

Mutual Equity Fund Portfolios: Risk Reduction Through Global Diversification

Binoy Alvares, Robert J. Boldin¹

Abstract

Investing in equity mutual funds enable investors to pool their money and place it under professional management. The portfolio manager selects the fund's equity securities, realizing a gain or loss and collects the dividend. This research deals exclusively with equity funds on a global basis. It examines diversification from a U.S. investor's view point whereby an investor holds a portfolio of U.S. equity funds along with other country equity funds. It was found that by diversifying through the addition of equity funds from other worldwide markets such as Asia- Pacific, South America and emerging markets, overall investment risk is substantially decreased. The mutual fund industry is divided into two sectors, namely short-term and long-term funds. Short-term funds include taxable money market mutual funds and tax-exempt money market mutual funds. Bond funds, equity funds and hybrid funds make up long-term mutual funds. Equity funds are basically comprised of common and preferred stock securities. Mutual funds provide opportunities for investors to diversify, thereby reducing risk. Ideally, investors seek a higher return on their investment but at lower risk.

Key Words

Mutual Equity Funds, Portfolio Analysis, Sharpe and Treynor Ratio

1 Introduction

Diversification is important when investing in an equity mutual fund for the individual mutual fund equity portfolio. It is the process of adding securities for the purpose of reducing security risk and in turn reducing total portfolio risk. It is the combining of selected securities that average out each other's risk because their changes in returns are not strongly positively correlated. The overall objective is to attain a level of portfolio risk that is less than the weighted average of the individual securities. The reduction in portfolio risk as a result of diversification is known as the diversification effect. Diversification allows investors with usually limited resources to benefit to a degree that is not possible by simply purchasing individual stocks. Mutual equity funds offer this advantage as each share represents proportionate ownership in the portfolio. Simply put, investors who seek diversification represented by the S&P 500 Index easily can do so. The S&P 500 Index along with the Vanguard Index are two of the most widely used benchmark indices in the industry. But, to attain higher returns for the same level or lower risk one may consider investing in several equity mutual funds from different parts of the world.

Thus, the purpose of this research is to examine the impact of the risk/reward ratio by moving from domestic diversification to global or international diversification. The next section provides additional background and literature related to this issue. Section III

¹ Binoy Alvares, Robert J. Boldin, Department of Finance and Legal Studies, Eberly College of Business and Information Technology, Indiana University of Pennsylvania, Indiana, PA 15705, Contact Person: rboldin@iup.edu ; Telephone: (724)-357-2465

describes the Data and Methodology. Section IV presents the Analysis and Results. The last Section concludes the paper.

2 Background and Literature Review

A central question related to this research is how many mutual funds are required for a diversified portfolio. Most investors are under the assumption that portfolios containing a large number of securities are well diversified. O'Neal, (2000), found that the dispersion in terminal- wealth variability could be reduced by holding multiple mutual funds. At a certain point, however the marginal risk associated with the addition of one more fund gradually decreases. He found that a portfolio of six funds is sufficiently large to provide end-period risk reduction. These results were confirmed in the same year by Sanders, (1996). Thus short-term volatility declines as the number of domestic equity funds held increases. On average, short-term volatility declines significantly for the first four funds, declines further with the next four or five funds and eventually levels off. Interestingly, the greater the number of funds, the lower the probability of achieving maximum wealth; by holding more funds, the probability of achieving minimum acceptable terminal wealth decreased. Relative to large cap funds, small cap funds benefit more from holding more securities as they have a wider range of performance.

Diversifying internationally extends the boundaries of domestic equity mutual funds. For example, Solnik (1994) determined that portfolios of both international and domestic stocks reduce average portfolio risk by as much as 30 percent more than the domestic portfolios alone. Domestic portfolios with more than forty to fifty stocks provide little additional risk reduction. By adding international stocks to domestic portfolios, risk can be reduced much more rapidly than by adding just domestic stocks. Portfolios with only forty stocks spread among major domestic and international markets reduce risk of domestic portfolios by more than 50 percent. The same results apply to actual and simulated portfolios over various time periods, including the area of various exchange rates. Solnik concluded that in all cases, international diversification provided a better and quicker reduction in risk, even for a portfolio with a limited number of securities.

