The National Economic Accounts

National Association for Business Economics
Economic Statistics...from Theory to Practice

"The National Income and Product Accounts"

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What are the NIPAs?

- The National Income and Product Accounts (NIPAs) are a set of economic accounts that track economic flows within the U.S. economy. Two key NIPA measures are:

    - Gross domestic product (GDP): Measures the total value of goods and services produced within the U.S. in a period.

    - Gross domestic income (GDI): Measures the incomes earned and the costs incurred in that production.

2

The NIPAs are designed to provide a consistent and comprehensive picture of the Nation's economy. The estimates are summarized in seven accounts, the most important of which is account 1, the domestic income and product account, which features gross domestic product (GDP), gross domestic income (GDI), and the balancing item, the statistical discrepancy.

-GDP measures the total value of goods and services produced within the United States within a period.

-GDI is the income-side analogue to GDP. It measures the incomes earned and costs incurred in production.

Brought together, the estimates represent a consolidated double-entry bookkeeping system where the value of production equals the incomes earned from that production.

The NIPAs in an historical context

- In 1932, under the direction of Simon Kuznets, the National Bureau of Economic Research and the Department of Commerce produced estimates of National Income at the beginning of the Great Depression.

- In early 1942, the Department of Commerce published the first estimates of the nation's production in an effort to determine production capacity to prepare for World War II.

  Double entry accounting is introduced.

3

Although there were some efforts to construct U.S. national income accounts in the 19th Century and earlier, the first major effort to prepare such accounts occurred in the early 1930's. In 1932, under the direction of Simon Kuznets, the National Bureau of Economic Research and the Department of Commerce produced estimates of National Income at the beginning of the Great Depression. These accounts, and those that followed, enabled policy-makers to maneuver the nation out of the Great Depression.

Another key milestone for the NIPAs was achieved in the early 1940's. In early 1942, the Department of Commerce published the first estimates of the nation's production in an effort to determine production capacity to prepare for World War II. At this time, double entry accounting was introduced.

NIPA seven-account summary

- Domestic Income and Product Account
- Private Enterprise Income Account
- Personal Income and Outlay Account
- Government Receipts and Expenditures Account
- Foreign Transactions Current Account
- Domestic Capital Account
- Foreign Transactions Capital Account

4

BEA summarizes the NIPAs in 7 accounts.

•1 Domestic Income and Product Account--which features the components of GDP and GDI.

•2 Private Enterprise Income Account--which presents the sources and uses of private enterprises' income, including corporate profits, the summary measure of earnings for corporations, and proprietors' income.

•3 Personal Income and Outlay Account--which shows the components of personal income and outlays, the difference between the two being personal saving.

•4 Government Receipts and Expenditures Account--similarly, showing total government receipts and total government expenditures, and the residual net government saving.

•5 Foreign Transactions Current Account—which present imports, exports, income receipts and payments and the current account balance.

•6 Domestic Capital Account—which shows the saving generated by the economy, and the uses of that saving in the form of investment; the difference between the two being net lending/borrowing.

•7 Foreign Transactions Capital Account—which presents the transactions that balance the foreign transactions for our economy.
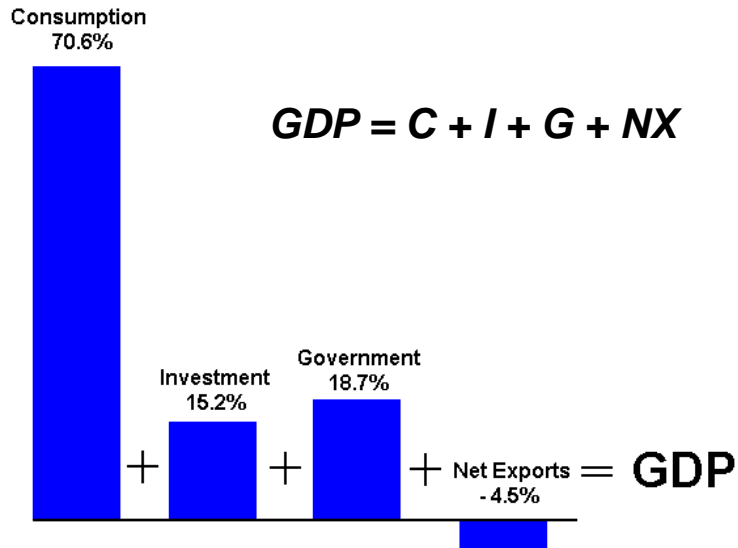
The Domestic Income and Product Account

Compensation of employees, paid	Personal consumption expenditures
Taxes on production and imports	Gross private domestic investment
Less: Subsidies	Net exports of goods and services
Net operating surplus	Government consumption expenditures and gross investment
Consumption of fixed capital	
Gross domestic income	
Statistical discrepancy	
Gross Domestic Product	**Gross Domestic Product**

5

Account 1 in more detail.

