

## BEA BRIEFING

# Gross Domestic Income

## Revisions and Source Data

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GROSS domestic product (GDP) is the Bureau of Economic Analysis' featured measure of the economy's output and is widely used by policymakers, academics, investment professionals, the media, and others to assess the condition of the U.S. economy. BEA also produces other measures, notably gross domestic income (GDI), that can also be used to assess the economy. Indeed, the Business Cycle Dating Committee of the National Bureau of Economic Research cited GDI in its recent determination that a business cycle peak occurred in December 2007.<sup>1</sup>

While GDP measures output as the sum of goods and services sold to final users plus the change in private inventories, GDI calculates the value of output as the sum of income payments and other costs incurred in the production of goods and services. In principle, GDI should equal GDP because they are measuring the same output. In practice, they differ because they are estimated using different source data.

GDI is also a major component in the calculation of gross national income (GNI), which is the most comprehensive measure of the nation's income and is calculated as the sum of GDI and net income receipts from the rest of the world. In other words, GNI measures all income from current production accruing to U.S. residents regardless of where the production occurs. In contrast, GDI measures all income generated from domestic production, whether accruing to U.S. or foreign residents.

In the February 2006 SURVEY OF CURRENT BUSINESS, BEA published an article that discussed the source data used to calculate the earliest quarterly GDP statistics and the subsequent annually revised statistics.<sup>2</sup> This article presents a similar analysis of GDI statistics.

BEA prepares quarterly and annual estimates of GDI. The "current quarterly" estimates of GDI are published

in a series of releases. Table 1 shows the release dates for the full set of estimates for the third quarter of 2005. Except for the fourth-quarter estimates, the initial estimates of GDI are released with the "preliminary" GDP estimates near the end of the second month after the quarter ends. Revised estimates are released with the "final" GDP estimates, near the end of the third month after the quarter ends.<sup>3</sup> For the fourth quarter of each year, the estimates of GDI and some related series are released only with the final GDP estimates.

**Table 1. Release Schedule for the Estimates of Gross Domestic Income for the Third Quarter of 2005**

Estimate	
Preliminary estimate .....	November 2005
Final estimate .....	December 2005
Revised previous quarter estimate .....	February 2006
First annual revision estimate .....	July 2006
Second annual revision estimate .....	July 2007
Third annual revision estimate .....	July 2008

In addition, when the preliminary estimates of GDP for the most recent quarter are released, BEA releases revised estimates for the previous quarter for two components of GDI—private wages and salaries and employer contributions for government social insurance. These revised estimates incorporate the most recently available wage and salary data from the Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW).<sup>4</sup> The data from the QCEW are more comprehensive than the monthly data on

3. Unlike GDP, an "advance" estimate of GDI is not released near the end of the first month after the quarter ends because data on domestic profits and data on foreign, or rest-of-world, payments and receipts of income used to derive estimates of net interest of domestic industries are not available. For the fourth quarter, these data are not available until the "final" estimate.

4. Revised estimates for the previous quarter, which reflect the incorporation of QCEW data, were first published for the first quarter of 2002. Other series that are revised because of the incorporation of data from the QCEW include the statistical discrepancy, GNI, national income, personal income, disposable personal income, personal saving, gross (national) saving, compensation of employees, personal current taxes, and gross value added of corporate business.

1. See National Bureau of Economic Research, Business Cycle Dating Committee, "Determination of the December 2007 Peak in Economic Activity" at [www.nber.org/cycles/dec2008.html](http://www.nber.org/cycles/dec2008.html).

2. See Bruce T. Grimm and Teresa L. Weadock, "Gross Domestic Product: Revisions and Source Data," SURVEY 86 (February 2006): 11–15.

employment, hours, and earnings from the BLS Current Employment Statistics survey that are used to derive the earlier estimates. The QCEW data include the pay of supervisors and irregular pay, such as bonuses and gains from the exercise of stock options.

