Note on Alternative Measures of Gross Product by Industry

THE TWO ARTICLES that precede this note present two independently derived, but conceptually equivalent, measures of current-dollar gross product by industry for 1992 that are prepared by the Bureau of Economic Analysis (BEA).

- Estimates of *gross product originating (GPO) by industry* are prepared using industry distributions of the components of the national income and product account (NIPA) measure of gross domestic income, which is the sum of the costs incurred and the incomes earned in the production of gross domestic product (GDP). (See Sherlene K.S. Lum and Robert E. Yuskavage, "Gross Product by Industry, 1947–96," beginning on page 20 of this issue.)
- Estimates of *value added by industry* are prepared in the benchmark input-output (I-O) accounts as the difference between the I-O measures of the gross output and the intermediate inputs used in each industry. (See Ann M. Lawson, "Benchmark Input-Output Accounts for the U.S. Economy, 1992," beginning on page 36 of this issue.)

This note explains BEA's use of the NIPA data for the GPO estimates, discusses the differences between the GPO estimates and the I-O estimates for 1992, and describes the steps BEA is taking to address these differences.

BEA views the GDP estimate that is derived in the benchmark I-O accounts as the most accurate estimate available. It is based on the most reliable source data—primarily detailed and comprehensive information from the most recent quinquennial economic censuses—and it is calculated within the framework of the I-O accounts, which track the detailed input and output flows in the economy.[1]

In order to prepare timely annual estimates of GPO by industry, BEA uses the industry distributions of the NIPA components of gross domestic income (GDI). The GDI estimates are available annually, while the I-O value-added estimates are available at roughly 5-year intervals. In addition, because of a lack of comprehensive source data on intermediate inputs, the I-O estimates of industry value added reflect a widespread use of indirect estimating methodologies; the missing source data are primarily on business purchases of services and purchases of goods by nonmanufacturing industries.[2] As a result, while the I-O-based estimate of GDP is viewed as a more accurate measure of GDP than the GDI-based estimate of GDP, the I-O-based estimates of the distribution of GDP by industry are not necessarily more accurate than GDI-based estimates of GDP by industry.

The industry distributions of GDI are available on a more timely basis, but they also reflect the use of less-than-adequate source data. In particular, IRS tabulations of corporate income tax returns—which are the source data for the estimates of corporate profits, depreciation, and net interest—are available only on an enterprise, or company, basis, so they must be converted by BEA to an establishment, or plant, basis. However, the methodologies used for this conversion are less than adequate, and they are not applicable to net interest, for which no conversion is made.[3]

Another source data problem that affects both the I-O value-added and the GPO estimates is the lack of consistency in industry classification at the establishment level. The I-O estimates largely reflect the industry classifications assigned by the Bureau of the Census in the economic censuses. The GPO estimates reflect a mix of classifications: The wage and salary component of GDI is based on industry classifications assigned by the Bureau of Labor Statistics for *Employment and Wages*, and the nonfarm proprietors' income component is based on industry classifications assigned by the Internal Revenue Service for the *Statistics of Income* program. In addition, GDI in theory should equal GDP, but in practice, these measures differ because they are estimated using largely independent and less-than-perfect source data. The difference between these two NIPA measures is called the "statistical discrepancy." For the GPO series, the statistical discrepancy is presented as a component of private industries because BEA assumes that it does not affect the estimates for government.[4] For the I-O accounts, this difference does not exist, because the components of both final expenditures and value added result from the internally consistent I-O framework and because these accounts do not include independent estimates of the detailed components of value added.

The accompanying table presents an approximation of the differences in the industry distribution of GDP for 1992 on the basis of the presently published GPO

1. The estimates of GDP and its final expenditures components from the I-O accounts will be incorporated into the NIPA's in the next comprehensive NIPA revision.

2. For information on the source data used to prepare the benchmark I-O accounts, see table B in Lawson, "Benchmark Input-Output Accounts," 44.

3. For information on the source data used to prepare the industry distributions of GDI, see Robert E. Yuskavage, "Improved Estimates of Gross Product by Industry, 1959–94," SURVEY OF CURRENT BUSINESS 76 (August 1996): 143–145.

4. For more information, see the box "Gross Product Originating: Definition and Relationship to Gross Domestic Product" on page 20 of this issue.

