

International Evidence on Ethical Mutual Fund Performance and Investment Style ^{**}

Rob Bauer

ABP Investments and Maastricht University

Kees Koedijk

Erasmus University Rotterdam, Maastricht University and CEPR

Rogér Otten

Maastricht University

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Correspondence address:

Rogér Otten
Limburg Institute of Financial Economics
Maastricht University
P.O. Box 616
6200 MD Maastricht
The Netherlands
Phone: (+31) 43 388 3687
Fax: (+31) 43 388 4875
E-mail: R.Otten@Berfin.Unimaas.nl
Homepage: <http://www.fdewb.unimaas.nl/finance>

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ABSTRACT

Using an international database containing 103 German, UK and US ethical mutual funds we review and extend previous research on ethical mutual fund performance. By applying a multi-factor Carhart (1997) model we solve the benchmark problem most prior ethical studies suffered from. After controlling for investment style, we find little evidence of significant differences in risk-adjusted returns between ethical and conventional funds for the 1990-2001 period. Introducing time-variation in betas however leads to a significant under-performance of domestic US funds and a significant out-performance of UK ethical funds, relative to their conventional peers. Finally, we differentiate previous results by documenting a learning effect. After a period of strong under-performance, older ethical funds finally are catching up, while younger funds continue to under-perform both the index and conventional peers.

1 INTRODUCTION

One of the astonishing new developments in the financial community is the rise of social and ethical investments during the last decade.¹ While the origins of ethical investing date back many hundreds of years, the modern roots of social investing can be traced to the political climate of the 1960's.² Issues like the environment, civil rights and nuclear energy served to increase the social awareness of investors. Accordingly, mutual funds were set up which met the demand for incorporating ethical criteria in the investment process. This led to a dramatic increase in ethically managed mutual fund assets, an industry which now represents \$153 billion in the United States. If we would also include all US private and institutional ethically screened portfolios this number tops the \$2 trillion mark at the end of 2000.³ At the moment almost 12% of money under professional management in the United States is part of a socially responsible portfolio.

Because of the sheer size and importance of this movement, both academics and practitioners have investigated the financial consequences of investing ethically, in other words: does it cost money to be ethical? The existing empirical evidence on US data suggests that ethical screening leads to similar or slightly less performance relative to comparable unrestricted portfolios. Among others, Diltz (1995), Guerard (1997) and Sauer (1997) concluded that there were no statistically significant differences between the returns of ethically screened and unscreened universes.

Evidence on the performance of ethical mutual funds is mostly limited to the US and UK markets. Hamilton, Jo and Statman (1993) and Statman (2000) compared the returns of ethical and non-ethical US funds to each other, and to both the S&P 500 and the Domini Social Index (DSI). Using Jensen's alpha it was concluded that no significant differences between risk-adjusted returns for ethical and non-ethical funds existed. Goldreyer and Diltz (1999) used an extended sample of ethical funds including equity, bond and balanced funds. Based on Jensen's alpha, Sharpe and Treynor ratios they found that social screening does not affect the investment performance of ethical mutual funds in any systematic way.

For the UK market four influential papers appeared during the last decade. The early studies compared ethical funds to market-wide indices like the FT all-share index. Using this methodology Luther, Matatko and Corner (1992) investigated the returns of 15 ethical unit trusts. Their results provided some weak evidence that ethical funds tend to out-perform general market indices. In addition a bias towards smaller companies for ethical funds was documented. Luther and Matatko (1994) confirmed this small cap bias and showed that

comparing ethical funds to a small cap benchmark, improved their relative performance substantially. Subsequently Mallin, Saadouni and Briston (1995) attempted to solve this benchmark problem by using a matched pair analysis. Using a sample matched on the basis of fund size and formation date, they provide evidence of ethical mutual fund out-performance, based on Jensen's alpha. Finally Gregory, Matatko and Luther (1997) argued that matching based on *fund* size does not control for a small cap bias in the ethical *portfolios*. Based on a 2-factor Jensen's alpha approach (including a small cap benchmark) they first confirm their prior observation of the small cap bias. Secondly, no significant difference between the financial performance of ethical and non-ethical unit trusts is found.

