

**Finance 30220**  
**Solutions to Practice Midterm #1**

- 1) Suppose that the return on a 90-day T-Bill is .6% while the total 10 year return on a 10 year T-Bond is 22%. Which of these two assets has the better annual return?

We need to make these returns comparable by expressing them both as annual returns:

$$90 \text{ Day T-Bill: } (1.006)^4 = 1.024 \Rightarrow 2.4\%$$

$$10 \text{ Year Bond: } (1.22)^{\frac{1}{10}} = 1.020 \Rightarrow 2.0\%$$

On an annual basis, the 90 Day T-Bill is the better return.

- 2) Consider the following data on movie grosses:

Year	Movie	Lifetime Gross	Rank
1972	Godfather	\$135M	#210
2002	Spiderman	\$404M	#7

What's wrong with this ranking? Use the following price data to calculate the real grosses in 2008 dollars:

Year	CPI
1972	42
2002	180
2008	216

These ranking don't take into account the fact that prices were a lot higher in 2002 than they were in 1972. By scaling up both grosses to reflect 2008 prices, we can compare these grosses on equal terms.

$$\text{Godfather: } \$135M \left( \frac{216}{42} \right) = \$694M$$

$$\text{Spiderman: } \$404M \left( \frac{216}{180} \right) = \$485M$$

Sorry Spidey, but you lose!

- 3) Suppose you have the following data on an economy. Assume that depreciation is equal to \$20 and that net factor payments are equal to \$50.

Gross Domestic Product (Y): \$1000

Government Purchases (G): \$200

Tax Revenues (T): \$150

Private Savings (S): \$100

Current Account (CA): -\$200

Find Consumption (C) and Investment (Gross and Net) (I)

First, let's find net investment:

$$S = I^N + (G - T) + CA$$

$$100 = I^N + (200 - 150) - 200$$

$$I^N = 250$$

Now, we need gross investment:

$$I^G = I^N + \delta = 250 + 20 = 270$$

We will also need net exports:

$$NX = CA - NFP = -200 - 50 = -250$$

Now we can find consumption:

$$GDP = C + I^G + G + NX$$

$$1000 = C + 270 + 200 - 250$$

$$C = 780$$

- 4) In the economy of Oz, there are only two commodities: Broomsticks and crystal balls. Below is some data for the country of Oz.

1994	Quantity Produced	Price
Broomsticks	50	\$40
Crystal Balls	20	\$100

1995	Quantity Produced	Price
Broomsticks	30	\$50
Crystal Balls	30	\$90

- a) Using 1994 as the base year, compute nominal GDP, real GDP, and the GDP deflator for 1994 and 1995.

Nominal GDP

$$1994: (50)(\$40) + (20)(\$100) = \$4,000$$

$$1995: (30)(\$50) + (30)(\$90) = \$4,200$$

Real GDP

$$1994: (50)(\$40) + (20)(\$100) = \$4,000$$

$$1995: (30)(\$40) + (30)(\$100) = \$4,200$$

GDP Deflator

$$1994: \$4,000/\$4,000 = 1 \text{ (or 100)}$$

$$1995: \$4,200/\$4,200 = 1 \text{ (or 100)}$$

- b) Using the GDP deflator, compute the inflation rate from 1994 to 1995.

$$\pi = [LN(1) - LN(1)] * 100 = 0\%$$

- c) Suppose a fixed weight index is defined as 50% broomsticks and 50% crystal balls. Compute the CPI for 1994 and 1995.

$$1994: (.5)(\$40) + (.5)(\$100) = \$70$$

$$1995: (.5)(\$50) + (.5)(\$90) = \$70$$

- d) Using the CPI, compute the inflation rate from 1994 to 1995.

$$\pi = [LN(70) - LN(70)] * 100 = 0\%$$

- 5) Suppose that there are 100 people in the economy. Of these, 90 people are either working or actively looking for a job. Each month, 5 people lose their job, and take one month to find a new one. Each January, 3 people lose their job and take a year to find a new job.

