

## Homework 1

Due: **Beginning of the hour** on the day announced in class (**no homework will be accepted afterward**).

**Show all calculations** on separate sheets of paper and **staple** all pages (without showing calculations, there will be no credit).

Your grade will depend not only on the correctness of your answers but on neatness, clarity, organization, and thoroughness. Please do **your own work**. If you need help, ask the instructor or a tutor. **Do not ask a fellow student!** Submitting identical works, which usually contain the same errors, is cheating and will have **grave consequences** (see the Syllabus). 5 points

**1) Answer questions 5, 7 and 9 in Chapter 7 of your textbook (Hall and Lieberman, pp. 194-195). Show all final answers in tables.**

**5. Fill the table**

Year	CPI	Inflation rate	Nominal wage	Real wage
1	100	-	\$10	\$10
2	110	10%	\$12	\$10.9
3	120	9.1%	\$13	\$10.8
4	115	-4.1%	\$12.75	\$11.09

$$\text{Inflation rate} = (\text{CPI}_2 - \text{CPI}_1) / \text{CPI}_1$$

$$(110-100)/100 = 10 \%$$

$$(120-110)/110 = 9.1 \%$$

$$(115-120)/120 = -4.1 \%$$

$$\text{Real wage} = (\text{nominal wage} / \text{CPI}) \times 100$$

$$(\$10 / 100) \times 100 = \$10$$

$$(\$12 / 110) \times 100 = \$10.9$$

$$(\$13 / 120) \times 100 = \$10.8$$

$$(\$12.75 / 115) \times 100 = \$11.09$$

**7. Fill the table**

End of Year	CPI	Nominal interest rate	Real interest rate
1	100	-	-
2	110	15%	5%
3	120	13%	4%
4	115	8%	12.1%

$$\text{Real interest rate} = \text{Nominal interest rate} - \text{Inflation rate}$$

$$i_r = i_n - \Delta P/P$$

$$\text{Inflation rate} = (\text{CPI}_2 - \text{CPI}_1) / \text{CPI}_1$$

$$(110-100)/100 = 10 \%$$

$$(120-110)/110 = 9.1 \%$$

$$(115-120)/120 = -4.1 \%$$

$$i_r = i_n - \Delta P/P$$

$$i_r = i_n - \Delta P/P$$

$$i_r = 15\% - 10\% = 5\%$$

$$i_r = 13\% - 9\% = 4\%$$

$$i_r = 8\% - (-4.1\%) = 12.1\%$$

### 9. Fill the table

Year	CPI	Inflation rate	Nominal wage	Real wage
1	37	-	\$5.60	\$15.14
2	48	29.7%	\$7	\$14.58
3	52.8	10%	\$11.26	\$21.32
4	62.8	19%	\$15.70	\$25
5	60	-4.45%	\$15	\$25

1) Real wage = (nominal wage / CPI<sub>1</sub>) X 100

$$(\$5.6 / 37) \times 100 = \$15.14$$


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2) Inflation rate = (CPI<sub>2</sub> - CPI<sub>1</sub>) / CPI<sub>1</sub>

$$(48 - 37) / 37 = 29.7\%$$

Real wage = (nominal wage / CPI<sub>2</sub>) X 100

$$(\$7 / 48) \times 100 = \$14.58$$


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3) Inflation rate = (CPI<sub>3</sub> - CPI<sub>2</sub>) / CPI<sub>2</sub>

$$10\% = (CPI_3 - 48) / 48$$

$$CPI_3 = 48 + 4.8 = 52.8$$

Real wage = (nominal wage / CPI<sub>3</sub>) X 100

$$(\$11.26 / 52.8) \times 100 = \$21.32$$


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4) Inflation rate = (CPI<sub>4</sub> - CPI<sub>3</sub>) / CPI<sub>3</sub>

$$19\% = (CPI_4 - 52.8) / 52.8$$

$$CPI_4 = 52.8 + 10 = 62.8$$

Real wage = (nominal wage / CPI<sub>4</sub>) X 100

Nominal wage = (Real wage X CPI<sub>4</sub>) / 100

$$\text{Nominal wage} = (\$25 \times 62.8) / 100 = \$15.7$$


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$$5) \text{ Inflation rate} = (CPI_5 - CPI_4) / CPI_4$$

$$(60 - 62.8) / 62.8 = -4.45 \%$$

$$\text{Real wage} = (\text{nominal wage} / CPI_5) \times 100$$

$$(\$15 / 60) \times 100 = \$25$$

**2) Answer the following typical multiple choice questions and explain your answers:**

1. Which of the following statements about inflation and the price level is *true*?

- a. When the inflation rate is zero, the price level must be zero as well.
- b. When the price level is rising, the inflation rate must be rising as well.
- c. When the inflation rate is falling, the price level cannot be rising.
- d. **When the inflation rate is positive, the price level must be rising.**
- e. All of the above.

Why? Because:

$$\text{Inflation rate} = (CPI_2 - CPI_1) / CPI_1 > 0$$

Implies:

$$CPI_2 > CPI_1$$

2. Suppose nominal wage (W) increased. Which of the following statements is *true*? [Hint: use the algebraic definition of nominal wage (W)]

- a. We can say for sure that CPI decreased.
- b. We can say for sure that CPI increased.
- c. We can say for sure that real wage (w) increased.
- d. We can say for sure that real wage (w) decreased.
- e. **none of the above.**

Why? Because:

$$\text{Real wage} = (\text{Nominal wage} / \text{CPI}) \times 100 \text{ or}$$

$$w = (W / \text{CPI}) \times 100, \text{ therefore}$$

$$\mathbf{W = (w \times \text{CPI}) / 100}$$

W depends on 2 factors, w and CPI. We don't know which factor changed, and which way, to cause an increase in W. We can say for sure that both factors could not have fallen.

e.g. Suppose W= 24, w=12 and CPI=2, then

$$\mathbf{W = w \times \text{CPI}}$$

$$24 = 12 \times 2$$

Now, suppose W= 48

$$48 = 2 \times 24 = 48 \times 1 = 24 \times 2, \text{ etc.}$$