In addition to this small cap bias, a set of US papers appeared which attributed the recent out-performance of the DSI index, to sector and style biases. For instance Dibartolomeo (1996), Guerard (1997) and Kurtz (1997) report that the large-cap growth exposures of the DSI were driving ethical out-performance and not a so-called social factor.

The purpose of our paper is to review and to extend previous research on ethical mutual funds. More explicitly, we investigate the investment styles of ethical funds and adjust their performance for any style tilts. In order to do so we employ more elaborate multi-factor models that control for size, book to market, momentum and time-variation in betas. More specifically, we will build upon the work of Carhart (1997) and Ferson and Schadt (1996), which presents the current standard methodology on conventional mutual fund performance. As far as we know, no other studies on ethical mutual funds employ conditional multi-factor models to evaluate both performance and investment style.

Using an international sample of 103 US, UK and German ethical funds we address the central question whether ethical funds differ in terms of risk-adjusted return *and* investment style from conventional funds. Principal objective will be to investigate whether the return on ethical investments transcends market cycles and style preferences.⁴

The remainder of the paper is organized as follows. Section 2 provides information on our data. Section 3 presents the empirical results. In section 4 we evaluate performance and investment style through time and finally we conclude in section 5.

2 DATA

(i) *General market overview*

Table 1 presents some figures on the size of the ethical mutual fund market in several selected countries. While the US market for ethical mutual funds rose from \$12 billion in 1995 to \$153

billion at the end of 2000, the European market for ethical funds is still in an early stage of development. For instance in Belgium, France and Germany ethical funds do not even account for 1% of the total domestic market for mutual funds. Frontrunners in Europe are Sweden, The Netherlands and the United Kingdom. But even their relative importance is only half that of ethical funds in the US. Overall it can be said that the entire ethical mutual fund market still presents only a marginal part of the traditional market.

[Table 1: Overview of Ethical Mutual Fund Market as of 30/12/2000]

(ii) *Ethical mutual funds*

To study the international performance and style of ethical mutual funds we construct a database containing the two most developed markets for ethical mutual funds, the United States and the United Kingdom. In addition we consider Germany, which is a relatively young but rapidly growing market. This allows us to consider the influence of experience and age on the relative performance of ethical versus conventional funds. We restrict our sample to pure domestic equity funds with at least 12 months of data, excluding balanced and guaranteed funds.

Using Morningstar (US), EIRIS (UK) and Ecoreporter (Germany) we constructed portfolios of mutual funds that invested their assets based on ethical screening. As a reference group we selected all other equity mutual funds in a certain country that did not explicitly claim to use ethical screening. Furthermore we divided funds into investment categories based on regional focus (domestic versus international), to enhance comparability. Return data was then collected from the CRSP Survivor-bias Free US Mutual Fund Database (United States) and Datastream (Germany and the United Kingdom). All returns are inclusive of any distributions, net of annual management fees and in local currency. This leads to a total sample of 103 ethical open-ended equity mutual funds and 4384 conventional funds with monthly logarithmic returns from January 1990 through March 2001.

As pointed out by Brown, Goetzmann, Ibbotson and Ross (1992), leaving out dead funds leads to an overestimation of average performance. Our US data was survivorship-bias free. To avoid a possible survivorship bias for Germany and the UK, we additionally add back funds that were closed at any point during the sample period. Through the national mutual fund publications (Unit Trust Yearbook and Hoppenstedt Fondsführer) we were able to identify dead German and UK funds. Return data for these funds was then collected from

Datastream. Dead funds were included in the sample until they disappeared. After that the portfolios are re-weighted accordingly.

The percentage of disappearing funds throughout the sample period for Germany, the United Kingdom and the United States was 6%, 28% and 19% respectively. The influence of this becomes apparent if we compare the mean returns of all funds (dead + surviving) with the return on surviving funds only. Restricting our sample to surviving funds would lead us to overestimate average returns by 0.14% (Germany), 0.17% (United Kingdom) and 0.31% (United States) per year.

