



Investing with a Conscience: An Evaluation of the Risk-Adjusted Performance of Socially Responsible Mutual Funds

Ed Edwards, *Western Michigan University*
Ajay Samant, *Western Michigan University*

Abstract

This study evaluates risk-adjusted performance of socially responsible mutual funds during the period 1991-2000, using objective statistical measures grounded in modern portfolio theory. A socially responsible mutual fund is defined as one which employs "social screens" in stock selection, such as whether a firm manufactures tobacco products, whether it is in the gambling business, whether it heeds environmental safety, its human rights records, etc. The main objective of this study is to provide empirical documentation on the risk-adjusted returns of these mutual funds, for the benefit of investors. To our knowledge, this is one of the first, if not the first, academic study to utilize a relatively new risk-adjusted performance measure, posited by Nobel Laureate Franco Modigliani and Leah Modigliani in 1997 (hereafter referred to as M Squared), to evaluate socially responsible mutual funds. The idea that underlies their methodology is to adjust the investment risk of a mutual fund to the level of risk in an unmanaged benchmark stock-market index and then measure the returns on the risk-matched fund. The M Squared measure not only relates the level of risk to the level of reward, but also enables risk-adjusted returns to be reported on a percentage basis, rather than on an absolute basis, which makes them more easily understood by the average investor. The results of this study can be used in decision making by investors who seek objective criteria to select a socially responsible mutual fund from among a menu of several funds with attractive returns and widely different levels of risk.

Introduction

Given the penchant of educated investors to seek out diversification in their asset portfolios, and considering the leaning of many such investors towards the ethical side of investing (i.e., reluctance to invest in certain "sinful" stocks) over the past few decades, it is no surprise that more so-called socially responsible mutual funds are finding their way into the marketplace. Whereas, in the 1980s and before, most of the attention was directed at

...this study can be used in decision making by investors who seek objective criteria to select a socially responsible mutual fund...

efforts towards South Africa free investing, today we find that socially responsible mutual funds try to screen out firms that manufacture alcohol or tobacco products, or are in the business of gambling or weapons production, and also examine a firm's record regarding animal testing, environmental damage, human rights violations, labor relations, gender equality, community investment and community relations. Table 1 reports the various screens used in some of the larger socially responsible mutual funds at the end of 2000¹. The number of these mutual funds based in the United States has grown from thirteen in 1991 to sixty-seven by the end of 2000. The dollar value of investment in such funds has grown from just under \$2.5 billion in 1991 to over \$12 billion in 2000². While it is generally believed that socially responsible mutual funds cannot wield significant power over corporate management, their mere presence has helped to draw the attention of the investing public to the social implications of corporate business practices. Further, while in the past, socially responsible mutual funds were of the smaller variety, in recent years, mutual fund giants such as TIAA-CREF, Vanguard and Morgan-Stanley have entered the field. This event is likely to result in even more scrutiny of the social responsibility of publicly held corporations.

This study evaluates the performance of socially responsible funds that have been in existence for at least ten years (1991-2000), as well as these and other funds that have been in existence for at least five years (1996-2000). The study will utilize standard methods grounded in Modern Portfolio Theory to evaluate the risk-adjusted performance of these funds, including the Sharpe, Treynor and Jensen's Alpha measures. In addition, it will utilize a relatively new risk-adjusted performance measure (M

Squared) first proposed by Leah and Franco Modigliani in 1997, which enables risk-adjusted returns to be reported on a percentage basis, easily understood by the average investor.

To begin, some caveats need to be stated. First, the study compares only the risk-adjusted performance of socially responsible funds with average market performance, and not with the performance of funds which do not utilize social screens³. Second, all studies on the long-term performance of mutual funds are affected by "survivor bias", i.e., only those funds that have survived during the period under study, are included in the data. Third, past results cannot predict future performance. Finally, the results of this study are not intended to, and should not, be construed as investment advice.

Review of the Literature

Evaluation of the performance of investment portfolios was pioneered by Treynor (1965), Sharpe (1966) and Jensen (1968). The statistical techniques developed by them are the most commonly used portfolio performance measures even now. Treynor (1965) suggested a method of evaluating the performance of a portfolio by adjusting the mean excess return (i.e. mean return less the risk-free interest rate in the economy) for the degree of market (systematic) risk and thus calculating the performance of the portfolio. Systematic risk could be estimated by regressing the mutual fund's returns on the returns to a market benchmark index. Sharpe (1966) computed mean excess return and adjusted for the degree of total risk involved in the portfolio. Total risk was estimated by the standard deviation of returns. Jensen (1968, 1969) devised a method of determining whether the deviation of portfolio returns from market returns (denoted by Alpha) was statistically significant, thereby determining whether the excess return could be attributed to superior management or purely to chance.

The techniques used in these three pioneering studies were further refined by Kon and Jen (1979), Henriksson and Merton (1981) and Chang and Lewellen (1984). Kon and Jen (1979) developed a methodology to evaluate timing, selectivity and market efficiency of mutual funds. Henriksson and Merton (1981) developed statistical procedures to evaluate forecasting skills of managers. The study by Chang and Lewellen (1984) focussed on the issue of market timing and the investment performance of mutual funds.

