Contents

Introduction

Welcome!

With this guided tour, you'll become familiar with The Expert Allocator (version 3.00) quickly, easily, and painlessly.

Learning The Expert Allocator uses an asset allocation assignment as the foundation to acquaint you with many of The Allocator's beginning and advanced features. This project is presented step-by-step, and many illustrations are provided along the way.

In the margin of each page, you'll find tidbits related to the current topic. Though these notes are not required reading, they provide a peek at many software features not covered in the tutorial.

A review is presented at the end of each section, summarizing steps taken so far. You can use these as quick reference guides even after you've completed the tutorial.

We encourage you to take this comprehensive tour of The Expert Allocator, which should take less than 20 minutes to complete, to help you get the most out of the software.

Keep in mind that help is available on-line (from the menu bar or by clicking a Help button), in the *User's Guide for The Expert Allocator*, and from Investment Technologies by telephone, fax, and e-mail. Or visit our website at www.invest-tech.com.

NOTE: The model `TUTORIAL.MOD` in your `SSIWIN\MODELS` directory contains all the input and optimization information covered in this tour. If you wish to skip ahead to other sections in the tour, open `TUTORIAL.MOD`. To do this, click **Open** on the Desktop and, in the Open Model dialog box, browse to the `SSIWIN\MODELS` directory and select `TUTORIAL`.

What You'll Learn

When you have finished this tour of The Expert Allocator, you will be able to do the following:

- develop asset assumptions using the Historical Forecasting tool
- display asset assumptions in tables and charts
- edit return, risk, and correlation forecasts

- add asset-mix constraints
- add your current portfolio or other portfolios for comparison
- enter beginning wealth and annual cash flows
- perform an optimization to generate an efficient frontier
- analyze efficient portfolios
- perform sensitivity analysis
- produce your printed report.

The Assignment

Let's suppose you've been hired to prepare an asset allocation report for an investor. Her objective is to better diversify her portfolio to improve expected return without increasing risk.

As you begin your analysis, you gather the following information:

- The investor has a five-year planning period.
- The investor's portfolio is currently valued at $1 million and is invested 50% in large domestic stocks, 40% in bonds, and 10% in cash equivalents.
- A contribution in the amount of $250,000 is expected to be made to the portfolio in the middle of the second year in the planning period.
- The investor's long-term goal is 9%. If a lower return is earned, the investor will be required to make additional contributions to the portfolio to cover the shortfall, something she doesn't want to have to do.
- Assets are in a qualified account, so taxes are not a consideration.
- Total equities should represent no more than 80% of the portfolio. The investor is willing to experiment with foreign stocks but would be more comfortable placing a 25% cap on this asset.

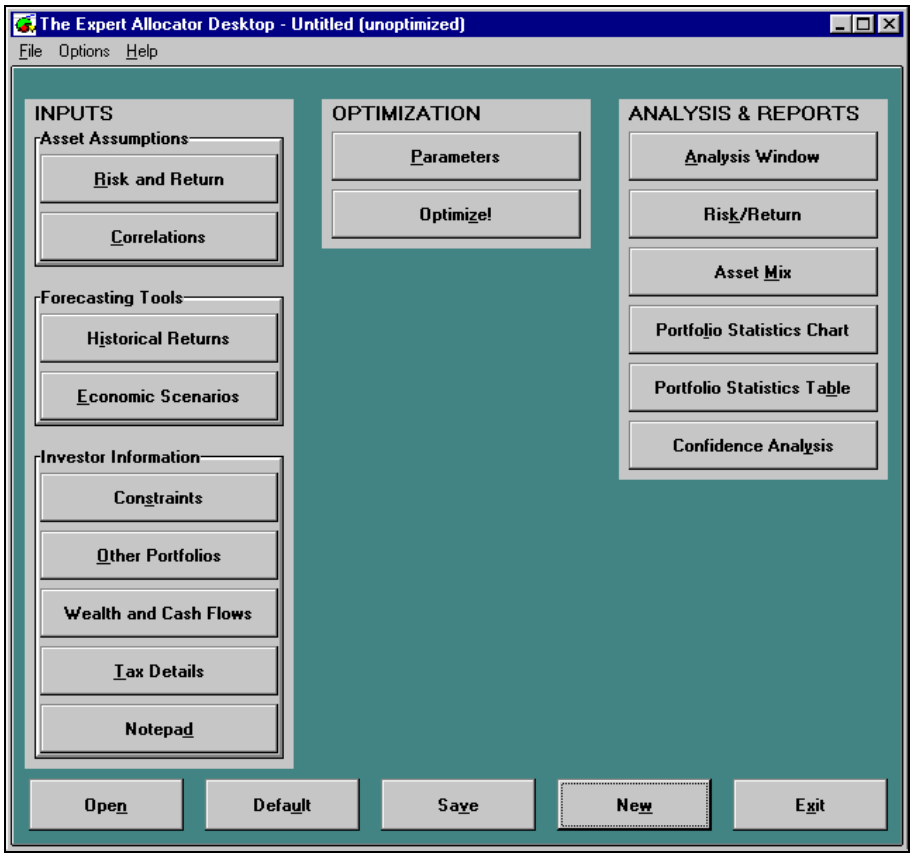
Asset assumptions (risk, return, and correlations) will be developed using historical performance as a guide. A data module, titled `TUTORIAL`, containing historical returns for selected asset proxies is provided with The Expert Allocator.

We'll use The Expert Allocator to evaluate the efficiency of the investor's current portfolio and recommend alternatives. An efficient frontier will be generated using downside deviation (downside risk) as the risk measure, a 9% goal, and 5-year holding period.

Begin at the Desktop

To begin, launch The Expert Allocator by double-clicking on the icon in the Investment Technologies program group.

Like a map, The Expert Allocator's Desktop guides you through the three sequential steps in an asset allocation work session: Inputs, Optimization, Analysis and Reports. The button groupings on the Desktop, laid out from left to right on-screen, follow this outline.


The Expert Allocator Desktop - Untitled (unoptimized)
File
Options
Help
INPUTS
Asset Assumptions
Risk and Return
Correlations
Forecasting Tools
Historical Returns
Economic Scenarios
Investor Information
Constraints
Other Portfolios
Wealth and Cash Flows
Tax Details
Notepad
OPTIMIZATION
Parameters
Optimize!
ANALYSIS & REPORTS
Analysis Window
Risk/Return
Asset Mix
Portfolio Statistics Chart
Portfolio Statistics Table
Confidence Analysis
Open
Default
Save
New
Exit

The Desktop

Lesson 1: Inputs

Step 1: Inputs

Inputs include investment forecasts for return, risk, and correlations (Asset Assumptions button group) and constraints on asset holdings, specific portfolios you may be interested in comparing, wealth and cash flows, and tax rates (Investor Information button group).

If you want to skip this lesson, click Open on the Desktop and select `TUTORIAL` *in the Open Model dialog box.*

In the Expert Allocator, two methods for generating asset assumptions are provided (Historical Returns and Economic Scenarios). You can also enter your own assumptions directly in the Risk and Return worksheet and Correlations worksheet. The Historical Returns Forecasting Tool will be used in this tutorial.

Create Model Using Historical Returns

1. On the Desktop in the Inputs frame, click **Historical Returns**. The Forecasting Tools: Historical Returns window appears. The screen has two panels: Available Series (series from which to choose for your analysis) and Selected Series (series you've chosen).

Use series provided in IT Data Modules or import your own series.

2. Click on the Module drop-down list in the Available Series panel and select *Tutorial*. All series in the Tutorial data module are listed in the Available Series panel.

To find a series quickly, type the series' name in the ***Quick Find*** *box.*

3. In the Available Series panel, double-click Large Stocks. Notice how it appears in the Selected Series panel. (Alternatively, click the series name once and press the **>** button.) Do the same for Small Stocks, Foreign Stocks, Bonds, and Cash Equivalents.

Click on the drop-down list boxes to change dates.

4. In the Selected Series panel, the common timeslice—Jan 70 to Jun 97—automatically appears in Beginning Date to Use and Ending Date to Use. Keep these settings.

5. If it's not already selected, choose Geometric as the Mean to Use for Expected Return.

Your screen should look like Figure 1-1.

If you want to use these settings again, chose ***File Save As*** *from the menu bar and enter a name. File names appear in the title bar with an* `.INP` *(inputs) extension.*

To use these settings at a future date, choose ***File Open*** *and double-click your* `.INP` *file name.*

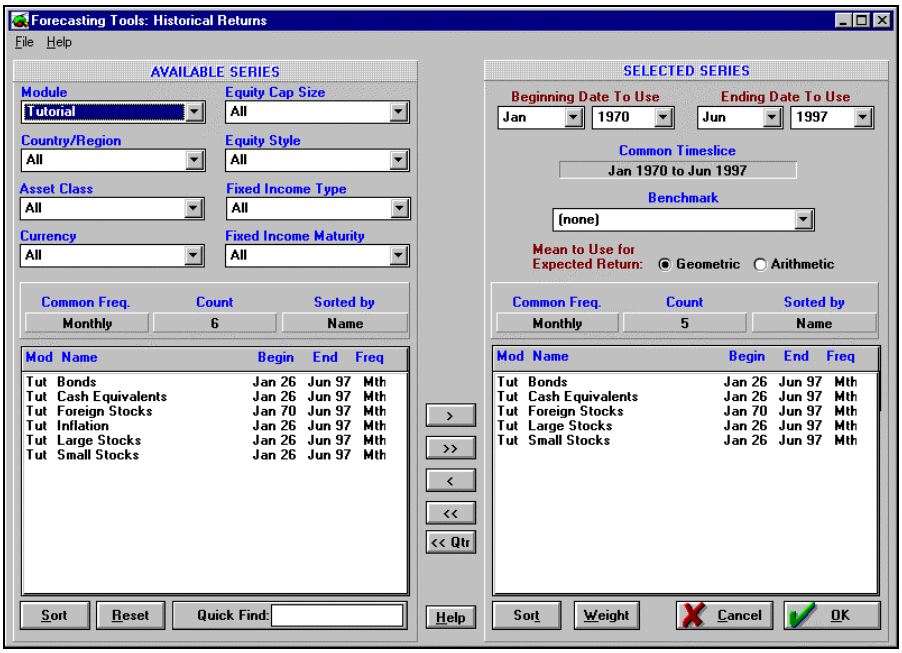


Figure 1-1 Forecasting Tools: Historical Returns Window

6. Click **OK** in the Forecasting Tools: Historical Returns window to automatically create a new model and return to the Desktop.

