

## Term Information

Effective Term Autumn 2022  
*Previous Value* Autumn 2019

## Course Change Information

### What change is being proposed? (If more than one, what changes are being proposed?)

We propose that this course be included in the Health & Well-being Theme.

### What is the rationale for the proposed change(s)?

The course meets the goals and expected learning outcomes of the theme. It also brings a valuable social and economic perspective to the theme. The course has a prerequisite of Economics 4001, which is taken by students across many colleges, particularly those in Fisher and Glenn. The course thus has the potential to serve a broad spectrum of majors.

### What are the programmatic implications of the proposed change(s)?

(e.g. program requirements to be added or removed, changes to be made in available resources, effect on other programs that use the course)?

No programmatic implications.

Is approval of the request contingent upon the approval of other course or curricular program request? No

Is this a request to withdraw the course? No

## General Information

Course Bulletin Listing/Subject Area Economics  
Fiscal Unit/Academic Org Economics - D0722  
College/Academic Group Arts and Sciences  
Level/Career Graduate, Undergraduate  
Course Number/Catalog 5860  
Course Title Health Economics  
Transcript Abbreviation Health Economics  
Course Description An introductory course to the field of health economics. Students will to apply concepts from introductory and intermediate microeconomics to problems that are faced in health and medical care. The focus is on individual demand for medical care; health insurance; markets for, and institutional features of, health care providers; measuring and pricing quality, and healthcare reform.  
Semester Credit Hours/Units Fixed: 3

## Offering Information

Length Of Course 14 Week, 12 Week, 8 Week, 7 Week, 6 Week, 4 Week  
Flexibly Scheduled Course Never  
Does any section of this course have a distance education component? No  
Grading Basis Letter Grade  
Repeatable No  
Course Components Lecture  
Grade Roster Component Lecture  
Credit Available by Exam No  
Admission Condition Course No  
Off Campus Never  
Campus of Offering Columbus, Lima, Mansfield, Marion, Newark, Wooster

[Previous Value](#)

[Columbus](#)

## Prerequisites and Exclusions

**Prerequisites/Corequisites** Prereq: 4001.01, 4001.02, or 4001.03. Prereq or concur: Stat 1450 or 2450.  
**Exclusions**  
**Electronically Enforced** No

## Cross-Listings

Cross-Listings

## Subject/CIP Code

**Subject/CIP Code** 45.0603  
**Subsidy Level** Doctoral Course  
**Intended Rank** Junior, Senior, Masters, Doctoral

## Requirement/Elective Designation

Health and Well-being

The course is an elective (for this or other units) or is a service course for other units

[Previous Value](#)

*The course is an elective (for this or other units) or is a service course for other units*

## Course Details

**Course goals or learning objectives/outcomes**

- Spending and Value in Healthcare

**Content Topic List**

- Health Demand
- Health Insurance
- Healthcare supply and Organization

**Sought Concurrence** No

[Previous Value](#)

## Attachments

- Cover-Letter-Submission.pdf: Cover Letter  
*(Cover Letter. Owner: Lam, Pok-Sang)*
- Submission-Health-Well-Being-ECON-5860.pdf: Submission Form  
*(Other Supporting Documentation. Owner: Lam, Pok-Sang)*
- ECON 5860 (2399523998) - Oostrom.pdf: Syllabus  
*(Syllabus. Owner: Lam, Pok-Sang)*
- ECON-5860-Problem-Sets.pdf: Main assignments  
*(Other Supporting Documentation. Owner: Lam, Pok-Sang)*

**Comments**

- Problem set is an important learning tool for this course. The submission form makes multiple references to the problem sets. A copy of problem sets is attached along with the syllabus for Autumn 2021. (by Lam, Pok-Sang on 03/02/2022 04:31 PM)

**Workflow Information**

Status	User(s)	Date/Time	Step
Submitted	Lam, Pok-Sang	03/02/2022 06:23 PM	Submitted for Approval
Approved	Peck, James D	03/03/2022 09:57 AM	Unit Approval
Approved	Vankeerbergen, Bernadette Chantal	05/03/2022 01:06 PM	College Approval
Pending Approval	Steele, Rachel Lea Cody, Emily Kathryn Jenkins, Mary Ellen Bigler Hanlin, Deborah Kay Hilty, Michael Vankeerbergen, Bernadette Chantal	05/03/2022 01:06 PM	ASCCAO Approval



Department of Economics

410 Arps Hall  
1945 North High Street  
Columbus, OH 43210-1172

Phone (614) 292-6701  
Fax (614) 292-3906

March 2, 2022

Dear colleagues:

On behalf of Economics, I am submitting Economics 5860 (Health Economics) for inclusion in the Health & Well-being theme. I am attaching:

- (a) Submission Form
- (b) Syllabus
- (c) Main Assignments

We feel the course meets the goals and expected learning outcomes of the theme, and it provides a valuable social and economic perspective. The course has a prerequisite in Economics 4001. Economics 4001 is a course taken by large number of students in Fisher, Glenn, and ASC. We thus believe the course will appeal to a wide spectrum of students.

