

Preview of the 2018 Comprehensive Update of the National Income and Product Accounts

Changes in Methods, Definitions, and Presentations

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In July, the Bureau of Economic Analysis (BEA) will release the initial results of the 15th comprehensive, or benchmark, update of the national income and product accounts (NIPAs). Comprehensive updates are usually conducted at 5-year intervals that correspond with the integration of updated statistics from BEA's quinquennial benchmark input-output accounts; the last comprehensive update was released in July 2013.

Comprehensive updates and, to a lesser extent, annual updates, provide the opportunity to introduce major improvements to maintain and to improve the NIPAs as outlined in BEA's strategic plan.¹ The changes are generally of three major types: (1) statistical changes to introduce new and improved methodologies and to incorporate newly available and revised source data, (2) changes in definitions to more accurately portray the evolving U.S. economy and to provide consistent comparisons with data for other national economies, and (3) changes in presentations to reflect the definitional and statistical changes, where necessary, or to provide additional data or perspectives for users.

This article describes the major changes that will be introduced in the NIPAs as part of the upcoming comprehensive update. An article in September will describe the results of the update and the effects of these changes on the NIPA estimates.

Major statistical changes in this comprehensive update include the following:

- New and revised source data, including the 2012 benchmark input-output accounts, which provide the most thorough and detailed information on the structure of the U.S. economy
- Changes in methodologies that address data gaps or implement other improvements, including
 - Improved seasonally adjusted measures
 - Improved deflation of fixed investment in software, medical equipment, and communications equipment
 - Improved method for measuring the implicit output of savings institutions and credit unions that is consistent with the methodology used for estimating the implicit output of commercial banks
 - Harmonized treatment of state and local defined benefit pension plans and federal plans by measuring state and local plans using the same approach used for federal plans
 - Expanded time spans for improvements that were introduced with limited time spans in previous updates (table 1)

Major changes in definitions in this comprehensive update include the following:

- Reclassification of research and development (R&D) for software originals from own-account software to R&D
- Recognition of capital services in own-account investment in software and R&D
- Reclassification of payments by the Federal Reserve banks to the U.S. government as dividend payments
- Reclassification of “other” state and local personal current taxes as “other” taxes on production

Major changes in presentations in this comprehensive update include the following:

- Updated presentation of federal and state and local government investment in structures for 1929–1996 that is consistent with the estimates beginning with 1997
- Expanded presentation of taxes on production and imports
- Updated descriptions of selected series in personal consumption expenditures (PCE) to better reflect the digital economy

Table 1. Expanded Timespan for Changes Introduced in Previous NIPA Updates

Description	Period of revision
From 2014 Annual NIPA Update	
Improved used auto and used truck margins	2011–forward
From 2015 Annual NIPA Update	
Seasonal adjustment of Census Bureau Quarterly Financial Report inventory data for mining industries	2002–forward
Seasonal adjustment of Census Bureau Quarterly Financial Report inventory data for information industries	2009–forward
Seasonal adjustment of Treasury Department data on government spending	2002–forward
Seasonal adjustment of Treasury inflation protected securities	2002–forward
Seasonal adjustment of Census Bureau Quarterly Services Report revenue and expense data for various industries	2009–forward
Improved deflation for trust, fiduciary, and custody services and portfolio management and investment advice services	2004–forward
From 2016 Annual NIPA Update	
Seasonal adjustment of Census Bureau construction spending data for state and local governments	2003–forward
Seasonal adjustment of Bureau of Labor Statistics (BLS) price indexes for transportation	2011–forward
Seasonal adjustment of BLS price indexes for communication	2009–forward
Seasonal adjustment of Federal Reserve Board price indexes for communication equipment	2002–forward
From 2017 Annual NIPA Update	
Improved casino gambling indicator	2011–forward
Improved personal consumption expenditures (PCE) control group	2008–forward
Improved source data for private fixed investment prepackaged software investment	2013–forward
Improved source data estimation methodology for PCE; merchandise line shares of electronic shopping and mail-order houses	2013–forward
Improved source data input for PCE prerecorded discs and digital downloads	2008–forward

NIPA National income and product accounts

As part of the upcoming 2018 comprehensive NIPA update, BEA will also feature output and price measures that use 2012 as the reference year; currently, the reference year is 2009. Quantity and price indexes will be expressed with 2012 equal to 100. The estimates for most tables showing real, or chained-dollar, estimates will begin with 2002.

Updating the reference year will not affect the percent changes in the price or quantity indexes (or in the chained-dollar estimates), because these changes are measured as chain-type indexes.² Revisions to the percent changes in NIPA aggregates will reflect the incorporation of newly available and revised source data as well as changes in definitions and methodologies.

Additionally, as part of its goal to more accurately portray the changing U.S economy, BEA will expand the minimum revision period during annual updates from 3 years to 5 years; beginning in 2019, annual updates will incorporate 2 additional years of revised source data and revisions to seasonal adjustment factors. As always, annual updates may be open beyond the minimum revision period to allow for improvements in concepts, definitions, and source data to be introduced before a comprehensive update.

Newly Available and Revised Source Data

As part of the upcoming comprehensive update, estimates will incorporate newly available and revised source data, including data from BEA's 2012 benchmark input-output accounts, selected data from the most recent quinquennial economic censuses, and annual source data that were not available in time for incorporation during previous annual NIPA updates.