Review and Modify Asset Assumptions

Risk and Return Assumptions

You can change asset names in any Input worksheet.

Use normal distribution for mean-variance analysis. Click the buttons in the ***Ret Distribution Shape*** *column.*

All values with white backgrounds can be edited. Just type in your own values or use ***Shift Distribution****.*

7. On the Desktop, click **Risk and Return**. The Risk and Return worksheet appears, displaying risk and return assumptions calculated based on the period January, 1970 to June, 1997.

8. Return Distribution Shape is set to True for all of the assets. This means that any asymmetry in an asset's returns will be reflected in your analysis. Keep this setting.

9. In this exercise, let's assume we expect short-term rates to average 100 basis points lower than the historical Expected Return shown for Cash Equivalents. Left-click your mouse anywhere on the row for Cash Equivalents and then click **Shift Distribution** (Figure 1-2). Enter –1 and click **OK**.

Shift Distribution *allows you to change the Expected Return, 90th and 10th Percentile Returns by the amount of the shift while preserving the shape of an asset's return distribution.*

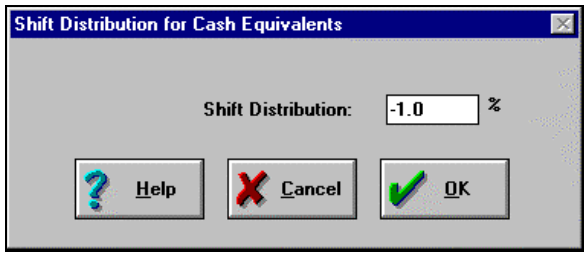


Figure 1-2 Shift Distribution Dialog Box

Now The Expected Return, 90th Percentile Return, and 10th Percentile for Cash Equivalents should be 6.07%, 5.14%, and 7.14%, respectively.

10. Click in the Goal cell and enter 9.0 to reflect the investor's 9% goal. Notice that the downside deviation for each asset is re-calculated for the 9% goal.

Your screen should look like Figure 1-3.

To print this worksheet, choose ***File Print*** *from the menu bar or click the Printer icon.*

Export Risk and Return assumptions to Excel by selecting ***File Export*** *from the menu bar.*

If taxes are a consideration, click ***After-Tax Values*** *to review after-tax returns.*

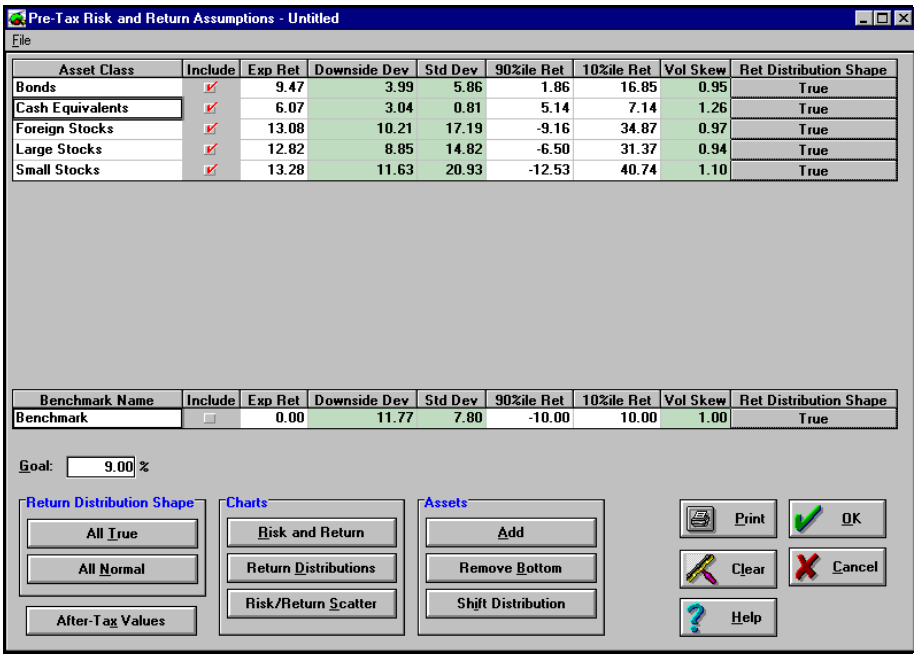


Figure 1-3 Risk and Return Worksheet

We've now completed the Risk and Return worksheet. Let's see how this information looks in chart form.

11. Click **Risk and Return** in the Charts frame to display these assumptions in a bar chart. The Risk and Return Assumptions window appears (see Figure 1-4). Downside Deviation is measured for the 9.0% goal specified in the Risk and Return worksheet.

Display risk as Downside Deviation or Standard Deviation by clicking the desired radio button.

Right-click anywhere on the chart to customize colors, fonts, titles, etc.

To print this chart, choose ***File Print Chart*** *from the menu bar. Then select* ***Color*** *or* ***Mono****, depending on your printer.*

Charts can be exported for use in other Windows software such as Word, Excel, and PowerPoint.

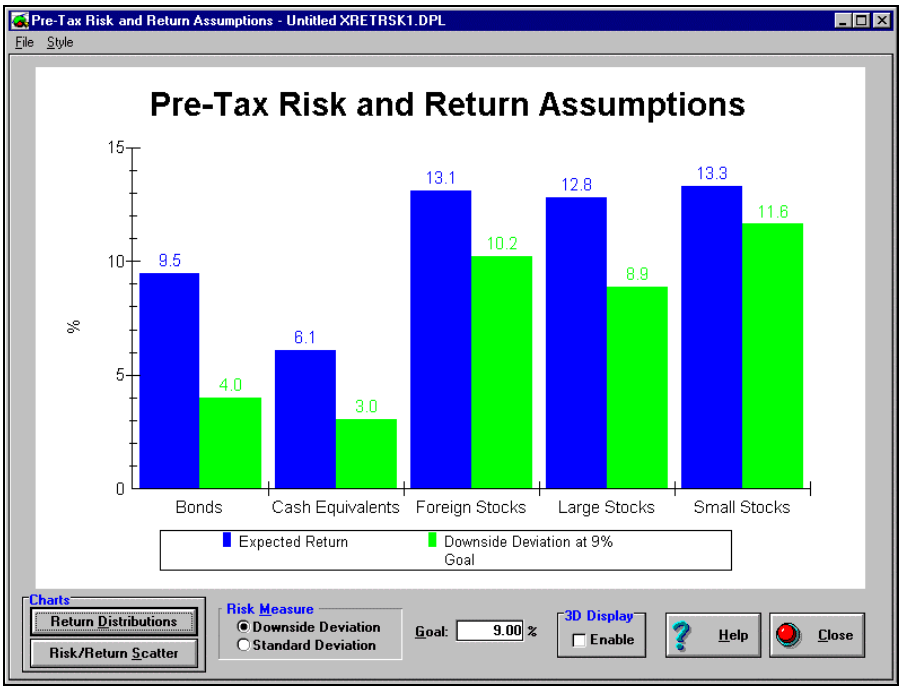


Figure 1-4 Risk and Return Assumptions Bar Chart

12. Click **Return Distributions** in the Charts frame to examine the dispersion of possible returns for each asset and to compare any differences between the true and normal distributions. Figure 1-5 displays true and normal distributions as well as related statistics for Bonds. Click the arrows to cycle through the assets.

Click the True and/or Normal check boxes to display one or both distributions.

Changing the goal in the Goal box automatically recalculates the corresponding goal-related statistics.

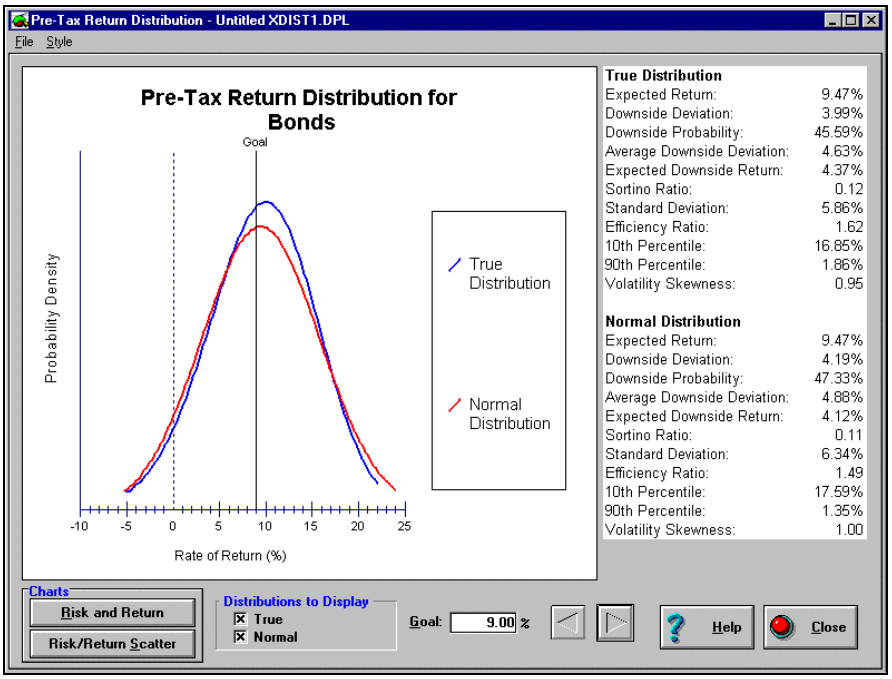


Figure 1-5 Return Distributions Chart

13. Click Risk/Return Scatter in the Charts frame to display the risk/return tradeoff for assets (see Figure 1-6).

Just click the appropriate radio button to switch between risk measures.

With downside deviation as the risk measure plotted, change the goal. Notice how the relative positions of the assets change.

