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Econ 761 HW 2

1. a) We are given $P = a_0 - a_1 Q + \nu \Rightarrow Q = \frac{1}{a_1}(a_0 + \nu - P)$

Elasticity of demand is $\varepsilon = -\frac{P}{Q}\frac{\partial Q}{\partial P} = \frac{P}{Q}\left(\frac{1}{a_1}\right)$

$\Rightarrow \varepsilon = \frac{1}{a_1 Q}(a_0 - a_1 Q + \nu) = \frac{a_0}{a_1 Q} + \frac{\nu}{a_1 Q} - 1$

$\frac{\partial \varepsilon}{\partial Q} = -\frac{a_0}{a_1 Q^2} - \frac{\nu}{a_1 Q^2} = -\frac{a_0 + \nu}{a_1 Q^2}$

For $a_1 > 0$, the denominator $a_1 Q^2 > 0$

Since $a_0, \nu \geq 0$, the numerator $-(a_0 + \nu) \leq 0$

$\Rightarrow \boxed{\frac{\partial \varepsilon}{\partial Q} \leq 0}$, so as quantity Q increases, elasticity of demand $\frac{\partial \varepsilon}{\partial Q}$ decreases

$\frac{\partial \varepsilon}{\partial \nu} = \frac{1}{a_1 Q} \geq 0$ for $a_1 > 0 \Rightarrow \boxed{\frac{\partial \varepsilon}{\partial \nu} \geq 0}$

$\Rightarrow$ as ν increases, $\frac{\partial \varepsilon}{\partial \nu}$ increases which makes sense since as maximum willingness to pay rises, there is higher demand elasticity

b) Since $b_1 = 0 \Rightarrow C = F + (b_0 + \eta) Q$

Then the problem for firm i is $\max_{q_i} P(Q) q_i - c(q_i)$

$\Rightarrow \max_{q_i} [a_0 - a_1(q_i + Q_{-i}) + \nu] q_i - [F + (b_0 + \eta) q_i]$

$\Rightarrow \max_{q_i} [a_0 - a_1(q_i + Q_{-i}) + \nu - b_0 - \eta] q_i - F$

Taking FOC wrt q_i, $a_0 - 2a_1 q_i - a_1 Q_{-i} + \nu - b_0 - \eta = 0$

Since firms are symmetric, let $q_i = q \ \forall i = 1, \dots, N \Rightarrow Q = Nq$

$\Rightarrow a_0 - a_1(N+1) q + \nu - b_0 - \eta = 0 \Rightarrow q^* = \frac{a_0 + \nu - b_0 - \eta}{a_1(N+1)}$

$\Rightarrow$ total quantity is $Q^* = Nq^* = N\left(\frac{a_0 + \nu - b_0 - \eta}{a_1(N+1)}\right)$

Price is $P^* = a_0 - a_1 Q^* + \nu = a_0 - N\left(\frac{a_0 + \nu - b_0 - \eta}{N+1}\right) + \nu = \frac{a_0 + \nu + N(b_0 + \eta)}{N+1}$

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Profits for each firm are $\pi = p^* q^* - c(q^*)$

$$\Rightarrow \pi = \left[\frac{a_0+\nu+N(b_0+\eta)}{N+1}\right]\left[\frac{a_0+\nu-b_0-\eta}{a_1(N+1)}\right] - \left[F+(b_0+\eta)\left[\frac{a_0+\nu-b_0-\eta}{a_1(N+1)}\right]\right]$$

$$\pi = \frac{1}{a_1(N+1)^2}\left[a_0+\nu+N(b_0+\eta)\right]\left[a_0+\nu-b_0-\eta\right] - \frac{1}{a_1(N+1)^2}\left[(b_0+\eta)(N+1)(a_0+\nu-b_0-\eta)\right] - F$$

$$\pi = \frac{1}{a_1}\left[\frac{a_0+\nu-b_0-\eta}{N+1}\right]^2 - F$$

$$\Rightarrow \text{Cournot equilibrium is } \begin{cases} q^* = \dfrac{a_0+\nu-b_0-\eta}{a_1(N+1)} \Rightarrow Q^* = N\left(\dfrac{a_0+\nu-b_0-\eta}{a_1(N+1)}\right) \\ p^* = \dfrac{a_0+\nu+N(b_0+\eta)}{N+1} \\ \pi = \dfrac{1}{a_1}\left[\dfrac{a_0+\nu-b_0-\eta}{N+1}\right]^2 - F \quad \text{for each firm} \end{cases}$$

