

---

# Save Diversification From The CAPM Controversy! An Excel-based Interactive Optimizer To Teach Diversification, Exploiting Mispriced Assets, and Asset Classes

Craig W. Holden

*The CAPM is embroiled in controversy regarding whether it is empirically valid or not. The best way to save the fundamental concept of diversification from being damaged by the CAPM's weak credibility is to expand our treatment of the individual investor's portfolio optimization problem. We need to teach that diversification is always a useful investment strategy and does not depend on whether the CAPM is true or not. The primary obstacle to doing this is the matrix algebra required by mean-variance analysis. I offer a new approach using an Excel-based interactive optimizer. I provide it free on the Web: [www.bus.indiana.edu/finweb/holden.htm](http://www.bus.indiana.edu/finweb/holden.htm)*

## INTRODUCTION

Two of the most important concepts in finance are: (1) diversification and (2) the CAPM. Recently, the CAPM has become embroiled in controversy. Fama and French [1992] claim that the CAPM does not hold empirically.<sup>1</sup> Haugen [1995] goes so far as to call the CAPM a "sham" and recommends that it be discarded entirely. Most college students have heard via the grapevine that "beta is dead," so instructors cannot avoid addressing the CAPM controversy. Regardless of what stand an instructor takes, the danger is that the weak credibility of the CAPM will lead students to become cynical about all equity market theory and heavily discount or discard the fundamental idea of diversification.

This bad outcome can be avoided by *divorcing* diversification and the CAPM. We need to make a sharp distinction between the *individual optimality* result that an individual investor holds a *diversified, optimal risky portfolio* (where the efficient frontier curve meets a tangent line draw from the riskfree asset) and the

*equilibrium* result that all investors hold the *market portfolio*.<sup>2</sup> This requires expanding and improving our treatment of the individual investor's portfolio optimization problem. In particular, leading students to discover that diversification is *always* a useful investment strategy and *does not depend on whether the CAPM is true or not*. Further, we need to explain that the optimal risky portfolio *optimally exploits* any assets that are *mispriced*, such as when particular assets exhibit pricing "anomalies"<sup>3</sup> or an individual investor's private information identifies particular assets that are either underpriced or overpriced.

Unfortunately, the standard textbook treatment of portfolio theory tends to go in the opposite direction and blur the distinction between the individual optimality framework and the equilibrium framework. Several of the leading investments textbooks introduce the *market model*<sup>4</sup> in the same chapter that discusses diversification among many risky assets. These textbooks are trying to explain the distinction between systematic risk (defined as risk which can *not* be diversified away) vs. idiosyncratic risk (defined as risk which *can* be diversified away). In the process of making this important distinction, these textbooks use the market model to connect systematic risk with risk relative to a market index and to connect idiosyncratic risk with error deviations that are uncorrelated with a market index.

---

School of Business, Indiana University, Bloomington, IN 47405. I thank an anonymous referee for suggestions and Jeff Fisher of Indiana University and Stephen L. Nesbitt and Jeanne Shearer of Wilshire Associates Incorporated for supplying asset class estimates.

In general terms, these are false connections. If the CAPM does *not* hold, then the market portfolio plays no special role and a market index does *not* define the distinction between systematic and idiosyncratic risk. If the CAPM does *not* hold, then it is suboptimal to invest in the market portfolio. Indeed, there is no reason for the word “market” to appear anywhere in a chapter based on individual optimality when we don’t know if the CAPM holds or not.<sup>5</sup>

For forty years, modern portfolio theory has provided techniques to solve for the optimal risky portfolio of an individual investor who is a mean-variance optimizer.<sup>6</sup> Yet undergraduate and M.B.A. textbooks that cover the portfolio theory do not provide students with a means to calculate the optimal portfolio and say very little about the qualitative features of the optimal portfolio. This often causes students to be very disappointed about the lack of real-world guidance as to how to invest. The insurmountable obstacle to teaching students how to calculate the optimal portfolio has always been the rigorous demands of matrix algebra.<sup>7</sup>

I offer a new approach. I explain simple techniques by which Microsoft Excel can be used to construct an interactive optimizer. This interactive optimizer does the following: 1) calculates the weights of the optimal portfolio; 2) displays a graph of the weights of the optimal portfolio; and 3) displays a graph of the individual assets, the efficient frontier, the (global) minimum variance portfolio, the optimal portfolio (the tangent portfolio), the optimal Capital Allocation Line (CAL) (the tangent line from the riskfree asset), and the complete portfolio (the portfolio which combines investments in the riskfree asset and the optimal risky portfolio).

This allows students to answer the three following questions:

1. How is the fundamental concept of diversification manifest in the optimal risky portfolio?
2. How should an individual investor optimally exploit mispriced assets?
3. What is a practical approach to investing in different asset classes?

All three questions, which are based on the individual optimality framework, are underemphasized in existing textbooks relative to the equilibrium concept of investing in the market portfolio.

For the first question, the optimizer illustrates the key strategic trade-off of the optimal portfolio: putting bigger weights in higher mean assets to increase portfolio mean vs. diversifying to lower portfolio standard deviation.

For the second question, given mispriced assets, the optimizer dramatically illustrates how to: 1) optimally exploit any underpriced assets (even bigger weights vs. diversification) 2) optimally exploit any overpriced

assets (even smaller weights—possibly negative), 3) optimally exploit any mispriced-low standard deviation assets (bigger weights vs. diversification), and 4) optimally exploit any mispriced-high standard deviation assets (smaller weights vs. diversification).