To print the chart currently displayed, choose ***File Print Chart*** *from the menu bar.*

Use ***File Export*** *to export charts to other Windows software.*

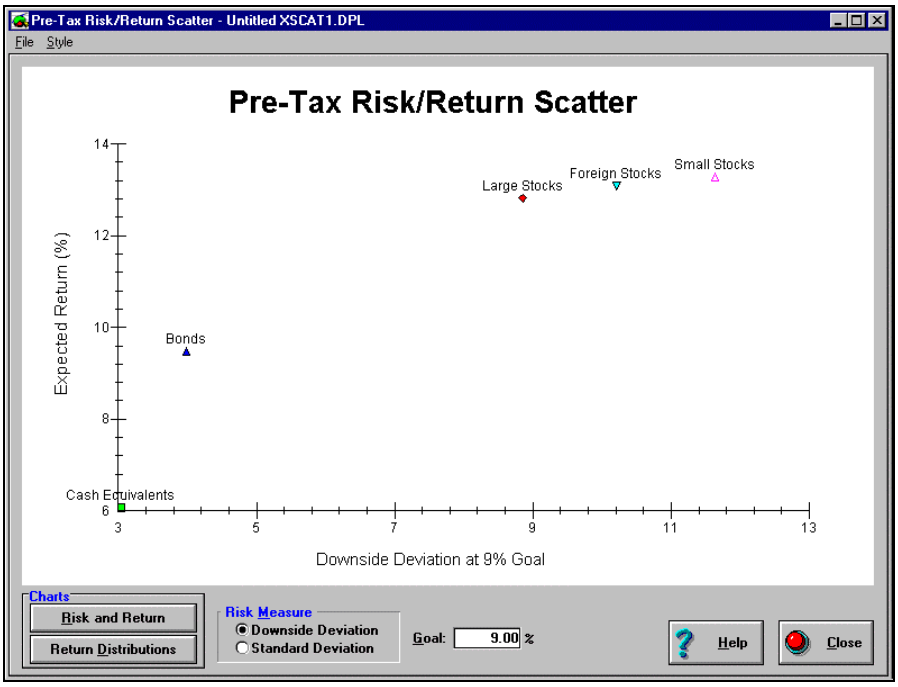


Figure 1-6 Risk/Return Scatter Chart

14. Click **Close** to return to the Risk and Return worksheet. Then click **OK** to save your changes and return to the Desktop.

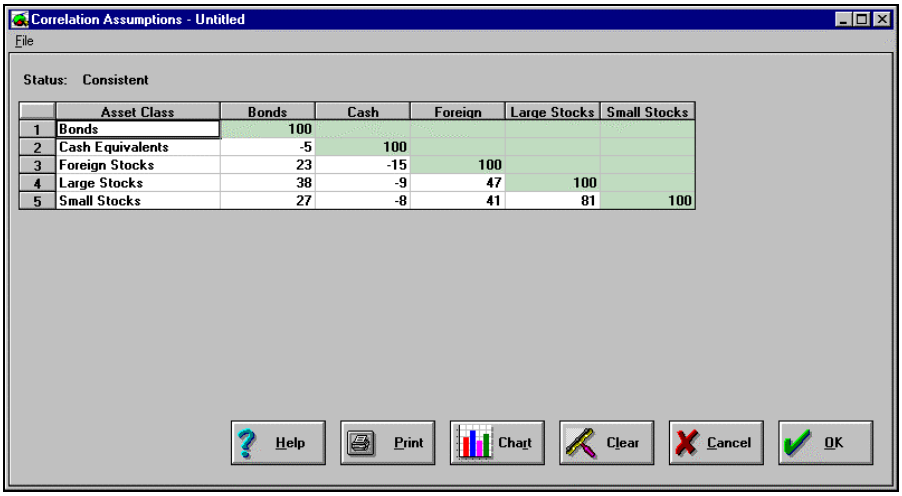
Correlation Assumptions

15. On the Desktop, click **Correlations** to display the correlations assumptions. Your screen should look like Figure 1-7. Recall that these values are for the period January, 1970 through June, 1997. Keep these settings.

All values in the Correlation worksheet can be edited. The Allocator checks for consistency to insure that correlations are positive-definite.

To print this worksheet, choose ***File Print*** *from the menu bar or click* ***Print****.*

To export this worksheet to Excel, choose ***File Export*** *from the menu bar.*



	Asset Class	Bonds	Cash	Foreign	Large Stocks	Small Stocks
1	Bonds	100				
2	Cash Equivalents	-5	100			
3	Foreign Stocks	23	-15	100		
4	Large Stocks	38	-9	47	100	
5	Small Stocks	27	-8	41	81	100

Figure 1-7 Correlation Assumptions Worksheet

16. Click **Chart** to display correlations for each pair of assets in a bar chart (Figure 1-8).

Click an arrow to display correlations by asset class.

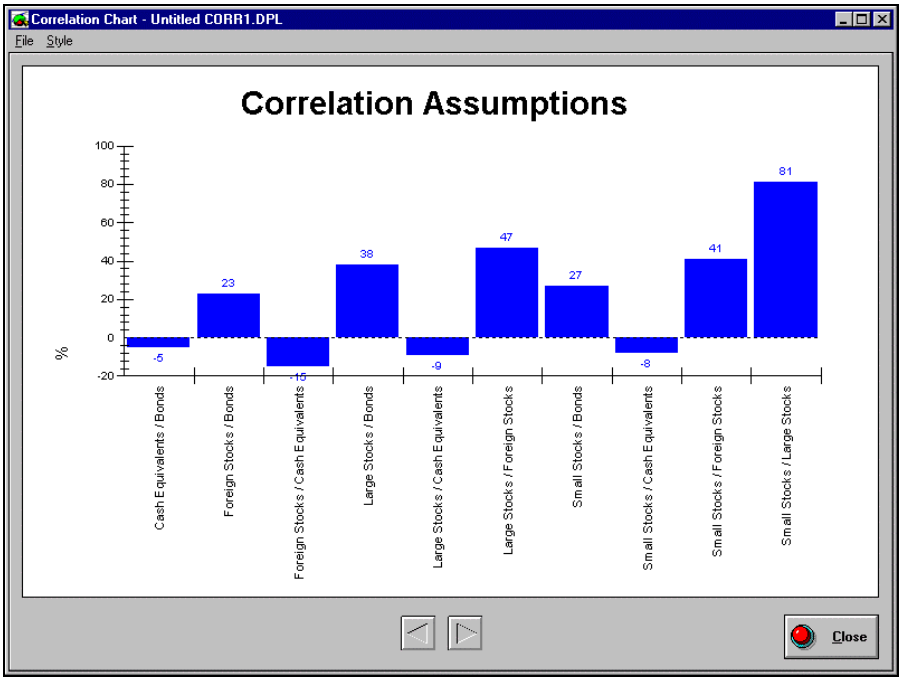


Figure 1-8 Correlations Bar Chart

17. Click **Close** to return to the Correlation worksheet. Then click **OK** to return to the Desktop.

We've now completed the minimum information needed to perform an optimization—namely, asset assumptions for expected returns, risk, and correlations. But before optimizing, let's incorporate the investor's specific information: preferences for constraining asset weightings, the value of the current portfolio and anticipated contribution, and her current portfolio for comparative purposes.

Incorporate Investor Information

Constraints on Asset Holdings

18. On the Desktop, click **Constraints** to enter asset-mix constraints. The Constraints worksheet appears.
19. Click in the Asset Constraints Max cell for Foreign Stocks, and enter 25.
20. Group Small Stocks, Large Stocks, and Foreign Stocks by clicking the check boxes in Group 1 column in Constraints for Groups of Assets. Enter 80 in the Group Max cell below.

Your screen should look like Figure 1-9.

Automatic checks are performed and noted in the Status line.

All tables can be exported as .TXT and .XLS files for use in other Windows software such as Excel.

To see the effect of constraints on the efficient frontier, run two optimizations simultaneously—one ignoring constraints and one with constraints.

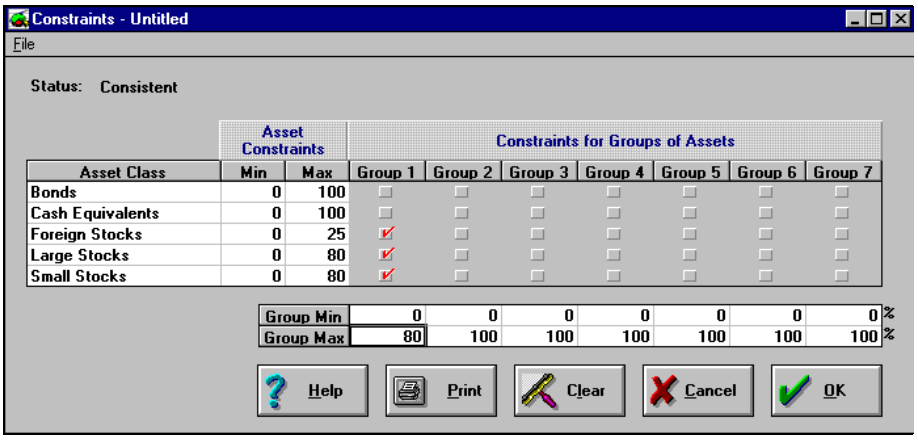


Figure 1-9 Constraints Worksheet

21. Click **OK** to save your changes and return to the Desktop.

Add the Investor's Current Portfolio

22. On the Desktop, click **Other Portfolios** to enter the investor's current asset mix. The Other Portfolios worksheet appears.
23. Click on *Portfolio 1* in the second column and enter *Current Mix*.

Another way to enter values is to double-click in a cell and then click on the up or down arrows.

24. Click on the Bonds cell and enter 40 in the Current Mix column. Enter 10 in the Cash Equivalents cell, and 50 in the Large Stocks' cell.

Your screen should look like Figure 1-10.

You can add Other Portfolios from the Desktop or in the Analysis Window after optimization.

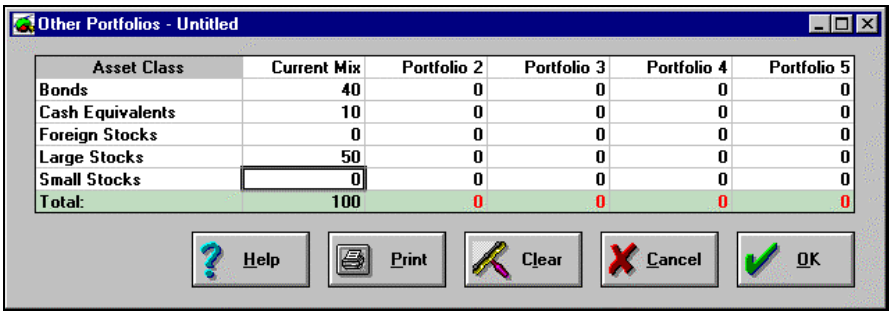


Figure 1-10 Other Portfolios Worksheet

25. Click **OK** to save your changes and return to the Desktop.

Add the Investor's Wealth and Cash Flows

26. On the Desktop, click **Wealth and Cash Flows** to enter the investor's current wealth and expected contribution. The Wealth and Cash Flows worksheet appears.
27. Click the Beginning Wealth cell and enter 1000000.

Project wealth up to 20 years.

28. Click Years to Project Wealth and enter 5.
29. In Year 2 in the Contributions column in Today's Dollars, enter 250000.

Your screen should look like Figure 1-11.