I look forward to hearing from you.

Sincerely,

Pok-sang Lam  
Associate Professor  
Lam.1@osu.edu

### **Econ 5860: Health Economics**

Prof. Tamar Oostrom

Arps Hall 429

Email: [oostrom.1@osu.edu](mailto:oostrom.1@osu.edu)

Office Hours: Thursdays 11:00-12:00 AM and Fridays 1:00 – 2:00 PM

Office Hours Location: Arps Hall 429

Lecture Times: Wednesdays and Fridays, 2:20 PM – 3:40 PM

Lecture Location: Building: Cunz Hall, 140

Teaching Assistant: Guanting Yi ([yi.445@buckeyeemail.osu.edu](mailto:yi.445@buckeyeemail.osu.edu))

**Course Description:** This is an introductory course to the field of health economics. Students will learn how to apply concepts that were taught in introductory and intermediate microeconomics to problems that are faced in health and medical care. We will focus on individual demand for medical care; health insurance; markets for, and institutional features of, health care providers; and discussing the economics behind major US health care policy changes such as the Affordable Care Act.

**Course Website:** [carmen.osu.edu](http://carmen.osu.edu)

Assignments, announcements, and lecture slides will be posted on the course website. Please check the website regularly for updates. The syllabus is subject to change, and I will notify you when I update it.

#### **Required Reading:**

- 1: The textbook for the course is *Health Economics*, by Bhattacharya, Hyde, and Tu 2013, (denoted BHT in reading list). This is required. Online, used, or rental copies are fine.
- 2: Supplemental articles and research papers. These papers will be posted for download on the course website under the 'Files' tab.

#### **Prerequisites:**

Students should have a firm understanding of intermediate-level microeconomics and some knowledge of statistics.

#### **Evaluation:**

20% Problem Sets (5 problem sets, lowest score dropped)

30% Midterm Exam: Friday, October 8<sup>th</sup>

40% Final Exam: Wednesday Dec 15, 12:00 – 1:45 pm

10% Reading Quizzes (+ up to 5% Potential Bonus)

Attendance and course participation is not required but are very strongly encouraged. Accordingly, there will be occasional quizzes on the reading and other course concepts.

### **Problem Sets:**

There will be 5 homework assignments during the semester. The assignments will be made available on the course website. **Problem sets should be submitted on paper in class** by the designated due date/time. If necessary, assignments may be submitted on Carmen. These will be printed out by the grader, so try to minimize their workload. Late assignments will receive no credit. The grader may choose to accept very marginally late problem sets (i.e. up to one hour) at his discretion. Solutions will be posted on the course website the day after the assignment is due. Once solutions are posted, late assignments will not be accepted. However, I will drop your lowest homework grade.

Cooperation and collaboration among students when doing problem sets is encouraged. You may work in **groups of four students or fewer** to discuss the problem sets. You only need to hand in one problem set per group. All members of the group should actively participate in answering every question or exercise. Handing in other's work either for this class or for other purposes as your own is strongly discouraged; you will earn a referral to University authorities, per the university's academic misconduct policy.

Problem set questions are good practice for the exam and students are *strongly* encouraged to seek guidance on the problem set questions during office hours. I will also post detailed solutions to all problem sets.

### **Exams and Grading:**

There will be two exams. The midterm exam will focus on the first half of the course and the final and will focus primarily on material covered after the midterm but will include some material and concepts covered earlier.

Makeup exams will not be given. Notify me **in advance** if you have a *documented* medical or family emergency. In such cases, the weight for the missed midterm exam will be shifted to the final exam. Travel plans are not an emergency. It is your responsibility to plan around scheduled exam times. The date of the final exam is fixed and will not be changed.

Any requests for an assignment or exam to be re-graded must be addressed in person during office hours or after class. This applies to both simple issues – such as arithmetic errors in score calculation – and more complicated issues. If the issue cannot be resolved quickly and clearly, then a formal regrade may be granted. If a formal regrade is granted, then the entire assignment or exam will be regraded, which may result in a higher or lower total score.

### **Reading Quizzes**

Students should complete the required reading (marked with an \* in the schedule) each week. There will be short quizzes given randomly in class to assess whether students read the reading assignment. Please read the assigned paper carefully so that we can have an informed discussion.

### **Potential Bonus**

To reward active and thoughtful participation, I will have several extra credit opportunities. (1) We will discuss the required reading during class. Students may earn extra credit opportunities for bringing up relevant questions, incorporating class information, or providing thoughtful responses. (2) Students can also earn extra credit for thoughtfully responding to questions posed during class or raising their own. (3) At the start of class, students may bring up a recent health policy for the class to discuss. You may consider any health policy in any country. Describe the policy and bring up one potential effect. For example, how is this policy predicted to change health demand or health disparities? Does it impact the supply of health care? What (if any) evidence do we have on the effectiveness of the policy, relative to its costs? How does this policy affect health innovation? Does the policy affect moral hazard or adverse selection? Students may bring up a policy as a group; in that case all students involved will get credit.

