Results of the 2018 Comprehensive Update of the National Income and Product Accounts
Real GDP average annual growth rates

<table>
<thead>
<tr>
<th>Period</th>
<th>Previously published</th>
<th>Revised</th>
</tr>
</thead>
<tbody>
<tr>
<td>1929-1944</td>
<td>5.1</td>
<td>5.1</td>
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<tr>
<td>1944-1973</td>
<td>3.1</td>
<td>3.1</td>
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<tr>
<td>1973-1990</td>
<td>3.0</td>
<td>3.0</td>
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<tr>
<td>1990-2007</td>
<td>3.0</td>
<td>3.1</td>
</tr>
<tr>
<td>2007-2017</td>
<td>1.4</td>
<td>1.5</td>
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</tbody>
</table>
Real GDI average annual growth rates

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1929-1944</td>
<td>5.1</td>
<td>5.1</td>
</tr>
<tr>
<td>1944-1973</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>1973-1990</td>
<td>2.9</td>
<td>2.9</td>
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<tr>
<td>1990-2007</td>
<td>3.1</td>
<td>3.1</td>
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<tr>
<td>2007-2017</td>
<td>1.4</td>
<td>1.5</td>
</tr>
</tbody>
</table>
Contributions to the revision to real GDP
2007 to 2017

<table>
<thead>
<tr>
<th>Percentage point</th>
<th>GDP</th>
<th>PCE</th>
<th>Investment</th>
<th>Exports</th>
<th>Imports</th>
<th>GOV</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>0.05</td>
<td>-0.02</td>
<td>0.12</td>
<td>0.01</td>
<td>0.01</td>
<td>-0.08</td>
</tr>
</tbody>
</table>

The chart shows the contributions of GDP, PCE, Investment, Exports, Imports, and GOV to the revision of real GDP from 2007 to 2017.
Revisions to recent contractions and expansions

[Average annual rates of change]

Previously published | Revised
---|---
1990 Q3 to 1991 Q1 | -2.6 -2.7
1991 Q1 to 2001 Q1 | 3.6 3.6
2001 Q1 to 2001 Q4 | 0.7 0.6
2001 Q4 to 2007 Q4 | 2.8 2.9
2007 Q4 to 2009 Q2 | -2.8 -2.7
2009 Q2 to 2017 Q4 | 2.2 2.2
New and revised source data

### Census Bureau
- Capital Expenditures Survey *annual*
- Retail Trade Survey *annual*
- Survey of Manufacturers *annual*
- Surveys of State and Local Government Finances *annual*
- Wholesale Trade Survey *annual*
- Construction Spending (Value Put in Place)
- Services Survey *annual, quarterly*

### BLS
- Quarterly Census of Employment and Wages
- Survey of Occupational Employment

### BEA
- Benchmark Input-Output Accounts
- International Transactions Accounts

### Additional Agencies | Data
---|---
Office of Management and Budget | Federal budget
IRS | Tax returns for corporations, sole proprietorships, and partnerships
Department of Agriculture | Farm statistics
Major statistical changes

• Incorporated benchmark input-output accounts for 2012
• Improved seasonal adjustment
• Improved measures of private fixed investment
  • New price indexes for tech (ICT) investment
  • Improved current dollar measurement of cloud computing
• Harmonized the treatment of government pension plans
• Improved measures of implicit output of savings institutions and credit unions
  • Consistent methodology used for commercial bank implicit output
Major definitional changes

- Reclassified R&D for software originals from own-account software to R&D
- Recognize capital services in own-account investment in software and R&D
- Reclassified payments made by the Federal Reserve Banks to the U.S. Government as dividend payments
Improved seasonal adjustment

• Phase One: July 2015
  – BEA began seasonally adjusting several series of data that previously hadn’t been seasonally adjusted

• Phase Two: July 2016
  – Completed review of component estimates that feed into quarterly estimates of GDP and GDI to see if there was residual seasonality and to identify causes

• Phase Three: July 2018
  – Apply seasonal adjustment improvements to the historical time series
  – Publish not seasonally adjusted estimates for quarterly GDP, GDI, and their major components
Improved seasonal adjustment