c) Firms enter until profits are zero $\Rightarrow 0 = \frac{1}{a_1}\left[\frac{a_0+\nu-b_0-\eta}{N+1}\right]^2 - F$

$$\Rightarrow F(N+1)^2 = \frac{1}{a_1}(a_0+\nu-b_0-\eta)^2 \Rightarrow \boxed{N = \frac{1}{\sqrt{Fa_1}}(a_0+\nu-b_0-\eta) - 1}$$

d) Lerner index: $L_I = \dfrac{P-MC}{P} = \dfrac{\frac{a_0+\nu+N(b_0+\eta)}{N+1} - (b_0+\eta)}{\frac{a_0+\nu+N(b_0+\eta)}{N+1}}$

$$\Rightarrow L_I = \frac{a_0+\nu-b_0-\eta}{a_0+\nu+N(b_0+\eta)}$$

Using $N = \dfrac{a_0+\nu-b_0-\eta}{\sqrt{Fa_1}} - 1$ from (c), $L_I = \dfrac{a_0+\nu-b_0-\eta}{a_0+\nu+\frac{a_0+\nu-b_0-\eta-\sqrt{Fa_1}}{\sqrt{Fa_1}}(b_0+\eta)}$

$$\Rightarrow L_I = \frac{\sqrt{Fa_1}(a_0+\nu-b_0-\eta)}{a_0\sqrt{Fa_1}+\nu\sqrt{Fa_1}+(a_0+\nu-b_0-\eta-\sqrt{Fa_1})(b_0+\eta)}$$

$$\Rightarrow L_I = \frac{\sqrt{Fa_1}(a_0+\nu-b_0-\eta)}{\sqrt{Fa_1}(a_0+\nu-b_0-\eta)+(a_0+\nu-b_0-\eta)(b_0+\eta)}$$

$$\Rightarrow L_I = \frac{\sqrt{Fa_1}(a_0+\nu-b_0-\eta)}{(\sqrt{Fa_1}+b_0+\eta)(a_0+\nu-b_0-\eta)} = \boxed{\frac{\sqrt{Fa_1}}{\sqrt{Fa_1}+b_0+\eta} = L_I}$$

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Herfindahl index : $H = \frac{1}{N}$ Since firms are symmetric

$$\Rightarrow H = \frac{1}{\frac{a_0+\nu-b_0-\eta-\sqrt{Fa_1}}{\sqrt{Fa_1}}} = \boxed{\frac{\sqrt{Fa_1}}{a_0+\nu-b_0-\eta-\sqrt{Fa_1}} = H}$$

demand elasticity : $\varepsilon = \frac{a_0+\nu-a_1Q}{a_1Q}$

using $Q = N\left(\frac{a_0+\nu-b_0-\eta}{a_1(N+1)}\right)$, $\varepsilon = \frac{a_0+\nu-N\left(\frac{a_0+\nu-b_0-\eta}{N+1}\right)}{N\left(\frac{a_0+\nu-b_0-\eta}{N+1}\right)}$

using $N = \frac{a_0+\nu-b_0-\eta-\sqrt{Fa_1}}{\sqrt{Fa_1}}$, $\frac{N}{N+1} = \frac{\frac{a_0+\nu-b_0-\eta-\sqrt{Fa_1}}{\sqrt{Fa_1}}}{\frac{a_0+\nu-b_0-\eta}{\sqrt{Fa_1}}} = \frac{a_0+\nu-b_0-\eta-\sqrt{Fa_1}}{a_0+\nu-b_0-\eta}$

$$\Rightarrow \varepsilon = \frac{a_0+\nu-(a_0+\nu-b_0-\eta-\sqrt{Fa_1})}{a_0+\nu-b_0-\eta-\sqrt{Fa_1}} = \boxed{\frac{b_0+\eta+\sqrt{Fa_1}}{a_0+\nu-b_0-\eta-\sqrt{Fa_1}} = \varepsilon}$$

e) $$\frac{\partial\varepsilon}{\partial F} = \frac{(a_0+\nu-b_0-\eta-\sqrt{Fa_1})\frac{\sqrt{a_1}}{2\sqrt{F}} + (b_0+\eta+\sqrt{Fa_1})\frac{\sqrt{a_1}}{2\sqrt{F}}}{(a_0+\nu-b_0-\eta-\sqrt{Fa_1})^2}$$

$$\Rightarrow \frac{\partial\varepsilon}{\partial F} = \frac{\sqrt{a_1}(a_0+\nu)}{2\sqrt{F}(a_0+\nu-b_0-\eta-\sqrt{Fa_1})^2} \geq 0 \Rightarrow \boxed{\frac{\partial\varepsilon}{\partial F} \geq 0}$$