The 2012 benchmark input-output (I-O) accounts

The benchmark I-O accounts are the most important data source for comprehensive updates of the NIPAs. They are based on the most detailed and comprehensive industry and commodity data available—the quinquennial economic censuses conducted by the Census Bureau—and their framework tracks the flows of detailed inputs and outputs throughout the economy. These detailed measures will incorporate the same changes in definitions that are being introduced into the NIPAs; as a result, they will provide a benchmark level of the portion of gross output that is purchased by final users—gross domestic product (GDP)—that is consistent with the NIPAs.³ With the November 2018 release of the benchmark I-O accounts, which are part of the time series of industry economic accounts, users will be able to move from one set of accounts to another to better understand the sources of growth in the economy. For example, a user interested in a component of consumer spending in the NIPAs will be able to access more detailed and more consistent information on the component in the benchmark I-O accounts.

Specifically, the 2012 benchmark supply-use table provides the 2012 benchmark levels for the NIPA measures of GDP, PCE, private investment, and several components of income. The table also provides essential information for estimating GDP in periods following the benchmark year, including the commodity weights for the estimates of change in private inventories and for the product-level detail of state and local government consumption expenditures and gross investment. The incorporation of the information from this table will result in revisions to NIPA estimates of selected components for 2008 forward.

Quinquennial economic census

The comprehensive NIPA update will also reflect the direct incorporation of statistics from the 2012 Economic Census. It will include data for the following categories: inventories; the receipts and expenses of business establishments and of governments; sales by detailed commodity and product line; final industry and product shipments; and trade margins.

Annual source data for 2014–2017

For these years, the revised NIPA estimates will also reflect the incorporation of newly available and revised source data that are regularly incorporated in annual NIPA updates and that became available after the last annual NIPA update in July 2017. These data include the following Census

Bureau surveys: Annual Survey of State and Local Government Finances for Fiscal Year 2015 (revised) and for Fiscal Year 2016 (new), Annual Survey of Manufactures for 2015 (revised) and for 2016 (new), Annual Survey of Wholesale Trade for 2015 (revised) and for 2016 (new), Annual Survey of Retail Trade for 2015 (revised) and for 2016 (new), Services Annual Survey for 2016 (revised) and for 2017 (new), and the value of construction put-in-place for 2015 and 2016 (revised) and for 2017 (preliminary). The data also include the following: Office of Management and Budget federal government budget data for fiscal years 2017 (revised) and 2018 (new), BEA data for 2015–2017 (revised) from the international transactions accounts, Bureau of Labor Statistics Quarterly Census of Employment and Wages for 2014–2016 (revised), Internal Revenue Service tabulations of corporate tax returns for 2015 (revised) and for 2016 (new) and tabulations of sole proprietorship and partnership tax returns for 2016, and U.S. Department of Agriculture farm statistics for 2015–2017 (revised).

Changes in Methodology

Improvements in seasonal adjustment

Many of the improvements already introduced into the seasonal adjustment of NIPA measures stem from the findings of a detailed review of the components of gross domestic product (GDP) and gross domestic income (GDI) conducted in 2016.⁴ As part of the upcoming comprehensive NIPA update, BEA will implement additional improvements identified in the 2016 review, including the following:

- Incorporation of improved seasonal adjustments to NIPA series over historical time spans and extending back improvements that were introduced in previous annual updates
- Revision of BEA's seasonal adjustment practices and collaboration with BEA's source data providers to address residual seasonality
- Conversion to the Census Bureau's X-13ARIMA-SEATS (X-13) seasonal adjustment program⁵
- Evaluation and modification of the revision spans for seasonally adjusted estimates, both within BEA and in collaboration with major source data providers
- Publication of quarterly not seasonally adjusted estimates for GDP, GDI, and their major components

Additionally, as is typical for a comprehensive or annual update, the seasonal factors that underlie the quarterly and monthly NIPA estimates will be updated to capture changes in seasonal patterns that emerge over time. In general, the revised NIPA estimates will reflect updates to seasonal factors for 2002 forward; updates to the seasonal factors before 2002 will be more limited.

Over the last several years, BEA incorporated many methodological improvements that addressed residual seasonality in GDP components in recent periods. In general, these improvements introduced additional seasonal adjustment to the underlying source data used for estimating components of PCE services, inventory investment, government consumption expenditures, and government investment. Table 1 summarizes these previous adjustments and identifies the time spans that will be affected by extending these improvements further back in history.

BEA will introduce seasonal adjustments to several additional components of PCE services that are based on data from the Census Bureau's Quarterly Service Report, expanding on the improvements introduced in 2015. Selected components of federal consumption expenditures and gross investment will be revised to introduce updated seasonal adjustments over longer time spans.

BEA also increased its collaboration with important source data providers, particularly for those components where residual seasonality has resulted from aggregating monthly seasonally adjusted source data to derive quarterly measures. Specifically, BEA and the Census Bureau jointly evaluated the quarterly and monthly Census Bureau data on trade in goods and on construction spending for the presence of residual seasonality in the aggregated quarterly estimates. As a result, improvements to the seasonal adjustment of these underlying source data will be incorporated in the corresponding NIPA series.

Additionally, in the fall of 2017, BEA and the Census Bureau conducted a joint investigation into the potential impact of the agencies' revision policies on residual seasonality; the two agencies concluded that best practices dictate that seasonally adjusted series be open to revision for periods longer than the unadjusted series. Consequently, both agencies will adopt longer revision spans for their annual updates of their seasonally adjusted statistics. Specifically, the Census Bureau's update of monthly construction spending statistics, to be released in July 2018, will reflect a 7-year revision span for the seasonally adjusted series, and BEA's future annual updates of the NIPAs will be 5 years rather than the 3 years used in the past.⁶ BEA's expanded revision period of 5 years is also consistent with the Bureau of Labor Statistics' revision practice.

