

Answer all questions in the space provided on the exam.

Total of 36 points (and worth 22.5% of final grade).

**Read each question carefully, so that you answer the question.**

**Short Answer (6 points each question)**

1. Circle True or False to each of the following statements about the U.S. health market.

[One point each.]

- (a) **True False** U.S. Health expenditures in 2017 will exceed \$12,000 per capita.
- (b) **True False** Hospital care, physicians, and pharmaceutical drugs combined will account for approximately two-thirds of health expenditures in 2017.
- (c) **True False** Medicare is health insurance targeted at adult poor people of any age.
- (d) **True False** HMOs declined substantially with the introduction of FFS insurance.
- (e) **True False** Under a Bronze 60 Health Savings Account plan an insured person pays 40% of in-network specialist visits if annual deductible is not yet reached.
- (f) **True False** Approximately 10% of the U.S. population has no insurance.

2. John believes he faces health costs in the current year of either \$2,000 with probability 0.9 or \$12,000 with probability 0.1.

(a) He can purchase complete insurance for \$4,000. Is this premium actuarially fair? Explain your answer.

(b) Suppose an insurance company sells insurance to 10,000 people who face the same distribution of health costs as does John. What interval will the average claim per individual insured person lie in with probability 0.95?

(c)(i) Suppose the health outcomes for the 10,000 people in part (b) are positively correlated. Will the interval in part (b) be **wider, the same** or **narrower**? No explanation is needed.

(ii) John obtains a major medical and hospital policy that covers all costs, aside from a \$600 annual deductible and a 10% coinsurance rate. If John actually incurs annual health charges of \$4,000, by how much will his health insurance company reimburse him?

3. Consider the following table

TABLE 3— VARIOUS MEASURES OF PREDICTED MEAN ANNUAL USE OF MEDICAL SERVICES, BY PLAN

Plan	Likelihood of Any Use (%)	One or More Admissions (%)	Medical Expenses (1984 \$)
Free	86.7 (0.67)	10.37 (0.420)	777 (32.8)
Family Pay			
25 Percent	78.8 (0.99)	8.83 (0.379)	630 (29.0)
50 Percent	74.3 (1.86)	8.31 (0.400)	583 (32.6)
95 Percent	68.0 (1.48)	7.75 (0.354)	534 (27.4)
Individual Deductible	72.6 (1.14)	9.52 (0.529)	623 (34.6)

(a)(i) What do we learn from this table? **A brief explanation will do.**

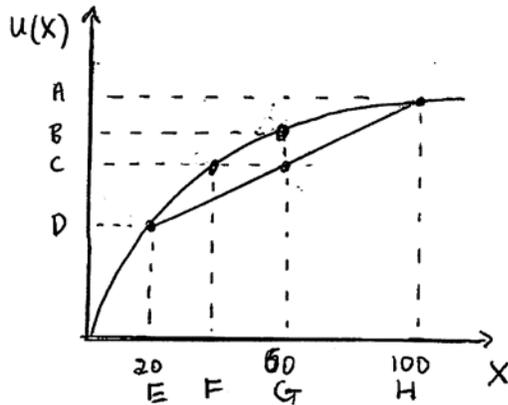
(ii) Is this table obtained from a randomized experiment or from health records of a random sample of people who happen to obtain different levels of insurance through their employers?

(b) Calculate the arc price elasticity of demand for medical expenses in moving from the 25% plan to the free plan. Note: the 25% plan was effectively only a 16% coinsurance plan as it had 25% coinsurance only up to a limit and then 0% thereafter. So use a coinsurance rate of 16%.

(c)(i) State one advantage of having health insurance through an HMO rather than FFS..

(ii) State one disadvantage of having health insurance through an HMO rather than FFS.

4.(a) You are given the following diagram for someone facing either  $X = 20$  with probability 0.5 or  $X = 100$  with probability 0.5.



(i) The utility obtained from full insurance at the actuarially fair premium is given by which point (**circle one**): A B C D E F or G.

(ii) The expected utility obtained without insurance is given by which point (**circle one**): A B C D E F or G.

(b) In insurance markets such as health insurance markets, risk is being transferred from individuals to insurance companies.

(i) Why are health insurance companies willing to take on this risk?  
**A very brief answer will do.**

(ii) Why are individuals willing to pay a premium above what they expect to get back in reimbursements? **A very brief answer will do.**

(c) On an appropriate diagram show the effect on market demand of going from no health insurance to health insurance with 50% coinsurance.

On the same diagram show the welfare loss due to moral hazard.

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5. Consider Stata output for people who have insurance with either 0% coinsurance or 95% coinsurance.

```
. describe out_infl coins0 coins95
```

variable name	storage type	display format	value label	variable label
out_infl	double	%9.0g		outpatient medical spending in 2011 dollars
coins0	float	%9.0g		= 1 if 0% coinsurance and = 0 otherwise
coins95	float	%9.0g		= 1 if 95% coinsurance and = 0 otherwise

```
. regress out_infl coins95
```

Source	SS	df	MS	Number of obs	=	710
Model	26654411.3	1	26654411.3	F(1, 708)	=	11.22
Residual	1.6816e+09	708	2375204.2	Prob > F	=	0.0009
Total	1.7083e+09	709	2409448.5	R-squared	=	0.0156
				Adj R-squared	=	0.0142
				Root MSE	=	1541.2

out_infl	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
coins95	-406.0351	121.2075	-3.35	0.001	-644.0043 -168.066
_cons	1127.435	71.77943	15.71	0.000	986.5088 1268.361

(i) Give the average difference in spending between the two plans.

(ii) Give a 95% confidence interval for the mean difference in spending between the two plans.

(iii) Does a test at significance level 5 percent reject the null hypothesis that mean spending is the same in the two plans? **Explain your answer.**

(iv) Suppose we give the command **ttest out\_infl, by(coins95)**

Will this also provide an estimate of the average difference in spending between the two plans?

A simple YES or NO will do.

(v) Provide an estimate of average spending in the 0% coinsurance plan.

(vi) Would the command **summarize out\_infl** give output that includes a 95% confidence interval for average spending across the two plans?

A simple YES or NO will do.

**Multiple Choice (1 point each) Note: You should spend 15-20 % of time on these!**

1. The Rand experiment was able to more accurately measure
  - a. the difference in outpatient spending across plans
  - b. the difference in inpatient spending across plans
  - c. there was little difference in ability to measure a. or b.
  
2. A gatekeeper is a feature of
  - a. HMO insurance
  - b. FFS insurance
  - c. both a. and b.
  - d. neither a. nor b.
  
3. Managed competition refers to
  - a. insurance companies being regulated to prevent them from making supernormal profits
  - b. insurance companies competing between themselves to sell a standardized insurance product
  - c. health care providers competing between themselves to increase market share
  - d. none of the above.
  
4. Obamacare led to decrease in the numbers uninsured by
  - a. widening the eligibility to Medicare
  - b. providing subsidies for lower income people purchasing insurance on the insurance exchanges
  - c. both a. and b.
  - d. neither a. nor b.
  
5. A risk-averse consumer has expected annual health costs of \$4,000 (with a standard deviation of \$5,000). For \$5,000 she can purchase a health insurance policy that will cover all her actual health costs. It follows that
  - a. she will **definitely not buy** the health insurance policy
  - b. she will **possibly buy** the health insurance policy
  - c. she will **definitely buy** the health insurance policy
  
6. A risk-averse consumer is more likely to purchase insurance
  - a. The greater the curvature of their utility of income function
  - b. The greater the range of income outcomes they face
  - c. neither a. nor b.
  - d. both a. and b.