- a) What is the unemployment rate in the economy?

$$\text{Labor Force} = 90$$

$$\text{Unemployed} = 8$$

$$\text{UR} = (8/90) * 100 = 8.8\%$$

- b) What is the participation rate?

$$\text{Eligible} = 100$$

$$\text{Labor Force} = 90$$

$$\text{PR} = (90/100) * 100 = 90\%$$

- c) What is the average duration of unemployment?

Note that there are a total of 63 people unemployed over the course of a year (5 per month times twelve months plus 3 for the full year).

$$(60/63) * 4 + (3/63) * 52 = 6.3 \text{ weeks}$$

- 6) It is usually assumed that labor and capital are *complements* in production. What does this assumption imply about the relationship between employment and the productivity of capital?

As employment rises, the productivity of capital increases and when capital rises the productivity of labor increases.

7) Suppose you have the following information regarding the production of Hula-Hoops

<u># of Hours</u>	<u># of Hula-Hoops</u>	(a) <u>MPL</u>	(c) <u>MPL</u>
0	0	---	---
1	16	16	32
2	28	12	24
3	38	10	20
4	44	6	12
5	48	4	8
6	50	2	4

Hula-Hoops cost \$2 apiece, and the nominal wage rate is \$12/hr.

- Calculate the marginal product of labor.
- How many hours of labor would the firm hire.

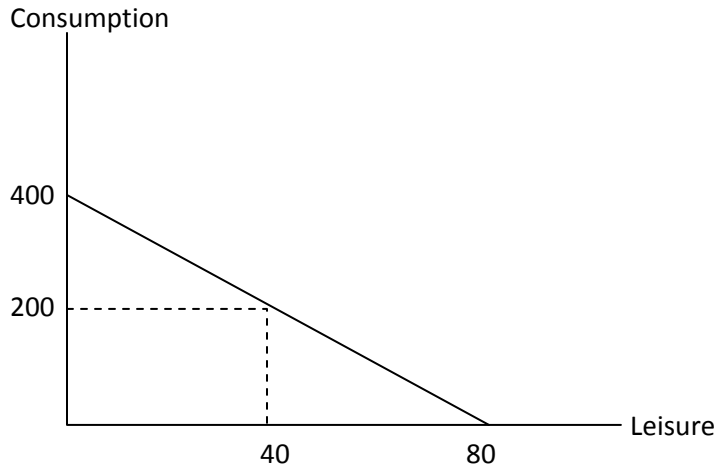
At a real wage of  $(\$12/\$2) = 6$ , 4 hours are hired.

- Suppose that through computerization, the firm is able to increase labor's productivity by 50% (i.e., each hour of labor produces 50% more hula hoops). What would be the firm's new demand for labor?

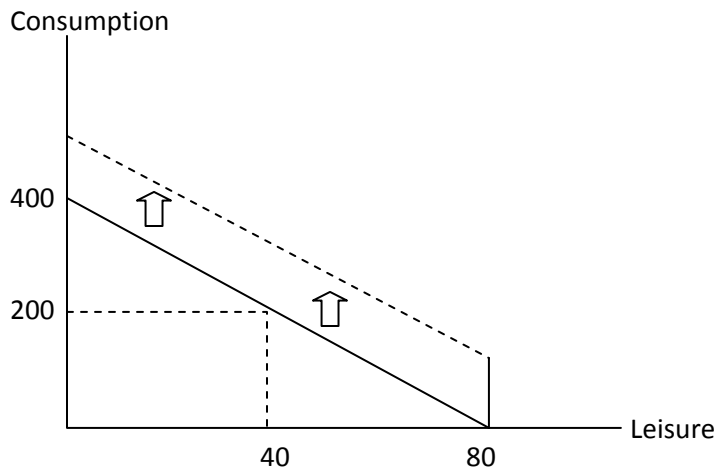
Now, at a real wage of 6, the firm hires 5 hours (labor demand shifts right)

8) Suppose the nominal wage rate is \$10/hr., and the average price of consumption goods is \$2. You have 80 hours per week available to work.

a) Sketch your budget constraint and indicate a labor choice.

