**Full Integration of the Industry Accounts for the United States**

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**Introduction**

With the release of the results of the 2014 comprehensive revision of the industry accounts, the Bureau of Economic Analysis (BEA) has completed “full integration” of the industry accounts—that is, the integration of the benchmark and annual input-output accounts and gross domestic product (GDP) by industry accounts with the national accounts (encompassing GDP). This full integration was first suggested in a March 2004 article in the Survey of Current Business. This paper summarizes the steps involved and the methods used to achieve full integration and it reviews the benefits of full integration. An appendix describes the methods used to balance the accounts.

**Background—U.S. Industry Accounts**

The BEA industry accounts provide statistics on the U.S. economy from an industry perspective—their interactions with each other and their impact on the U.S. economy. These statistics show the flow of goods and services produced and purchased as part of production processes and the incomes earned from that production.

Unlike many countries, the United States does not prepare “supply-use” tables. Instead, the U.S. input-output (I-O) accounts provide “make-use” tables. The “make” table shows the production of products (goods and services) by industries valued at producer prices. [[1]](#footnote-1) The row and column totals in the make table show total industry output and total product output, respectively. The “use” table shows the interdependencies among industries, the contribution of each industry to GDP, and expenditure-based categories of GDP (final consumption, exports less imports, and gross capital formation). In addition, the use table shows the components of value added by industry. Similar to the make table, the column and row totals of the use table show total industry output and total product output, respectively.

The U.S. I-O accounts consist of “benchmark” I-O accounts and “annual” I-O accounts. Benchmark I-O accounts provide the most comprehensive information available on the production of goods and services by industries and the flow of these goods and services to industries for use in their production processes and to final users in the economy. These accounts, which are primarily based on data from 5-year economic censuses, are used for benchmark years to establish the level of GDP and to provide critical information for the nation’s economic structure through intermediate consumption, as well as for estimating GDP for periods after benchmark years.[[2]](#footnote-2) Thus, these accounts provide the basis for a more detailed understanding of the national accounts (encompassing GDP). For example, the 2007 benchmark I-O account—released in December 2013—was used to establish the 2007 level and the product composition of GDP by final use category as well as the level of *selected* income components in the 2013 comprehensive revision of the national accounts. The annual I-O accounts are more timely than the benchmark I-O accounts. However, they provide less detail because they rely on less detailed annual data that are based on smaller sample surveys. Historically, value added in the I-O accounts was measured as a “residual”—that is, gross output less intermediate inputs by industry.

At BEA, the I-O accounts have traditionally served two major purposes, both of which have focused on information about the use of products. First, the accounts provide the national accounts with “best-level” estimates for the products that compose GDP in a benchmark year. Second, they provide the national accounts with information on the split between intermediate inputs and final uses of products for the years after a benchmark year, which is critical for GDP determination. GDP measures final uses, while most source data commingle intermediate-use and final-use expenditures. Because of their importance in determining the levels of GDP in the national accounts, the compiling processes of I-O accounts were traditionally focused more on the product composition of the economy and less on the measures of value added by industry.

BEA has a long history of producing annual GDP by industry; the first set of estimates—for gross national product (GNP) by industry—was published in 1962 for the years 1947-60.[[3]](#footnote-3) The GDP by industry accounts provide time-series estimates of gross output, intermediate inputs, and value added by industry. The components of gross output are derived using an industry’s sales, shipments, or receipts, which can include sales to final users in the economy (GDP) or sales to other users. The components of value added by industry are derived using industry distributions of components of gross domestic income (GDI) from the national accounts. The GDI-based measures of value added by industry represent the sum of the costs incurred and the incomes earned in production and are estimated as the sum of the industry distributions of compensation of employees, gross operating surplus, and taxes on production and imports less subsidies. These GDI-based industry distributions incorporate additional annual survey data and data from annual tax returns and administrative records. Historically, intermediate inputs by industry in the GDP by industry accounts were measured as a “residual”—that is, gross output less value added by industry.

