

Assignment #4Due Monday 6/14/10 by 6 p.m. in the Econ 300/QAC201 slot in the Economics Alcove

Please show the calculations used to arrive at your answers. Round final answers to the second decimal place if necessary.

A. Use of data and Excel: Descriptive statistics and saving data for further use.

- 1) Type or import twelve values from an economic series into a worksheet column [e.g., twelve years of GDP, twelve months of inflation, twelve months of unemployment, etc.]. Everyone in the class needs to have different data. You can use DataInsight data or another source.
- 2) Compute the median, the average, and the standard deviation of your data series using the correct worksheet commands. Print out a page showing your data and the median, average, and standard deviation. Include a note on the page as to what the data are. Turn in this page as part of your assignment.
- 3) Save your data series as an excel worksheet in your wesfiles account or on a removable drive as you will need it for the next problem set.

B. Are wealthier people more moral? Consider this (fictional) joint distribution of morality and wealth:

Morality M	Wealth W		
	0 (poor)	1 (middling)	2 (filthy rich)
0 (lie, cheat, and steal)	0.10	0.10	0.05
1 (big lies occasionally)	0.12	0.35	0.04
2 (only white lies)	0.08	0.10	0.06

- 1) Calculate $E(M | W)$ for the various levels of W .
 - 2) Calculate the covariance σ_{MW} and correlation ρ_{MW} .
 - 3) What statements, if any, do you feel justified in making concerning the relationship between income and morality based on these results?
- C. A random sample of 5 married couples, where both spouses held paying jobs, was drawn. The annual incomes (in thousands of dollars) of the men and women were as follows:

Couple	Woman	Man
Uno	35	20
Dos	30	40
Tres	30	35
Quatro	35	40
Cinco	25	35

- 1) Let X denote the income of the woman and let Y denote the income of the man. Find the joint distribution of X and Y .
- 2) Calculate the (marginal) distribution, mean, and variance of X . Calculate the same things for Y .
- 3) Calculate the correlation ρ_{XY} . Do high-income men have low-income wives and vice-versa, or do couples tend to have similar incomes?

- D. The approximately 150 million adult Martians (age 2 or over, in Martian year 3579) were classified by education (X) and sex (Z) as follows:

Education X		Sex Z	
(last completed level)		0 (xale)	1 (yale)
0 (none)		6,000,000	18,000,000
1 (xary)		12,000,000	24,000,000
2 (yary)		24,000,000	36,000,000

- 1) If a Martian is chosen at random, what is the chance of getting each of the 6 possible combinations of education and sex (i.e., tabulate the joint distribution of X and Z)?
- 2) What is the chance of getting each of the 3 possible levels of education (i.e., tabulate the marginal distribution of X, $p(x)$)? What is the chance of getting each of the 2 sexes (i.e., tabulate $p(z)$)?
- 3) What is the mean education level $E(X)$? What is $E(Z)$?
- 4) What is $E(X | Z = 0)$? What is $E(X | Z = 1)$? What is $E(Z | x)$ for each value x ? State in words what each of these mathematical expressions means.
- 5) A Martian infers from the table and the results in 4 that receiving some education makes a Martian more likely to become a yale. Based on what you know about Martians, do you have grounds for disagreeing? What if someone inferred from Earth data that receiving some education makes an Earthling more likely to become a male? What is different about your knowledge in this case?
- 6) Suppose that each Martian received a salary S that depended only upon education (X) and sex (Z) as follows (annual salary in thousands of Mars bars):

$$S = 20 + 6X - 2Z$$

- a. What would the salary be for each of the 6 cells in the table?
 - b. From the distribution of salary, calculate the expected salary $E(S)$.
 - c. Now try calculating the expected salary using the equation $E(S) = 20 + 6E(X) - 2E(Z)$, where $E(X)$ and $E(Z)$ were found in 3. Do you get the same answer as in b?
- E. You have \$10,000 saved up to invest for a year and are considering a stock mutual fund and/or a bond mutual fund. The rates of return (variable S for stocks and B for bonds) for both investments are uncertain, as summarized in the following joint distribution table:

		Stocks S		
Bonds B		-5%	0%	20%
3%		0.05	0.20	0.20
8%		0.10	0.30	0.15

- 1) Calculate the covariance between S and B. What does the sign of this signify?
- 2) Calculate the expected values and standard deviations for each portfolio to fill in the following table. Which portfolio would you choose? Why?

Stocks/Bonds Split	Expected Value μ	Standard Deviation σ
100/0		
0/100		
50/50		
65/35		