 | 0.128 | -0.082 | -5.254 | 0.314 | 0.98 |
| | BLS (DIPS) | 3.121 | -0.422 | -3.543 | | 2.852 | 3.062 | -2.506 | 0.210 | | -5.568 | | |
| 333, Machinery Manufacturing | BEA | 3.442 | -1.862 | -5.305 | -0.160 | 3.416 | 2.492 | -1.306 | -0.924 | -0.237 | -3.798 | 1.876 | 0.93 |
| | BLS (DIPS) | 3.394 | -1.751 | -5.144 | | 3.247 | 2.560 | -3.113 | -0.687 | | -5.674 | | |
| 334, Computer and Electronic Product Manufacturing | BEA | 16.662 | 7.667 | -8.995 | -0.278 | 14.328 | 21.587 | 0.697 | 7.259 | -1.078 | -20.889 | 2.328 | 0.98 |
| | BLS (DIPS) | 16.065 | 7.347 | -8.717 | | 13.332 | 21.669 | -1.548 | 8.338 | | -23.217 | | |

Table 5A. Comparison of Real Output Series: NAICS 3-Digit Subsectors

| NAICS 3-Digit Subsector | Output Series | Average Annual Growth Rate (1990-97) (1) | Average Annual Growth Rate (1997-03) (2) | Acceleration (2) - (1) | Difference in Acceleration | Average Annual Growth Rate (1990-95) (3) | Average Annual Growth Rate (1995-00) (4) | Average Annual Growth Rate (2000-04) (5) | Acceleration (4) - (3) | Difference in Acceleration | Acceleration (5) - (4) | Difference in Acceleration | Correlation Coefficient |
|---|---------------|--|--|---------------------------|----------------------------|--|--|--|---------------------------|----------------------------|---------------------------|----------------------------|-------------------------|
| 335, Electrical Equipment, Appliance, and Component Manufacturing | BEA | 3.491 | -1.573 | -5.064 | -0.270 | 3.529 | 3.442 | -4.573 | -0.087 | -0.172 | -8.015 | 0.154 | 0.98 |
| | BLS (DIPS) | 3.107 | -1.687 | -4.794 | | 3.216 | 3.302 | -4.867 | 0.086 | | -8.169 | | |
| 337, Furniture and Related Product Manufacturing | BEA | 2.962 | 1.588 | -1.374 | 0.145 | 1.793 | 4.767 | 0.959 | 2.974 | 0.537 | -3.807 | 0.247 | 0.99 |
| | BLS (DIPS) | 2.975 | 1.455 | -1.520 | | 2.025 | 4.462 | 0.408 | 2.437 | | -4.055 | | |
| 339, Miscellaneous Manufacturing | BEA | 3.137 | 3.644 | 0.507 | 0.448 | 2.891 | 4.224 | 2.898 | 1.333 | 0.131 | -1.326 | 1.345 | 0.90 |
| | BLS (DIPS) | 3.034 | 3.093 | 0.059 | | 2.857 | 4.058 | 1.387 | 1.201 | | -2.672 | | |
| 481, Air Transportation | BEA | 4.048 | 2.924 | -1.124 | 1.596 | 3.147 | 5.010 | 3.456 | 1.863 | 0.506 | -1.554 | 1.580 | 0.87 |
| | BLS (DIPS) | 4.126 | 1.407 | -2.720 | | 3.536 | 4.893 | 1.759 | 1.357 | | -3.134 | | |
| 511, Publishing Industries | BEA | 7.199 | 4.269 | -2.930 | 1.385 | 5.492 | 9.922 | 1.462 | 4.430 | 0.017 | -8.461 | 2.887 | 0.94 |
| | BLS (DIPS) | 7.092 | 2.777 | -4.315 | | 5.171 | 10.184 | -1.164 | 4.413 | | -11.348 | | |
| 722, Food Services and Drinking Places | BEA | 1.968 | 3.097 | 1.130 | 0.431 | 1.622 | 3.724 | 2.807 | 2.102 | 0.805 | 1.501 | -0.810 | 0.93 |
| | BLS (DIPS) | 1.829 | 2.528 | 0.699 | | 1.593 | 2.890 | 2.783 | 1.297 | | 0.791 | | |

1. BEA refers to the Bureau of Economic Analysis published NAICS 3-digit gross output estimates from the GDP-by-industry accounts.

2. BLS (DIPS) refers to the Bureau of Labor Statistics published NAICS 3-digit sectoral output measures.

BEA output measures are based on the 1997 NAICS classification and BLS (DIPS) output measures are based on the 2002 NAICS classification. For selected industries, the 1997 and 2002 NAICS classifications differ. Industries where the 1997 and 2002 NAICS classifications are different and result in incomparable output data are shaded in yellow. Of the industries where output measures are compared above, only 511, Publishing Industries, reflects NAICS classification differences.

Table 5B. Comparison of Nominal Output Series: NAICS 3-Digit Subsectors

| NAICS 3-Digit Subsector | Output Series | Average Annual Growth Rate (1990-97) (1) | Average Annual Growth Rate (1997-03) (2) | Acceleration (2) - (1) | Difference in Acceleration | Average Annual Growth Rate (1990-95) (3) | Average Annual Growth Rate (1995-00) (4) | Average Annual Growth Rate (2000-04) (5) | Acceleration (4) - (3) | Difference in Acceleration | Acceleration (5) - (4) | Difference in Acceleration | Correlation Coefficient |
|--|-------------------------|--|--|---------------------------|----------------------------|--|--|--|---------------------------|----------------------------|---------------------------|----------------------------|-------------------------|
| 211, Oil and Gas Extraction | BEA ¹ | 0.889 | 9.650 | 8.761 | -1.478 | -4.387 | 14.870 | 8.330 | 19.257 | -1.030 | -6.540 | 0.166 | 1.00 |
| | BLS (DIPS) ² | 0.182 | 10.421 | 10.239 | | -5.280 | 15.007 | 8.301 | 20.287 | | -6.706 | | |
| 212, Mining (except Oil and Gas) | BEA | 0.302 | -0.840 | -1.141 | 0.147 | -0.078 | -1.524 | 3.726 | -1.447 | -0.347 | 5.250 | 0.327 | 0.96 |
| | BLS (DIPS) | 0.592 | -0.696 | -1.288 | | 0.318 | -0.782 | 4.141 | -1.100 | | 4.924 | | |
| 321, Wood Product Manufacturing | BEA | 6.948 | 0.373 | -6.575 | -0.249 | 7.394 | 3.560 | 3.312 | -3.834 | 0.683 | -0.248 | 0.193 | 0.98 |
| | BLS (DIPS) | 6.762 | 0.436 | -6.327 | | 7.484 | 2.967 | 2.527 | -4.517 | | -0.441 | | |
| 322, Paper Manufacturing | BEA | 2.350 | -0.260 | -2.610 | 0.225 | 5.593 | -0.414 | -0.732 | -6.007 | -0.048 | -0.318 | 1.559 | 0.98 |
| | BLS (DIPS) | 2.984 | 0.150 | -2.835 | | 6.116 | 0.158 | -1.719 | -5.958 | | -1.877 | | |
| 323, Printing and Related Support Activities | BEA | 3.125 | -0.919 | -4.044 | 0.006 | 3.297 | 2.475 | -3.090 | -0.822 | 0.309 | -5.565 | -0.482 | 0.99 |
| | BLS (DIPS) | 3.126 | -0.925 | -4.050 | | 3.416 | 2.286 | -2.798 | -1.131 | | -5.084 | | |
| 324, Petroleum and Coal Products Manufacturing | BEA | 0.468 | 4.952 | 4.484 | -1.297 | -2.533 | 9.211 | 8.517 | 11.745 | -0.447 | -0.695 | 1.141 | 0.98 |
| | BLS (DIPS) | 0.054 | 5.835 | 5.781 | | -2.909 | 9.282 | 7.446 | 12.192 | | -1.836 | | |
| 325, Chemical Manufacturing | BEA | 4.343 | 2.284 | -2.059 | -1.081 | 4.244 | 3.391 | 3.656 | -0.853 | -0.146 | 0.266 | -1.128 | 0.98 |
| | BLS (DIPS) | 4.116 | 3.138 | -0.978 | | 4.136 | 3.429 | 4.823 | -0.707 | | 1.394 | | |
| 326, Plastics and Rubber Products Manufacturing | BEA | 5.634 | 1.625 | -4.009 | -0.446 | 6.179 | 3.929 | 2.001 | -2.250 | -0.209 | -1.928 | 1.545 | 0.89 |
| | BLS (DIPS) | 5.577 | 2.014 | -3.564 | | 6.158 | 4.117 | 0.644 | -2.041 | | -3.473 | | |
| 327, Nonmetallic Mineral Product Manufacturing | BEA | 4.383 | 1.902 | -2.481 | 0.067 | 3.488 | 5.067 | 0.875 | 1.579 | 0.242 | -4.192 | -0.127 | 0.99 |
| | BLS (DIPS) | 4.435 | 1.887 | -2.548 | | 3.705 | 5.042 | 0.976 | 1.337 | | -4.066 | | |
| 331, Primary Metal Manufacturing | BEA | 2.996 | -3.588 | -6.584 | -0.056 | 3.663 | -0.904 | 2.231 | -4.567 | -0.141 | 3.135 | -0.873 | 0.99 |
| | BLS (DIPS) | 3.029 | -3.499 | -6.528 | | 3.686 | -0.740 | 3.267 | -4.426 | | 4.007 | | |
| 332, Fabricated Metal Product Manufacturing | BEA | 4.944 | 0.049 | -4.895 | -0.353 | 4.745 | 4.223 | -0.076 | -0.523 | -0.012 | -4.298 | 0.400 | 0.98 |
| | BLS (DIPS) | 4.765 | 0.222 | -4.543 | | 4.635 | 4.124 | -0.575 | -0.511 | | -4.699 | | |
| 333, Machinery Manufacturing | BEA | 5.495 | -1.152 | -6.647 | -0.222 | 5.598 | 3.658 | -0.267 | -1.940 | -0.299 | -3.925 | 1.894 | 0.94 |
| | BLS (DIPS) | 5.495 | -0.931 | -6.426 | | 5.466 | 3.825 | -1.995 | -1.641 | | -5.820 | | |
| 334, Computer and Electronic Product Manufacturing | BEA | 8.033 | -3.403 | -11.437 | 0.332 | 7.957 | 6.293 | -5.898 | -1.664 | -0.589 | -12.191 | 2.499 | 0.97 |
| | BLS (DIPS) | 8.239 | -3.529 | -11.768 | | 7.829 | 6.754 | -7.936 | -1.076 | | -14.690 | | |

