Homework #3 Solutions

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- 1. What are the names of the people in your study group?
- 2. Please complete the following exercises from Chapter 3 of the Stock and Watson textbook: 3.10, 3.12, 3.16, and 3.17. Then use the PUMS data on people in NYC to update the Gender Gap in Earnings of College Graduates as in the text.

3.10 With mean 58, stdev 8, the 95% confidence interval for the mean is $58 \pm 1.96 \times 8/sqrt(100) = (56.43, 59.57)$. For sample 2, mean is 62, stdev is 11, N=200, so the difference in means is (62 - 58) = 4. The standard error of the difference is

 $\sqrt{\frac{8^2}{100} + \frac{11^2}{200}}$ =1.12. So a 90% C.I. is 4 ± 1.64*1.12 = (2.16, 5.84). So we can conclude with a high degree of certainty that there is a difference since the z-statistics is 4/1.12 =

.0003. **3.12** Now the difference in means is (3100 - 2900) = 200. The standard error of the difference is $\sqrt{\frac{200^2}{100} + \frac{320^2}{64}} = 44.72$, so the z-stat is 200/44.72 = 4.47 with a p-value of nil. If the workers have similar job descriptions, then this does not reject the hypothesis of discrimination.

3.16 The 95% C.I. is 1013 ± (108/sqrt(453)) = (1003, 1023). The difference in scores after the prep course is 6. The standard error is $\sqrt{\frac{108^2}{453} + \frac{95^2}{503}}$ = 6.61, so the z-stat is now 0.91 with a p-value of .36, so we cannot reject the null hypothesis that there is no difference in scores. When the original students are given the prep course and re-take the test, they change by 9, with standard error 60/sqrt(453) = 2.82, so the z-stat is now 9/2.82 = 3.19, with p-value of .001. You could imagine ways of trying to figure out how much is due to practice; probably about 3 points is due to practice.

3.17 Male wages changed by (21.99 – 20.33) = 1.66; the std error of this change is 0.32 so with a z-stat of 5.14 we can reject the null hypothesis of no change. Women's wages rose by 0.87 with std error of 0.27 so z-stat is 3.22 and, again, can reject the null of no change (both cases the p-value is below .001). A test of the difference in differences shows that men's wages grew faster.