Presents GDP on the right-hand side and GDI on the left hand side. Theoretically, GDP and GDI should be the same. However, in practice the two measures differ because GDP and GDI are measured using different methods and different data sources. The balancing item for this account is the statistical discrepancy, which simply measures the difference between GDP and GDI.

Expenditure components of GDP (2003)

Consumption
70.6%

$$GDP = C + I + G + NX$$

Government
18.7%

Investment
15.2%

$+$ $+$ $+$ Net Exports $=$ **GDP**
- 4.5%

6

The classic expression for calculating GDP is to add up its major components: Personal consumption expenditures, which accounts for about two-thirds of GDP, and consists of durable goods, nondurable goods and services; gross private domestic investment, which consists of nonresidential and residential structures, private equipment and software, and change in private farm and nonfarm inventories; government (Federal and state and local) consumption expenditures and gross investment (structures and equipment and software); and net exports (exports minus imports).
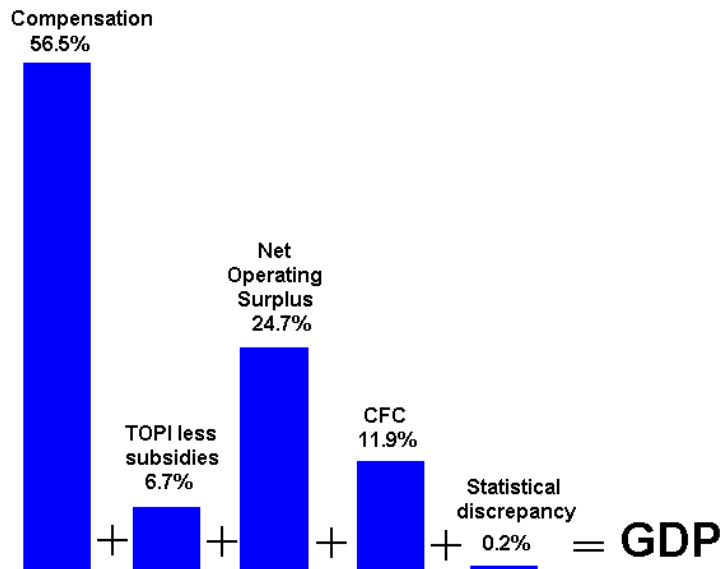
A formulaic presentation of GDI on the other hand is the sum of the following income-side components: Compensation, which includes private and public wages and salaries and supplements to wages and salaries; taxes on production and imports (that includes sales taxes, property taxes, and custom duties) less subsidies to business; the net operating surplus of business, including corporate profits, the net earnings of unincorporated business, and the surpluses of government enterprises; and the value or cost of consumption of fixed capital (CFC), which represents the value of capital services used in production. The difference between the sum of these income-side components and GDP is the statistical discrepancy.

how do you obtain access to the estimates just discussed?
 "free" on BEA's Web site www.bea.gov

Once you reach this web page, click on National

Accessing NIPA tables on the Web

http://www.bea.gov/bea/dn1.htm

From the National Economic Accounts page,

Click on interactive NIPA tables.

The salmon box will take you to the interactive tables page,

Where you click on the "List of All NIPA Tables".

NIPA tables web page

http://www.bea.gov/bea/dn/nipaweb/SelectTable.asp?Selected=N

10

And arrive at a comprehensive catalogue of all NIPA tables separated into 8 sections:

Section 1 features summary product and income tables, such as the GDP Component (C+I+G+NX) table and the National Income by Type of Income table.

Section 2 features personal income and outlays estimates; for example, there is a table on personal income and there are summary and detailed tables on personal consumption expenditures. Section 2 also includes monthly estimates of personal income and outlays.

Section 3 features government transactions; including summary tables on total, Federal, and state and local government receipts and expenditures and consumption expenditures and gross investment by type and by function, plus detailed tables on taxes, social benefits, social insurance funds, etc.

Section 4 features foreign transactions; that is, summary and detailed tables on exports and imports of goods and services and receipts and payments of income.

Section 5 covers private- and public-sector investment; including net and gross investment in structures, in equipment and software, and in inventories.

Section 6 features estimates of income by type and by industry. Beginning with 1998, annual estimates are on the North American Industry Classification System (NAICS) basis; (for example, wages and salaries and corporate profits).

Section 7 features special supplemental tables; including tables on motor vehicle output, on farm output, and on housing output.

Section 8 features NIPA estimates on a not seasonally adjusted basis.

In all, BEA publishes 359 NIPA tables.

Each of these tables are available for downloading into an excel spreadsheet, or other electronic formats. Additionally, the website includes a graphing function that allows you to view the overall trend in a series.