In 1997, Nobel Laureate Franco Modigliani and Leah Modigliani, his granddaughter, pioneered work in the area of financial reward and risk. They proposed a new risk-adjusted performance measure (hereafter referred to as M Squared) which is intuitively quite appealing to investors. The idea that underlies their methodology is to adjust the returns of a mutual fund to the level of risk in an unmanaged stock market index and then measure the returns

on the risk-matched fund. This method has two distinct advantages over earlier techniques. First, it reports the risk-adjusted performance of a mutual fund as a percentage, which is easily understood by a lay investor. Second, the method permits investors to calculate the degree of leverage that is needed to attain the highest return possible for a given level of risk. On the one hand, aggressive investors can use this information to raise their expected returns by leveraging their portfolio (borrowing money and investing in the right mutual fund). On the other hand, risk-averse investors can use this information to reduce their expected risk by unleveraging their portfolio (selling off part of their holding in a mutual fund, and investing the proceeds in a risk-free security, such as a Treasury bill).

...the study compares only the risk-adjusted performance of socially responsible funds with average market performance...

Statman (2000) evaluates the performance of socially responsible mutual funds by comparing the returns on each fund with market returns, and with the returns on a social investments index. However, in his study, the time period used for comparison purposes is different for each fund. The results of his study, therefore, cannot be used for determining the risk-adjusted performance of socially responsible funds in specified time frames, such as the medium run (the past 5 years) or the long run (the past ten years).

Practitioner literature (for example, Morningstar 2000) often contains reports on the mean returns to mutual funds, including those which are socially responsible. However, the only measure of risk that is usually reported is the standard deviation of fund returns. Risk-adjusted returns are almost never reported and the reader is given very little guidance as to what criteria to employ while choosing a mutual fund from among a menu of several funds with attractive returns and a widely different risk.

The objective of this study is to bridge the gap between practitioner oriented literature and academic literature on the subject of evaluating the risk-adjusted returns on socially responsible mutual funds. While the former is not well-grounded in terms of investment management theory, the latter is often unintelligible to the average investor, as it uses technical jargon and abstract mathematical principles. The contribution of this study is that it rigorously evaluates the performance of socially responsible mutual funds using performance measures that are easily understood by the average investor, such as simple percentages, which report the risk-adjusted returns that accrued to these mutual funds. As mentioned, the study makes extensive use of the M Squared measure and is the first study to ap-

Table 1
Screens Used by Socially Responsible Mutual Funds

Mutual Fund Name (Ticker Symbol)	Alc	Tob	Gam	Wea	Ani	Pro	Env	Hum	Lab	Emp	Col	CoR
1. Bridgeway Aggressive Growth		•		•								
2. Citizens Emerging Growth Stndrd (WAEGX)	•	•	•	•	•	•	•	•	•	•		•
3. Citizens Global Equity Stndrd (WAGEX)	•	•	•	•	•	•	•	•	•	•		•
4. Bridgeway Social Responsible		•		•								
5. Dreyfus Premier Third Century Z (DRTHX)		•				•	•			•	•	
6. Domini Social Equity	•	•	•	•		•	•	•	•	•		•
7. Parnassus (PARNX)	•	•	•	•		•	•			•	•	•
8. Pro-Conscious Women's Equity	•	•		•	•	•	•			•	•	•
9. Calvert Capital Accumulation A (CCAFX)	•	•		•		•	•	•	•	•	•	•
10. Calvert Social Investment Equity A (CSIEIX)	•	•	•	•	•	•	•	•	•	•	•	•
11. Pax World (PAXWX)	•	•	•	•		•	•	•		•		
12. Ariel (ARGFX)		•		•			•			•		
13. Neuberger Berman Social Fund	•	•	•	•		•	•		•	•	•	•
14. Ariel Appreciation (CAAPX)		•		•			•			•		
15. Smith Barney Concert Soc Aware B (SESIX)		•		•		•	•			•		
16. Americal Mutual (AMRMX)	•	•	•			•						
17. New Alternatives (NALFX)	•	•	•	•	•	•				•	•	
18. Calvert World Values Intl Equity A (CWVGX)	•	•	•	•		•	•	•	•	•	•	•
19. Aquinas Equity Income (AQEIX)		•		•		•	•	•	•	•	•	•
20. MMA Praxis Growth B (MMPGX)	•	•	•	•		•	•			•	•	
21. Aquinas Balanced (AQBLX)		•		•		•	•	•	•	•	•	•
22. Calvert Social Investment Balanced A (CSIFX)	•	•	•	•	•	•	•	•	•	•	•	•
23. Righttime Social Awareness (RTAWX)	•	•	•	•	•	•	•	•	•	•	•	•

Alc=Alcohol, Tob=Tobacco Products, Gam=Gambling, Wea=Weapons Manufacture, Ani=Animal Testing, Pro=Dangerous or offensive products and services, Env=Environmental safety, Hum=Human Rights, Lab=Labor Relations, Emp=Employment equality, Col= Community Investment, CoR=Community Relations.
Source: Social Investment Forum

ply this measure to evaluate the performance of socially responsible mutual funds.

Data

Socially responsible funds are identified using information obtained from the Social Investment Forum. These mutual funds avoid investing in shares of firms which are in the business of manufacturing tobacco products, alcohol, gambling, weapons manufacture, or manufacture of dangerous or unsocial products, as well as their record in the area of environmental safety, human rights, testing on live animals, employment equality, community investment and community relations. Of the sixty-seven mutual funds existing at the end of 2000, twenty-four were listed for at least the past five years. Of these twenty-four funds, data on quarterly returns was available for twenty-three funds. Table 1 gives the details of which specific screens are used by each of these mutual funds. It is interesting to note that the most commonly used screen is tobacco products (all the 23 funds in this study used this screen), followed by weapons manufacture (21 funds), and employment equality (20 funds).