Table 2 describes the data we use in our subsequent analyses. Based on returns and Sharpe ratios it seems German and domestic US ethical funds under-perform both their conventional peers and the relevant indices. Only UK ethical funds appear to be able to match conventional funds when it comes to risk and return. If we look at some basic features of ethical mutual funds the smaller size and higher expense ratio becomes apparent.

[Table 2: Summary Statistics on Mutual Funds 1990:01 - 2001:03]

(iii) Benchmarks

In the basic 1-factor Jensen's alpha analysis we make use of well-known equity indices for each country. For all international funds we use the MSCI World index in local currency, while for domestic UK funds the FT-ALL share index, and for domestic US funds the S&P 500 is employed. Besides these indices we also consider the explanatory power of several ethical indices that have been launched recently. These include the Domini Social index (DSI), the ethical balanced index by Ethical Investment Research Service (EIRIS) and the Dow Jones Sustainability indices (DJSI). In constructing our version of the Carhart (1997) 4-factor model we consider all stocks in the Worldscope universe for each country/region.⁵ For the excess market return we take the return of all stocks in the Worldscope universe that are larger than \$25 million, minus the 1-month inter-bank rate. We then rank all stocks based on size and assign the bottom 20% of total market capitalization to the small portfolio. The remaining part goes into the large portfolio. SMB is the return difference between small and large. For the HML factor all stocks are ranked on their book-to-market ratio. In line with Fama and French (1992) we then assign the top 30% of market capitalization to the high book-to-market portfolio and the bottom 30% to the low book-to-market portfolio. HML is obtained by subtracting the low from the high book-to-market return. The momentum factor

portfolio is formed by ranking all stocks on their prior 12-month return. The return difference between the top 30% and bottom 30% by market capitalization then provides us with the momentum factor returns.⁶

3 EMPIRICAL RESULTS

(i) CAPM model

The main model used in studies on ethical mutual fund performance is a CAPM based single index model. The intercept of such a model, α_i , gives the Jensen alpha, which is usually interpreted as a measure of out- or under-performance relative to the used market proxy.⁷

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it} \quad (1)$$

where R_{it} is the return on fund i in month t , R_{ft} the return on a one month T-bill in month t , R_{mt} the return on the local equity benchmark in month t and ε_{it} an error term.

Table 3 presents the results of applying equation (1) on our database. Per country and within a country by region, we compute Jensen's alpha for both the portfolio of ethical funds and the portfolio of conventional funds. To enhance comparability we also add a portfolio which is constructed by subtracting conventional fund returns from ethical fund returns. This portfolio is then used to examine differences in risk and return between the two investment approaches.

[Table 3: Results CAPM model]

From this table several conclusions can be drawn. First, it is clear that German and US ethical funds under-perform both the index and their conventional counterparts. Although only domestic US ethical funds exhibit significant (at 10% level) under-performance, the differences in alpha estimates are larger than we would expect based on prior research. Second, German and UK ethical funds exhibit significantly less market risk, while for US funds no significant difference in market beta can be established. UK ethical funds finally seem to outpace conventional funds, but not significantly.

As ethical funds are constructed using several ethical, social and environmental screens, the common equity benchmarks used before might not be perfectly suitable to

measure performance. To assess such possible bias we alternatively use several ethical indices to measure ethical fund performance. For all international funds we use the Dow Jones Sustainability Global Index (DJSI). Domestic UK funds are evaluated using the Ethical balanced index from EIRIS and domestic US funds are investigated by using both the Dow Jones Sustainability US Index and the Domini Social Index (DSI).

[Table 4: Alternative indices 1994-2000]

In table 4 we present the results of applying alternative ethical indices using a 1-factor model. For reasons of comparison we only investigate the 1994-2000 period, as the Dow Jones indices were launched in 1994. Accordingly, the results on the CAPM model with common indices are also based on the 1994-2000 period.