Numbering system for NIPA table families

X.Y.1	Percent change from preceding period in real estimates
X.Y.2	Contributions to percent change in real estimates
X.Y.3	Real estimates, quantity indexes
X.Y.4	Price indexes
X.Y.5	Current dollars
X.Y.6	Real estimates, chained dollars
X.Y.7	Percent change in prices
X.Y.8	Contributions to percent change in prices
X.Y.9	Implicit price deflators
X.Y.10	Percentage shares of GDP (table 1.1.10)

11

BEA now presents estimates as families of tables instead of having tables reflecting various types of estimates for the same series in many different sections.

Looking at the slide, you can see how this numbering system works.

X represents the NIPA table section (1 through 8).

Y represents the table number.

And the last digit (1 through 10) represents the type of estimate presented; for example, 1 for real percent change, 2 for contributions to real percent change, 3 for quantity indexes, etc.

We use the first two digits of a table (X.Y) to refer to the NIPA table family.

Later, we'll have practical examples of how this new numbering system works.

NIPA income estimates, which are presented in nominal terms do not have the three digit numbering.

Real GDP, 1960 - 2003
(percent change from preceding period)
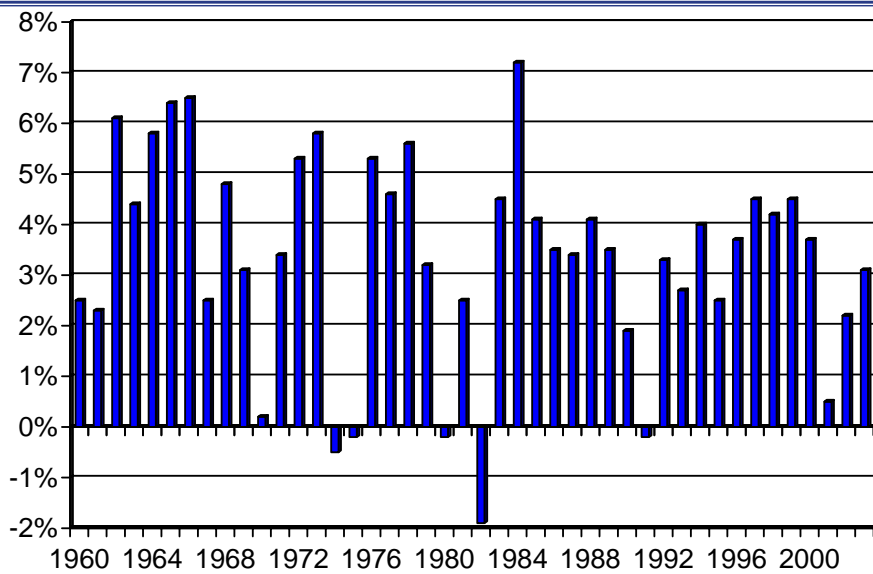
This graph presents the annual percent change from the preceding period in real GDP for 1960 to 2003.

Real GDP is our most heavily watched and reported statistic, the estimate is reported at a quarterly frequency, seasonally adjusted at annual rates.
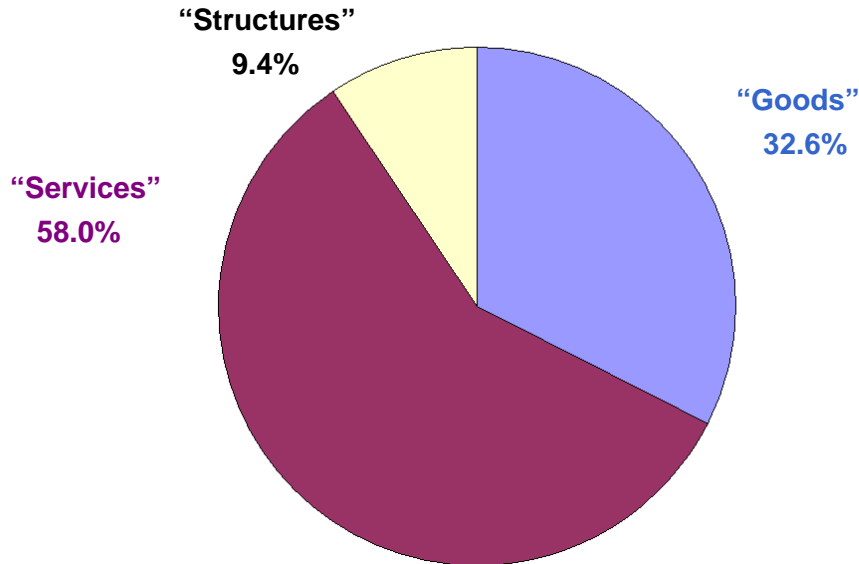
For 2003,

Services (including PCE services, net exports of services, and the services provided by government) accounted for roughly 58 percent of total production

Goods (including PCE durable and nondurable goods, private equipment and software goods, net exports of goods, and the goods produced by government) accounted for about 33 percent

And Structures (private and public nonresidential and residential structures) accounted for about 9 percent of production.