Contributions and Withdrawals can be entered in Today's Dollars or Future Dollars.

Net Cash Flow used in projecting wealth can be based on Today's Dollars or Future Dollars.

Use the Timing column to pick the best month for the timing of Annual Net Cash Flows.

*Click **Chart** to show cash flows in bar or line chart.*

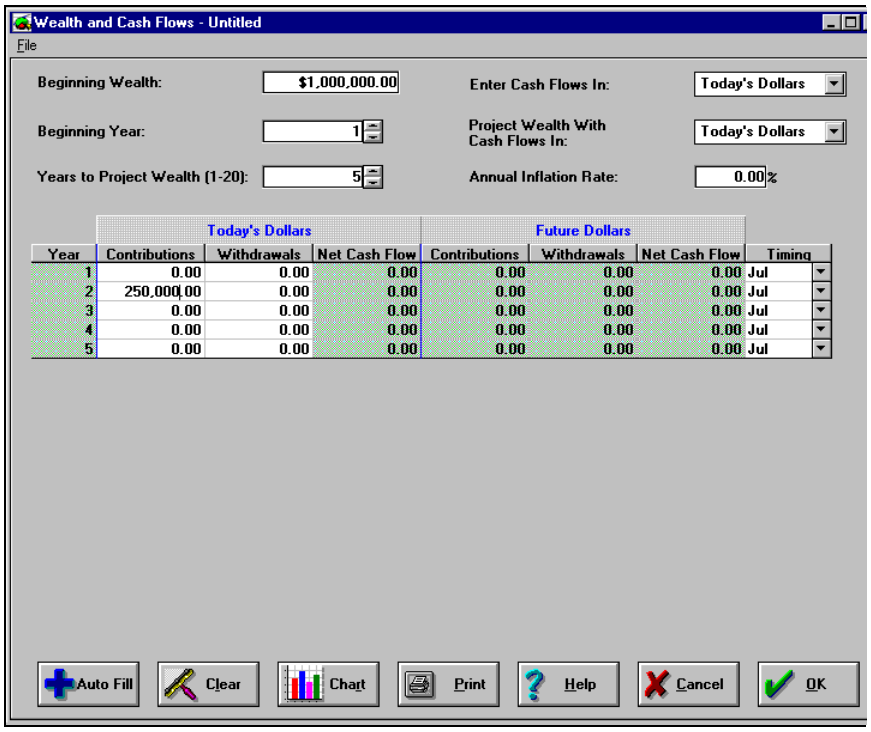


Figure 1-11 Wealth and Cash Flows Worksheet

30. Click **OK** to save your changes and return to the Desktop.

Save Your Work

*Click **Notepad** on the Desktop to keep notes and reminders.*

All models have an .MOD extension.

31. Save your work by clicking the **Save** button on the Desktop. The Save Model As dialog box appears. Enter *mytour* in the File Name text box and click **OK**.

The model name, `MYTOUR.MOD`, is shown in the title bar.

A Review of Step 1: Inputs

- Developed asset assumptions using the Historical Returns tool.
- Reviewed risk and return assumptions and modified some to reflect our expectations for the future.
- Reviewed correlation assumptions.
- Reviewed asset assumptions in charts.
- Set constraints on individual assets and groups of assets.
- Added the investor's current portfolio for comparative purposes.
- Added the investor's beginning wealth and expected contribution.
- Saved the model.

Now let's move on to Step 2: Optimization.

Lesson 2: Optimization

Step 2: Optimization

After optimizing, The Expert Allocator identifies efficient portfolios for one or two frontiers based on your inputs (asset assumptions and investor information) and preferences (risk measure, goal, and holding period, among others) specified in the Optimization Parameters worksheet.

Set Your Optimization Parameters

1. Click **Parameters** on the Desktop.

You can generate one frontier at a time, or two frontiers simultaneously.

2. In the Primary Optimization column, double-click on *Frontier 1* and type *Downside Dev*. This is the label for the efficient frontier that will appear in the Analysis Window.
3. In Optimize?, a red check mark appears. Keep this setting. (Note: In this example, we will optimize only one efficient frontier.)

Choose between Downside Deviation and Standard Deviation as the risk measure for optimization.

4. In Optimization Risk Measure, Downside Deviation appears. Keep this setting.
5. In Return Distribution Shape, Choices in Risk/Return Worksheet appears. Keep this setting.
6. In Goal, 9.00 appears (it is carried over from the Risk and Return worksheet). Keep this setting.

Holding period can be between 1 and 20 years.

7. In Holding Period, click on the number 1 and enter 5. (Alternatively, click on the small up arrow until the number 5 is displayed.)

Place a check mark here to optimize without *constraints.*

8. In Ignore Constraints?, no check mark appears. Keep this setting.

Place a check mark here to ignore the benefits of diversification.

9. In Use Perfect Correlation?, no check mark appears. Keep this setting.
10. In Number of Efficient Portfolios, 40 appears. Keep this setting.

Your screen now should look like Figure 2-1.

Dual optimization is The Allocator's most powerful feature. Optimize two frontiers simultaneously to see the effect of risk measure, return distribution shape, constraints, goals, holding periods, diversification, and/or taxes.

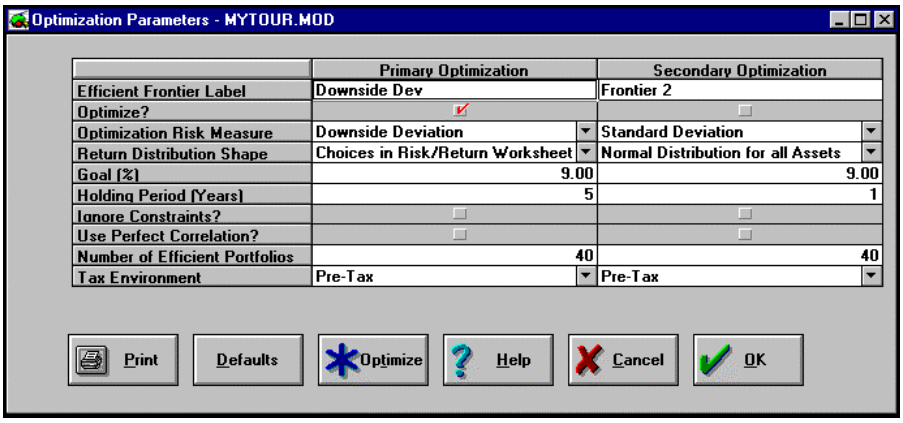


Figure 2-1 Optimization Parameters Worksheet

*Other ways to optimize: click **OK** and then click **Optimize** on the Desktop* or *click **OK** and then click any button in the Analysis & Reports group.*

11. Click **Optimize**. When optimization is complete, the Desktop is displayed.
12. Click **Save** to save your work.

A Review of Step 2: Optimization

- One efficient frontier was generated using the modified historical data developed in Step 1.
- The efficient frontier label *Downside Dev* will appear in the Analysis Window.
- The risk measure is Downside Deviation.
- The true distribution for all assets was used to represent the shape of forecasted returns.
- A 9.0% goal and 5-year holding period were used.
- Forty efficient portfolios were generated along the frontier.

Now let's move on to Step 3: Analysis and Reports.

Lesson 3: Analysis and Reports

Step 3: Analysis and Reports

In the Analysis Window, information on efficient portfolios, assets, and other portfolios is available in charts and tables. Here we will analyze and compare efficient portfolios and print charts and tables for your report.

1. Click **Risk/Return** in the Analysis & Reports frame on the Desktop to display the Analysis Window.

   The Analysis Window consists of five areas:

   - The menu bar at the top of the screen.
   - Pane 1, the larger area on the left side of the screen.
   - Pane 2, the smaller area on the upper right side of the screen.
   - Pane 3, the smaller area on the lower right side of the screen.
   - Control Panel, the area on the lower left portion of the screen.

Pane 2 and Pane 3 offer identical charts and tables.

Pane 1 is the focal point of the Analysis Window. It is used to display information on efficient frontiers, assets, and Other portfolios.

Panes 2 and 3 display information for one or two portfolios (or assets) at a time. These are called the Selected and Compared portfolios. To select which portfolios are displayed in Panes 2 and 3: (1) point-and-click on a portfolio or asset in a Pane 1 chart, (2) use **Find**, **Go To**, and/or the scroll arrows in the Control Panel, or (3) use the keyboard.

Select the charts and/or tables you want displayed in each pane from the menu bar (**Pane1**, **Pane2**, **Pane3**). Use the hand icon in the upper left corner of each pane to customize the currently-displayed chart.

Find a Portfolio with the Same Risk as Current Mix

*For new models, you can set which Pane 2/Pane 3 chart or table to display initially in the Analysis Window. Click **Options** on the Desktop menu bar and make your selections in the Analysis Window tab.*

2. Let's begin our analysis. The Risk/Return Analysis chart is displayed in Pane 1, showing the efficient frontier and Current Mix. Select **Pane2** from the menu bar and **Portfolio-Statistics Table** to display a table in Pane 2. Select **Pane3** from the menu bar and **Asset-Mix Charts**, **Pie Chart** to display asset mix in a pie chart in Pane 3.

Your screen now should look like Figure 3-1.