By using ethical indices three striking observations emerge. First, the ethical indices are less powerful in explaining fund performance compared to standard, non-ethical indices. In all but one case the R^2_{adj} for the model with ethical indices is lower than the R^2_{adj} of the standard CAPM model. Second, ethical funds are not able to out-perform their ethical index. Third, the conclusions based on the CAPM model with standard, non-ethical indices, seems to be quite robust to the use of ethical indices instead.

These results create an unexpected view on ethical mutual fund performance and investment behaviour. It looks like standard non-ethical indices are more useful in explaining ethical fund returns than ethical indices. This raises the question whether ethical funds are really following distinct ethical investment styles. Or are ethical funds riding the wave of media attention for ethical investments, while in reality they are conventional funds in disguise. In the remainder of this paper we will examine this concern in more detail, using more elaborate multi-factor models, which enable us to perform a style analysis.

(ii) *Multi-factor model*

The need for a multi-factor asset-pricing model stems from the recent literature on the cross-sectional variation of stock returns (see, e.g. Fama & French (1993, 1996) and Chan, Jegadeesh & Lakonishok (1996)). The results of these studies lead us to question the adequacy of a single index model to explain mutual fund performance. Therefore the Fama & French (1993) 3-factor model has been considered to give a better explanation of fund behaviour. Besides a value-weighted market proxy, two additional risk factors are used, size

and book-to-market. Although this model already improves average CAPM pricing errors, it is not able to explain the cross-sectional variation in momentum-sorted portfolio returns. Therefore Carhart (1997) extends the Fama-French model by adding a fourth factor that captures the Jegadeesh & Titman (1993) momentum anomaly. The resulting model is consistent with a market equilibrium model with four risk factors, which can also be interpreted as a performance attribution model, where the coefficients and premia on the factor-mimicking portfolios indicate the proportion of mean return attributable to four elementary strategies.

Formally

$$R_{it} - R_{ft} = \alpha_i + \beta_{0i}(R_{mt} - R_{ft}) + \beta_{1i}SMB_t + \beta_{2i}HML_t + \beta_{3i}Mom_t + \varepsilon_{it} \quad (2)$$

where

| | | |
|---------|---|---|
| SMB_t | = | the difference in return between a small cap portfolio and a large cap portfolio at time t |
| HML_t | = | the difference in return between a portfolio of high book-to-market stocks and one of low book-to-market stocks at time t |
| Mom_t | = | the difference in return between a portfolio of past 1 month winners and a portfolio of past 12 month losers at time t |

Table 5 summarizes the results of applying the multi-factor model. First, we notice a sharp increase in average R^2_{adj} for the multi-factor model (0.90), compared to the 1-factor CAPM model (0.79). This indicates that the extended model is better able to explain mutual fund returns. Second, German and UK ethical funds exhibit significantly less market exposure compared to conventional funds, which corroborates our previous 1-factor results. Third, German and UK ethical funds are heavily exposed to small caps while US funds on the other hand are relatively more invested in large caps. Fourth, all ethical funds are more growth-oriented than value-oriented, if compared to conventional funds. This is in line with for instance Guerard (1997) who finds a growth bias in the DSI index. A reason for the high proportion of growth stocks may lie in the exclusion of traditional value sectors like chemical, energy and basic industries. As these represent a higher environmental risk, ethical portfolios

are often under-weighted in them, which leads to a growth focus. Finally, after controlling for market risk, size, book-to-market and momentum the difference in return between ethical and conventional funds remains negative for Germany and the US, and positive for the UK. However, as none of the differences are significantly different from zero we cannot distinguish between the two.

[Table 5: 4-factor Carhart Model]

(iii) *Conditional multi-factor model*

It is well known that biases can arise if managers trade on publicly available information, in other words if dynamic strategies are employed. Average alphas calculated using a fixed beta estimate for the entire performance period are highly unreliable if expected returns and risks vary over time. Therefore Chen & Knez (1996) and Ferson & Schadt (1996) advocate conditional performance measurement.