All points will be tallied throughout the semester; students who fully engaged may earn up to 5% extra credit.

**Email Policy:** Expect a response within 24 hours (48 hours on weekends). If you do not receive a response within 24 hours, I encourage you to send a follow-up email. Do not send repeated emails about the same issue within a 24-hour period.

I will never raise, round, or edit any grade simply due to an email request, nor will I offer any extra credit opportunities that are not available to the whole class.

**Electronic Device Policy:** The use of electronic devices for note taking or quizzes is permitted during lectures. However, if a student's use of an electronic device becomes disruptive to the learning environment, then that student will be required to cease use immediately. Repeated disruptions will result in more serious consequences.

### **Course Grading; OSU Standard Scheme:**

Symbol	%	Symbol	%
A	93	C+	77
A-	90	C	73
B+	87	C-	70
B	83	D+	67
B-	80	D	60

For example, your points tally to 90; you would receive an A- for your final grade. The final grade may be curved at my discretion.

**Course Outline:**

<b>Week #</b>	<b>Class Date</b>	<b>Class #</b>	<b>Topic</b>	<b>Reading (* indicates response required)</b>	<b>Assignments</b>
1	Aug. 25	1	Course overview and introduction to health economics		
	Aug. 27	2	Demand for health care	Bhattacharya, Hyde, and Tu (BHT), Chp 2 Finkelstein (NYT, 2021)*	
2	Sept. 1	3	Demand for health care	Finkelstein (2012) pp. 1057-1062*	Problem Set 1 Posted
	Sept. 3	4	Behavioral Aspects of Demand and Economics of Addiction	BHT, Chp 24	
3	Sept. 8	5	Supply of Health Care: Physicians	BHT Chp. 5, Chp 13.3-13.4, Gawande (2009)*	
	Sept. 10	6	Supply of Health Care: Hospitals	BHT Chp 6	Problem Set 1 Due
4	Sept. 15	7	Production of Health, Health Disparities		
	Sept. 17	8			
5	Sept. 22	9	Health Spending	Reinhardt et al (2004)*	
	Sept. 24	10	Health Spending and Value	BHT 14.4-14.6	Problem Set 2 Posted
6	Sept. 29	11	Returns to Health Spending	Culter and McClellan (2001)*	
	Oct. 1	Class Cancelled			
7	Oct. 6	12	Review for Midterm		Problem Set 2 Due
	Oct. 8	13	In-class Midterm Exam		
8	Oct. 13	14	Health Insurance	BHT, Chp. 7	Problem Set 3 Posted



	Oct. 15	No Class, Autumn Break			
9	Oct. 20	15	Akerlof Model of Adverse Selection	BHT, Chp. 8	
	Oct. 22	16	Akerlof Model of Adverse Selection		Problem Set 3 Due
10	Oct. 27	17	Finish Akerlof Model, start Rothschild Stiglitz	BHT, Chp 9	
	Oct. 29	18	Rothschild Stiglitz		Problem Set 4 Posted
11	Nov. 3	19	Adverse selection in real health insurance markets	BHT, Chp 10	
	Nov. 5	20	Organization of health care markets in the US	BHT Chp 15.3, Chapter 18	Problem Set 4 Due
12	Nov. 10	21	Nationalized health care, social health insurance	BHT, Chp 16 & 17, Gruber (2008)*	
	Nov. 12	22	The ACA		
13	Nov. 17	23	The ACA and prospects for health insurance reform		Problem Set 5 Posted
	Nov. 19	Class Cancelled			
14	Nov. 24	No Class Thanksgiving			
	Nov. 26	No Class (Indigenous People's Day)			
15	De., 1	24	The ACA and prospects for health insurance reform		
	Dec. 3	25	The ACA or Drug development and pharmaceuticals (time depending)	BHT, Chp 12	Problem Set 5 Due
16	Dec. 8	26	Review and conclude		
	Dec 15, 12:00 – 1:45 pm	Final Exam			

**Other Course Resources and Policies:**

You are expected to follow all university-wide policies. You can familiarize yourself with those policies, including the Code of Student Conduct and other policies, here:

<http://policies.osu.edu/home>

- **Statement on Academic Misconduct:** It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>.
- **Statement about Disability Services:** The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12<sup>th</sup> Avenue.

### **Reading List**

Cutler, David and Mark McClellan, “Is Technological Change in Medicine Worth It?” Health Affairs, 2001 (20):5.

Finkelstein, Amy, “Why It’s So Hard to Cut Waste in Health Care” New York Times, January 22, 2021. <https://www.nytimes.com/2021/01/22/business/why-its-so-hard-to-cut-waste-in-health-care.html>

Finkelstein, Amy, Sarah Taubman, Bill Wright, Mira Bernstein, Jonathan Gruber, Joseph Newhouse, Heidi Allen, Katherine Baicker, and The Oregon Health Study Group, “The Oregon Health Insurance Experiment: Evidence from the First Year,” Quarterly Journal of Economics, 2012, 127(3).

