<u>**Version A**</u>

**1.(a)** True  $11,600 in 2019.
**(b)** False   Hospitals is the top category.
**(c)** False   More people have private insurance, mostly employer-provided.
**(d)** True    Roughly 50/50
**(e)** True    This is the health production function.
**(f)** False   It uses mortality rates in 2018 at different ages. It does not forecast future mortality

**2.(a) (i)** Elasticity $= \dfrac{(340 - 260) / [(340 + 260)/2]}{-(0 - 25) / [(0 + 25)/2]} = \dfrac{80/300}{25/12.5} = \dfrac{0.267}{2} = 0.133.$

**(ii)** Dental care was more responsive, especially in the first year, from the Table reproduced in course slides and discussed in class. (Full credit will also be given for equally responsive).

**(b)** $E[U(x)] = 0.5 \times U(50) + 0.5 \times U(150) = 0.5 \times 88 + 0.5 \times 188 = 138.$
Since $E[U(x)] = 138 < U(90) = 139$ it is best to get the insurance.

**(c)**
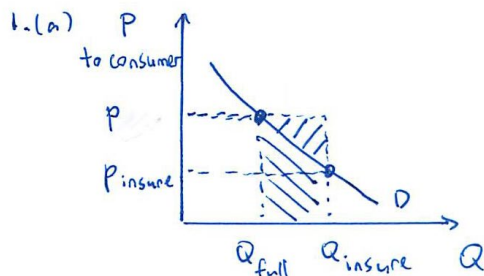


Health expenditure increase is the entire shaded area

welfare loss is the triangle shaded as ////

**3.(a)(i)** All people are required to have health insurance (so healthy individuals cannot opt out).

**(ii)** Health exchanges offer standardized insurance health policies offered by competing insurance companies.
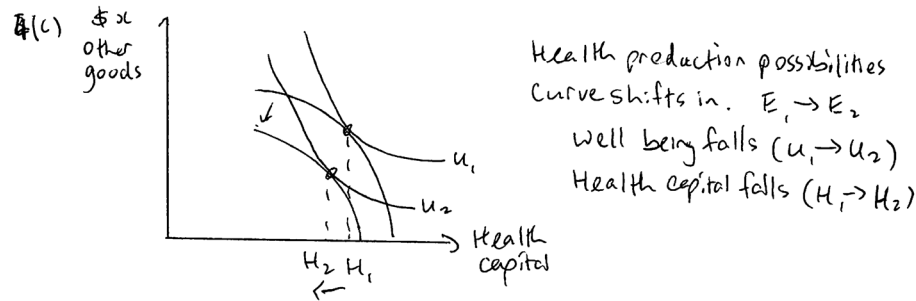
**(b)(i)** $E[X] = 70$ as uniform on (50, 90) has mean 70. (Posted price of 90 is the upper bound).
$E[U(X)] = 1.5 \times E[X] = 1.5 \times 70 = 105.$ Since this is greater than the price of 90, do buy car.

**(c)** $T = [0.50 - 0.43] / \sqrt{0.02^2 + 0.02^2} = 0.07 / 0.0283 = 2.47.$
Since $|T| > z_{0.05} = 1.96$ reject $H_0: \mu_1 = \mu_2$ in favor of $H_A: \mu_1 \neq \mu_2$.
The difference is statistically significant at significance level 5%.
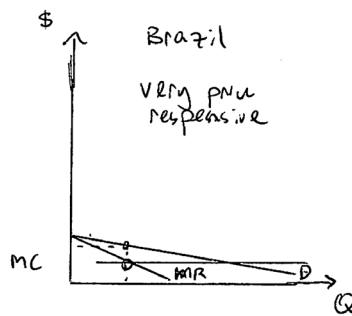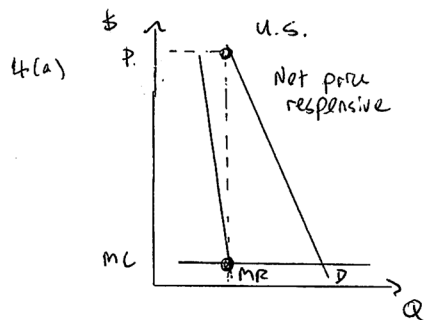


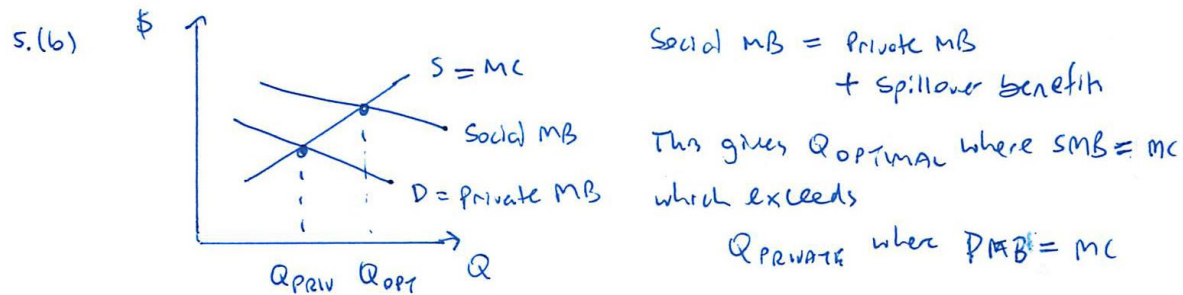**(b)** Passive vs none: MC per QALY saved = ($40,000-$0)/(4x0.5–2x0.4) = $40,000/1.2 = $33,333.  Aggressive vs none: MC per QALY saved = ($100,000-$0)/(10x0.6–2x0.4) = $100,000/5.2 = $19,230.  Prefer aggressive to passive treatment as lower MC per QALY saved.