Table 5B. Comparison of Nominal Output Series: NAICS 3-Digit Subsectors

| NAICS 3-Digit Subsector | Output Series | Average Annual Growth Rate (1990-97) (1) | Average Annual Growth Rate (1997-03) (2) | Acceleration (2) - (1) | Difference in Acceleration | Average Annual Growth Rate (1990-95) (3) | Average Annual Growth Rate (1995-00) (4) | Average Annual Growth Rate (2000-04) (5) | Acceleration (4) - (3) | Difference in Acceleration | Acceleration (5) - (4) | Difference in Acceleration | Correlation Coefficient |
|---|---------------|--|--|---------------------------|----------------------------|--|--|--|---------------------------|----------------------------|---------------------------|----------------------------|-------------------------|
| 335, Electrical Equipment, Appliance, and Component Manufacturing | BEA | 4.605 | -1.732 | -6.337 | -0.181 | 4.902 | 3.697 | -4.015 | -1.205 | -0.405 | -7.712 | 0.341 | 0.99 |
| | BLS (DIPS) | 4.389 | -1.768 | -6.157 | | 4.608 | 3.808 | -4.245 | -0.801 | | -8.053 | | |
| 337, Furniture and Related Product Manufacturing | BEA | 5.197 | 2.821 | -2.376 | 0.225 | 4.184 | 6.308 | 2.222 | 2.124 | 0.384 | -4.086 | 0.428 | 0.99 |
| | BLS (DIPS) | 5.273 | 2.672 | -2.601 | | 4.410 | 6.150 | 1.636 | 1.740 | | -4.514 | | |
| 339, Miscellaneous Manufacturing | BEA | 5.014 | 4.693 | -0.320 | 0.677 | 5.057 | 5.147 | 4.268 | 0.091 | 0.038 | -0.879 | 1.887 | 0.84 |
| | BLS (DIPS) | 4.872 | 3.874 | -0.998 | | 4.985 | 5.037 | 2.271 | 0.052 | | -2.766 | | |
| 481, Air Transportation | BEA | 4.970 | 1.731 | -3.239 | 1.653 | 4.189 | 5.998 | 0.123 | 1.809 | -0.471 | -5.875 | 2.085 | 0.91 |
| | BLS (DIPS) | 4.459 | -0.434 | -4.893 | | 3.579 | 5.859 | -2.100 | 2.280 | | -7.960 | | |
| 511, Publishing Industries | BEA | 8.435 | 4.792 | -3.643 | -0.310 | 7.058 | 10.593 | 1.286 | 3.535 | -0.678 | -9.307 | 1.228 | 0.95 |
| | BLS (DIPS) | 8.476 | 5.143 | -3.333 | | 6.843 | 11.635 | 1.101 | 4.213 | | -10.534 | | |
| 722, Food Services and Drinking Places | BEA | 4.433 | 5.201 | 0.769 | -0.185 | 3.997 | 5.707 | 5.634 | 1.711 | 0.065 | -0.073 | -0.136 | 0.98 |
| | BLS (DIPS) | 4.227 | 5.181 | 0.954 | | 3.881 | 5.527 | 5.590 | 1.645 | | 0.063 | | |

1. BEA refers to the Bureau of Economic Analysis published NAICS 3-digit gross output estimates from the GDP-by-industry accounts.

2. BLS (DIPS) refers to the Bureau of Labor Statistics published NAICS 3-digit sectoral output measures.

BEA output measures are based on the 1997 NAICS classification and BLS (DIPS) output measures are based on the 2002 NAICS classification. For selected industries, the 1997 and 2002 NAICS classifications differ. Industries where the 1997 and 2002 NAICS classifications are different and result in incomparable output data are shaded in yellow. Of the industries where output measures are compared above, only 511, Publishing Industries, reflects NAICS classification differences.

