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DELIVERING
THE PROMISE

IN THIS
ISSUE

A summary
of Yanni
Partners'
recent
position paper
on investment
risk.

MEASURING UP

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Managing Investment Risk

The Path to Achieving Objectives

On September 11, 2001, terrorists struck at the hearts of America's financial and military centers. The terrorists crashed commercial airliners into the twin World Trade Center towers in New York and the Pentagon in Washington, DC. Both World Trade Center towers collapsed into rubble. The Pentagon withstood the attack, but sustained deep wounds as it smoldered for several days.

These attacks transformed America. The nation has united in supporting families of the deceased and wounded. The citizens, government, management, and labor have resolved to work together to extract the roots of terrorism.

The physical devastation from the collapse of the World Trade Center towers disrupted the financial markets. The explosions obliterated major segments of Wall Street's infrastructure (computer networks, telephone lines, water lines, subway tunnels, paper files, and offices). The stock market closed for four days.

The terrorists' attacks have profound implications for institutional investors. Catastrophic events can wreck havoc on markets. Market disruptions manifest

themselves as investment risks. We define risk as the possibility that investment results might fall short of an investor's objectives. The study of history cannot capture the full dimensions of future market risks because it is impossible to predict catastrophes.

Yanni Partners had completed a position paper on investment risk prior to the September 11 tragedies. The September 11 events place the concept of risk in much sharper focus. This edition of *Measuring Up* summarizes our risk paper. We will make the complete risk paper available upon request to each client in the near future. Yanni Partners is prepared to evaluate our clients' unique circumstances to help each client measure and manage risk more effectively.

The following sections summarize the full paper:

Background:

Risk analysis evolved throughout history as a method to help individuals and enterprises manage uncertainty. The advent of *Modern Portfolio Theory* in the 1950s demonstrated how investors could enhance the return/risk trade-off through diversification.

Risk Measures:

The most common measure has been variability of returns, as measured by the standard deviation. Some of the traditional applications of standard deviation erroneously assume that the distribution of returns is normal (symmetrical). Some of these applications understate the likelihood of negative outliers. The full paper describes several measures that focus on downside risk and outliers.

Risk Management:

Tools for controlling risks include: defining the investor's capacity to bear risks, diversification among different asset types, avoidance of leverage and market timing, and interpreting historical data properly by understanding survivor bias and other distortions. Although diversification can help to reduce downside risk, most high-risk investments tend to decline in tandem during periods of market turmoil. This relationship suggests that high-grade fixed income serves as the only effective method of protection during market weakness.

Standards of Practice:

In 1996, the Risk Management Working Group issued guidelines to direct the management, measurement, and oversight of risk. These guidelines recommend actions such as stressing the importance of

documentation, defining roles and responsibilities, setting limits, computing risk adjusted returns, and subjecting strategies to "stress tests."

This edition of *Measuring Up* focuses on the background of risk management to provide a foundation for the comprehensive measures and management principles that the full paper will explain. This article covers the following topics:

- Importance of risk analysis.
- Relationship between risk and return.
- Evolution of risk analysis.

The Importance of Risk Analysis

In pursuing investment objectives for a portfolio, the elements of a quality investment strategy must be defined. The basic elements are return and risk. Forming reasonable and obtainable return expectations is the first step. While this endeavor involves a great deal of market analysis and modeling, the purpose of formulating return expectations is fairly obvious. The next step, finding a level of risk with which the investor is comfortable and implementing a program to manage that level of risk, is not quite as obvious. However, when an investor understands that for each level of risk there is an optimal portfolio structure, the need to quantify risk levels becomes more appreciated.