Gawande, Atul, “The Cost Conundrum,” The New Yorker, 2009  
<https://www.newyorker.com/magazine/2009/06/01/the-cost-conundrum>

Gruber, Jon, “Covering the Uninsured in the United States,” Journal of Economic Literature, 2008, 46(3): 571-606.

Reinhardt, Uwe, Peter Hussey, and Gerard Anderson, “US Health Care Spending In An International Context,” 2004, 23(3).

**Econ 5860: Health Economics**

Professor Tamar Ostrom

Ohio State University

Fall 2021

Problem Set 1

Due Date: September 10th, 2021 by the beginning of class

Please submit assignments in class

**A. True/False Explain.** Indicate whether each of the following statements is true or false and then explain why you think this. Include in your explanation any pertinent institutional details and economic reasoning (including appropriate graphs and equations). *Please provide concise, clear answers with minimal irrelevant detail. **Explanation is required.** (5 points each).*

1. Suppose you are interested in estimating the elasticity of demand for medical care. A good way to do this would be to compare the quantity demanded by people with insurance to the quantity demanded by people who chose not to buy insurance, and estimate how quantity responds to the reduction in prices caused by insurance coverage.
2. According to the model of rational addiction, an increase in taxes on addictive goods is likely to reduce the number of non-addicted consumers who try the addictive good for the first time.

**B. Analytical Problems:** Please show all calculations for full credit.

3. (12 points) Suppose you are collecting data from a country like Japan where the government sets the price of health care. Each prefecture in Japan has a different set of prices. Data from 1999 are displayed in the following table:

Region	Outpatient Visits	Price per Visit
Tokyo	1 per month	25 Yen
Hokkaido	2 per month	15 Yen

- a. What is the arc price elasticity of demand for health care in Japan based on these data?
- b. Suppose that incomes are generally much higher in Tokyo than in Hokkaido. Is the correct demand function more elastic or more inelastic than your answer to the previous question? Justify your answer.

- c. Using your estimated elasticity from part a, what would the demand for health care be if the price in Tokyo were raised to 30 Yen per visit?
  - d. Using your estimated elasticity from part a, what would the demand in Hokkaido be if the price were lowered to 5 Yen per visit?
4. (8 Points) California decides to introduce a tax on the sale of marijuana. Assume the elasticity of demand is -0.5, and that supply is perfectly elastic.
- a) If the tax increases the price of marijuana by 100%, what will happen to the amount that is sold?
  - b) Suppose marijuana is addictive, and that consumers who choose to buy it are rational addicts. Explain what the theory of rational addiction predicts will happen to the quantity sold today if the tax increase begins next year. (Note: the theory of rational addiction says nothing about stockpiling goods to avoid paying taxes, so that is not the answer I am looking for.)
  - c) (Extra Credit Question) Suppose there is a legal market with perfectly elastic supply that pays the tax, and a secondary black market that evades the tax. The elasticity of supply in the black market is 1 (the number doesn't matter, just assume that it's neither perfectly elastic nor perfectly inelastic), and assume that after the tax it's cheaper to buy from the black market at low market quantities. Draw an example of what the market supply curve would look like. (Hint: the market supply curve represents the lowest price at which you could buy a given quantity of a good.) Now suppose the state is short on money so they raise the tax rate. Show using a supply-demand diagram what will happen to total tax revenue.
5. (10 Points) Suppose that demand for COVID vaccines is a function of price with  $D=300,000,000-100,000*P$ . Assume supply is perfectly elastic and the market price is \$1600. This vaccine requires only one unit or dose per person.
- a) Assume nobody has insurance and everyone pays market price for the vaccine. How many units will be demanded?
  - b) Now assume the vaccine is free, how many units will be demanded? If the population of the united states is 350 million, what share of the population will get a vaccine?
  - c) Now assume the vaccine price drops from market price to just a 10% copay (assume 90% of the price is paid by the government). What is the gain in consumer surplus?
  - d) What is the increase in spending by the government?

- e) What is the total deadweight loss?
- f) This welfare calculation only included individual consumer and producer surplus due to the price individuals paid or received for the vaccine. Name one other factor a welfare calculation of vaccines should involve.



3. Clemens and Gottlieb (2014) found that when physicians receive lower prices, they provide less medical care to their patients.

**Analytical Questions: Please show all calculations for full credit.**

- 4 Hearing Loss and QALY : A new device is invented to cure hearing loss. Imagine this device is similar to a cochlear implant, but perfectly effective. Demand for these hearing devices in the US is given by  $Q = 2000 - P$ . The supply of these devices is perfectly elastic, with a market price of \$1,000.

a) [1 point] After surveying individuals, deaf individuals report they are indifferent between living for ten years with hearing loss or six years with perfect hearing. Based on this survey, what is the implied QALY associated with hearing loss?

b) [2 points] What is the equilibrium price and quantity for hearing devices?

c) [2 points] A new universal health insurance policy provides insurance to everyone in the country, which pays 50% of all medical costs. After this policy is enacted, what will be the new quantity of hearing devices purchased?

d) [2 points] Suppose the value of a QALY is determined to be \$1,000. Calculate the increased benefit to consumers of universal health insurance due to QALY.

e) [3 points] What is the deadweight loss from moral hazard caused by universal health insurance?