Methodology

This study estimates risk-return profiles for socially responsible mutual funds that have been around for the five year period 1996-2000 and for the ten year period, 1991-2000. Quarterly returns are used for computing measures of return and risk. Thus each statistic reported for the five year period 1996-2000 is based on at least twenty distinct data points, and each statistic reported for the ten year period 1991-2000 is based on at least forty distinct data points.

Mean returns are calculated by averaging the quarterly total returns over the past five and ten years. Arithmetic averages are used and reported in the tables. *Mean excess return* is calculated by subtracting from the mean return the risk-free rate of return. The surrogate used in this study for the risk free rate of return is the average yield on 90 day US treasury bills. This is in accordance with the standard practice in performance evaluation of mutual funds. *Total risk* is measured by the standard deviation of returns. *Systematic (market) risk* is estimated by beta, which is calculated by the coefficient of regression of the fund rate of return on the market rate of return. The benchmark market index used here is the S&P 500 Index.

There are several reasons why this particular benchmark is chosen (1) these funds have different investment styles (value funds, growth funds, blend funds, large cap, mid-cap, etc.) and to use a different benchmark for each fund category may only serve to confuse the issue of comparison of the risk-adjusted performance of the funds with one another, (2) most investors are quite familiar with the S&P 500 Index and use it as a benchmark to evaluate the performance of their investment portfolios, (3) the S&P 500 Index is a viable investment alternative (via indexed mutual funds and exchange traded funds), and (4) use of this index makes it easy to compare the results of the study with results published in practitioner literature.

Table 2
Stock Market and Mutual Fund Benchmarks
Total Returns (Percent)

Year	Quarter	Morningstar Equity Fund Average	S&P 500 Index
2000	4	-7.77	-7.84
	3	0.72	-0.95
	2	-3.56	-2.68
	1	-1.99	2.27
1999	4	19.85	14.54
	3	-3.17	-6.56
	2	9.77	6.72
	1	1.63	4.65
1998	4	17.35	20.87
	3	-13.81	-10.31
	2	-1.51	2.91
	1	11.06	13.53
1997	4	-3.60	2.44
	3	8.34	7.02
	2	13.01	16.91
	1	-0.83	2.21
1996	4	5.93	7.77
	3	3.71	2.49
	2	2.79	3.89
	1	5.83	4.81
1995	4	2.67	5.39
	3	7.37	7.28
	2	7.84	8.80
	1	4.68	9.02
1994	4	-2.63	-0.74
	3	5.87	4.15
	2	-2.10	-0.34
	1	-3.20	-4.43
1993	4	4.19	1.64
	3	5.62	1.86
	2	2.86	-0.25
	1	4.85	3.66
1992	4	3.71	4.29
	3	2.97	2.37
	2	0.87	1.10
	1	-4.26	-3.21
1991	4	7.93	7.54
	3	3.72	4.49
	2	-2.76	-1.08
	1	12.86	13.63

It may be noted that rigorous testing of the relative performance of socially responsible funds (versus other mutual funds) requires the use of a benchmark index which excludes socially responsible funds and includes all other funds with similar investment strategy, but without the socially responsible orientation.⁴ The closest such index that we could obtain is the Morningstar Equity Mutual Fund Average which measures the performance of 8,665 stock mutual funds, the overwhelming majority of which have no explicit socially responsible orientation. Table 2 reports the quarterly total returns of the Morningstar Equity Mutual Fund Average and the S&P 500 Index. The correlation coefficient between the two is 0.92. Given this high correlation, and for the reasons explained in the previous paragraph, this study utilizes the S&P 500 Index rather than the Morningstar Average.

The *Sharpe performance measure* (S_i) is calculated for each fund by dividing the mean excess return by the total risk of the fund, as estimated by its standard deviation of returns.

$$S_i = \frac{R_i - R_f}{\sigma_i}$$

where R_i = mean return on fund i

R_f = mean risk-free rate of return

σ_i = standard deviation of returns for fund i

σ_i is obtained from the Capital Asset Pricing Model

$$R_{it} = \alpha_i + \beta_i R_{mt} + e_{it}$$

where R_{it} = return on the market index during time t

e_{it} = stochastic error term.

The *Treynor performance measure* is calculated by dividing the mean excess return of each fund by its beta.

$$T_i = \frac{R_i - R_f}{\beta_i}$$

$$R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + e_{it}$$

Jensen's alpha is calculated by subtracting the expected return of each fund from its mean return. The expected return for each fund is calculated on the basis of the Capital Asset Pricing Model. Jensen's alphas are then tested for statistical significance.

The *M Squared measure* is computed by multiplying the Sharpe measure by the benchmark standard deviation and then adding the risk-free rate of return.

$$M^2_i = \frac{R_i - R_f}{\sigma_i} \sigma_m + R_f$$

Finally, the *leverage factor* (L_i) is calculated by dividing the market standard deviation by the fund standard deviation.

$$L_i = \frac{\sigma_m}{\sigma_i}$$

A leverage factor greater than one implies that the standard deviation of the fund is less than the standard deviation of the market index, and that the investor should consider leveraging the fund by borrowing money (if possible, at the risk-free rate of interest) and investing in that particular fund. While this would tend to increase the risk of the investment somewhat, there would be a greater than proportional increase in returns. A leverage factor less than one implies that the risk of the fund is greater than the risk of the market index, and that the investor should consider unleveraging the fund by selling off part of the holding in the fund and investing the proceeds in a risk-free security, such as a Treasury bill. In this way, while returns on the investment reduce somewhat, there would be greater than proportional reduction in the risk.

Results of the Study

Five-Year Performance

Data on quarterly returns over the past five years are available for twenty-three funds. The funds are identified in Table 3, along with their risk, return and performance statistics. (Each statistic reported here is based on twenty

observations.) The fund with the highest mean return was Bridgeway Aggressive Growth with an average quarterly return of 9.40 per cent. In comparison, the quarterly mean return of the benchmark S&P 500 Index was 5.28 percent. The fund with the highest risk (measured by standard deviation of returns) was Parnassus with quarterly standard deviation of 16.53 percent. Again, in comparison, the standard deviation of the benchmark S&P 500 Index was 7.41 percent. Further, Table 3 reports the numerical values of the Sharpe measures which are used to rank the funds. The highest Sharpe measure obtained (0.71) was by Pax World. In comparison, the Sharpe measure of the benchmark S&P 500 Index was 0.55.

Table 3 also reports the values of fund Betas, R Square, M Squared measures, Jensen's Alpha, T-Statistic for Alpha, and Treynor measures, all of which are computed using the benchmark S&P 500 Index. The fund with the highest systematic risk (Beta of 1.57) was Parnassus. (In comparison, of course, the Beta of the benchmark S&P 500 Index is, by definition, exactly 1.0). R Square values for the goodness of fit range from a high of 0.99 (Domini Social Equity) to a low of 0.18 (New Alternatives). The fund with the highest Modigliani and Modigliani (M Squared) measure (6.50) was Pax World.

Table 3
5-Year Performance of Socially Responsible Mutual Funds on Quarterly Basis (1996-2000)

Mutual Fund Name (Ticker Symbol)	Quarterly Mean Return (%)	Quarterly Std. Dev (%)	Sharpe Measure	Beta	R Sq	M Sq Measure	Alpha Measure	Alpha T-Stat*	Treynor Measure
1. Bridgeway Aggressive Growth	9.40	14.71	0.55	1.47	0.55	5.35	2.22	1.12	5.55
2. Citizens Emerging Growth Stndrd (WAEGX)	6.66	13.09	0.41	1.09	0.38	4.30	1.02	0.41	4.98
3. Citizens Global Equity Stndrd (WAGEX)	6.41	12.31	0.42	1.14	0.47	4.35	0.55	0.35	4.53
4. Bridgeway Social Responsible	6.26	9.67	0.52	0.92	0.50	5.09	1.31	0.36	5.47
5. Dreyfus Premier Third Century Z (DRTHX)	6.20	8.31	0.60	1.07	0.91	5.66	0.62	0.37	4.63
6. Domini Social Equity	6.05	7.93	0.61	1.08	0.99	5.73	0.43	0.32	4.44
7. Parnassus (PARNX)	5.66	16.53	0.27	1.57	0.50	3.22	-1.95	-0.09	2.81
8. Pro-Conscious Women's Equity	4.61	8.05	0.42	1.01	0.86	4.34	-0.69	-0.27	3.35
9. Calvert Capital Accumulation A (CCAFX)	4.42	9.99	0.32	1.15	0.73	3.60	-1.46	-0.31	2.77
10. Calvert Social Investment Equity A (CSIEX)	4.40	9.44	0.33	1.15	0.81	3.72	-1.48	-0.33	2.76
11. Pax World (PAXWX)	4.31	4.33	0.71	0.53	0.82	6.50	0.94	0.51	5.83
12. Ariel (ARGFX)	4.06	8.61	0.33	0.75	0.42	3.66	-0.22	-0.48	3.75
13. Neuberger Berman Social Fund	4.02	8.24	0.34	0.96	0.75	3.74	-1.08	-0.51	2.91
14. Ariel Appreciation (CAAPX)	3.70	7.48	0.33	0.92	0.83	3.67	-1.27	-0.67	2.66
15. Smith Barney Concert Soc Aware B (SESIX)	3.62	6.03	0.40	0.79	0.94	4.17	-0.81	-0.78	3.02
16. Americal Mutual (AMRMX)	3.22	5.49	0.36	0.60	0.66	3.91	-0.45	-1.00	3.30
17. New Alternatives (NALFX)	3.22	10.35	0.19	0.60	0.18	2.65	-0.45	-0.72	3.29
18. Calvert World Values Intl Equity A (CWVGX)	3.06	7.77	0.23	0.93	0.79	2.97	-1.93	-0.92	1.96
19. Aquinas Equity Income (AQEIX)	2.99	7.41	0.24	0.83	0.69	2.99	-1.59	-0.98	2.12
20. MMA Praxis Growth B (MMPGX)	2.81	7.04	0.22	0.64	0.45	2.89	-1.02	-1.08	2.45
21. Aquinas Balanced (AQBLX)	2.81	4.61	0.34	0.52	0.70	3.76	-0.55	-1.27	3.00
22. Calvert Social Investment Balanced A (CSIFX)	2.73	4.85	0.31	0.57	0.76	3.51	-0.82	-1.29	2.61
23. Righttime Social Awareness (RTAWX)	2.43	6.60	0.18	0.46	0.27	2.57	-0.67	-1.28	2.58
S&P 500 Index	5.28	7.41	0.55	1.00	NA	5.28	0.00	NA	4.04
US 90 Day Treasury Bill Rate	1.24	0.09	0.00	NA	NA	NA	NA	NA	NA

