

**SUNY-Stony Brook. Economics Department**  
**Economics 323: Fall 2011**  
**Professor Hugo Benítez-Silva**

Sample Questions for Midterm 2: November 22, 2011

Suggested Answers

Remember that for this midterm you have to study the following topics: Uncertainty (theory and exercises), and all the notes on statistics and econometrics up to the issues reviewed in class on Thursday November 17.

1. **True or False.** In the exam credit will only be given for justified answers.

a) Regressions using time series data usually have considerably lower R-squared since they do not exploit the individual variation present in cross-sectional data. **True or False**

**False, time series data usually deliver higher R-squares given that the dependent and independent variables share trends. The individual variation in cross-sectional data usually pushes the R-squared towards zero.**

b) A risk-averse individual will always buy insurance if offered to him by a reputable insurance company. **True or False**

**False, the reputation of the insurance company has nothing to do with this, it is all about the price. If offered fairly price insurance the risk averse individual will fully insure.**

c) An insurance company that makes an economic profit will, most likely, offer unfairly priced insurance. **True or False**

**True, we cannot be 100% sure (this explains the most likely), but we suspect that it is going to be the case because if it was making no profit the price would be fair.**

d) Given two variables, Y and X, if their correlation coefficient is positive and close to 1, it means that low values of Y are usually observed along with low values of X. **True or False**

**True, just by the definition of this bivariate statistic.**

e) Most diversification strategies try to maintain the risk of a particular portfolio by sacrificing part of the upside potential of the investment. **True or False**

**False, diversification is most commonly used to reduce the risk by sacrificing part of the upside potential of the investment.**

## 2. The risk of uncertainty

Oskar's preferences can be represented by a utility function  $U(w) = \sqrt{w}$ . He is faced with a gamble that provides 9 units of wealth with probability 0.5, and 25 units with probability 0.5. How much money for sure will give Oskar the same utility as playing the lottery? (**Hint:** given his utility function Oskar is risk averse, therefore the answer may (or may not) be different from the Expected Money Value of the lottery.)

- a) 12.5
- b) 9
- c) 16
- d) 17
- e) None of the above

$$EU = 0.5 \sqrt{9} + 0.5 \sqrt{25} = 1.5 + 2.5 = 4$$

$$EMV = 0.5 * 9 + 0.5 * 25 = 17$$

**But Oskar is risk averse so  $U(EMV) > EU$ ,  $\sqrt{17} > 4$**

**This means a quantity for sure lower than the EMV can give Oskar the same utility as playing the lottery, in fact it should be clear that  $\sqrt{16} = 4$ , or  $4^2 = 16$ , so the answer is c).**

### 3. Fertility, Female Literacy, and more

Think of an economic model that tries to explain the differences across countries in fertility rates with the data on those same countries on female literacy rate.

We are fortunate enough to have data for a number of countries both on fertility rates (TFR) and female literacy (FL) rates. And we propose to estimate the following econometric model:

$$\text{TFR} = \beta_0 + \text{FL} \beta_1 + u_i$$

After estimating the parameters of the model the Sum of Squares of the Regression is 56.208, and the Total Sum of Squares is 143.45. Also the estimated value for  $\beta_0$  is 7.4.

- a) Given the information above compute the R-squared of the regression.

**Just divide the SSR by TSS and the R-squared is 0.3918**

- b) Explain the meaning of the number calculated in a) as clearly as possible.

**The variation in female literacy across these countries explains almost 40% of the variation in fertility rates in those countries.**

- c) Explain the meaning of the estimated  $\beta_0$ .

**If female literacy were zero in these countries, on average women there would have around 7.4 children.**

- d) What do you think will be the sign of the estimated  $\beta_1$ ? Explain the meaning of this parameter.

**Economic Theory would probably suggest that this parameter should be negative, higher values of female literacy are likely to be linked with lower values for fertility. The parameter tells us how changing the exogenous variable, FL in this case, affects the variable of interest, in this case the fertility rate.**

- e) Can you think of other variables that could affect the Total Fertility Rate on top of female literacy, and how? Explain.

**One possibility would be GNP per capita, and also Child Mortality, and maybe a measure of family planning.**

**Extra Credit:** Given your answer in e), what do you think would be the consequence if we tried to explain in the regression framework the TFR both with the FL variable and the one(s) you suggested? What do you think would happen to  $\beta_1$ ? (Note: I will ask the same question in the exam, so think hard about it. See if you can come up with a coherent answer.)

**I am not going to give you the answer because I want you to keep thinking about it, but I can tell you I am going to ask the same question in the exam (5 extra credit points), so thinking about it will pay off. If you are still confused, think about the connection (correlation?) between the variable(s) you suggest adding to the regression, and the variable that is already in as exogenous variable.**