Table 5C. Comparison of Output Price Deflator Series: NAICS 3-Digit Subsectors

| NAICS 3-Digit Subsector | Output Series | Average Annual Growth Rate (1990-97) (1) | Average Annual Growth Rate (1997-03) (2) | Acceleration (2) - (1) | Difference in Acceleration | Average Annual Growth Rate (1990-95) (3) | Average Annual Growth Rate (1995-00) (4) | Average Annual Growth Rate (2000-04) (5) | Acceleration (4) - (3) | Difference in Acceleration | Acceleration (5) - (4) | Difference in Acceleration | Correlation Coefficient |
|--|-------------------------|--|--|---------------------------|----------------------------|--|--|--|---------------------------|----------------------------|---------------------------|----------------------------|-------------------------|
| 211, Oil and Gas Extraction | BEA ¹ | 1.222 | 10.515 | 9.294 | -1.326 | -3.941 | 15.460 | 9.123 | 19.401 | -0.969 | -6.337 | -0.048 | 1.00 |
| | BLS (DIPS) ² | 0.676 | 11.295 | 10.619 | | -4.619 | 15.751 | 9.463 | 20.370 | | -6.289 | | |
| 212, Mining (except Oil and Gas) | BEA | -1.198 | 0.186 | 1.384 | -0.062 | -0.991 | -2.370 | 4.239 | -1.379 | -0.330 | 6.609 | 1.191 | 0.89 |
| | BLS (DIPS) | -0.489 | 0.957 | 1.446 | | 0.049 | -1.000 | 4.418 | -1.049 | | 5.418 | | |
| 321, Wood Product Manufacturing | BEA | 4.683 | 0.078 | -4.604 | 0.001 | 5.890 | 0.538 | 3.011 | -5.352 | -0.053 | 2.473 | 0.072 | 1.00 |
| | BLS (DIPS) | 4.604 | -0.002 | -4.606 | | 5.800 | 0.501 | 2.902 | -5.299 | | 2.401 | | |
| 322, Paper Manufacturing | BEA | 1.149 | 1.402 | 0.253 | 0.217 | 3.739 | -0.066 | 0.197 | -3.805 | 0.395 | 0.263 | -0.167 | 1.00 |
| | BLS (DIPS) | 1.341 | 1.378 | 0.036 | | 4.025 | -0.175 | 0.255 | -4.200 | | 0.430 | | |
| 323, Printing and Related Support Activities | BEA | 2.208 | 1.162 | -1.046 | 0.308 | 2.600 | 1.436 | 0.752 | -1.165 | 0.071 | -0.684 | 0.333 | 0.98 |
| | BLS (DIPS) | 2.189 | 0.835 | -1.354 | | 2.593 | 1.357 | 0.340 | -1.236 | | -1.017 | | |
| 324, Petroleum and Coal Products Manufacturing | BEA | -0.971 | 5.980 | 6.951 | -0.103 | -3.368 | 7.760 | 7.127 | 11.129 | -0.618 | -0.633 | 0.518 | 0.97 |
| | BLS (DIPS) | -1.783 | 5.271 | 7.054 | | -4.193 | 7.553 | 6.402 | 11.747 | | -1.151 | | |
| 325, Chemical Manufacturing | BEA | 2.394 | 1.752 | -0.642 | -0.197 | 3.080 | 1.314 | 2.755 | -1.767 | -0.520 | 1.441 | 0.276 | 0.98 |
| | BLS (DIPS) | 2.438 | 1.994 | -0.445 | | 2.967 | 1.721 | 2.886 | -1.246 | | 1.165 | | |
| 326, Plastics and Rubber Products Manufacturing | BEA | 1.031 | 0.761 | -0.270 | -0.055 | 1.618 | 0.187 | 1.341 | -1.431 | -0.151 | 1.153 | 0.051 | 0.99 |
| | BLS (DIPS) | 1.006 | 0.791 | -0.215 | | 1.537 | 0.257 | 1.360 | -1.280 | | 1.103 | | |
| 327, Nonmetallic Mineral Product Manufacturing | BEA | 2.102 | 1.232 | -0.871 | -0.024 | 2.365 | 1.664 | 1.329 | -0.701 | -0.070 | -0.335 | -0.004 | 0.98 |
| | BLS (DIPS) | 2.152 | 1.305 | -0.847 | | 2.397 | 1.766 | 1.436 | -0.631 | | -0.330 | | |
| 331, Primary Metal Manufacturing | BEA | 0.770 | -0.941 | -1.711 | 0.122 | 1.795 | -1.544 | 4.168 | -3.339 | 0.153 | 5.712 | -0.599 | 0.99 |
| | BLS (DIPS) | 0.983 | -0.849 | -1.832 | | 1.934 | -1.559 | 4.753 | -3.493 | | 6.312 | | |
| 332, Fabricated Metal Product Manufacturing | BEA | 1.526 | 0.641 | -0.884 | 0.063 | 1.627 | 0.997 | 2.024 | -0.630 | 0.073 | 1.027 | 0.076 | 1.00 |
| | BLS (DIPS) | 1.594 | 0.647 | -0.948 | | 1.734 | 1.031 | 1.982 | -0.703 | | 0.951 | | |
| 333, Machinery Manufacturing | BEA | 1.984 | 0.727 | -1.257 | -0.060 | 2.110 | 1.137 | 1.051 | -0.973 | -0.057 | -0.086 | -0.007 | 1.00 |
| | BLS (DIPS) | 2.032 | 0.835 | -1.198 | | 2.149 | 1.233 | 1.154 | -0.916 | | -0.079 | | |
| 334, Computer and Electronic Product Manufacturing | BEA | -7.395 | -10.283 | -2.888 | 0.502 | -5.572 | -12.579 | -6.550 | -7.006 | 0.398 | 6.028 | 0.257 | 1.00 |
| | BLS (DIPS) | -6.742 | -10.132 | -3.390 | | -4.855 | -12.259 | -6.488 | -7.404 | | 5.771 | | |

Table 5C. Comparison of Output Price Deflator Series: NAICS 3-Digit Subsectors

| NAICS 3-Digit Subsector | Output Series | Average Annual Growth Rate (1990-97) (1) | Average Annual Growth Rate (1997-03) (2) | Acceleration (2) - (1) | Difference in Acceleration | Average Annual Growth Rate (1990-95) (3) | Average Annual Growth Rate (1995-00) (4) | Average Annual Growth Rate (2000-04) (5) | Acceleration (4) - (3) | Difference in Acceleration | Acceleration (5) - (4) | Difference in Acceleration | Correlation Coefficient |
|---|---------------|--|--|---------------------------|----------------------------|--|--|--|---------------------------|----------------------------|---------------------------|----------------------------|-------------------------|
| 335, Electrical Equipment, Appliance, and Component Manufacturing | BEA | 1.077 | -0.159 | -1.236 | 0.089 | 1.324 | 0.254 | 0.585 | -1.070 | -0.211 | 0.332 | 0.167 | 0.99 |
| | BLS (DIPS) | 1.243 | -0.082 | -1.325 | | 1.348 | 0.489 | 0.654 | -0.859 | | 0.164 | | |
| 337, Furniture and Related Product Manufacturing | BEA | 2.185 | 1.209 | -0.976 | 0.056 | 2.361 | 1.492 | 1.240 | -0.869 | -0.147 | -0.253 | 0.140 | 0.99 |
| | BLS (DIPS) | 2.231 | 1.199 | -1.032 | | 2.338 | 1.616 | 1.223 | -0.722 | | -0.393 | | |
| 339, Miscellaneous Manufacturing | BEA | 1.822 | 1.016 | -0.806 | 0.220 | 2.110 | 0.886 | 1.349 | -1.223 | -0.095 | 0.462 | 0.531 | 0.89 |
| | BLS (DIPS) | 1.784 | 0.758 | -1.026 | | 2.069 | 0.941 | 0.872 | -1.128 | | -0.069 | | |
| 481, Air Transportation | BEA | 0.881 | -1.153 | -2.033 | -0.094 | 1.002 | 0.941 | -3.220 | -0.061 | -0.940 | -4.161 | 0.553 | 0.87 |
| | BLS (DIPS) | 0.319 | -1.620 | -1.939 | | 0.042 | 0.921 | -3.793 | 0.879 | | -4.714 | | |
| 511, Publishing Industries | BEA | 1.158 | 0.498 | -0.660 | -1.663 | 1.483 | 0.614 | -0.170 | -0.869 | -0.622 | -0.785 | -1.759 | 0.78 |
| | BLS (DIPS) | 1.292 | 2.295 | 1.003 | | 1.590 | 1.317 | 2.291 | -0.247 | | 0.974 | | |
| 722, Food Services and Drinking Places | BEA | 2.418 | 2.037 | -0.381 | -0.613 | 2.337 | 1.912 | 2.746 | -0.424 | -0.734 | 0.833 | 0.665 | 0.84 |
| | BLS (DIPS) | 2.355 | 2.587 | 0.233 | | 2.253 | 2.562 | 2.731 | 0.310 | | 0.169 | | |

1. BEA refers to the Bureau of Economic Analysis published NAICS 3-digit gross output estimates from the GDP-by-industry accounts.

2. BLS (DIPS) refers to the Bureau of Labor Statistics published NAICS 3-digit sectoral output measures.

BEA output measures are based on the 1997 NAICS classification and BLS (DIPS) output measures are based on the 2002 NAICS classification. For selected industries, the 1997 and 2002 NAICS classifications differ. Industries where the 1997 and 2002 NAICS classifications are different and result in incomparable output data are shaded in yellow. Of the industries where output measures are compared above, only 511, Publishing Industries, reflects NAICS classification differences.

