Problem Set 1

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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 _____

(A) 235 (B) 240 (C) 245 (D) 250

(2) Nominal GDP in 2019 is _____

(A) 582.5 (B) 592.5 (C) 602.5 (D) 612.5

(3) Nominal GDP in 2020 is _____

(A) 1025 (B) 1030 (C) 1035 (D) 1040

(4) Real GDP in 2018 is _____

(A) 235 (B) 240 (C) 245 (D) 250

(5) Real GDP in 2019 is _____

(A) 390 (B) 395 (C) 400 (D) 405

(6) Real GDP in 2020 is _____

(A) 540 (B) 545 (C) 550 (D) 555

(7) GDP deflator in 2019 is _____

(A) 152.53 (B) 155.63 (C) 152.63 (D) 163.52

(8) GDP deflator in 2020 is _____

(A) 166.36 (B) 186.42 (C) 186.36 (D) 166.42

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 _____

(A) 155 (B) 160 (C) 165 (D) 170

(10) CPI in 2020 is _____

(A) 100 (B) 200 (C) 300 (D) 400

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 _____

(A) 30% (B) 40% (C) 50% (D) 60%

(12) Inflation rate in 2020 is _____

(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 _____

(A) 484 (B) 565 (C) 584 (D) 465

(14) Inflation rate in 2021 is _____

(A) 120% (B) 142% (C) 20% (D) 42%

(15) Comparing Inflation in 2021 and 2020. Is 2021 experiencing an inflation or deflation? _____

(A) deflation (B) stagflation (C) inflation

2 Employment

Credit: Sungmin Park

(16) 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? _____

(A) $\dfrac{1-u}{e}$ (B) $\dfrac{1-e}{u}$ (C) $\dfrac{e}{1-u}$ (D) $\dfrac{u}{1-e}$

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" ⇒ "NATIONAL ACCOUNTS" ⇒ "NATIONAL INCOME & PRODUCT ACCOUNTS" ⇒ "GDP/GNP", then find the data series labeled "Billions of Chained 2012 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" ⇒ "NATIONAL ACCOUNTS" ⇒ "NATIONAL INCOME & PRODUCT ACCOUNTS" ⇒ "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" ⇒ "POPULATION, EMPLOYMENT, & LABOR MARKETS" ⇒ "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)

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

(17) _____

(A) 5461580 million (B) 5641580 million (C) 5645180 million (D) 5156480 million

(18) _____

(A) 443953 million (B) 445393 million (C) 449353 million (D) 449335 million

(19) _____

(A) 9197997 million (B) 9179997 million (C) 9199779 million (D) 9791997 million

(20) _____

(A) 2939134 million (B) 2439193 million (C) 2933941 million (D) 2934391 million

(21) _____

(A) 330513000 (B) 330351000 (C) 331305000 (D) 351330000

(22) _____

(A) 248773000 (B) 238747000 (C) 248773000 (D) 247387000

(23) _____

(A) 122168000 (B) 168221000 (C) 168212000 (D) 122681000

(24) _____

(A) 66446.88 (B) 68846.64 (C) 64664.88 (D) 64466.88

(25) _____

(A) 20428.67 (B) 22804.67 (C) 22467.80 (D) 20467.28

(26) _____

(A) 2671.21 (B) 2121.67 (C) 2621.71 (D) 2761.21

(27) _____

(A) 57558.24 (B) 57524.58 (C) 58524.75 (D) 57585.24

㉘ _____

(A) 37180.60 (B) 37160.80 (C) 38060.71 (D) 37060.18

㉙ _____

(A) 17367.44 (B) 17467.43 (C) 17443.67 (D) 14367.74

㉚ _____

(A) 121.29 (B) 112.29 (C) 112.92 (D) 121.92

㉛ _____

(A) 64.33 (B) 63.33 (C) 61.33 (D) 62.33

㉜ _____

(A) 15.13 (B) 15.31 (C) 13.15 (D) 11.53