

1. Use the model of supply and demand to explain how a fall in the price of frozen yogurt would affect the price of ice cream and the quantity of ice cream sold. In your explanation, identify the exogenous and endogenous variables.

Since the price of a substitute good is falling, the demand curve for ice-cream would shift to the left. This rise in price of frozen yogurt is the exogenous variable. The endogenous variables are the price of ice-cream (should rise), and the quantity of ice cream sold (should fall).

2. Jimmy is an avid candy connoisseur. Last year, he purchased 75 Snickers bars costing \$1.75 each and 100 Butterfinger bars costing \$1.25 each. This year, he purchased 150 Snickers bars for \$1.25 each and 80 Butterfinger bars for \$2.25 each.

Assume that a typical consumer basket includes 50 bars of each type. Compute a consumer price index for each year and determine the percentage change in the index over the two years.

The basket cost \$150 ($\$1.75 \times 50 + \1.25×50) in the first year and \$175 ($\$1.25 \times 50 + \2.25×50) in the second year. The percent increase is 16.67% ($(175 - 150) / 150$)

Calculate the implicit price deflator (defined as Jimmy's nominal spending divided by his real spending). How does this deflator compare to the CPI you calculated above? Which measurement do you think is more relevant in determining the change in Jimmy's cost of living?

Nominal spending: Jimmy spent \$256.25 ($\$1.75 \times 75 + \1.25×100) in the first year and \$367.50 ($\$1.25 \times 150 + \2.25×80) in the second year.

Real spending: Using the first year as the base year, Jimmy spent \$256.25 ($\$1.75 \times 75 + \1.25×100) in the first year and \$362.50 ($\$1.75 \times 150 + \1.25×80) in the second year.

The implicit price deflator is 1 in the first year (\$256.25/\$256.25) and 1.014 (\$367.50/\$362.50) in the second year. In other words, the change in the implicit price deflator implies a slight inflation, while the change in the CPI implies much larger inflation. Why the big difference? The GDP deflator adjusts with Jimmy's spending behavior, while the CPI does not. Jimmy switches to the cheaper Snickers, lowering his overall cost of living. The implicit price deflator is more directly related to Jimmy's cost of living since it is based upon his purchases in each year.

3. Consider an economy that produces and consumes bread and automobiles. The following table contains data for two different years:

	Year 2000	Year 2010
Price of an automobile	\$40,000	\$50,000
Price of a loaf of bread	\$1.50	\$2.50
Number of automobiles produced	100	120
Number of loaves of bread produced	5,000,000	4,000,000

Using the year 2000 as the base year, compute the following statistics for each year: nominal GDP, real GDP, the implicit price deflator for GDP, and a fixed-weight price index such as the CPI.

$$\begin{aligned} \text{Nominal GDP}_{2000} &= (P_{cars}^{2000} * Q_{cars}^{2000}) + (P_{bread}^{2000} * Q_{bread}^{2000}) \\ &= \$11,500,000 \end{aligned}$$

$$\begin{aligned} \text{Nominal GDP}_{2010} &= (P_{cars}^{2010} * Q_{cars}^{2010}) + (P_{bread}^{2010} * Q_{bread}^{2010}) \\ &= \$16,000,000 \end{aligned}$$

$$\begin{aligned} \text{Real GDP}_{2010} &= (P_{cars}^{2000} * Q_{cars}^{2010}) + (P_{bread}^{2000} * Q_{bread}^{2010}) \\ &= \$10,800,000 \end{aligned}$$

$$\text{Implicit Price Deflator}_{2010} = \text{Nominal GDP}_{2010} / \text{Real GDP}_{2010} = 1.48$$

$$\begin{aligned} \text{CPI}_{2010} &= \frac{(P_{\text{cars}}^{2010} * Q_{\text{cars}}^{2000}) + (P_{\text{bread}}^{2010} * Q_{\text{bread}}^{2000})}{(P_{\text{cars}}^{2000} * Q_{\text{cars}}^{2000}) + (P_{\text{bread}}^{2000} * Q_{\text{bread}}^{2000})} \\ &= 1.52 \end{aligned}$$

4. List and explain (one or two sentences each) the differences between the CPI Index and the GDP Deflator. Which do you believe is a better measure of actual inflation in the U.S? Why?