Table 6A. Comparison of Real Output Series: NAICS 4-Digit Industry Groups

| NAICS 4-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficients |
|--|-------------------------|---|---|---------------------------------|
| 2111, Oil and Gas Extraction | BEA ¹ | -0.490 | 0.580 | 0.85 |
| | BLS (DIPS) ² | -1.070 | | |
| 2121, Coal Mining | BEA | -0.266 | 1.133 | 0.99 |
| | BLS (DIPS) | -1.399 | | |
| 2211, Electric Power Generation, Transmission and Distribution | BEA | -0.005 | 1.443 | 0.11 |
| | BLS (DIPS) | -1.448 | | |
| 2212, Natural Gas Distribution | BEA | 0.078 | -0.373 | 0.17 |
| | BLS (DIPS) | 0.451 | | |
| 3152, Cut and Sew Apparel Manufacturing | BEA | -8.081 | 3.683 | 0.35 |
| | BLS (DIPS) | -11.764 | | |
| 3159, Apparel Accessories and Other Apparel Manufacturing | BEA | -9.617 | 3.097 | 0.85 |
| | BLS (DIPS) | -12.714 | | |
| 3161, Leather and Hide Tanning and Finishing | BEA | -10.547 | 1.620 | 0.16 |
| | BLS (DIPS) | -12.167 | | |
| 3162, Footwear Manufacturing | BEA | -9.643 | 1.341 | 0.96 |
| | BLS (DIPS) | -10.984 | | |
| 3169, Other Leather and Allied Product Manufacturing | BEA | -10.673 | -2.790 | 0.77 |
| | BLS (DIPS) | -7.883 | | |
| 3254, Pharmaceutical and Medicine Manufacturing | BEA | 3.099 | -2.752 | 0.82 |
| | BLS (DIPS) | 5.851 | | |
| 3325, Hardware Manufacturing | BEA | -1.633 | 1.612 | 0.67 |
| | BLS (DIPS) | -3.245 | | |
| 3326, Spring and Wire Product Manufacturing | BEA | -1.571 | 0.217 | 0.95 |
| | BLS (DIPS) | -1.788 | | |
| 3343, Audio and Video Equipment Manufacturing | BEA | 2.714 | -3.416 | 0.61 |
| | BLS (DIPS) | 6.130 | | |
| 3363, Motor Vehicle Parts Manufacturing | BEA | 1.682 | -0.088 | 1.00 |
| | BLS (DIPS) | 1.770 | | |

Table 6A. Comparison of Real Output Series: NAICS 4-Digit Industry Groups

| NAICS 4-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficients |
|--|---------------|---|---|--------------------------|
| 3365, Railroad Rolling Stock Manufacturing | BEA | -0.606 | 2.763 | 0.77 |
| | BLS (DIPS) | -3.368 | | |
| 4911, Postal Service | BEA | -0.249 | 0.147 | 0.84 |
| | BLS (DIPS) | -0.396 | | |
| 5112, Software Publishers | BEA | 8.475 | 4.691 | 0.97 |
| | BLS (DIPS) | 3.784 | | |
| 8123, Drycleaning and Laundry Services | BEA | -0.626 | -0.041 | 0.81 |
| | BLS (DIPS) | -0.584 | | |

1. BEA refers to the Bureau of Economic Analysis unpublished detailed NAICS 4-digit gross output estimates underlying the GDP-by-industry accounts.
2. BLS (DIPS) refers to the Bureau of Labor Statistics published NAICS 4-digit sectoral output measures.

BEA output measures are based on the 1997 NAICS classification and BLS (DIPS) output measures are based on the 2002 NAICS classification. For selected industries, the 1997 and 2002 NAICS classifications differ. Industries where the 1997 and 2002 NAICS classifications are different and result in incomparable output data are shaded in yellow.

Table 6B. Comparison of Nominal Output Series: NAICS 4-Digit Industry Groups

| NAICS 4-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficients |
|--|-------------------------|---|---|---------------------------------|
| 2111, Oil and Gas Extraction | BEA ¹ | 19.114 | 0.219 | 1.00 |
| | BLS (DIPS) ² | 18.895 | | |
| 2121, Coal Mining | BEA | 0.902 | -0.966 | 0.91 |
| | BLS (DIPS) | 1.868 | | |
| 2211, Electric Power Generation, Transmission and Distribution | BEA | 2.675 | 2.874 | 0.65 |
| | BLS (DIPS) | -0.199 | | |
| 2212, Natural Gas Distribution | BEA | 8.513 | -3.089 | 0.99 |
| | BLS (DIPS) | 11.602 | | |
| 3152, Cut and Sew Apparel Manufacturing | BEA | -8.297 | 3.390 | 0.39 |
| | BLS (DIPS) | -11.687 | | |
| 3159, Apparel Accessories and Other Apparel Manufacturing | BEA | -8.936 | 2.921 | 0.84 |
| | BLS (DIPS) | -11.857 | | |
| 3161, Leather and Hide Tanning and Finishing | BEA | -7.662 | 1.723 | 0.07 |
| | BLS (DIPS) | -9.386 | | |
| 3162, Footwear Manufacturing | BEA | -9.329 | 1.247 | 0.96 |
| | BLS (DIPS) | -10.576 | | |
| 3169, Other Leather and Allied Product Manufacturing | BEA | -10.275 | -2.848 | 0.77 |
| | BLS (DIPS) | -7.427 | | |
| 3254, Pharmaceutical and Medicine Manufacturing | BEA | 6.056 | -3.267 | 0.86 |
| | BLS (DIPS) | 9.323 | | |
| 3325, Hardware Manufacturing | BEA | -0.078 | 1.643 | 0.72 |
| | BLS (DIPS) | -1.721 | | |
| 3326, Spring and Wire Product Manufacturing | BEA | 0.648 | 1.065 | 0.92 |
| | BLS (DIPS) | -0.417 | | |
| 3343, Audio and Video Equipment Manufacturing | BEA | 0.970 | -3.348 | 0.53 |
| | BLS (DIPS) | 4.318 | | |
| 3363, Motor Vehicle Parts Manufacturing | BEA | 1.430 | -0.070 | 1.00 |
| | BLS (DIPS) | 1.500 | | |

Table 6B. Comparison of Nominal Output Series: NAICS 4-Digit Industry Groups

| NAICS 4-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficients |
|--|---------------|--------------------------------------|---|--------------------------|
| 3365, Railroad Rolling Stock Manufacturing | BEA | -0.069 | 2.869 | 0.81 |
| | BLS (DIPS) | -2.938 | | |
| 4911, Postal Service | BEA | 2.418 | 0.735 | 0.57 |
| | BLS (DIPS) | 1.683 | | |
| 5112, Software Publishers | BEA | 5.612 | 0.695 | 0.99 |
| | BLS (DIPS) | 4.918 | | |
| 8123, Drycleaning and Laundry Services | BEA | 2.162 | 0.147 | 0.82 |
| | BLS (DIPS) | 2.015 | | |

1. BEA refers to the Bureau of Economic Analysis unpublished detailed NAICS 4-digit gross output estimates underlying the GDP-by-industry accounts.

2. BLS (DIPS) refers to the Bureau of Labor Statistics published NAICS 4-digit sectoral output measures.

BEA output measures are based on the 1997 NAICS classification and BLS (DIPS) output measures are based on the 2002 NAICS classification. For selected industries, the 1997 and 2002 NAICS classifications differ. Industries where the 1997 and 2002 NAICS classifications are different and result in incomparable output data are shaded in yellow.

Table 6C. Comparison of Output Price Deflator Series: NAICS 4-Digit Industry Groups

| NAICS 4-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficients |
|--|-------------------------|---|---|---------------------------------|
| 2111, Oil and Gas Extraction | BEA ¹ | 19.700 | -0.481 | 1.00 |
| | BLS (DIPS) ² | 20.181 | | |
| 2121, Coal Mining | BEA | 1.171 | -2.142 | 0.78 |
| | BLS (DIPS) | 3.313 | | |
| 2211, Electric Power Generation, Transmission and Distribution | BEA | 2.680 | 1.413 | 0.96 |
| | BLS (DIPS) | 1.267 | | |
| 2212, Natural Gas Distribution | BEA | 8.429 | -2.672 | 0.98 |
| | BLS (DIPS) | 11.101 | | |
| 3152, Cut and Sew Apparel Manufacturing | BEA | -0.235 | -0.322 | -0.32 |
| | BLS (DIPS) | 0.087 | | |
| 3159, Apparel Accessories and Other Apparel Manufacturing | BEA | 0.751 | -0.231 | -0.16 |
| | BLS (DIPS) | 0.982 | | |
| 3161, Leather and Hide Tanning and Finishing | BEA | 3.228 | 0.062 | 1.00 |
| | BLS (DIPS) | 3.167 | | |
| 3162, Footwear Manufacturing | BEA | 0.353 | -0.106 | 0.92 |
| | BLS (DIPS) | 0.459 | | |
| 3169, Other Leather and Allied Product Manufacturing | BEA | 0.440 | -0.055 | 0.38 |
| | BLS (DIPS) | 0.495 | | |
| 3254, Pharmaceutical and Medicine Manufacturing | BEA | 2.868 | -0.412 | 0.70 |
| | BLS (DIPS) | 3.280 | | |
| 3325, Hardware Manufacturing | BEA | 1.581 | 0.006 | 0.99 |
| | BLS (DIPS) | 1.575 | | |
| 3326, Spring and Wire Product Manufacturing | BEA | 2.256 | 0.860 | 0.97 |
| | BLS (DIPS) | 1.396 | | |
| 3343, Audio and Video Equipment Manufacturing | BEA | -1.698 | 0.010 | 0.99 |
| | BLS (DIPS) | -1.708 | | |
| 3363, Motor Vehicle Parts Manufacturing | BEA | -0.248 | 0.018 | 0.99 |
| | BLS (DIPS) | -0.266 | | |