(f) [1 point] Is the gain in QALYs due to universal health care in this setting larger or smaller than the DWL?



5 Physician Supply: The supply of physician office visits is given by  $Q_S=40P-1000$ , and demand for physician office visits is  $Q_D=6000-60P$ .

a. [2 points] If the market is perfectly competitive, what are the equilibrium price and quantity?

b. [3 points] Suppose there is an entry barrier that prevents new physicians from entering the market, which limits  $Q_S \leq 1200$ . What is the market price given this entry barrier?

c. [3 points] How much total welfare (consumer surplus + producer surplus) is lost because of the entry barrier?

## Short Answers

- 6 [3 points] Dranove and Wehner (1994) argue that the statistical evidence used to support the supplier-induced demand hypothesis is invalid because they find that the same statistical techniques also suggest that obstetricians induce demand. In other words, having more obstetricians in an area is correlated with more births in that area. Briefly explain the supplier-induced demand hypothesis and why this finding by Dranove and Wehner is evidence against the hypothesis. [Note: This is not directly related to the lecture slides on Johnson and Rehavi (2014), which consider the delivery method for births, not the number of births.]
  
- 7 [3 points] We would like to estimate the causal effect of income on health spending. Suppose that both income and actual health (and only those two things!) affect health spending. However, we do not observe actual health, so we can only regress income on health spending. What would we expect the sign of the omitted variable bias to be on the coefficient on income? [You may assume that individuals with higher actual health have higher incomes on average. You may also assume that individuals with higher actual health spend less on medical care.]

## Econ 5860: Health Economics

Professor Tamar Oostrom

Ohio State University

Fall 2021

Problem Set 3

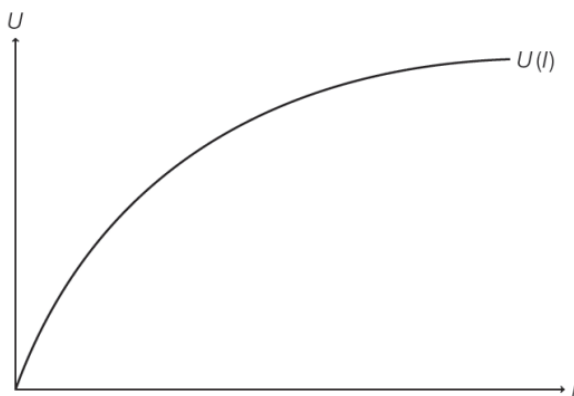
Due Date: October 22nd, 2021 by the beginning of class

Please submit assignments in class

**A. True/False Explain.** Indicate whether each of the following statements is true or false and then explain why you think this. Include in your explanation any pertinent institutional details and economic reasoning (including appropriate graphs and equations). *Please provide concise, clear answers with minimal irrelevant detail. Explanation is required.*

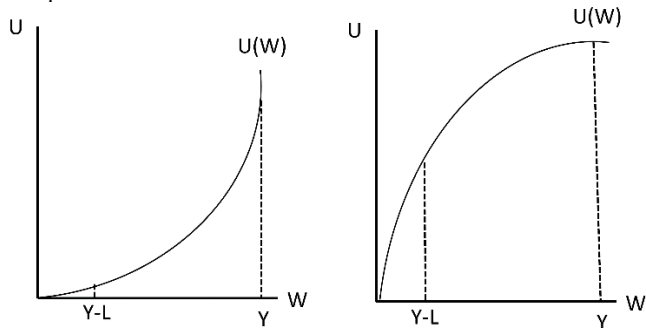
1. [5 points] In the basic model of demand for insurance in competitive markets, consumers may prefer partial and actuarially unfair insurance to full and actuarially unfair insurance.
2. [5 points] Jimmy owns a lottery ticket that has a 50% chance of winning \$1000 (and a 50% chance of paying nothing). Because Jimmy is risk averse, with preferences consistent with the utility function graphed below, he is indifferent between owning the lottery ticket or owning \$400 in cash.

True or false: if the probability of the lottery ticket winning decreases to 25%, Jimmy will be willing to sell the lottery ticket for \$150. [Hint: You do not have enough information to calculate the precise value at which Jimmy is willing to sell his ticket. However, you can determine if it is more or less than \$150.]



3. [5pts] Robinson Crusoe and Friday are shipwrecked on a desert island. Having taken Economics 4001, they know that they should create a market-based system for allocating their scarce resources efficiently, so they develop their own currency. Robinson Crusoe is risk-averse, with utility for dollars given by the graph on the right, while Friday is risk-loving, with utility for dollars given by the graph on the left. Each of them begins with  $Y$  dollars, but each faces a 50% (independent) risk of having  $L$  dollars stolen by pirates.