As entry costs rise, potentially fewer firms enter the market leading to an increase in demand elasticity.

$$\frac{\partial\varepsilon}{\partial\nu} = -\frac{b_0+\eta+\sqrt{Fa_1}}{(a_0+\nu-b_0-\eta-\sqrt{Fa_1})^2} \leq 0 \Rightarrow \boxed{\frac{\partial\varepsilon}{\partial\nu} \leq 0}$$

Hence with endogenous number of firms entering, as willingness to pay increases, number of firms entering increases which drives the demand elasticity down.

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$$\frac{\partial \varepsilon}{\partial \eta} = \frac{(a_0+\nu-b_0-\eta-\sqrt{Fa_1}) + (b_0+\eta+\sqrt{Fa_1})}{(a_0+\nu-b_0-\sqrt{Fa_1})^2}$$

$$\Rightarrow \frac{\partial \varepsilon}{\partial \eta} = \frac{a_0+\nu}{(a_0+\nu-b_0-\sqrt{Fa_1})^2} \geq 0 \Rightarrow \boxed{\frac{\partial \varepsilon}{\partial \eta} \geq 0}$$

As marginal cost increases, firms produce less and so the demand elasticity increases.

$$\ln(L_I) = \tfrac{1}{2}\ln(Fa_1) - \ln(\sqrt{Fa_1}+b_0+\eta)$$
$$\ln(H) = \tfrac{1}{2}\ln(Fa_1) - \ln(a_0+\nu-b_0-\eta-\sqrt{Fa_1})$$

$$\left.\begin{aligned} \frac{\partial \ln(L_I)}{\partial F} &= \frac{1}{2F} - \frac{\sqrt{a_1}}{(\sqrt{Fa_1}+b_0+\eta)2\sqrt{F}} \\ \frac{\partial \ln(H)}{\partial F} &= \frac{1}{2F} + \frac{\sqrt{a_1}}{(a_0+\nu-b_0-\eta-\sqrt{Fa_1})2\sqrt{F}} \end{aligned}\right\} \Rightarrow \frac{\partial \ln(L_I)}{\partial F} \neq \frac{\partial \ln(H)}{\partial F}$$

$$\left.\begin{aligned} \frac{\partial \ln(L_I)}{\partial \nu} &= 0 \\ \frac{\partial \ln(H)}{\partial \nu} &= -\frac{1}{a_0+\nu-b_0-\eta-\sqrt{Fa_1}} \end{aligned}\right\} \Rightarrow \frac{\partial \ln(L_I)}{\partial \nu} \neq \frac{\partial \ln(H)}{\partial \nu}$$

$$\left.\begin{aligned} \frac{\partial \ln(L_I)}{\partial \eta} &= -\frac{1}{\sqrt{Fa_1}+b_0+\eta} \\ \frac{\partial \ln(H)}{\partial \eta} &= \frac{1}{a_0+\nu-b_0-\eta-\sqrt{Fa_1}} \end{aligned}\right\} \Rightarrow \frac{\partial \ln(L_I)}{\partial \eta} \neq \frac{\partial \ln(H)}{\partial \eta}$$

$\Rightarrow$ $\ln(L_I)$ and $\ln(H)$ do <u>not</u> change at the same rate due to exogenous changes in F, ν, η

f) Firms now have $\max_Q P(Q)Q - C(Q)$

$$\Rightarrow \max_Q (a_0 - a_1 Q + \nu)Q - [(b_0+\eta)Q + F]$$

FOC is $a_0 - 2a_1 Q + \nu - b_0 - \eta = 0 \Rightarrow Q^* = \dfrac{a_0+\nu-b_0-\eta}{2a_1}$

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Price is $P^* = a_0 - a_1 Q^* + \nu = a_0 - \frac{a_0+\nu-b_0-\eta}{2} + \nu = \frac{1}{2}(a_0+\nu+b_0+\eta)$