The comprehensive update also provides an opportunity for BEA to address residual seasonality in the longer history of some NIPA components.⁷ Specifically, BEA will adjust the quarterly pattern of current-dollar quarterly estimates of exports of services during the 1960s; addressing this period in particular will mitigate the residual seasonality observed throughout the timespan. The annual estimates will not be affected by the change.

Measures of federal consumption expenditures and gross investment also show evidence of residual seasonality over longer time spans. One contributing factor to the residual seasonality in nominal and price measures is the current NIPA treatment of federal wages and salaries in which the pay raises that federal government military and civilian employees often receive in January are shown as a level increase in the NIPA estimates of federal government wages and salaries for the first

quarter of each year. By convention, BEA currently includes these seasonal movements in this series to better illustrate the effects of the federal employee pay raises.⁸ As part of the comprehensive update, measures of federal wages and salaries will be revised to remove this seasonal effect from the first-quarter estimates. Users will be able to see the effect of the pay raise in the not seasonally adjusted estimates described below.

Introduction of not seasonally adjusted estimates

Recognizing that the evaluation of residual seasonality is quite sensitive to the periods reviewed and statistical tests employed, BEA will provide quarterly estimates of GDP, GDI, and their major components that are not seasonally adjusted (NSA). These estimates will be released concurrently with BEA's seasonally adjusted estimates and will provide greater transparency and expanded analysis of the effects of seasonal adjustment by distinguishing movements attributable to underlying source data from those attributable to seasonal adjustment.⁹

Like BEA's seasonally adjusted estimates, the NSA estimates will often be based on source data that are compiled for purposes other than measuring domestic production; as a result, the construction of NSA estimates will be similar to their seasonally adjusted counterparts.¹⁰ Specifically, when NSA source data are available, they will be adjusted to align with NIPA conventions and will then provide the indicator or pattern series for the corresponding NSA NIPA estimate. When NSA source data are unavailable, most NSA estimates will be interpolated or extrapolated without an indicator. As a result, the primary difference between the NSA estimates and the seasonally adjusted estimates for any given component will be the implicit seasonal adjustment.

The NSA measures will be presented in six new NIPA tables that are described in the section on "Changes in Presentations."

Improved deflation of software, medical equipment, and communications equipment

Software, medical equipment, and communications equipment typically experience rapid innovation and are associated with state-of-the-art technologies. Such products present challenges when using standard matched-model techniques to construct quality-adjusted price indexes. BEA continually strives to improve the price indexes used throughout the NIPAs and consults regularly with colleagues at the Bureau of Labor Statistics (BLS) and the Federal Reserve Board (FRB). As part of the upcoming 2018 comprehensive NIPA update, BEA will introduce several improved indexes and will extend improvements that were introduced in prior updates to previous years to improve the deflation of these products.

Software. As part of the 2017 annual NIPA update, BEA improved the price index used to deflate fixed investment in prepackaged software, beginning with the first quarter of 2014.¹¹ The improved price index replaced the BLS producer price index (PPI) for "application software publishing" with

the broader PPI for “software publishing, except games.” The PPI for “software publishing, except games” captures movements in the prices of systems software publishing, which accounts for a large share of total investment spending on prepackaged software, as well as in the prices of application software publishing. As part of the 2018 comprehensive update, BEA will extend this improved methodology back to 2007.

Additionally, the price indexes for both custom and own-account software will reflect, for the first time, an explicit adjustment to account for changes in productivity. Currently, these price indexes are estimated using a weighted average of the BEA prepackaged software price index and a BEA input-cost index that is based on BLS data on wage rates for computer programmers and systems analysts and on intermediate input costs associated with the production of software. The prepackaged software price reflects actual market prices and therefore reflects implicit changes in productivity, but the input-cost index does not. BEA will implement an explicit productivity adjustment to the input-cost index, beginning with 1997. The adjustment will be based on research conducted by BEA using reports from academic, commercial, and public sources.

Medical equipment. Beginning with 2002, BEA will introduce newly developed annual estimates of quality-adjusted prices for components of electro-medical equipment, including magnetic resonance imaging equipment, ultrasound scanning devices, and CT-scan machinery. These types of medical equipment embody rapid rates of product innovation that can present challenges when using standard matched-model techniques. These new price indexes were developed by BEA using data from the ECRI Institute on purchases of medical equipment by health care providers. The new annual price indexes better account for product quality change than the previously used price indexes, which were based on monthly PPIs and monthly international price indexes (IPIs) from BLS. The improved price indexes will be used to deflate annual private fixed investment and exports and imports of electro-medical equipment. The previously used PPIs and IPIs will be used in conjunction with the newly developed annual indexes to estimate the higher frequency quarterly prices.