In contrast to the annual I-O accounts, the annual GDP by industry accounts, with their time-series dimension, focus on the industry composition of the economy and the measures of value added by industry; therefore, the GDP by industry accounts are ideally suited for analysis of industry shares of GDP and contributions to GDP growth.

**The Rationale for Integration**

Prior to integration, BEA would release the latest benchmark I-O account one to two years before the corresponding comprehensive revision of the national accounts. Because of the timing of the completion of the two sets of statistics, they were not fully consistent. In particular, while the latest benchmark I-O account was the foundation for the level of GDP in the benchmark year, the benchmark I-O account did not include major changes in definitions and classification that were incorporated into the latest GDP statistics. Because BEA did not subsequently release revised benchmark I-O accounts, the published benchmarks did not include any of these improvements that were later introduced into the national accounts. These benchmark I-O accounts were not consistent with each other, with the national accounts, or with the annual industry accounts. As such, their usefulness was limited. They have provided an accurate and detailed set of interindustry relationships at a point in time to analyze structural changes, and they were used to benchmark the national accounts and annual industry accounts. However, their relevance was somewhat diminished because they lacked a “time-series” dimension.

In addition, BEA prepared two sets of somewhat inconsistent annual industry accounts: The I-O accounts and the GDP by industry accounts. The primary strength of the I-O accounts methodology was the balanced row-and-column framework in which the detailed estimates of gross output and intermediate inputs by industry were prepared; this framework allowed for a simultaneous look at both the industry composition and the product composition of the economy. The primary strength of the GDP by industry accounts methodology was the direct approach to estimating a time series of value added by industry from high quality source data.

Both the annual I-O accounts and the GDP by industry accounts presented measures of gross output, intermediate inputs, and value added by industry. However, because of the use of different methodologies and different source data, these measures were inconsistent across the two sets of accounts. Furthermore, the annual I-O accounts were prepared only sporadically and for short time periods after a benchmark year. These stand-alone annual I-O tables were not designed for time-series use. The inconsistencies between the two sets of accounts were frustrating to data users, who wanted to be able to combine the richness of information from each account for their own applications.

In an effort to resolve these inconsistencies, BEA began a decade-long series of strategic initiatives with the ultimate goal of fully integrating the benchmark and annual I-O accounts and GDP by industry accounts with the national accounts. The integration process included three major milestone years: 2004, 2010, and 2014. In 2004, BEA integrated the annual I-O accounts with the GDP by industry accounts. In addition, these accounts were integrated with the GDP statistics from the national accounts. In 2010, the benchmarking process was enhanced by incorporating more than one benchmark year into the annual industry accounts. Lastly, in 2014, full integration was achieved.

**2004: Integration of annual I-O accounts and GDP by industry accounts and integration with the GDP statistics**

The highlight of the 2004 comprehensive revision of the annual industry accounts was the integration of the annual I-O accounts and the GDP by industry accounts for 1998-2002. For the first time, the annual I-O accounts and the annual GDP by industry accounts were released concurrently and presented equivalent measures of gross output, intermediate inputs, and value added by industry.[[4]](#footnote-4)

As a first step, BEA prepared a revised 1997 best-level benchmark I-O account that incorporated the definitional, methodological, and statistical changes from the 2003 comprehensive revision of the national accounts. However, these benchmark year statistics were not formalized into a full I-O account due to lack of resources and thus were not released to the public. Nevertheless, they provided the critical information needed for preparing integrated annual industry accounts for the periods after the 1997 benchmark year. Creating this revised benchmark I-O table ensured that the integrated accounts for 1998-2002 included the same improvements that were introduced into the GDP statistics in the national accounts and that their GDP levels aligned with those levels in the national accounts.

