

## **Final Project - Portfolio Performance Evaluation**

**Finance 34600 – Spring 2008**  
**University of Notre Dame, London Centre**

Due Monday, April 28<sup>th</sup>  
(100 points)

### **Objectives:**

The primary objective of this project is to evaluate your performance as investment managers. You should evaluate your performance relative to the market benchmark (the S&P 500) and relative to another appropriate benchmark that is consistent with your stated investment strategy. (Note: you may also evaluate your overall performance relative to other groups in the class – total performance numbers for all groups will be available on the class web page). This is a group assignment and should be completed by the members of your portfolio management group.

The report should be written in the form of a report for your current investors. This is a writing assignment and will be graded as such. Do not simply list the items described below. Note that your grade depends on you correctly evaluating your performance, not on whether you had good performance. Do not try to make your performance look good if it wasn't. Whether your performance was good or bad, you need to explain it to your investors. Also, be sure to discuss the specific numbers in the text, even if you list them in an attached table or figure. An investor should be able to read through the report without having to refer to the attachments.

Our trading simulation started on Monday, January 21<sup>st</sup> and ended on Friday, April 18<sup>th</sup>. You will evaluate your performance based on your daily returns and holding period returns during this period. Your daily return on January 21<sup>st</sup> and your holding period return should both be calculated relative to the starting value of \$500,000. You can use benchmark and S&P values from January 18<sup>th</sup> as a starting point to calculate daily returns on these indices starting on January 21<sup>st</sup>. Throughout the project, you should use an annual risk-free rate of 2.5%, which corresponds to a daily rate of 0.0001, or 0.01% ( $.025/250$  trading days = 0.0001).

### **Requirements:**

- The report should be 3-4 pages typed and double-spaced, using one inch margins and a font size of between 10 and 12. Points will be deducted if you go over 4 pages. Additional graphs and tables may be included and are not counted in the number of pages. (Do NOT include graphs or tables that you do not specifically discuss in the report.) Also, be sure that your write-up includes an introduction and conclusion as described below.

#### **A. Introduction**

- The introduction should clearly explain the basic structure of the investment simulation and the purpose of this report. For example, an investor reading this should be able to understand the investment time frame, what is contained in the report, and why you are writing the report.

## **B. Overall Performance**

- You should begin by discussing the overall return and risk characteristics of your portfolio. Most importantly, what are the total holding period return and total risk of your portfolio and how do they compare to that of the market and that of your benchmark? What was your investment strategy and how well did it work? How does your performance compare to other groups in the class (the competing investment managers)?

## **C. Market, Industry, and Security-Specific Events**

- Next you should discuss the five most important individual-security positions that explain the performance of your portfolio. What economic, industry, or security-specific events explain the return on these securities and were these events consistent with your expectations when taking the position? Be sure you are specific about how these events impacted your portfolio performance. Note that you do not have space in the report to discuss every event that took place. Instead, you should focus on those that are the most important and had the greatest impact on your portfolio performance. If you have room, you could also discuss the risk and return characteristics of the best and worst securities in your portfolio, how your securities performed relative to their industries, and whether your portfolio was diversified or dominated by any particular securities.

## **D. Risk-Adjusted Performance**

- This is the most important part of the project and will likely represent the largest section in your report. In this section, you should use what you learned in class to analyze the risk-adjusted performance of your portfolio. Use the portfolio performance measures discussed in class to assess your performance relative to the market and relative to your chosen benchmark. This is the most important part of the project since it involves risk-adjusted performance measures that are used throughout the finance industry. Your discussion should include calculations of the various performance measures, as well as complete explanations and interpretations of the results from each measure. (*Note: At a minimum, you must calculate and discuss the Sharpe, Jensen, and Treynor measures for your portfolio, for the market, and for your benchmark index, and the  $M^2$  measures of your portfolio relative to the market and relative to the benchmark.*)

Which performance measure or measures are most appropriate to judge the performance of your investment management group? Why?

## **E. Market Timing and Security Selection**

- Use one of the market-timing models we discussed in class to evaluate the market timing and security selection skills of your portfolio management team. Discuss and interpret the results. Did your group demonstrate any market timing skills? Did your group demonstrate security selection skills?

## **F. Conclusion**

- What are your conclusions based on the evaluation you have done for this assignment? What have you learned? If you could start the investment simulation over from the beginning, would you do anything differently?

## Technical Notes:

- **Beta:** To calculate the Treynor and Jensen measures, you will need an estimate of Beta for your portfolio. In general, you want to calculate a regression, where the X variable is the excess return on the market (the S&P 500) and the Y variable is the excess return on your portfolio. The slope of this regression is the Beta of your portfolio. There are several ways to calculate this slope coefficient. First, you can make an X-Y scatterplot and add a trendline and regression equation. This is by far the easiest way to calculate Beta. Second, you can estimate a complete regression analysis. To do this in Excel, go to 'Tools' then to 'Data Analysis' then to 'Regression'. Third, you can obtain the Slope and Intercept of the regression directly (without estimating the complete regression). To do this, just use the '=Slope' and '=Intercept' functions. Again, Excel will ask you for the ranges of the X and Y variables. Finally, you can calculate Beta as the covariance between returns on the market and returns on your portfolio, divided by the variance of market returns.
- **Market Timing:** You can estimate market timing using either of the methods we discussed in class. Again, the easiest method is to create an X-Y scatterplot and add a trendline. The only difference from the example discussed above is that you will add a curved (second order) trendline rather than a straight trendline. A second, but more difficult, way to estimate market timing is to estimate a regression similar to the one you estimated for Beta. The only difference is you will include a second X variable that is defined as the Return on the market squared. Using both of the above methods, the coefficient on the squared market return variable is the gamma for the Treynor-Mazuy model. Finally, you can estimate market timing using the Hendriksson-Merton model. To do this, you need to sort your return observations based on the market return on each day. In other words, the first observation will be the day with the lowest market return and the last observation will be the day with the highest market return. You then calculate Beta separately for the high market return days and the low market return days. This will give you the  $Beta_{low}$  and  $Beta_{high}$  for the Hendriksson-Merton model.

**Group Member Evaluation**

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On the lines below, please list the name of your group and the members of your group. For each group member (including yourself), assign a percentage grade (out of 100%). These assignments will be considered when determining final project grades and final semester grades. If you had significant problems with a group member or wish to commend a group member who worked especially hard, describe the situation in the written comments section at the bottom of the page.

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Group Name: \_\_\_\_\_

Group Members:	Grade (out of 100%)
(You) _____	_____
_____	_____
_____	_____

Comments: