

How to Weight an Investment Portfolio

Lexington Financial: Model 10B Equity Growth

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Author Note

This paper was prepared for Decision Modeling, taught by Professor Weatherford

### EXECUTIVE SUMMARY

Lexington Financial is one of the region's leading Financial and tax firms located in Los Gatos, CA. They offer unmatched planning, investment and tax expertise. As comprehensive wealth consultants, Lexington Financials focus is coordinating and managing investment assets, retirement income, estate planning and tax planning. Lexington Financial wants to make their clients' financial goals a reality. Through continuing to educate its employees, Lexington Financial can ensure that its clients' tax and financial needs will be met.

One of Lexington Financial's goals for the 2013 business year is to reduce the amount of investment models and organize portfolios by strategy and risk. However, Lexington needs a system to help with the decision process. Up to this point, Lexington Financial has created portfolios by plugging mutual funds and other investments into Morning Star and changing the weights on each investment on gut feeling or until an acceptable return and standard deviation could be found. This method is time consuming and rarely yields the best alternatives.

For this reason, Lexington Financial has sought out a bright and quick-learning MBA student from the University of Wyoming to build them a model that will tell them the least risky investments to take, what their expected return will be and how each investment should be weighted within a portfolio.

### **Situation**

Lexington Financial is located in Los Gatos, CA. Los Gatos is a beautiful area nestled in the Santa Cruz mountain range and 25 minutes from the beach. Due to its beautiful location, Los Gatos has attracted many of the rich and famous to live within its mountainous walls. With the increase of wealth into the community, Los Gatos has become a prime location for financial investment businesses.

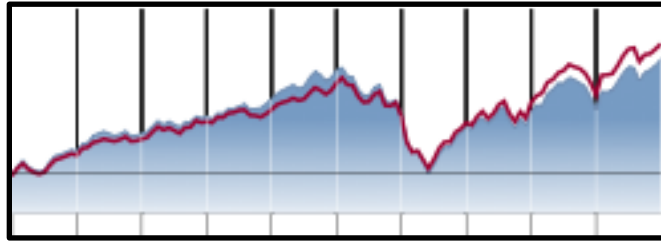
Lexington Financial has grown quickly over the past 10 years and would like to see continued wealth and strategic growth in the future. The key to success in the financial world is seeking out new and creative ways to pick quality investments. Morning Star, an online investment strategy tool, has helped Lexington Financial for years to create effective portfolios, giving quality returns on their investments. However, Morning Star takes lengthy amounts of time to analyze investments and decide on correct weighting strategies to effectively reduce risk and maximize returns. For this reason, it has been my job to create a model that will work alongside Morning Star and assist Lexington Financial in analyzing investments, deciding the best weighting ratios for each at a least possible risk option and giving an expected rate of return.

### **Analysis**

To understand the “Growth of 10,000 Portfolio Model” and its assumptions, the model must be analyzed. Beginning at the top of the model, the analysis will start with the “Growth of 10,000 Portfolio Model,” go to investments then work down toward “Types of Investors”.

**Growth of 10,000 Portfolio Model**

Morning Star classifies a “Growth of 10,000 Portfolio Model” as follows with the graph:



The red line represents the growth of a \$10,000 investment based on the fund's market price. The line is plotted on a logarithmic scale, so that identical percentage changes in the value of an investment have the same vertical distance on the graph. For example, the vertical distance between \$10,000 and \$20,000 is the same as the distance between \$100,000 and \$200,000 because both represent a 100% increase in investment value. This provides a more accurate representation of a fund's performance than would a simple arithmetic graph. The graph is scaled so that the full length of vertical axis represents a tenfold increase in investment value. For funds whose returns have exhibited greater than a tenfold increase over the period shown in the graph, the vertical axis has been compressed accordingly (Morning Star).

**Investments**

Each investment represented in the portfolio is a mutual fund. However, mutual funds are not the only investment that can be analyzed and weighted in this model. In fact, any investment with past data can be inputted into the model and analyzed to see if it could yield desired returns at an acceptable standard deviation. Past gains and losses of each investment are represented as percentages. The percentage gain and losses are used throughout the rest of the model to help us make helpful assumptions about each investment opportunity, in this case nine separate mutual funds are represented.

**Average Return, Standard Deviation & Variance**

The gains and losses are used to obtain a 10-year average of each investment. The 10-year average is used in correlation with the “decided weighted investment percent” to give an expected rate of return for each investment (at the bottom). Also, a standard deviation and a variance are calculated. Their uses will be discussed later in the analysis.