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and the new I-O estimates. In order to make a valid comparison, it was necessary to adjust both series. The GPO estimates were adjusted to reflect the new I-O estimates of GDP: The difference between the new I-O estimates and the existing NIPA estimates of GDP was added to the statistical discrepancy on the assumption that the new I-O estimates will not affect the existing estimates of GDI. The I-O estimates of value added were adjusted for the major differences in industry classification between the two sets of estimates.[5]

A comparison of the adjusted series shows that the largest percentage difference in the industry distribution in GDP is for manufacturing: The I-O estimates show a share of GDP (18.5 percent) that is 1.4 percentage points higher than the GPO share. The largest offset to this difference is in retail trade, where the I-O share (8.1 percent) is 0.6 percentage point lower than the GPO share. These differences may reflect the weakness in the methodology used to convert some of the GDI components, such as corporate profits, from an enterprise to an establishment basis; this weakness may be particularly significant for manufacturing firms because many of them are also engaged in retail activities. For both the communications industry and the electric, gas, and sanitary services industry, the I-O value-added estimates are 0.4 percentage point lower than the GPO estimates. These differences may reflect errors in the industry distribution of intermediate inputs in the I-O accounts or differences in establishment-industry classifications embedded in the source data.

As part of the implementation of its Strategic Plan, BEA is working to improve the integration of the I-O accounts and the GPO estimates in order to reduce or eliminate these differences.[6] BEA will be reviewing expected improvements in the source data and in the methodologies used to prepare both the I-O accounts and the GPO series. These improvements include collecting additional data on intermediate purchases by nonmanufacturing establishments in the 1997 economic censuses and improving the consistency of the industry classifications assigned by Federal statistical agencies using the new U.S. industry classification system (the North American Industry Classification System). BEA is also developing plans to prepare annual I-O accounts and will evaluate the reliability of the procedures that are used in the GPO estimates to convert enterprise data to an establishment-industry basis.

5. For differences between the GPO industry classifications, which follow the 1987 Standard Industrial Classification system, and the I-O classification system, see appendix A in Lawson, "Benchmark Input-Output Accounts," 58.

6. For more information, see "Mid-Decade Strategic Review of BEA's Economic Accounts: Maintaining and Improving Their Performance," SURVEY 75 (February 1995): 36–66; and "Mid-Decade Strategic Review of BEA's Economic Accounts: An Update," SURVEY 75 (April 1995): 48–56.

Table 1.—Comparison of GPO With I-O Value Added, 1992

	Billions of dollars				Percent	
	GPO		I-O value added		Percentage of GDP	
	Published	Adjusted	Published [1]	Adjusted	Adjusted GPO	Adjusted I-O value added
Gross domestic product	**6,244.4**	**6,233.9**	**6,233.9**	**6,233.9**	**100.0**	**100.0**
Private industries	**5,370.8**	**5,360.3**	**5,382.5**	**5,365.9**	**86.0**	**86.1**
Agriculture, forestry, and fishing	112.4	112.4	98.1	105.9	1.8	1.7
Mining	92.2	92.2	88.5	89.0	1.5	1.4
Construction	229.7	229.7	301.7	252.4	3.7	4.0
Manufacturing	1,063.6	1,063.6	1,136.1	1,155.7	17.1	18.5
Durable goods	573.4	573.4	603.6	616.0	9.2	9.9
Nondurable goods	490.3	490.3	532.6	539.6	7.9	8.7
Transportation and public utilities	528.7	528.7	466.9	484.5	8.5	7.8
Transportation	192.8	192.8	192.3	193.5	3.1	3.1
Communications	161.1	161.1	132.4	139.9	2.6	2.2
Electric, gas, and sanitary services	174.7	174.7	142.2	151.1	2.8	2.4
Wholesale trade	406.4	406.4	399.9	404.2	6.5	6.5
Retail trade	544.3	544.3	494.3	506.3	8.7	8.1
Finance, insurance, and real estate	1,147.9	1,147.9	1,165.1	1,165.2	18.4	18.7
Services	1,200.8	1,200.8	1,239.8	1,202.8	19.3	19.3
Inventory valuation adjustment	n.a.	n.a.	–8.0	n.a.	n.a.	n.a.
Statistical discrepancy	44.8	34.3	n.a.	n.a.	.5	n.a.
Government	**873.6**	**873.6**	**851.8**	**868.0**	**14.0**	**13.9**
General government	781.0	781.0	764.4	781.0	12.5	12.5
Government enterprises	92.6	92.6	87.0	87.0	1.5	1.4

n.a. Not applicable.
1. For this table, I-O industries have been combined for consistency with the Standard Industrial Classification system used in the GPO estimates.

GPO Gross product originating
I-O Input-output