GDP by Sector, 2003

State and local governments 8.0%

Federal Government 3.4%

Households and institutions 11.5%

Business 77.1%
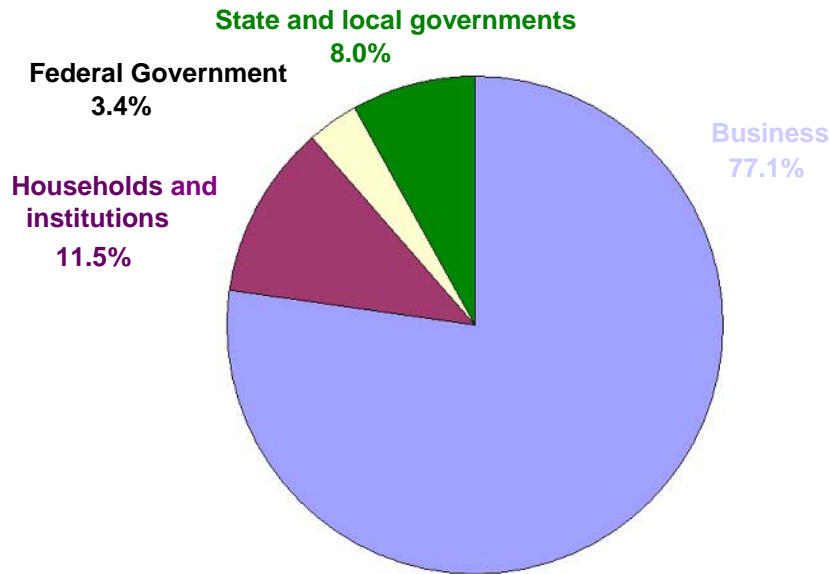
The shares of GDP, or gross value added, by sector. Value added measures the contribution to final output by the producers of that output. It includes the compensation paid to employees producing the output, the net operating surplus generated from selling the output (that is the profit or net income), the taxes paid by the producer to government less the subsidies provided to the producer by government, and the economic depreciation, or consumption of fixed capital, incurred by the producer.

Value added can be measured as the difference between a producer's gross output (that is total sales plus the value of production for own use), less the total value of intermediate goods and services consumed in that production.

In 2003, BEA estimated that

Business accounted for about 77 percent of total value added

Households and nonprofit institutions serving households accounted for 12 percent

State and local governments accounted for 8 percent

And the Federal Government accounted for 3 percent of gross value added.

What are the featured measures of GDP?

- Real GDP growth, as indicated by the percent change in the chain-type quantity index.

- Contributions to real GDP growth reflect the role that individual components of GDP play in producing the growth in GDP.

- GDP chain-type price indexes, from which an "inflation" measure can be computed, reflect price trends for GDP and its components.

15

The featured measure of GDP is "Real GDP Growth." This measure is based on a chain-type quantity index that is produced by BEA when aggregating the components of GDP. The quantity index is based on a Fisher Ideal index formula, which helps ensure against bias in this measure of growth. Quantity indexes from which to calculate real growth rates are found in NIPA tables ending in 3. However, for most of our series, BEA publishes these growth rates for you - in our tables that end in 1.

To determine how specific GDP components contribute to the overall growth rate in real GDP. Tables reflecting contributions to growth--overall and to components of GDP—end in the number 2.

CPIs and PPI are important measures of price change, and BEA uses these measures to derive our inflation-adjusted estimates- our featured price measure is "gross domestic purchases." The price index for gross domestic purchases is a measure of the growth in prices faced by consumers, businesses, and governments that are located in the U.S. That is, gross domestic purchases equals GDP less net exports. Of course, BEA also produces a price index for gross domestic product. The gross domestic product and gross domestic purchases prices indexes differ because the latter excludes the effects prices for imported and exported goods and services. You will find the price indexes, percent change in the indexes, and contribution of components to the percent change in prices for gross domestic purchases in NIPA table family 1.6 and for prices for gross domestic product in NIPA table family 1.1.

Other important GDP-related measures

- Current-dollar GDP represents the value of production at a point in time.

- GDP percentage shares provide a measure of the size and importance of a component.

- Chained-dollar GDP is calculated as reference period values that are scaled to quantity indexes. They do not sum to related aggregates.

16

If we were not concerned with comparing GDP for different time periods, current-dollar GDP, or GDP at current market prices, would be perfectly appropriate. However, as you know, you would not want to use current-dollar GDP to compare the level of output over two or more time periods.