BEA also releases three “annual revision” estimates of GDI and its components. These statistics provide updated quarterly estimates for the most recent calendar year and the preceding 2 years. The first annual revision estimates for a given year are usually released in July of the following year.<sup>5</sup> The first annual revision estimates for 2007, for example, were released in July 2008. The second and third annual revision estimates follow in successive years. The estimates released in July 2008 also included second annual revision estimates for 2006 and third annual revision estimates for 2005.

After the third annual revision, the GDI statistics—both quarterly and annual—are generally not revised until the next comprehensive revision. Comprehensive revisions occur about every 5 years.<sup>6</sup>

### Source data types

To estimate GDI and related measures in the national income and product accounts (NIPAs), BEA relies on a wide range of source data, including measures of employment and wages, pension contributions and employer-provided health insurance data, information from tax returns, financial statement data for private corporations, and estimates of government outlays.

Some of the source data are used as indicator series to interpolate or extrapolate quarterly or annual estimates. Generally, monthly or quarterly source data are not as comprehensive as annual source data. Thus, for some estimates, the more frequent but less comprehensive source data may be used as an indicator of the movements of the component series rather than as a measure of the absolute levels of the series. Specifically, for the periods for which annual estimates are available and the quarterly estimates must be forced to average these totals, the quarterly pattern is estimated by inter-

polation. For periods not yet covered by annual estimates (such as the current quarter), the quarterly estimates are made by extrapolation.<sup>7</sup> For example, the tax return data used to prepare the second annual revision estimates of corporate profits are only available annually, so quarterly estimates are interpolated using data from Census Bureau quarterly financial reports, regulatory agency reports, and publicly available corporate financial statements. In other cases, interpolation and extrapolation are based on trends.

For many components of GDI, estimates are derived from “value data,” which already reflect quantity and price information. For example, the QCEW wage and salary data used to prepare revised estimates of private wages and salaries reflect both the number of people employed (quantity) and the wages paid to the employees (price).

For estimates that are not derived from value data, BEA may combine separate quantity and price data.<sup>8</sup> For example, to calculate the initial current quarterly estimates of private wages and salaries, for each industry, BEA simply takes the product of employment times average hourly earnings times average hours worked.

In other cases, BEA uses variations of a “stock of assets/liabilities times an effective rate of interest” method. For example, the current quarterly estimates of net domestic monetary interest are partly derived by multiplying a stock of interest-bearing assets by an effective rate of interest.

### Source data categories and successive estimates

In this article, BEA categorizes the source data that are used to prepare the GDI estimates according to quality, availability, and use. The four categories are as follows:

**Comprehensive data.** These data provide comprehensive coverage of the relevant population and are consistent, or can be adjusted to be consistent, with national accounts concepts. These data include census data and survey data with comprehensive coverage as well as tax or regulatory data that have been adjusted to correct for misreporting, differences in coverage, and differences in accounting concepts. For example, the annual revision estimates of government wages and salaries reflect the incorporation of QCEW wage and salary data. These data are more comprehensive than the monthly data that are used to extrapolate the earlier estimates.

5. Before the release of the first annual revision estimates, BEA releases early annual estimates of GDI and related series. For most of the components of GDI, early annual estimates are released with the preliminary GDP estimates for the fourth quarter, usually in February of the following year. Early annual estimates of GDI, corporate profits, and the series that are affected by the release of data on foreign payments and receipts of income are released with the final GDP estimates for the fourth quarter, usually in March of the following year. Early annual estimates of GDI, private wages and salaries, and employer contributions for government social insurance are revised to reflect the incorporation of fourth-quarter QCEW data, usually in May of the following year.

6. After the release of the comprehensive revision in July 2009, BEA will move to “flexible annual revisions” that will allow BEA to incorporate changes on a flow basis rather than delaying incorporation for up to 5 years. For more information, see “Taking Account” SURVEY 87 (July 2007): *iv*.

7. For more information on the use of interpolation and extrapolation to prepare NIPA estimates, see *Concepts and Methods of the U.S. National Income and Product Accounts (Introductory Chapters 1–4)* (July 2008): 4–6–4–7, [www.bea.gov/national/pdf/NIPAhandbookch1-4.pdf](http://www.bea.gov/national/pdf/NIPAhandbookch1-4.pdf).