Consider the following case where \mathbf{Z}_{t-1} is a vector of lagged pre-determined instruments. Assuming that the beta for a fund varies over time, and that this variation can be captured by a linear relation to the conditional instruments, then $\beta_{it} = \beta_{i0} + \mathbf{B}'_i \mathbf{Z}_{t-1}$, where \mathbf{B}'_i is a vector of response coefficients of the conditional beta with respect to the instruments in \mathbf{Z}_{t-1} . For a single index model the equation to be estimated then becomes

$$R_{it} - R_{ft} = \alpha_i + \beta_{i0} (R_{mt} - R_{ft}) + \mathbf{B}'_i \mathbf{Z}_{t-1} (R_{mt} - R_{ft}) + \varepsilon_{it} \quad (3)$$

This equation can easily be extended to incorporate multiple factors, which results in a conditional Carhart 4-factor model with time-varying betas. The instruments we use are publicly available and proven to be useful for predicting stock returns by several previous studies.⁸ Introduced are (1) the 1-month T-bill rate, (2) dividend yield on the market index, (3) the slope of the term structure and finally (4) the quality spread, by comparing the yield of government and corporate bonds. All instruments are lagged 1 month.

Table 6 presents the results of the conditional Carhart 4-factor model for the individual countries. While column 2 repeats the unconditional alphas from table 5, the conditional alphas are in column 4. In 8 out of 10 cases the hypothesis of constant betas can be rejected at the 5% level (see Wald test statistics in column 6), indicating strong time-variation in betas. The conditional alphas however strengthen our previous observations.

German and US ethical funds under-perform, while UK ethical funds out-perform their conventional peers. Interestingly, US domestic ethical funds under-perform and UK ethical funds out-perform their conventional peers *significantly* using time-varying betas.

[Table 6: Unconditional versus Conditional performance evaluation]

Finally, in figure 1 we present some dynamics of the relative style deviations of ethical funds versus conventional funds. As an example we consider UK domestic funds. The figure presents the *differences* in time-varying market beta, SMB, HML and Momentum between domestic UK Ethical and Conventional mutual funds. These results are obtained by evaluating the difference portfolio using the conditional multifactor version of equation (3).

This yields some interesting results concerning the consistency of ethical style deviations. First, ethical funds have lower betas throughout the 90's. During the last 2 years however their beta rises dramatically and closely matches the conventional funds beta. Second, ethical funds are always relatively more invested in small caps, except for the beginning of the 90's and the last 2 years. Third, the growth bias in ethical portfolios is subject to quite some time-variation. Fourth, during our almost 12 year sample period ethical funds switched from contrarian to momentum strategies, relative to their conventional counterparts.

[Figure 1: Time-variation in differences between UK ethical and conventional fund exposures (domestic)]

4 DEVELOPMENT OF RELATIVE PERFORMANCE THROUGH TIME

The final issue we will touch upon in this study addresses the development of relative performance through time. In order to detect whether the rather young ethical investment sector is undergoing changes we divide our sample period into three non-overlapping sub-periods. Table 7 reports the results for the 4-factor model using 3 different sub-periods.

[Table 7: Difference between Ethical and Conventional funds for 3 Sub-periods]

Examining the differences in alpha between ethical and conventional funds provides an interesting development. Where German and US funds under-perform their conventional

peers significantly during the first 4 years of our sample period (1990-1993), this difference is gradually transformed into a slight out-performance during the most recent sub-period (1998-2001). It appears that US and German ethical funds went through a learning phase in which they first trailed conventional funds significantly while more recently they matched conventional fund performance. UK ethical fund performance clearly holds up with conventional funds throughout the almost 12 year period.

This intriguing development calls for further investigation. A possible source for the recent strong upsurge in relative ethical fund performance could be the launch of new funds, which could have learned from the “mistakes” from previous ones. For instance, Otten and Bams (2002) document a negative relationship between fund age and risk-adjusted performance for conventional European mutual funds. Evidence on the influence of age on ethical fund performance provides a different picture. According to Gregory, Matatko and Luther (1997) young funds perform worse. Their results however are somewhat sensitive to the definition of being a young fund.