NA: Not applicable

* None of the t statistics is significant at the 5% level

Table 4
5-Year Ranks of Socially Responsible Mutual Funds on Quarterly Basis
(1996-2000)

<i>Mutual Fund Name (Ticker Symbol)</i>	<i>Rank based on Sharpe & MSq Measures</i>	<i>Rank based on Treynor Measure</i>	<i>Rank based on Alpha Measure</i>
Pax World (PAXWX)	1	1	4
Domini Social Equity	2	7	7
Dreyfus Premier Third Century Z (DRTHX)	3	5	5
Bridgeway Aggressive Growth	4	2	1
S&P 500 Index	5	8	8
Bridgeway Social Responsible	6	3	2
Citizens Global Equity Stndrd (WAGEX)	7	6	6
Pro-Conscious Women's Equity	8	10	14
Citizens Emerging Growth Stndrd (WAEGX)	9	4	3
Smith Barney Concert Social Aware B (SESIX)	10	13	15
Americal Mutual (AMRMX)	11	11	10
Neuberger Berman Social Fund	12	14	18
Aquinas Balanced (AQBLX)	13	15	12
Calvert Social Investment Equity A (CSIEX)	14	18	21
Ariel (ARGFX)	15	9	9
Ariel Appreciation (CAAPX)	16	19	19
Calvert Capital Accumulation A (CCAFX)	17	17	20
Calvert Social Investment Balanced A (CSIFX)	18	20	16
Parnassus (PARNX)	19	16	24
Aquinas Equity Income (AQEIX)	20	23	22
Calvert World Values Intl Equity A (CWVGX)	21	24	23
MMA Praxis Growth B (MMPGX)	22	22	17
New Alternatives (NALFX)	23	12	11
Righttime Social Awareness (RTAWX)	24	21	13

In comparison, the benchmark index had an M Squared measure of 5.28. The fund with the highest Alpha measure was Bridgeway Aggressive Growth with Alpha equal to 2.22. The alpha measure of the benchmark S&P 500 Index is, by definition, zero. None of the alpha measures were statistically significant at the 5 percent level. Finally, the fund with the highest Treynor measure (5.83) was again, Pax World. In comparison, the Treynor measure for the benchmark S&P 500 Index was 4.04.

Table 4 reports the ranking of all the funds. The Sharpe rank is based on the Sharpe measure which adjusts mean returns for the total risk involved. The Sharpe rank indicates that only four funds (out of 23) had returns (adjusted for total risk) that exceeded the risk-adjusted returns of the S&P 500 Index. The Pax World fund had the highest Sharpe rank. The ranking on the basis of the M Squared measure is identical to the ranking on the basis of the Sharpe measure. However, the M Squared measure enables us to draw some inferences that cannot be drawn from the Sharpe measure (or, as a matter of fact, from any other measure), and these are detailed in the end of this section.

When market risk (proxied by Beta computed using the benchmark S&P 500 Index) was used for adjusting the mean returns, the results were a little different. Using both

the Treynor measure and Jensen's Alpha, seven out of twenty-three (or, roughly, one third) of the mutual funds had risk-adjusted returns exceeding the benchmark index, which had a rank of eight. The fund with the highest Treynor rank is Pax World, and the fund with the highest Jensen's Alpha rank is Bridgeway Aggressive Growth. Note that for New Alternatives, the rank based on the Sharpe measure (24) is much lower than the rank based on Treynor's measure (12) and the Alpha measure (11). Given that the Treynor and Alpha measures are computed using the value of Beta, and that the value of R Square for this fund (see Table 3) is very low (0.18), the Sharpe rank may be a better indicator of risk-adjusted performance, rather than the Treynor and Alpha ranks.

Table 5 reports the average returns that accrued to the funds, with and without risk-adjustment. The data is annualized for the convenience of investors. The Bridgeway Aggressive Growth

Fund, which ranked first on the basis of mean (unadjusted) returns, fell back to rank four, on the basis of returns adjusted for risk. On the other hand, Pax World, which ranked twelve on an unadjusted basis, ranked first when the returns were adjusted for risk. The leverage factor for this fund is 1.71, which implies that an investor who is comfortable with bearing the same level of risk as in the benchmark S&P 500 index, could leverage the fund (borrow 71 percent of his/her down payment and invest in the fund) and thereby attain an annual level of returns of 28.65 percent (on the assumption that the borrowing took place at the risk-free rate of return). The example below details how this return can be obtained.