8. For more details, see “Updated Summary of NIPA Methodologies,” SURVEY 88 (November 2008): 8–25.

**Direct indicator data.** These source data are used to prepare indicator series. While these data are closely related to the comprehensive data that are ultimately incorporated into the estimates, they may be less detailed or less comprehensive initially. For example, the current quarterly and first annual revision estimates of corporate profits are extrapolated using data on corporate profits from Census Bureau quarterly financial reports, from regulatory agency reports, and from publicly available corporate financial statements. These data are less comprehensive than the data from corporate tax returns that are used to prepare the second annual revision estimates.

**Indirect indicator data.** These source data are used to prepare indicator series; they include two main types: (1) volume or activity indicators; for example the current quarterly estimates of private wages and salaries are extrapolated using BLS data on employment, hours, and earnings. And (2) other NIPA estimates; for example, the current quarterly estimates of employer contributions for government social insurance are extrapolated using NIPA estimates of wages and salaries as indicator series.

**Trend-based data.** These data are typically calculated from previous estimates and trends, using judgment by BEA economists. For example, the preliminary quarterly estimates of net domestic imputed interest paid by commercial banks are judgmentally extrapolated using historical trends in the series.

Table 2 and chart 1 summarize the shares of the GDI estimates for successive vintages that incorporate the four types of source data.<sup>9</sup> The preliminary and final current quarterly estimates are based on data from all four categories, and the largest share of the estimates (about 58 percent) is derived using indirect indicator data. (The estimates of private wages and salaries account for nearly two-thirds of the total share of

9. The third annual revision estimates are not included in table 2, because the shares of the estimates that incorporate each type of source data do not change from the second annual revision estimates to the third annual revision estimates. However, the third annual revision estimates incorporate revised source data that are more reliable than the data used to derive the earlier estimates.

**Table 2. Shares of Source Data for the Successive Gross Domestic Income Estimates**  
[Percent]

Sources	Preliminary estimates	Final estimates	Revised previous quarter estimates	First annual revision estimates	Second annual revision estimates
Comprehensive data .....	2.1	2.1	39.3	51.7	99.4
Direct indicator data .....	12.4	14.1	14.1	17.7	0.5
Indirect indicator data .....	57.8	57.8	20.6	8.6	0.0
Trend-based data .....	27.7	26.0	26.0	21.9	.....

NOTE: Shares were calculated using annual data for 2005; quarterly data are not available for a number of the detailed components of GDI. Shares may not sum to 100 because of rounding.

the estimates that incorporates indirect indicator data.)

For the preliminary quarterly estimates, about 12 percent of the estimates are based on source data used to prepare direct indicators, and about 28 percent of the estimates are trend based. For the final quarterly estimates, about 14 percent of the estimates are derived using direct indicator data, and about 26 percent of the estimates are trend based. The 2 percent shift from trend-based estimates to estimates based on direct indicator data primarily reflects the incorporation of data from the Federal Reserve Board on commercial banking activity, which are used to derive estimates of imputed interest; these data are not usually available until the final quarterly estimates.

As noted above, estimates of private wages and salaries, which reflect the incorporation of QCEW wage and salary data, are released with the preliminary GDP estimates for the most recent quarter. These data are more comprehensive than the monthly employment, hours, and earnings data that are used to construct indirect indicators to derive the earlier estimates. When the QCEW data are included, the percent of the estimates that incorporate comprehensive data increases from about 2 percent for the preliminary and final estimates to about 39 percent.

The first and second annual revision estimates of GDI include revisions to the quarterly estimates for the previous 3 years in addition to new annual estimates. By the time the first and second annual revision estimates are calculated and released, much of the source data used to calculate the earlier quarterly estimates have been replaced with more comprehensive or more reliable data.

Many of the quarterly estimates in the first and second annual revisions are based on source data that cover a full year (annual data) and are either interpolated or extrapolated using monthly or quarterly source data.<sup>10</sup> The monthly or quarterly data are often the same as those used to calculate the current quarterly estimates, with revisions, if necessary, to make them consistent with the annual data and with updated seasonal adjustments.