For the third question, the optimizer allows practical calculations of how to optimally exploit asset class indexes (portfolios). Using asset classes is a practical method to achieve significant portfolio optimization benefits without suffering from the substantial calculation burdens involved in using thousands of individual assets.

The optimizer also has educational value to illustrate additional qualitative features:

1. the optimal CAL pivots around the efficient frontier as the riskfree rate is lowered,
2. the optimal portfolio places smaller weights on higher correlated assets, and
3. the complete portfolio moves up the optimal CAL line as investor risk aversion is lowered.

I make available the finished product to download for free at the Web address (in lower case letters):

[www.bus.indiana.edu/finweb/holden.htm](http://www.bus.indiana.edu/finweb/holden.htm)

The plan of the article is as follows. Section one describes how the interactive optimizer can be used to explain the trade-off between investing more in assets with higher means vs. spreading investment across many assets to lower risk by diversification. Section two describes how to optimally exploit any mispriced assets. Section three describes how to optimally exploit different asset classes and provides a practical application. Section four is the conclusion. The appendix describes some additional qualitative features that are illustrated by the interactive optimizer.

## HIGHER MEANS VS. DIVERSIFICATION

The Excel-based interactive optimizer is structured for five risky assets and one riskfree asset. Figure 1 shows what the Excel spreadsheet looks like for a simple base case in which the risky assets have different means, identical standard deviations, and zero correlations with each other. Column **A** lists the asset number. Asset 0 is the riskfree asset and assets 1-5 are the risky assets. Columns **B** and **D** list the mean return and standard deviation (SD) of return for each asset. Initially, asset 0 has a mean return of 4.0%, which is the riskfree rate, and a SD of 0.0%. Initially, assets 1-5 are given mean returns of 8.0%, 9.0%, 10.0%, 11.0%, and 12.0%, respectively, and identical SDs of 20.0%.<sup>8</sup>

It is very easy to change the mean and SD inputs with a click of the mouse. Columns **C** and **E** are a series of up-arrow and down-arrow combinations, to which Micro-

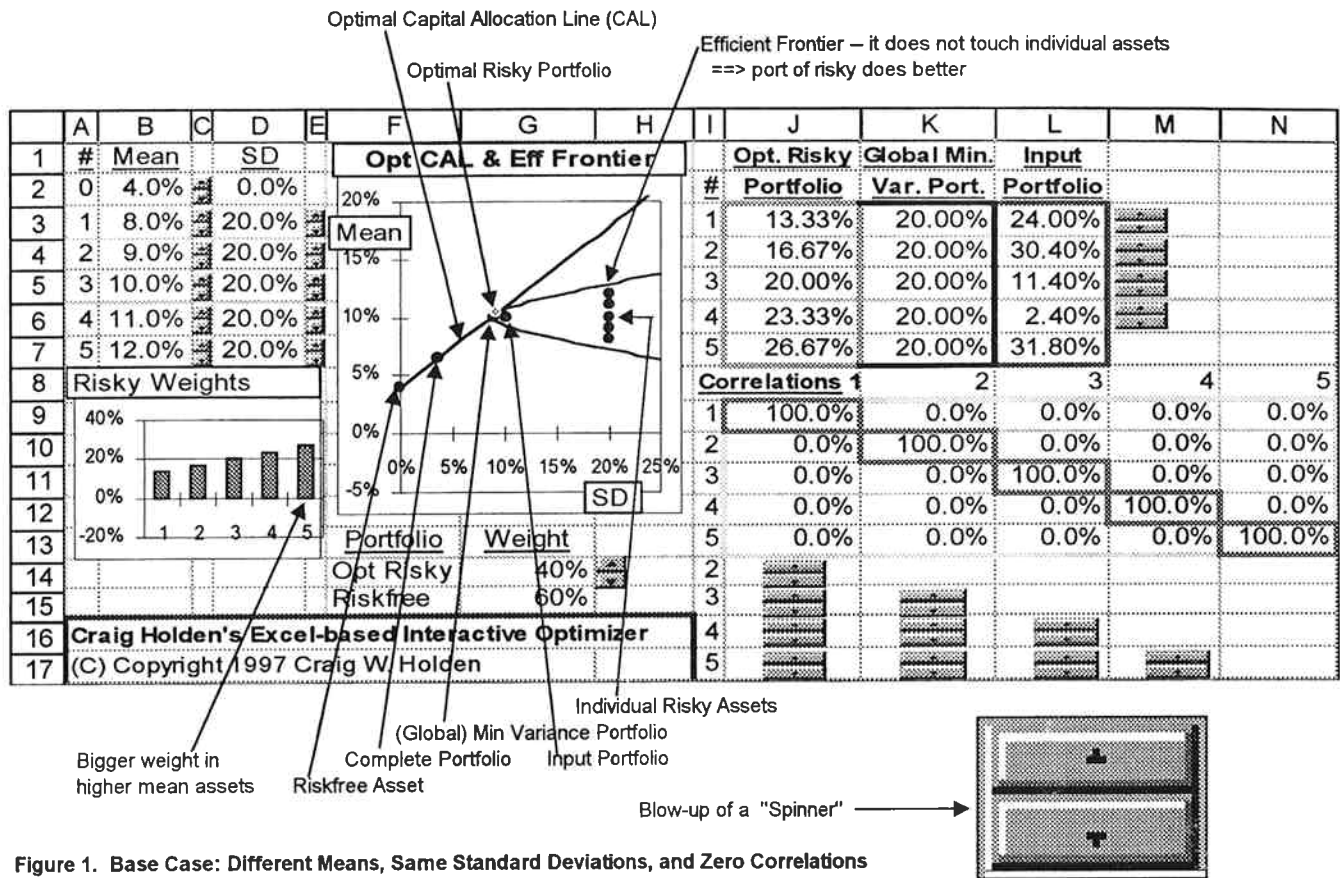


Figure 1. Base Case: Different Means, Same Standard Deviations, and Zero Correlations