**4(c)**

$y$-axis: $\$$ $x$ Other goods
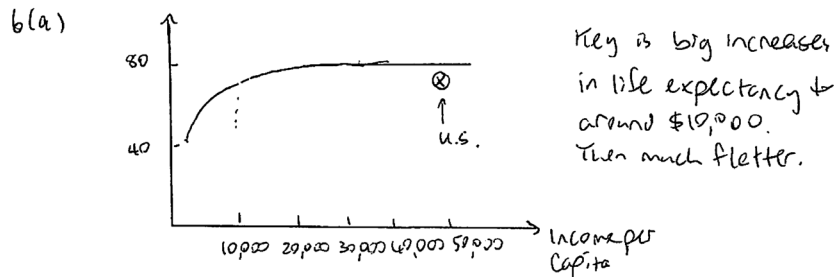$x$-axis: Health capital, $H_2$ $H_1$
Curves: $u_1$, $u_2$

Health production possibilities
Curve shifts in. $E_1 \to E_2$
well being falls $(u_1 \to u_2)$
Health capital falls $(H_1 \to H_2)$

**5.(a)(i)** Prospective payment provides providers an incentive to keep their costs down.
**(ii)** Physician-induced demand is when physicians encourage patients to get more healthcare than they really need (and would choose on their own to get). This pushes the demand curve out, leading to greater quantity of healthcare and most likely a higher price.

**5.(b)**

$y$-axis: $\$$
Curves: $S = MC$, Social MB, $D = $ Private MB
$x$-axis: $Q_{PRIV}$ $Q_{OPT}$ $Q$

Social MB = Private MB
+ spillover benefit
This gives $Q_{OPTIMAL}$ where $SMB = MC$
which exceeds
$Q_{PRIVATE}$ where $PMB = MC$

**(c)(i)** Positive: Potential monopoly profits given patents encourages firms to develop drugs.
**(ii)** Negative: Monopoly with patents allows high monopoly price.

**6(a)**

$y$-axis values: 80, 40
Points: ⊗, ↑ U.S.
$x$-axis: 10,000 20,000 30,000 40,000 50,000 — Income per Capita

Key is big increases
in life expectancy to
around $10,000.
Then much flatter.

**(b)(i)** There was a substantial increase in spending per patient on treatment of heart attacks.
**(ii)** The article found that the benefits of this increased spending were several times the increase in costs. The more costly interventions were definitely worth it.

**(c)(i)** U.S. insurance is not universal and (compared to most) has greater private sector role.
**(ii)** U.S. life expectancy is lower and infant mortality is higher. So outcomes were not as good.

**7.(i)** Outpatient spending $= 1044.5 + 793.5 \times coins0 = 1838.0$ in 0% plan as then $coins0 = 1$.

**(ii)** This is regression of out_infl on an intercept which gives the sample average of outpatient spending.

**(iii)** Directly from regression coeff of coins0 95% CI is (348.0, 1238.9).

**(iv)** Log-linear model: regress lnout age coins0 (or regress lnout age income coins25). Age is age in years, (Multiply the coefficient of age to get the percentage change).

**(v)-(vi)** For communities effected change from 2005 to 2015 by $13 - 5 = 8$
For communities not effected change from 2005 to 2015 by $12 - 10 = 2$.
The difference in difference estimate of the policy is $8 - 2 = 6$.

**Multiple choice**

| Question | | | |
|----------|---|---|---|
| | 1 | b | Insurance company pays $0.6 \times (4000 - 1000) = 1800$ |
| | 2 | d | A common situation. Insurance costs more than expected losses, but may still buy if risk averse. |
| | 3 | b | $6{,}000 \pm 2 \times 4{,}000 / \text{sqrt}(100) = 6000 \pm 800 = (5200, 6800)$ |
| | 4 | c | On balance some studies HMO better, some worse, some no diff |
| | 5 | b | Need value of life to calculate marginal benefit |
| | 6 | c | |
| | 7 | b | |
| | 8 | a | |
| | 9 | c | A voluntary insurance market would fail due to adverse selection |
| | 10 | b | Social MB is the sum of individual MB's which we don't observe |
| | 11 | b | Once the drug ingredient is discovered it is public information |
| | 12 | c | There are fewer old & disabled but they cost a lot more per person |
| | 13 | c | $100,000 for year of life and 3% discount rate |
| | 14 | d | 24 years from notes |
| | 15 | d | |
| | 16 | b | There is concern about excessive rates of C-sections |
| | 17 | b | |
| | 18 | d | |

**Scores out of 60**　　　　**Curve (Indication only: Course Grade is based on Total Score!)**

| | | | | |
|---|---|---|---|---|
| 75th percentile 50 | (83 %) (Ave GPA 2.83 on this curve) | | C+ | 41.5 and above |
| Median | 46.5 (78 %) | A　　51.5 and above | C | 39.5 and above |
| 25th percentile 41.5 | (69 %) | A-　　49.5 and above | C- | 37.5 and above |
| | | B+　　47.5 and above | D+ | 35.5 and above |
| | | B　　45.5 and above | D | 33.5 and above |
| | | B-　　43.5 and above | D- | 31.5 and above |