

Macroeconomics I Problem Set 1

Hui-Jun Chen

Answers

- 1 250
- 2 602.5
- 3 1025
- 4 250
- 5 395
- 6 550
- 7 152.53
- 8 186.36
- 9 160
- 10 200
- 11 60%
- 12 25%
- 13 484
- 14 142%
- 15 inflation
- 16 $\frac{e}{1-u}$
- 17 5,641,580 millions of dollars
- 18 449,353 millions of dollars
- 19 9,869,003 millions of dollars
- 20 3,148,765 millions of dollars
- 21 330,513 thousands
- 22 247,387 thousands
- 23 168,221 thousands
- 24 65,171.36 dollars per capita
- 25 22,804.67 dollars per capita
- 26 2,671.20 dollars per capita
- 27 42,201.46 dollars per capita
- 28 39,892.97 dollars per capita
- 29 18,706.25 dollars per capita
- 30 154.4
- 31 57.2

1 Inflation

Credit: Sungmin Park

Consider the following list of all final goods produced in an economy during years 2018-2020.

| | 2018 | | 2019 | | 2020 | |
|----------|----------|--------|----------|--------|----------|--------|
| | Quantity | Price | Quantity | Price | Quantity | Price |
| Apples | 100 | \$1.00 | 120 | \$2.00 | 150 | \$2.50 |
| Bananas | 100 | \$0.50 | 150 | \$0.75 | 200 | \$1.00 |
| Cupcakes | 50 | \$2.00 | 100 | \$2.50 | 150 | \$3.00 |

1.1 GDP deflator

Compute this economy's nominal gross domestic product (GDP) and the real GDP in each year, using 2018 as the base year.

Notice that here the Real GDP is calculated using the GDP deflator method.

- ① Nominal GDP in 2018 is 250
- ② Nominal GDP in 2019 is 602.5
- ③ Nominal GDP in 2020 is 1025
- ④ Real GDP in 2018 is 250
- ⑤ Real GDP in 2019 is 395
- ⑥ Real GDP in 2020 is 550
- ⑦ GDP deflator in 2019 is 152.53
- ⑧ GDP deflator in 2020 is 186.36

1.2 CPI

Continuing to using 2018 as the base year, What is the Consumer Price Index (CPI) in 2019 and 2020?

⑨ CPI in 2019 is 160

⑩ CPI in 2020 is 200

After calculating the CPI, the inflation formula is:

$$\text{Inflation} = \text{percentage change in CPI} = \frac{CPI_t - CPI_{t-1}}{CPI_{t-1}} \times 100.$$

What are the inflation rates in 2019 and 2020 based on the CPI?

⑪ Inflation rate in 2019 is 60%

⑫ Inflation rate in 2020 is 25%

(A) 15%

(B) 20%

(C) 25%

(D) 30%

1.3 COVID shock

| | 2021 | |
|----------|----------|--------|
| | Quantity | Price |
| Apples | 150 | \$3.00 |
| Bananas | 200 | \$5.60 |
| Cupcakes | 150 | \$7.00 |

What is the CPI and inflation rate in 2021 using 2018 as base year?

⑬ CPI in 2021 is 484

⑭ Inflation rate in 2021 is 142%

⑮ Comparing Inflation in 2021 and 2020. Is 2021 experiencing an inflation, stagflation, or deflation? inflation

2 Employment

Credit: Sungmin Park

- ⑩ Let u denote the unemployment rate of an economy. Let e denote the fraction of adult population that is employed. What is the labor-force participation rate written in terms of u and e ? $\frac{e}{1-u}$

Please write calculation process if you want to earn partial credits.

3 Computer Exercise

Credit: Mike Carter

One of the most important measurements of economic output is Gross Domestic Product. This question asks you to find information about GDP for a few selected time periods to get you some practice using official data. The data we will use is accessible at <http://FRED.StLouisFed.org>.

- To get to Real GDP, click “CATEGORY” \Rightarrow “NATIONAL ACCOUNTS” \Rightarrow “NATIONAL INCOME & PRODUCT ACCOUNTS” \Rightarrow “GDP/GNP”, then find the data series labeled “Billions of Chained 2017 Dollars, Not Seasonally Adjusted”.
 - I think it’s easier to view this data in table form. To do that, click the link halfway down the page to “Table 1.1.6 Real Gross Domestic Product, Chained Dollars: Annual”.
 - Be sure you’ve selected “**chained dollars**” to get real GDP
 - Also be sure you’ve selected “**annual**” so you can see GDP for the whole year
- For nominal GDP, click “CATEGORY” \Rightarrow “NATIONAL ACCOUNTS” \Rightarrow “NATIONAL INCOME & PRODUCT ACCOUNTS” \Rightarrow “GDP/GNP”, then find the data series labeled “Billions of Dollars, Annual, Not Seasonally Adjusted”.
 - Again, I think this data is easier to use in table form. To find that, click the link halfway down the page to “Table 1.1.5 Gross Domestic Product: Annual”
 - For nominal GDP, make sure you don’t see “**real**” or “**chained**” labels
 - Also be sure to select “**annual**” to find GDP for the whole year
- To find population data, click “CATEGORY” \Rightarrow “POPULATION, EMPLOYMENT, & LABOR MARKETS” \Rightarrow “POPULATION”. The annual population should be toward the top of the list on that page.
 - Unfortunately this series doesn’t have a nice table linked at the bottom of the page. But you can click the “**DOWNLOAD**” button near the top of the page to see values for every year.

fill in the table below

| | 2019 | 1989 | 1956 |
|------------------------|------------------|------|------|
| Nominal GDP | 21372582 million | Q17 | Q18 |
| Real GDP | 19032672 million | Q19 | Q20 |
| Population | Q21 | Q22 | Q23 |
| Nominal GDP per capita | Q24 | Q25 | Q26 |
| Real GDP per capita | Q27 | Q28 | Q29 |
| Implied Deflator | Q30 | Q31 | Q32 |

*(FRED has updated their numbers for Nominal and Real GDP for 2019. I am following the same numbers as before)

$$\text{*Implied Deflator} = \frac{\text{Nominal GDP per capita}}{\text{Real GDP per capita}} \times 100$$

①7 5,641,580 millions of dollars

①8 449,353 millions of dollars

①9 9,869,003 millions of dollars

②0 3,148,765 millions of dollars

②1 330,513 thousands

②2 247,387 thousands

②3 168,221 thousands

②4 65,171.36 dollars per capita

②5 22,804.67 dollars per capita

②6 2,671.20 dollars per capita

②⑦ 42,201.46 dollars per capita

②⑧ 39,892.97 dollars per capita

②⑨ 18,706.25 dollars per capita

③⑦ 154.4

③① 57.2

③② 14.3