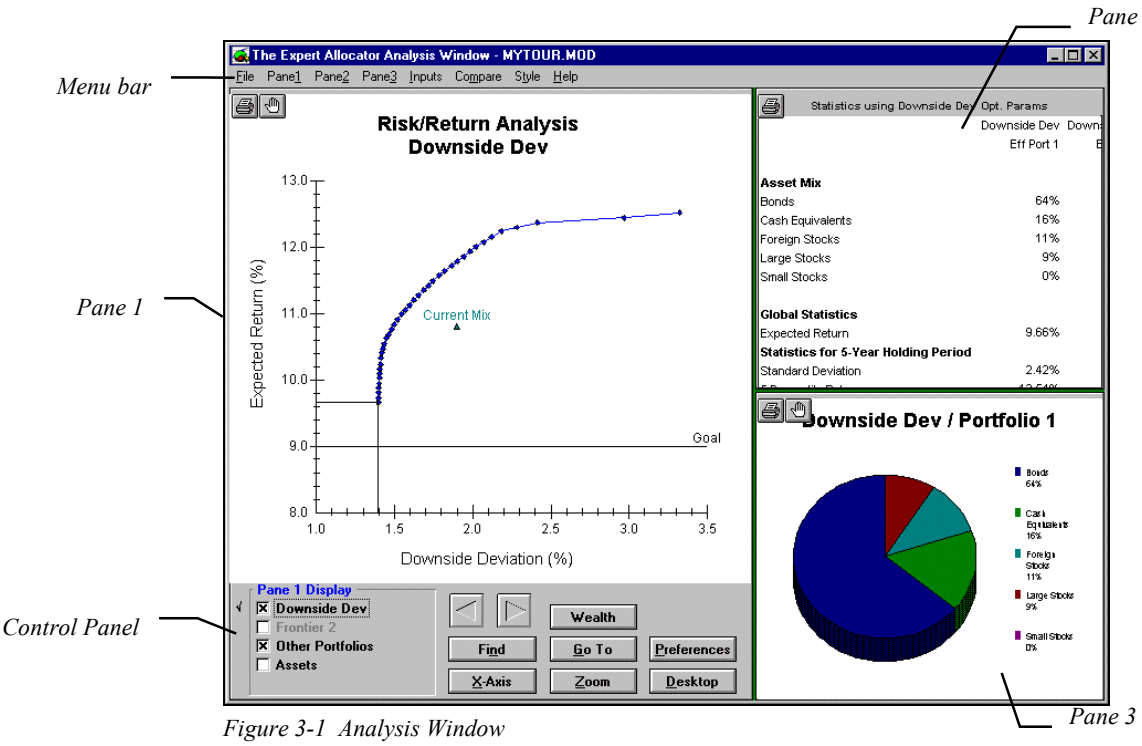


Figure 3-1 Analysis Window

*Click **Zoom** in the Control Panel to display Pane 1 full screen. Click **Unzoom** to return it to its original size.*

Because the Current Mix lies below the efficient frontier (Figure 3-1), it is inefficient. Our objective is to find an appropriate efficient portfolio.

Let's start by finding the efficient portfolio with the same risk level as the Current Mix.

3. Click **Find** in the Control Panel. In the Find Efficient Portfolio dialog box, click on the Portfolio Statistic drop-down list box and select Downside Deviation from the list. In the Value frame, click on the Closest to Portfolio radio button and in the adjacent list box, select Current Mix (Figure 3-2). Click **OK**.

*Use **Find** to identify an efficient portfolio that meets specific criteria. You determine the criteria.*

Examples include finding the efficient portfolio with the lowest Downside Probability or the highest wealth value at the 5th Percentile.

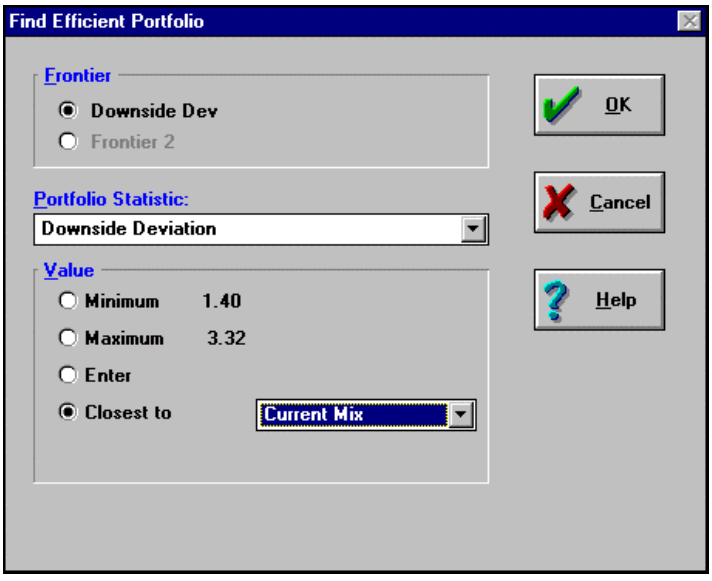


Figure 3-2 Find Efficient Portfolio Dialog Box

Panes 2 and 3 always show information on the portfolio identified by the cross-hair in Pane 1.

The cross-hair in the Risk/Return chart in Pane 1 automatically points to Efficient Portfolio 30—the Selected portfolio—and information on this portfolio is displayed in Panes 2 and 3.

Efficient Portfolio 30 is the optimal portfolio—namely, the efficient portfolio with the same risk as the Current Mix. Let's compare these two portfolios.

Compare Current Mix and Optimal Portfolio

4. From the menu bar, choose **Compare Other Portfolio.** In the Select Other Portfolio to Compare dialog box, double-click Current Mix (Figure 3-3). Now the Current Mix appears as the Compared portfolio in all tables and charts in Panes 2 and 3.

The Compared Portfolio can be an efficient portfolio, an asset, or other portfolio.

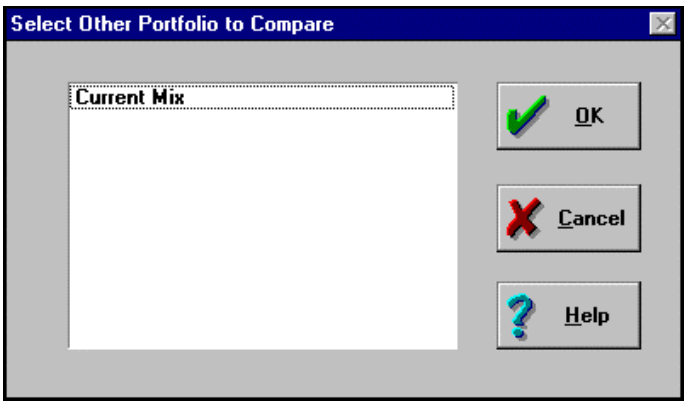


Figure 3-3 Select Other Portfolio to Compare Dialog Box

Panes 2 and 3 have identical choices from the menu bar.

Customize charts and tables with one or more of the Preferences tabs.

5. In Pane 2, the Portfolio-Statistics Table should be displayed, which shows asset mix and selected portfolio statistics for Efficient Portfolio 30 (the Selected portfolio) and Current Mix (the Compared portfolio).

   To specify the information you wish to display in this table, click **Preferences** in the Control Panel. The Preferences tabs appear.

*If you use the same statistics often, click **Make Defaults** and the settings will be saved.*

6. In the **Portfolio Statistics** tab, click **Clear** and then click on the check boxes for the following statistics: Expected Returns/Wealth, Percentile Returns/Wealth, Expected Downside Return/Wealth, Downside Deviation, Downside Probability, Standard Deviation, and Sortino Ratio (Figure 3-4).

The selected portfolio statistics appear in the Portfolio-Statistics Charts and Portfolio-Statistics Tables which are available in all three panes.

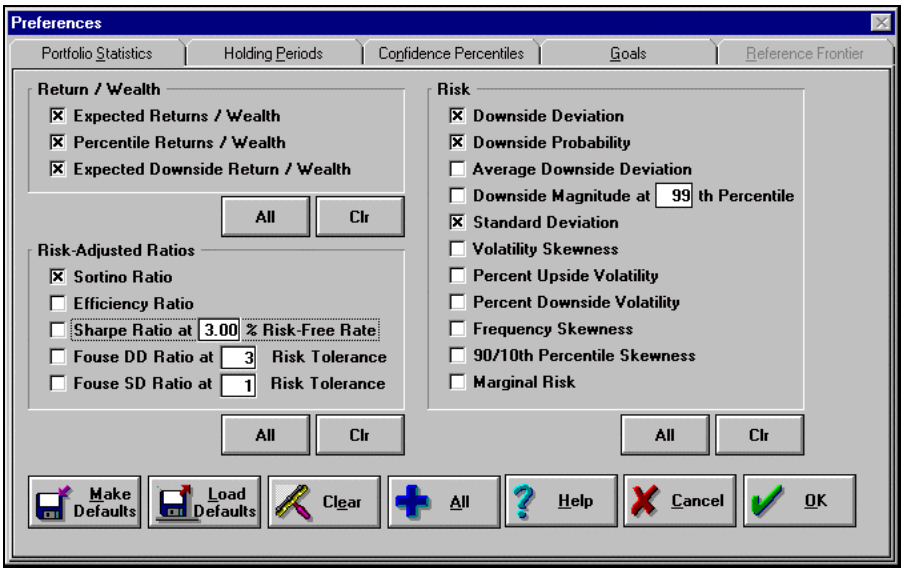


Figure 3-4 Portfolio Statistics Tab in Preferences

7. Click the **Holding Periods** tab, and de-select the 1-Year and 2-Year Holding Periods by clicking the checkbox in the Use column so that no **x**'s appear. Only the 5-Year Holding Period should be selected (Figure 3-5).

You can select one, two, or three time periods to display in the Portfolio-Statistics Charts and Confidence Charts in Pane 1 and the Portfolio-Statistics Tables in all three panes.

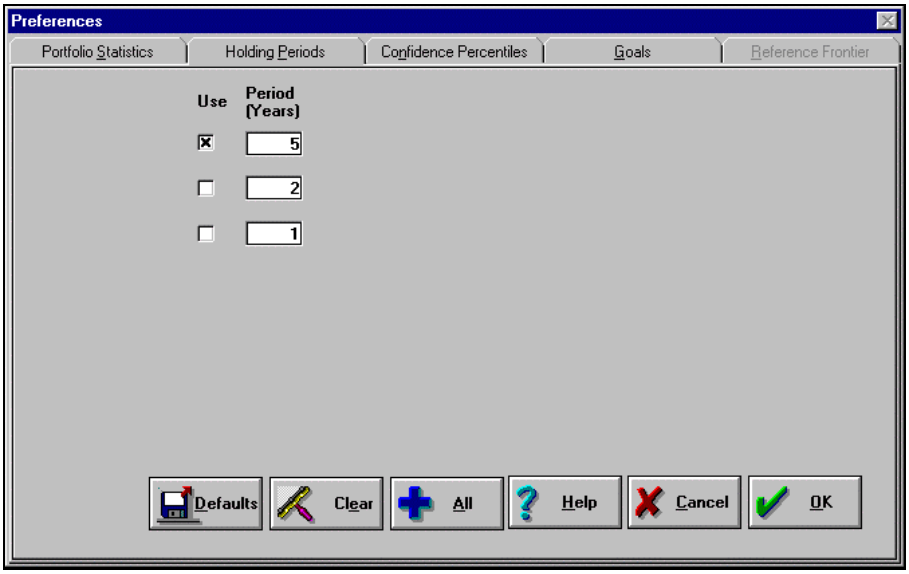


Figure 3-5 Holding Periods Tab in Preferences

8. Click on the **Confidence Percentiles** tab. De-select all percentiles except the 95th and 5th. (If the 95th and 5th don't appear in your tab, click in any cell and enter each value.) Click the Use check boxes so that an **x** appears only for these two percentiles (see Figure 3-6).