soft Excel gives the somewhat odd name of “spinners.” Spinners allow a mouse click to increment a number up or down by a fixed amount.<sup>9</sup> For example, if a student clicks on the up-arrow in cell C5, then the mean return for asset 3 in cell B5 would increase from 10.0% to 10.2%. Then if the student clicks on the down-arrow in cell C5, the mean return in cell B5 would drop back to 10.0%. Similarly, the spinner in cell E5 increments the SD in cell D5 up or down by 0.2%.

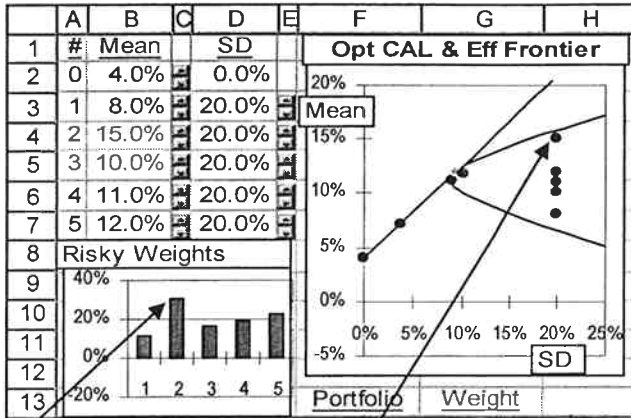
There are two graph outputs. In the lower left of Figure 1 (cells A8:E13), there is a bar graph of the portfolio weights of the optimal risky portfolio by the asset number. For example, asset number 1 has a bar at approximately 13%, asset 2 at approximately 17%, asset 3 at 20%, etc. Since all of the risky assets have identical standard deviations and zero correlations between them, it is obvious that the portfolio which *maximizes diversification* would put 20% in each asset. By contrast, the optimal portfolio puts bigger weights in the higher mean assets (that is, more than 20% in assets 4 and 5). But it does *not* put 100% in the highest mean asset. The optimal portfolio weights reflect a compromise which trades-off *higher means* (putting more in higher mean assets) *vs. lower risk by diversification* (spreading investment among all five assets). The calculation of the

optimal weights is done off-to-the-side using Excel's built-in matrix algebra functions.<sup>10</sup>

In the middle of Figure 1 (cells F1:H12), there is a scatter graph of the standard mean-SD graph. Mean return is on the y-axis and SD of return is on the x-axis. The graph distinctly shows all five individual assets as large dots with means of 8.0%, 9.0%, 10.0%, 11.0%, and 12.0% and SDs of 20.0%. One can easily recognize on the graph the efficient frontier, the (global) minimum variance portfolio, the riskfree asset, the optimal capital allocation line (CAL), the optimal risky portfolio, and the complete portfolio (initially based on 40% in the optimal risky portfolio and 60% in the riskfree asset).

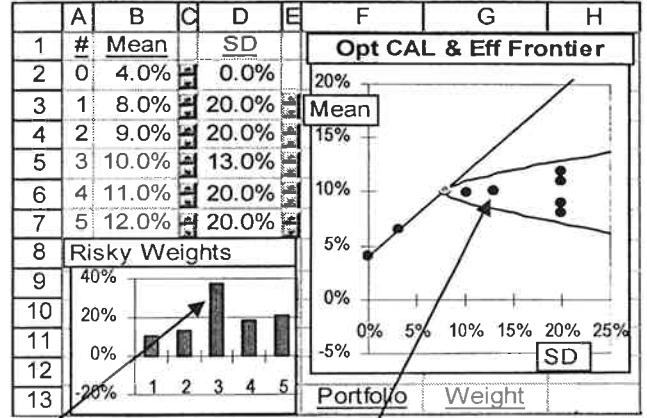
The graph illustrates an interesting point. The efficient frontier does not (generally) touch any of the individual assets—it passes above the individual assets. For example, one portfolio on the efficient frontier is able to provide approximately 13% mean return for the same 20.0% SD. This is accomplished by short selling the low return assets and using the proceeds to invest more than 100% in the high return assets.

