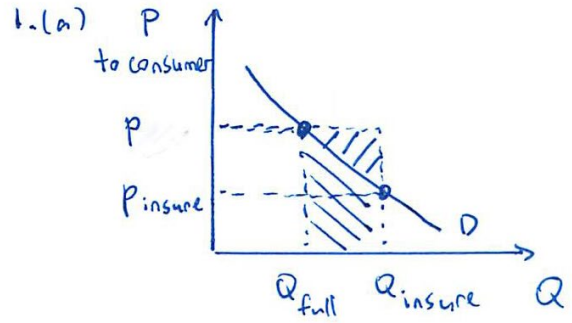
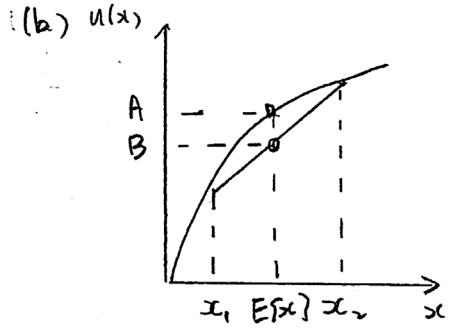


Health expenditure increase is the entire shaded area

Welfare loss is the triangle shaded as ////



- 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 x 2,000 + 0.8 × 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] = sqroot(4,000,000) = $2,000.
Standard deviation of average claims = S.D.[X] / sqroot(N) = 2,000 / sqroot(10000) = $20.
95 % are within two standard deviations of mean since average is normally distributed.
i.e. ($6,000 - 2×20, $6,000 + 2×20) = (<u>$5,960</u>, <u>$6,040</u>).
(ii) John receives from insurance 0.7 × (8000 – 5000) = 0.7 × 3000 = <u>$2,100</u>.

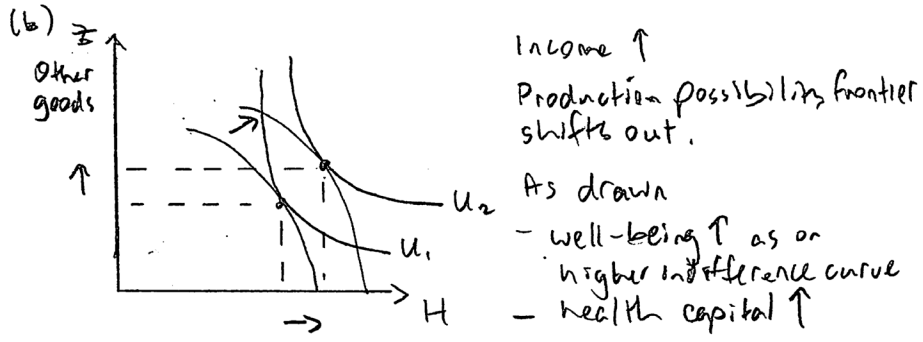
2.(a)(i) 20,000 ± 1.96×10,000×sqrt(100) = 20,000 ± 1960 = (<u>$18,040</u>, <u>$21,960</u>).
(Or could use 20,000 ± 2×10,000×sqrt(100) = 20,000 ± 2000 = (<u>$18,000</u>, <u>$22,000</u>).
(ii) Value is no more than posted price, so uniform on (10,90) with E[X] = (90+10)/2=50.
Since U(50) = 1.5×50 = 75 < 90 will <u>not buy car</u>.

(b)(i) Elasticity = $\dfrac{(550 - 750) / [(550 + 750)/2]}{(30 - 0) / [(30+0)/2]} = \dfrac{-200/650}{30/15} = \dfrac{-4/13}{2} = -2/13 = \underline{-.154}$.
(you can also multiply by minus one, in which case the answer is 0.154).

(ii) <u>Outpatient</u> (the first category in Table 2)

(c)(i) True **(ii)** False

3.(a) For passive versus aggressive: MC per marginal QALY saved = ($100,000-$40,000)/(10×0.7 - 5×0.5) = $60,000/4.5 = $13,333.
It's cost effective if we feel a QALY is worth at least $13,333.