We talked about using contributions to assess the role of individual GDP components in overall real GDP growth. However, if you are simply interested in an individual GDP component as a proportion of the level of total GDP, GDP share is a useful measure. GDP shares are calculated using current-dollar estimates. GDP shares are found in NIPA table 1.1.10. And component percentage shares of GDI are found in NIPA table 1.11.

BEA also publishes estimates of real GDP in "chained dollars." Chained-dollar estimates, currently shown only for periods after 1990 for most NIPA tables, are prepared by scaling the nominal or current-dollar values in the reference period (currently set to the year 2000) using the chain-type quantity index. Chained-dollar estimates are found in NIPA tables ending in 6. There has been a tendency on the part of some BEA users to use chained-dollars to measure the relative importance or contributions to growth. BEA strongly advises against doing this. Why? Because chained-dollar estimates are not additive, and the non-additivity is due to the fact that weights for adjacent periods, not one period, are used to calculate chain-type quantity indexes and, therefore, chained-dollars. This non-additiivity confounds the process of calculating shares in chained dollars.

If you were to use the chained dollar-estimate to calculate a share of a component that exhibits rapid price change relative to other prices in the economy such as computers, your estimate would be overstated. For example, if you were to calculate the share of computers and peripheral equipment in GDP for 2003 using current dollars you will find that the share is .9 percent. However, if you were to calculate the share using chained-dollars, you obtain a share value of about 1.5 percent. Clearly, the share calculated from chained dollars overstates the importance of computers for 2003.

The key points to remember are that quantity indexes, or chained dollars, can be used to calculate growth, current-dollar estimates should be used to calculate shares, and if you need contributions to growth for a particular series, use the estimates from our contributions tables—tables ending in 2.

How often are GDP estimates updated?

- "Advance" estimates are released $3\frac{1}{2}$ weeks after a calendar quarter concludes
- "Preliminary" and "final" estimates are released 30 and 60 days later, respectively
- "Annual revisions" are released in July of non-comprehensive revision years
- "Comprehensive revisions" occur about every 4-5 years

17

BEA publishes estimates of GDP on a well-defined schedule. About 3 1/2 weeks after the conclusion of a quarter, BEA releases an "advance" estimate of GDP. This estimate is labeled "advance" because a significant amount of source data, especially for the third month of the quarter in question, are not available and must be estimated by BEA; these BEA assumptions are made available on our Web site.

About 30 and 60 days later, BEA releases "preliminary" and "final" estimates, respectively, of GDP. In the preliminary and final estimates, BEA is normally able to replace its assumptions with newly available source data.

To give you and idea of how these revisions could influence the GDP story, based on statistics for the period 1978 to 2002, the average absolute value of the revision in the percent change of real GDP from advance to preliminary estimate is 0.5 percentage point, and 0.3 percentage point from the preliminary to the final estimate.

In July of non-comprehensive revision years, BEA publishes revised estimates for the most recent 3 years. We "open up" the most recent 3 years to revision because, generally speaking, the longest-lagging regular source data are then normally available. In these annual revisions, BEA incorporates newly available and revised source data and other statistical changes in methodologies and procedures.

As you know, every 4 to 5 years, BEA conducts comprehensive revisions. The timing of a comprehensive revision generally follows the publication of the Economic Censuses and the release of BEA's Benchmark input-output (I-O) accounts.

During a comprehensive revision, the entire NIPA time series (1929 to the present) is open to revision, and important definitional, statistical, and presentational changes are incorporated. Definitional changes reshape the concepts underlying the NIPAs and fundamentally alter how the NIPAs are constructed. Statistical changes generally reflect incorporating new or revised source data. Finally, presentational changes alter how the estimates are presented in the NIPA tables.

It is important for you to realize that the source data and methods used to prepare NIPA data differ depending on the vintage of the estimates being produced. This is because source data become available on varying schedules, and the methods used to prepare estimates using available source data must take into account the source data being used.

How are GDP estimates used?

- Policymaking
- Academic research
- Business decisions

NIPA estimates, especially GDP, are used primarily for three purposes:

Policy making: Policymakers, including Federal Reserve Board (FED), the Council of Economic Advisers (CEA), the Congressional Budget Office (CBO), the Office of Management and Budget (OMB), state, and local governments use these data in a variety of ways. For example, the FED uses the data to manage the economy through monetary policy; OMB and CBO use the data to assist the President and Congress to manage the economy using fiscal policy.

Academic research: Academicians use NIPA data to seek answers to an unending stream of questions about the economy. Being recent graduates yourselves, you are aware that it is quite common place to see references to GDP in scholarly journals in many fields: From economics to political science to business, and so on.