About 52 percent of the first annual revision estimates incorporate comprehensive data. About 18 percent of the estimates are derived from direct indicator data, about 9 percent are based on indirect indicator data, and about 22 percent of the estimates are trend based.

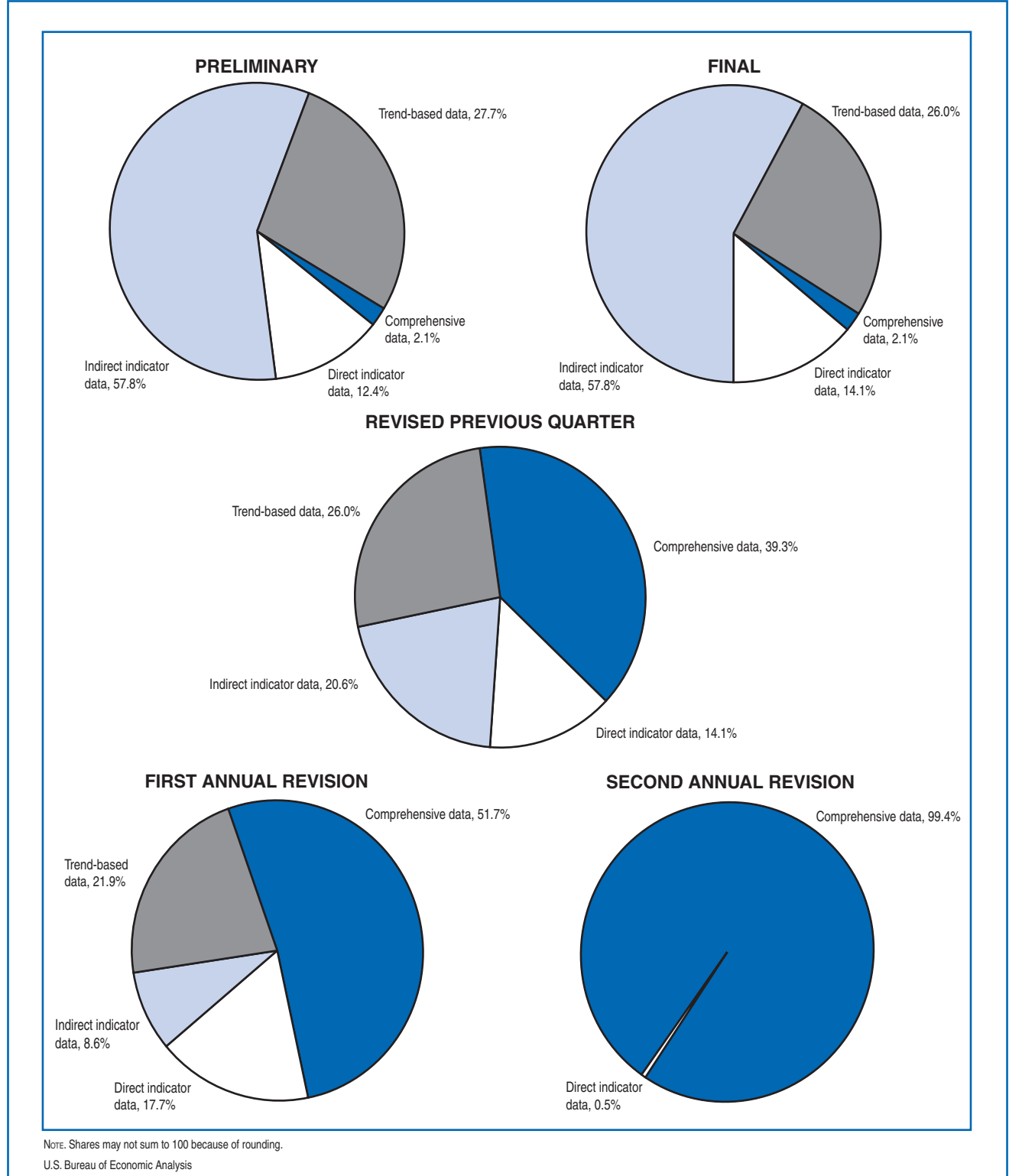
By the second annual revision, more than 99 percent of the estimates incorporate comprehensive data.

