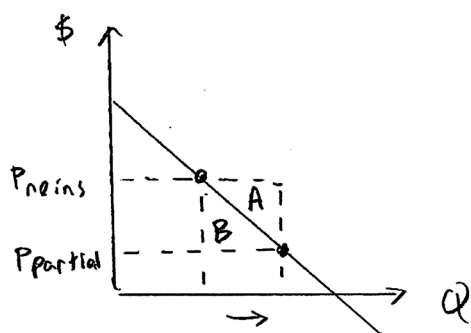
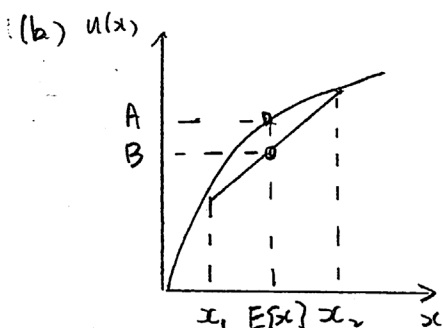


1.(a)



$A+B$ = increase in total expenditures

A = welfare loss due to moral hazard



- x_1 or x_2 equally likely with expected value $E(x)$
- A is $U(E(x))$ utility if get $E(x)$ for sure
- B is $E(u(x))$ expected utility in uncertain world.
- A has higher utility than B

(c)(i) $X = 2,000$ with probability 0.2 and $X = 7,000$ with probability 0.8.

Mean of health expenses: $E[X] = 0.2 \times 2,000 + 0.8 \times 7,000 = \$6,000$.

Variance of health expenses: $V[X] = 0.2 \times (2,000 - 6,000)^2 + 0.8 \times (7,000 - 6,000)^2$
 $= 0.2 \times 16,000,000 + 0.8 \times 1,000,000 = 4,000,000$

Standard deviation of health expenses = S.D.[X] = $\sqrt{4,000,000} = \$2,000$.

Standard deviation of average claims = S.D.[X] / $\sqrt{N} = 2,000 / \sqrt{40,000} = \10 .

95 % are within two standard deviations of mean since average is normally distributed.

i.e. $(\$6,000 - 2 \times 10, \$6,000 + 2 \times 10) = (\$5,980, \$6,020)$.

(ii) John receives from insurance $0.7 \times (8000 - 5000) = 0.7 \times 3000 = \underline{\$2,100}$.

2.(i) Yes. It is currently difficult to obtain health care price and quality information.

(ii) No. The credit is substantially lower than what insurance policies currently cost.

[This is a sufficient answer. In fact a family policy through employer cost on average $> \$15,000$ in 2014].

(iii) Yes. It doesn't seem that it would replace other money the government is spending.

For every 10 million families the credit is \$57 billion more in government spending.

(iv) Those who cannot get insurance through an employer will have more opportunity to get a more reasonably priced insurance policy through a private policy due to being in a large pool.

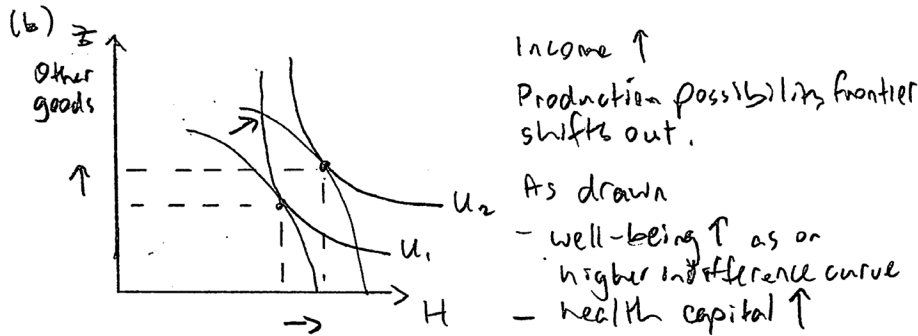
(v) The Ryan plan has no individual mandate to have insurance, unlike President Obama's plan.

(vi) This is harder though there are many possibilities. No mention of expanding Medicaid coverage, or creating a cost-effectiveness institute, or lowering Medicare and Medicaid reimbursement rates.

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3.(a) For passive versus aggressive: MC per marginal QALY saved = $(\$100,000 - \$40,000) / (10 \times 0.7 - 5 \times 0.5) = \$60,000 / 4.5 = \$13,333$.

It's cost effective if we feel a QALY is worth at least \$13,333.



(c)(i) Cost-benefit analysis compares cost to benefits with both measured in dollars.

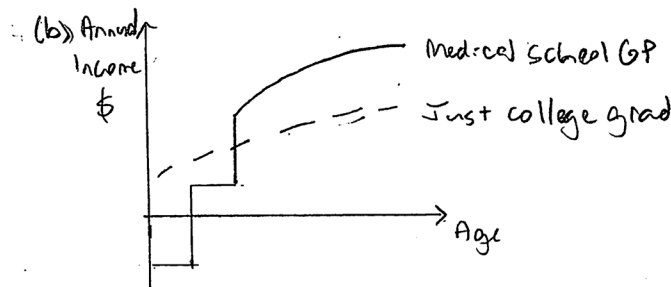
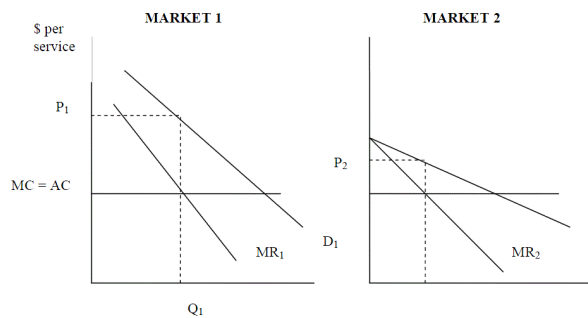
Cost-effectiveness analysis calculates cost (in dollars) per standardized outcome such as QALY that need not be measured in dollars.

