

ECO 103, Winter 2021, Exam #1

Name:

Key

Instructions: Answer all parts of all questions. You have 90 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.

1. Suppose that a government is considering raising income taxes in order to finance a new highway. What are the trade-offs involved with this choice?

The benefits include those from the public good. This includes the consumption benefits of the highway as well as the potential for higher productivity.

The costs are the loss of income to the taxpayer. Higher taxes may also reduce employment.

2. True or False? Rationality implies that all households and firms are fully informed about the market, including the cost of making goods and the utility that goods provide.

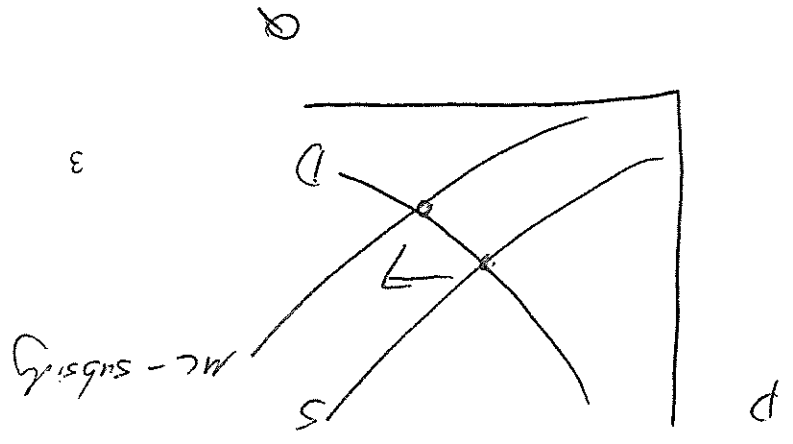
False. Rationality implies that households maximize utility while firms maximize what they care about (often profits). Economics often studies how agents make choices with imperfect information. One example is adverse selection where suppliers are unable to observe how risky buyers are.

3. Many argue that a person's education brings benefits to the rest of society. These may include better civic engagement or lower crime. Is this an example of an externality or a public good? Explain.

This is a positive externality because the good brings public as well as private benefits. It is not a public good because there is rivalry in consumption and consumption is excludable.

4. Suppose that a firm's production is shown to cause production spillovers. Show how a policy might improve efficiency.

A production spillover is also a positive externality where a firm's production benefits other firms. Uncorrected, firms will under-produce. A well-designed subsidy may correct this problem by reducing the overall marginal cost.



By assumption marginal utility (which is demand) is decreasing where each hot tub provides less additional utility than the previous hot tub.

5. Why is the downward curve downward sloping in this example?

Units	Marginal Utility	Marginal Cost
1	1000	2
2	900	22
3	600	111
4	400	132
5	200	200
6	100	222
7	100	4000

Table 1: Marginal Utility and Marginal Cost for Hot Tubs

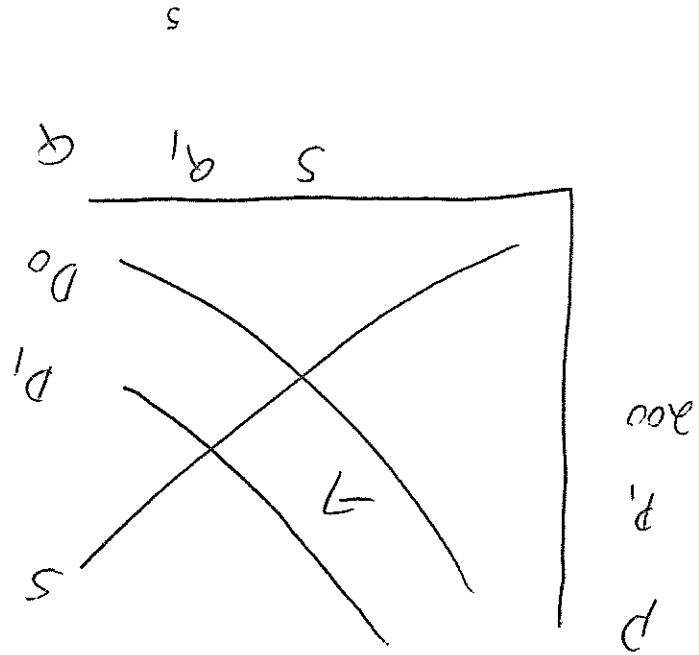
For questions #5-7, refer to the following table:

6. What are the equilibrium price and quantity in this example?

Equilibrium occurs where marginal cost (supply) equals marginal utility. This occurs when $P=5$ and $P=200$.

7. Suppose that hot tubs are shown to have previously unknown health benefits. How will this affect the equilibrium price and quantity.

This will increase utility, increasing demand. The equilibrium price and quantity will increase.



It has increased inequality. Both the pandemic and measures taken against it (business closures) have been concentrated in low-income sectors such as leisure and hospitality.