Table 6C. Comparison of Output Price Deflator Series: NAICS 4-Digit Industry Groups

| NAICS 4-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficients |
|--|---------------|---|---|--------------------------|
| 3365, Railroad Rolling Stock Manufacturing | BEA | 0.541 | 0.096 | 0.99 |
| | BLS (DIPS) | 0.445 | | |
| 4911, Postal Service | BEA | 2.674 | 0.586 | 0.30 |
| | BLS (DIPS) | 2.088 | | |
| 5112, Software Publishers | BEA | -2.639 | -3.731 | 0.97 |
| | BLS (DIPS) | 1.092 | | |
| 8123, Drycleaning and Laundry Services | BEA | 2.805 | 0.190 | 0.90 |
| | BLS (DIPS) | 2.615 | | |

1. BEA refers to the Bureau of Economic Analysis unpublished detailed NAICS 4-digit gross output estimates underlying the GDP-by-industry accounts.

2. BLS (DIPS) refers to the Bureau of Labor Statistics published NAICS 4-digit sectoral output measures.

BEA output measures are based on the 1997 NAICS classification and BLS (DIPS) output measures are based on the 2002 NAICS classification. For selected industries, the 1997 and 2002 NAICS classifications differ. Industries where the 1997 and 2002 NAICS classifications are different and result in incomparable output data are shaded in yellow.

Table 7A. Comparison of Real Output Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|--|-------------------------|--------------------------------------|---|-------------------------|
| 31123, Breakfast Cereal Manufacturing | BEA ¹ | -3.681 | -5.603 | 0.75 |
| | BLS (DIPS) ² | 1.922 | | |
| 31131, Sugar Manufacturing | BEA | 0.850 | 1.362 | 0.71 |
| | BLS (DIPS) | -0.512 | | |
| 31134, Nonchocolate Confectionery Manufacturing | BEA | -0.799 | -0.089 | 0.98 |
| | BLS (DIPS) | -0.710 | | |
| 31141, Frozen Food Manufacturing | BEA | -0.012 | -0.237 | -0.17 |
| | BLS (DIPS) | 0.224 | | |
| 31142, Fruit and Vegetable Canning, Pickling, and Drying | BEA | 1.754 | 0.558 | 0.08 |
| | BLS (DIPS) | 1.196 | | |
| 31152, Ice Cream and Frozen Dessert Manufacturing | BEA | 4.272 | 2.369 | 0.96 |
| | BLS (DIPS) | 1.903 | | |
| 31211, Soft Drink and Ice Manufacturing | BEA | -0.369 | -0.648 | 0.78 |
| | BLS (DIPS) | 0.279 | | |
| 31311, Fiber, Yarn, and Thread Mills | BEA | -1.419 | 0.407 | 0.99 |
| | BLS (DIPS) | -1.825 | | |
| 31321, Broadwoven Fabric Mills | BEA | -7.748 | 1.870 | 0.35 |
| | BLS (DIPS) | -9.619 | | |
| 31411, Carpet and Rug Mills | BEA | 1.605 | -0.590 | 0.86 |
| | BLS (DIPS) | 2.194 | | |
| 31412, Curtain and Linen Mills | BEA | -1.340 | 1.417 | 0.85 |
| | BLS (DIPS) | -2.757 | | |
| 31491, Textile Bag and Canvas Mills | BEA | -0.283 | -2.415 | 0.72 |
| | BLS (DIPS) | 2.132 | | |
| 31519, Other Apparel Knitting Mills | BEA | -12.595 | 5.232 | 0.10 |
| | BLS (DIPS) | -17.827 | | |

Table 7A. Comparison of Real Output Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|--|----------------------|---|---|--------------------------------|
| 32192, Wood Container and Pallet Manufacturing | BEA | 2.765 | 1.617 | 0.86 |
| | BLS (DIPS) | 1.147 | | |
| 32221, Paperboard Container Manufacturing | BEA | -1.876 | 0.025 | 0.78 |
| | BLS (DIPS) | -1.901 | | |
| 32411, Petroleum Refineries | BEA | 1.237 | 0.560 | 0.14 |
| | BLS (DIPS) | 0.677 | | |
| 32513, Synthetic Dye and Pigment Manufacturing | BEA | 2.728 | 2.433 | 0.61 |
| | BLS (DIPS) | 0.295 | | |
| 32518, Other Basic Inorganic Chemical Manufacturing | BEA | -3.192 | 2.032 | 0.68 |
| | BLS (DIPS) | -5.224 | | |
| 32519, Other Basic Organic Chemical Manufacturing | BEA | 0.637 | -0.078 | 0.98 |
| | BLS (DIPS) | 0.715 | | |
| 32541, Pharmaceutical and Medicine Manufacturing | BEA | 3.099 | -2.752 | 0.82 |
| | BLS (DIPS) | 5.851 | | |
| 32551, Paint and Coating Manufacturing | BEA | -0.778 | -1.230 | 0.94 |
| | BLS (DIPS) | 0.452 | | |
| 32562, Toilet Preparation Manufacturing | BEA | 3.826 | -0.274 | 0.67 |
| | BLS (DIPS) | 4.100 | | |
| 32611, Plastics Packaging Materials and Unlaminated Film and Sheet Manufacturing | BEA | 1.370 | 1.873 | 0.58 |
| | BLS (DIPS) | -0.503 | | |
| 32612, Plastics Pipe, Pipe Fitting and Unlaminated Profile Shape Manufacturing | BEA | 2.215 | -1.085 | 0.84 |
| | BLS (DIPS) | 3.300 | | |
| 32621, Tire Manufacturing | BEA | -1.116 | -0.080 | 0.98 |
| | BLS (DIPS) | -1.036 | | |

Table 7A. Comparison of Real Output Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|--|----------------------|---|---|--------------------------------|
| 32622, Rubber and Plastics Hoses and Belting Manufacturing | BEA | -0.798 | 0.617 | 0.93 |
| | BLS (DIPS) | -1.415 | | |
| 32629, Other Rubber Product Manufacturing | BEA | -0.345 | 1.544 | 0.78 |
| | BLS (DIPS) | -1.889 | | |
| 32732, Ready-Mix Concrete Manufacturing | BEA | 1.048 | -0.088 | 0.97 |
| | BLS (DIPS) | 1.136 | | |
| 33121, Iron and Steel Pipe and Tube Manufacturing from Purchased Steel | BEA | -3.767 | 2.934 | 0.75 |
| | BLS (DIPS) | -6.701 | | |
| 33151, Ferrous Metal Foundries | BEA | 0.161 | 1.831 | 0.95 |
| | BLS (DIPS) | -1.670 | | |
| 33251, Hardware Manufacturing | BEA | -1.633 | 1.612 | 0.67 |
| | BLS (DIPS) | -3.245 | | |
| 33261, Spring and Wire Manufacturing | BEA | -1.571 | 0.217 | 0.95 |
| | BLS (DIPS) | -1.788 | | |
| 33271, Machine Shops | BEA | 0.215 | 0.241 | 0.98 |
| | BLS (DIPS) | -0.026 | | |
| 33272, Turned Product and Screw, Nut, and Bolt Manufacturing | BEA | -0.156 | 0.706 | 0.96 |
| | BLS (DIPS) | -0.862 | | |
| 33291, Metal Valve Manufacturing | BEA | -1.363 | 1.203 | 0.77 |
| | BLS (DIPS) | -2.567 | | |
| 33312, Construction Machinery Manufacturing | BEA | 0.834 | 1.164 | 0.99 |
| | BLS (DIPS) | -0.330 | | |
| 33421, Telephone Apparatus Manufacturing | BEA | -0.908 | 4.415 | 0.98 |
| | BLS (DIPS) | -5.323 | | |