Integration can be achieved through a variety of methods. For example, many countries produce integrated annual I-O accounts and GDP by industry accounts by assuming that the industry ratios of intermediate inputs to gross output do not change from the most recent set of benchmark I-O accounts; these ratios are then used to estimate a time series of value added by industry from annual source data on gross output by industry. BEA used a different approach because of the richness of the source data that are available in the United States. For example, the Census Bureau, the Bureau of Labor Statistics (BLS), and the Internal Revenue Service (IRS) provide data that can be used to estimate value added by industry. However, the quality of these source data varies by data series and by industry. BEA developed an integration methodology that (1) ranked the available source data by quality and (2) estimated a balanced set of annual I-O accounts and GDP by industry accounts that incorporated a weighted average of these source data on the basis of their relative quality. As a result, BEA’s integrated annual I-O accounts and GDP by industry accounts provided a more consistent and a more accurate set of estimates.

BEA’s integration methodology incorporated the relative strengths from both the I-O accounts and the GDP by industry accounts. It yielded a set of annual I-O accounts and GDP by industry accounts that were prepared within a balanced framework and that incorporated the most timely and accurate source data, including the GDI-based measures of value added from the GDP by industry accounts. It ensured equivalent estimates of gross output, of intermediate inputs, and of value added by industry in both the annual I-O accounts and the GDP by industry accounts. The benefits of integration, however, went beyond the consistency of the annual industry accounts and the use of the best available source data. The revised I-O estimates included the latest GDP statistics from the national accounts, providing users with yet another level of consistency. Finally, the integration methodology imposed a time-series framework on the annual I-O tables, making the tables more useful for analyses of trends over time. As a result, the 1998-2002 national accounts and the integrated annual industry accounts were now harmonized. To improve their relevance, the benchmark I-O accounts still needed to be integrated with the annual industry accounts.

**2010: Integration of the annual accounts with two benchmark I-O accounts**

Benchmark I-O accounts serve as the statistical foundation for the annual industry accounts as well as for GDP statistics in the national accounts. With the release of the 2004 comprehensive revision of the industry accounts, BEA began providing a consistent time series of annual industry accounts after the latest benchmark year. For the 2010 comprehensive revision of the industry accounts, BEA integrated the benchmark I-O accounts for both 1997 and for 2002 into the annual industry accounts.

As a first step in this phase of the integration process, BEA updated the industry and product definitions of the revised 1997 benchmark I-O account (previously discussed) and of the annual industry accounts so that they would be consistent with the 2002 North American Industry Classification System structure. This forced the 1997 benchmark I-O account to be on the same industrial structure as the 2002 benchmark I-O account.

Next, both the newly adjusted 1997 and the published 2002 benchmark I-O accounts were modified to incorporate the definitional, methodological, and statistical changes from the 2009 comprehensive revision of the national accounts. As with the 2004 comprehensive revision, these revised benchmark year statistics were not formalized into a full I-O account due to lack of resources and were not released to the public. Nevertheless, incorporating these changes ensured that the annual industry accounts for 1998-2008 would be consistent with the levels of GDP in the national accounts.

Lastly, an interpolation methodology was introduced in order to develop a consistent time series of annual accounts. The new method ensured that the structures of the revised 1997 and 2002 benchmark I-O accounts informed the preparation of the annual industry statistics for the years between the benchmarks.[[5]](#footnote-5)

One additional enhancement was an improved method to “reconcile” value added by industry within a balanced I-O framework.[[6]](#footnote-6) The new method—which was based on a generalized least squares framework—offered advantages over past models. The model was transparent; it was familiar to national economic accounting and statistical agencies. The framework guaranteed that adjustments to initial estimates were as small as necessary to remove discrepancies between the estimates subject to the model’s accounting constraints. Furthermore, the framework yielded a model that was replicable.

**2014: Integration of the benchmark I-O account**

The 2014 comprehensive revision marked the first time that the benchmark I-O account, the annual industry accounts, and national accounts were fully integrated. Future benchmark I-O accounts will be revised to reflect revisions stemming from the GDP statistics, and they will be published with the revisions to the time series of the industry accounts.