Example

Data:

Name of Fund: Pax World

Quarterly Standard Deviation: 4.33 percent

Quarterly Mean Return: 4.31 percent

Quarterly Mean Risk-free Return: 1.24 percent

Quarterly Standard Deviation of the S&P 500 Index:

7.41 percent

Initial Investment \$1000

Leverage Factor 1.71

Table 5
5-Year Annualized Unadjusted and Risk-Adjusted Mean Returns
(1996-2000)

Mutual Fund Name	Annualized Unadjusted Mean Return (%)	Unadjusted Rank	Annualized Risk-adjusted Mean Return (%)	Risk-adjusted Rank
Pax World (PAXWX)	18.39	12	28.65	1
Domini Social Equity	26.49	6	25.11	2
Dreyfus Premier Third Century Z (DRTHX)	27.20	5	24.76	3
Bridgeway Aggressive Growth	43.24	1	23.02	4
S&P 500 Index	22.85	8	22.85	5
Bridgeway Social Responsible	27.49	4	21.98	6
Citizens Global Equity Stndrd (WAGEX)	28.21	3	18.58	7
Pro-Conscious Women's Equity	19.75	9	18.58	8
Citizens Emerging Growth Stndrd (WAEGX)	29.42	2	18.24	9
Smith Barney Concert Social Aware B (SESIX)	15.29	16	17.91	10
Americal Mutual (AMRMX)	13.52	17	16.57	11
Neuberger Berman Social Fund	17.08	14	15.91	12
Aquinas Balanced (AQBLX)	11.72	22	15.91	13
Calvert Social Investment Equity A (CSIEX)	18.80	11	15.58	14
Ariel (ARGFX)	17.26	13	15.58	15
Ariel Appreciation (CAAPX)	15.64	15	15.58	16
Calvert Capital Accumulation A (CCAFX)	18.89	10	15.25	17
Calvert Social Investment Balanced A (CSIFX)	11.38	23	14.92	18
Parnassus (PARNX)	24.64	7	13.61	19
Aquinas Equity Income (AQEIX)	12.51	20	12.63	20
Calvert World Values Intl Equity A (CWVGX)	12.81	19	12.31	21
MMA Praxis Growth B (MMPGX)	11.72	21	11.98	22
New Alternatives (NALFX)	13.52	18	11.02	23
Righttime Social Awareness (RTAWX)	10.08	24	10.70	24

Given the above data, the following procedure may be used to create a portfolio with the same risk as the benchmark S&P 500 Index, but with a higher level of return:

1. Borrow \$710 at the risk-free rate.
2. Invest \$1710 in the Capital World Fund. The quarterly returns will be $\$1710 \times 0.0431 = \73.701
3. Repay Interest of $\$710 \times 0.0124 = \8.80
4. Returns net of interest are $\$73.70 - \$8.80 = \$64.90$ which is a return of 6.49 percent on quarterly basis or 28.65 percent on annual basis.
5. The quarterly risk of the portfolio is $1.71 \times 4.33 = 7.4$ percent which is the same as the quarterly risk in the benchmark S&P 500 Index.

It may be noted that the above example assumes that the covariance between the returns on a risk-free security and the mutual fund is zero. An investor who was comfortable with a higher level of risk could have attained

higher returns by leveraging the fund even further. It is interesting that no matter what level of risk the investor is comfortable with, he/she will be better off leveraging this particular mutual fund, rather than any other fund. Thus, the methodology developed by Modigliani and Modigliani enables the investor to compute the optimal degree of leverage to attain any desired level of return. Finally, it may be noted that the fund which was ranked the lowest on an unadjusted basis, was also ranked the lowest on a risk-adjusted basis.

Ten-Year Performance

Data on quarterly returns over the past ten years are available for ten of these funds. The funds are identified in Table 6, along with their risk, return and performance statistics. (Each statistic reported here is based on 40 observa-

tions.) The funds with the highest mean return is Parnassus with average quarterly returns of 6.20 percent. In comparison, the quarterly mean return of the benchmark S&P 500 Index is 4.16 percent. The fund with the highest risk (measured by standard deviation of returns) is, again, Parnassus, with quarterly standard deviation of 13.50 percent. Again, in comparison, the standard deviation of the benchmark index is 6.28 percent. Further, Table 6 reports the numerical values of the Sharpe measures that are used to rank the funds. The highest Sharpe measure obtained (0.50) was by Domini Social Equity. In comparison, the Sharpe measure of the benchmark index was 0.48.

Table 6 also reports the values of fund Beta, R Square, Modigliani M Squared measures, Jensen's Alpha, T-Statistic for Alpha, and Treynor measures, all computed using the benchmark S&P 500 Index. The fund with the highest systematic risk (Beta of 1.40) was Parnassus. In comparison, of course, the Beta of the benchmark S&P 500 Index is by definition, exactly 1.0. The values of R Square range from a high of 0.95 (Domini Social Equity) to a

Table 6
10-Year Performance of Socially Responsible Mutual Funds on Quarterly Basis
(1991-2000)