Table 7A. Comparison of Real Output Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|--|----------------------|---|---|--------------------------------|
| 33422, Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing | BEA | 0.716 | 2.607 | 0.97 |
| | BLS (DIPS) | -1.891 | | |
| 33431, Audio and Video Equipment Manufacturing | BEA | 2.714 | -3.416 | 0.61 |
| | BLS (DIPS) | 6.130 | | |
| 33451, Navigational, Measuring, Electromedical, and Control Instruments Manufacturing | BEA | 9.757 | 8.168 | 0.21 |
| | BLS (DIPS) | 1.589 | | |
| 33511, Electric Lamp Bulb and Part Manufacturing | BEA | -2.850 | 1.028 | 0.94 |
| | BLS (DIPS) | -3.878 | | |
| 33512, Lighting Fixture Manufacturing | BEA | -1.676 | -0.344 | 0.96 |
| | BLS (DIPS) | -1.332 | | |
| 33593, Wiring Device Manufacturing | BEA | -3.192 | -0.472 | 0.90 |
| | BLS (DIPS) | -2.720 | | |
| 33611, Automobile and Light Duty Motor Vehicle Manufacturing | BEA | 3.181 | 0.787 | 0.96 |
| | BLS (DIPS) | 2.394 | | |
| 33612, Heavy Duty Truck Manufacturing | BEA | -1.017 | -1.365 | 0.93 |
| | BLS (DIPS) | 0.348 | | |
| 33651, Railroad Rolling Stock Manufacturing | BEA | -0.606 | 2.763 | 0.77 |
| | BLS (DIPS) | -3.368 | | |
| 33711, Wood Kitchen Cabinet and Countertop Manufacturing | BEA | 7.288 | -1.087 | 0.83 |
| | BLS (DIPS) | 8.375 | | |
| 33991, Jewelry and Silverware Manufacturing | BEA | 0.910 | 0.830 | 0.90 |
| | BLS (DIPS) | 0.080 | | |

Table 7A. Comparison of Real Output Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|---|----------------------|---|---|--------------------------------|
| 33992, Sporting and Athletic Goods Manufacturing | BEA | 3.200 | 1.416 | 0.83 |
| | BLS (DIPS) | 1.784 | | |
| 33993, Doll, Toy, and Game Manufacturing | BEA | -0.690 | 1.170 | 0.95 |
| | BLS (DIPS) | -1.860 | | |
| 33994, Office Supplies (except Paper) Manufacturing | BEA | -4.449 | -1.506 | 0.62 |
| | BLS (DIPS) | -2.943 | | |
| 33995, Sign Manufacturing | BEA | 2.790 | 0.313 | 0.98 |
| | BLS (DIPS) | 2.477 | | |
| 49111, Postal Service | BEA | -0.249 | 0.147 | 0.84 |
| | BLS (DIPS) | -0.396 | | |
| 51111, Newspaper Publishers | BEA | -0.349 | 2.060 | 0.99 |
| | BLS (DIPS) | -2.409 | | |
| 51112, Periodical Publishers | BEA | -0.572 | 0.315 | 1.00 |
| | BLS (DIPS) | -0.887 | | |
| 51113, Book Publishers | BEA | 0.253 | -0.302 | 0.92 |
| | BLS (DIPS) | 0.555 | | |
| 51121, Software Publishers | BEA | 8.475 | 4.691 | 0.97 |
| | BLS (DIPS) | 3.784 | | |
| 53223, Video Tape and Disc Rental | BEA | 5.450 | -1.215 | 0.88 |
| | BLS (DIPS) | 6.665 | | |

1. BEA refers to the Bureau of Economic Analysis unpublished detailed NAICS 5-digit gross output estimates underlying the GDP-by-industry accounts.
2. BLS (DIPS) refers to the Bureau of Labor Statistics published NAICS 5-digit sectoral output measures.

BEA output measures are based on the 1997 NAICS classification and BLS (DIPS) output measures are based on the 2002 NAICS classification. For selected industries, the 1997 and 2002 NAICS classifications differ. Industries where the 1997 and 2002 NAICS classifications are different and result in incomparable output data are shaded in yellow.

Table 7B. Comparison of Nominal Output Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|--|-------------------------|---|---|--------------------------------|
| 31123, Breakfast Cereal Manufacturing | BEA ¹ | -2.501 | -5.332 | 0.74 |
| | BLS (DIPS) ² | 2.831 | | |
| 31131, Sugar Manufacturing | BEA | 0.686 | 1.109 | 0.80 |
| | BLS (DIPS) | -0.423 | | |
| 31134, Nonchocolate Confectionery Manufacturing | BEA | 1.118 | 0.012 | 0.98 |
| | BLS (DIPS) | 1.106 | | |
| 31141, Frozen Food Manufacturing | BEA | 0.840 | -0.081 | -0.22 |
| | BLS (DIPS) | 0.921 | | |
| 31142, Fruit and Vegetable Canning, Pickling, and Drying | BEA | 2.906 | 0.777 | 0.11 |
| | BLS (DIPS) | 2.129 | | |
| 31152, Ice Cream and Frozen Dessert Manufacturing | BEA | 6.945 | 2.374 | 0.95 |
| | BLS (DIPS) | 4.571 | | |
| 31211, Soft Drink and Ice Manufacturing | BEA | 1.949 | -0.614 | 0.79 |
| | BLS (DIPS) | 2.563 | | |
| 31311, Fiber, Yarn, and Thread Mills | BEA | -2.911 | 0.338 | 0.99 |
| | BLS (DIPS) | -3.249 | | |
| 31321, Broadwoven Fabric Mills | BEA | -8.680 | 2.008 | 0.58 |
| | BLS (DIPS) | -10.688 | | |
| 31411, Carpet and Rug Mills | BEA | 2.746 | -0.615 | 0.92 |
| | BLS (DIPS) | 3.361 | | |
| 31412, Curtain and Linen Mills | BEA | -1.344 | 1.454 | 0.83 |
| | BLS (DIPS) | -2.798 | | |
| 31491, Textile Bag and Canvas Mills | BEA | 0.984 | -2.577 | 0.78 |
| | BLS (DIPS) | 3.561 | | |
| 31519, Other Apparel Knitting Mills | BEA | -12.790 | 7.022 | 0.18 |
| | BLS (DIPS) | -19.812 | | |
| 32192, Wood Container and Pallet Manufacturing | BEA | 3.802 | 1.649 | 0.90 |
| | BLS (DIPS) | 2.153 | | |

Table 7B. Comparison of Nominal Output Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|--|----------------------|---|---|--------------------------------|
| 32221, Paperboard Container Manufacturing | BEA | 0.877 | 0.478 | 0.96 |
| | BLS (DIPS) | 0.399 | | |
| 32411, Petroleum Refineries | BEA | 16.701 | 0.146 | 0.98 |
| | BLS (DIPS) | 16.555 | | |
| 32513, Synthetic Dye and Pigment Manufacturing | BEA | 2.091 | 2.643 | 0.59 |
| | BLS (DIPS) | -0.552 | | |
| 32518, Other Basic Inorganic Chemical Manufacturing | BEA | -2.336 | 1.594 | 0.85 |
| | BLS (DIPS) | -3.929 | | |
| 32519, Other Basic Organic Chemical Manufacturing | BEA | 4.524 | 0.402 | 0.99 |
| | BLS (DIPS) | 4.123 | | |
| 32541, Pharmaceutical and Medicine Manufacturing | BEA | 6.056 | -3.267 | 0.86 |
| | BLS (DIPS) | 9.323 | | |
| 32551, Paint and Coating Manufacturing | BEA | 1.290 | -1.227 | 0.94 |
| | BLS (DIPS) | 2.517 | | |
| 32562, Toilet Preparation Manufacturing | BEA | 4.866 | -0.327 | 0.64 |
| | BLS (DIPS) | 5.194 | | |
| 32611, Plastics Packaging Materials and Unlaminated Film and Sheet Manufacturing | BEA | 4.018 | 1.829 | 0.17 |
| | BLS (DIPS) | 2.190 | | |
| 32612, Plastics Pipe, Pipe Fitting and Unlaminated Profile Shape Manufacturing | BEA | 4.714 | -1.163 | 0.96 |
| | BLS (DIPS) | 5.878 | | |
| 32621, Tire Manufacturing | BEA | 0.333 | 0.003 | 0.99 |
| | BLS (DIPS) | 0.331 | | |
| 32622, Rubber and Plastics Hoses and Belting Manufacturing | BEA | 0.484 | 0.638 | 0.93 |
| | BLS (DIPS) | -0.154 | | |
| 32629, Other Rubber Product Manufacturing | BEA | -0.232 | 1.650 | 0.77 |
| | BLS (DIPS) | -1.881 | | |
| 32732, Ready-Mix Concrete Manufacturing | BEA | 3.223 | -0.122 | 0.87 |
| | BLS (DIPS) | 3.345 | | |

