

Answer key

Midterm 1 Practice

Consider a student with the following monthly nominal expenditure and monthly nominal income:

Year	Soda		Pizza		Nominal Income
	q	p	q	p	
2013	30	\$1.00	30	\$4.00	\$200
2014	30	\$1.10	30	\$4.50	\$200
2015	30	\$1.15	30	\$5.00	\$200

a) Pick a base year and identify what is in the CPI basket

Base year: 2013

CPI basket: 30 sodas and 30 pizzas

b) Find the price level in each year:

$$CPI^{2013} = PL^{2013} = 100$$

$$CPI^{2014} = PL^{2014} = \frac{\text{cost of basket 2014}}{\text{cost of basket base}} \times 100 = \frac{30 \times 1.10 + 30 \times 4.5}{30 \times 1.00 + 30 \times 4} \times 100 = \frac{168}{150} \times 100 = 112$$

$$CPI^{2015} = PL^{2015} = 100 \times \frac{30 \times 1.15 + 30 \times 5}{30 \times 1.00 + 30 \times 4} = \frac{184.5}{150} \times 100 = 123$$

2013: 100

2014: 112

2015: 123

c) Find the inflation rate in 2014 and 2015:

$$\pi_{2014} = \frac{CPI^{2014} - CPI^{2013}}{CPI^{2013}} \times 100 = \frac{112 - 100}{100} \times 100 = 12\%$$

$$\pi_{2015} = \frac{CPI^{2015} - CPI^{2014}}{CPI^{2014}} \times 100 = \frac{123 - 112}{112} \times 100 = 9.82\%$$

2014: 12%

2015: 9.82%

- g) The student knows that the price level in 2015 is 110. He is pessimistic about inflation and thinks that by 2025 the price level will be 180. Based on this prediction, is his employment contract good? Show how you came up with the conclusion.

Calculate real income for both years.

Pick 2015 as base.

$$y_{2015}^R = y_{2015}^N = \$2000$$

$$y_{2025}^R = y_{2025}^N \times \frac{CPI_{2015}}{CPI_{2025}} = \$3257.79 \times \frac{110}{180} = \$1990.87$$

Real income in 2025 with this contract is smaller than real income in 2015, so the contract is not good.

Answer:

No

- h) Statistics say that out of 1000 people in U.S. (including the above student) who graduated in 2015 with the major in Medieval Flemish literature, 300 graduates did not try to look for jobs, and that the unemployment rate for Medieval Flemish literature majors is currently 20%.

Based on these statistics, how many 2015 graduates who majored in Medieval Flemish literature are currently employed?

labor force of Medieval Flemish lit. majors =

Total number of people who graduated - number of people who didn't look for jobs =

$$= 1000 - 300 = 700 \text{ people}$$

$$u = \frac{\text{number of unemployed}}{\text{labor force}} \Leftrightarrow 20\% = \frac{x}{700} \Leftrightarrow 0.2 \cdot 700 = x$$

$$\text{number of unemployed} = 140$$

$$\begin{aligned} \text{number of employed} &= \text{labor force} - \text{unemployed} = \\ &= 700 - 140 = 560 \text{ graduates} \end{aligned}$$

Answer:

560 graduates

d) Find the real income in each year:

Denote income by y .

$$y_{2013}^R = y_{2013}^N = \$200$$

$$y_{2014}^R = y_{2014}^N \times \frac{CPI_{base}}{CPI_{2014}} = \$200 \times \frac{100}{112} = \$178.57$$

$$y_{2015}^R = y_{2015}^N \times \frac{CPI_{base}}{CPI_{2015}} = \$200 \times \frac{100}{123} = \$162.60$$

2013: \$200	2014: \$178.57	2015: \$162.60
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e) What is the student's real income growth rate in 2014 and 2015:

$$g_{2014}^y = \frac{y_{2014}^R - y_{2013}^R}{y_{2013}^R} = \frac{\$178.57 - \$200}{\$200} = -0.1072 \text{ or } -10.72\%$$

$$g_{2015}^y = \frac{y_{2015}^R - y_{2014}^R}{y_{2014}^R} = \frac{\$162.60 - \$178.57}{\$178.57} = -0.0894 \text{ or } -8.94\%$$

2014: -10.72%	2015: -8.94%
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f) At the end of 2015 the student got a job with a starting salary of \$2,000 per month (nominal). His employment contract says that each year he will get a 5% increase from the previous year salary. What will his salary be in 2025?

$$y_{2025} = y_{2015} \times (1 + g)^{2025-2015} = \$2000 \times 1.05^{10} = \$3257.79$$

↑
formula for exponential growth

2025: \$3257.79