As previously mentioned, past benchmark I-O accounts were released well before the comprehensive revision of the national accounts and were not subsequently revised to reflect revisions stemming from the comprehensive revisions of the national accounts. As a consequence, past benchmark I-O accounts have not been fully consistent with the national accounts or with the annual industry accounts. The 2007 benchmark I-O account was released along with a revised time series of annual industry statistics after the 2013 comprehensive revision of the national accounts and it incorporated all of the improvements to the industry accounts and national accounts.

A benefit of full integration has been that, for the first time, the benchmark I-O and annual industry accounts are fully consistent with all changes in definition, classification, and statistical methods that were brought into the 2013 comprehensive revision of the national accounts.[[7]](#footnote-7) These changes include the following:

* The recognition of research and development (R&D) expenditures as capital;
* The capitalization of entertainment, literary, and other artistic originals;
* The expansion of the capitalization of the ownership transfer costs of residential fixed assets; and
* The use of an improved measure of transactions for defined benefit pension plans.

**2014: New quarterly statistics on GDP by industry**

In April 2014, BEA issued its first “regular” release of quarterly statistics on GDP by industry for 22 industry sectors.[[8]](#footnote-8) These new quarterly statistics supplement other quarterly and monthly indicators of industries’ performance in the analysis of business cycle dynamics and sources of U.S. economic growth. These statistics, which also include measures of gross output and of intermediate inputs by industry, are prepared within a balanced I-O framework and are fully integrated with the quarterly GDP statistics in the national accounts. The introduction of these quarterly GDP by industry statistics provides new insights into industry performance during the period of the Great Recession and during the period of economic recovery.

**Benefits of the integration**

Under full integration, the benchmark I-O accounts provide the best measures of value added by industry because they incorporate the most comprehensive and highest quality information on gross output and intermediate inputs by industry. In addition, the annual I-O accounts and the GDP by industry accounts incorporate all available annual data on intermediate inputs by industry that allow for updating industry ratios of intermediate inputs to gross output.

Integrating the benchmark I-O account into the time series allows for a higher degree of consistency among the national accounts, the benchmark I-O accounts, and the annual industry accounts. For example, in using the fully integrated industry accounts, data users will be able to track time-series trends in a GDP final expenditure category at a detailed product level in benchmark years and at a slightly higher level of product aggregation in non-benchmark years. Users interested in more detailed statistics on outputs, inputs, and value added at the industry level will be able to crosswalk between a time series of benchmark statistics and a slightly higher level of industry aggregation in non-benchmark years.

As a result of full integration, BEA is able to provide on its Web site annual bridge tables that show the product composition of detailed personal consumption expenditures categories and of detailed private fixed investment in equipment from the national accounts that are fully consistent with both the 2007 benchmark I-O table and with the annual I-O tables. These bridge tables show the products included in each expenditure category and the value of the transactions in producers’ and purchasers’ prices as well as the associated transportation costs and trade margins.

**Future directions**

One long-term project is to create a true (i.e. independent) benchmark year estimate for GDI. GDP calculated from a benchmark I-O account is the most reliable measure of GDP for a benchmark year. Currently, GDI—based on an income approach—is derived using different sources and methods than that used in an I-O account. Large misreporting adjustments reflected in both profits and proprietors income are never really “benchmarked.” This results in a statistical discrepancy between GDP and GDI, even for a benchmark year. A case may be made for setting the statistical discrepancy to zero in benchmark years—thereby forcing GDP = GDI. This would entail a highly collaborative project between the Industry and National accounts teams, similar to the way we currently reconcile detailed final demand categories. Residually-derived estimates for gross operating surplus based primarily on economic census data would be used to inform IRS’ Statistics of Income (SOI)-based measures of income.