In her research, Paluch, (1995), found that identifying distinct mutual fund investment opportunities is becoming more difficult. She found higher correlations between worldwide markets. She surmised that this may be due to the fact that there is growing similarity between the domestic and international stock markets and/or by individual fund portfolio holdings becoming more diffused. If such is the case, diversification may not provide the expected benefits. Higher return correlations were found between bond portfolios of different quality, between growth and pacific stock funds, between asset allocation and international stock funds, and between specialty precious metals and growth funds. Adding precious metal funds provided the best approach for diversifying portfolio risk. In contrast, Solnik, (2000), found that while the correlation of returns varies between these markets over time, there was still room for successful risk diversification. The European markets were found to be more correlated with the domestic markets than Asian markets while the emerging markets were found to be least correlated to the rest of the world. International stocks and bonds were analyzed and their correlations were found to fluctuate widely over time. In times of crisis, volatility is contagious across global markets and international correlation of returns increases when volatility is high, which is not helpful for international investors. Over the last four decades or so, the correlation of returns of individual international stock markets with domestic markets increased only by a small amount. Moreover, the correlation of the international bond market had not increased at all over the last decade. He also found that bond and stock markets are not synchronized, which is positive for investors. Therefore one

may conclude that overall, the benefits of risk reduction are still present. A passive global diversification strategy of 80/20 domestic/international stock seems reasonable, especially if large weights to single countries are avoided and emerging markets are included. This research extends the diversification issue by examining four asset allocation portfolios. These include equity funds from the United States, Europe, the Asia-Pacific region and emerging markets. For over forty years, the benefits of international diversification have been recognized. Investing in international indices reduces the volatility of domestic portfolios (U.S.) because of the smaller correlation between international and domestic indices. As noted by Paluch (1996) nearly 25 percent of domestic equity funds with assets of \$1 billion or more have at least 10 percent of assets invested overseas. Based on this information, large family funds have spent huge sums to establish expertise and operations overseas.

One of the many benefits of international investing is that investors can mimic international indices by holding only domestically traded securities. This means that it is not necessary to invest in securities that only trade overseas. Homemade portfolios include securities with claims on international assets that trade domestically, such as country closed-end funds, multinational corporation stocks and mutual funds. Analyses by Bernstein (1995), Siegel (1998) and Gibson (1990) indicate that (1) investors can hold domestically traded securities to mimic those trading overseas; (2) the benefits of international diversification can be largely exhausted by investing only in domestically traded securities; and, (3) homemade portfolios correct for the low correlation of domestic indices with internationally traded securities. Hence, there is no need to take on the additional risks of direct international investing to gain the benefits of international investing.

Despite the fact that domestic stock funds are performing better now, the arguments for international investing cannot be ignored. First, domestic markets are only 50 percent of world stock market capitalization, so opportunities for favorable returns and reduced portfolio risks should not be restricted. There are many international economies that are growing more rapidly than the United States and there are also opportunities from gains in currency exchange rates. Although the correlations between markets change over time, there are still sizeable opportunities for diversifying risk. This holds true for both stocks and bonds. While international markets tend to move together when worldwide events take place, over time they provide sufficient opportunities for risk diversification. Rekenhaller, (1995), observed that the returns of domestic mutual funds with international holdings show more consistency than funds with only domestic holdings.

