Exam #2 Answer Key

Economics 435: Quantitative Methods

Spring 2006

1 Ugly criminals

a) Teenagers with high family income can spend more on clothes, makeup, gym memberships, etc., all with the intention of making themselves look better. So it is likely that $cov(income, ugly) < 0$. It is also likely that high family income reduces the relative benefits to a life of crime ($beta_2 < 0$).

b) Since plim $\hat{\beta}_1 = \beta_1 + \beta_2 \frac{cov(ugly, income)}{var(ugly)}$, my guesses imply that plim $(\hat{\beta}_1 - \beta_1) > 0$.

c) We are more likely to conclude that being unattractive increases the likelihood of committing crimes, as Mocan and Tekin conclude.

d) This is just an example of measurement error, so our results on measurement error apply. An OLS regression of $crime$ on $(ugly, x)$ will not tend to lead researchers to conclude a positive effect of (true) unattractiveness on crime even if there is no effect. It will, however, lead them to systematically underestimate the effect of unattractiveness on crime.

2 Peer effects

a) It will be negative.

b) We only need one year of data to calculate $\hat{\beta}_1^{OLS}$, but need two years of data to calculate $\hat{\beta}_1^{FE1}$ and three years of data to calculate $\hat{\beta}_1^{FE2}$.

c)

$$
\begin{aligned}
\text{plim } \hat{\beta}_1^{OLS} &= \beta_1 + \frac{cov(\alpha_i, x_{it})}{var(x_{it})} \\
\text{plim } \hat{\beta}_1^{FE1} &= \beta_1 \\
\text{plim } \hat{\beta}_1^{FE2} &= \beta_1
\end{aligned}
$$

So $\hat{\beta}_1^{FE1}$ and $\hat{\beta}_1^{FE2}$ are consistent.

d)

$$
\begin{aligned}
\text{plim } \hat{\beta}_1^{OLS} &= \beta_1 + \frac{cov(\alpha_i + \delta_i t, x_{it})}{var(x_{it})} \\
\text{plim } \hat{\beta}_1^{FE1} &= \beta_1 + \frac{cov(\delta_i t, x_{it} - x_{i1})}{var(x_{it} - x_{i1})} \\
\text{plim } \hat{\beta}_1^{FE2} &= \beta_1
\end{aligned}
$$

So $\hat{\beta}_1^{FE2}$ is consistent.