Problem Set 9 - Answers

Problems from Textbook

8.12

a. B2 – positive, the higher the real output the bigger the economy and hence the bigger the demand for international reserves.
   B3 – positive, the greater the volatility of balance of payments the greater the demand for international reserves to cushion balance of payments fluctuations.
   B4 – negative, the higher the fluctuation in the exchange rate the lower the need for international reserves to smooth out these fluctuations.

b. B2 – if real output increases by 1%, international reserves increases by 0.4%.
   B3 – if the measure of BoP volatility increases by 1%, international reserves increase 0.5%.
   B4 - if the measure of exchange rate variability increases by 1%, international reserves decrease 0.09%.
c. In all cases the t-statistics are greater than 2 hence each of them are individually significant.
d. We use the F - test for overall significance of all slope coefficients. The null hypothesis is that slope coefficients are jointly equal to zero. The F statistic is distributed F(3,1116). The critical region is (2.60, infinity). The computed statistic is 1151 which is in the rejection region. Thus, we reject the null hypothesis that all slope coefficients are jointly equal to zero.

9.9

(a) The fare is decreasing in the number of carriers, but the effect tapers off.

(b) The positive coefficient on miles and the negative coefficient on miles squared suggests that the fare increases with the mileage, but at a decreasing rate.

(c) It is cheaper to fly to Cleveland from a big city as compared to a small city. The population variable may reflect traffic volume and, hence, economies of scale.

(f) Continental charges lower fares than the airline(s) in the benchmark category.

Additional Problems

1. (a), (b) The dependent variable is the weight of the child in grams. We know of complications in the pregnancies of older women, so we include age and expect it to enter negatively. Since the effect may taper off, we include a squared term and expect that to be positive. We include number of visits to the physician in the first trimester; more visits may reflect the fact that the mother is being cared for better, so we would expect it to enter positively. We include the weight of the mother in her last menstrual period, and expect it to enter positively. The other explanatory variables are dummies for hypertension, smoking, and a history of uterine irritability; since these are all negative

health conditions, we expect them to enter negatively. (Note: we could have included a dummy for history of premature labor, but there appears to be a problem with the data. It should only take values 0 and 1, but the maximum value is 3.)

Table 1
Determinants of Birth weight

Dependent Variable: Birth weight of the child in grams

Variable	Coefficient (t-statistic)
Age	-137.056 (-2.224)*
Age squared	2.806 (2.315)*
Weight of Mom (pounds)	4.382 (2.595)*
Physician visits in first trimester	-6.169 (-0.130)
Smoke during pregnancy (dummy)	-232.278 (-2.333)*
History of hypertension (dummy)	-618.754 (-2.992)*
History of uterine irritability (dummy)	-536.492 (-3.864)*
Constant	4181.905 (5.350)*
Number of Observations	189
R^2, Adj. R^2	0.1979, 0.1669
Mean of Dependent Variable	2944.656

* = Significant at 5%

(c) As expected, the impact of the age of the mother is negative, but the effect tapers off (the squared term is positive). Both coefficients are statistically significant. An extra year for the mother is associated with a change in the weight of -137.056 + (2)(2.806)(Age), on average. The sample mean of age is 23.24. The impact at the sample mean is, therefore, -137.056 + (2)(2.806)(23.24) = -6.63 grams. The elasticity is: (-6.63)(23.24/2944.656) = -0.052.

We also see that if the mother is a pound heavier the child is 4.382 grams heavier, on average. The elasticity is (4.382)(129.81/2944.656) = 0.193. Thus, our coefficient is statistically and substantively significant.

The number of physician visits in the first trimester does not seem to have any impact on the weight of the child.

If the mother smoked during the pregnancy the child is 232.278 grams lighter, on average; this is 7.89% of the mean of the dependent variable. Thus the effect of smoking is statistically significant and substantively important.

If the mother has a history of hypertension the child is 618.754 grams lighter, on average; this is 21.01% of the sample mean. Again, this is a statistically significant and substantively important effect.

If the mother has a history of uterine irritability, the child is 536.492 grams lighter, on average; this 18.22% of the sample mean. Once again, the coefficient is statistically significant and substantively important.

(d) As we can see above, there is clear evidence that smoking reduces the birth weight of the child.

2. Let the price of an apartment be P_i, and the distance from the city center be D_i. We also have two dummy variables: $S_i = 1$ if public transportation is readily available and 0 otherwise, $H_i = 1$ if high-rise building, and zero otherwise.

Our model will be:

$$P_i = B_1 + B_2D_i + B_3S_i + B_4D_iS_i + B_5H_i$$

We expect $B_2 < 0$ (the farther from the center of the city, the lower the price), and $B_5 > 0$ (rent is higher in high-rise buildings). Note that the impact of availability of public transportation is $B_3 + B_4D_i$; since the impact is positive, but lower when you are closer to the center of the city, we expect $B_3 > 0$, $B_4 > 0$.