Solnik, (2000), studied the performance of domestic versus international stock portfolios and he determined that the risk/return profiles of global portfolios greatly dominate domestic portfolios. For example, international stock portfolios with the same risk level as domestic stock portfolios would earn nearly three percentage points more in average annual returns. He also examined the volatility of the 80/20 domestic/international stock portfolio mix for the years 1971-1977. Consistent with the 80/20 domestic/international stock minimum risk portfolio, the global stock portfolio has always been less risky than a domestic (only) stock portfolio. Despite temporary increases in domestic/international market correlations during world crises, international diversification has added value at all times. International stock funds now provide more diversification than during the late 1970's and the early 1980's. Over the past twenty years, the proportion of variance of returns that each type of stock explains, the R-square has ranged from 53 to 80. But the 80/20 domestic international stock allocation has not added risk-adjusted value relative to a purely domestic portfolio. The 80/20 domestic international stock portfolio allocation may require years to pay off. It is not difficult to find appropriate geographically diversified international mutual fund portfolios. Kelley (1995), showed that the average diversified international fund has 40 percent of its assets in Europe,

20 percent in Japan and 20 percent in emerging markets. There are also good opportunities that exist for investors seeking funds in particular countries.

It should be noted that domestic/international stock allocations do not protect portfolios from short-term downturns. International markets are not significantly riskier than domestic markets. For example, the average five-year and ten-year standard deviations of returns of European equity funds are about the same as domestic large-cap growth funds. Diversification benefits during 1980-90 were studied by Solnik, (2000), for domestic/international stock and bond portfolios. Global stock/bond portfolios were found to be more efficient than domestic (only) stock/bond portfolios giving twice the return for the same amount of risk. In addition, global stock/bond portfolios were found to be more efficient than global bond (only) or global stock (only) portfolios. International securities make a strong contribution to portfolio efficiency, both as international stock and as international bond additions. Country allocations play a much larger role than investment style in international fund performance. The high/risk return relationship for domestic funds does not generally hold overseas. In fact, there are lower returns overseas. International small-cap equity funds, however, are more effective than domestic large-cap funds as far as risk reduction is concerned.

Other factors for investors to consider in order to reduce the volatility of international investing would be to limit fund investments in volatile emerging markets. They should also focus on large-cap funds, those that rarely or never hedge exchange risk (currency risk) to reduce volatility, and those with below-average expense ratios. International equity funds expense ratio is 1.70% whereas domestic equity funds 1.40%.

When investing in international markets, currency movements can have a significant impact on returns. Sometimes, portfolios are left unhedged. If such is the case and the dollar appreciates relative to other countries, returns will be lower and vice-versa if the dollar depreciates. Unhedged funds tend to benefit from a stable or a depreciating dollar. Therefore, hedging does not always guarantee safety. If asset returns are taken into consideration, fully hedged portfolios stand to lose more than unhedged ones. Portfolio managers may try to time exchange rates as a hedge but they are difficult to forecast.

Currency risks do not necessarily affect all international portfolios to the same degree. Falling interest rates may cause a particular currency to depreciate and fund prices to increase. Gains in fund prices are usually larger than the losses due to declining exchange rates. Dollar returns from holdings in international markets increase or decrease depending on movements of the international currency relative to the dollar. Currency risk is inherent in international exchange transactions and is caused by currency fluctuations such as when converting euros to U.S. dollars when the dollar has appreciated relative to the euro. In this case, U.S. investors investing internationally would benefit from a weak dollar exchange rate. Therefore, investors have a choice in either investing in funds that never hedge, or investing in funds that always hedge. In either case, the returns are about the same in the long run but the hedging case is more volatile. Perhaps, another alternative could be investing equal amounts in otherwise hedged and unhedged funds to stabilize risk and return over time.

3 Data and Methodology

Data used in this study are taken from Morningstar (<http://www.morningstar.com/>) and from Yahoo Finance (<http://finance.yahoo.com/>). Morningstar provided lists of mutual funds from four different markets. These markets are the United States market, the European market, the Asia-Pacific Market and the emerging markets (Refer to Tables A, B, C and D in the Appendix for the complete data set listing related to each market segment). A total of 10 mutual funds from each market were selected and a series of tests were conducted. The parameters for selection were (1) only no-load funds were used, (2) these funds had a

Morningstar rating of three stars or better, (3) mean annual returns over a five year period were used to ensure consistency and completeness, and (4) large and small-cap funds were selected.