Communications equipment. BEA first introduced quality-adjusted price indexes produced by the FRB for communications equipment in the 2010 annual NIPA update.¹² These prices are used to deflate private fixed investment, exports, and imports of selected communications equipment. This year, in addition to the continued use of these FRB price indexes, BEA will also introduce a newly available quality-adjusted FRB price index for cellular phones beginning with 2002. This newly available annual price index will be used to deflate PCE, private fixed investment, and imports of cellular phones. Previously, cellular phones were not separately deflated in any of these categories and instead were deflated as part of aggregated series that included cellular phones. These aggregated series were deflated using FRB prices, PPIs, IPIs and consumer price indexes (CPI) that implicitly included cellular phones. Beginning with January 2018, explicit quality adjustments for smartphones, which are generated using hedonic modeling methods, are applied to the CPI for “telephone hardware, calculators and other consumer information items.” Within this category,

cellular phones account for approximately half of the sample.¹³ BEA plans to incorporate this improved CPI into the deflation of cellular phones in PCE, in private fixed investment, and in imports beginning with the first quarter of 2018. For quarterly prices before the first quarter of 2018, the FRB price for “wireless networking equipment” will be used in conjunction with the newly developed annual index to estimate the higher frequency quarterly price indexes.

Measures of the implicit services of savings institutions and credit unions

Measures of the intermediation services by savings banks and credit unions will be aligned with the measures for commercial banks by using the same reference rate approach and by introducing services to borrowers.

Currently, the implicit output of savings institutions and credit unions is measured using the property income method. Imputed interest (that is, the implicit services provided) is measured by taking the difference between the interest earned on loans and the interest paid on deposits, using data from the Federal Deposit Insurance Corporation, the Office of Thrift Supervision, and the Credit Union National Association. Consumption of this output is then allocated to depositors in different sectors. For savings institutions, implicit services are allocated to households and other sectors based on their deposits at these institutions, using data on deposits from the FRB’s Financial Accounts. For credit unions, households are assumed to consume all such depositor services.

The new methodology will measure the implicit services of savings institutions and credit unions using the reference rate approach that is used for deriving the implicit services of commercial banks. In this approach the “reference rate” is measured as the average rate earned by banks on U.S. government and agency securities. The services to borrowers is the difference between the rate of return on loans and the reference rate times the value of loans that involve direct customer contact. The services to depositors is the difference between the reference rate and the rate paid on deposits times the value of deposits that involve direct customer contact. In addition, the new methodology will reflect two improvements that were introduced as part of the 2013 comprehensive NIPA update for the derivation of the implicit services of commercial banks.¹⁴ The value of implicit services is reduced by the amount of interest that is charged to cover defaults. Additionally, fluctuations in the relative levels of borrower and depositor services that are caused by differences between the timing and the maturity of banks loans and deposits and the assets used to compute the reference rate are dampened.

Effects on the accounts. This new method reduces the value of implicit services allocated to final uses (the portion that contributes to GDP). With the introduction of borrower’s services, a portion of the implicit banking services related to mortgage services is now allocated to business and

treated as intermediate services rather than as final services. Moreover, total implicit services will be reduced by the removal of default charges from implicit services and the exclusion of loans funded by the bank's own funds from production.

Measures of state and local defined benefit pension plans

Employer-sponsored defined benefit pension plans provide benefits during retirement based on a formula that typically depends on an employee's length of service and average pay, among other factors. To fund promised benefits to retirees, defined benefit plans primarily rely on contributions from employers and employees and on interest and dividend income earned on the financial assets that the plans hold.¹⁵

As part of this comprehensive NIPA update, measures of the claims to benefits accrued through service to employers during a given period (also referred to as "normal cost") and of the benefit entitlements (also referred to as "pension liabilities") for state and local governments will be based on the projected benefit obligation (PBO) method rather than on the accumulated benefit obligation (ABO) method. The PBO method is currently used for federal government defined benefit pension plans, so the change will enhance the comparability of the two measures. Private sector defined benefit plans will continue to be presented on an ABO basis.

The PBO method considers future wage growth, while the ABO method does not.¹⁶ The change, which will affect estimates back to 1929, is necessary because the Government Accounting Standards Board *Statement 67* (GASB 67) introduced many changes in the actuarial information that public pension plans must report and how they must report it. GASB 67 provides the accounting and financial reporting standards underlying the financial statements that are the primary source of actuarial data for BEA's estimates. While some data (such as a breakdown of pension liabilities into active employee portions and beneficiary portions) are no longer available, other data (such as on normal cost) are available for all pension plans for the first time. As a result of these changes, the available data are no longer sufficient for use in the ABO method but will support the PBO method.

Before the implementation of GASB 67, state and local government pension plans typically used the same actuarial methods for funding the plans and for financial reporting purposes. The previous GASB allowed the pension plans to choose from among six PBO alternatives. BEA compiled the data on plan liability and employers' normal cost from the financial statements and actuarial valuation reports for a sample of 120 of the largest state and local government pension plans for 2000 forward, accounting for about 90 percent of the pension plan universe. The data provided a breakdown of the plans' liabilities into active employee liability and beneficiary liability; BEA used actuarial equations for converting the data to standardized ABO estimates and simultaneously converted the reported liabilities and normal costs from the discount rate used by the plans to the

discount rate used in deriving NIPA measures. Finally, the sample data were scaled up to represent the entire population based on the ratio of total membership of all plans, based on Census Bureau data, to membership of the sampled plans.¹⁷

For financial reporting purposes for fiscal years ending after June 15, 2014, GASB 67 requires all pension plans to use the entry age actuarial method, a PBO type method, to calculate pension liabilities and normal costs.¹⁸ GASB 67 also requires the publication of information about the sensitivity of the net pension liability to changes in the discount rate. Specifically, it requires the publication of the net pension liability calculated using a discount rate 1 percentage point higher than the plan's chosen discount rate and calculated using a discount rate 1 percentage point lower. BEA will use these sensitivity data to convert the liability from the plan's discount rate to the NIPA discount rate, which will enhance the accuracy of the discount rate conversion, because the sensitivity data are based on a complete characterization of the plan's provisions and membership.