In the lower middle of Figure 1 (cells F13:H15), there is the input section for the complete portfolio weights. Column F lists the portfolios—either the optimal risky portfolio or the riskfree asset. Column G lists the



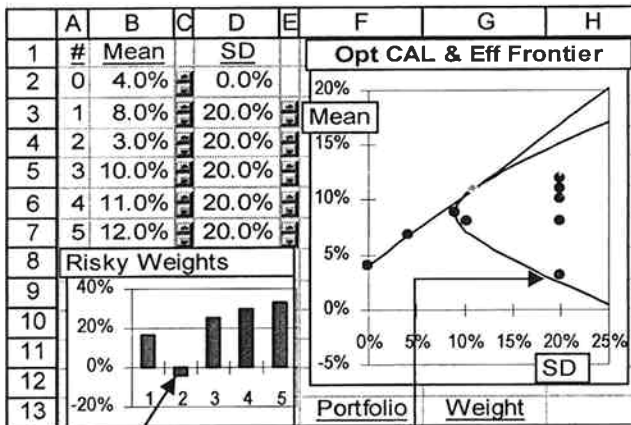
Bigger weight in Asset 2  
Asset 2 is underpriced = high mean return = 15%

Figure 2. Asset 2 is Underpriced



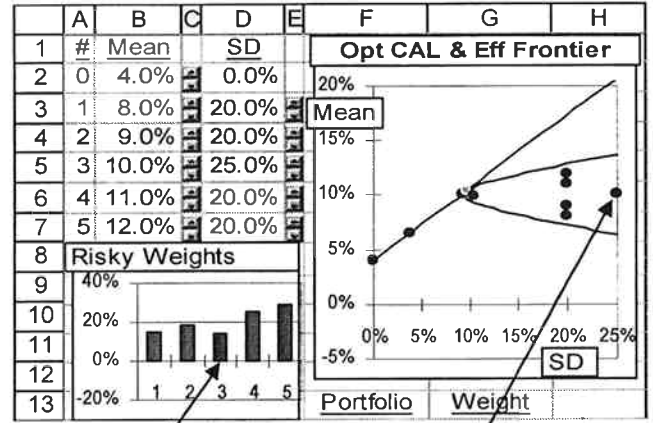
Bigger weight in Asset 3  
Asset 3 has a low SD

Figure 4. Asset 3 Has a Low SD



Negative weight in Asset 2  
Asset 2 is overpriced = low mean return = 3%  
= Short-sell it

Figure 3. Asset 2 is Overpriced



Smaller weight in Asset 3  
Asset 3 has a high SD

Figure 5. Asset 3 Has a High SD

respective portfolio weights of the complete portfolio. The spinner in cell H14 increments the weight in cell G14 up or down by 10%. The riskfree asset weight in cell G15 is 1.0 minus the optimal risky portfolio weight in cell G14. For example, a click on the up-arrow in cell H14 increases the weight in cell G14 to 50% and causes the weight in cell G15 to drop to 50%. This causes the complete portfolio dot on the graph to shift accordingly.

In the middle right of Figure 1 (cells J9:N13) is the correlation matrix of the five risky assets. The correlation terms on the diagonal are always equal to 100.0% (by definition). Initially, the correlations on the off-diagonal are set equal to 0.0%. In the bottom right of Figure 1 (cells J14:M17) are a set of spinners for changing the off-diagonal correlations. For example, a click on the up-arrow in cell J14 increases the correlation between assets 1 and 2 in cell J10 by 10%.<sup>11</sup>

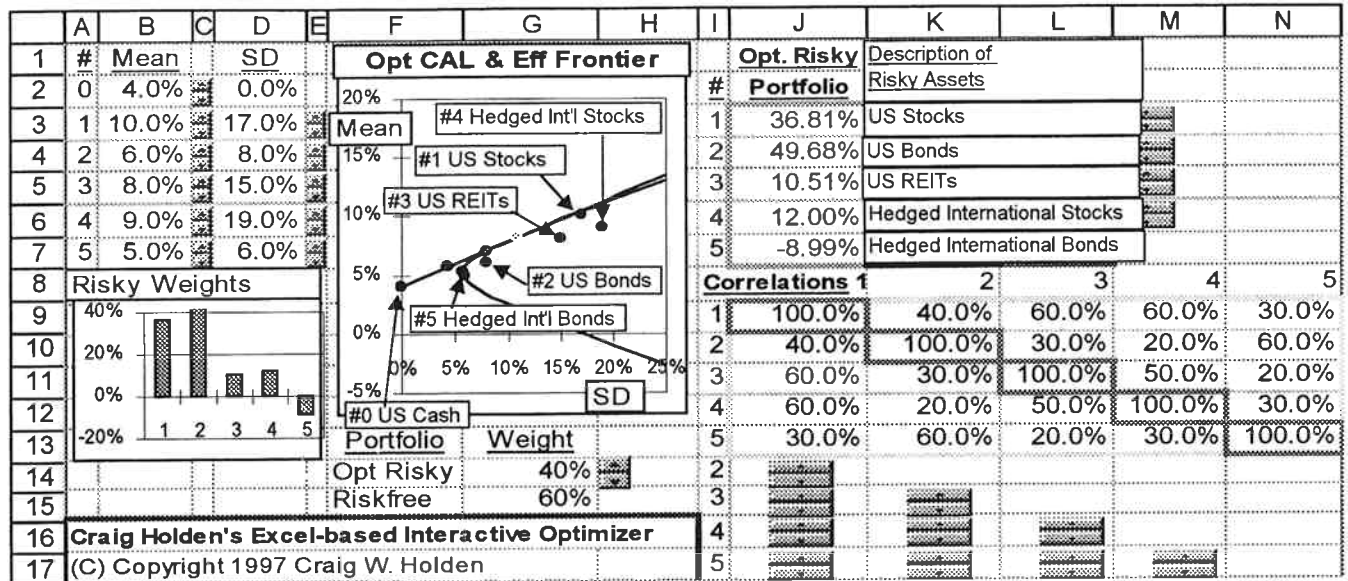
## OPTIMALLY EXPLOITING MISPRICED ASSETS

Security analysis seeks to identify mispriced assets in the hope of generating a favorable investment opportunity. In addition, empirical research has identified a list of asset pricing “anomalies” which are difficult to explain on a rational basis. The individual investor should optimally exploit any mispriced assets based on the investor’s private information (security analysis) or based on public information (anomalies) which have not yet been eliminated.