True or false: Robinson and Friday can increase social welfare by creating their own market for pirate insurance.



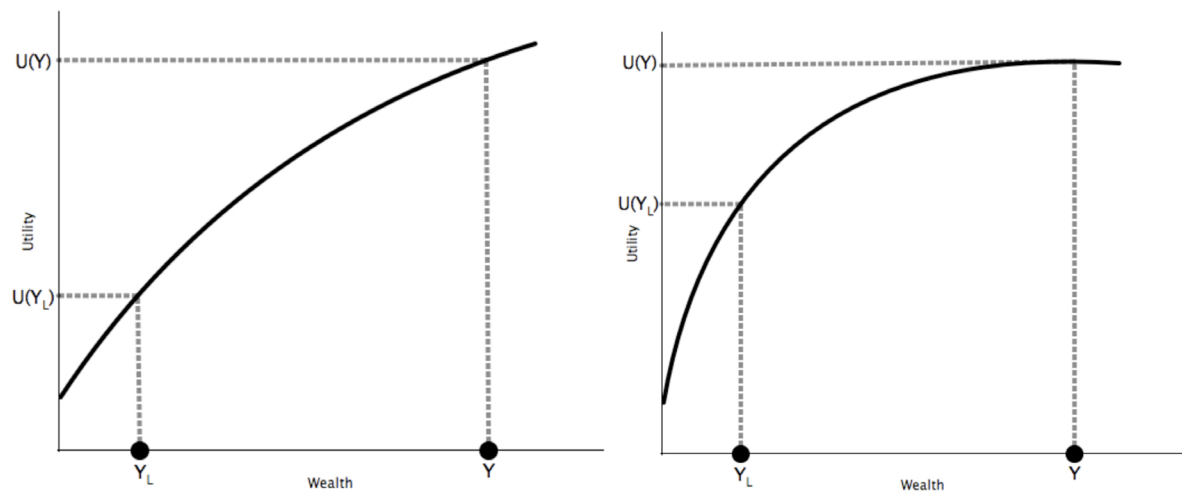
4. [5 points] Under partial insurance, income in the sick state with insurance is higher than income in the healthy state.

## B. Analytical Problems

4. [10 points] An individual has a health insurance plan with a deductible of \$1200 and a coinsurance rate of 50%. Their demand curve is  $Q=20-(P/10)$ , and the equilibrium market price of medical care is \$100 per unit. What quantity of medical care will the individual choose to consume?

5. Demand for Insurance. The next two questions refer to Figure 2 below.

Figure 2.



Graph 1

Graph 2

Suppose individual A and B both have a  $\frac{1}{2}$  probability of receiving  $Y$  and a  $\frac{1}{2}$  probability of receiving  $Y_L$ . Individual A is more risk averse than individual B.

- a. [4 points] Label which of the graphs above describes individual A and individual B's utility function.
  
- b. [6 points] Suppose the insurer offers an actuarially unfair, full-insurance contract. Draw on each of the graphs the maximum administrative costs that each individual would be willing to pay. Is this amount larger for person A or person B?

**Econ 5860: Health Economics**

Professor Tamar Oostrom

Ohio State University

Fall 2021

Problem Set 4

Due Date: November 10th, 2021 by the beginning of class

Please submit assignments in class

**A. True/False Explain.** Indicate whether each of the following statements is true or false and then explain why you think this. Include in your explanation any pertinent institutional details and economic reasoning (including appropriate graphs and equations). *Please provide concise, clear answers with minimal irrelevant detail. **Explanation is required.***

1. Policymakers in at least 14 states in the US have in recent history passed laws called “community-rating” laws. The idea of these laws is that, since individual private health insurance markets don’t seem to function very well, leaving many older and sickly people unable to purchase affordable insurance, community rating laws impose restrictions on prices that insurance companies are allowed to charge. Consider a community rating law that forces insurance companies to charge the same price to all individuals (and forces insurance companies to sell insurance to anyone who is willing to pay the chosen price).

[5 points] True or false: the Rothschild-Stiglitz model suggests that this law will help old and sickly people gain access to insurance.

## B. Analytical Problems

2. Consider the market for used cars discussed by Akerlof. Car sellers have the utility function

$$U_S = M + \sum a x_i$$

where  $M$  is the amount of money they have,  $x_j$  is the quality level of the  $j$ th car, and 'a' is the coefficient on car quality in the utility function.

Buyers have utility function

$$U_B = M + \sum b x_i$$

There is a uniform distribution of quality of the cars held by sellers,  $x_i \sim U[0,2]$ . Sellers know the quality of the cars, but buyers only know the average quality of the cars on the market. Buyers also know the utility function of sellers.

- a. [5 points] Let  $P$  be the price of used cars put up for sale. What is the average quality of cars put up for sale as a function of  $P$  and  $a$ ?

- b. [5 points] For what values of  $b$  will buyers be willing to buy the cars?