BEA will estimate the employers' normal cost as the difference between the normal cost and employee contributions (also reported in the financial statements). Because GASB 67 does not require pension plans to report the sensitivity of the normal cost to changes in the discount rate, BEA will continue to use its current method (a set of actuarial equations) to convert from the plan's discount rate to the NIPA discount rate.

Because aggregated actuarial data of individual agent employers are no longer required to be disclosed under GASB 67, BEA will also expand the number of sampled plans to offset some of the resulting decline in coverage of the current sample. For years before 2014, plans are not required to use the entry age actuarial method to calculate pension liabilities and normal costs. For those years, BEA will use actuarial methods to convert the data to standardized PBO estimates.

Effects on the accounts. The new treatment will affect NIPA measures of compensation, the current surplus of government enterprises, and government consumption expenditures and gross investment. Imputed employers' contributions, a component of supplements to wages and salaries, will be reduced. As compensation is treated as a consumption expenditure for general government, the reduction in compensation will be reflected in state and local government consumption expenditures and gross investment. Conversely, the reduction in compensation costs will result in an increase in the current surplus of government enterprises. Additionally, interest payments by state and local governments will be revised up, reflecting the higher imputed interest on plans' claims on employers.

Changes in Definitions

Reclassification of software R&D

The 1999 comprehensive update of the NIPAs recognized purchases of software and the own-account production of software as investment, and the 2003 comprehensive NIPA update expanded this treatment to include the own-account development of software originals used for reproduction.¹⁹

With the introduction of R&D as fixed investment as part of the 2013 comprehensive update of the NIPAs, BEA recognized that the development of own-account software originals is conceptually consistent with its definition of R&D; in fact, such consistency is reflected in the primary source data underlying BEA's R&D estimates. However, because own-account software originals were already included as investment in the NIPA measures of own-account software, they were excluded from the new R&D measures to avoid double-counting their value in the NIPAs.

This treatment introduced an inconsistency between the NIPA measures and the primary source data underlying the estimates of investment in R&D. This inconsistency will be resolved by reclassifying the own-account production of software originals from own-account software to R&D within private fixed investment in intellectual property products.

Currently, the NIPA estimates of investment in own-account software are measured as the sum of the costs associated with its development, including the development of software originals intended for future reproduction. Estimates for investment in R&D are measured using data from the National Science Foundation (NSF) with adjustments to remove R&D expenditures associated with software development. The adjustment is implemented for 1990 forward; before 1990, no adjustment is necessary, because software R&D expenditures were not included in the NSF R&D estimates.

In the new method, the NSF data on R&D expenditures will not be adjusted to exclude expenditures for the development of own-account software originals, and these expenditures will be included in the NIPA measures of investment in R&D.

Effects on the accounts. Estimates of private fixed investment in own-account software will be revised down for 1987 forward to remove the value of investment in software originals, and measures of investment in R&D will be revised up for the same period. For 1987–2001, these revisions will be equal and offsetting, and aggregate measures of private fixed investment will not be affected. For 2002 forward, the revisions will not be equal, because they will also reflect updated assumptions that underlie the measurement of own-account software.

Introduction of capital services into own-account investment

By definition, own-account investment does not reflect a market transaction. The NIPAs currently measure investment in own-account software as the sum of costs associated with its production, including reported charges for the depreciation of fixed assets used in the production process of own-account investment. Own-account investment in R&D is estimated using information from NSF's Business R&D and Innovation Survey.

As part of this comprehensive NIPA update, BEA will improve the accuracy of its measures by incorporating the value of the return to fixed capital into the estimates of private own-account investment in software and in R&D beginning with 2007. The new treatment is consistent with international standards and will provide more complete estimates of the opportunity costs of own-account investment, provide improved measures of the sources of economic growth and productivity, and contribute to the literature on measuring own-account investment and intangible assets.

Currently, BEA measures investment in own-account software as the sum of costs, including reported charges for depreciation of fixed assets used in the production of own-account investment but excluding the value of the return to capital. Estimates are based on data on the compensation of employees and the costs of intermediate inputs used in its production. The compensation measures are based on data on employees from the BLS Occupational Employment Statistics, on NIPA wage data, and on intermediate input costs based on relationships between intermediate inputs and compensation that are derived primarily from the Census Bureau's Economic Census. The estimates for R&D are based primarily on NSF data on the reported expenditures for R&D.²⁰

Under the new treatment, BEA will continue to estimate private own-account investment in software as the sum of the associated costs, but the measure of depreciation will be replaced with a measure of capital services (that is, a measure that reflects both the depreciation and the return to capital). For R&D, NSF reported expenditures for depreciation are replaced with BEA-derived capital services measures. These capital services measures will be based on BLS external rates of return and BEA data on prices, depreciation, and capital stocks to estimate capital services.

Effects on the accounts. The new treatment will result in increases in the value of total private fixed investment and in GDP and a parallel increase in GDI as a result of the associated increases in the NIPA estimates of corporate profits, income of sole proprietors and partnerships, and consumption of fixed capital.

Reclassification of payments made by Federal Reserve banks to the U.S. government

Regional Federal Reserve banks are required to transfer excess operating surplus to the United States Treasury. The NIPAs currently record these transfers as taxes on corporate income. As part of the comprehensive NIPA update, they will be recorded as dividend payments.

