



# ECN101: Intermediate Macroeconomic Theory TA Section

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# Outline

- 1 Feedback on Mid-Quarter Interview
- 2 Discussion: Cost of Inflation
- 3 Problem Set #4 Preview
  - Q.4 - Asymmetric Information in the Labor Market
  - Q.5 - Quantity Theory of Money
  - Revisit Q.1 - Q.3



# Feedback on Mid-Quarter Interview

- Let students more involved with the on-line site
  - piazza.com vs. smartsite
- pace/time-management
  - some points need more elaboration
  - writing on the board for detail
- more solution for past exams
- more fun



# Discussion: Costs of Inflation

- Today, we are going to talk about
  - Why is inflation bad?
  - What costs does inflation impose on society?
  - Think like an economist.



## Background Information: Costs of Inflation

- costs of expected inflation + costs of unexpected inflation
- Only real price matters in economic decisions!
- costs of expected inflation
- additional costs of unexpected inflation
  - arbitrary redistribution of purchasing power
    - Who are hurt from inflation:
      - An individual who has a pension that is not indexed to inflation
      - A bank that issues loans at fixed rates but that pays interest rates that move with the market
      - An individual with a variable rate mortgage
  - increased uncertainty
- Is inflation really bad?
  - nominal wage contract and downward wage rigidity



# Discussion: Costs of Inflation

- How big is the U.S. GDP?
  - \$16-17 trillion

# Discussion: Costs of Inflation



Figure : 100 Trillion Zimbabwe Dollar Bill



## Discussion: Costs of Inflation

- Please read the article and discuss the following. <http://www.economist.com/news/finance-and-economics/21576665-grubby-greenbacks-dear-credit-full-shops-an>
  - Which of the costs of inflation do you see represented in this article?
  - What do you think caused the hyperinflation?
  - How did adopting the U.S. dollar as a national currency solve the hyperinflation problem. And what new problems were created by giving up a separate national currency?



# Costs of Inflation



**Figure :** Children playing with money in Germany after WWI



## Q.4 - Asymmetric Information in the Labor Market

- Consider the model of the labor market with asymmetric information that we analyzed in class. Let the worker productivities,  $\theta$ , be distributed uniformly in the set  $[1, 3]$ . For any given  $\theta$  suppose that the outside option of this worker is given by  $r(\theta) = \frac{3}{4}\theta$ . Like in the lecture notes, firms do not know the  $\theta$  of every worker that they encounter, but they know the distribution of productivities. Workers know their own productivity (i.e. they have private information).



## Q.4 - Asymmetric Information in the Labor Market

- a) What is the expectation formed by firms about the average productivity of workers who choose to be employed when the wage is  $w = \frac{3}{4}$ ?
- $E[\theta | r(\theta) = \frac{3}{4}\theta \leq w = \frac{3}{4}] = ?$
- b) What is the expectation formed by firms about the average productivity of workers who choose to be employed when the wage is  $w = \frac{9}{4}$ ?
- $E[\theta | r(\theta) = \frac{3}{4}\theta \leq w = \frac{9}{4}] = ?$
- c) Provide a general formula that expresses the average expected productivity of workers who choose to be employed for every wage in the interval  $w \in [\frac{3}{4}, \frac{9}{4}]$ .



## Q.4 - Asymmetric Information in the Labor Market

- d) Use your answer in part (c) in order to find the competitive equilibrium wage in this market.
- $w^* = \frac{3}{2}$ . Why?
- e) Using the equilibrium wage you found in part (d), explain which workers (indicated by their productivities) will be employed in equilibrium.



## Q.5 - Quantity Theory of Money

- Suppose velocity is constant, the growth rate of real GDP is 3 percent per year, and the growth rate of money is 5 per cent per year. Calculate the long-run rate of inflation in the following cases:
  - a) What is the rate of inflation in this baseline case?
    - From  $MV = PY$ ,  $g_M + g_V = g_P + g_Y$ . the inflation rate  $\pi \equiv g_P$ .
    - Use given numbers,  $g_Y = 3\%$  and  $g_M = 5\%$ . What is  $g_V$ ?
  - b) Suppose the growth rate of money rises to 10 percent per year.
  - c) Suppose the growth rate of money rises to 100 percent per year.
  - d) Back to the baseline case, suppose real GDP growth rises to 5 percent per year.
  - e) Back to the baseline case, assume that velocity of money rises at 1 percent per year. What happens to inflation in this case? Why might velocity change in this fashion?
    - Make your own story about changing the velocity of money.



# Q.1 - Valuing Human Capital with Wage Growth, Ch.7

## Exercise 7

- Suppose labor income starts at \$ 50,000 and then grows at a constant rate of 2% per year after that. Let  $w_t$  be labor income in year  $t$ , so that

$$w_t = \bar{w}_0(1 + \bar{g})^t$$

where  $\bar{w}_0 = \$50,000$  and  $\bar{g} = 0.02$ .



# Q.1 - Valuing Human Capital with Wage Growth, Ch.7

## Exercise 7

- a) If the interest rate is  $R$ , what is the formula for the present discounted value (PDV from now on) today (in year 0) of labor income from a particular future year  $t$ ?
- b) Now add up these term from  $t = 0$  to  $t = 45$  to get a formula for the present discounted value of labor income. Your answer should look something like that in equation (7. 12),



# Q.1 - Valuing Human Capital with Wage Growth, Ch.7

## Exercise 7

- c) Write your answer to part (b) so that it takes the form of geometric series:

$$pdv = \bar{w}_0(1 + a + a^2 + a^3 + \dots + a^{45})$$

What is the value of  $a$  that you find?

- d) Apply the geometric series formula to compute the present discounted value for the case of  $R = 0.04$ ,  $R = 0.03$ , and  $R = 0.02$ . What happens when  $R = 0.02$  and why?





## Q.2 - How much is a college education worth?, Ch.7

### Exercise 8

- Suppose that college education raises a person's wage by \$30,000 per year, from \$40,000 to \$70,000. Assume the interest rate is 3% and there is no growth in wages. Suppose you are a high school senior and deciding whether or not to go to college. Find the present discounted value of earnings in the following cases. Also, assume that the work time is still 45 years, adding up to a 49-year non-college work career.
  - a) What is the PDV of your labor income if you do not go to college and start working immediately?



## Q.2 - How much is a college education worth?, Ch.7

### Exercise 8

- b) As an alternative, you could pay \$20,000 per year in college tuition, attend for 4 years, and then earn \$70,000 per year after you graduate. What is the present discounted value of your net earnings (adjusting for tuition) under this plan? (Compute this value from the point of view of a high school senior.)
- c) Discuss the economic value of a college education.



## Q.2 - How much is a college education worth?, Ch.7

### Exercise 8

- d) What if you pursue the plan described in (b), but you also expect to be unemployed for 2 years after finishing college (knock on wood). During these years assume that you do not have access to any unemployment insurance. What is the PDV of your net earnings under this plan?



## Q.3 - Optimal Unemployment Insurance, Ch.7

### Exercise 10

- Consider the following two proposals to reform unemployment insurance. Explain the arguments for and against each proposal.
  - a) The insurance payment would be increased so that it replaced 100 per cent of a worker's regular labor income for 26 weeks.
  - b) Each worker would get a one time payment equal to 10 weeks of his or her labor income at the start of the spell of unemployment. There would be no other payments.