Choose up to five percentiles for display in charts and tables in all three panes: Confidence Charts (Pane 1 only), Portfolio Statistics Charts, and Portfolio-Statistics Tables.

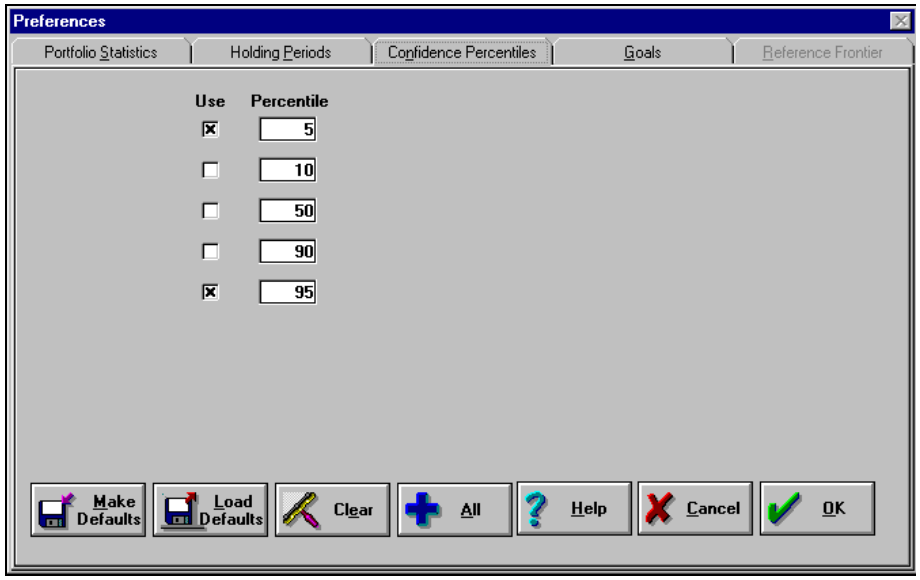


Figure 3-6 Confidence Percentiles Tab in Preferences

9. Click **OK** to close Preferences.

*If information in Pane 2 is hidden from view, try one or more of the following: Click anywhere in the pane and use the scroll bars to display more information; select Display Abbreviated Statistics from the **Style** menu option; enlarge Pane 2 by dragging the split bars.*

10. From the menu bar, select **Style Display Abbreviated Statistics Names**. Portfolio statistics names will appear in abbreviated form (e.g., Expected Downside Return appears as Exp. Downside Return) to make more room in Pane 2.

11. From the menu bar, choose **Pane3 Distribution Chart**. This chart compares holding period return distributions for Efficient Portfolio 30 and the Current Mix.

Your Analysis Window should now look like Figure 3-7.

*Navigate Pane 1 by pointing-and-clicking, using **Go To** and **Find**, and scroll arrows in the Control Panel.*

For Pane 2 and 3 tables, click in the pane and use the vertical and horizontal scroll bars to display information. Or use the split bars to stretch the pane.

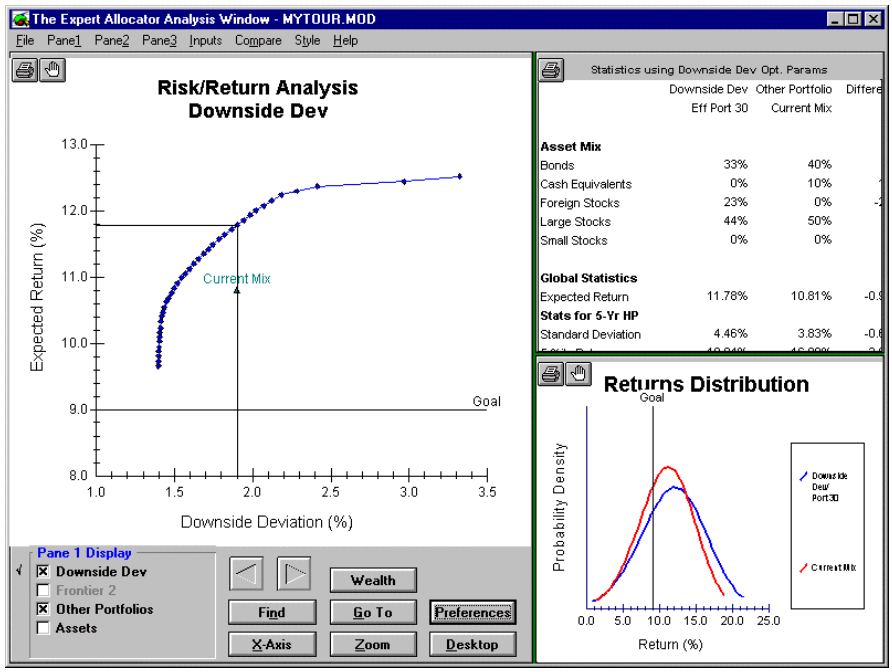


Figure 3-7 Analysis Window

NOTE: If your screen looks different than Figure 3-7 and you wish to proceed with this tour immediately, open the model `TUTORIAL` provided in your `SSIWIN` directory. `TUTORIAL` contains all the input and optimization results covered so far.

To do so, in the Control Panel, click **Desktop** to return to the Desktop. Click **Open**. If prompted to save the existing model, click **No** and, in the File Open dialog box, enter the File name `TUTORIAL`. Click **OK** and then click **Analysis Window** in the Analysis & Reports button group to return to the Analysis Window.

From the information shown in the Analysis Window, we observe the following:

Asset Mix:
Efficient Portfolio 30 has a higher overall stock commitment than the Current Mix (67% versus 50%). In addition, the *makeup* of the stock allocation differs substantially: Foreign Stocks represent one-third of Efficient Portfolio 30's stock allocation, while the Current Mix holds only domestic stocks. Neither portfolio holds Small Stocks.

Return versus Risk:
The expected return for Efficient Portfolio 30 is 98 basis points higher than that for the Current Mix but with the same risk (using downside deviation). As a result, the former is more attractive on the basis of return-per-unit-of risk as measured by the Sortino ratio (1.47 versus 0.95, respectively).

Goal:
With Efficient Portfolio 30, there is a 26.15% chance (Downside Probability) of not meeting the 9.0% goal. In the event of failure, the portfolio is expected to earn 6.15% (Expected Downside Return). For the Current Mix, the chance of failing to meet the goal is 30.95%, with a 6.38% expected return in the event of failure.

Distribution of Returns:
Despite the higher standard deviation, Efficient Portfolio 30's return distribution is more attractive than the Current Mix. As shown in Pane 3, both portfolios' left tails virtually overlap at the low end of the return scale while Efficient Portfolio 30's right tail extends above that of the Current Mix at the high end. While the worst case returns are virtually the same for both portfolios (4.26% versus 4.29%, respectively, at the 95th Percentile), the best possible return (measured by the 5th Percentile Return) for Efficient Portfolio 30 is more than 200 basis points better than for the Current Mix (18.94% versus 16.89%).

12. To present these observations from a different perspective, click **Wealth** in the Control Panel to display information in wealth values.
13. From the menu bar, select **Bar Charts** from the **Pane3 Asset Mix Charts** option (Figure 3-8).

Asset Mix is available in pie chart, too.

Charts can be printed, exported as .BMP and .WMF files, or copied to the Clipboard.

Display asset mix in pie charts or bar charts, in percentages or wealth values.

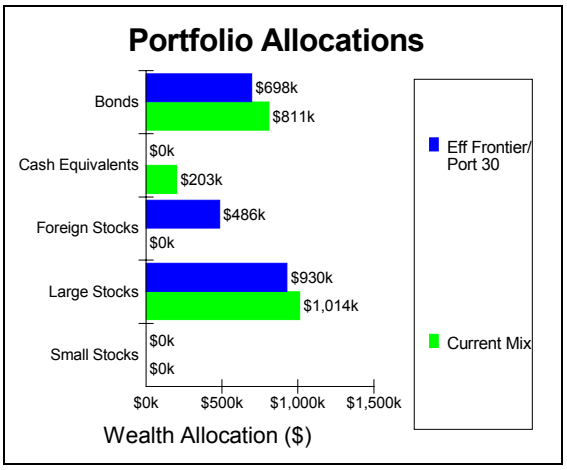


Figure 3-8 Asset Mix Bar Chart in Pane 3

If wealth values displayed on-screen are rounded, grab the split bar and enlarge Pane 3.

Asset Mix:

Efficient Portfolio 30 is invested as follows: $930,000 in Large Stocks, $486,000 in Foreign Stocks, and $698,000 in Bonds. The Current Mix is invested as follows: $1,014,000 in Large Stocks, $203,000 in Cash Equivalents, and $811,000 in Bonds.

Expected Return:
By the end of the five-year period, Efficient Portfolio 30 has an expected value of $2,114,694 compared to $2,028,321 for the Current Mix, an $86,373 difference.

Goal:
For Efficient Portfolio 30, there is a 26.15% chance that the actual return will be less than the goal; in the event of failure, the expected wealth is $1,668,675 ($208,275 less than goal).

For the Current Mix, there is a 30.95% chance of failure. In that event, the expected wealth is $1,683,665 ($193,285 less than goal).

Distribution of Returns:
In a worst case scenario, Efficient Portfolio 30 would be valued at $1,493,305 and Current Mix would be valued at $1,498,782. In a best case scenario, Efficient Portfolio 30 would be worth $234,635 more than the Current Mix.

Document Your Findings

You can export charts and tables and use them in other Windows applications such as Word, Excel, and PowerPoint.

14. From the menu bar, choose **File Print Print All Panes**. Select **Color** or **Mono**, depending on your printer. In the Print dialog box, click **OK**. The Risk/Return Chart, Portfolio-Statistics Table, and Asset Mix Bar Chart will print.
15. To print other charts and tables, make your selection from the **Pane1**, **Pane2**, or **Pane3** menu options and then choose **File Print**.
16. To print Asset Assumptions, Investor Information, or Optimization Parameters, select **Inputs** from the menu bar, choose a worksheet, and click **Print**.

Save Your Work...Again

17. You don't have to leave the Analysis Window to save your work. Choose **File Save** from the menu bar.

A Review of Step 3: Analysis and Reports

- Reviewed the Risk/Return Chart in Pane 1 showing the efficient frontier and Current Mix (Pane1, Risk/Return Chart).
- With **Find**, identified the efficient portfolio with the same risk as Current Mix.
- Chose Current Mix as the compared portfolio (Compare, Other Portfolio).
- Displayed asset mix and selected portfolio statistics for both portfolios in a Pane 2 table (Preferences tabs).
- Displayed return distributions for both portfolios in a Pane 3 chart (Pane3, Distribution Chart).
- Displayed asset mix in a bar chart in Pane 3 (Pane3, Asset Mix Charts).
- Reviewed portfolio information in return and wealth formats (Returns and Wealth toggle).
- Printed charts and tables (File, Print).