Effects on the accounts. The reclassification will be reflected as offsetting revisions to corporate taxes and to dividends; neither national income nor the statistical discrepancy will be affected. The reclassification, which improves the consistency of the NIPAs with international guidelines and the practices of other countries, will be incorporated back to 1929 for annual measures and back to 1947 for quarterly measures.

Reclassification of state payroll taxes from personal taxes to taxes on production and imports

NIPA measures of the “other” category of state and local government personal current taxes are based on Census Bureau data on hunting and fishing licenses and on “taxes not elsewhere classified.” Historically, these Census Bureau series aligned well with the NIPA definition of personal current taxes, and they were consistent with international guidelines. However, the Census Bureau data on “taxes not elsewhere classified” now include the revenue generated by state payroll taxes that were introduced in Nevada in 2007 and in New York in 2010. According to the recommendations in the *System of National Accounts 2008*, payroll taxes are primarily a tax on employers and thus a tax on production rather than on persons or households.

With the comprehensive update, BEA will split the Census Bureau data for “taxes not elsewhere classified” for Nevada and New York from the data for all the other states; the taxes for other states will continue to be included in personal current taxes, but the taxes for Nevada and New York will be recorded partly as “other” state and local taxes on production, a component of taxes on production and imports. This reclassification will bring the NIPA estimates of personal current taxes and taxes on production back into alignment with *SNA* recommendations. It will also improve the accuracy of the by-sector distribution of tax payments.

Effects on the accounts. Personal current taxes will decrease, and taxes on production and imports will increase by equal and offsetting values, so state and local current receipts will not be affected. Similarly, the increase in taxes on production and imports will be offset by an equal decrease in net operating surplus, with no net impact on gross domestic income.

Changes in Presentations

Several changes in presentations will be implemented, including the following:

- New tables will present BEA's not seasonally adjusted estimates. The new tables will be available in "Section 8: Not Seasonally Adjusted Estimates" of the NIPA tables presented in the interactive data application on BEA's Web site.
- A new presentation of the estimates of federal and state and local government investment in structures for 1929–1996 will be consistent with the estimates beginning in 1997.
- Table changes will reflect the reclassification of payments by the Federal Reserve to the U.S. Treasury as dividends rather than as corporate tax payments.
- Table changes will provide additional detail for taxes on production and imports.
- Table changes will clarify the underlying detail provided for personal consumption expenditures.

Detailed changes to the NIPA tables will be presented on BEA's Web site before the July release of the comprehensive update.

Not seasonally adjusted estimates

A new section of NIPA tables will present quarterly NSA current dollar, chained dollar, quantity index, and price index estimates for GDP and its major components; NSA measures of the percent change from the same period 1 year ago for real GDP and its major components; and current dollar NSA estimates for GDI and its major components. The estimates in these tables will be presented at quarterly rates. Tables 2 and 3 present the level of detail that will be featured in the GDP and GDI component tables for 2002 forward. Additionally, with the creation of this new section of tables, the tables already provided by BEA for NSA federal and state and local current receipts and expenditures—that is, NIPA tables 3.22 and 3.23, respectively—will be renumbered as tables 8.3 and 8.4 in the new section 8 of NIPA tables on BEA's interactive data page.

Table 2. GDP Not Seasonally Adjusted Component Detail

Gross domestic product
Personal consumption expenditures
Goods
Durable goods
Nondurable goods
Services
Gross private domestic investment
Fixed investment
Nonresidential
Structures
Equipment
Intellectual property products
Residential
Change in private inventories
Net exports of goods and services
Exports
Goods
Services
Imports
Goods
Services
Government consumption expenditures and gross investment
Federal
National defense
Nondefense
State and local

Table 3. GDI Not Seasonally Adjusted Component Detail

Gross domestic income
Compensation of employees, paid
Wages and salaries
To persons
To the rest of the world
Supplements to wages and salaries
Taxes on production and imports
Less: Subsidies
Net operating surplus
Private enterprises
Net interest and miscellaneous payments, domestic industries
Business current transfer payments (net)
Proprietors' income with inventory valuation and capital consumption adjustments
Rental income of persons with capital consumption adjustment
Corporate profits with inventory valuation and capital consumption adjustments, domestic industries
Taxes on corporate income
Profits after tax with inventory valuation and capital consumption adjustments
Net dividends
Undistributed corporate profits with inventory valuation and capital consumption adjustments
Current surplus of government enterprises
Consumption of fixed capital
Private
Government
Addenda:
Statistical discrepancy

Federal and state and local investment in structures

BEA will present estimates of federal government nondefense and state and local government structures investment using a single classification system beginning in 1929 that will categorize construction projects by their end use (that is, by function) rather than by building type. The end-use classification is consistent with the way government structures are presented currently for 1997 and later. In the currently published estimates, which are shown in the NIPA 5.9 family of tables, the time series is split into two parts: part A presents estimates by type from 1929–1997, and part B presents estimates by function beginning with 1997. In the new presentation, the time series currently shown in the part A series of tables will be restated in the functional presentation, the by-type series of tables will be discontinued, and the “B” designation will be dropped from the table title. Estimates for federal government nondefense structures for years before 1997 will be based on the pattern of the currently published structures estimates and on data from the *Budget of*

the United States Government and related sources. Estimates for state and local government structures for the years before 1997 will be based on historical data from the Census Bureau's Annual Survey of State and Local Government Finances and on the pattern of the currently published estimates for 1929–1958.