**Covariance Matrix**

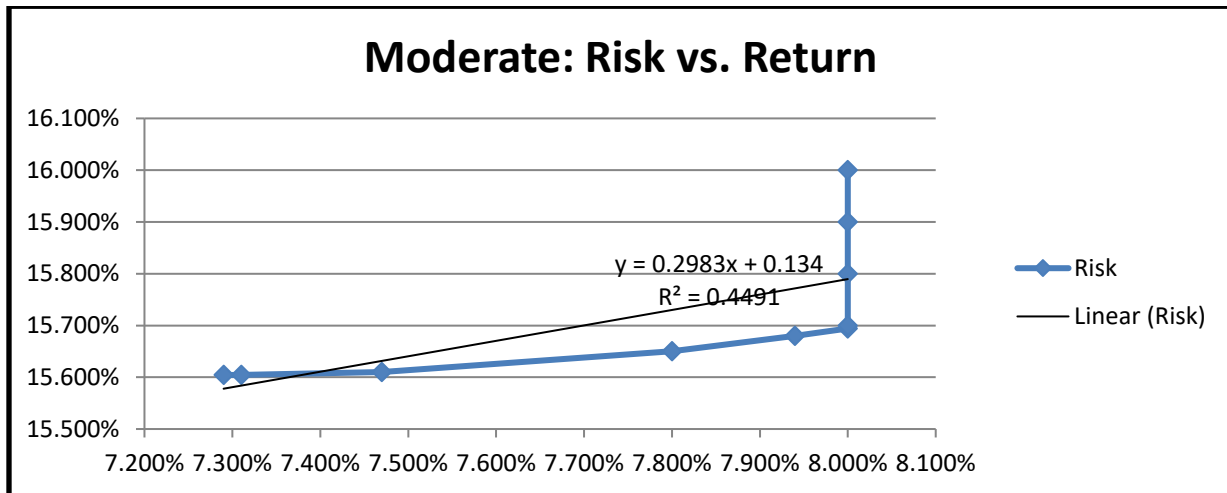
The covariance matrix is used to see if any relationships exist between each investment. For example, in C9, MADVX mutual fund had an increase of 5.92%. As you go horizontally across the model and stop at J9 you will see that USLIX had an increase of 4.29%. Now go down to J23 and observe the covariance with C23. C23 is .026 (rounded) and J23 is .024 (rounded). C23 compares C9 change of 5.92% to itself, 5.92%. However, J23 compares C9’s 5.92% increase to J9’s 4.29% increase. This comparison makes a covariance of .024 that is quite similar to MADVX’s covariance of C9. Luckily, we do not need to see all the relationships by going through by hand, as the model does this for us at an extraordinarily fast rate. These covariance are used with “Weighted Investment Decision Percent” to give us a portfolio variance which, when squared, gives us the standard deviation of the weighted decisions solver chooses.

**Solver**

Solver is not seen in the model but is the tool we use to find optimal solutions according to the parameters that that we define. All boxes in red are parameters that solver must hold to while calculating a solution. Solver is incredibly sophisticated, yet it has one problem: it will do whatever you tell it to do. This means that the user must be aware of the workings of solver to avoid

incorporating considerable user fault into the model. For example, when trying to have solver maximize expected return while giving a range to stay in for standard deviation, solver will maximize your expected return but will always choose the highest standard deviation within your range even if the same expected return could be obtained at a lower standard deviation within your range (see Table 1).

Table 1



### Conservative, Moderate & Aggressive

Conservative, moderate and aggressive describe types of investors. They are classified according to an allowable standard deviation and an expected rate of return at the specified standard deviation. Below is how each investor is classified:

	<u>Conservative</u>	<u>Moderate</u>	<u>Aggressive</u>
Std. Deviation	<7%	9-16%	18-20%
Expected Return	2-4%	6-8%	9-13%

### Assumptions

By letting solver minimize standard deviation or maximize expected return, the assumption is made that the resulting “Weighted Decision Investment Percent” will be the best way to invest your money to gain the expected return in future markets. However, there are two things that are needed to invest money intelligently: a good system for choosing investments and market knowledge. Historical markets can help us to deduct what could possibly happen in future markets and minimize risk, but only when you couple knowledge and modeling can you truly marginally reduce the risk of large losses.

### Conclusions

In the end solver suggested that any combination of these nine mutual funds is either for an aggressive or moderate investor. A standard deviation between 2-4% and an expected return of less than 7% could not be obtained for a conservative investor. Solver needed to be run multiple times to find the least possible standard deviation with the highest expected return. Multiple expected returns could be found at one standard deviation (see Table 1 above). Again, this anomaly was due to the amazing ability that solver has to do exactly what you tell it ☺. Below are the recommendations found through optimizing the data for each investor type:

Conservative: Not Possible (Moderate)			
Return=	7.94%	Risk (Group Std. Dev.)=	15.68%
	MADVX	VEIPX	USLIX
Weighted Investment %	43.21	43.50	13.29
Std. Deviation	17.00%	17.00%	20.00%

## Moderate: Best Return for Risk

Return=	8.00%	Risk (Group Std. Dev.)=	15.69%
	MADVX	VEIPX	USLIX
Weighted Investment %	46.66%	40.33%	13.01%
Std. Deviation	17.00%	17.00%	20.00%

## Aggressive: Best for Risk Reduction

Return=	9.63%	Risk (Group Std. Dev.)=	18.00%
	MADVX	JATTX	
Weighted Investment %	80.02%	19.98%	
Std. Deviation	17.00%	28.00%	

## Aggressive: Most Aggressive

Return=	10.46%	Risk (Group Std. Dev.)=	20.00%
	MADVX	JATTX	
Weighted Investment %	59.89%	40.11	
Std. Deviation	17.00%	28.00%	



**References**

Morning Star, "Black Rock Equity Dividend," <http://quote.morningstar.com/fund/f.aspx?t=MADVX>.  
Accessed November 9, 2012.