$\Rightarrow$ profits are $\pi = P^* \frac{Q^*}{N} - C\left(\frac{Q^*}{N}\right)$
$= \frac{1}{2}(a_0+\nu+b_0+\eta)\frac{a_0+\nu-b_0-\eta}{2Na_1} - \left[(b_0+\eta)\frac{a_0+\nu-b_0-\eta}{2Na_1} + F\right]$

$\Rightarrow \pi = \frac{1}{4Na_1}[a_0+\nu-b_0-\eta]^2 - F$ for each firm

Firms enter until zero profits $\Rightarrow \frac{1}{4Na_1}[a_0+\nu-b_0-\eta]^2 - F = 0$

$\Rightarrow 4NFa_1 = (a_0+\nu-b_0-\eta)^2 \Rightarrow N = \frac{1}{4Fa_1}(a_0+\nu-b_0-\eta)^2$

Lerner index : $L_I = \frac{P-MC}{P} = \frac{\frac{1}{2}(a_0+\nu+b_0+\eta)-(b_0+\eta)}{\frac{1}{2}(a_0+\nu+b_0+\eta)}$

$\Rightarrow \boxed{L_I = \frac{a_0+\nu-b_0-\eta}{a_0+\nu+b_0+\eta}}$

Herfindahl index : $H = \frac{1}{N} = \boxed{\frac{4Fa_1}{(a_0+\nu-b_0-\eta)^2} = H}$

demand elasticity : $-\frac{P}{Q}\frac{dQ}{dP} = \frac{P}{Q}\left(\frac{1}{a_1}\right) = \boxed{\frac{a_0+\nu+b_0+\eta}{a_0+\nu-b_0-\eta} = \varepsilon}$

9) (a) $\ln P = c_0 - c_1 \ln Q + \xi \Rightarrow P = \exp(c_0 - c_1 \ln Q + \xi)$
$c_1 \ln Q = c_0 - \ln P + \xi \Rightarrow Q = \exp\left[\frac{1}{c_1}(c_0 - \ln P + \xi)\right]$

$\Rightarrow$ elasticity of demand $\varepsilon = -\frac{P}{Q}\frac{dQ}{dP} = \frac{P}{Q}\left[\exp\left[\frac{1}{c_1}(c_0-\ln P+\xi)\right]\frac{1}{P}\right]$

$\Rightarrow \varepsilon = \frac{1}{Q}\exp\left[\frac{1}{c_1}(c_0-\ln P+\xi)\right]$

$\frac{\partial \varepsilon}{\partial Q} = -\frac{1}{Q^2}\exp\left[\frac{1}{c_1}(c_0-\ln P+\xi)\right] \Rightarrow \boxed{\frac{\partial \varepsilon}{\partial Q} \le 0}$

$\frac{\partial \varepsilon}{\partial \xi} = \frac{1}{Q}\exp\left[\frac{1}{c_1}(c_0-\ln P+\xi)\right] \Rightarrow \boxed{\frac{\partial \varepsilon}{\partial \xi} \ge 0}$

$\Rightarrow$ we have the same results as part (a) previously

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(b) Problem for firm i is $\max_{q_i} P(Q)q_i - c(q_i)$

$$\Rightarrow \max_{q_i} \exp(c_0 - c_1 \ln(q_i + Q_{-i}) + \xi)\, q_i - [F + (b_0+\eta) q_i]$$

FOC wrt q_i: $\exp(c_0 - c_1 \ln(q_i + Q_{-i}) + \xi) - (q_i)\exp(c_0 - c_1 \ln(q_i + Q_{-i}) + \xi)\frac{c_1}{q_i + Q_{-i}}$
$- b_0 - \eta = 0$