10. In the interpolation process, the annual estimates are interpolated using quarterly or monthly source data that generally retain patterns of the annual source data; the quarterly estimates are interpolated in ways that retain the annual totals.

The increase in the share of the estimates that incorporate comprehensive data from the first to the second annual revision primarily reflects the incorporation of tax return data compiled by the Internal Revenue Service (IRS). These data are used to prepare several estimates, including corporate profits, nonfarm proprietors' income, net domestic monetary interest, and capital consumption allowance. Before the second

vice (IRS). These data are used to prepare several estimates, including corporate profits, nonfarm proprietors' income, net domestic monetary interest, and capital consumption allowance. Before the second

**Chart 1. Shares of Source Data for the Quarterly GDI Estimates**



annual revision, these estimates are extrapolated using direct or indirect indicators or are trend based, as noted above.

The third annual revision estimates incorporate more newly available or revised annual source data as well as revised monthly and quarterly data. In addition, BEA releases a comprehensive revision about every 5 years.<sup>11</sup> Comprehensive revisions incorporate

11. As mentioned previously, after the release of the comprehensive revision in July 2009, BEA will move to “flexible annual revisions.”

even more detailed source data from various economic censuses. In years when comprehensive revisions are released, no annual revision is released.

### GDI components

The estimates of private wages and salaries, net domestic imputed interest, and nonfarm proprietors’ income illustrate how source data change from the preliminary estimates to the second annual revision estimates (table 3).

The preliminary and final quarterly estimates of private wages and salaries are extrapolated using an

**Table 3. Sources for the Successive Estimates of Quarterly Gross Domestic Income**

Component	Preliminary estimates	Final estimates	Revised previous quarter estimates	First annual revision estimates	Second annual revision estimates
<b>Compensation of employees, paid</b>					
Wage and salary accruals					
Disbursements					
Private domestic industries .....	Indirect indicator data	Indirect indicator data	Comprehensive data	Comprehensive data	Comprehensive data
Government .....	Indirect indicator data	Indirect indicator data	Indirect indicator data	Comprehensive data	Comprehensive data
Wage accruals less disbursements .....	Indirect indicator data	Indirect indicator data	Indirect indicator data	Indirect indicator data	Indirect indicator data
Supplements to wages and salaries					
Employer contributions for employee pension and insurance funds					
Pension and profit sharing					
Private pension and profit sharing .....	Trend-based data	Trend-based data	Trend-based data	Direct indicator data	Comprehensive data
Publicly administered government employee retirement plans					
Federal .....	Comprehensive data	Comprehensive data	Comprehensive data	Comprehensive data	Comprehensive data
State and local .....	Trend-based data	Trend-based data	Trend-based data	Trend-based data	Comprehensive data
Private insurance funds .....	Trend-based data	Trend-based data	Trend-based data	Trend-based data	Comprehensive data
Employer contributions for government social insurance .....	Indirect indicator data	Indirect indicator data	Indirect indicator data	Comprehensive data	Comprehensive data
<b>Taxes on production and imports</b>					
Federal .....	Comprehensive data	Comprehensive data	Comprehensive data	Comprehensive data	Comprehensive data
State and Local					
State sales taxes					
General .....	Direct indicator data	Direct indicator data	Direct indicator data	Direct indicator data	Comprehensive data
Other .....	Trend-based data	Direct indicator data	Direct indicator data	Direct indicator data	Comprehensive data
Other .....	Trend-based data	Trend-based data	Trend-based data	Trend-based data	Comprehensive data
<b>Less: Subsidies</b>					
Federal .....	Comprehensive data	Comprehensive data	Comprehensive data	Comprehensive data	Comprehensive data
State and local .....	Trend-based data	Trend-based data	Trend-based data	Trend-based data	Comprehensive data
<b>Net operating surplus</b>					
Private enterprises					
Net interest and miscellaneous payments, domestic industries					
Net interest					
Domestic monetary interest, net .....	Indirect indicator data	Indirect indicator data	Indirect indicator data	Indirect indicator data	Comprehensive data
Domestic imputed interest, net					
Commercial banks .....	Trend-based data	Direct indicator data	Direct indicator data	Comprehensive data	Comprehensive data
Other .....	Trend-based data	Trend-based data	Trend-based data	Direct indicator data	Comprehensive data
Federal rents and royalties .....	Comprehensive data	Comprehensive data	Comprehensive data	Comprehensive data	Comprehensive data
State and local rents and royalties .....	Trend-based data	Trend-based data	Trend-based data	Trend-based data	Comprehensive data
Business current transfer payments, net .....	Trend-based data	Trend-based data	Trend-based data	Trend-based data	Comprehensive data
Proprietors’ income with IVA					
Farm .....	Indirect indicator data	Indirect indicator data	Indirect indicator data	Comprehensive data	Comprehensive data
Nonfarm .....	Indirect indicator data	Indirect indicator data	Indirect indicator data	Indirect indicator data	Comprehensive data
Rental income of persons .....	Indirect indicator data	Indirect indicator data	Indirect indicator data	Direct indicator data	Direct indicator data
Corporate profits with IVA, domestic industries .....	Direct indicator data	Direct indicator data	Direct indicator data	Direct indicator data	Comprehensive data
Current surplus of government enterprises					
Federal .....	Trend-based data	Trend-based data	Trend-based data	Comprehensive data	Comprehensive data
State and local .....	Trend-based data	Trend-based data	Trend-based data	Trend-based data	Comprehensive data
<b>Capital consumption adjustments plus consumption of fixed capital<sup>1</sup></b> .....	Trend-based data	Trend-based data	Trend-based data	Trend-based data	Comprehensive data