BEA plans a number of enhancements to the new set of quarterly GDP by industry statistics. Over the next few years, BEA plans to expand the level of detail presented from 22 industry groups to 69 industry groups. During the same timeframe, BEA plans to accelerate the quarterly GDP by industry to coincide with the third estimate of the current-quarter GDP statistics. This acceleration would speed up the release of quarterly GDP by industry from 4 months after the reference quarter to 3 months after the reference quarter.

Over a longer horizon, BEA plans to study the feasibility of producing quarterly GDP by industry coincident with the advance release of GDP. An acceleration of this magnitude will require significant changes to the way these estimates are currently produced and will necessitate a careful analysis of the quality of the resulting estimates. Finally, BEA plans to study the feasibility of producing an additional independent “production-based” measure of quarterly GDP. Currently, BEA produces two measures of quarterly GDP: (1) a final demand-based measure, which is the featured measure, and (2) an income-based measure referred to as GDI. Quarterly GDP by industry is prepared in a fully balanced I-O framework in which the sum of all value added is forced to equal the final demand-based measure of GDP. With more complete, quarterly information on business expenses and intermediate inputs, it is possible to produce a third “production-based” measure of GDP.

**Appendix**

The estimation methodology used to construct the industry accounts—that is, the benchmark I-O account, the annual I-O accounts, and the GDP by industry accounts—can be described in 10 summary steps: (1) benchmark year domestic supply; (2) benchmark year final expenditures; (3) initial estimates of benchmark year value added and intermediate inputs; (4) reconciliation of value added and intermediate inputs; (5) benchmark year balancing; (6) annual domestic supply; (7) initial annual estimates of intermediate inputs and final expenditures; (8) initial annual estimates of value added by industry; (9) annual balancing; and (10) price and quantity indexes for GDP by industry and for KLEMS statistics.[[9]](#footnote-9)

**Step 1. Benchmark year domestic supply.** The domestic supply of each product is the total value of goods and services available for use as intermediate inputs by industries or as final uses. Domestic supply represents the value of goods and services (products) produced by domestic firms, plus imports and government sales, less exports, and changes in inventory. The output of most products and industries was based on receipts and shipments data from the economic censuses and were supplemented by a variety of other sources. Changes in private inventories by product were based on data from economic censuses, data from the national accounts, and information on corporate inventories by industry from the IRS SOI program. Exports and imports were based on international trade statistics from the Census Bureau and from BEA.

**Step 2. Benchmark year final expenditures***.* The estimation of final expenditures by product was primarily based on the commodity-flow methodology. In many cases, a predominant user of a product can be identified and a portion of that product can be assigned to flow to a particular final use for purchase by consumers or by business for investment. Class-of-customer data from the economic censuses or information developed from alternative sources—such as trade associations, private businesses, and other government agencies—was used to identify the purchaser of a product. The estimates of final uses of the federal government and of state and local governments were based on the estimates of total consumption and investment expenditures by type of purchase from the national accounts.

**Step 3. Initial estimates of benchmark year value added and intermediate inputs.** Value added by industry represents the costs incurred and the incomes earned in production, and it consists of compensation of employees by industry, taxes on production and imports less subsidies, and gross operating surplus. Intermediate inputs, or the secondary factors of production, consist of the energy, materials, and purchased-services inputs that are used in each industry’s production process. Initial estimates of value added and of intermediate inputs by industry were prepared using economic census and annual survey data on business expenses, data from the national accounts for the components of value added, the BLS quarterly census of employment and wages program for estimates of wages and salaries and of supplements to wages and salaries, and the IRS SOI for taxes and other business income estimates.

