

Bus 274: Further Statistics for Business

Spring 2010

PROBLEM SHEET # 11

Problem 1: The following is a summary of a simple linear regression with monthly returns (all returns in percent, using the closing prices on the last trading day of each month) on Tüpraş share prices (endogenous variable) and returns on İMKB 100 (exogenous variable) in the time period from January 2002 through December 2009:

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Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.85694    0.90625   0.946   0.347
ret.imkb100  0.77879    0.08694   8.957 3.03e-14
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Residual standard error: 8.725 on 94 degrees of freedom
Multiple R-squared:  0.4605, Adjusted R-squared:  0.4548
F-statistic: 80.23 on 1 and 94 DF,  p-value: 3.028e-14
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Summary information concerning the returns is given in the following table:

	minimum	25% quantile	median	75% quantile	maximum	mean	std. dev.
İMKB 100	-23.860	-5.664	3.204	8.045	29.740	1.935	10.30
Tüpraş	-25.710	-5.735	2.560	9.082	47.110	2.364	11.82

- Does the 3-sigma rule hold for the two series? What are your conclusions?
- Write down the estimated regression equation.
- Considering the Turkish stock market, explain why the regression coefficient is positive.
- Is the exogenous variable significant?
- If the return on İMKB 100 one month is 5%, compute the expected return on Tüpraş share prices that month.
- Explain the meaning of R-Squared in the summary above.
- Compute the coefficient of correlation between the two variables.
- Explain why the residual standard error is smaller than the standard deviation of Tüpraş returns.

Problem 2: The following data were obtained on the dosage level of a medicine on patients' recovery time:

Dosage Level (grams)	1.2	1.0	1.5	1.2	1.4
Recovery Time (hours)	25	40	10	27	16

- Estimate the linear regression of the recovery time on the dosage level.
- Calculate the resulting change in the recovery time if there is a unit change in the dosage level.
- Does the intercept of the linear regression line have any meaning in this application? Explain.
- Compute the coefficient of determination and give an interpretation of its value.