off of day trading. The key to the game is "buy low,
uld be "show me the money." The days of having a
he average American. One question still remains,

ing Fisher [1906] was a major player in defining the
importance of allocating resources over time and to
probability distribution. It was during this time that
conceive the theory of portfolio selection. There were
at this time. One was that the markets represented a
urr Williams [1938] challenged this notion and created
ted that the asset prices represented the inherent value
Markowitz [1952] put this all together and capitalized
loped by John von Neumann and Oskar Morgenstern
notion of an optimal portfolio selection based on the
rn. He used the idea of diversification as a way to
ersification could be achieved by solving for the
iving a correlation factor. This idea was the birth of
obin [1958] took this idea and created the two-fund
a risk-free asset to mix. Building on a Keynesian
ed that people would determine their attitude toward
risk-free asset and the portfolio of risky assets. With
day, it was very costly at that time to compute the
Markowitz. In 1964, William Sharpe[1964] developed a

way to compute the correlation coefficient for each asset in relation to a general market
index. This correlation coefficient became known as beta. Sharpe's model became
known as the capital asset pricing model (CAPM). From these early models, spun out
other ideas of how to achieve the optimal portfolio.

Perhaps the most important idea realized by modern portfolio theory is the idea of
diversification. A study by Brinson, Hood and Beebower [1991] looked at 82 large
pension plans covering a ten year period. The purpose of the study was to determine
which of the factors: asset allocation policy, market timing, or security selection
contributed the most to the variation in quarterly total returns among the plans. They
found that the asset allocation policy explained 91.5 percent of the variation in the
quarterly returns among the pension plans. Diversification is so important because it
works to not only reduce volatility but also works to enhance returns. Gibson [2000]
sites market timing and investor psychology as the two agents that tend to cloud the
benefits of multiple-asset-class investing. There is an obsession investors have with
analysts and other financial wizards and their apparent ability to predict the future. Very
few fund managers have the predictive ability to beat the return gained by the market.
Depending on the investor's frame of reference, they can interpret their portfolio as
winning or losing. In the case of losing, the investor perceives that diversification has
hindered the expected returns. However, if that investor changed his frame of reference,
then it is possible that his portfolio could be a winner.

Most research in modern portfolio theory has revolved around three general asset classes:
stocks, bonds, and cash and the optimal mix of these classes with respect to various
theories. The purpose of this thesis is to investigate the implications of further dividing

these asset classes to determine if a more prescriptive form of investment exists. The
asset classes used in this study are short-term government bonds, long term government
bonds, international stocks, small cap growth, small cap value, large cap growth, large
cap value, real estate and commodities. These asset classes are measured by the
respective indices: Merrill Lynch three to five year government bonds, Merrill Lynch
fifteen years and up government bonds, MSCI EAFE Equity Index, Russell 2000 Growth,
Russell 2000 Value, S&P 500/BARRA Growth, S&P 500/BARRA Value, NAREIT-
REIT ALL Index and Goldman Sachs Commodity Index. Based on these asset classes,
the efficient frontier of optimal portfolios will be generated by the mean-variance
technique and the minimax rule. These two techniques will be compared to determine
any differences. Various future market conditions will be simulated to determine if one
theory reacts better than the other.