Table 7B. Comparison of Nominal Output Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|--|----------------------|---|---|--------------------------------|
| 33121, Iron and Steel Pipe and Tube Manufacturing from Purchased Steel | BEA | -0.419 | -0.530 | 0.96 |
| | BLS (DIPS) | 0.111 | | |
| 33151, Ferrous Metal Foundries | BEA | 0.112 | 0.424 | 0.98 |
| | BLS (DIPS) | -0.311 | | |
| 33251, Hardware Manufacturing | BEA | -0.078 | 1.643 | 0.72 |
| | BLS (DIPS) | -1.721 | | |
| 33261, Spring and Wire Manufacturing | BEA | 0.648 | 1.065 | 0.92 |
| | BLS (DIPS) | -0.417 | | |
| 33271, Machine Shops | BEA | 1.265 | 0.201 | 0.98 |
| | BLS (DIPS) | 1.064 | | |
| 33272, Turned Product and Screw, Nut, and Bolt Manufacturing | BEA | 0.350 | 0.609 | 0.98 |
| | BLS (DIPS) | -0.259 | | |
| 33291, Metal Valve Manufacturing | BEA | 0.398 | 1.312 | 0.85 |
| | BLS (DIPS) | -0.914 | | |
| 33312, Construction Machinery Manufacturing | BEA | 2.468 | 1.188 | 0.99 |
| | BLS (DIPS) | 1.280 | | |
| 33421, Telephone Apparatus Manufacturing | BEA | -7.469 | 3.900 | 0.99 |
| | BLS (DIPS) | -11.369 | | |
| 33422, Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing | BEA | -1.312 | 2.686 | 0.97 |
| | BLS (DIPS) | -3.998 | | |
| 33431, Audio and Video Equipment Manufacturing | BEA | 0.970 | -3.348 | 0.53 |
| | BLS (DIPS) | 4.318 | | |
| 33451, Navigational, Measuring, Electromedical, and Control Instruments Manufacturing | BEA | 7.734 | 5.623 | 0.03 |
| | BLS (DIPS) | 2.111 | | |
| 33511, Electric Lamp Bulb and Part Manufacturing | BEA | -3.410 | 1.053 | 0.94 |
| | BLS (DIPS) | -4.463 | | |

Table 7B. Comparison of Nominal Output Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|--|----------------------|---|---|--------------------------------|
| 33512, Lighting Fixture Manufacturing | BEA | -1.469 | -0.341 | 0.97 |
| | BLS (DIPS) | -1.127 | | |
| 33593, Wiring Device Manufacturing | BEA | -1.725 | -0.409 | 0.92 |
| | BLS (DIPS) | -1.316 | | |
| 33611, Automobile and Light Duty Motor Vehicle Manufacturing | BEA | 2.987 | 0.761 | 0.96 |
| | BLS (DIPS) | 2.226 | | |
| 33612, Heavy Duty Truck Manufacturing | BEA | 0.094 | -1.846 | 0.94 |
| | BLS (DIPS) | 1.940 | | |
| 33651, Railroad Rolling Stock Manufacturing | BEA | -0.069 | 2.869 | 0.81 |
| | BLS (DIPS) | -2.938 | | |
| 33711, Wood Kitchen Cabinet and Countertop Manufacturing | BEA | 8.996 | -0.933 | 0.77 |
| | BLS (DIPS) | 9.929 | | |
| 33991, Jewelry and Silverware Manufacturing | BEA | 1.810 | 0.757 | 0.88 |
| | BLS (DIPS) | 1.053 | | |
| 33992, Sporting and Athletic Goods Manufacturing | BEA | 2.663 | 1.422 | 0.82 |
| | BLS (DIPS) | 1.241 | | |
| 33993, Doll, Toy, and Game Manufacturing | BEA | -0.558 | 3.542 | 0.97 |
| | BLS (DIPS) | -4.100 | | |
| 33994, Office Supplies (except Paper) Manufacturing | BEA | -3.864 | -1.505 | 0.65 |
| | BLS (DIPS) | -2.359 | | |
| 33995, Sign Manufacturing | BEA | 4.137 | 0.435 | 0.99 |
| | BLS (DIPS) | 3.702 | | |
| 49111, Postal Service | BEA | 2.418 | 0.735 | 0.57 |
| | BLS (DIPS) | 1.683 | | |
| 51111, Newspaper Publishers | BEA | 1.686 | 0.224 | 1.00 |
| | BLS (DIPS) | 1.462 | | |
| 51112, Periodical Publishers | BEA | 2.182 | -0.354 | 0.99 |
| | BLS (DIPS) | 2.536 | | |

Table 7B. Comparison of Nominal Output Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|-----------------------------------|---------------|---|---|-------------------------|
| 51113, Book Publishers | BEA | 3.704 | -0.553 | 0.91 |
| | BLS (DIPS) | 4.257 | | |
| 51121, Software Publishers | BEA | 5.612 | 0.695 | 0.99 |
| | BLS (DIPS) | 4.918 | | |
| 53223, Video Tape and Disc Rental | BEA | 3.749 | -0.813 | 0.93 |
| | BLS (DIPS) | 4.562 | | |

1. BEA refers to the Bureau of Economic Analysis unpublished detailed NAICS 5-digit gross output estimates underlying the GDP-by-industry accounts.

2. BLS (DIPS) refers to the Bureau of Labor Statistics published NAICS 5-digit sectoral output measures.

BEA output measures are based on the 1997 NAICS classification and BLS (DIPS) output measures are based on the 2002 NAICS classification. For selected industries, the 1997 and 2002 NAICS classifications differ. Industries where the 1997 and 2002 NAICS classifications are different and result in incomparable output data are shaded in yellow.

Table 7C. Comparison of Output Price Deflator Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|--|-------------------------|---|--|----------------------------|
| 31123, Breakfast Cereal Manufacturing | BEA ¹ | 1.225 | 0.333 | 0.66 |
| | BLS (DIPS) ² | 0.892 | | |
| 31131, Sugar Manufacturing | BEA | -0.163 | -0.251 | 0.96 |
| | BLS (DIPS) | 0.089 | | |
| 31134, Nonchocolate Confectionery Manufacturing | BEA | 1.930 | 0.102 | 1.00 |
| | BLS (DIPS) | 1.828 | | |
| 31141, Frozen Food Manufacturing | BEA | 0.852 | 0.157 | 0.96 |
| | BLS (DIPS) | 0.695 | | |
| 31142, Fruit and Vegetable Canning, Pickling, and Drying | BEA | 1.132 | 0.211 | -0.53 |
| | BLS (DIPS) | 0.921 | | |
| 31152, Ice Cream and Frozen Dessert Manufacturing | BEA | 2.563 | -0.055 | 1.00 |
| | BLS (DIPS) | 2.618 | | |
| 31211, Soft Drink and Ice Manufacturing | BEA | 2.326 | 0.048 | 0.94 |
| | BLS (DIPS) | 2.278 | | |
| 31311, Fiber, Yarn, and Thread Mills | BEA | -1.514 | -0.063 | 1.00 |
| | BLS (DIPS) | -1.451 | | |
| 31321, Broadwoven Fabric Mills | BEA | -1.010 | 0.173 | 0.97 |
| | BLS (DIPS) | -1.183 | | |
| 31411, Carpet and Rug Mills | BEA | 1.124 | -0.017 | 0.98 |
| | BLS (DIPS) | 1.141 | | |
| 31412, Curtain and Linen Mills | BEA | -0.005 | 0.037 | 0.48 |
| | BLS (DIPS) | -0.042 | | |
| 31491, Textile Bag and Canvas Mills | BEA | 1.271 | -0.128 | 0.98 |
| | BLS (DIPS) | 1.399 | | |
| 31519, Other Apparel Knitting Mills | BEA | -0.221 | 2.195 | 0.27 |
| | BLS (DIPS) | -2.416 | | |