The interactive optimizer can be used to teach what an individual investor should do to optimally exploit any mispriced assets. One approach is for the instructor to run through a series of examples as a classroom presentation. This is what I have usually done and it works well. Alternatively, the instructor may assign this series of examples for the students to do on their own. A

**Table 1.**  
**A Practical Example Using Asset Class Indexes**

#	Type	Asset Class Description	Mean	Std Dev	Correlations				
0	Riskfree	US Cash (Short-term bonds)	4%	0%	#1	#2	#3	#4	#5
1	Risky	US Stocks	10%	17%	100%	40%	60%	60%	30%
2	Risky	US Bonds (Long-term)	6%	8%	40%	100%	30%	20%	60%
3	Risky	US REITs (Real estate)	8%	15%	60%	30%	100%	50%	20%
4	Risky	Hedged International Stocks	9%	19%	60%	20%	50%	100%	30%
5	Risky	Hedged International Bonds	5%	6%	30%	60%	20%	30%	100%



**Figure 6. A Practical Example Using Indexes**

third alternative would be to provide relatively little guidance and let the students discover these features on their own.

Figure 2 shows what happens when an individual investor believes that a particular asset is *underpriced*. Whatever the source of the mispricing, the individual investor believes that the low price today is likely to be corrected in the future, leading to a high mean return. This example modifies the Figure 1 base case by giving asset 2 a very high mean of **15.0%**. The mean-SD graph plots asset 2 with a high mean. The optimal weights graph shows a bigger weight on asset 2 to optimally exploit the underpricing. Notice it does not put 100% in the underpriced asset. Again, the optimal weights reflect a tradeoff between higher means vs. lower risk by diversification.

Figure 3 is the converse case when an individual investor believes that a particular asset is *overpriced*. The high price today is likely to be corrected in the future leading to a low mean return. This example modifies the base case by giving asset 2 a very low mean of **3.0%**. The mean-SD graph plots asset 2 with a low mean. The optimal weights graph shows a very low (indeed, *nega-*

*tive*) weight on asset 2. This is accomplished by short-selling the asset. Again, the optimal weights are a tradeoff between higher means (by short-selling an extremely low mean asset) vs. lower risk by diversification.

Figure 4 shows what happens when an individual investor believes that a particular asset is mispriced because it actually has a low SD. In this case, the SD of asset 3 is reduced to **13.0%**. The mean-SD graph clearly shows asset 3 with a lower SD than the other assets. The optimal weights graph shows a bigger weight on asset 3 to take advantage of this low SD. The individual investor does not put 100% in the low SD asset, because diversification is able to lower risk below any one asset. The optimal weights reflect a tradeoff between lower risk by investing in low SD assets vs. lower risk by investing in many assets with low correlations.

Figure 5 is the converse case when the SD of asset 3 is increased to **25.0%**. The mean-SD graph clearly shows asset 3 with a higher SD than the other assets. The optimal weights graph shows a smaller weight on asset 3 to avoid this high SD. The individual investor does not put 0% in the high SD asset. Again, the optimal weights

reflect a tradeoff between lower risk by putting less in high SD assets vs. lower risk by investing in many assets with zero correlations.

### Optimally Exploiting Asset Classes: A Practical Example

Theoretically, one should use mean, standard deviation, and correlation information about thousands of individual assets in order to calculate the optimal portfolio. A much more practical approach is to group securities by broad asset classes<sup>12</sup> and use these asset classes as the raw inputs to the optimizer. Many indexes have been calculated for various asset classes. Typically, the portfolios which correspond to these indexes are already well-diversified *within* a given asset class and now the challenge is to optimally exploit the opportunities provided *between* asset classes.

The following is a practical example of using asset class indexes. This example is based on estimates supplied by Stephen Nesbitt and Jeanne Shearer of Wilshire Associates Incorporated. Table 1 describes the asset classes and February 1996 estimates for these asset classes.<sup>13</sup>

In this example, the assets classes broadly represent major *types* of assets (short-term bonds, stocks, long-term bonds, real estate) and major sources (US vs. international). All estimates are based on returns in U.S. dollars. The two international indexes are based on portfolios that have been hedged with respect to exchange rate risk between the currency of the foreign assets and U.S. dollars.

Figure 6 shows the interactive optimizer inputs and outputs for this example. Clicking on the spinners in column C sets the means in column B. Clicking on the spinners in column E sets the standard deviations in column D. Clicking on the spinners in range J14:M17 sets the off-diagonal correlations in range J10:M13. The mean-SD graph show the results. I have superimposed on the graph an identifier for each of the individual assets. The two stock asset classes are the farthest in the northeast direction, representing the highest risk and highest return asset classes. The two bond asset classes are the farthest in the southwest direction (among the *risky* asset classes), representing the lowest risk and lowest return asset classes. The real estate asset class is in-between the stocks and the bonds and can be viewed as a blend of fixed income and equity-type characteristics. The optimal weights graph shows that the optimal portfolio in this case is heavy investment in US Stocks and US Bonds, a small investment in US REITs and Hedged International Stocks, and a small negative investment in Hedged International Bonds. The exact weights in the optimal risky portfolio are shown in the range J3:J7.