**Step 4. Reconciliation of value added and intermediate inputs.** The reconciliation of value added and of intermediate inputs by industry produces a combined measure of value added by industry, where the weights are determined by the relative variances of each initial estimate.[[10]](#footnote-10) Two initial estimates of value added by industry for 65 industries are prepared: (1) a residual estimate of value added by industry that is calculated as the difference between gross output and intermediate inputs by industry and (2) a direct estimate of value added by industry that is calculated as the sum of the establishment-based distribution of gross domestic income from the national accounts. In the reconciliation model, initial estimates of intermediate inputs by product and by industry and initial estimates of the components of gross operating surplus are assigned a reliability indicator from two sources: (1) coefficients of variation, which measure sampling errors, from the source data provided by the Census Bureau and the IRS and (2) qualitative reliability weights determined by criteria that indicate the relative quality of underlying data for which there are no coefficients of variation. The reconciliation method makes adjustments to the initial estimates based on the strengths and limitations of the data that underlie those estimates.[[11]](#footnote-11)

**Step 5. Benchmark year balancing.** The benchmark year use table is balanced using a bi-proportional adjustment procedure that sequentially adjusts the columns and rows of the use table to a set of predetermined controls, including reconciled value added by industry, final expenditures by product, and GDP measured as the sum of final expenditures. Balancing also ensures that the sum of value added by industry equals GDP, intermediate inputs by product and final use of products are consistent with domestic supply, and intermediate inputs and value added by industry are consistent with gross output by industry.

**Step 6. Annual (non-benchmark year) domestic supply.** A time series of annual domestic supply is prepared by calculating annual estimates of domestic output by product and industry, changes in private inventories, and estimates of exports and imports by product. Domestic output is estimated, where available, using annual survey data from the Census Bureau, but it is supplemented with a wide array of public and private sector data sources. Changes in private inventories are based on data from the national accounts; exports and imports are based on international trade statistics from the Census Bureau and from BEA.

**Step 7. Initial annual estimates of intermediate inputs and final expenditures.** The distribution of initial intermediate inputs and final expenditures by product are based on the most recent available annual use table. For years in which a use table has been previously published, the initial intermediate inputs and final expenditures for that year are based on previously published details; for years in which a use table has not been published, the most recent year that is available is used to create initial estimates for the most recent estimate year.[[12]](#footnote-12) Initial estimates for intermediate inputs are then updated based on broad business expense data from the Census Bureau’s annual surveys and from other sources. Intermediate inputs and final expenditures by commodity are later updated as part of balancing the use table to a set of control totals that include domestic supply, industry and commodity output from the make table, value added by industry, final expenditure by category, and GDP from the national accounts.

**Step 8. Initial annual estimates of value added by industry**. Initial estimates of current-dollar value added by industry are prepared using distributions by industry of GDI from the national accounts. Corporate data from the national accounts are converted from an enterprise basis to an establishment basis using a cross-tabulation of employment data by company and establishment that is available for economic census years. Initial estimates of value added by industry are later updated as part of balancing the use table to a set of control totals that include domestic supply, industry and commodity output from the make table, initial value added and intermediate inputs by industry, final expenditure by category, and GDP from the national accounts.

**Step 9. Annual balancing***.* The annual use tables are balanced using a bi-proportional adjustment procedure that sequentially adjusts the columns and rows of the use table to a set of predetermined controls, including initial value added and intermediate inputs by industry, final expenditures by category, and GDP as measured by the sum of final expenditures from the national accounts. The balancing also ensures that the sum of value added by industry equals GDP, intermediate inputs by product and final use of products are consistent with domestic supply, and intermediate inputs and value added by industry are consistent with gross output by industry.

**Step 10. Price and quantity indexes for GDP by industry and for KLEMS statistics.** Price and quantity indexes for GDP by industry and KLEMS statistics are prepared in three steps. First, indexes are derived for gross output by deflating each product produced by an industry that is included as part of its gross output from the make table. Second, indexes for intermediate inputs are derived by deflating all products that are consumed by an industry as intermediate input, from the use table. Domestic and international sources of intermediate inputs are deflated separately through the use of the import proportionality, or comparability. Third, indexes for value added by industry are calculated using the double-deflation method in which real value added is computed as the difference between real gross output and real intermediate inputs within a Fisher-index number framework.[[13]](#footnote-13)