• Updated quarterly estimates reflect:
  – Improvements to PCE services, inventory investment, and government spending originally introduced in 2015; See Table 1, *Survey of Current Business* (April)
  – Seasonal adjustment of PCE services components derived from Quarterly Services Report data, mostly replacing moving averages
  – Updated BEA-derived seasonal factors as well as new and revised seasonally-adjusted source data
Improved seasonal adjustment

• Converted to Census Bureau’s X13 ARIMA-SEATS program

• Benefited from closer collaboration with partners, especially the Census Bureau

• Future annual GDP updates will cover at least five years

• An article in the planned August *Survey of Current Business* will describe BEA’s latest research on residual seasonality in GDP and GDI. It will update the July 2016 article by Brent Moulton and Benjamin Cowan
Average of real growth rates of GDP by quarter, 2002 to 2017

Previously published | Revised
--- | ---
Q1 | 1.2 | 1.6
Q2 | 2.4 | 2.4
Q3 | 2.4 | 2.2
Q4 | 1.9 | 1.9
Average quarterly growth in real GDP, 2012 to 2017

Previously published | Revised
---|---
Q1 | 1.6 | 2.1
Q2 | 2.6 | 2.7
Q3 | 2.7 | 2.4
Q4 | 1.9 | 1.7
Not seasonally adjusted estimates

• New tool for evaluating the U.S. economy’s performance

• Helps to identify and analyze changes in seasonal trends

• Prepared in concert with the seasonally-adjusted estimates
  – In most cases, source data are available without seasonal adjustment
  – Released with each monthly report of quarterly GDP estimates
  – Found in new “Section 8” NIPA tables in interactive database

• Seasonally-adjusted estimates continue to reflect an indirect (bottom up) approach to seasonal adjustment
  – The not seasonally adjusted estimates allow for comparison of the two adjustment approaches (direct and indirect)
Improved measures of IT investment

• Identified additional computer hardware and packaged software investment, as part of the 2012 benchmarking process
  – Software investment recorded as receipts for “application services provisioning”

• Reallocated selected imports to final demand
  – Impacted servers and storage devices

• Modified allocations of domestic supply
  – From intermediate to fixed investment
Improved prices for tech products

• Software: prepackaged, custom, and own-account
  – More appropriate PPI
  – Productivity adjustment to input-cost based indexes

• Medical equipment
  – New quality adjusted price index for electromedical equipment

• Communications equipment
  – New and revised quality adjusted prices (including cell phones) from the Federal Reserve Board
Private fixed investment in equipment

- Current dollars, published
- Current dollars, revised
- Chained dollars, published
- Chained dollars, revised
- Price index, published
- Price index, revised

2012 = 100

Billions of dollars

Price Index

- 2002
- 2004
- 2006
- 2008
- 2010
- 2012
- 2014
- 2016

2012 = 100

94
97
100
103
106
109
112

600
700
800
900
1000
1100
1200
Gross Domestic Product
Revisions to GDP, 2012

Billions of dollars

GDP  PCE  Investment  Exports  Imports  GOV

110.1
41.8
-43.8
-6.9
-4
-21.6
Real gross domestic product
[Percent change from preceding period, SAAR]

Previously published
Revised

Percent

2012 Q1 2013 Q1 2014 Q1 2015 Q1 2016 Q1 2017 Q1
Real GDP growth was revised from 1.7 to 1.8 percent

<table>
<thead>
<tr>
<th>Component</th>
<th>2013</th>
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<th></th>
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<tbody>
<tr>
<td>GDP</td>
<td>0.10</td>
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<td></td>
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<tr>
<td>PCE</td>
<td>0.01</td>
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<tr>
<td>Investment</td>
<td>0.16</td>
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<td></td>
<td></td>
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<tr>
<td>Exports</td>
<td>-0.01</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Imports</td>
<td>0.09</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>GOV</td>
<td>-0.08</td>
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</table>
Real GDP growth was revised from 2.6 to 2.5 percent
2015: Contributions to revision to GDP growth