Values for beta, 5-year average annual return, r-squared, standard deviation, Sharpe ratio, Treynor ratio, Jensen's Alpha and the adjusted Jensen's Alpha were calculated. The Sharpe ratio measures risk-adjusted performance and it is calculated by subtracting the risk-free rate from the rate of return of the portfolio and dividing the result by the standard deviation of the portfolio returns. This ratio serves as a litmus test to determine if the return of a portfolio is due to good decision making or if it is due to high risk. The higher the value of the Sharpe ratio for the portfolio, the better its risk adjusted performance. The Treynor ratio measures the returns earned in excess of that which could have been earned in a riskless environment (i.e., Treasury bill) (per each unit of market risk assumed). The Jensen's Alpha is a risk-adjusted performance that measures the average return on a portfolio over and above that which is predicted by the Capital Asset Pricing Model, given the portfolio's beta value and its average market return. Its basic function is to evaluate the performance of the investment manager by looking not only the overall return of the portfolio but the risk as well.

An adjusted Jensen's Alpha is needed to compare alphas among different assets so that alternative mutual fund investments can be ranked. To make a comparison among portfolios, the Jensen's Alpha is divided by the beta in order to adjust the alpha for differences in systematic risks among portfolios.

4 Analysis and Results

An analysis was conducted by developing correlation matrices for all four markets. Their returns, their Sharpe ratios and their Treynor ratios were computed to determine if they are all moving in the same direction. Table 1 shows how "return" is correlated among the four market segments.

Table 1 - Correlation Matrix for Return

	United States	Emerging Markets	Europe	Asia-Pacific
United States	1			
Emerging Markets	-0.076162	1		
Europe	-0.054486	0.0331268	1	
Asia-Pacific	0.1046386	0.288407	-0.4040	1

As noted, over a five year period the US market was positively correlated to the Asia-Pacific market (0.104) but negatively correlated with the emerging market (-0.7616) and with the European market (-0.05449). These are the causes of the performance differences between these asset classes. These data reveal that the US market is negatively correlated with the European and the emerging markets but is positively correlated with the Asia-Pacific market. From the U.S. investor's standpoint, this negative correlation is desirable. If the returns of the European market falls by 0.05449 (which is the correlation co-efficient between these two markets as noted in Table 1, the returns in the United States would increase by the same amount thereby minimizing overall risk. The same is true if US investors invest in the

emerging markets (where the correlation co-efficient is -0.07616). If US investors invest in the Asia-Pacific market, however, a positive correlation between these two markets signifies movements in similar directions by 0.104639. If returns in either market are increasing (positive correlation), the returns in the corresponding market would also increase which is desirable. If returns in Asia-Pacific decline; U.S. investors investing there would be hurt as U.S. funds would also decrease by that same amount. This negative correlation is desirable and U.S. investors should concentrate on the European and emerging markets more so than the Asia-Pacific Market.

Table 2 shows how the Sharpe Ratio is correlated among the four market segments.

Table 6 - Sharpe Ratio Correlation Matrix

	United States	Emerging Markets	Europe	Asia-Pacific
United States	1			
Emerging Markets	-0.112	1		
Europe	-0.472	0.107157	1	
Asia-Pacific	-0.023	0.288227	0.3078	1

As shown in Table 2, the US market is negatively correlated with the other three markets which is a good sign. (-0.112, -0.472 and -0.023).

Table 3 shows how the Treynor Ratio is correlated among the four market segments.