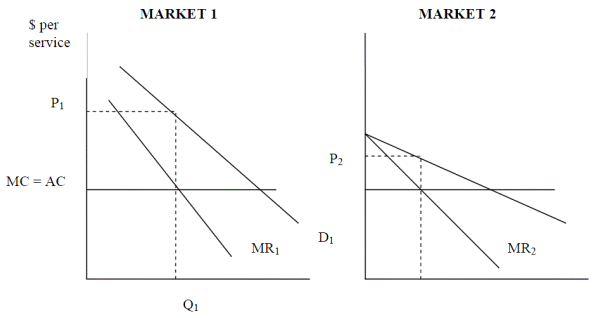


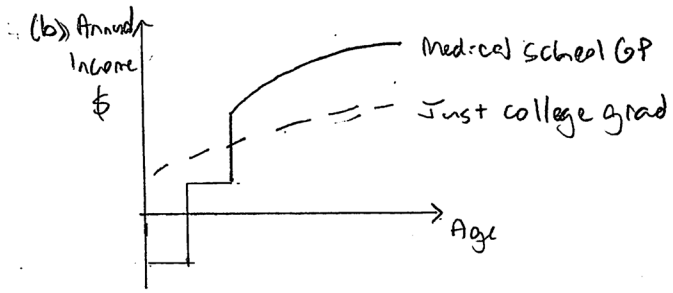
(c)(i) Cost-benefit analysis compares cost to benefits with both measured in dollars. Cost-effectiveness analysis calculates cost (in dollars) per standardized outcome such as QALY that need not be measured in dollars.
(ii) We have

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.

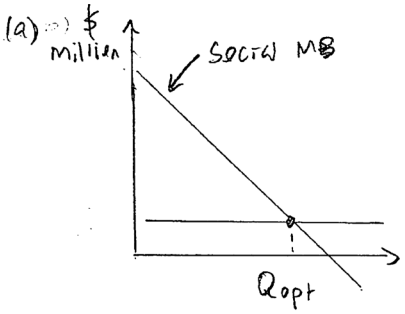
4.(a)





(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) Herfendahl-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.

5(a) $ million



Social MB = MC

$\Rightarrow 100(1-0.001)Q = 5$

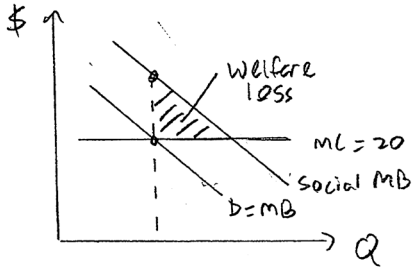
$\Rightarrow 95 = 0.1Q$

$\Rightarrow Q = 950$ studies

Spend $950 \times \$5$ million

$= \$4{,}750$ million.

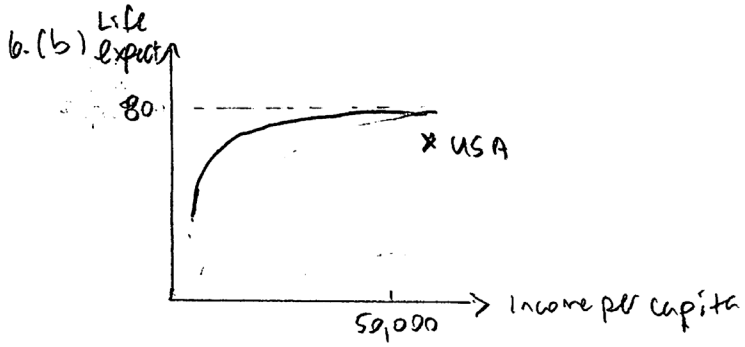
(b) $



(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.

6.(b) Life expect



(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).

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	c	
2	b	Discussed several times in class.
3	b	
4	d	
5	-	This is not a good question. All answers receive full credit.
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

75th percentile	48.5	(81%)
Median	43.5	(78%)
25th percentile	36	(60%)

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

Average GPA on this curve 2.79

A+	55 and above	C+	38 and above
A	49 and above	C	36 and above
A-	46 and above	C-	34 and above
B+	44 and above	D+	32 and above
B	42 and above	D	30 and above
B-	40 and above	D-	28 and above