Problem set 4

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1. The point estimates are presented in the following table:

	$MC_H(p)$	$MC_L(p)$	$MC_S(p)$
intercept	-120.92	-94.04	3.01
slope	1.06	1.02	0.98

   Use the delta method to calculate standard errors:

$$Var(\mu_H) = Var(\gamma_H) + Var(\delta_H)(\frac{\alpha}{\beta})^2 + (\frac{\delta_H}{\beta})^2 Var(\alpha) + (\frac{\alpha \delta_H}{\beta^2})^2 Var(\beta)$$
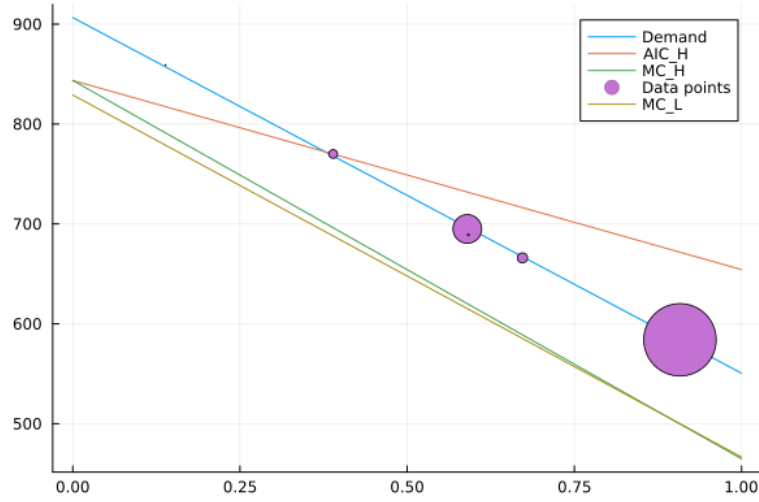
$$SE(\mu_H) = \sqrt{Var(\mu_H)} \approx 22.440$$

$$Var(\nu_H) = 4 Var(\delta_H)$$

$$SE(\nu_H) = \sqrt{Var(\nu_H)} \approx 0.037$$

2. Plotting $D(p)$, $AIC_H(p)$, $MC_H(p)$ and data points in the same figure: Since the marginal cost curve is downward sloping, this figure features adverse selection, where customers with the highest willingness to pay also have the highest expected costs.

   Efficient point: Demand curve intersects with the MC curve.

Competitive equilibrium point: Demand curve intersects with AIC_H curve, which we denote as point A.

In the competitive market there would be underprovision of the high coverage plan because of adverse selection.

DWL: The area to the right of vertical line going through point A and between the demand and MC_H lines.

3. The MC_H curve lies above the MC_L curve, but they are very close. If we fail to reject the null hypothesis of $MC_H \neq MC_L$, it implies there is moral hazard. If we reject the null hypothesis, we couldn't conclude that there is no moral hazard. We need to directly compare MC_H and MC_S.

4. Leave out $MC_L(p)$ and plot $MC_S(p)$. The MC_S curve is above the MC_H curve and they are quite far away depending on the point estimates. If we fail to reject that $MC_H \neq MC_S$, there exists moral hazard. If we reject it, it implies there is no moral hazard.