Effects on the accounts. This change will not result in revisions to the current-dollar estimates of total federal government and state and local government structures investment. However, because of changes to the weights for the components of the structures investment, small revisions to the pattern of prices and chained dollars are expected. BEA uses the perpetual inventory method to estimate government consumption of fixed capital, which will now be calculated using these revised estimates; therefore, this change will result in small revisions to current-dollar and chained-dollar estimates of consumption of fixed capital for 1929 forward.

Reclassification of payments by Federal Reserve banks

As a result of the reclassification of payments by Federal Reserve banks to the U.S. Treasury as dividend payments rather than as tax payments, changes will be made to NIPA tables, including tables 3.2 and 7.16, to remove lines that reflect tax payments paid by the banks. In NIPA table 3.2, a new line will be added to reflect dividends received by the federal government from the banks.

Improved presentation of taxes on production and imports

BEA will expand its presentation of taxes on production and imports by distinguishing “taxes on products” from “other taxes on production.” Within the estimates for state and local government, the new presentation will distinguish “sales taxes” from “excise taxes” within taxes on products. The new treatment is consistent with the recommendations of the *SNA 2008* and will enhance the comparability of the NIPA measures of taxes on production and imports with BEA's industry measures.

In the *SNA*, taxes on production and imports consist of “taxes on products” and “other taxes on production.” Taxes on products are “taxes on goods and services that become payable as a result of the production, sale, transfer, leasing, or delivery of those goods or services or as a result of their use for own consumption or own capital formation.” Other taxes on production are primarily “taxes on the ownership or use of land, buildings or other assets used in production or on the labour employed, or compensation of employees paid.”²¹ The distinction provides information on the portion of taxes that is dependent on the level of production as compared with taxes that vary only with longer term changes in the ownership or use of fixed assets in production. As excise taxes are levied only on specific goods—often goods such as alcohol, tobacco, or fuel—their distinction from more general sales taxes will enhance analyses of the revenues generated by general, versus targeted, taxation and will align the presentation of state and local taxes more closely with the presentation for federal taxes.

For the state and local sector, underlying detail is not available to distinguish all taxes between “taxes on products” and “other taxes on production” for the entire time series. Beginning with 1988, NIPA “Table 3.5. Taxes on Production and Imports” will distinguish state and local taxes on products from other taxes on production. Before 1988, a new line—taxes on production, n.i.e.—will include those taxes that cannot be separately identified. The distinction between “sales taxes” and “excise taxes” will begin in 1929 for state taxes and in 1959 for local taxes. Table 4 illustrates the changes to presentation of taxes on production and imports.

Table 4. Changes in the Presentation of Taxes on Production and Imports

Line	Existing presentation	Line	New presentation
1	Taxes on production and imports	1	Taxes on production and imports
2	Federal	2	Federal
3	Excise taxes	3	Taxes on products
4	Gasoline	4	Excise taxes
5	Alcoholic beverages	5	Gasoline
6	Tobacco	6	Alcoholic beverages
7	Diesel fuel	7	Tobacco
8	Air transport	8	Diesel fuel
9	Health insurance	9	Air transport
10	Medical devices	10	Health insurance
11	Pharmaceutical	11	Medical devices
12	Crude oil windfall profits tax	12	Pharmaceutical
13	Other	13	Crude oil windfall profits tax
14	Customs duties	14	Other
15	Other	15	Customs duties
16	State and local	16	Other
17	Sales taxes	17	Other taxes on production
18	State	18	State and local
19	General	19	Taxes on products
20	Gasoline	20	Sales taxes
21	Alcoholic beverages	21	State general sales taxes
22	Tobacco	22	Local general sales taxes
23	Public utilities	23	Excise taxes
24	Insurance receipts	24	State
25	Other	25	Gasoline
26	Local	26	Alcoholic beverages
27	General	27	Tobacco
28	Public utilities	28	Public utilities
29	Other	29	Insurance receipts
30	Property taxes	30	Other excise taxes
31	Motor vehicle licenses	31	Local
32	Severance taxes	32	Public utilities
33	Special assessments	33	Other excise taxes
		34	Severance taxes
		35	Local taxes on product, n.i.e.
		36	Other
		37	Other taxes on production
		38	Property taxes
		39	Special assessments
		40	Motor vehicle licenses
		41	License taxes
		42	Other
		43	Taxes on production, n.i.e.

n.i.e. Not included elsewhere

NIPA National income and product accounts

Clarification of series titles in underlying detail tables for PCE

To provide additional insight into the digital economy, BEA will clarify the series names for several underlying detail categories of personal consumption expenditures (table 5).

