

Problem set 12, due Monday 12/7/2015

Regressions with two independent variables

Go to the course web page, <http://inside.bard.edu/~armytag/metricsf15/>

There, next to the link for this problem set, find three simulated data sets. In each of these data sets, there are two independent variables, x_1 and x_2 , and one dependent variable, y . Suppose that y_i values are determined by a linear process $y = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \varepsilon_i$. For each data set, perform each of the following steps. You can work with Stata, Excel, Matlab, or some combination of these, depending on your preference.

- a)** Regress y only on x_1 . Find the slope and intercept of the regression line. Find the t statistic associated with the slope coefficient, and the R^2 value associated with the regression.
- b)** Regress y only on x_2 . Find the slope and intercept of the regression line. Find the t statistic associated with the slope coefficient, and the R^2 value associated with the regression.
- c)** Regress y on x_1 and x_2 . Find the OLS estimates b_0 , b_1 , and b_2 , which correspond to the unknown true values β_0 , β_1 , and β_2 . Find the t statistic associated with each of these estimates, and the R^2 value associated with the overall regression.
- d)** Find the correlation coefficients between each pair of variables (x_1 and x_2 ; x_1 and y ; x_2 and y).
- e)** Explain in words what is going on. For example, explain the difference between the estimates generated by the three regressions (with x_1 only; with x_2 only; with x_1 and x_2). Which estimates are likely closest to being correct. If the other estimates are biased, explain clearly what direction they are biased in, and why.

Please submit your answers by e-mail before the beginning of class on Monday, along with relevant computational outputs. For example, if you work with Excel, you can attach .xlsx spreadsheets. If you work with Stata, you can paste tables into your e-mail. If you work with Matlab, you can paste .m code into your e-mail, and attach .mat workspace files if needed. Feel free to add graphs if you like (though it isn't required).