Table 3 - Treynor Ratio Correlation Matrix

	United States	Emerging Markets	Europe	Asia-Pacific
United States	1			
Emerging Markets	0.058694	1		
Europe	-0.09951	-0.16697	1	
Asia-Pacific	0.245979	0.497324	-0.0897	1

The Treynor ratio correlation matrix shown in Table 3 on the other hand shows that the US market is only negatively correlated with the European market but positively correlated with the emerging markets and the Asia-Pacific market. This presents potential drawbacks for investors in the US who seek investments in these two markets. Therefore, based on this study, it would be advisable for US investors to invest most of their securities in the European Market as they are least likely to be hurt there.

Despite the fact that there exists some positive correlation among the US market, Asia-Pacific and the emerging markets, by investing and diversifying their investments in these markets, US investors are still able to reduce their overall risk. This is shown in Table 4

whereby the overall risk is calculated. Through diversification and by adding more investments to their portfolio, the overall loss that investors incur decreases from 8.58% (if they hold two portfolios) to 7.98% (if they hold 3 portfolios) to 6.67% (if they hold all four portfolios). Clearly the analysis indicates that diversification reduces risk and for this reason, it is highly recommended.

Table 4 - Calculation of Overall Risk

1. Consider a portfolio of U.S. and European Funds. The overall risk can be calculated as follows:-

$$\sigma(p) = [(W1)^2(\sigma1)^2 + (W2)^2(\sigma2)^2 + 2W1W2\sigma1\sigma2P12]^{1/2}$$

where:- W1 = 0.5, W2 = 0.5, $\sigma1 = 0.0877$, $\sigma2 = 0.10469$, P12 = 0.58879

$$\sigma(p) = [(0.5)^2(0.0877)^2 + (0.5)^2(0.10469)^2 + 2(0.5)(0.5)(0.0877)(0.10469)(0.58879)]^{1/2}$$

$$\sigma(p) = (0.001922 + 0.002739 + 0.0027029)^{1/2} = (0.007369)^{1/2} = 0.0858 \text{ or } \mathbf{8.58\%}$$

2. Consider a portfolio with U.S., European and Asia-Pacific Funds.

The overall risk of this portfolio is calculated as follows:-

$$\sigma(p) = [(W1)^2(\sigma1)^2 + (W2)^2(\sigma2)^2 + (W3)^2(\sigma3)^2 + 2(W1)(W2)(\sigma1)(\sigma2)(P12) + 2(W2)(W3)(\sigma2)(\sigma3)(P23) + 2(W3)(W1)(\sigma3)(\sigma1)(P31)]^{1/2}$$

where:- W1 = 0.33, $\sigma1 = 0.0877$, P12 = 0.58879, W2 = 0.33, $\sigma2 = 0.10469$, P23 = -0.15266, W3 = 0.33, $\sigma3 = 0.214126$, P31 = -0.268

$$\sigma(p) = [(0.33)^2(0.0877)^2 + (0.33)^2(0.10469)^2 + (0.33)^2(0.214126)^2 + 2(0.33)(0.33)(0.0877)(0.10469)(0.58879) + 2(0.33)(0.33)(0.10469)(0.214126)(-0.15266) + 2(0.33)(0.33)(0.214126)(0.0877)(-0.268)]^{1/2}$$

$$\sigma(p) = (0.007024 + 0.001177 - 0.0007453 - 0.00108)^{1/2} = (0.006357)^{1/2} = 0.07984 \text{ or } \mathbf{7.984\%}$$

