DTC: Estimating a Model to Determine the Effect of Net Operating Assets on Returns

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1. Introduction

Our team is tasked with building a financial model, which we will use to evaluate and recommend a course of action to the CEO of a new start-up company. On behalf of the CEO, we seek to answer whether a larger amount of net operating assets (NOA) increase or decrease buy and hold return for the firm.

To answer this question, our team pulled, cleaned, and analyzed data to estimate our model. Throughout this paper, we will go into detail on the data and methodology we used, as well as the results from our model. As with any financial model, there is always room for improvement. Because of this, we will also offer points of suggestion to further improve the current model.

2. Data

The data for this project is sourced from the Wharton Research Data Services (WRDS), pulled specifically from the section, CRSP/Compustat Merged and CRSP Monthly Stock. From this section, we can retrieve the necessary annual fundamentals data for NOA. For sales, we selected the specific variable, sales/turnover (Net) (SALE). For holding period returns, we selected the variable RET. To gather the necessary variables to calculate NOA, we chose the following variables: shareholder's equity (SEQ), cash and short-term investments (CHE), long-term debt (DLTT), and debt in current liabilities (DLC). For our model, we use a date range from the year 2000 to 2003. To later clean and merge this data, which we will go into more detail about in the Methodology section, all variables and their respective data points were extracted with GVKEY as the key identifier.

As previously mentioned, after pulling the respective datasets from WRDS, there are additional variables that require minor manipulation using the raw data files that allowed for key dependent variables to be calculated, namely the NOA and lag sales (LSALES) variables. Because we have the datasets extracted from WRDS, before the calculations, we chose to clean the data before any calculations take place. This involved removing any missing observations and outliers, which cause skewing of the normal distribution. After this process, we were able to utilize the dataset to formulate all NOA values. To accomplish this, the company's value of cash, investments and total liabilities were subtracted from the shareholder equities and then summed with their total debts. Essentially, the variable names used in WRDS to generate NOA = SEQ - CHE+ (DLTT + DLC). In addition to NOA, to create LSALES, we use the collected SALE data and prompted LSALES and fiscal year (FDYEAR) through a dedicated SAS script. Once LSALE was generated, we had the adequate elements needed to run our regression model.

3. Methodology

Once we have our data ready with all the necessary variables, we transformed and analyzed it in order to determine if larger NOA increases or decreases buy and hold returns for the firm. Before applying the regression model, we performed verification steps leading up to the results ensuring the results were reasonable.

First, in preparation for the analysis, we merged the NOA, SALE, and RET variables into a newly designated data file. Furthermore, we scaled NOA by lag sales by simple division. As a product of having scaled NOA, additional missing data and outliers were output, requiring a final cleaning of the data. In processing the data through the final clean, we ran the regression of NOA onto RET.

4. Results

After running our data through the regression model, we can view the results and start to interpret our findings. Below are the results (expanded versions of the results will be provided for more clarity):

***Tables 1-4**: Descriptive statistics of model*

The SAS System

The REG Procedure
Model: MODEL1
Dependent Variable: RET Total RE Property

Number of Observations Read	16679
Number of Observations Used	16679

Analysis of Variance

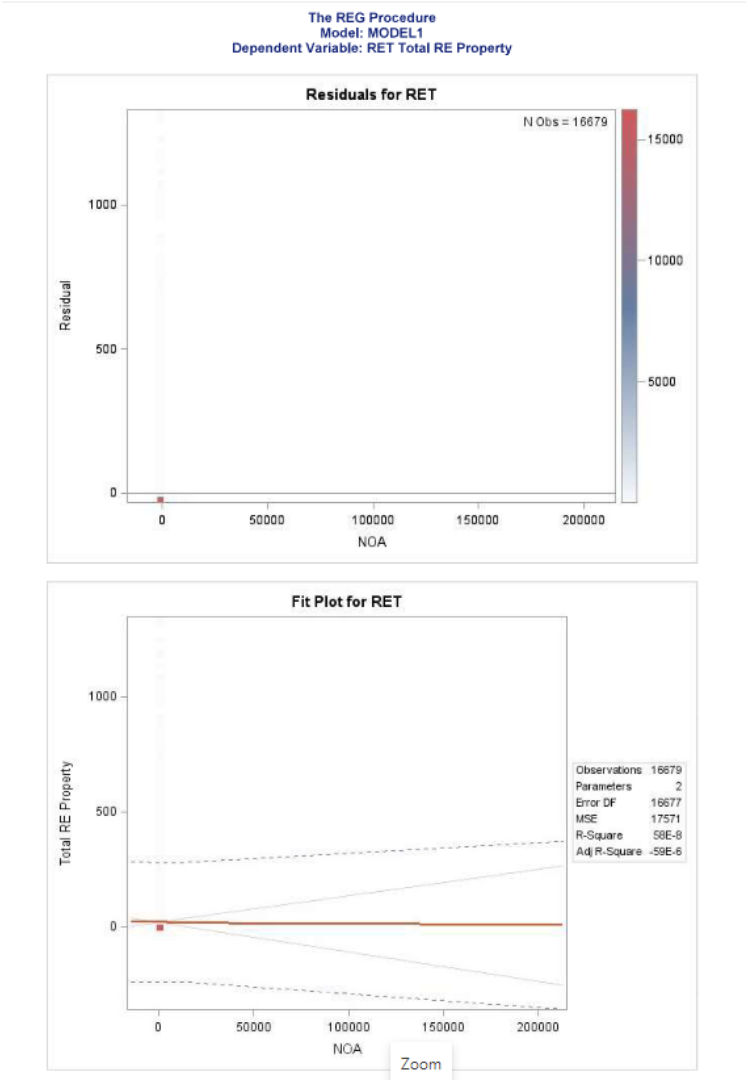
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	169.83071	169.83071	0.01	0.9217
Error	16677	293025305	17571		
Corrected Total	16678	293025475			

Root MSE	132.55423	R-Square	0.0000
Dependent Mean	18.32457	Adj R-Sq	-0.0001
Coeff Var	723.36893		

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	1	18.32552	1.02643	17.85	<.0001
NOA		1	-0.00006098	0.00062024	-0.10	0.9217

Plots 1-2: *Graphs for return residuals and model*



Based on the negative coefficient on NOA, our model suggests that the larger the amount of NOA, the return tends to decrease. Intuitively, this goes against what we expect, as we would assume a larger amount of NOA would lead to an increase in returns for the company. Since our results are counterintuitive, we have thought of suggestions that may help improve the model.

An improvement to the model we could make in a future iteration is to use monthly returns instead of annual returns. By utilizing another section within WRDS, Stock/Security Files, we can retrieve returns from monthly stock data – the specific variable, holding period return (ret). By doing so, we would need to transform the vertical data to horizontal data to be able to manipulate with SAS, doing this 12 times for one year. By using monthly data, we would be able to retain more observations in our datasets.