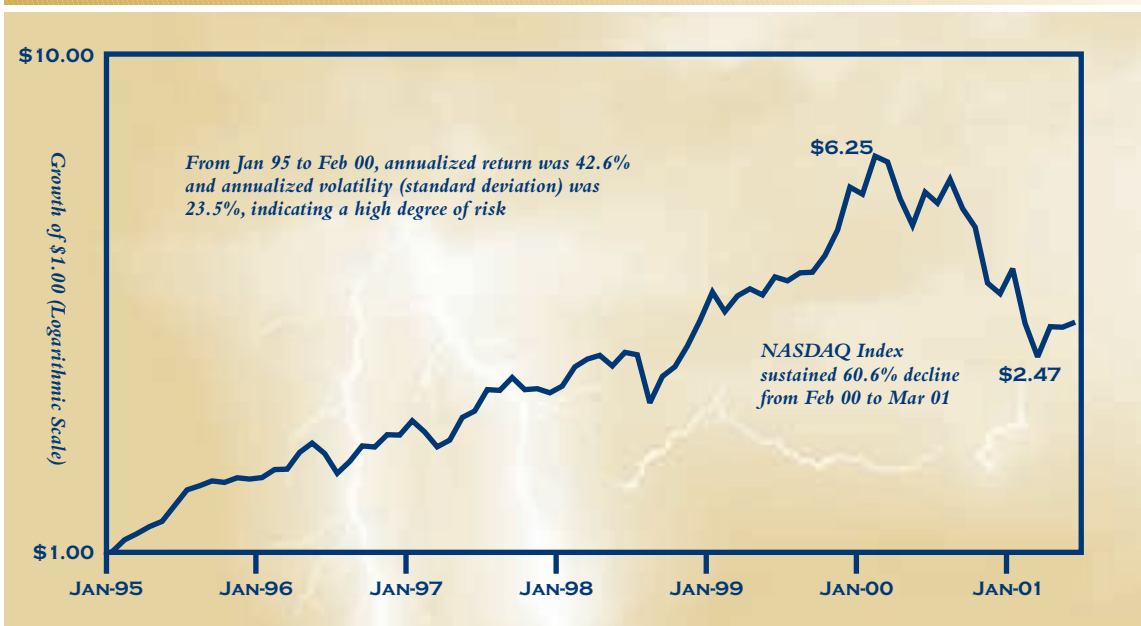
In addition to eliminating extreme downside exposure, risk analysis can also help an investor to increase the prospects for portfolio returns. Risk analysis, of course, has applications not limited to just market investments. In his book, *Against the Gods: The Remarkable Story of Risk*, Peter L. Bernstein discusses how the modern world is able to grow economically through the understanding of risk analysis:¹

¹ Peter L. Bernstein, *Against the Gods: The Remarkable Story of Risk*, John Wiley & Sons, New York, 1996.

“By defining a rational process of risk-taking . . . innovators provided the missing ingredient that has propelled science and enterprise into the world of speed, power, instant communication, and sophisticated finance that marks our own age. Their discoveries about the nature of risk, and the art and science of choice, lie at the core of our modern market economy that nations around the world are hastening to join. Given all its problems and pitfalls, the free economy, with choice at its center, has brought humanity unparalleled access to the good things of life. . . . The ability to define what may happen in the future and to choose among alternatives lies at the heart of contemporary societies. Risk management guides us over a vast range of decision-making, from allocating wealth to safeguarding public health, from waging war to planning a family, from paying insurance premiums to wearing a seatbelt, from planting corn to marketing cornflakes.”

FIGURE ONE

Relationship Between Risk and Return: NASDAQ Index



It is probably not a coincidence that mankind took great strides in all fields during the Renaissance, the period of time in which risk analysis was first developed.

The importance of risk analysis is not in minimizing risk; it is in properly matching the appropriate level of risk with the potential levels of return. There may even be occasions where risk analysis leads to taking on a greater amount of risk.

The Relationship Between Risk and Return

The NASDAQ in the late 1990s and the Japanese market in the 1980s are two good examples of very high returns followed by a severe downturn, indicating a strong presence of risk (refer to Figure One, Relationship Between Risk and Return: NASDAQ Index). These are examples of very broad market return patterns, but the same risk-return relationship holds true for single securities.

Intuition suggests that there exists a positive relationship between risk and return. If a portfolio earns a high return, it is likely that the portfolio has assumed a high degree of risk. Several analytical tools are able to quantify the trade-off between risk and return. Two of the more commonly employed tools are the Treynor ratio and the Sharpe ratio. Analysts calculate the Treynor ratio by dividing annualized excess return by market risk, as measured by Beta² (See Figure Two). This tool's usefulness is found primarily in measuring the level of risk for a specific asset class.

Similarly, the Sharpe ratio is calculated by dividing annualized excess return by total risk, as measured by standard deviation (See Figure Three). This ratio is more appropriate for a total portfolio rather than for a specific asset class.

The output of this ratio, when compared with the Sharpe ratio of an appropriate benchmark, can usually tell an analyst if the return on a total portfolio was from skillful investing or from excess risk.

The Evolution of Risk Analysis

Today's world of instant communications, sophisticated quantitative tools, and technical financial models creates a market environment in which risk can be exploited for the benefit of institutional investors. However, the development of investment risk concepts has come a long way in a relatively short amount of time. As recently as 50 years ago, there was very little knowledge of market-related risk. Risk was regarded as simply the decline in the value of a stock.³

In the early 1950s, Harry Markowitz sought to prove the benefits of diversification. He illustrated that in most instances, an investor needs to focus on two factors, return and risk. For the first time,

² The measure of the sensitivity of a fund's return to change in the overall market. Commonly referred to as "market-related risk." Funds with a beta of 1.0 are, by definition, as volatile as the market index. Funds with a beta of 0.50 are half as volatile.

FIGURE TWO

$$\text{Treynor Ratio} = (r_p - r_f) / \beta_p$$

WHERE:

r_p = average return on security

r_f = average risk free rate

β_p = market-related risk of asset class

risk was being measured as the standard deviation of returns. While portfolio return is simply the weighted average of the securities contained in the portfolio, portfolio standard deviation can be minimized through diversification across securities.