3. Consider a portfolio of U.S., European, Asia-Pacific and Diversified Emerging Market Funds.

The overall risk of this portfolio is as calculated as follows:-

$$\sigma(p) = [(W1)^2(\sigma1)^2 + (W2)^2(\sigma2)^2 + (W3)^2(\sigma3)^2 + (W4)^2(\sigma4)^2 + 2(W1)(W2)(\sigma1)(\sigma2)(P12) + 2(W2)(W3)(\sigma2)(\sigma3)(P23) + 2(W3)(W4)(\sigma3)(\sigma4)(P34) + 2(W4)(W1)(\sigma4)(\sigma1)(P41)]^{1/2}$$

where:- W1 = 0.25, $\sigma1 = 0.0877$, P12 = 0.58879, W2 = 0.25, $\sigma2 = 0.10469$, P23 = -0.15266, W3 = 0.25, $\sigma3 = 0.214126$, P34 = -0.18054, W4 = 0.25, $\sigma4 = 0.045412$, P41 = 0.536149

$$\sigma(p) = [(0.25)^2(0.0877)^2 + (0.25)^2(0.10469)^2 + (0.25)^2(0.214126)^2 + (0.25)^2(0.045412)^2 + 2(0.25)(0.25)(0.0877)(0.10469)(0.58879) + 2(0.25)(0.25)(0.10469)(0.214126)(-0.15266) + 2(0.25)(0.25)(0.214126)(0.045412)(-0.18054) + 2(0.25)(0.25)(0.045412)(0.0877)(0.536149)]^{1/2}$$

$$\sigma(p) = (0.004160 - 0.0004277 + 0.000675 - 0.0002194 + 0.0002669)^{1/2} = (0.004455)^{1/2} = 0.0667 \text{ or } \mathbf{.67\%}$$

Hence, it is clearly seen that as more stocks are included in the portfolio, the overall risk reduces, i.e:- 8.58% → 7.98% → 6.67%

Jensen's Alpha is also calculated for each portfolio as shown in Table 5. The Adjusted Jensen's Alpha was calculated as well.

Table 5 - Calculation of Jensen's Alpha

Jensen's Alpha for the portfolio= $J_p = R_p - [R_f + (R_m - R_f) B_p]$	
<p>J_p = Jensen's Alpha R_p = the Return of the portfolio R_f = The Risk Free Rate of Return (U.S. Treasury Securities) R_m = Market Return B_p = Beta of the portfolio</p>	
Jensen's Alpha for the US Market	
$R_p = 7.432$, $R_f = 4.840$, $R_m = 5.97$ and $B_p = 0.886$	
$J_p = 7.432 - [4.840 + (5.97 - 4.840)0.886] = 1.59$	
Adjusted Jensen's Alpha for the portfolio = J_p/B_p , where:-	$J_p = 1.59$, $B_p = 0.886$
$Adj. J_p = 1.59 / 0.886 = 1.79$	
Jensen's Alpha for the European Market	
$R_p = 7.644$, $R_f = 4.840$, $R_m = 14.01$ and $B_p = 1.084$	
$J_p = 7.644 - [4.840 + (14.01 - 4.840)1.084] = -7.136$	
Adjusted Jensen's Alpha for the portfolio = J_p/B_p , where:-	$J_p = -7.136$, $B_p = 1.084$
$Adj. J_p = -7.136 / 1.084 = -6.58$	
Jensen's Alpha for the Asia-Pacific Market	
$R_p = 19.766$, $R_f = 4.840$, $R_m = 12.14$ and $B_p = 0.875$	
$J_p = 19.766 - [4.840 + (12.14 - 4.840)0.875] = 8.5385$	
Adjusted Jensen's Alpha for the portfolio = J_p/B_p , where:-	$J_p = 8.5385$, $B_p = 0.875$
$Adj. J_p = 8.5385 / 0.875 = 9.758$	
Jensen's Alpha for Emerging Markets	
$R_p = 24.086$, $R_f = 4.840$, $R_m = 22.97$ and $B_p = 1.078$	
$J_p = 24.086 - [4.840 + (22.97 - 4.840)1.078] = 0.9169$	
Adjusted Jensen's Alpha for the portfolio = J_p/B_p , where:-	$J_p = 0.9169$, $B_p = 1.078$
$Adj. J_p = 0.9169 / 1.078 = 0.850$	