Table 7C. Comparison of Output Price Deflator Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|--|----------------------|---|---|------------------------------------|
| 32192, Wood Container and Pallet Manufacturing | BEA | 1.008 | 0.014 | 1.00 |
| | BLS (DIPS) | 0.995 | | |
| 32221, Paperboard Container Manufacturing | BEA | 2.805 | 0.460 | 1.00 |
| | BLS (DIPS) | 2.345 | | |
| 32411, Petroleum Refineries | BEA | 15.275 | -0.496 | 0.95 |
| | BLS (DIPS) | 15.771 | | |
| 32513, Synthetic Dye and Pigment Manufacturing | BEA | -0.621 | 0.223 | 0.99 |
| | BLS (DIPS) | -0.844 | | |
| 32518, Other Basic Inorganic Chemical Manufacturing | BEA | 0.885 | -0.482 | 0.98 |
| | BLS (DIPS) | 1.366 | | |
| 32519, Other Basic Organic Chemical Manufacturing | BEA | 3.863 | 0.480 | 0.99 |
| | BLS (DIPS) | 3.384 | | |
| 32541, Pharmaceutical and Medicine Manufacturing | BEA | 2.868 | -0.412 | 0.70 |
| | BLS (DIPS) | 3.280 | | |
| 32551, Paint and Coating Manufacturing | BEA | 2.084 | 0.028 | 0.99 |
| | BLS (DIPS) | 2.056 | | |
| 32562, Toilet Preparation Manufacturing | BEA | 1.003 | -0.048 | 0.95 |
| | BLS (DIPS) | 1.051 | | |
| 32611, Plastics Packaging Materials and Unlaminated Film and Sheet Manufacturing | BEA | 2.612 | -0.094 | 1.00 |
| | BLS (DIPS) | 2.707 | | |
| 32612, Plastics Pipe, Pipe Fitting and Unlaminated Profile Shape Manufacturing | BEA | 2.446 | -0.049 | 1.00 |
| | BLS (DIPS) | 2.495 | | |
| 32621, Tire Manufacturing | BEA | 1.465 | 0.084 | 1.00 |
| | BLS (DIPS) | 1.381 | | |

Table 7C. Comparison of Output Price Deflator Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|--|---------------|---|---|-------------------------|
| 32622, Rubber and Plastics Hoses and Belting Manufacturing | BEA | 1.291 | 0.012 | 1.00 |
| | BLS (DIPS) | 1.279 | | |
| 32629, Other Rubber Product Manufacturing | BEA | 0.114 | 0.105 | 0.99 |
| | BLS (DIPS) | 0.008 | | |
| 32732, Ready-Mix Concrete Manufacturing | BEA | 2.152 | -0.032 | 1.00 |
| | BLS (DIPS) | 2.184 | | |
| 33121, Iron and Steel Pipe and Tube Manufacturing from Purchased Steel | BEA | 3.478 | -3.822 | 0.97 |
| | BLS (DIPS) | 7.300 | | |
| 33151, Ferrous Metal Foundries | BEA | -0.049 | -1.431 | -0.19 |
| | BLS (DIPS) | 1.382 | | |
| 33251, Hardware Manufacturing | BEA | 1.581 | 0.006 | 0.99 |
| | BLS (DIPS) | 1.575 | | |
| 33261, Spring and Wire Manufacturing | BEA | 2.256 | 0.860 | 0.97 |
| | BLS (DIPS) | 1.396 | | |
| 33271, Machine Shops | BEA | 1.047 | -0.042 | 0.96 |
| | BLS (DIPS) | 1.090 | | |
| 33272, Turned Product and Screw, Nut, and Bolt Manufacturing | BEA | 0.506 | -0.102 | 0.79 |
| | BLS (DIPS) | 0.608 | | |
| 33291, Metal Valve Manufacturing | BEA | 1.786 | 0.089 | 1.00 |
| | BLS (DIPS) | 1.696 | | |
| 33312, Construction Machinery Manufacturing | BEA | 1.621 | 0.005 | 1.00 |
| | BLS (DIPS) | 1.615 | | |
| 33421, Telephone Apparatus Manufacturing | BEA | -6.621 | -0.235 | 0.97 |
| | BLS (DIPS) | -6.386 | | |
| 33422, Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing | BEA | -2.014 | 0.133 | 0.99 |
| | BLS (DIPS) | -2.147 | | |

Table 7C. Comparison of Output Price Deflator Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|--|----------------------|---|---|------------------------------------|
| 33431, Audio and Video Equipment Manufacturing | BEA | -1.698 | 0.010 | 0.99 |
| | BLS (DIPS) | -1.708 | | |
| 33451, Navigational, Measuring, Electromedical, and Control Instruments Manufacturing | BEA | -1.844 | -2.358 | 0.68 |
| | BLS (DIPS) | 0.514 | | |
| 33511, Electric Lamp Bulb and Part Manufacturing | BEA | -0.571 | 0.037 | 1.00 |
| | BLS (DIPS) | -0.608 | | |
| 33512, Lighting Fixture Manufacturing | BEA | 0.211 | 0.003 | 0.99 |
| | BLS (DIPS) | 0.207 | | |
| 33593, Wiring Device Manufacturing | BEA | 1.517 | 0.073 | 1.00 |
| | BLS (DIPS) | 1.444 | | |
| 33611, Automobile and Light Duty Motor Vehicle Manufacturing | BEA | -0.188 | -0.024 | 1.00 |
| | BLS (DIPS) | -0.164 | | |
| 33612, Heavy Duty Truck Manufacturing | BEA | 1.123 | -0.464 | 0.81 |
| | BLS (DIPS) | 1.587 | | |
| 33651, Railroad Rolling Stock Manufacturing | BEA | 0.541 | 0.096 | 0.99 |
| | BLS (DIPS) | 0.445 | | |
| 33711, Wood Kitchen Cabinet and Countertop Manufacturing | BEA | 1.594 | 0.159 | 0.71 |
| | BLS (DIPS) | 1.434 | | |
| 33991, Jewelry and Silverware Manufacturing | BEA | 0.893 | -0.080 | 0.98 |
| | BLS (DIPS) | 0.973 | | |
| 33992, Sporting and Athletic Goods Manufacturing | BEA | -0.520 | 0.014 | 0.99 |
| | BLS (DIPS) | -0.534 | | |
| 33993, Doll, Toy, and Game Manufacturing | BEA | 0.133 | 2.416 | -0.30 |
| | BLS (DIPS) | -2.282 | | |

Table 7C. Comparison of Output Price Deflator Series: NAICS 5-Digit Industry Groups

| NAICS 5-Digit Industry Groups | Output Series | Average Annual Growth Rate (1998-04) | Difference , 1998-04 (BEA less BLS Average Annual Growth Rate) | Correlation Coefficient |
|---|---------------|---|---|-------------------------|
| 33994, Office Supplies (except Paper) Manufacturing | BEA | 0.610 | 0.009 | 0.97 |
| | BLS (DIPS) | 0.601 | | |
| 33995, Sign Manufacturing | BEA | 1.311 | 0.115 | 0.99 |
| | BLS (DIPS) | 1.196 | | |
| 49111, Postal Service | BEA | 2.674 | 0.586 | 0.30 |
| | BLS (DIPS) | 2.088 | | |
| 51111, Newspaper Publishers | BEA | 2.042 | -1.924 | 0.71 |
| | BLS (DIPS) | 3.966 | | |
| 51112, Periodical Publishers | BEA | 2.770 | -0.683 | 0.87 |
| | BLS (DIPS) | 3.453 | | |
| 51113, Book Publishers | BEA | 3.442 | -0.239 | 0.53 |
| | BLS (DIPS) | 3.681 | | |
| 51121, Software Publishers | BEA | -2.639 | -3.731 | 0.97 |
| | BLS (DIPS) | 1.092 | | |
| 53223, Video Tape and Disc Rental | BEA | -1.613 | 0.359 | 0.96 |
| | BLS (DIPS) | -1.972 | | |

1. BEA refers to the Bureau of Economic Analysis unpublished detailed NAICS 5-digit gross output estimates underlying the GDP-by-industry accounts.

2. BLS (DIPS) refers to the Bureau of Labor Statistics published NAICS 5-digit sectoral output measures.

BEA output measures are based on the 1997 NAICS classification and BLS (DIPS) output measures are based on the 2002 NAICS classification. For selected industries, the 1997 and 2002 NAICS classifications differ. Industries where the 1997 and 2002 NAICS classifications are different and result in incomparable output data are shaded in yellow.