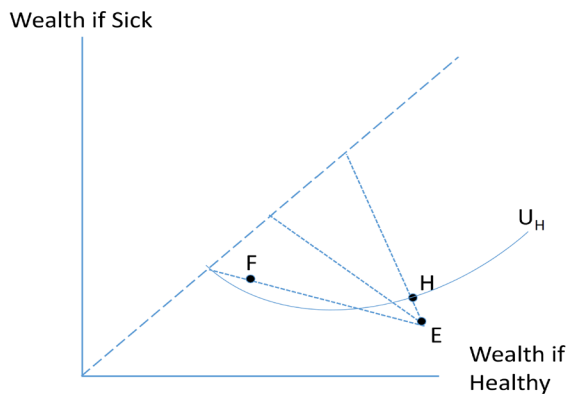
- c. [5 points] Consider a version of the Akerlof model in which *neither buyers nor sellers observe car quality* (though somehow – please suspend your disbelief – both buyers and sellers enjoy higher utility from higher quality cars). For this question, please assume that *both buyers and sellers recognize that neither can observe car quality*.



Sellers' utility function is given by  $U_S = M + \sum x_i$  and buyers' utility is given by  $U_B = M + \sum 3x_i$  where  $M$  is the level of consumption of non-car goods and  $x_i$  is the quality level of car, and there is a uniform distribution of quality of the cars held by sellers,  $x_i \sim U[0,100]$ .

In this market, is there a price,  $p$ , at which all cars will sell? If not, prove there is no such price. If so, calculate what prices will work.

3. Consider the figure below



- a. [2 points] Explain why  $U_H$  is not a valid indifference curve.
  
- b. [3 points] Draw a new version of the diagram with the same indifference curve. On the new diagram, label two insurance contracts, A and B, such that A provides more income in both states of the world but the individual with the indifference curve in the diagram nonetheless prefers contract B over contract A.

- c. [2 points] Draw a new diagram with a version of the indifference curve that represents valid preferences
  
  - d. [3 points] Is the set of contracts (F, H) a valid separating equilibrium if the high risk individuals have preferences as you have drawn them in part c?
4. Consider the basic Rothschild-Stiglitz model with asymmetric information and two types on consumers. A policymaker who has taken this class suggests that it might be beneficial to impose a flat tax on healthy people and distribute the tax revenue to sick people, providing partial insurance to people.
- a. [5 points] Since the tax will only offer partial insurance, there will still be a private competitive market for additional insurance. Will a separating equilibrium be possible in the insurance market if this tax is implemented? Draw a diagram to justify your answer.
  
  - b. [5 points] After the tax is implemented a recession hits and a new policymaker decides to make up for a tax revenue shortfall by expanding the tax to include sick people as well as healthy people. Will a separating equilibrium be possible in the insurance market under this policy.

## Econ 5860: Health Economics

Professor Tamar Oostrom

Ohio State University

Fall 2021

Problem Set 5

Due Date: December 3rd, 2021 by the beginning of class

Please submit assignments in class

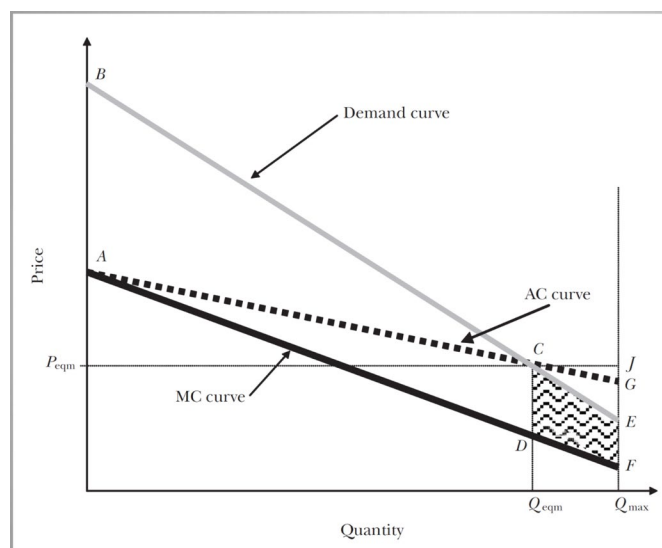
**A. True/False Explain.** Indicate whether each of the following statements is true or false and then explain why you think this. Include in your explanation any pertinent institutional details and economic reasoning (including appropriate graphs and equations). *Please provide concise, clear answers with minimal irrelevant detail. Explanation is required.*

1. [5 points] In the Rothschild-Stiglitz model, more risk averse consumers have flatter indifference curves, all else equal.
2. [5 points] Suppose there is a separating equilibrium in the Rothschild-Stiglitz model. If everyone becomes more risk averse, this can cause the equilibrium to collapse.
3. [5 points] There is empirical evidence that young people subsidize the cost of insurance for older people in the ACA health insurance exchanges.

### B. Analytical Problems

#### 4. Individual Health Insurance Mandates and Adverse Selection

Consider a market for health insurance similar to the one depicted below that we discussed in class.