A positive value of the Jensen's Alpha indicates that the portfolio is generating an excess return (more than what is normal for its level of risk). A negative value would imply that the portfolio is not generating sufficient return (that which is proper for its level of risk). It basically means that the portfolio is underperforming. US, Emerging Markets and the Asia-Pacific all are showing good returns and are performing well. Of these, the Asia-Pacific funds are performing the best, (Jensen's Alpha of 8.5385). The US is second best recording a value of 1.59 and the emerging markets are slightly behind with a value of 0.9169. The European Markets, however, are underperforming as noted by this Jensen's Alpha value of -7.136. This could be due to multiple factors such as higher market risk, inflation and poor management of funds. While Jensen's Alpha is one measure of a portfolio manager's performance, one should be reminded that market risk tends to rise and fall over time, inflation is periodic, and more efficient and experienced portfolio managers can always be appointed so there is no real need for investors to panic.

Adjusted values of Jensen's Alpha are also listed in the analysis for each portfolio. These explain how the alphas of alternative mutual fund investments are ranked. Again, it is the Asia-Pacific market that ranks first with an adjusted Jensen's Alpha value of 9.758 while those of the US, European and Emerging Markets recorded values of 1.79, -6.58 and 0.850, respectively.

5 Conclusion

Equity mutual fund portfolios of four different markets were analyzed in order to determine how diversification minimizes risk. This study showed that the correlation matrices of all four portfolios, with regard to return, suggest that the U.S. portfolio is negatively correlated with the international portfolio (those of Europe and the Emerging Markets) thereby making it possible for U.S. investors to diversify internationally. With increased diversification, the overall portfolio loss was found to decrease. Thus, it is possible to create portfolios that will improve overall performance.

Jensen's Alpha calculated for each portfolio also demonstrated how funds in each portfolio were faring. Results of the analysis infer that the European funds were underperforming whereas the other markets were doing very well, especially the Asia-Pacific market. The correlation of the European market, however, was in favor with that of the U.S. market in that the two were negatively correlated whereas the Asia-Pacific market was not. Many different factors influence investors and different markets behave differently. Therefore, it is best to include funds from as many markets as possible so that any negative forces present will be cancelled out and the overall effect will be a higher return at low risk.

The contribution that this study makes to decision making and portfolio management is quite useful. It could serve as a guide to investors by helping them choose the best possible match of risk and return. Although diversification is important, it is by no means easy to find the perfect match of risk and return. Therefore, domestic equity mutual funds combined with equity funds from international markets is a better investment policy than using only domestic funds for investment. Proper selection of funds should lower volatility and consequently increase investor returns.

References

- [1] BERNSTEIN, WILLIAM, J.: *The Intelligent Asset Allocator*, 1995. Siegel, Jeremy, J.: *Stocks for the Long Run*, 2nd edition, 1998 and Gibson, Roger, C.: *Asset Allocations: Balancing Financial Risk*, 1990.

- [2] HASLEM, JOHN, A.: *Mutual Funds – Risk Performance Analysis for Decision Making* (Blackwell Publishing Ltd) 2003.
- [3] KELLEY, JEFF.: “*International Funds– Down, But Not Out*”, Morningstar Investor, December 1995.
- [4] Morningstar, <http://www.morningstar.com/>
- [5] O’NEAL, EDWARD S.: *Industry Momentum and Sector Mutual funds*, Financial Analyst Journal, July/ August, 2000.
- [6] PALUCH, SUSAN.: *Convertible Bond Funds*, Morningstar Investor, May 1995.
- [7] REKENTHALER, JOHN.: “*With International Stock Funds, Let the Winners Ride,*” Morningstar Investor, June 1995.
- [8] SANDERS, CATHERINE V.: “*Yield Doesn’t Beget Yield,*” Morningstar Investor, April 1996.
- [9] SOLNIK, BRUNO.: *International Market Correlation and Volatility*, Financial Analysts Journal, September/October, 1994.
- [10] SOLNIK, BRUNO.: *International Investments*, 4th edition (Addison Wesley Longman, Reading, MA), 2000.
- [11] Yahoo Finance, <http://finance.yahoo.com/>