(ii) We have

Number of teams	1	2	3	4	5	6	7
Lives saved	200	400	500	510	512	513	513
Marginal lives saved	200	200	100	10	2	1	0
Marginal cost	100,000	100,000	100,000	100,000	100,000	100,000	100,000
MC per life saved	500	500	1,000	10,000	50,000	100,000	∞

So choose 4 teams as with 4 teams $10,000 < 20,000$ but with 5 teams $50,000 > 20,000$.

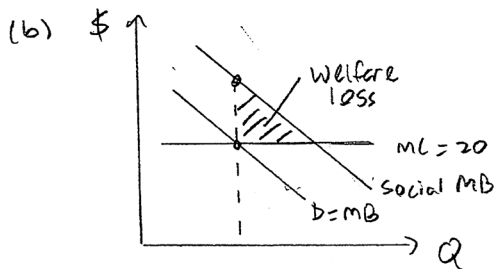
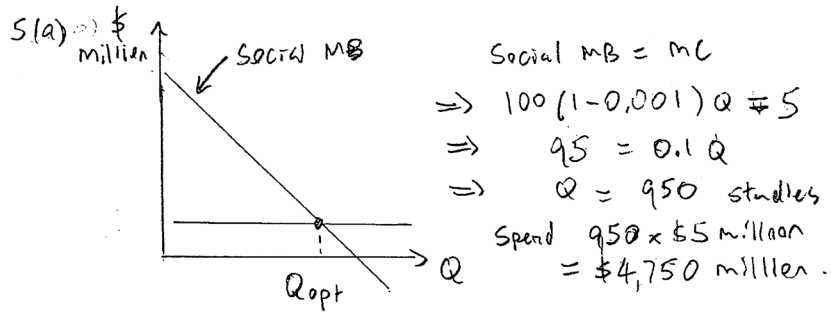
4.(a)



(c)(i) A prospective payment system pays providers a fixed amount for treatment of a health condition, such as a tonsillectomy, regardless of how much it costs the provider to perform the treatment.

(ii) Herfindahl-Hirschman Index is used to measure market concentration. In particular if a regional hospital market is highly concentrated (high HHI) then hospitals have a lot of market power.

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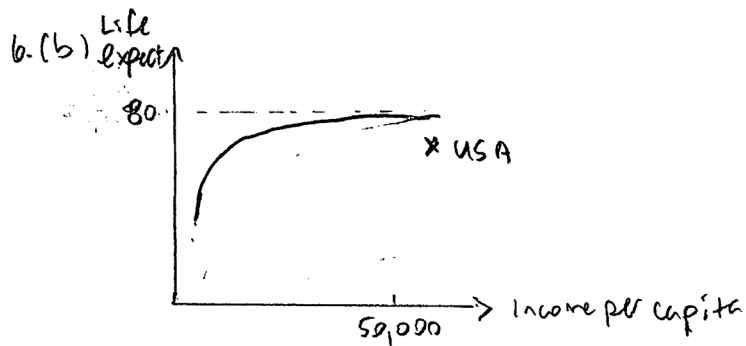


(c)(i) True. (If a person uses an antibiotic, then they increase the chance of bacteria developing resistance to the antibiotic, which has a cost to society).

(ii) False. (Patents enable privatizing benefits of a drug formula).

6.(a)(i) Technological change was worth it. For 4 out of 5 interventions MB considerable $>$ MC.

(ii) Yes. It suggests that some regions are giving too many c-sections, leading to unnecessary health care with added costs and chance of complications.



(c)(i) Government pays for a much greater fraction of health care in the major western European countries compared to the U.S.

(ii) The amount (ie. **number**) of health services received per person is if anything less for people in the U.S., aside from some expensive interventions such as MRI's. (Also full credit if instead say similar amount in U.S. to other countries).

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- 7.(a) Drug price increases by \$157,665 per extra life year gained.
- (b) The elasticity of drug price at launch with respect to life years gained is 1.035. This is obtained from the log-log regression in the second set of output.
- (c) This is not given. It needs the command **regress lnprice year**
- (d) There is a statistically significant relationship between drug price at launch and drug effectiveness at level 0.05. From the first set of output variable **lyg** has $p = 0.000 < 0.05$. or ... From the second set of output variable **lnlyg** has $p = 0.000 < 0.05$.
- (e) This adds variable **lncomp** which is statistically significant at 5% has meaningfully large coefficient. Drug price is lower when there is competition from other drugs.**regress price**
- (f) **summarize price** or **mean price**

Multiple choice

Question

- 1 a
- 2 b Discussed several times in class.
- 3 b
- 4 d
- 5 a This is not a good question and won't be repeated.
- 6 b Asymmetric information is the key
- 7 c An economist (and many others) favors comparative effectiveness research
- 8 a Though two or three tests would be even better..
- 9 c
- 10 a They can be no better than alternatives but still be approved
- 11 a The demand curve shifts out.
- 12 c
- 13 d Hospitals have become much more labor intensive
- 14 c
- 15 c
- 16 a
- 17 a
- 18 a

Scores out of 60

Curve (Indication only: Course Grade is based on Total Score!)

		Average GPA on this curve 2.72			
75 th percentile	45.5 (76 %)	A+	55 and above	C+	37 and above
Median	41 (68 %)	A	47 and above	C	35 and above
25 th percentile	36.5 (61%)	A-	45 and above	C-	33 and above
		B+	43 and above	D+	31 and above
		B	41 and above	D	29 and above
		B-	39 and above	D-	27 and above