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1. The supply table is an extension to the make table. [↑](#footnote-ref-1)
2. Most U.S. documents will use the word “commodity” when referring to a product (both for goods and for services). [↑](#footnote-ref-2)
3. See Martin L. Marimont, “GNP by Major Industries: Comparative Patterns of Postwar Growth,” *Survey of Current Business* (October 1962): 6-18. [↑](#footnote-ref-3)
4. 4 For additional information on integrating the annual I-O accounts and the GDP by industry accounts, see Brian C. Moyer, Mark A. Planting, Mahnaz Fahim Nader, and Sherlene K.S. Lum, “Preview of the Comprehensive Revision of the Annual Industry Accounts: Integrating the Annual Input-Output Accounts and the Gross Domestic Product by Industry Accounts,” *Survey of Current Business* (March 2004): 38–51. [↑](#footnote-ref-4)
5. For additional information on estimation methods, see Nicole M. Mayerhauser and Erich H. Strassner, “Preview of the Comprehensive Revision of the Annual Industry Accounts: Changes in Definitions, Classification, and Statistical Methods,” *Survey of Current Business* (March 2010): 21–34. [↑](#footnote-ref-5)
6. For additional information on balancing procedures in the industry accounts, see Dylan G. Rassier, Thomas F. Howells III, Edward T. Morgan, Nicholas R. Empey, and Conrad E. Roesch, “Integrating the 2002 Benchmark Input-Output Accounts and the 2002 Annual Industry Accounts,” *Survey of Current Business* (December 2007): 14–22. [↑](#footnote-ref-6)
7. For additional information on the 2014 comprehensive revision of the industry accounts, see Donald D. Kim, Erich H. Strassner, and David B. Wasshausen, “Industry Economic Accounts: Results of the Comprehensive Revision,” *Survey of Current Business* (February 2014): 1-18. [↑](#footnote-ref-7)
8. See Erich H. Strassner and David B. Wasshausen, “BEA BRIEFING: New Quarterly Gross Domestic Product by Industry Statistics,” *Survey of Current Business* (May 2014): 1-16. [↑](#footnote-ref-8)
9. For additional information on estimation methods, see Karen J. Horowitz and Mark A. Planting, *Concepts and Methods of the U.S. Input-Output Accounts* (2006) at www.bea.gov. [↑](#footnote-ref-9)
10. For a detailed description of the model used to reconcile value added by industry, see Dylan G. Rassier, Thomas F. Howells III, Edward T. Morgan, Nicholas R. Empey, and Conrad E. Roesch, “Integrating the 2002 Benchmark Input-Output Accounts and the 2002 Annual Industry Accounts,” *Survey of Current Business* (December 2007): 14–22. [↑](#footnote-ref-10)
11. Essentially, the reconciliation produces a weighted average of the two initial estimates, in which initial estimates that are considered relatively weak are adjusted more than initial estimates that are considered relatively reliable. [↑](#footnote-ref-11)
12. For example, in the November 2014 release of the annual revision of the industry accounts, the year 2013 will be estimated for the first time using as initial estimates the use table for the year 2012. Next annual revision, 2013 will be re-estimated using as initial estimates the use table published in this revision for 2013. [↑](#footnote-ref-12)
13. For details on the Fisher-index number framework for computing real value added by industry, see the technical appendix in Brian C. Moyer, Mark A. Planting, Mahnaz Fahim Nader, and Sherlene K.S. Lum, “Preview of the Comprehensive Revision of the Annual Industry Accounts: Integrating the Annual Input-Output Accounts and the Gross Domestic Product by Industry Accounts,” *Survey of Current Business* (March 2004): 38–51. For details on computing contributions to growth by industry, see Brian C. Moyer, Mark A. Planting, Paul V. Kern, and Abigail M. Kish, “Improved Annual Industry Accounts for 1998-2003: Integrated Annual Input-Output Accounts and Gross Domestic Product by industry Accounts,” *Survey of Current Business* (June 2004): 21–57. [↑](#footnote-ref-13)