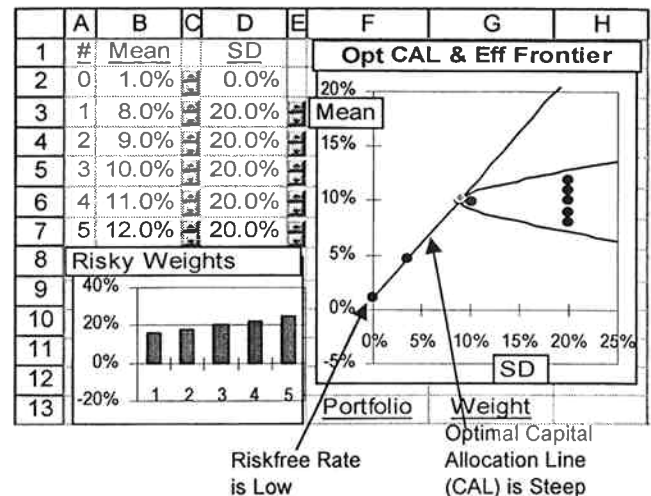


Figure 7. The Riskfree Rate is Low

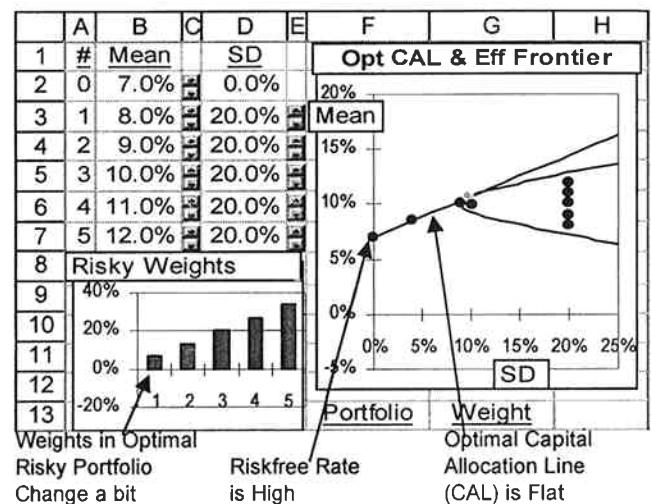


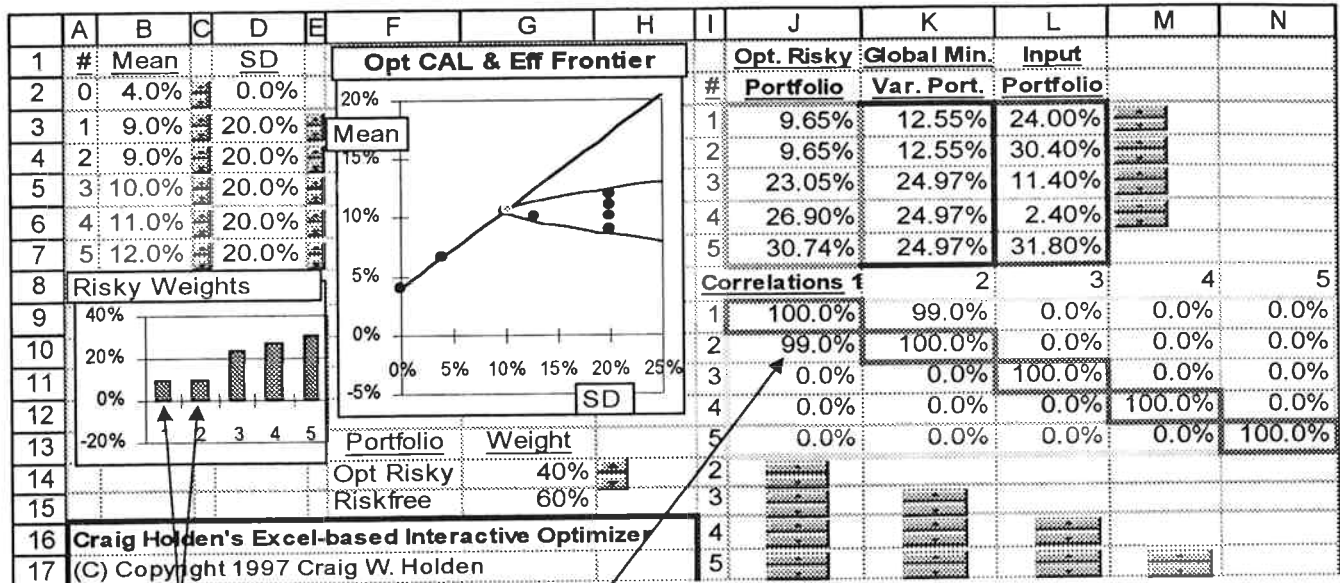
Figure 8. The Riskfree Rate is High

This example shows how the interactive optimizer can illustrate the concept of asset classes and how it can be used to construct an optimal portfolio in a very practical manner. One could certainly go much further by examining additional asset classes such as emerging market stocks, high yield debt, venture capital, etc. and by breaking out asset classes by country, size, value vs. growth, etc.