Table 5. PCE Series Title Changes

Previous series title	New series title
Prerecorded and blank audio discs/tapes/digital files/downloads	Audio discs, tapes, vinyl, and permanent digital downloads
Video cassettes and discs, blank and prerecorded	Video discs, tapes, and permanent digital downloads
Video media rental	Video and audio streaming and rental Video streaming and rental services Audio streaming and rental services
Personal computers and peripheral equipment	Personal computers/tablets and peripheral equipment
Telephone and facsimile equipment	Telephone and related communication equipment
Repair of audio-visual, photographic, and information processing equipment	Repair and rental of audio-visual, photographic, and information processing equipment
Cable and satellite television and radio services	Cable, satellite, and other live television services
Taxicabs	Taxicabs and ride sharing services

PCE Personal consumption expenditures

1. See "[Bureau of Economic Analysis Strategic Plan](#)" on the "About BEA" page of BEA's Web site.
2. See J. Steven Landefeld and Robert P. Parker, "[Preview of the Comprehensive Revision of the National Income and Product Accounts: BEA's New Featured Measures of Output and Prices](#)," *Survey of Current Business* 75 (July 1995): 31–38.
3. Gross output is a measure of what is produced in the domestic economy. It reflects the value of intermediate inputs (energy, materials, and purchased services) and the value added created by an industry's labor and capital. It includes both the value of what is produced and then used by others in the production processes as well as the value of what is produced and sold to final users; as a result, it reflects double-counting and is therefore much higher than GDP.
4. See Brent Moulton and Benjamin D. Cowan, "[Residual Seasonality in GDP and GDI: Findings and Next Steps](#)," *Survey* 96 (July 2016).
5. The X-13 is a software program developed and maintained by the Census Bureau that identifies and removes seasonal effects from a time series; it is the successor to the X-12-ARIMA (X-12) software package. In general, the seasonal factors derived from the X-12 and X-13 moving average adjustment processes are similar; however, the X-13 introduces additional diagnostics for evaluating seasonality in a time series. For more information, see the [Census Bureau Web site](#).
6. See the notice in the April 2, 2018, release of "[Monthly Construction Spending, February 2018](#)" (release number CB18–49) on the Census Bureau's Web site.
7. As part of the upcoming comprehensive update, detailed NIPA series that were previously seasonally adjusted were evaluated for residual seasonality by applying the Census Bureau's X-13 seasonal adjustment program. Because of the large number of series subjected to the statistical tests, simplified criteria were used to standardize and automate the process. Specifically, the following combined criteria were interpreted as evidence of residual seasonality: (1) values of the M7 statistic that are less than 1.0, (2) values of the F-test statistics for stable seasonality from the ARIMA program's table D8 that are greater than 7.0, and (3) QS p-values of less than 0.01. For more details on the diagnostics that were evaluated, see the Census Bureau's [X-13ARIMA-SEATS Web page](#).
8. In the NIPAs, the annual pay raise for federal government employees reflects an increase in the costs of the services provided by government employees. As government output is measured as the sum of the costs associated with producing the output, these federal pay raises impact current-dollar and price measures for federal government consumption expenditures and GDP as well as compensation. Real measures of federal government compensation, consumption expenditures, and GDP are not impacted by the pay raises.
9. For an overview of the benefits and appropriate uses of both NSA estimates and seasonally adjusted estimates, see paragraphs 21 through 25 of the International Monetary Fund's *Quarterly National Accounts Manual*.
10. Source data are adjusted for three primary reasons: to align data with NIPA concepts and definitions, to fill in gaps in data or coverage, and to adjust for the time of recording or valuation methods. For more information, see chapters 3 and 4 of the *NIPA Handbook of Concepts and Methods* on BEA's Web site.
11. See Stephanie H. McCulla, Vijay Khosa, and Kelly Ramey, "[The 2017 Annual Update of the National Income and Product Accounts](#)" *Survey* 97 (August 2017).

12. See Eugene P. Seskin and Shelly Smith, "[Annual Revision of the National Income and Product Accounts](#)" *Survey* 90 (August 2010).
13. For more information, see the [Consumer Price Index factsheet for telephone hardware, calculators, and other consumer information items](#) on the BLS Web site.
14. Kyle K. Hood, "[Measuring the Services of Commercial Banks in the National Income and Products Accounts](#)," *Survey* 93 (February 2013).
15. In addition, many plans hold assets that are expected to yield capital gains, which are treated as changes in the balance sheet rather than as current income in the NIPAs. If capital gains are realized as expected, the resulting increase in the value of the assets will provide additional resources for paying pension benefits.
16. The ABO method counts only benefits that have already been accrued as the pension wealth of the plan's participants, and it excludes the effects of projected future events such as pay raises. The effect of future events on the pension wealth of employees of state and local governments is uncertain because for instance, their required contribution rates may rise and cost-of-living adjustments may be reduced. For a more in-depth discussion of the differences between ABO and PBO actuarial accounting methods, please see Marshall B. Reinsdorf and David G. Lenze, "[Defined Benefit Pensions and Household Income and Wealth](#)," *Survey* 89 (August 2009): 50–62.
17. For years before 2000, BEA's estimates of liabilities and normal costs were extrapolated using a sparser set of data from Census Bureau and other agency surveys.
18. For funding purposes, the pension plans may use an alternative. For years before 2014, BEA will convert the data of the plans that did not use the entry age method to be consistent with the new GASB 67 data.
19. See Brent R. Moulton, Robert P. Parker, and Eugene P. Seskin, "[A Preview of the 1999 Comprehensive Revision of the National Income and Product Accounts: Definitional and Classificational Changes](#)," *Survey* 79 (August 1999) and see Carol E. Moylan and Brooks B. Robinson, "[Preview of the 2003 Comprehensive Revision of the National Income and Product Accounts: Statistical Changes](#)," *Survey* 83 (September 2003).
20. For more information on the estimating methods and source data underlying BEA's measures of research and development, see Marissa J. Crawford, Jennifer Lee, John E. Jankowski, and Francisco A. Moris, "[Measuring R&D in the National Economic Accounting System](#)," *Survey* 94 (November 2014).
21. *System of National Accounts 2008*, [paragraph 7.73,143](#).



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