GDP: Production and Income

Data published since 1947

- GDP is the market value of all final goods and services produced within a country in a given period of time.
- GDP is the sum of value added in the economy during a given period (value of its production minus the value of intermediate goods it uses in production).
- GDP is the sum of incomes in the economy during a given period (wage, dividends, indirect taxes).

Notes:

a) it includes the value of housing services
b) it does not include the value of vegetables and fruits produced and consumed at home
An economy has 100 workers and there are only two firms. One firm is producing toys and the other one is producing plastic (used in toys’ production). A worker can produce 10 batches of toys or 4t of plastic. Each worker earns 40,000$ a year in wages. Toys can sell for $ 5,000 each and tones of plastic sell for $12,500.
Currently the economy produces 900 batches of toys per year and all workers are employed. At the end of the year all toys and plastics are sold and all firms’ profits are distributed as dividends to household.
Calculate the GDP of this country.
Solution:

10 workers produce plastic: 40t plastic.

Plastic production (Firm 1)

Revenues from sales: 40*12,500=500,000$

Expenses: 10*40,000=400,000$

Wages: 400,000$

Profit: 100,000$

Toy company (firm 2)

Revenues from sales: 900*5,000=4,500,000$

Expenses: 4,100,000$

Wages: 90*40,000$=3,600,000$

Plastic purchases: 500,000$

Profit: $400,000

GDP=value of final output=$4,500,000

GDP=sum of value added: $500,000 + (4,500,000-500,000)

=$4,500,000

GDP=sum of incomes: 400,000+3,600,000(wages 90%)+100,000+400,000(profits)=4,500,000$
Nominal and Real GDP

- Nominal GDP: The sum of the quantities of final goods produced times their current price
  Increase due to increase in prices and increase in the quantity of goods

- Real GDP: the sum of the quantities of final goods produced at constant prices
Suppose the number and prices of footballs and basketballs in 3 successive years are given by:

<table>
<thead>
<tr>
<th>Year</th>
<th>Price ($)</th>
<th>Quantity</th>
<th>P($)</th>
<th>Q</th>
<th>Nominal GDP</th>
<th>Real GDP 2012</th>
<th>Growth rate</th>
<th>GDP deflator</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>10</td>
<td>120</td>
<td>12</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>12</td>
<td>200</td>
<td>15</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>14</td>
<td>180</td>
<td>18</td>
<td>275</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GDP growth: the rate of change of real GDP in year $t$

$$= (Y_t - Y_{t-1})/Y_{t-1}$$

Using different base years we would get different growth rates (historically changed the base year and re-estimate history)

Real GDP in chained (2005) dollars

Periods of negative growth for at least 2 consecutive quarters: *recessions*

Periods of positive growth: *expansions*

*Nominal GDP*: dollar GDP pr GDP in current dollars

*Real GDP*: GDP in terms of goods, in constant $, adjusted for inflation or in 2005 $

Real GDP per capita (ratio of GDP to the population)
The GDP deflator: a measure of the average price of output (an index number): average price of output/ final goods produced in the economy

\[ P_t = \frac{\text{Nominal } GDP_t}{\text{Real } GDP_t} \times 100 = \frac{Y_t}{Y_t} \]

Consumer Price Index (CPI): a measure of the average price of consumption (the cost of living) based on a basket of goods that the typical consumer consumes (updated every 2 years) since 1917

BLS: every month they visit stores to find out prices of about 80,000 items

Set to 100 in a given year (base is 1982-1984)

2015: =238 (cost 125% more to buy the same consumption basket)

Differences:

Imported goods (oil)

Industrial goods

1974 and late ’79 differences in the inflation rate (oil crises)

Used to determine inflation: the rate at which prices increase=

\[ \pi_t = \frac{P_t - P_{t-1}}{P_{t-1}} \times 100. \]

CPI and inflation from 1913

http://www.bls.gov/news.release/cpi.t01.htm
Inflation: sustained rise in the general price level

Deflation

Why do we care about inflation?
- affects income distribution (retirees are on fixed income)

US Social Security benefits are adjusted for inflation
- more uncertainty in the market (fixed prices lag)
- distorts the relative prices
- distorts the taxation

US : 2015 (0.2%); 2010 (1.6%); 2009 (-0.4%); July 2006: 4.15%, 2005: 3.17%, 2003: 2.11%

Core price consumption-expenditure index, increased 1.8% percent in July 2015 from a year earlier (excludes prices for food and energy)

The Unemployment rate:

Labor force: \( L = N + U \) (employed + unemployed)

Unemployment rate: \( u = \frac{U}{L} \)

Before 1940: \( U \)= people registered at unemployment offices
Now: surveys of household (Current Population Survey): 60,000 HHS every month

2000 4.0
2005 5.1
2006 4.6
2007 4.6
2008 5.8
2009 9.3
2010 9.6
2011: 9.1%
2015: 5.3%

A person who doesn’t have a job and has been looking for work in the last 4 weeks.

Discouraged workers: not in the labor force

Employment situation

http://www.bls.gov/news.release/empsit.nr0.htm

Why do we care about unemployment?

- an indicator if the economy is operating above or below the normal level of activity

Okun’s law (1960): high output growth leads to decrease in unemployment and vice-versa

- important social consequences

Participation rate: ratio of labor force to total population of working age
It increases when unemployment decreases and vice versa.