Business decisions: Businesses use GDP in macroeconomic models primarily to forecast economic activity. These forecasts help businesses plan production, hiring, and investment for their companies. Notably, state and local governments use GDP data much like businesses; they use forecasts of GDP to predict revenue flows and to anticipate demand for services.

Where Do GDP Data Come From?

- Census Bureau manufacturers' shipments, inventories, and orders (M3) survey
- Census retail sales
- Bureau of Labor Statistics (BLS) wages and salaries
- BEA/Census international transactions accounts
- *Federal Budget & Monthly Treasury Statement*
- Census *Survey of Government Finances*

19

Data used in the construction of the NIPAs come from numerous business and administrative surveys, a few of which are listed here.

Census retail sales (used to estimate PCE for goods)

Census M3 Shipments (used to estimate private investment)

International transactions accounts (used to estimate net exports)

The Federal Budget and the Monthly Treasury Statement (used to estimate Federal government receipts and expenditures)

Census Surveys of Government Finances (used to estimate state and local government receipts and expenditures)

BLS Employment (used to estimate wages)

However, these data do not always align themselves with the concepts BEA measures. As a result, BEA makes adjustments to these data to bring them into alignment with the economic accounting concepts that underlie the NIPAs.

How does GDP relate to other economic measures?

- Federal Reserve Board Industrial Production

- BLS Consumer Price Index (CPI)

- BLS Producer Price Index (PPI)

20

One measure that has recently been compared to GDP measures is the Industrial Production Index (IPI), which is produced by the FED. The IPI is a monthly series that measures output in manufacturing, mining, and electric and gas utilities. Individual indexes of industrial production are constructed from two types of source data: (1) output measured in physical units and (2) inputs used in the production process (e.g., production-worker hours). GDP is a quarterly series that measures the market value of the goods and services produced by labor and property located in the United States. The aggregate GDP measure that corresponds most closely to the IPI is GDP goods - a measure that consists of durable and nondurable goods within personal consumption expenditures, fixed investment, change in private inventories, and net exports. The GDP values production in terms of *purchasers'* prices–the "final" prices paid by consumers and by other final-demand sectors. The IPI values production in terms of *producers'* prices paid to manufacturers by wholesalers, by retailers, and in the case of direct sales, by consumers.

What about differences between BEA's personal consumption expenditure deflator and the Consumer Price Index, which is prepared by the Bureau of Labor Statistics?

BEA and BLS have in the past conducted a joint study to examine the reasons for the difference. The items include:

coverage – the CPI covers out of pocket expenditures by households, whereas the PCE deflator is a broader concept that includes consumption by persons that is not "out-of-pocket."

Index construction-- CPI is fixed weighted and PCE deflator is Fisher chain index

and weights – CPI weights are dervied from a Household survey and the PCE weights are derived from final sales to consumers as measured by business surveys.

Finally, BEA has no direct analog to BLS' Producer Price Index. PPIs are prices received by producers for goods. PPIs for services are available, however these indexes are not included in the featured PPI measure. If you were comparing the featured PPI to the price index for GDP goods, you would want to consider in your analysis that the PPI measures prices paid for goods at their point of production, the largest being manufacturing, however, the GDP goods deflator is a final expenditure measure that excludes intermediate goods and services. As with the CPI, the PPI is also a fixed-weighted index, the GDP goods deflator is chain-weighted.

How do these data tell you about economic conditions?

- GDP provides information concerning consumer behavior, business investment decisions, government activities, and the international movement of goods and services.

- When used in conjunction with other economic statistics, such as the Federal Reserve Board's Flow-of-Funds statistics and BEA's input-output (I-O) accounts, one can develop comprehensive and detailed measures of the nation's economic activity.

21

Because GDP is estimated by major component, one can obtain information about consumer behavior (personal consumption expenditures), about business investment decisions (gross private domestic investment), about government spending (government consumption expenditures and gross investment), and about the movement of international goods and services (net exports) by analyzing the NIPAs.

Similarly, when one uses the NIPAs in conjunction with the Federal Reserve Board's Flow-of-Funds Accounts, which capture financial flows for the various sectors of the economy, to prepare balance sheets for the economy, one is able to obtain a comprehensive perspective of developments within the economy.

