Homework Assignment 1: Building and Testing a Trading Strategy

The University of Hong Kong
FINA3327 Hedge Funds: Strategies, Business Management, and Institutions
Fall 2023
Due: Oct 14, 2023

Introduction

In this homework assignment, you are asked to replicate and back test a hedge fund trading strategy. The strategy was first described in Edmans (2011) "Does the stock market fully value intangibles? Employee satisfaction and equity prices." The basic question is, does it matter if a firm's employees are happy? And if so, does the stock market realize and value this?

Edmans (2011) takes a list of the "Best Companies to Work For" and shows that historically, if you were to buy these companies, then you would earn positive risk-adjusted returns. These are companies that have high-levels of employee satisfaction, and where employees have many benefits. His results provide evidence that employee happiness matters, and further, that the market does not fully realize the value of happiness. That is, companies with happier employees perform better than those with sad employees.

Submission Instructions

You may answer the questions in the programming language of your choice (including Excel). Please submit your assignments on Moodle before 11:59 p.m. on Saturday, March 4, 2023. Assignments should be **typed**, and the first page should include the names and UIDs of all members in your group. Please upload either an Excel, PDF, or Word file, and rename the file to "Assignment 1 G#", where "#" is your group number. Also, please submit all code, and be prepared to submit your data upon request.

Questions

1) **Identify Which Stocks to Buy:** The first step is to come up with a rule for which stocks we want to buy, and when.

   Professor Alex Edmans has made available a list of the 100 Best Companies to Work for in America. This list has been updated in 1984, 1993, and every year from 1998 through 2012. We will download this data from his website to identify which companies we want to buy, and in which years do we want to hold these stocks.

   Go to Professor Alex Edmans' website: http://alexedmans.com/data/ and download the 100 Best Companies to Work for in America data (bcwlist.xlsx). The data is listed in two sets of columns, and we will use only the first set of data. This data contains 17 years of rankings.

   On Moodle, there is a file that has the monthly stock market data for all firms that appear on this list ("crsp_data.csv"). We'll refer to this file as the "stock dataset".

a) (5 points) Suppose our investment strategy is to take a long position in all stocks listed in each ranking of Professor Edmans' list. What is the logic of this strategy? If this strategy works, why does it work? Or put different, what must be true for this strategy to work?

b) (10 points) The lists are published at different times. The first list is published in 1984, then 1993, then 1998, and then every year afterwards. In the paper, Professor Edmans mentions "On April 1, 1984, I form a portfolio containing the 74 publicly traded [Best Companies] in that year, and measure the returns to this portfolio from April 1984 to February 1993. ... The portfolio is reformed on March 1, 1993 to contain the 65 firms included in the new list, and returns are calculated through January 1998. This process is repeated until December 2009." To the stock dataset, add a new variable called "*strategy_rule*" that is equal to 1 if our strategy says to invest in this firm at this particular month.

Total for Question 1: 15

2) **Build Portfolio Weights:** Now that we know which stocks we will invest in, we will now build **two** portfolios. The first is an equal-weighted portfolio, and the second is a value-weighted portfolio.

a) (10 points) In the stock dataset, add the portfolio weights for the equal-weighted portfolio. Label this variable "*eq_weight*". Recall from our notes that the weight for stock *i* is 1 divided by the number of stocks in the "group". At each month, the group is the number of stocks that we have chosen to invest in (*strategy_rule* = 1).

b) (5 points) In the stock dataset, create a new variable called "market value" and set this equal to price times shares outstanding (PRC times SHROUT).

c) (10 points) In the stock dataset, add the portfolio weights for the value-weighted portfolio. Label this variable "*val_weight*".

Total for Question 2: 25

3) **Calculate Portfolio Returns:** With our portfolio weights, we can calculate monthly portfolio returns and cumulative portfolio returns. For this question, recall that weights are formed at the beginning of the month, but the returns are realized at the *end* of the month.

a) (10 points) In a new dataset (or Excel worksheet), calculate the monthly returns for the equal- and value-weighted portfolios. Label these variables "*eq_return*" and "*val_return*", respectively. We'll call this new dataset the "return dataset".

b) (5 points) In the return dataset, calculate the cumulative returns for the equal- and value-weighted portfolios.

Total for Question 3: 15

4) **Backtesting:** We will now analyze the ==return==, ==sources or returns==, and ==risk profile== of the two portfolios. The following questions apply to both the equal- and value-weighted return series.

    a) (5 points) Plot the cumulative returns. Plot this against the market return (this data is available in the alpha tool Excel file).

    b) (5 points) Either using the Excel Alpha tool from Moodle, or your own code, calculate the average monthly return, Sharpe ratio, CAPM alpha, Carhart Alpha, and beta exposures (sources of risk). Report whether the alpha and beta estimates are statistically significant.

    c) (5 points) Calculate the volatility, downside risk, value-at-risk, and expected shortfall of the strategy.

<div align="right">Total for Question 4: 15</div>

5) **Analysis**

    a) (5 points) Does this strategy beat the market? Why or why not?

    b) (5 points) What is the Alpha of the strategy? Is this large, why or why not?

    c) (5 points) You should find that the beta of this strategy is close to 1. Why is this the case? Suppose you combine this strategy with a short side that shorts the entire market. Why might this be more attractive to institutional investors? Why might it be less attractive to retail investors?

    d) (5 points) Explain why these results show that financial markets do not fully price the value of employee satisfaction.

    e) (5 points) Do you expect this strategy to continue to be profitable, why or why not?

    f) (5 points) Do you think you could implement this strategy in Hong Kong? If you wanted to test this strategy, how might you try to learn which companies have high employee satisfaction, and which have low employee satisfaction?

<div align="right">Total for Question 5: 30</div>