1. The total of capital consumption adjustments and consumption of fixed capital is based on capital consumption allowances which are estimated from tax data.

NOTE: For more information on the source data and estimating methods used to prepare national income and product account estimates, see *Concepts and Methods of the National Income and*

*Product Accounts (Introductory Chapters 1–4)* (July 2008); [www.bea.gov/national/pdf/NIPAhandbookch1-4.pdf](http://www.bea.gov/national/pdf/NIPAhandbookch1-4.pdf).

IVA Inventory valuation adjustment

indirect indicator constructed with monthly data on employment, hours, and earnings. The revised estimates for the previous quarter (released with the preliminary GDP estimates for the most recent quarter) and the first and second annual revision estimates incorporate QCEW quarterly data.<sup>12</sup>

The preliminary quarterly estimates of net domestic imputed interest paid by commercial banks are extrapolated using historical trends in the series.<sup>13</sup> The final quarterly estimates are extrapolated using a direct indicator that incorporates quarterly data from commercial bank income statements and balance sheets and are not affected by the incorporation of QCEW data. The first and second annual revision estimates incorporate quarterly commercial banking data that are more detailed than the data used to compile the final quarterly estimates.

The preliminary and final quarterly estimates and the first annual revision estimates of nonfarm proprietors' income are extrapolated using other NIPA estimates and several volume and activity indicators. For example, the income of proprietors engaged in manufacturing is extrapolated using the value of manufacturers' shipments. Proprietors' income for the real estate industry is extrapolated using a NIPA estimate of real estate brokers' commissions. Estimates of nonfarm proprietors' income for the previous quarter are not revised when QCEW data are incorporated. The second annual revision estimates incorporate newly available data on sole proprietorship and partnership tax returns compiled by the IRS. These data are more reliable than the data used to extrapolate the earlier estimates. However, the tax return data are only available annually; therefore, for the second annual revision, the quarterly estimates are interpolated using the same indirect indicator data that are used to prepare the earlier estimates.

### Current quarterly and annual revision comparison

The current quarterly estimates receive the most attention from policymakers and business analysts because they are the first estimates published for a quarter. Except for the fourth quarter of each year, the prelimi-

12. BEA adjusts data from the QCEW to conform to NIPA concepts and definitions and to fill gaps in coverage. Adjustments are also made to account for nonreporting and under reporting of wages by employers and to ensure that the proper geographic coverage is maintained.