Suppose individuals have different health levels  $H$ , where  $H$  is distributed uniformly between 0 and 9. The marginal cost of medical care depends on an individual's health  $H$ , and is characterized by the function  $MC=1000+1000 \cdot H$  (notice that a higher value of  $H$  corresponds to a sicker person, with higher marginal costs, so the left edge of the graph corresponds to the sickest person with  $H=9$ , and the right edge of the graph corresponds to the healthiest person with  $H=0$ ). Individuals are risk averse, there is a single insurance plan available for purchase (as in the Akerlof model, NOT the R-S model), and individuals have utility functions for this insurance plan that result in a risk premium equal to  $RP=1000 \cdot H$ .

- a) [2 points] Write down the equation describing the demand function for this insurance plan. (Hint: the demand function should express willingness to pay for insurance as a function of  $H$ ).
- b) [3 points] Write down the equation describing the average cost function of the insurer. (Hint: since the MC function is linear, the AC function is also linear. If you find any two points along the line you can figure out the equation for the line.)
- c) [5 points] Draw a graph similar to the one above containing the demand function, MC function, and AC functions. For each function indicate the values of the vertical intercepts on the left ( $H=9$ ) and right ( $H=0$ ) sides of the graph.
- d) [2 points] What is the equilibrium price  $p^*$  of the insurance plan in this market?
- e) [3 points] Which consumers will purchase the insurance plan in equilibrium? (Your answer should depend on  $H$ .)
- f) [3 points] Calculate the size of the deadweight loss from adverse selection in the insurance market.

Now suppose an individual insurance mandate is imposed that forces all consumers to purchase insurance or else pay a tax of \$3000.

- g) [3 points] What will the insurance mandate do to the equilibrium price of insurance?
- h) [2 points] What is the effect of the mandate on the deadweight loss from adverse selection in the market?
- i) [2 points] What is the smallest mandate tax penalty that will completely eliminate the deadweight loss from adverse selection in this market?

# GE THEME COURSES

## Overview

Courses that are accepted into the General Education (GE) Themes must meet two sets of Expected Learning Outcomes (ELOs): those common for all GE Themes and one set specific to the content of the Theme. This form begins with the criteria common to all themes and has expandable sections relating to each specific theme.

A course may be accepted into more than one Theme if the ELOs for each theme are met. Courses seeing approval for multiple Themes will complete a submission document for each theme. Courses seeking approval as a 4-credit, Integrative Practices course need to complete a similar submission form for the chosen practice. It may be helpful to consult your Director of Undergraduate Studies or appropriate support staff person as you develop and submit your course.

Please enter text in the boxes to describe how your class will meet the ELOs of the Theme to which it applies. Please use language that is clear and concise and that colleagues outside of your discipline will be able to follow. You are encouraged to refer specifically to the syllabus submitted for the course, since the reviewers will also have that document. Because this document will be used in the course review and approval process, you should be *as specific as possible*, listing concrete activities, specific theories, names of scholars, titles of textbooks etc.

## Accessibility

If you have a disability and have trouble accessing this document or need to receive it in another format, please reach out to Meg Daly at [daly.66@osu.edu](mailto:daly.66@osu.edu) or call 614-247-8412.

Course subject & number

## General Expectations of All Themes

**GOAL 1: Successful students will analyze an important topic or idea at a more advanced and in-depth level than the foundations.**

**Please briefly identify the ways in which this course represents an advanced study of the focal theme.** In this context, “advanced” refers to courses that are e.g., synthetic, rely on research or cutting-edge findings, or deeply engage with the subject matter, among other possibilities. (50-500 words)

Course subject & number

**ELO 1.1 Engage in critical and logical thinking about the topic or idea of the theme.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

**ELO 1.2 Engage in an advanced, in-depth, scholarly exploration of the topic or idea of the theme.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

Course subject & number

**GOAL 2: Successful students will integrate approaches to the theme by making connections to out-of-classroom experiences with academic knowledge or across disciplines and/or to work they have done in previous classes and that they anticipate doing in future.**

**ELO 2.1 Identify, describe, and synthesize approaches or experiences as they apply to the theme.**

Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. (50-700 words)

**ELO 2.2 Demonstrate a developing sense of self as a learner through reflection, self-assessment, and creative work, building on prior experiences to respond to new and challenging contexts.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met.

(50-700 words)

Course subject & number

Specific Expectations of Courses in Health & Wellbeing

**GOAL Students will explore and analyze health and wellbeing through attention to at least two dimensions of wellbeing. (Ex: physical, mental, emotional, career, environmental, spiritual, intellectual, creative, financial, etc.).**

**ELO 1.1 Explore and analyze health and wellbeing from theoretical, socio-economic, scientific, historical, cultural, technological, policy, and/or personal perspectives.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. *(50-700 words)*

**ELO 1.2 Identify, reflect on, and apply the skills needed for resiliency and wellbeing.** Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. *(50-700 words)*