jual weighted total return index based on the three month T-bill

D

nining the investment horizon. The profiles serve as guidelines for
estment horizon. The third step deals with determining long run
sk. Merrill Lynch uses historical monthly data to estimate long-
s for the four asset classes. A twenty-year time period is employed
i and the covariance matrix used to determine the risk levels. Risk
ualized standard deviation of monthly returns over the sample
ip uses Merrill Lynch's proprietary asset allocation software, ML-
produces forward looking, risk adjusted portfolios based on their
ations for stock, bond and currencies throughout the world. The
owitz's mean variance optimization to generate an efficient frontier,
ecomes crucial. The efficient frontier is comprised of thirty
int frontier is divided into five segments to position the asset
e investor profiles. The mid-point of each segment is chosen and
its the recommendation for the respective risk portfolio. However,
only provides the percentage of investments into the four major

ompared to Merrill Lynch's, the following observations can be

	Bonds		Cash		US Stocks		International Stocks		Commodities	
	Merrill Lynch	This Study	Merrill Lynch	This Stud	Merrill Lynch	This Stud	Merrill Lynch	This Study	Merrill Lynch	This Study
Capital Preservation	60	0	25	86	10-15	10	0-5	1.4	0	3
Income	50	12	20	55	25	27	5	1.3	0	5
Income and Growth	45	26	10	26	40	40	5	1.3	0	7
Growth	30	35	5	0	60	55	5	1	0	8
Aggressive Growth	15	7	5	0	70-75	86	5-10	0	0	6

Table 4.4 Asset Allocation Comparisons

For the profiles capital preservation, income, and income and growth, in this model, more of the investment is put into cash and less into bonds unlike the Merrill Lynch model. As the investor's risk level increases, the asset allocation proportions become more alike. In terms of stocks, both models recommend the same proportion but these values diverge as risk level increases. Some of the divergence can be explained by the investment in commodities in this model, which is not present in the Merrill Lynch model. However, as the asset classes are condensed into the general equity and cash and bonds categories the models exhibit more similarities as shown in Table 4.5.

	Equity		Bonds & Cash	
	Merrill Lynch	This Study	Merrill Lynch	This Study
Capital Preservation	15	11	85	86
Income	30	28	70	67
Income and Growth	45	41	55	52
Growth	65	56	35	35
Aggressive Growth	80	86	20	7

Table 4.5 General Asset Allocations for Investor Profiles

For the purpose of comparison, commodities were not included in this table so the numbers in the rows for each profile for this study do not sum to one hundred. Generally, the allocation proportions differ by only a few percentage points except for the aggressive growth allocation in bonds and cash.

This mean-variance model produced results that were on par with Merrill Lynch's investor profiles. It is questionable whether or not any benefit was derived from having ten asset classes to choose from since half of these were not considered in any of the thirty portfolios. The other concern is the practicality of the asset allocation at the extremes of the efficient frontier. Eighty-five percent of the investment is allocated to cash in the capital preservation profile whereas eighty-five of the investment is allocated to large cap value stocks in the aggressive growth profile. Furthermore, out of the five asset classes for stocks, large cap value is the only class that receives significant investment amounts and this seems counter-intuitive from a diversification perspective. To deal with this problem, constraints are added to this framework to obtain a more even distribution among the asset classes. The constraints change based on the general percentage of investment into cash and bonds, and equity by the investment profiles found in the unconstrained model. The additional constraints are:

- Of the overall percentage invested in equity, that is 11 percent for capital preservation, 28 percent for income, 41 percent for growth and income, 56 percent for growth and 86 percent for aggressive growth, a maximum of five to ten percent of this value will be invested in international stocks.
- At least five percent of the total amount in equity, that is .5 percent for capital preservation, 1.4 percent for income, 2.1 percent for income and growth, 2.8