### CONCLUSION

I have used Excel's built-in matrix algebra functions and spinners to construct an interactive optimizer. This is a big advantage since it provides a very intuitive way to teach students about diversification, optimally exploiting mispriced assets, and optimally exploiting asset classes. But there is no reason to stop here. Excel-based interactive demos could be developed for a wide variety





Smaller weight in highly correlated assets

Assets 1 and 2 have a high correlation

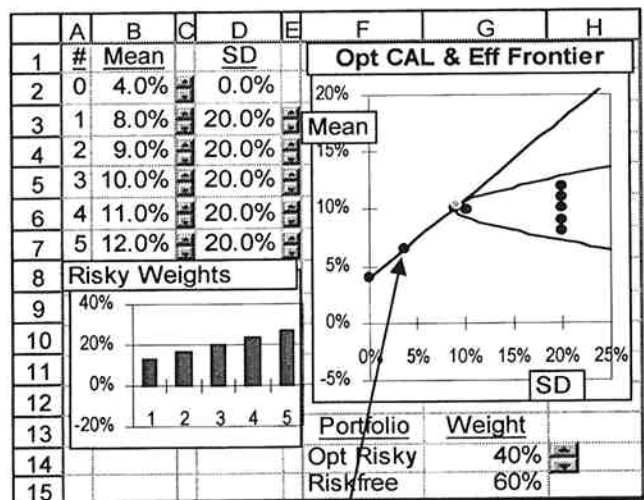
Figure 9. High Correlation

of applications, such as the Black-Scholes formula, bond pricing models, and so on.

## APPENDIX

Another determinant of the optimal portfolio is where the tangent line hits the efficient frontier. Figures 7 and 8 show what happens when you change the riskfree rate. In Figure 7, the riskfree rate (the mean return of asset 0) is dropped to 1.0%. This causes the optimal CAL to pivot around and downwards. The optimal portfolio shifts to the left (less risk) and downward (less return). Conversely in Figure 8, the riskfree rate is increase to 7.0%. This causes the optimal CAL to pivot back around and upwards. The optimal portfolio shifts to the right (more risk) and upwards (more return). Comparing the optimal weights graphs, it is clear that Figure 8 puts more weight on the higher return assets (Assets 4 and 5) than Figure 7. Similarly, Figure 8 puts less weight on Assets 1 and 2 than Figure 7 and is willing to suffer the loss of diversification (more risk) involved in doing this.

Figure 9 shows what happens when two assets have a high correlation. Asset 1 and 2 are given identical means of 9.0%, identical standard deviations of 20.0%, and a correlation of 99.0%. Looking at cell J10 in the correlation matrix, we see the 99.0% correlation between assets 1 and 2. The mean-SD graph appears to be plotting only four risky assets since assets 1 and 2 plot on the same large dot. The optimal weights graph shows

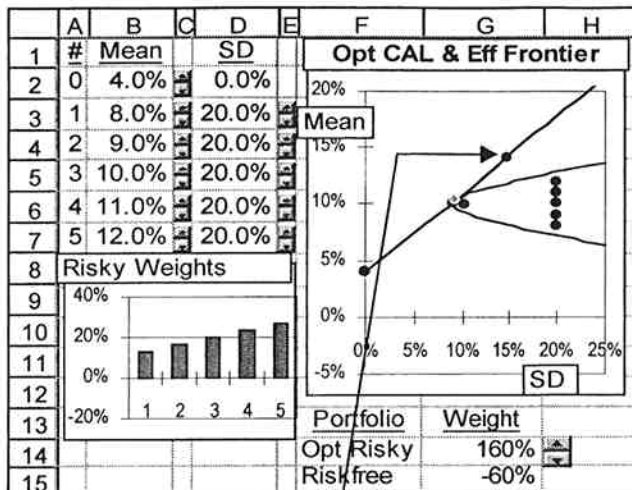


Complete Portfolio:  
Put a little (40%) in the optimal risky portfolio  
and lend the rest (60%)

Figure 10. High Risk Aversion

small weights on the highly correlated assets 1 and 2. Intuitively, this is because their high correlation makes them less useful for diversification purposes. Indeed, since they are nearly perfectly correlated, it is almost as if assets 1 and 2 represented a single asset and each got half of the weight that a single risky asset in a set of four risky assets would obtain.

Figures 10 and 11 show what happens to the complete portfolio as the individual investor's risk aversion



Complete Portfolio:  
 Borrow a lot (60%) and put it all (160%)  
 in the optimal risky portfolio

Figure 11. Low Risk Aversion

changes. Cell G14 shows the overall proportion invested in the optimal risky portfolio. Cell G15 shows the residual proportion placed in the riskfree asset. Cell G15 is specified by the formula =1-G14 so that the proportions always add up to one. Cell G14 is controlled by a spinner in cell H14. A click on the up-arrow in cell H14 increases cell G14 by 10%. Conversely, a click on the down-arrow decreases cell G14 by 10%. Figure 10 shows an investor with high risk aversion. This investor puts relatively little in the optimal risky asset (40%) and lends the rest (60%) at the riskfree rate. The mean-SD graph shows the complete portfolio as a medium-size, light-colored dot far to the left on the optimal CAL. By contrast, Figure 11 shows an investor with low risk aversion. This investor borrows a significant amount (-60%) at the riskfree rate and is pleased to combine the proceeds with the original investment (160%) and put it all in the optimal risky portfolio. The mean-SD graph shows the complete portfolio has shifted far to the right on the optimal CAL. Hence, lower risk aversion yields a greater proportion in the optimal risky portfolio, which moves the complete portfolio to the right on the optimal CAL.

