

**Version A**

**1.(a)(i)** Either is possible. A risk averse assurance wants to reduce risk (lower coinsurance), but must balance this against the cost of doing so (the price of the insurance policy).

**(ii)** Covered California.

**(b)(i)** Carna receives from insurance  $0.8 \times (8000 - 5000) = 0.8 \times 3000 = \underline{\$2,400}$ .

**(ii)** This is an example of fee-for-service or indemnity insurance.

**(c)**  $t = (0.90 - 0.72) / \sqrt{0.06^2 + 0.08^2} = 0.18 / \sqrt{0.01} = 0.18 / 0.1 = 1.80$ .

Do not Reject  $H_0$ : means are equal, as  $|t| < 1.96$ .

Conclude that the difference is not statistically significant at significance level 5 percent.

**2.(a)** True By around five years.

**(b)** False U.S. spends much more but given this spending has lower life expectancy and greater infant mortality.

**(c)** False In order it is hospitals, physician, pharmaceutical.

**(d)** True It is entirely federal funded, by a joint employer / employee payroll tax.

**(e)** False HDHP can be FFS, HMO, PPO or POS.

**(f)** True It is around \$20,000 per year.

**3.(a)** Mean  $E[X] = 0.8 \times 10 + 0.2 \times 60 = 8 + 12 = \underline{20}$ .

Variance  $V[X] = 0.8 \times (10-20)^2 + 0.2 \times (60-20)^2 = 0.8 \times 100 + 0.2 \times 1600 = 400$ .

St. dev.  $St.dev.[X] = \sqrt{400} = 20$

For average of 100 individuals, standard deviation of average loss =  $20 / \sqrt{100} = 20 / 10 = 2$ .

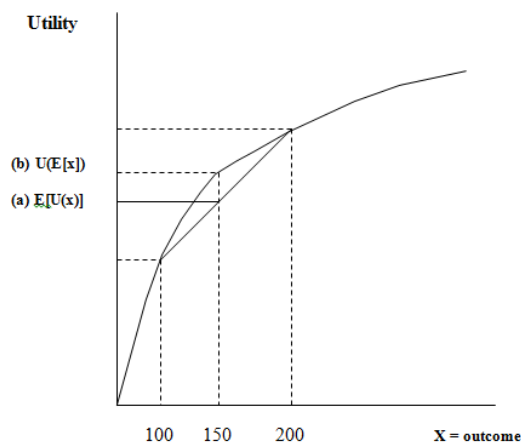
95% confidence interval for average loss is  $20 \pm 2 \times 2 = (16, 24)$ .

**(b)** Elasticity =  $\frac{(3000 - 2000) / [(3000 + 2000)/2]}{-(100 - 50) / [(100+50)/2]} = \frac{1000/2500}{50/75} = \frac{0.4}{2/3} = 0.6$ .

**(c)** Georges utility function is given:

- Expected utility  $E[U(x)] = 0.5 \times U(100) + 0.5 \times U(200)$

- Utility of expected outcome  $U(E[x]) = U(0.5 \times 100 + 0.5 \times 200) = U(150)$



**Econ 132 – MT1(A) Solutions**

**4.(a)** We move from (Q<sub>100</sub>, P<sub>100</sub>) to (Q<sub>50</sub>, P<sub>50</sub>).

**(i)** Change in health expenditure is C + B + F (equals P<sub>100</sub> × (Q<sub>50</sub> – Q<sub>100</sub>)).

**(ii)** Moral hazard loss is C (difference between societal cost (P<sub>100</sub>) and maximum willing to pay (given by the demand curve)).

**(b)(i)** By randomly assigning people to the different insurance plans (so no choice of plan)..

**(ii)** The 25% plan (with lower coinsurance).

**(c)(i)** True. (Smaller price elasticity, less responsive to prices, so less effect of increased coinsurance which increases prices).

**(ii)** True. (This was the motivation for Pauly writing this article)..

**5.(i)** The 95% plan is the case where coins=1 which is group 1.

From output for Group 1 a 95% confidence interval for mean spending is (616.12, 807.52).

**(ii)** This is given in the output for diff. A 95% confidence interval for the mean difference in spending between the two plans is (485.45, 820.00).

**(iii)** Yes. The test statistic is t=7.65 with p=0.000 from the middle test output. Since p < 0.01 we reject the null hypothesis of no difference between the two plans at level 0.01.

**(iv)** The intercept is 1364.55 and the slope is -652.73.

Reason regression is  $y = a + b \times d$ .

When d = 0 this yields  $y = a$  so a is mean spending on group 0 plan which equals 1364.55.

When d = 1 this yields  $y = a + b$  so a + b is mean spending on group 1 plan which equals 817.

Then by subtraction the slope  $b = (a + b) - a = 711.82 - 1364.55 = -652.73$ .

**(v)** Yes. It is 1138.975 from the mean of combined with n = 2364 (=1547+817) observations.

**(vi)** NO. (It is asymmetrically distributed – right skewed as most people have lowish spending and some have extremely high spending).

**Multiple choice**

|          |   |   |          |          |   |   |
|----------|---|---|----------|----------|---|---|
| Question | 1 | 2 | 3        | 4        | 5 | 6 |
| Answer   | d | b | c (or a) | c (or a) | c | b |

**Scores out of 36**

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

|                             |             |                              |                |                |                |
|-----------------------------|-------------|------------------------------|----------------|----------------|----------------|
| 75 <sup>th</sup> percentile | 29 (79 %)   | (Ave GPA 2.70 on this curve) | C+             | 23.5 and above |                |
| Median                      | 25.5 (71 %) | A                            | 30.5 and above | C              | 22.5 and above |
| 25 <sup>th</sup> percentile | 22.5 (64 %) | A-                           | 29 and above   | C-             | 21 and above   |
|                             |             | B+                           | 27.5 and above | D+             | 19.5 and above |
|                             |             | B                            | 26.5 and above | D              | 18.5 and above |
|                             |             | B-                           | 25 and above   | D-             | 17 and above   |