

Appendix A

Additional Information About the NIPA Estimates

Statistical Conventions

Changes in current-dollar GDP measure changes in the market value of goods and services produced in the economy in a particular period. For many purposes, it is necessary to decompose these changes into quantity and price components. To compute the quantity indexes, changes in the quantities of individual goods and services are weighted by their prices. (Quantity changes for GDP are often referred to as changes in “real GDP.”) For the price indexes, changes in the prices for individual goods and services are weighted by quantities produced. (In practice, the current-dollar value and price indexes for most GDP components are determined largely using data from Federal Government surveys, and the real values of these components are calculated by deflation at the most detailed level for which all the required data are available.)

The annual changes in quantities and prices are calculated using a Fisher formula that incorporates weights from 2 adjacent years. For example, the annual percent change in real GDP in 1997–98 uses prices for 1997 and 1998 as weights, and the 1997–98 annual percent change in the GDP price index uses quantities for 1997 and 1998 as weights. Because the Fisher formula allows for the effects of changes in relative prices and in the composition of output over time, the resulting quantity or price changes are not affected by the substitution bias that is associated with changes in quantities and prices calculated using a fixed-weighted formula.¹ These annual changes are “chained” (multiplied) together to form time series of quantity and price; the percent changes that are calculated from these time series are not affected by the choice of reference period.

The quarterly changes in quantities and prices are calculated with weights from two adjacent quarters. As part of an annual or comprehensive revision, the quarterly indexes through the most recent complete year are adjusted to ensure that the average of the quarterly indexes conforms to the corresponding annual index.

In addition, BEA prepares measures of real GDP and its components in a dollar-denominated form, designated “chained (1996) dollar estimates.” These estimates are computed by multiplying the 1996 current-dollar value of GDP, or of a GDP component, by the corresponding quantity index number. For example, if a current-dollar GDP component equaled \$100 in 1996 and if real output for this component increased by 10 percent in 1997, then the “chained (1996) dollar” value of this com-

ponent in 1997 would be \$110 ($\100×1.10). Note that percentage changes in the chained (1996) dollar estimates and the percentage changes calculated from the quantity indexes are identical, except for small differences due to rounding.

Because of the formula used for calculating real GDP, the chained (1996) dollar estimates for detailed GDP components do not add to the chained-dollar value of GDP or to any intermediate aggregates. A “residual” line is shown as the difference between GDP and the sum of the most detailed components shown in each table. The residual generally is small close to the base period but tends to become larger as one moves further from it. Accurate measures of component contributions to the percentage changes in real GDP and its major components are shown in NIPA tables 8.2–8.6.

BEA also publishes the “implicit price deflator” (IPD), which is calculated as the ratio of current-dollar value to the corresponding chained-dollar value, multiplied by 100; the values of the IPD and of the corresponding “chain-type” price index are very close.

For quarters and months, the estimates are presented at annual rates, which show the value that would be registered if the rate of activity measured for a quarter or a month were maintained for a full year. Annual rates are used so that time periods of different lengths—for example, quarters and years—may be compared easily. These annual rates are determined simply by multiplying the estimated rate of activity by 4 (for quarterly data) or by 12 (for monthly data).

Percent changes in the estimates are also expressed at annual rates. Calculating these *changes* requires a variant of the compound interest formula:

$$r = \left[\left(\frac{x_t}{x_o} \right)^{m/n} - 1 \right] \times 100,$$

where r is the percent change at an annual rate; x_t is the level of activity in the later period; x_o is the level of activity in the earlier period; m is the periodicity of the data (for example, 1 for annual data, 4 for quarterly, or 12 for monthly); and n is the number of periods between the earlier and later periods (that is, $t - o$).

Quarterly and monthly NIPA estimates are seasonally adjusted, if necessary. Seasonal adjustment removes from the time series the average impact of variations that normally occur at about the same time and in about the same magnitude each year—for example, weather, holidays, and tax payment dates. After seasonal adjustment, cyclical and other short-term changes in the economy stand out more clearly.

1. In addition, because the changes in quantities and prices calculated using these weights are symmetric, the product of a quantity index and the corresponding price index is generally equal to the current-dollar index.

Reconciliation Tables

Table 1. Reconciliation of Changes in BEA-Derived Compensation Per Hour with BLS Average Hourly Earnings
[Percent change from preceding period]