Summary

Investing in equity mutual funds enable investors to pool their money and place it under professional management. The portfolio manager selects the fund’s equity securities, realizing a gain or loss and collects the dividend. This research deals exclusively with equity funds on a global basis. It examines diversification from a U.S. investor’s view point whereby an investor holds a portfolio of U.S. equity funds along with other country equity funds. It was found that by diversifying through the addition of equity funds from other worldwide markets such as Asia- Pacific, South America and emerging markets, overall investment risk is substantially decreased. The mutual fund industry is divided into two sectors, namely short-term and long-term funds. Short-term funds include taxable money market mutual funds and tax-exempt money market mutual funds. Bond funds, equity funds and hybrid funds make up long-term mutual funds. Equity funds are basically comprised of common and preferred stock securities. Mutual funds provide opportunities for investors to diversify, thereby reducing risk. Ideally, investors seek a higher return on their investment but at lower risk

Appendix

Table A - Selected US Equity Mutual Funds

Name of Fund	Symbol	Beta (v/s standard index)	Mean Annual Return (5 years)	R-Squared (v/s standard index)	Std. Dev	Sharpe Ratio	Treynor Ratio
ABN AMRO Large Cap Stock	ATLVX	0.87	6.33	92	12.73	0.38	2.72
American Beacon Large Cap Value	AAGPX	0.94	9.9	89	13.82	0.6	6.35
Amana Trust Income	AMANX	0.74	9.14	65	12.86	0.58	6.96
American Century Capital	ACTIX	0.88	7.48	92	12.83	0.46	3.99
American Funds Wash. Mutual	AWSHX	0.82	5.6	91	12.03	0.33	1.98
Dodge and Cox	DODGX	0.89	11.97	87	13.38	75	8.98
Franklin Equity Income	FISEX	0.85	5.15	87	12.72	0.29	1.39
Goldman Sachs Struct. Large Cap	GCVAX	0.87	7.81	91	12.83	0.48	4.41
Merrill Lynch	MDBAX	1.08	5.92	94	15.53	0.31	1.82
Wells Fargo Adv. U.S.	WFUAX	0.92	5.02	94	13.28	0.27	1.14
Mean Values		↓ 0.886	↓ 7.432	↓ 88.2	↓ 13.201	↓ 7.87	↓ 3.974

Table C – Asia- Pacific Equity Mutual Funds

Name of Fund	Symbol	Beta (against standard index)	Mean Annual Return (5 years)	R- Squared (against standard index)	Std. Dev	Sharpe Ratio	Treynor Ratio
AIM Asia Pacific Growth	ASIAX	0.83	16.92	63	15.48	0.95	8.75
Commonwealth Australia/New Zealand	CNZLX	0.54	20.29	37	12.94	1.33	19.93
Guinness Atkinson Asia	IASMX	0.95	20.98	49	20.25	0.94	11.92
Matthews Asian Growth and Income	MACSX	0.48	20.65	51	9.81	1.75	23.19
Matthews Korea	MAKOX	1.11	36.84	41	25.9	1.27	24.44
Matthews Pacific	MAPTX	1.05	21.34	66	19.08	1	11.15
Thomas Rowe Price New- Asia Fund	PRASX	1.02	18.14	61	19.38	0.85	8.34
Fidelity South East Asia	FSEAX	1.04	18.09	58	20.38	0.82	8.1
Morgan Stanley Pacific Growth	TGRAX	0.9	11.9	69	16.15	0.64	2.5
Excelsior Pacific/ Asia	USPAX	0.83	12.51	60	15.9	0.69	3.46
Mean Values		↓ 0.875	↓ 19.766	↓ 55.5	↓ 17.527	↓ 1.024	↓ 12.178

