

TOPIC: QUANTITATIVE METHODS

THE TOTAL POINT VALUE FOR THIS QUESTION SET IS 12 POINTS

Lena Pilchard, a research associate at Eiffel, is attempting to measure the value added to the Eiffel Investments portfolio from the use of 1-year earnings growth forecasts developed by professional analysts. Additionally, Pilchard wants to develop an algorithm to create a custom index to use as a benchmark.

Pilchard's supervisor, Edna Wilrus, recommends a portfolio allocation strategy that overweights neglected firms. Wilrus cites studies of the "neglected firm effect," in which companies followed by a small number of professional analysts are associated with higher returns than firms followed by a larger number of analysts. Wilrus considers a company covered by three or fewer analysts to be "neglected."

Pilchard also is aware of research indicating that, on average, stock returns for small firms have been higher than those earned by large firms. Pilchard develops a model to predict stock returns based on analyst coverage, firm size, and analyst growth forecasts. She runs the following cross-sectional regression using data for the 30 stocks included in the Eiffel Investments portfolio:

$$R_i = b_0 + b_1 \text{COVERAGE}_i + b_2 \text{LN}(\text{SIZE}_i) + b_3(\text{FORECAST}_i) + e_i$$

where:

R_i = the rate of return on stock i

COVERAGE_i = one if there are three or fewer analysts covering stock i , and equals zero otherwise

$\text{LN}(\text{SIZE}_i)$ = the natural logarithm of the market capitalization (stock price times shares outstanding) for stock i , units in millions

FORECAST_i = the 1-year consensus earnings growth rate forecast for stock i

Pilchard derives the following results from her cross-sectional regression:

Exhibit 1: Results of Pilchard's Cross-Sectional Regression

Variable	Coefficient	t-Statistic
Constant	0.060	1.56

COVERAGE	0.050	3.20
LN(SIZE)	-0.003	-2.50
FORECAST	0.200	2.85

The standard error of estimate in Pilchard's regression equals 1.96 and the regression sum of squares equals 400. The coefficient of determination of the regression model using the squared residuals as dependent variable and using the same set of independent variables is 0.07832.

Wilrus provides Pilchard with the following values for analyst coverage, firm size, and earnings growth forecast for Eggmann Enterprises, a company that Eiffel Investments is evaluating.

Exhibit 2: Coverage, Firm Size, and Earnings Growth Forecast for Eggmann Enterprises

Number of analysts	5
Firm size	\$500 million
Earnings growth forecast	50%

Pilchard uses the following table to conduct some of her hypothesis tests.

Exhibit 3: Critical Values for Chi-Square Distribution (Level of Significance = 5%)

Degree of Freedom	Critical Value
1	3.841
2	5.991
3	7.815
4	9.488
5	11.070
6	12.592

Question #1 of 88

Question ID: 1531380

To create the custom benchmark, Elwell would *most* appropriately use a:

- A) LASSO algorithm.
- B) KNN technique. 

C) random forest classifier.

Explanation

Least absolute shrinkage and selection operator (LASSO) is a popular penalized regression model that is useful in building parsimonious models through feature reduction. K-nearest neighbor (KNN) is used in classification and regression. This technique is used to classify an observation based on *nearness* to the observations in the training sample. Investment applications of KNN include predicting bankruptcy, assigning a bond to a ratings class, predicting stock prices, and creating customized indices. **Random forest** is a variant of classification trees whereby a large number of classification trees are trained using data bagged from the same data set. Investment applications of random forest include factor-based asset allocation, and prediction models for the success of an IPO.

(Module 3.2, LOS 3.c)

Question #2 of 88

Question ID: 1531381

Does the model exhibit evidence of conditional heteroskedasticity in residuals?

A) Yes because the χ^2 of 6.44 is less than the critical χ^2 of 7.815.

B) No because the χ^2 statistic of 2.35 is less than the critical χ^2 of 7.815. 

C) No because the data is cross-sectional.

Explanation

The calculated chi-square statistic uses the R^2 of the regression of squared residuals on the original independent variables (R^2 is given as 0.07832). $\chi^2 = n \times R^2 = 30 \times 0.07832 = 2.35$

Critical χ^2 (dof = k = 3) = 7.815.


Since the calculated χ^2 is not greater than the critical value, we fail to reject the null hypothesis of no conditional heteroskedasticity.

(Module 1.3, LOS 1.h)

Question #3 of 88

Question ID: 1531382

Holding firm size and consensus earnings growth forecasts constant, the estimated average difference in stock returns between neglected and non-neglected firms equals:

- A) 1%.
- B) 3%.
- C) 5%. 

Explanation


The slope on the dummy variable (COVERAGE), which is 0.05 or 5%, equals the change in average returns between neglected and non-neglected firms after controlling for SIZE and FORECAST.

(Module 1.2, LOS 1.f)

Question #4 of 88

Question ID: 1531383

Using the inputs for Eggmann Enterprises provided in Exhibit 2, the predicted stock return for Eggmann Enterprises is *closest* to:

- A) 4%.
- B) 9%.
- C) 14%. 

Explanation

The estimated regression equation equals:

$$\text{return} = 0.06 + 0.05\text{Coverage} - 0.003\text{LN}(\text{SIZE}) + 0.20\text{Forecast}$$

where:

coverage equals zero if number of analysts exceeds 3

Therefore, the predicted return for Eggmann Enterprises equals:

$$\text{return} = 0.06 + 0 - 0.003\text{LN}(500) + 0.20(0.50)$$

$$\text{return} = 14.14\%$$

(Module 1.2, LOS 1.f)

Overview for Questions #5-8 of 88

Question ID: 1622584

TOPIC: ECONOMICS

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