	2000	2001	Seasonally adjusted at annual rates					
			2000	2001				2002
				IV	I	II	III	
BEA-derived compensation per hour of all persons in the nonfarm business sector (less housing) ¹	6.5	5.8	8.9	4.9	4.7	3.7	2.3	3.2
<i>Less:</i> Contribution of supplements to wages and salaries per hour.....	-0.2	-0.2	-0.3	-0.4	-0.2	0.0	0.0	0.9
<i>Plus:</i> Contribution of wages and salaries per hour of persons in housing and in nonprofit institutions.....	-0.2	-0.2	-0.6	-0.3	-0.1	0.3	-0.1	0.2
<i>Less:</i> Contribution of wages and salaries per hour of persons in government enterprises, unpaid family workers, and self-employed.....	0.0	-0.1	-0.5	-0.1	0.1	-0.1	0.0	0.0
Equals: BEA-derived wages and salaries per hour of all employees in the private nonfarm sector	6.7	5.9	9.2	5.2	4.7	3.9	2.1	2.6
<i>Less:</i> Contribution of wages and salaries per hour of nonproduction workers in manufacturing.....	0.0	-0.1	1.0	0.4	0.6	0.4	0.2	0.2
<i>Less:</i> Other differences ²	2.9	1.9	3.3	0.8	0.3	-0.2	-1.8	-0.5
Equals: BLS average hourly earnings of production or nonsupervisory workers on private nonfarm payrolls	3.8	4.1	4.9	4.0	3.8	3.8	3.8	3.0
Addendum:								
BLS estimates of compensation per hour in the nonfarm business sector ³	6.5	5.8	8.9	4.9	4.7	3.7	2.3	2.8

1. Includes BLS data on compensation and hours of nonfarm proprietors and hours worked of unpaid family workers

2. Includes BEA use of non-BLS data and differences in detailed weighting. Annual estimates also include differences in BEA and BLS benchmark procedures; quarterly estimates also include differences in

seasonal adjustment procedures.

3. These estimates differ from the BEA-derived estimates (first line) because the BLS estimates include compensation and hours of tenant-occupied housing.
BLS Bureau of Labor Statistics.

Table 2. Relation of Net Exports of Goods and Services and Net Receipts of Income in the NIPA's to Balance on Goods and Services and Income in the ITA's

[Billions of dollars]

	Line	2000	2001	Seasonally adjusted at annual rates					
				2000	2001				2002
					IV	I	II	III	
Exports of goods and services and income receipts, ITA's	1	1,417.2	1,281.8	1,443.1	1,396.2	1,326.4	1,237.9	1,166.7	1,165.3
<i>Less:</i> Gold, ITA's.....	2	6.0	4.9	6.5	6.7	7.6	2.4	2.9	2.5
Statistical differences ¹	3	-1.1	-30.9	-7.0	-27.6	-30.3	-29.6	-36.2	-36.2
Other items.....	4	1.2	1.0	0.9	1.2	1.1	1.0	0.8	0.9
<i>Plus:</i> Adjustment for grossing of parent/affiliate interest payments.....	5	6.5	6.2	6.9	6.2	6.4	6.0	5.9	5.2
Adjustment for U.S. territories and Puerto Rico.....	6	48.3	49.7	50.8	51.2	49.2	49.0	49.4	52.7
Services furnished without payment by financial intermediaries except life insurance carriers.....	7	21.2	22.9	22.8	23.0	23.0	22.7	22.9	23.4
Equals: Exports of goods and services and income receipts, NIPA's	8	1,487.1	1,385.5	1,523.1	1,496.3	1,426.5	1,341.9	1,277.4	1,279.2
Imports of goods and services and income payments, ITA's	9	1,774.1	1,625.7	1,821.3	1,780.6	1,675.7	1,553.8	1,492.7	1,551.8
<i>Less:</i> Gold, ITA's.....	10	5.9	4.3	6.7	6.1	6.5	2.2	2.4	2.0
Statistical differences ¹	11	-34.7	-34.2	-27.4	-35.5	-50.4	-29.8	-21.2	-21.2
Other items.....	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Plus:</i> Gold, NIPA's.....	13	-3.3	-2.9	-3.0	-3.0	-3.1	-3.0	-2.5	-2.5
Adjustment for grossing of parent/affiliate interest payments.....	14	6.5	6.2	6.9	6.2	6.4	6.0	5.9	5.2
Adjustment for U.S. territories and Puerto Rico.....	15	35.8	38.8	40.9	34.3	39.7	40.2	41.2	32.7
Imputed interest paid to rest of world.....	16	21.2	22.9	22.8	23.0	23.0	22.7	22.9	23.4
Equals: Imports of goods and services and income payments, NIPA's	17	1,863.1	1,720.6	1,909.5	1,870.6	1,785.6	1,647.4	1,578.9	1,629.7
Balance on goods and services and income, ITA's (1-9)	18	-356.9	-343.9	-378.2	-384.4	-349.3	-315.9	-326.0	-386.5
<i>Less:</i> Gold (2-10+13).....	19	-3.2	-2.3	-3.2	-2.4	-2.0	-2.8	-2.0	-2.0
Statistical differences (3-11) ¹	20	33.6	3.3	20.4	7.9	20.1	0.2	-15.0	-15.0
Other items (4-12).....	21	1.2	1.0	0.9	1.2	1.1	1.0	0.8	0.9
<i>Plus:</i> Adjustment for U.S. territories and Puerto Rico (6-15).....	22	12.5	10.9	9.9	16.9	9.5	8.8	8.2	20.0
Equals: Net exports of goods and services and net receipts of income, NIPA's (8-17)	23	-376.0	-335.1	-386.4	-374.3	-359.1	-305.5	-301.5	-350.5

1. Consists of statistical revisions in the ITA's that have not yet been incorporated into the NIPA's (2000:1-2002:1).

ITA's International transactions accounts
NIPA's National income and product accounts