P6. Missing Data Fill

Below is a table of a certain statistics of companies. Company X and Y are in the same industry while Company Z is in another industry. Average of All is an average over all 5,000 companies in the stock market including X, Y, and Z. Please estimate blanks of the table – X’s 2010 Q4 and Y’s 2011 Q3 based on your own theory.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Company X | Company Y | Company Z | Average of All |
| 2010 Q1 | 30 | 100 | 35 | 90 |
| 2010 Q2 | 40 | 130 | 50 | 80 |
| 2010 Q3 | 50 | 120 | 60 | 110 |
| 2010 Q4 | ? | 170 | 85 | 100 |
| 2011 Q1 | 80 | 200 | 100 | 130 |
| 2011 Q2 | 90 | 230 | 120 | 150 |
| 2011 Q3 | 120 | ? | 130 | 180 |
| 2011 Q4 | 130 | 300 | 160 | 180 |

P7. Strategy Sigma on different universes

Below is a table of several portfolios’ 1 year performance with a certain universe; where universe means candidate stocks which a strategy can buy. We apply the same formula(Strategy Sigma) to different group of stocks i.e. different universes.

Universe Size means the number of stocks in the universe and this universe size decreases in this 1 year period due to bankruptcy or delist of stocks in the universe. For example, in the Whole Market, there were 2000 stocks in the beginning but after 1 year 30 stocks are delisted or their companies are bankrupt so that only 1970 stocks survived. No other stock came in and 30 stocks went out.

|  |  |  |  |
| --- | --- | --- | --- |
| Universe | Return | Universe Size Start | Universe Size End |
| Whole Market | 1.7% | 2000 | 1970 |
| Random Pick A | 2.0% | 400 | 380 |
| Random Pick B | 2.3% | 150 | 149 |
| Industry X | 1.9% | 200 | 197 |
| Industry Y | 2.7% | 60 | 57 |
| Criterion P | -3.5% | 230 | 202 |
| Criterion Q | 0.9% | 190 | 189 |

* Whole Market means all the stocks listed in the exchange
* Random Pick A(B) consist of 400(150) stocks randomly selected from 2000 stocks in Whole Market
* Industry X(Y) is a group of companies which are in the same field e.g. Energy, Bank, etc.
* Criterion P and Q are groups of stocks which are selected by certain filtering functions P and Q respectively.
* Return is a percentage change of a portfolio built by Strategy Sigma. This Strategy Sigma is a Prediction Model which takes market data and gives weights of stocks in the Universe. The same Strategy Sigma is applied to above seven Universes – only difference is a candidate pool of stocks determined by the Universe. In other word, Strategy Sigma determines amount of money invested in each stock. If Strategy Sigma is applied to Whole Market, it distributes the seed money over 2000 stocks while it would distribute the seed money over 60 stocks when applied to Industry Y.

Now you are required to build your trading model derived from above results.

P8. You are building filters (X and Y) which select stocks with a certain condition out of 3000 stocks. Below is statistics of filter X and filter Y. From market data of 2010, 500 stocks out of 3000 are selected by filter X and 400 out of 3000 are selected by filter Y. In 2011 and 2012, you counted how many of 500 stocks selected by filter X in 2010 are again selected by filter X in 2011 – the result is 110 stocks are selected by filter X in 2011 among 500 stocks selected by filter X in 2011 (110/500 in *column 1 of 2011 row*). As a control group, you counted how many out of 400 stocks selected by filter Y in 2010 are selected by filter X in 2011 (50/400 in *column 2 of 2011 row*). Also in 2011, filter X selected 450 stocks if we look at all the 3000 stocks (450/3000 in *column 3 of 2011 row*). By analyzing below table, you need to discuss consistency(predicting power) of filter X and filter Y – whether stocks selected by filter X will be selected by filter X again

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 1 | 2 | 3 | 4 | 5 | 6 |
|  | All | Filter X | | | Filter Y | | |
|  | no Filter | Filter X | Filter Y | no Filter | Filter X | Filter Y | no Filter |
| 2010 | 3000 | N/A | N/A | 500/3000 | N/A | N/A | 400/3000 |
| 2011 | 3000 | 110/500 | 50/400 | 450/3000 | 120/500 | 100/400 | 600/3000 |
| 2012 | 3000 | 85/450 | 85/600 | 300/3000 | 150/450 | 150/600 | 1000/3000 |

End