In order to investigate the influence of new fund launches on the strong performance of ethical funds during 1998-2001, we construct two portfolios of funds based on age. The “Old” portfolio consists of funds that were launched before 1998, while the “Young” portfolio contains all funds that were launched in or after 1998, the start of our last sub-period.

[Table 8: Old versus Young Ethical Funds, 1998:01 – 2001:03]

Table 8 provides evidence to support the fact that ethical funds launched before 1998 (old) *significantly* out-performed funds that were set up after 1998 (young) in all countries and regions, except for the domestic UK funds. Especially the magnitude of this difference is striking as alphas are already corrected for investment style. Furthermore the new funds differ substantially from the older funds when it comes to market risk, size and book-to-market exposure. While the older funds have low market risk, the newer ones are significantly more exposed to the market index. In addition to that the small-cap growth bias for German and UK ethical funds is reduced significantly by the younger funds. These results indicate a switch in investment style by young ethical funds. Where the older funds had some distinctive loadings on certain investment styles, the younger funds are more closely following the general market, and more importantly, following their conventional counterparts.

The latter point is supported by table 9, which presents the difference in performance and investment style between old ethical funds versus conventional funds and young ethical

funds versus conventional funds. While the older ethical funds clearly deviated from conventional funds with respect to market risk, small cap exposure and value/growth, the younger funds follow less pronounced styles. Especially their market beta is much closer to the conventional fund beta, which indicates a stricter following of general market movements. This is supported by the lower R^2_{adj} of the difference between young ethical funds and conventional funds. Finally the differences in alpha appear to support the fact that the older funds finally have caught up with conventional funds, while funds that were launched recently still trailed their conventional peers. This could point towards a learning effect that ethical funds have to go through before their financial return is comparable to conventional mutual funds.⁹

[Table 9: Differences between ethical and conventional funds by age, 1998:01 – 2001:03]

5 CONCLUSION

Although ethical mutual fund assets witnessed an unprecedented growth in assets during the last decade, the industry still only presents an insignificant part of the total mutual fund market. A crucial factor that determines the incorporation of ethical mutual funds into the mainstream investment area is their financial performance. Using an international database of 103 ethical mutual funds we therefore analyse ethical fund performance and investment style.

While most of the previous work on ethical mutual fund performance is conducted using market wide indices, we explore the added value of more elaborated multi-factor models. This not only improves performance measurement but also enables us to investigate ethical mutual fund investment styles in more detail.

After employing a standard CAPM 1-factor model, using both standard an ethical indices, we consider a Carhart (1997) 4-factor asset-pricing model that controls for size, book-to-market and stock price momentum. From this four interesting results emerge. First, German and US ethical funds under-perform both their relevant indices and conventional peers, while UK ethical funds show a slight out-performance. None of these differences however are statistically significant after we control for common factors like size, book-to-market and momentum. Second, ethical indices perform worse than standard indices in explaining ethical fund performance. Third, ethical funds exhibit distinct investment styles if compared to conventional funds. For instance, German and UK ethical funds exhibit significantly less market exposure compared to conventional funds and are heavily exposed to

small caps. US funds on the other hand are relatively more invested in large caps. In addition, all ethical funds are more growth-oriented than value-oriented, if compared to conventional funds. Fourth, allowing for time-variation in betas partly corroborates our previous results on performance. German and US ethical funds under-perform, while UK ethical funds out-perform their conventional peers. Interestingly, US domestic ethical funds under-perform and UK ethical funds out-perform their conventional peers *significantly* using time-varying betas.

