ECO220Y1Y, Tests #1, #2, #3, and August 2019 Final Exam: DACM Questions

Summer 2019

SOLUTIONS

(1) (a) 783 = 0.48846*1,603

(b) 173 = 0.42506*407

(c) Among the 802 participants (a *subset of* the 1,603) in the credit card choice experiment that were shown the *longer video* (with the helpful recap at the end), showing misleading ads *lowered* the fraction choosing the best credit card among the four offers by *14 percentage points*: from 65% down to 51%, which is a *21 percent* drop. This means that even after seeing the long video, misleading ads can still substantially worsen financial decisions.

(2) (a) In the Philippines from 2000-2014, real GDP per capita on average increased annually by $174 (2011 US$). The value -344,869 (the intercept) has no interpretation in this case because the year 0 is extremely far outside the range of the data and negative GDP is not possible.

(b) In the Philippines from 2000-2014, real GDP per capita on average increased annually by approximately 3.3 percent.

(c) This measures the amount of scatter about the regression line: it is a measure of fit where the smaller the s_e then the better the fit of the line to the data. It is measured in the same units as the y-variable, which means that it is measured in 2011 US dollars: $138.79.

(3) (a) $\sqrt{\frac{\hat{P}(1-\hat{P})}{n}} = \sqrt{\frac{0.023(1-0.023)}{11{,}129}} = 0.0014$, which rounds to 0.001. The standard error of 0.001 measures how much the point estimate of 0.023 is affected by sampling error. It is really tiny for two reasons: the sample size is huge (over 10,000) and donations are rare (proportion is near 0).

(b) $SE[\bar{X}] = \frac{s}{\sqrt{n}}$ and plugging in obtain $4.232 = \frac{s}{\sqrt{100}}$ to solve for a standard deviation of $s \approx \$42$. [The correct sample size is approximately 100 because only 1.5% of the 6,648 respondents gave a donation. To get the exact answer of $41.68 use the original data rather than the rounded numbers in Table 2B.]

(c) In their experimental study of charitable giving in response to direct mail solicitation, Karlan and List (2007) find that among donors living in Blue states (Democrat leaning), offering a match for each dollar donated illustrated with low example amount (to show how the match works) slightly decreases the likelihood of a donation by a mere 0.1 percentage points (5 percent) compared to the standard solicitation letter. This is consistent with the general finding that in Blue states offering a match (regardless of the details) does not seem to improve the chances of a donation.

(4) (a) $(\bar{X}_1 - \bar{X}_2) \pm t_{\alpha/2}\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$ (CI estimation with independent samples) [Note: Alternatively, you could assume equal variances and use: $(\bar{X}_1 - \bar{X}_2) \pm t_{\alpha/2}\sqrt{\frac{s_p^2}{n_1} + \frac{s_p^2}{n_2}}$.]

(b) $\bar{X}_d \pm t_{\alpha/2}\frac{s_d}{\sqrt{n}}$ (CI estimation with paired data)

(c) The paired data approach described in Analysis **B** is better for two big reasons. First, every year many additional employees make the $100,000 cut-off (e.g. getting a raise from $98,000 to $100,000), which means that even if salaries are all rising, you may see the average go down. Second, because salaries are strongly positively correlated over time, a paired approach is more efficient: you will get narrower confidence intervals.

(5) (a) The "No controls" regression has the natural log of electricity usage as the y-variable and a set of 11 vintage dummy variables as the x-variables (as well as a dummy to control for the year of the RASS survey).

The "Full controls" regression is the same except that it has a lot of additional x-variables to control for house characteristics, climate, occupants, etc.

(b) The key difference is that the results for the "Full controls" case after the vertical line at 1978 would be much more negative (lower down in the figure).