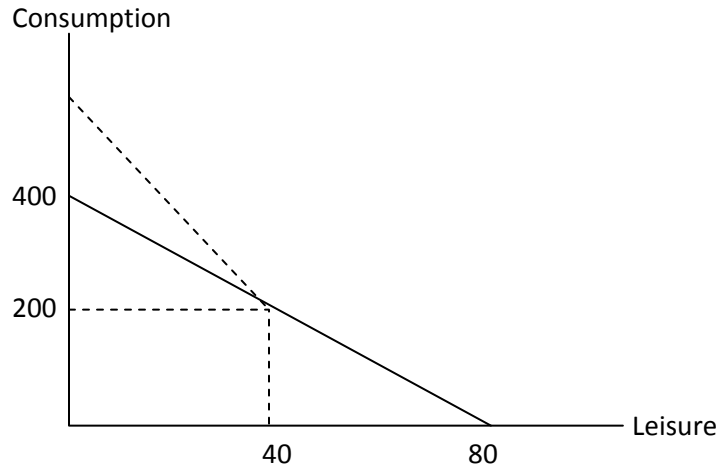


b) Now, suppose that you receive an unexpected inheritance of \$100 from a long lost aunt. Show the effect of this gift on your budget constraint and your labor choice.



Given the extra income, you would most likely work less (labor supply shifts left)

- c) Suppose that your firm adds a “time and a half” overtime premium. That is, any hours over 40 hrs/wk. Pay \$15 dollars rather than \$10. What happens to your budget set? What happens to your labor supply decision? (**Be careful here!**)



Given that you are currently working exactly 40 hours, there is no income effect from the wage increase. With only a substitution effect, you will respond by working more (Labor supply shifts right). Note that if you were currently working more than 40 hours; the result is ambiguous because there is both an income effect and a substitution effect. Finally, if you were initially working less than 40 hours, you are unaffected.

- 9) Empirically, average labor productivity is positively correlated with output while the real wage has little or no correlation with output. Can we explain these empirical facts using our labor market model? Explain.

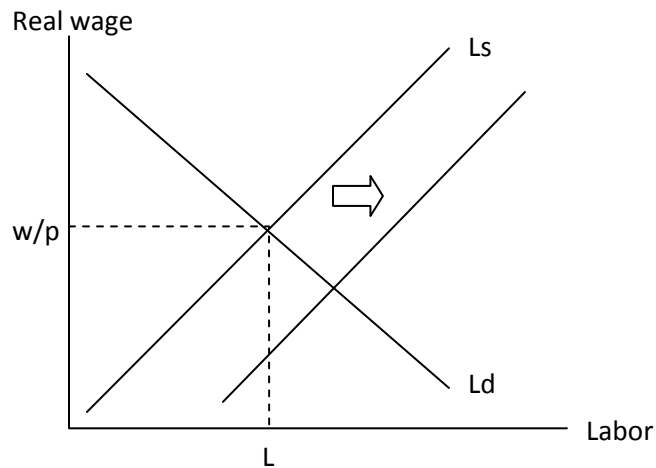
Our labor market model assumes that fluctuations in employment and output are caused by changes in productivity that shift labor demand. The fact that the correlation between wages and output suggests that labor supply is really flat.

- 10) What does it mean for an economic variable to be *pro-cyclical* or *countercyclical*? Give an example of a pro-cyclical and countercyclical variable.

Procyclical variables are positively correlated with GDP while countercyclical variables are negatively correlated with GDP.

- 11) Suppose the government passes some new legislation that makes it easier for foreigners to immigrate to the US. As a result, thousands of new immigrants flood into the United States. What should happen in the labor market as a result of the large influx of workers? What happens to the real wage and employment? What should happen to GDP?

The increase in immigration increases labor supplied (labor supply shifts right). The real wage should fall while employment rises.



- 12) Explain why permanent productivity improvements have larger effects on the real wage while temporary productivity improvements have larger effects on employment.

Permanent improvements in productivity generate bigger wealth effects which cause households to choose to work less. This magnifies the effect on the real wage and decrease the impact on employment. Temporary changes have no impact on labor supply.