Since firms are symmetric, $q_i = q$ for all $i = 1, \dots, N$ $\Rightarrow Q = Nq$

$$\Rightarrow \exp(c_0 - c_1 \ln(Nq) + \xi) - \frac{q c_1}{Nq}\exp(c_0 - c_1 \ln(Nq) + \xi) - b_0 - \eta = 0$$
$$\Rightarrow \frac{N-c_1}{N}\exp(c_0 - c_1 \ln(Nq) + \xi) - b_0 - \eta = 0$$

$$\Rightarrow \exp(c_0 - c_1 \ln(Nq) + \xi) = \frac{N}{N-c_1}(b_0 + \eta)$$
$$\Rightarrow c_0 - c_1 \ln(Nq) + \xi = \ln\left[\frac{N}{N-c_1}(b_0+\eta)\right]$$

$$\Rightarrow c_1 \ln(Nq) = c_0 + \xi - \ln\left[\frac{N}{N-c_1}(b_0+\eta)\right]$$

$$\Rightarrow q^* = \frac{1}{N}\exp\left[\frac{1}{c_1}\left(c_0 + \xi - \ln\left[\frac{N}{N-c_1}(b_0+\eta)\right]\right)\right]$$

Hence $Q^* = Nq^* = \exp\left[\frac{1}{c_1}\left(c_0 + \xi - \ln\left[\frac{N}{N-c_1}(b_0+\eta)\right]\right)\right]$

Price is $P^* = \exp(c_0 - c_1 \ln Q^* + \xi)$ with Q^* defined above

$$\Rightarrow P^* = \exp\left(c_0 - c_1 \ln\left[\exp\left[\frac{1}{c_1}\left(c_0 + \xi - \ln\left[\frac{N}{N-c_1}(b_0+\eta)\right]\right)\right]\right] + \xi\right)$$
$$= \exp\left(c_0 - \left[c_0 + \xi - \ln\left[\frac{N}{N-c_1}(b_0+\eta)\right]\right] + \xi\right)$$

$$\Rightarrow P^* = \frac{N}{N-c_1}(b_0+\eta)$$

Profits are $\pi = P^* q^* - c(q^*)$ for each firm

$$\Rightarrow \pi = \frac{N}{N-c_1}(b_0+\eta)\frac{1}{N}\exp\left[\frac{1}{c_1}\left(c_0 + \xi - \ln\left[\frac{N}{N-c_1}(b_0+\eta)\right]\right)\right]$$
$$- \left[F + (b_0+\eta)\frac{1}{N}\exp\left[\frac{1}{c_1}\left(c_0 + \xi - \ln\left[\frac{N}{N-c_1}(b_0+\eta)\right]\right)\right]\right]$$

Because we will not use the profits anymore, I will not simplify it further.

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(d) Lerner index: $L_I = \frac{P - MC}{P} = \frac{\frac{N}{N-c_1}(b_0+\eta) - (b_0+\eta)}{\frac{N}{N-c_1}(b_0+\eta)}$

$$\Rightarrow L_I = \frac{\frac{N}{N-c_1} - 1}{\frac{N}{N-c_1}} = \frac{\frac{N-(N-c_1)}{N-c_1}}{\frac{N}{N-c_1}} = \boxed{\frac{c_1}{N} = L_I}$$

Herfindahl index: $\boxed{H = \frac{1}{N}}$

demand elasticity: $\varepsilon = \frac{1}{Q} \exp\left[\frac{1}{c_1}(c_0 - \ln P + \xi)\right]$

$$\Rightarrow \varepsilon = \frac{\frac{1}{c_1}\exp\left[\frac{1}{c_1}\left(c_0 - \ln\left[\frac{N}{N-c_1}(b_0+\eta)\right] + \xi\right)\right]}{\exp\left[\frac{1}{c_1}\left(c_0 + \xi - \ln\left[\frac{N}{N-c_1}(b_0+\eta)\right]\right)\right]} = \frac{1}{c_1} \Rightarrow \boxed{\varepsilon = \frac{1}{c_1}}$$

(e) We take N as fixed and exogenous, so the Lerner index L_I, Herfindahl index H, and demand elasticity all do not vary with F, ν, η.

For ε, $\frac{\partial \varepsilon}{\partial F} = \frac{\partial \varepsilon}{\partial \nu} = \frac{\partial \varepsilon}{\partial \eta} = 0$.

Similarly, $$\begin{cases} \frac{\partial \ln(L_I)}{\partial F} = \frac{\partial \ln(H)}{\partial F} = 0 \\ \frac{\partial \ln(L_I)}{\partial \nu} = \frac{\partial \ln(H)}{\partial \nu} = 0 \\ \frac{\partial \ln(L_I)}{\partial \eta} = \frac{\partial \ln(H)}{\partial \eta} = 0 \end{cases}$$

$\Rightarrow \ln(L_I)$ and $\ln(H)$ do change at the same rate (0) in response to changes in F, ν, η.

2. a) see attached code

b) see attached code

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c) The results of the three regressions are presented below.

	Collusion possible N=500	no collusion N=500	Pooled Sample N=1000
Constant	0.387 (0.081)	-0.163 (0.001)	0.077 (0.056)
ln (Herfindahl)	0.619 (0.049)	0.962 (0.001)	0.764 (0.034)
F-stat for test $H_0: \ln(\text{Herfindahl})=1$	61.59 $\Rightarrow$ reject	4261.89 $\Rightarrow$ reject	47.77 $\Rightarrow$ reject

When collusion is possible, a one percent increase in Herfindahl index increases the Lerner index by 0.619 percent. This is much higher when there is no collusion (0.962) and in between these two for the pooled sample (0.764).

For this demand function, the elasticity of demand is $\frac{1}{c_1} = \frac{1}{0.9} = 1.111$. Due to the high demand elasticity, monopolies can charge higher prizes leading to a lower correlation between H and L_I in the sample with collusion.

It makes sense that the pooled sample yields a coefficient between either of the individual samples, because it contains them both. Hence, in all three samples there is a positive correlation between H and L_I.

The f-statistic in each test of ln(Herfindahl) = 1 is large and leads to a rejection of the null. However, the reason it is rejected in the sample with no collusion is because of a very small standard error. By inspection, for the no collusion sample, there is very near a 1-1 correlation between H and L_I.

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d) Now we use linear demand, still taking N as fixed.

For nonlinear demand in (c) we had $L_I = \frac{c_1}{N}$, $H = \frac{1}{N}$, $\varepsilon = \frac{1}{c_1}$.

In this case, we have $L_I = \frac{a_0 + \nu - b_0 - \eta}{a_0 + \nu + N(b_0 + \eta)}$, $H = \frac{1}{N}$, $\varepsilon = \frac{a_0 + \nu + N(b_0 + \eta)}{a_0 + \nu - b_0 - \eta}$.

The results from the structure-conduct-performance paradigm regressions as well as the hypothesis tests are below.

	collusion possible $N=500$	no collusion $N=500$	Pooled sample $N=1000$
constant	-0.473 (0.041)	-0.658 (0.005)	-0.580 (0.027)
ln(Herfindahl)	0.294 (0.024)	0.480 (0.003)	0.376 (0.016)
F-stat for test H_0: ln(Herfindahl) = 1	893.73 ⇒ reject	28309.22 ⇒ reject	1481.95 ⇒ reject

There is still a higher correlation between H and L_I for the sample with no collusion. However, with linear demand, the magnitude of the relationship in each sample is lower than the respective coefficient with nonlinear demand. In all three samples with linear demand, we reject the null hypothesis that ln(Herfindahl) = 1, as can be seen in the table above.

In the case of linear demand, demand elasticity depends on quantity whereas in part (c), elasticity is a constant. With collusion, the equilibrium quantity is lower than when collusion isn't possible, so demand elasticity is higher in the former, leading to potentially lower markups. These factors explain these results and why they differ from part (c).

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e) From part (d), if we know demand is linear and we suspect collusion in markets 1-250, we can run a structure-conduct-performance paradigm regression and the coefficient on ln(Herfindahl) should be quite low, around 0.3.

However, this may not necessarily help us generally. If we do not know the functional form of demand, the regression could result in a higher coefficient (higher than the no collusion sample with linear demand), which could mislead us in concluding collusion. Hence, the functional form of demand is important in the subsequent regression and analysis for us to be certain whether or not some markets are colluding.

3. a,b) The results of the regressions are below.

	$\nu \sim U[-1,1]$ $\eta = 0$	$\nu = 0$ $\eta \sim U[-1,1]$
constant	-0.851 (0.0005)	-2.116 (0.011)
ln(Herfindahl)	-0.146 (0.0004)	-1.359 (0.011)

c) When $\nu = 0$, maximum willingness to pay is a constant across cities, and the Lerner index drops by 1.359% for a 1% increase in the Herfindahl index. For $\eta = 0$, marginal costs across cities are the same and the effect of Herfindahl index on Lerner index is much closer to zero.

With more firms, higher competition opposes higher markups and demand is more elastic when $\nu \sim U[-1,1]$ than $\eta \sim U[-1,1]$, leading to coefficient on ln(Herfindahl) that is closer to 0.

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