Also, the NIPAs, in conjunction with BEA's input-output (I-O) accounts, permit one to track the flow of goods and services that are produced from and to the various industries that produce and consume that production. In this way, one can glean very detailed information from NIPA and I-O statistics.
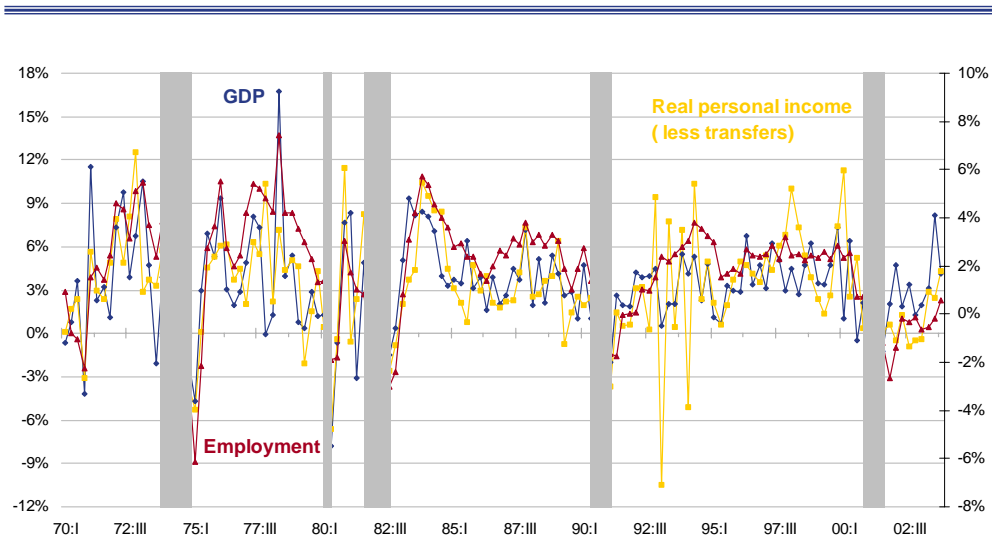
GDP growth is one of the BEA-produced measures that NBER uses to date economic recessions.

Another BEA produced measure that NBER uses is personal income.

The graph here shows these BEA-produced measures along with employment measures produced by the BLS-- three of the many measures the National Bureau of Economic Research uses when dating the economy's business cycles, although I should note that recently NBER began using Macroeconomic Advisors monthly GDP to track the business cycle.
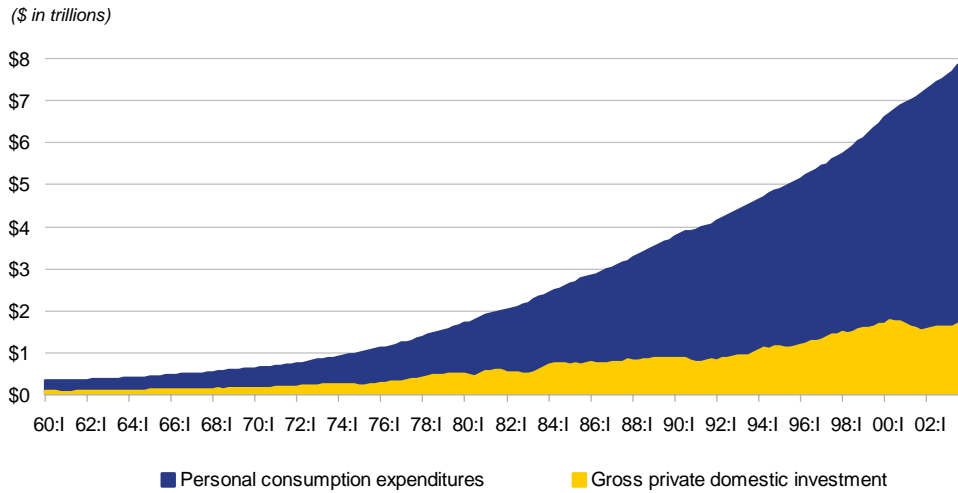
As you know, personal consumption expenditures accounts for roughly 2/3 of the level of GDP. However, gross private domestic investment, which includes the change in private inventories, tends to account for more of the volatility of GDP growth. This chart makes this point by showing the very smooth growth trajectory of PCE, and the volatile nature of gross private domestic investment

Optimizing use of the NIPAs

- Detailed estimates of output and price change by type, by products and services, and by sector

- Related estimates of income

- Estimates by industry

- Estimates for selected commodities

24

You can find estimates of GDP by type: Consumption, investment, exports, imports, and government consumption expenditures and gross investment. Users can find estimates by products and by services: Motor vehicles, computers, food, clothes and shoes, single-family homes, aircraft, financial services, health care services, travel and leisure services, and entertainment. Also, users can access data by economic sectors: Households, businesses, the public sector, and the rest-of-the-world sector.

Another great feature of the NIPAs is that one can obtain high quality estimates of economic activity for selected commodities: Motor vehicle output, inventories and inventories-to-sales ratios, and the output of various types of government services, such as defense, health, and educational services.

So far, we have mainly mentioned the product or expenditure side of the NIPAs. There is also an income side to the NIPAs. The featured income measures are gross domestic income, national income, and personal income. In fact and as mentioned earlier, BEA produces a monthly news release on personal income and outlays, which serves as an important statistical indicator.

