Economics 466–Introduction to Econometrics–Exam I

Instructions:

Please read each questions carefully. Be clear and concise with all answers. Partial credit will be given where earned so show all work. Each question is of different point value so plan accordingly. The exam is worth a total of 100 points.

1. Understanding Regression (60 points, each subquestion is of equal value): Suppose your friend estimated the following demand model for organic apples. Here the quantity of organic apples (*ecolbs*) is measured in pounds, while the price of organic apples (*ecoprice*) is measured in dollars per pound, the price of non-organic apples (*regprice*) is measured in dollars per pound, and the income of the person purchasing the apples (*income*) is measured in thousands of dollars. The standard error for each coefficient is listed in parentheses beneath the estimate.

Dependent Variable: *ecolbs*			
Independent Variables	(1)	(2)	(3)
ecoprice	−0.845	−2.926	−2.906
	(0.3315)	(0.5879)	(0.5881)
regprice	-	3.029	3.029
		(0.7108)	(0.7107)
income	-	-	−0.003
			(0.0027)
intercept	2.388	1.965	1.779
	(0.3717)	(0.3801)	(0.4139)
Observations	660	660	660
R^2	0.00978	0.0364	0.0383

   (a) Are *ecoprice* and *regprice* negatively correlated?

   (b) Are non-organic apples complementary to organic apples?

   (c) Interpret each coefficient in model (3) above and indicate whether they are economically meaningful.

   (d) If you convert quantity of organic apples purchased into ounces, what do the coefficient estimates come out to be in model (2)? What about the R^2? Do the standard errors change?

   (e) Perform a test of no regression at the 5% level, stating explicitly the null hypothesis and the alternative hypothesis for each model.

(f) Perform tests of significance on the coefficients for model (3). Be sure to state your null and alternative hypotheses correctly and conduct the tests at the 1% level.

(g) Bonus Question (5 points): What would the R^2 in any of the above models be if your friend were to use the natural logarithm of *ecoprice* instead of its level?

2. Data Structure (5 points): What is the difference between cross-sectional data and time series data.

3. Rejection or Acceptance: (10 points): Why is it proper to state "we cannot reject the null" rather than "we accept the null"?

4. Choosing an estimator (25 points): You have at your disposal an independent, identically distributed random sample $X_1, X_2, \ldots, X_n$ with common mean μ_x and common variance σ_x^2. Your goal is to estimate μ_x as best as possible using your random sample. Which one of the following three estimators would you use to construct your estimate of μ_x? Be as detailed and specific as possible.

a) $\bar{x} = \sum_{i=1}^{n} X_i$

b) $\tilde{x} = X_1$

c) $\breve{x} = (X_1 + X_n)/3$