## ENDNOTES

<sup>1</sup>An extensive literature has developed which analyzes the Fama and French result. Jagannathan and Wang [1996] propose a version of the Conditional CAPM which includes human capital and find that this does well empirically. Fama and French [1996] propose a three factor version of the Intertemporal CAPM and find that this does well empirically. There is a substantial debate as to whether these intertemporal models are picking up rational variations in risk premia, irrational biases, or some combination. Lakonishok, Shleifer, and Vishny [1994] argue that the high returns on "value"

stocks, above what the CAPM would predict, are the result of overreaction by investors and are not compensation for risk. The bottom line: no researchers since 1992 have defended the empirical validity of the Static CAPM, which is still the standard textbook offering.

<sup>2</sup>The regular APT (based on arbitrage as opposed to "equilibrium APT" models) provides no guidance at all for what is the individual investor's optimal portfolio among correctly-priced assets.

<sup>3</sup>Such as the January / small firm / losers effect or the average return differential on value stocks vs. growth stocks.

<sup>4</sup>Also known as a single-factor model based on a market index as a proxy for the market portfolio.

<sup>5</sup>Except, perhaps, to explicitly disclaim that the optimal risky portfolio is generally the same thing as the market portfolio.

<sup>6</sup>The seminal papers were Markowitz [1952] and Markowitz [1959]. Markowitz won the Nobel prize largely on the basis of these papers.

<sup>7</sup>Alternatively, one might use the critical lines technique. The insurmountable obstacle to using this technique is programming a computer to do a sequence of numerical optimizations.

<sup>8</sup>Technically, I add 2 basis points to the mean return of assets 4 and 5 and add 1 basis point to the standard deviation of return of assets 4 and 5. This avoids having exactly identical risky assets, where the efficient frontier hyperbola degenerates into a line segment and the hyperbola formula yields a divide-by-zero error.

<sup>9</sup>Spinners are available in Microsoft Excel version 5.0 or higher. Simply click on "View" and then "Toolbars. . .". Put a check in the check box for the "Forms" toolbar and click on OK. Click on the spinner icon and then highlight an area on the spreadsheet where you want to place the spinner button. To specify the spinner settings, select the spinner button and then double-click on it. Click on the "Control" tab and fill out the dialog box. Unfortunately, Lotus 1-2-3 does not have spinners that can be placed on the spreadsheet.

<sup>10</sup>For doctoral students, an additional use of the spreadsheet is to show them the matrix algebra calculations. The matrix algebra formulas are based on Ingersoll [1987], Chapter 4. Similar formulas are available in Huang and Litzenberger [1988], Chapter 3.

<sup>11</sup>In order to keep the variance-covariance matrix invertible, the range of the off-diagonal correlations is limited to [-99.0%,99.0%].

<sup>12</sup>The general idea is to group similar assets so that there are high correlations within the asset class and low correlations between asset classes.

<sup>13</sup>See Nesbitt and Shearer [1996]. I have rounded the mean and standard deviation estimates to the nearest 1% and the correlation estimates to the nearest 10%. In Table 1, the term "cash" refers to short-term government bonds and the term "REITs" refers to Real Estate Investment Trusts, which are liquid securities based on cash flows from real estate.

## REFERENCES

- Fama, E.F. and K.R. French, "The Cross-Section of Expected Stock Returns," *Journal of Finance*, 47 (June 1992), 427-465.  
 Fama, E.F. and K.R. French, "Multifactor Explanations of Asset Pricing Anomalies," *Journal of Finance*, 51 (March 1996), 55-84.



Haugen, R.A. *The New Finance: The Case Against Efficient Markets* (Englewood Cliffs, 1995), Prentice-Hall.  
 Huang, C. and R.H. Litzenberger, *Foundations for Financial Economics* (New York, 1988), North Holland.  
 Ingersol, J., *Theory of Financial Decision Making* (Totowa, 1987), Rowman and Littlefield.  
 Jagannathan, R. and Z. Wang, "The Conditional CAPM and the Cross-Section of Expected Returns," *Journal of Finance*, 51, (March 1996), 3-53.

Lakonishok, J., A. Shleifer, and R. Vishny, "Contrarian Investment, Extrapolation, and Risk," *Journal of Finance*, 49 (December 1994), 1541-1578.  
 Markowitz, H., "Portfolio Selection," *Journal of Finance*, 7 (1952), 77-91.  
 Markowitz, H., *Portfolio Selection: Efficient Diversification of Investment* (New York, 1959), John Wiley & Sons.  
 Nesbitt, S. and J. Shearer, *1996 Asset Allocation Report: Rethinking Alternative Investments*, Wilshire Associated Incorporated Working Paper (February 1996).

## ***THE EASTERN FINANCE ASSOCIATION***

### **Application for Membership**

Membership in the EFA is on a twelve-month basis. Individual membership is \$25 for twelve months. Institutional membership is \$75 for twelve months.

Membership includes a 12 month subscription to *The Financial Review*.

To join the EFA complete the following:

NAME \_\_\_\_\_

AFFILIATION \_\_\_\_\_

MAILING ADDRESS \_\_\_\_\_  
 \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Please send membership application and your check payable to EFA in U.S. dollars for deposit in a U.S. bank to:

**Eastern Finance Association  
 c/o Donald A. Nast  
 Florida State University  
 College of Business Administration  
 Tallahassee, FL 32306-1042**