Later, as part of this seminar, you will hear about the GDP by industry estimates that are produced at BEA within the industry economics division. However, the NIPAs embody their own industry estimates. NIPA industry estimates are prepared mainly using income-side data; there are industry estimates of national income, wages and salaries, corporate profits, etc.
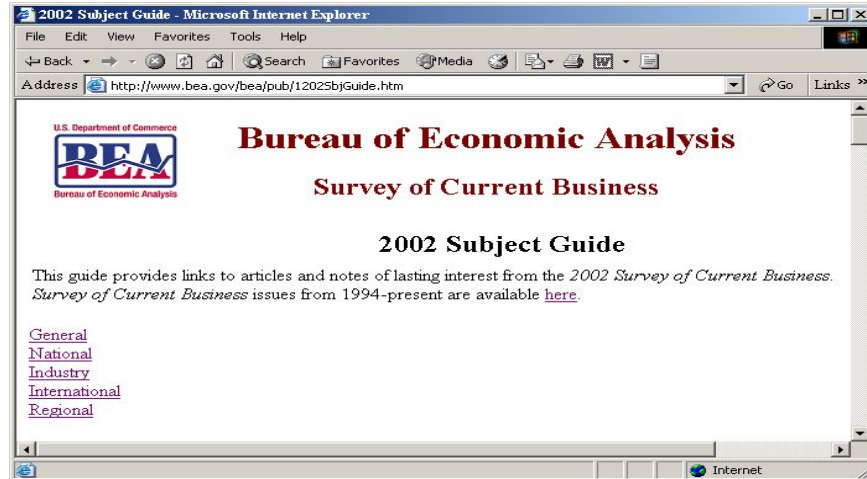
Optimizing use of the NIPAs

- BEA's Web site: www.BEA.gov
- BEA's *Survey of Current Business*
- BEA's Methodology Papers
- Business magazines and journals
- The press
- BEA staff

25

To become very familiar with NIPA and GDP data, we highly recommend that you become familiar with BEA's Web site.
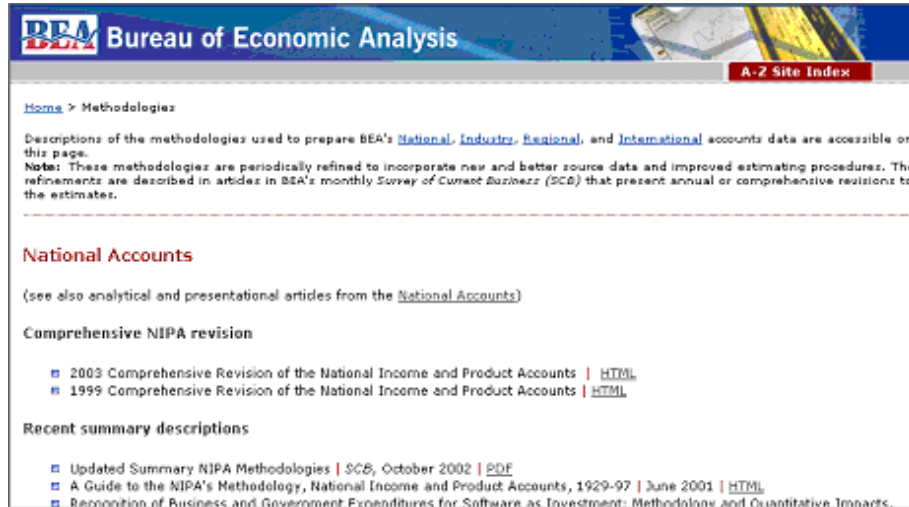
Survey of Current Business online

http://www.bea.gov/bea/pub/1202SbjGuide.htm

The *Survey of Current Business*, BEA's monthly journal, on the Web Site back to 1994. The *Survey* contains articles on BEA's estimates and on the concepts and methods used to prepare them.

Methodology Papers online

http://www.bea.gov/bea/mp.htm

BEA's Web site also contains a section devoted to providing you with up-to-date information on our methodologies. On this page you will find links to *Survey* articles that describe methods and source data used in developing other components of the national accounts. Additionally, you will find detailed methodology papers for PCE, Government Transactions, and Corporate Profits.

Print Sources

BEA products are covered and discussed in numerous sources, such as business magazines and journals;

Television and radio programming

29

or on television and radio programs that cover economic topics. As you become more familiar with the quantity of statistics BEA provides, the more you will notice how frequently our work is cited.

BEA contacts

http://www.bea.gov/ bea/contacts/search.asp

30

Finally, we invite you to use BEA staff as a resource. BEA's Web site has an up-to-date contact list, which you can use to identify the BEA staff member who can answer your questions.

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