<i>Mutual Fund Name (Ticker Symbol)</i>	<i>Quarterly Mean Return (%)</i>	<i>Quarterly Std. Dev (%)</i>	<i>Sharpe Measure</i>	<i>Beta</i>	<i>R Sq</i>	<i>M Sq Measure</i>	<i>Alpha Measure</i>	<i>Alpha T-Stat*</i>	<i>Treynor Measure</i>
1. Parnassus (PARNX)	6.20	13.50	0.38	1.40	0.42	3.49	0.83	0.61	3.62
2. Domini Social Equity	4.55	6.90	0.50	1.07	0.95	4.24	0.17	0.19	3.19
3. Ariel Appreciation (CAAPX)	3.70	7.48	0.34	0.94	0.62	3.29	-0.29	-0.21	2.73
4. Smith Barney Concert Soc Aware B (SESIX)	3.42	5.05	0.45	0.76	0.89	3.97	-0.02	-0.41	3.01
5. American Mutual (AMRMX)	3.15	4.49	0.45	0.58	0.67	3.96	0.25	0.58	3.47
6. Pax World (PAXWX)	3.12	4.05	0.49	0.56	0.76	4.22	0.29	0.62	3.55
7. Calvert Social Investment Equity A (CSIEX)	3.11	7.69	0.26	1.08	0.78	2.74	-1.30	-0.45	1.83
8. New Alternatives (NALFX)	2.68	8.23	0.19	0.68	0.27	2.32	-0.52	-0.64	2.27
9. Righttime Social Awareness (RTAWX)	2.50	6.06	0.23	0.56	0.33	2.54	-0.32	-0.85	2.45
10. Calvert Social Invest Balanced A (CSIFX)	2.47	4.17	0.32	0.58	0.76	3.14	-0.42	-1.01	2.31
S&P 500 Index	4.16	6.28	0.48	1.00	NA	4.16	0.00	NA	3.03
US 90 Day Treasury Bill Rate	1.13	0.22	0.00	NA	NA	NA	NA	NA	NA

NA: Not Applicable * None of the t statistics is significant at the 5 % level

low of 0.27 (New Alternatives). The fund with the highest M Squared measure (4.24) is Domini Social Equity. In comparison, the benchmark index has an M Squared measure of 4.16. The fund with the highest Jensen Alpha measure was, also, the Parnassus fund with Alpha equal to 0.83. In comparison, of course, the Alpha measure of the benchmark index is, by definition, zero. None of the Alpha T-statistics were significant at the 5 percent level. Finally, the fund with the highest Treynor measure (3.62) was, again, Parnassus. In comparison, the Treynor measure for the benchmark index is 3.03.

Table 7 reports the ranking of the funds. It is interesting to note that only two out of ten funds have out-performed the S&P 500 Index on the basis of the Sharpe measure. Using both the Treynor and Jensen's Alpha methods, four funds (out of 10) ranked higher than the index, which earned a rank of five.

Table 8 reports the average returns that accrued to the funds, with and without risk-adjustment. The data is annualized for the convenience of investors. The Parnas-

sus Fund which was ranked one on unadjusted basis, was ranked six on a risk-adjusted basis. The Domino Social Equity Fund was ranked two on an unadjusted basis, and one on a risk-adjusted basis. The leverage factor for this fund is 0.91, which implies that an investor who is comfortable with bearing the same level of risk as in the benchmark S&P 500 index, could unleverage the fund (sell 9 percent of his/her fund-holdings and invest in Treasury Bills) and thereby attain an annual level of returns of 18.20 percent. The example below details how this may be done:

Example

Data:

Name of Fund: Domino Social Equity

Quarterly Standard Deviation: 6.90

Quarterly Mean Return: 4.55 percent

Quarterly Mean Risk-free return: 1.13 percent

Quarterly Standard Deviation of S&P500 Index:

6.28 percent

Initial Investment \$1000 Leverage Factor 0.91

Given the above data, the following procedure may be used to create a portfolio with the same risk as the benchmark S&P 500 Index, but with a higher level of return:

1. Lend \$90 at the risk-free rate.
2. Invest \$910 in the Domino Social Equity Fund. The quarterly returns will be $\$910 \times 0.0455 = \41.41
3. Earn Interest of $\$90 \times 0.0113 = \1.02
4. Total Returns are $\$41.41 + 1.02 = \42.43 which is a quarterly

Table 7
10-Year Ranks of Socially Responsible Mutual Funds on Quarterly Basis
(1991-2000)

<i>Mutual Fund Name (Ticker Symbol)</i>	<i>Rank based on Sharpe & MSq Measures</i>	<i>Rank based on Treynor Measure</i>	<i>Rank based on Alpha Measure</i>
Domini Social Equity	1	4	4
Pax World (PAXWX)	2	2	2
S&P 500 Index	3	5	5
American Mutual (AMRMX)	4	3	3
Smith Barney Concert Social Aware B (SESIX)	4	6	6
Parnassus (PARNX)	6	1	1
Ariel Appreciation (CAAPX)	7	7	7
Calvert Social Investment Balanced A (CSIFX)	8	9	9
Calvert Social Investment Equity A (CSIEX)	9	11	11
Righttime Social Awareness (RTAWX)	10	8	8
New Alternatives (NALFX)	11	10	10

Table 8
10-Year Annualized Unadjusted and Risk-Adjusted Mean Returns
(1991-2000)

<i>Mutual Fund Name</i>	<i>Annualized Unadjusted Mean Return (%)</i>	<i>Unadjusted Rank</i>	<i>Annualized Risk-adjusted Mean Return (%)</i>	<i>Risk-adjusted Rank</i>
Domini Social Equity	19.48	2	18.20	1
Pax World (PAXWX)	13.09	7	17.93	2
S&P 500 Index	17.71	3	17.71	3
American Mutual (AMRMX)	13.23	6	16.79	4
Smith Barney Concert Social Aware B (SESIX)	14.38	5	16.79	4
Parnassus (PARNX)	27.21	1	14.83	6
Ariel Appreciation (CAAPX)	15.64	4	13.71	7
Calvert Social Investment Balanced A (CSIFX)	10.24	11	13.16	8
Calvert Social Investment Equity A (CSIEX)	13.02	8	11.52	9
Righttime Social Awareness (RTAWX)	10.37	10	10.71	10
New Alternatives (NALFX)	11.18	9	9.62	11

return of 4.243 percent. The annualized return is 18.20 percent

5. The risk of the portfolio is $0.91 \times 6.90 = 6.28$ percent which is the same as the risk in the benchmark S&P 500 Index.