9. How has the recession related to covid-19 impacted economic inequality.

False. If inflation is evenly distributed (wages, interest rates, goods prices, etc.) then it will not change the economic distribution. Furthermore, even if it does change the distribution of wealth, it is subjective if that reduces welfare.

8. True or False? High inflation always reduces social welfare.

10. Our basic model of supply and demand assumes that households are price takers. Do you think that this is a valid assumption?

In most cases, yes. Households are often so numerous that no individual one can affect the price. But there are cases where there are only a few buyers (monopsony when there is one) and they have market power.

11. What subfield of macroeconomics seeks to understand why GDP per capita in Switzerland is more than 100 times higher than that in Madagascar?

This is a long-term difference in income. This is field of economic growth.

12. On January 1, 2021, the U.K. officially left the European Union (known as "Brexit"). This act means that the country will no longer participate in a common set of regulatory, trade, and labor policies with the remaining members. Is it valid to claim that Brexit led to a rise in unemployment?

No. There are many other factors that make which makes a simple before/after Brexit comparison invalid. We need to make the (harder) comparison between the UK data and a hypothetical UK without Brexit.

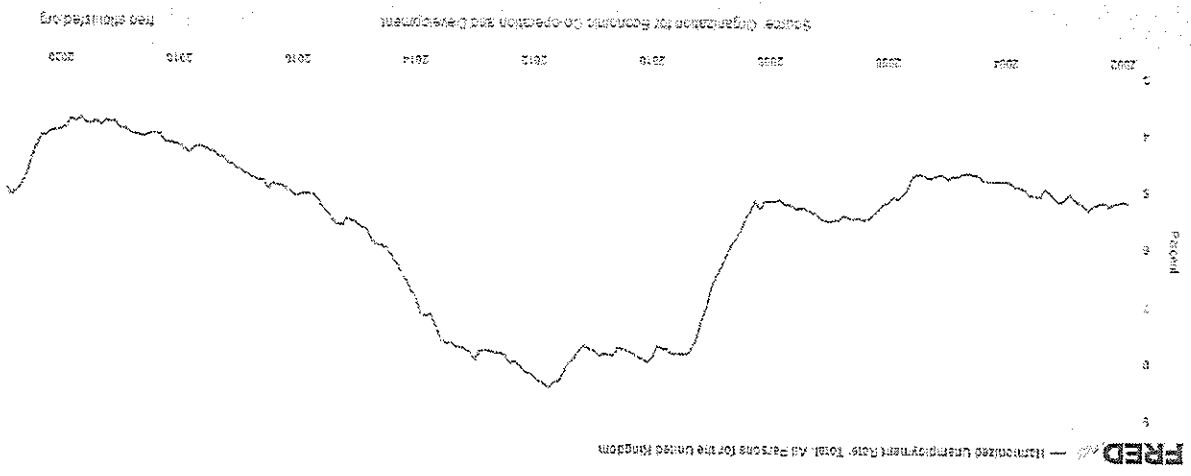


Figure 1: Unemployment Rate: United Kingdom

The following graph shows the United Kingdom's unemployment rate:

For Questions #13-16 use the following data:

Table 2: Economic Activity in the U.S.

	Q(2020)	P(2020)	Q(2021)	P(2021)
Imported Bacon	2	4	6	3
New Housing	2	10	3	12
Haircuts	3	1	2	1
Previously Built Housing	10	3	12	5
Education	5	8	1	8

13. Calculate nominal GDP for 2021. In doing so, explain why any items from the Table are *not* counted.

Imports (bacon) are excluded because they are not produced in the economy. Old housing is also

excluded.

$$NGDP_{21} = 12 \times 3 + 1 \times 2 + 1 \times 8 = 46$$

* Students putting education in investment did not lose credit
 $\pi_{21} = 0$
 $CPI_{20} = 3 \times 1 + 5 \times 8 = 43$
 $CPI_{21} = 3 \times 1 + 5 \times 8 = 43$
 baskets are valid)
 goods is 3 haircuts and 5 units of education (other
 Held quantities constant at base levels, so the basket of
 this is only haircuts and education.

15. Construct a basket of goods and services which includes only the items included in consumption. Use this index to calculate inflation in 2021.

$$GDP_{growth} = \frac{40 - 63}{63} =$$

$$rGDP_{21} = 10 \times 3 + 2 \times 8 + 5 \times 8 = 40$$

$$rGDP_{20} = 10 \times 2 + 3 \times 1 + 5 \times 8 = 63$$

- We hold prices constant at base levels (10, 1, 8)

14. Calculate real GDP growth in 2021 using 2020 as the base year.

Bonus: Using the data from the table, explain how GDP's exclusion of non-market activity in 2021 could cause 2021 GDP growth to be artificially low. In answering this question, consider how the covid-19 pandemic has affected some of the items from the table.

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we might consider education which fell from 9 units in 2020 to 2 units in 2021. It is possible that because of school closures, the decline is really a switch from education provided in a formal market to non-market education (e.g. homeschooling). This would then exaggerate the decline in economic activity.