³ BARRA Risk Model Handbook: U.S. Equity Model Version 3 (E3), BARRA, 1998.

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Managing Investment Risk

Contemporary investment publications were recommending one stock portfolios containing the stock with the highest expected return that an investor could find. Markowitz's model held that an investor could minimize residual risk, a component of total portfolio risk, by investing in as few as 20 securities, as long as they were optimally diversified. He showed that investors could reduce risk and increase expected returns at the same time. This work is the basis of Modern Portfolio Theory and eventually earned Markowitz a Nobel Prize in Economics.

Diversification reduces risk exposure by offsetting factor-related risk. An example of this principle would be holding the stock of two companies with stocks that move in opposite directions in relation to the business cycle. Not all risk can be diversified away. Systematic, or market, risk will always be present because stocks tend to move up and down as the overall market moves. In the 1960s, William Sharpe sought to create a model that would explain the equilibrium relationship between expected return and market risk. He earned the Nobel Prize in Economics for creating the Capital Asset Pricing Model (CAPM). The CAPM shows that investors are compensated only for systematic risk, and that the trade-off between return and market-related risk is linear. Analysts measure this relationship using *Beta*. The *Beta* of a security is the degree of risk of a stock in relation to the overall risk of the market. While the CAPM is relatively simple and somewhat useful, it is limited. It is a one-factor model in which the market is assumed efficient. These limitations led to even more sophisticated risk analysis.

FIGURE THREE

$$\text{Sharpe Ratio} = (r_p - r_f) / \sigma_p$$

WHERE:

r_p = average return on security

r_f = average risk free rate

σ_p = standard deviation of returns

By the 1970s, analysts were beginning to understand that the expected returns of stocks could be explained using several factors. The Arbitrage Pricing Theory (APT) states that the performance of a specific stock is linearly related to many underlying market-related factors. Several influences affect the volatility of a security. There are three types of factors in a multi-factor model:

- Macroeconomic factors might consist of changes in GDP, inflation, and interest rates.
- Fundamental factors might include security-specific characteristics such as price to earnings ratio, market capitalization, and industry sector.
- Statistical factors include data from historical returns and covariance matrices.

Multi-factor models are useful to analysts because they present a comprehensive dissection of risk. They are flexible tools that change in response to changing market environments and individual firm characteristics. The dynamic nature of multi-factor modeling allows portfolio managers to constantly adjust assumptions and model inputs in order to exploit opportunities that the market might present.

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Yanni Partners

310 Grant Street Pittsburgh, PA 15219-2302

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Managing Investment Risk

Advances in technology, as well as a deeper understanding of risk, have resulted in a wide array of risk analysis tools that are now available throughout the investment management industry. Investment consultants utilize portfolio optimization models that translate a client's tolerance for risk into a viable asset allocation strategy. Once granted the mandate by a client, portfolio strategists can employ a number of quantitative models in order to maximize expected returns, given a stated level of risk. Even the back office function in the field of investment management has contributed to the robust nature of risk management. Custodian banks have added value to the client by becoming more automated and responsive in areas such as security pricing, exception reporting, and compliance with objectives reporting.

Conclusion

Rigorous measurement and management of risk can help the investor to meet the investor's unique objectives. Yanni Partners will support each client in these endeavors. The investor must first assess the investor's capacity to bear losses. Some traditional risk measures understate the probability of large negative outliers. Major losses are highly disruptive because they might compel the investor to change the investment policy at an inopportune time. Our work has focused on measures that isolate downside risk. Yanni Partners is prepared to work with each client to develop appropriate risk measures and management actions to enhance each client's probability for meeting key investment objectives.

This article was written by: David Hammerstein, CFA, a Senior Consultant with Yanni Partners, who received a BA from Colgate University and an MBA in finance from the University of Chicago; Jon Koteski, an Associate Consultant, who received a BA from Franklin and Marshall College and an MBA in finance and economics from the University of Pittsburgh's Joseph Katz Graduate School of Business; and Patrick Fisher, Consulting Analyst, who received both a BA and a BSBA from West Virginia University and an MBA in finance from Duquesne University Graduate School of Business Administration.

If you have any questions or comments concerning this issue of "Measuring Up," please contact:

Lisa M. Marcotullio, Administrative Coordinator

Phone: 412.232.1000 Email: marcotullio@yannipartners.com Web: www.yannipartners.com

Calendar of Events

MARCH

17-20

**2002 National
Healthcare
Investment
and Finance
Symposium**

*The Ritz-Carlton
Key Biscayne, FL*

*Attendance by
invitation only.*

Yanni Partners provides a full range of consulting services vital to the management of various portfolios. Our ultimate goal is to offer a basis for improved investment monitoring and performance.

Yanni Partners is registered as an investment advisor and as an NASD registered broker/dealer. Yanni Partners is also a member of the Securities Investors Protections Corporation (SIPC).