As before, it may be noted that the above example assumes that the covariance between the returns on a risk-free security and the mutual fund is zero. Further, if an investor lends funds at an interest rate that is higher than the risk-free rate of return, then the returns of the portfolio would be higher. However, the fact remains that the investor can use leverage to raise the returns on the investment portfolio.

Conclusion

This study provides documentation on the risk-adjusted performance of socially responsible mutual funds. The evaluation is based on standard performance measures grounded in modern portfolio theory such as the Sharpe, Treynor and Jensen measures. In addition, using the methodology developed by Modigliani and Modigliani in 1997, the study reports the returns that would have accrued to these mutual funds, had the fund managers taken the same degree of risk as that which prevails in the benchmark S&P 500 Index, for a five-year holding period, as well as a ten-year holding period. Further, the results are reported on a percentage basis, which makes them easily comprehensible to a lay investor. It is evident from the empirical results of this study that the funds with the highest average returns may not look so attractive to investors, once the degree of risk embedded in the fund has been factored into the analysis.

Conversely some funds whose average (unadjusted) returns do not stand out, may look very attractive once their low risk is factored into their performance. This study also demonstrates how financial leverage can be used to raise the returns on socially responsible mutual funds with low risk. Alternatively, the investment risk of some funds can be lowered by unleveraging the investor's holding. The empirical evidence presented in this study can be used as input in decision making by investors who are exploring the possibility of

investing with social responsibility via mutual funds, but are not sure which funds to select. On a final note, future researchers may want to update the information presented in this study on a regular basis, for the benefit of investors who are evaluating opportunities to invest with a conscience via a socially responsible mutual fund. ■

Notes

1. Source: Social Investment Forum
2. Source: Landis (2001)
3. We are grateful to an anonymous reviewer who brought this fact to our attention.
4. Once again, we are grateful to an anonymous reviewer for this insight.

References

- Chang, E.C. and W.G. Lewellen. 1984. Market timing and mutual fund investment performance. *Journal of Business* 57: 57-72.
- Henriksson R.D. and R.C. Merton, 1981. On market timing and investment performance II: Statistical procedures for evaluating forecasting skills. *Journal of Business* 54:513-34.
- Jensen, M.C. 1968. The performance of mutual funds in the period 1945-64. *Journal of Finance* 23:389-416.
- _____. 1969. Risk, the pricing of capital Assets, and the evaluation of investment portfolios. *Journal of Business* 42: 167-247.
- Kon, S.J. and F.C. Jen. 1979. The investment performance of Mutual funds: An empirical investigation of timing, selectivity and market efficiency. *Journal of Business* 52:263-90.
- Landis, D. 2001. Do social funds deserve your money? *Mutual Funds*, (Sept.) 57.

- Modigliani, F. and L. Modigliani. 1997. Risk-adjusted performance: How to measure it and why. *Journal of Portfolio Management* (Winter):1997.
- Morningstar. 2001. Mutual Fund 500.
- Sharpe W.F. 1966. Mutual fund performance. *Journal of Business* 39:119-38.
- Social Investment Forum. www.socialinvest.org.
- Statman, M. 2000. Socially responsible mutual funds. *Financial Analysts Journal* 56(3):May/June 2000.
- Treynor, J.L. 1965. How to rate management of investment funds. *Harvard Business Review* 43:63-75.

About the Authors

Ed Edwards is the Chair, Department of Finance and Commercial Law at the Haworth College of Business, Western Michigan University. He has a Ph.D. from the Ohio State University. His articles have been published in the *Review of the Academy of Finance*, *Journal of Dental Practice*, and *Journal of Global Business*. His current research interests are in the areas of investments and corporate valuation.

Ajay Samant is an Associate Professor in the Department of Finance and Commercial Law at the Haworth College of Business, Western Michigan University. He has a Ph.D. from Indiana University. His articles have been published in the *Journal of Financial Services Research*, *International Review of Financial Analysis*, *Managerial Finance*, and *Journal of Global Business*. His current research interests are in the areas of financial markets and international finance.



Midwest
BUSINESS
ADMINISTRATION
ASSOCIATION

40th
Annual Conference

March 17-19, 2004

Palmer House Hilton – Chicago, Illinois
“America’s Best Conference Value”

Submission deadline:
October 1, 2003

PAPER SUBJECT AREAS:

Accounting
Business and Health Administration
Business Economics
Business/Society/Government
Entrepreneurship
Finance
Human Resources/Industrial Relations
Information Systems/Quantitative Methods
International Business
Legal Studies in Business
Management
Marketing
Operations Management
Society for Case Research
Two-Year Colleges

PROGRAM AND REGISTRATION INFORMATION:

Executive Director MBAA:	Program Chair:
Dr. W. Jeff Clark	Dr. Richard Sebastian
Jennings A. Jones	G.R. Herberger
College of Business	College of Business
Middle Tennessee State University	720 4th Ave. S. BB104
Murfreesboro, TN 37132-0001	St. Cloud State University
Telephone: (615) 898-2838	St. Cloud, MN 56301-4498
Email: jclark@mtsu.edu	rsebastian@stcloudstate.edu

For continuously updating information visit:
WWW.MBAACONFERENCE.ORG