Real GDP growth was unrevised at 2.9 percent

<table>
<thead>
<tr>
<th>Percentage point</th>
<th>GDP</th>
<th>PCE</th>
<th>Investment</th>
<th>Exports</th>
<th>Imports</th>
<th>GOV</th>
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<tbody>
<tr>
<td>0.0</td>
<td>0.03</td>
<td>0.03</td>
<td>-0.04</td>
<td>-0.07</td>
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2015
2016: Contributions to revision to GDP growth

Real GDP growth was revised from 1.5 to 1.6 percent

- GDP
- PCE
- Investment
- Exports
- Imports
- GOV

2016

Percentage point

0.2
0.1
0.0
-0.1

0.1
0.01
0.04
0.03
0.12
-0.09

-0.01
Real GDP growth was revised from 2.3 to 2.2 percent
Real GDP growth was revised from 2.7 to 3.2 percent [SAAR]
Real GDP growth was revised from 2.8 to 3.6 percent [SAAR]

2013 Q1: Contributions to revision to GDP growth
Real GDP growth was revised from 4.6 to 5.1 percent [SAAR]
2016 Q1: Contributions to revision to GDP growth

Real GDP growth was revised from 0.6 to 1.5 percent [SAAR]

- **GDP**
- **PCE**
- **Investment**
- **Exports**
- **Imports**
- **GOV**

Percentage point

<table>
<thead>
<tr>
<th></th>
<th>2016 Q1</th>
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<tbody>
<tr>
<td>GDP</td>
<td>0.9</td>
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<tr>
<td>PCE</td>
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<tr>
<td>Investment</td>
<td>0.37</td>
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<tr>
<td>Exports</td>
<td>0.02</td>
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<tr>
<td>Imports</td>
<td>-0.10</td>
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<tr>
<td>GOV</td>
<td>0.28</td>
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</table>
Real GDP growth was revised from 2.9 to 2.3 percent [SAAR]

2017 Q4: Contributions to revision to GDP growth
Price Indexes
Gross domestic purchases price index
[Percent change from preceding period, SAAR]

Previously published
Revised

Percent

2012 Q1 2013 Q1 2014 Q1 2015 Q1 2016 Q1 2017 Q1
Personal consumption expenditures price index, excluding food and energy

[Percent change from preceding period, SAAR]
Gross Domestic Income
National income revision in level

<table>
<thead>
<tr>
<th>Year</th>
<th>National income</th>
<th>Compensation</th>
<th>Proprietors' income</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>0</td>
<td>49.9</td>
<td>32.8</td>
</tr>
<tr>
<td>2013</td>
<td>43.4</td>
<td>49.9</td>
<td>43.4</td>
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<tr>
<td>2014</td>
<td>101.4</td>
<td>49.9</td>
<td>6.9</td>
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<td>2015</td>
<td>-80</td>
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<td>6.9</td>
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<tr>
<td>2016</td>
<td>-120</td>
<td>-120</td>
<td>6.9</td>
</tr>
<tr>
<td>2017</td>
<td>146.2</td>
<td>49.9</td>
<td>146.2</td>
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</tbody>
</table>
Compensation of employees

[Billions of dollars, SAAR]
### Personal income and outlays, 2012 Q4 to 2017 Q4 [Average annual growth]

<table>
<thead>
<tr>
<th>Component</th>
<th>Previously published</th>
<th>Revised</th>
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<tbody>
<tr>
<td>Personal income</td>
<td>3.1</td>
<td>3.5</td>
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<tr>
<td>Disposable personal income</td>
<td>2.7</td>
<td>3.2</td>
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<tr>
<td>Personal outlays</td>
<td>4.1</td>
<td>4.1</td>
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<tr>
<td>Real DPI</td>
<td>1.5</td>
<td>2.0</td>
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<tr>
<td>Personal saving rate*</td>
<td>5.0</td>
<td>7.0</td>
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<tr>
<td>Average over 2013 Q1 to 2017 Q4</td>
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Personal saving rate

[Personal saving as a percentage of disposable personal income]