The prices of capital goods are included in the GDP deflator but not in the CPI index (people don't buy capital goods for consumption purposes).

The prices of imported goods are included in the CPI index but not in the GDP deflator (we don't produce imported goods, so they are not part of our GDP – they are however a part of our consumption baskets).

The basket of goods are fixed in the CPI index (Laspeyres index); the basket of goods changes every year in the GDP deflator (Paasche index).

Which is a better measure of actual inflation? It depends. If relative prices are changing a lot (the price of good X compared to the price of good Y), the CPI will overstate inflation by a lot, while the GDP deflator will understate inflation by a lot (think about why...). Also, if we import a lot of goods, CPI would be better. If on the other hand we produce a lot of capital goods relative to consumption goods, the GDP deflator would be better.

5. Place each of the following transactions in one of the 4 components of expenditure: consumption, investment, government purchases, and net exports:

- a) Boeing sells an airplane to the Air Force
 - b) Boeing sells an airplane to American Airlines
 - c) Boeing sells an airplane to Air France.
 - d) Boeing sells an airplane to Amelia Earhart.
 - e) Boeing builds an airplane to be sold next year.
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- a) *The airplane sold to the Air Force counts as government purchases because the Air Force is part of the government.*
 - b) *The airplane sold to American Airlines counts as investment because it is a capital good sold to a private firm.*
 - c) *The airplane sold to Air France counts as an export because it is sold to a foreigner.*
 - d) *The airplane sold to Amelia Earhart counts as consumption because it is sold to a private individual.*
 - e) *The airplane built to be sold next year counts as investment. In particular, the airplane is counted as inventory investment, which is where goods that are produced in one year and sold in another year are counted.*

6. Consider how each of the following events is likely to affect real GDP. Do you think the change in real GDP reflects a similar change in economic well-being? Explain briefly.

- a) A hurricane in Florida forces Disney World to shut down for a month.
- b) The discovery of a new, easy-to-grow strain of wheat increases farm harvests.
- c) Increased hostility between unions and management sparks a rash of strikes.
- d) Firms throughout the economy experience falling demand, causing them to lay off workers.
- e) Congress passes new environmental laws that prohibit firms from using production methods that emit large quantities of pollution.

- f) More high-school students drop out of school to take jobs mowing lawns.
- g) Fathers around the country reduce their work-weeks to spend more time with their children.
- a) *Real GDP falls because Disney does not produce any services while it is closed. This corresponds to a decrease in economic well-being because the income of workers and shareholders of Disney falls (the income side of the national accounts), and people's consumption of Disney falls (the expenditure side of the national accounts).*
- b) *Real GDP rises because the original capital and labor in farm production now produce more wheat. This corresponds to an increase in the economic well-being of society, since people can now consume more wheat. (If people do not want to consume more wheat, then farmers and farmland can be shifted to producing other goods that society values.)*
- c) *Real GDP falls because with fewer workers on the job, firms produce less. This accurately reflects a fall in economic well-being.*
- d) *Real GDP falls because the firms that lay off workers produce less. This decreases economic well-being because workers' incomes fall (the income side), and there are fewer goods for people to buy (the expenditure side).*
- e) *Real GDP is likely to fall, as firms shift toward production methods that produce fewer goods but emit less pollution. Economic well-being, however, may rise. The economy now produces less measured output but more clean air; clean air is not traded in markets and, thus, does not show up in measured GDP, but is nevertheless a good that people value.*
- f) *Real GDP rises because the high-school students go from an activity in which they are not producing market goods and services to one in which they are. Economic well-being, however, may decrease. In ideal national accounts, attending school would show up as investment because it presumably increases the future productivity of the worker. Actual national accounts do not measure this type of investment. Note also that future GDP may be lower than it would be if the students stayed in school, since the future work force will be less educated.*
- g) *Measured real GDP falls because fathers spend less time producing market goods and services. The actual production of goods and services need not have fallen, however. Measured production (what the fathers are paid to do) falls, but unmeasured production of child-rearing services rises.*