

ECO 103, Winter 2020, Exam #1

Name: Key

Instructions: Answer all parts of all questions. You have 80 minutes to complete the exam. This exam is open note, but not open book. You are welcome to use any written materials that you might find helpful excluding textbooks. Calculators, but no other electronic devices, are allowed. Here are some things to keep in mind.

- i. Explain all of your answers. Unsupported answers will receive little or no credit.
- ii. On true/false questions, I only care about the quality of your explanation. Simply writing “true” or “false” will yield no credit.
- iii. Avoid extensive irrelevance, this will also cost you points. Your goal should be to provide clear and concise explanations.
- iv. It is more important to demonstrate that you understand the correct method. Minor math errors will result in only minor deductions.
- v. All parts of all questions are worth the same amount.
- vi. Many questions ask you about a deviation from something that we did in class. If you simply copy down what we did in class, I will award no credit.

168603

1. Assorted Questions

a. A firm must choose how much of its workforce to direct towards production (which increases current profits) and how much to direct to research & development (which may affect future profits). How is this an example of allocating resources under scarcity? What is the constraint that the firm faces?

The firm's scarce resource is labor. There is a tradeoff between short-run and long-run profits.

The constraint is that labor used for production and labor used for R&D cannot exceed the firm's workforce.

b. True or False? Economic models always assume that fully informed households maximize utility and that fully informed firms maximize profits.

False.

We have seen several examples where people have imperfect information (e.g. used cars).

While most firms maximize profits, some maximize something else (e.g. Bates).

[Hint: The word "always" should give away that this is False.]

c. True or False? Inflation is costly because when prices for goods and services increase, people can afford fewer of them.

False. The question references a decline in output, not a rise in inflation.

Inflation is costly because it is redistributionary.

- Unexpected inflation benefits borrowers at the expense of lenders.

- If wages are slow to adjust, it also benefits firms at the expense of workers.

d. On January 1, 1994, the North American Free Trade Agreement (NAFTA) went into effect. In the five years that followed, the U.S. unemployment rate fell from 6.6% to 4.3%. How would you evaluate whether NAFTA was good for the U.S. labor market?

• Many factors impact unemployment. You should not simply look at the change in the unemployment rate.

• You would compare the economy with NAFTA to a hypothetical economy where NAFTA was not enacted.

e. You are asked to analyze how a financial crisis in Europe will impact the U.S. economy over the next three years. What subfield(s) of macroeconomics addresses this question?

This is primarily open-economy macroeconomics which examines how events in one economy impact other economies.

It also has implications for the study of business cycles and macro-finance.

2. Microeconomics

The following table shows *total cost* and *total utility* for wine.

Table 1: The Market for Wine

Quantity	Total Cost	Total Utility
1	10	50
2	20	90
3	35	120
4	55	140
5	85	150
6	125	152
7	190	140
8	290	120

- a. Suppose that Table 1 applies to each household and that there are 10 bottles of wine to be consumed among 2 households. Is it Pareto efficient to give each household 5 bottles? Is it Pareto efficient to give one household 8 bottles, and the other 2 bottles?

It is Pareto efficient to give both households 5 bottles. To make either better off (higher utility), you must make the other worse off (lower utility).

It is not Pareto efficient to give one household 8 bottles and the other 2. Switching to 7 and 3, for example, will increase the utility of both.

b. Now suppose that Table 1 applies to the entire market. Derive the supply and demand curves for wine.

wine	MC	MU
1	10	50
2	10	40
3	15	30
4	20	20
5	30	10
6	40	2
7	65	-12
8	100	-20
9		
10		

MC \Rightarrow ~~curve~~
supply

MU \Rightarrow demand.

c. What is the market price and quantity for wine?

$$MC = MU \text{ at } Q = 4, P = 20.$$

3. Consider the following economy:

Table 2: Goods and Services Used at Bates

Good or Service	Quantity (19)	Price (19) (\$)	Quantity (20)	Price (20) (\$)
Sweatpants	7	6	7	8
Columbian coffee	10	2	12	3
Laptops	2	20	1	22
Processors (laptop part)	2	1	1	2
Illegal Drugs	1	10	2	13

a. Which goods are excluded from Bates's GDP and why?

Columbian coffee, while delicious, is excluded for being an import.

Illegal drugs are part of the shadow economy and are excluded.

Processors are an intermediate good. They are excluded because they are part of a final good (laptops).

b. Using 2020 as the base year, calculate real GDP growth for Bates from 2019 to 2020.

$$RGDP(2019) = 7 \times 8 + 2 \times 22 = 100$$

- Hold prices constant at base year (2020) levels.

$$RGDP(2020) = 7 \times 8 + 1 \times 22 = 78$$

$$GDP_{growth} = \frac{78 - 100}{100} = -22\%.$$

c. Define a basket of goods for a price index. Use it to calculate inflation from 2019 to 2020 for Bates.

My basket is 2 sweatpants and 3 laptops.

Hold Q constant at these levels (which are arbitrary here).

$$P(2019) = 2 \times 6 + 3 \times 20 = 72$$

$$P(2020) = 2 \times 8 + 3 \times 22 = 82$$

$$\pi = \frac{82 - 72}{72} = 13.9\%$$

4. For *a* and *b*, refer to the provided Tables from the Bureau of Labor Statistic's January employment summary. Note that these data are in thousands of workers.

a. If 1 million unemployed workers found work (so that the unemployed fell from 5892 to 4892), what would happen to the U-3 and U-6 unemployment? rates.

Actual Jan 2020 data:

$$U-3 = \frac{5892}{164,606} = 3.6\%$$

$$U-6 = \frac{5892 + \text{Marginally attached} + \text{part time for economic reasons}}{164,606 + \text{Marginally attached}}$$

includes discouraged workers

$$= \frac{5892 + 1342 + 4182}{164,606 + 1342} = 6.9\%$$

Now $U-3 = \frac{4892}{164,606} = 3.0\%$ (LF is unchanged)

$$U-6 = \frac{4892 + 1342 + 4182}{164,606 + 1342} = 6.3\%$$

b. If these one million workers instead became discouraged workers, what would happen to the U-3 and U-6 unemployment rates?

For U-3. These leave both the numerator and denominator:

$$U-3 = \frac{4892}{163,606} = 3.0\%$$

$$U-6 = \text{its original} = \frac{4892 + 2342 + 4182}{163,606 + 2342} = 6.9\%$$

c. How would you judge whether an increase in labor force participation is a sign of a stronger economy?

It is likely a good sign if

- People are ~~leaving~~ joining the labor force by becoming employed
- Discouraged workers are once again actively searching for work

It may not be a good sign if:

- Economic conditions are driving retirees back into the work force¹⁰
- Unemployment (especially U-6) is rising at the same time.

Bonus: Provide a plausible explanation for why the U.S. natural rate of unemployment has declined over the past decade.

Frictional factors (non-exhaustive)

- Better search technologies
- Less generous welfare state
- Less desire to relocate

Structural factors

- Slower pace of technological growth.