13. For more information on the definition and estimation of imputed interest, see Dennis J. Fixler, Marshall B. Reinsdorf, and George M. Smith, "Measuring the Services of Commercial Banks in the NIPAs: Changes in Concepts and Methods," SURVEY 83 (September 2003): 33–44.

nary estimates are the first available estimates of GDI. For the fourth quarter of every year, the final estimates are the first available. From 1983 to 2007, the current quarterly estimates of GDI growth in current dollars ranged from 0.0 percent to 14.2 percent.

To assess the magnitude of revisions to current-dollar GDI growth estimates, the two current quarterly estimates were compared, and the current quarterly estimates were compared with the first and second annual revision estimates.<sup>14</sup> These comparisons allow for an assessment of the impact of source data changes because the first and second annual revision estimates incorporate higher quality source data, mainly newly available or revised annual data and revised monthly and quarterly data. For example, the second annual revision estimates of corporate profits, nonfarm proprietors' income, and net domestic monetary interest incorporate newly available tax return data from the IRS that are more comprehensive than the data used to derive the earlier estimates. In addition, the effects of revisions due to changes in definitions or methodologies affect some of the annual revision estimates.

Overall, the magnitude of the revisions to the growth rates of GDI is small and roughly the same as the magnitude of the revisions to GDP.<sup>15</sup> Furthermore, the revisions from the current quarterly GDI estimates to the latest estimates, which are considered to be the most accurate, are similar to the revisions from the annual revision estimates to the latest estimates (table 4).

14. The comparisons are not quite complete, because there are no preliminary estimates of fourth-quarter GDI after 1994. Because the revised estimates for the previous quarter, which reflect the incorporation of QCEW data, only begin in 2002, they are excluded from the comparisons.

15. See Dennis J. Fixler and Bruce T. Grimm, "The Reliability of the GDP and GDI Estimates," SURVEY 88 (February 2008): 16–32.

**Table 4. Mean and Mean Absolute Revisions to the Successive Estimates of Gross Domestic Income for 1983–2007**

	[Percentage points]			
	Final estimates	First annual revision estimates	Second annual revision estimates	Latest estimates
<b>Mean revisions</b>				
Preliminary estimates .....	0.01	–0.03	–0.05	0.03
Final estimates .....		–0.03	–0.07	0.05
First annual revision estimates .....			–0.06	0.08
Second annual revision estimates .....				0.15
<b>Mean absolute revisions</b>				
Preliminary estimates .....	0.29	0.98	1.07	1.21
Final estimates .....		0.88	1.08	1.16
First annual revision estimates .....			0.80	1.07
Second annual revision estimates .....				0.90

**Mean revisions.** Although the annual revision estimates incorporate more comprehensive source data than the current quarterly estimates, the average revisions from the current quarterly estimates to the annual revision estimates are small and negative. The mean revisions from the preliminary and final estimates to the first annual revision estimates are both  $-0.03$  percentage point. The revisions from the three earlier vintages of estimates to the second annual revision estimates range from  $-0.05$  percentage point to  $-0.07$  percentage point.

The revisions from the current quarterly estimates and the two annual revision estimates to the latest estimates are positive, ranging from  $0.03$  percentage point to  $0.15$  percentage point. This shift from negative to positive average revisions reflects the effects of comprehensive revisions that are fully incorporated in the latest estimates.

**Mean absolute revisions (MARs).** The mean revision without regard to sign from the preliminary estimates to the final estimates of GDI is  $0.29$  percentage point. The MAR from the preliminary GDI quarterly estimates to the first annual revision estimates is  $0.98$  percentage point, and the MAR from the final quarterly estimates to the first annual revision estimates is  $0.88$  percentage point. The MARs from the two current quarterly estimates to the second annual revision estimates are nearly identical— $1.07$  percentage points and  $1.08$  percentage points, respectively. In contrast, the MAR from the first annual revision estimates to the second annual revision estimates is  $0.80$  percentage point. The MARs to the latest estimates decline steadily across successive vintages, from  $1.21$  percentage points for the preliminary estimates to  $0.90$  percentage point for the second annual revision estimates.