Wait!…There's More to See

This completes the introductory portion of The Expert Allocator tour. But there's a lot more to see. For more features in the Analysis Window, read on!

More Charts for Portfolios

Use the Portfolio Statistics and Confidence Percentiles tabs in Preferences to tailor this chart.

1. From the menu bar, choose **Pane 2 Portfolio Statistics Chart**. This bar chart plots portfolio statistics for the holding period for Efficient Portfolio 30 and the Current Mix.
2. Click **Preferences**. In the Portfolio Statistics tab, click **Clear**, de-select Expected Returns/Wealth, and select Percentile Returns/Wealth.
3. Click **OK** to close Preferences. The Portfolio Statistics Chart in Pane 2 now displays wealth values in best (5th percentile) and worst (95th percentile) scenarios for the holding period for Efficient Portfolio 30 and Current Mix (Figure 3-9).
4. Click Returns in the Control Panel to display 5^{th} and 95^{th} Percentile Returns (Figure 3-10).

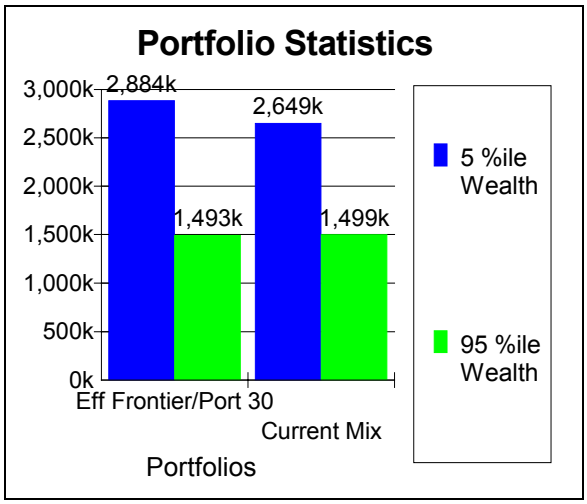


Figure 3-9 Portfolio Statistics Chart in Pane 2 in Wealth Values

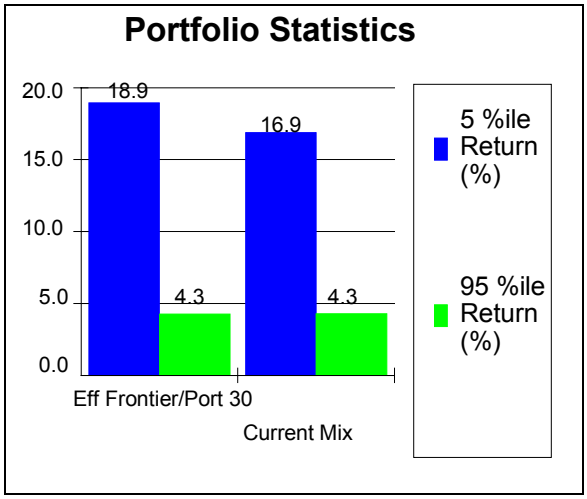


Figure 3-10 Portfolio Statistics Chart in Pane 2 in Returns

Notice that the worst return is about the same for both portfolios, but Portfolio 30's best return is substantially better than that of the Current Mix.

*Other ways to navigate Pane 1 are point-and-click, **Go To** button, and the PageUp and PageDown keys.*

5. Click the right or left arrow button in the Control Panel to cycle through the efficient portfolios. Notice how the values for the Selected portfolio change in Panes 2 and 3 and the Compared portfolio (currently Current Mix) remains fixed.

Asset Allocation for the Entire Frontier

6. From the menu bar, choose **Pane1 Asset-Mix Charts Standard Chart.** This chart shows the allocation to each asset class across all efficient portfolios (Figure 3-11). We can notice, at a glance, the absence of Cash Equivalents in all but the most conservative portfolios and the absence of Small Stocks in all but the most aggressive portfolios.

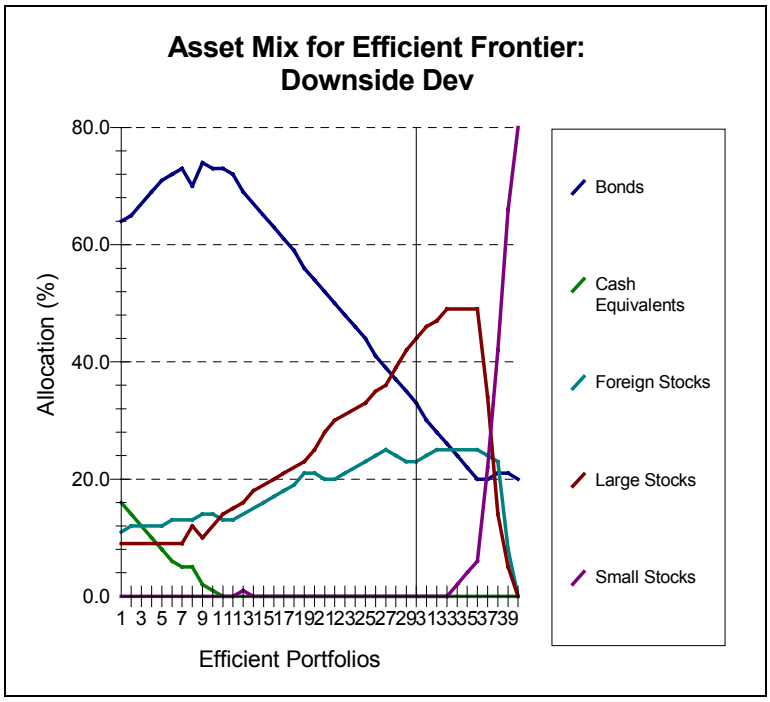


Figure 3-11 Asset-Mix Standard Chart in Pane 1

7. Here's another way to view asset mix. From the menu bar, choose **Pane1 Asset-Mix Charts Cumulative Chart**. This chart plots the cumulative allocations (totaling 100%) in an area chart for the efficient frontier (Figure 3-12).

Click on the Other Portfolios radio button in Pane 1 Display to see asset mix for Other Portfolios in a stacked bar.

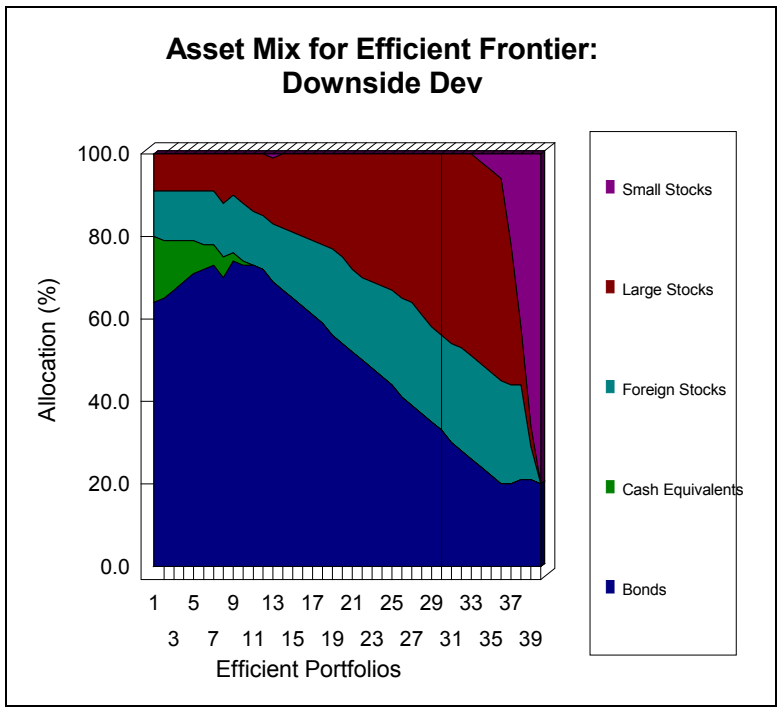


Figure 3-12 Asset-Mix Cumulative Chart for Efficient Frontier in Pane 1

Ways to View Portfolio Statistics

Portfolio Statistics can be displayed in Pane 1 in line and bar charts.

8. From the menu bar, choose **Pane1 Portfolio Statistics Charts Line Chart**. This chart displays the selected portfolio statistics (currently 5th and 95th Percentile Returns) for selected periods for the efficient frontier.
9. Click **Preferences**. In the **Portfolio Statistics** tab, de-select Percentile Returns, and select Sortino Ratio, Efficiency Ratio, and Sharpe Ratio. For Sharpe Ratio, enter 6.0 as the risk free rate.
10. Click **OK** to close Preferences. The Portfolio Statistics Line Chart in Pane 1 now displays the three risk/reward ratios for the 5-year holding period for the efficient frontier (Figure 3-13).

The Portfolio Statistics Bar Chart can display an efficient frontier, Other Portfolios, or Assets.

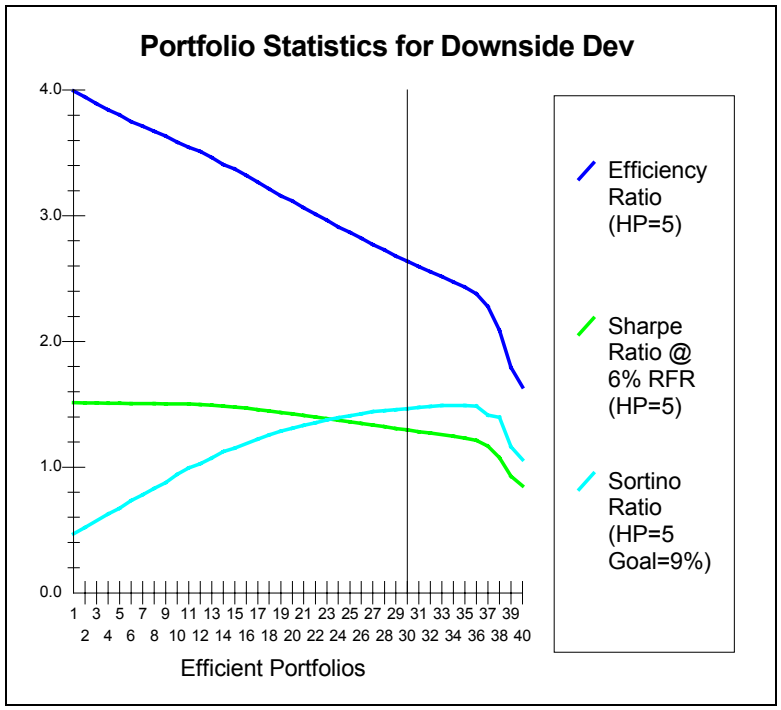


Figure 3-13 Portfolio Statistics Line Chart in Pane 1

Ways to View Confidence Analysis

Range of returns can be displayed in Pane 1 in bar, line, and percentile charts.

11. From the menu bar, choose **Pane1 Confidence Charts Bar Chart**. This chart displays returns for the percentiles (currently 95th and 5th) and holding periods (5 years) specified in Preferences (Figure 3-14).

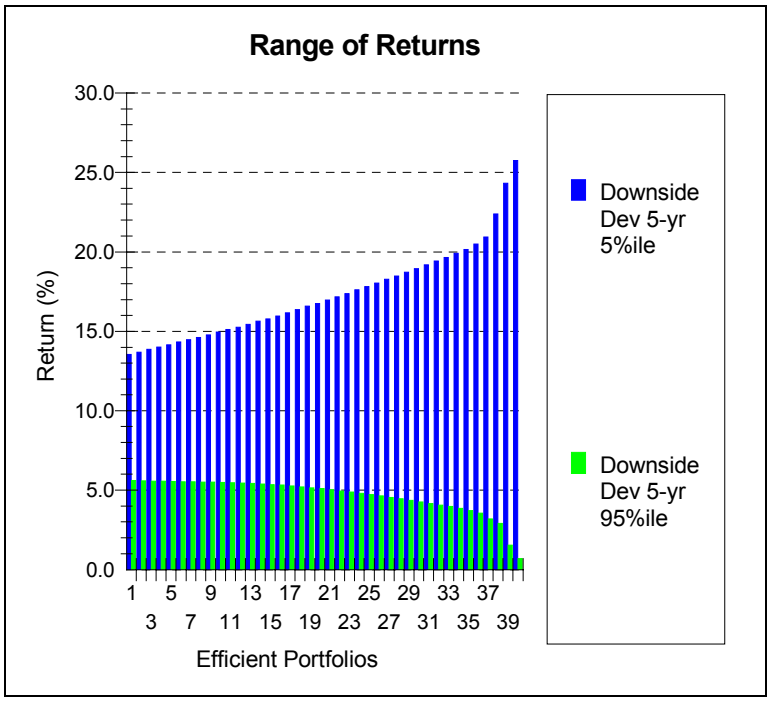


Figure 3-14 Confidence Bar Chart in Pane 1

12. From the menu bar, choose **Pane1 Confidence Charts Percentile Chart.** This chart displays the range of returns for the efficient frontier.

13. Click **Preferences**. In the **Confidence Percentiles** tab, click **All** to select the 5th, 25th, 50th, 75th and 95th percentiles. Click **OK** to close Preferences.

14. In **Pane 1 Display** in the Control Panel, select Assets. The range of returns for the five asset classes are displayed in Pane 1 (Figure 3-15).

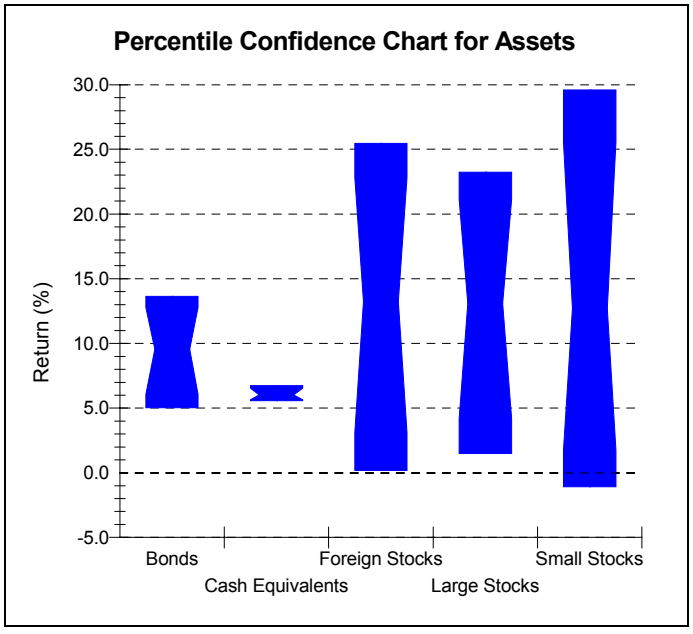


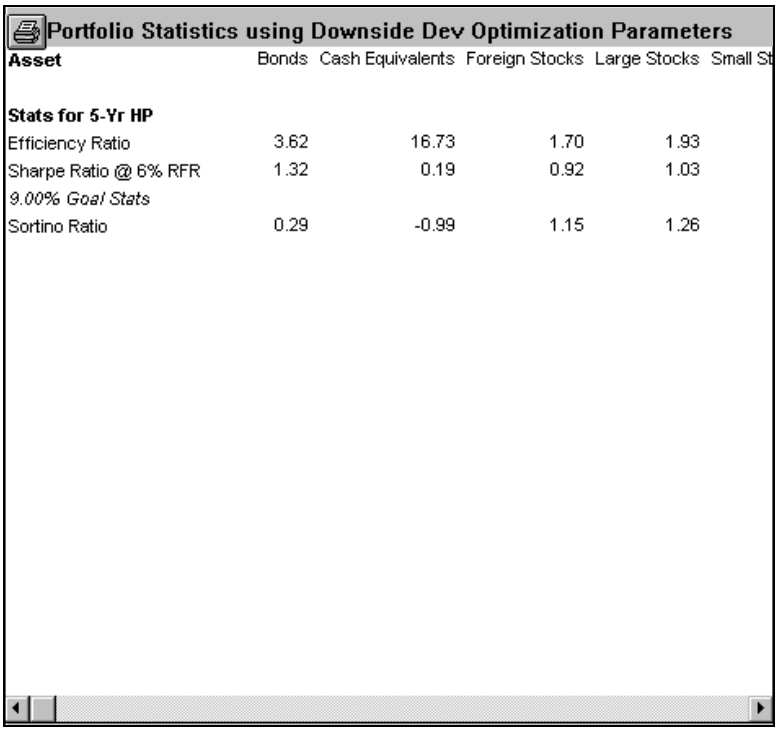
Figure 3-15 Confidence Percentile Chart in Pane 1

Tabular Information

15. From the menu bar, choose **Pane1 Portfolio-Statistics Table**. This table displays selected portfolio statistics for all assets for the confidence percentiles, goals, and holding periods specified in the Preferences tabs (Figure 3-16).

Tailor this table to display only the information you want. Make your selections in the Preferences tabs: Portfolio Statistics, Holding Periods, Confidence Percentiles, and Goals.

Display information for efficient frontiers, Other Portfolios, or assets by clicking on the radio button in ***Pane 1 Display*** *in the Control Panel.*



Portfolio Statistics using Downside Dev Optimization Parameters

Asset	Bonds	Cash Equivalents	Foreign Stocks	Large Stocks	Small St
Stats for 5-Yr HP					
Efficiency Ratio	3.62	16.73	1.70	1.93	
Sharpe Ratio @ 6% RFR	1.32	0.19	0.92	1.03	
9.00% Goal Stats					
Sortino Ratio	0.29	-0.99	1.15	1.26	

Figure 3-16 Portfolio-Statistics Table in Pane 1

This concludes the introductory tutorial. We hope you found it to be informative.

For more information, please refer to on-line Help and the *User's Guide for The Expert Allocator*.

Where to Go from Here

Dual Frontier Optimization

The Expert Allocator's state-of-the-art optimization capabilities combine power and flexibility to make your analysis quick, easy, and thorough. You can perform two optimizations at a time and easily and immediately compare the differences. To generate two frontiers, check the *Optimize*? boxes in both Primary and Secondary Optimizations columns.

Some examples of using this dual optimization feature are listed below.

If You Want to Do This . . .	In Optimization Parameters . . .
Show the impact of asset mix constraints on the efficient frontier	Check *Ignore Constraints*? for Primary Optimization and uncheck it for Secondary Optimization
Show the benefits from diversification	Check *Use Perfect Correlations*? for Primary Optimization and uncheck it for Secondary Optimization
Show the effect of taking a long-term investment view versus a short-term view	Select a higher number of years in *Holding Period* for Primary Optimization than for Secondary Optimization*
Evaluate differences in efficient frontiers based on risk measure	Select Downside Deviation as the *Optimization Risk Measure* for Primary Optimization and Standard Deviation for Secondary Optimization
Analyze the effect of skewness in asset return forecasts	Select True Distribution as the *Return Distribution Shape* for Primary Optimization and Normal Distribution for Secondary Optimization
Analyze the effect of taxes on efficient frontiers	Select Pre-Tax as the *Tax Environment* for Primary Optimization and After-Tax for Secondary Optimization
Compare efficient frontiers generated using Mean-Variance (MPT) and Downside Risk (Post-MPT)	Select Normal Distribution and Standard Deviation for Primary Optimization and True Distribution and Downside Deviation for Secondary Optimization

*applies to frontiers generated using Downside Deviation as risk measure

Advanced Features

In this tutorial we've explored the basic techniques in creating an asset allocation model, generating an efficient frontier, comparing portfolios, and finding an optimal portfolio. Listed below are some sections in the *User's Guide for The Expert Allocator* you may want to read to learn more about The Allocator and its advanced features.

If You Want to Do This . . .	Read This Section
Create customized charts for your report	"Working with Style Templates" and "Customizing Charts" in Chapter 6: Reports
Reflect inflation in projected contributions and withdrawals	Wealth and Cash Flows section of "Investor Information" in Chapter 3: Inputs
Incorporate tax aspects of investing	Tax Details section of "Investor Information" in Chapter 3: Inputs
Export charts and tables to other Windows applications	"Printing and Exporting Charts" and "Printing and Exporting Tables" in Chapter 6: Reports
Create a model using Economic Scenario forecasting	"Forecasting Tools" in Chapter 3: Inputs
Understand the differences and similarities of downside deviation and standard deviation	"Choosing a Risk Measure" in Chapter 4: Optimization
Customize the look of the Analysis Window	"Customizing the Analysis Window" in Chapter 5: Analysis
Understand terms used in asset allocation analysis and The Expert Allocator	Chapter 11: Glossary
Read more about optimization including Post-Modern Portfolio Theory	Chapter 9: Reference
Learn how to use on-line Help	Chapter 10: Using the Navigator for On-line Help