Subsequently we investigate the relative returns of ethical versus conventional funds through time, using 3 sub-periods. This provides support for the idea that German and US ethical funds went through a so-called learning phase. After significant under-performance in the beginning of the 1990's, they match conventional fund performance during the 1998-2001 period. In addition we find a strong age effect if funds are divided based on launch date. Funds that were set up before 1998 significantly out-performed funds that were launched after 1998. These younger funds also changed their investment style. While the older ethical funds clearly deviated from conventional funds with respect to market risk, small cap exposure and value/growth, the younger funds follow much less pronounced investment styles. Finally the differences in alpha appear to support the fact that the older funds finally have caught up with conventional funds, while funds that were launched recently still trail their conventional peers.

In conclusion, we document corroborative evidence for the results that ethical funds do not under-perform relative to conventional funds. Even after controlling for investment style we find no significant differences in risk-adjusted returns between ethical and conventional funds. However we differentiate previous results by documenting a learning effect. After a period of strong under-performance, older ethical funds finally are catching up, while younger funds continue to under-perform both the index and conventional peers.

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Table 1: Overview of Ethical Mutual Fund Market as of 30/12/2000

| Country | # of Ethical Mutual funds | Ethical assets under management in million USD | As a % of total mutual fund assets |
|-----------------|---------------------------|--|------------------------------------|
| Belgium * | 26 | 602 | 0.80 % |
| France * | 14 | 371 | 0.01 % |
| Germany | 22 | 1,317 | 0.04 % |
| Italy * | 5 | 2,077 | 0.45 % |
| Sweden * | 42 | 1,190 | 1.46 % |
| Switzerland* | 22 | 1,011 | 1.12 % |
| The Netherlands | 11 | 1,309 | 1.20 % |
| United Kingdom | 55 | 6,390 | 1.35 % |
| United States | 230 | 153,000 | 2.26 % |

Notes:

This table presents the characteristics of the major European ethical mutual fund markets and the United States. The first column presents the total number of ethical mutual funds within a country. The second column provides the amount of total ethical mutual fund assets under management (in USD). The last column presents the % of the total domestic fund market that is possessed by ethical funds. Sources: Avenzi, VBDO, EIRIS, Socialinvest, Arèse, IMUG

* Size at 31/12/99

Table 2: Summary Statistics on Mutual Funds 1990:01 - 2001:03

| Country | Return | Standard deviation | Sharpe ratio | Size | Expense ratio | # of Funds |
|-----------------------|--------|--------------------|--------------|------|---------------|------------|
| Germany | | | | | | |
| <i>International</i> | | | | | | |
| Ethical | 4.77 | 14.13 | - 0.06 | 73 | 1.40 | 16 |
| Conventional | 7.52 | 15.97 | 0.13 | 323 | 1.04 | 114 |
| MSCI World | 11.97 | 19.06 | 0.33 | | | |
| United Kingdom | | | | | | |
| <i>Domestic</i> | | | | | | |
| Ethical | 9.81 | 13.11 | 0.16 | 48 | 1.24 | 20 |
| Conventional | 9.58 | 13.64 | 0.14 | 176 | 1.19 | 300 |
| FT-All | 10.95 | 14.22 | 0.22 | | | |
| <i>International</i> | | | | | | |
| Ethical | 8.92 | 15.16 | 0.08 | 89 | 1.49 | 12 |
| Conventional | 8.18 | 14.74 | 0.03 | 107 | 1.33 | 96 |
| MSCI World | 8.52 | 15.99 | 0.05 | | | |
| United States | | | | | | |
| <i>Domestic</i> | | | | | | |
| Ethical | 13.09 | 13.32 | 0.61 | 154 | 1.49 | 50 |
| Conventional | 14.64 | 13.68 | 0.71 | 610 | 1.41 | 2806 |
| S&P 500 | 15.38 | 13.89 | 0.75 | | | |
| <i>International</i> | | | | | | |
| Ethical | 11.95 | 13.91 | 0.57 | 140 | 1.71 | 5 |
| Conventional | 11.88 | 13.59 | 0.58 | 385 | 1.62 | 1068 |
| MSCI World | 14.35 | 12.51 | 0.83 | | | |

Notes:

Table 2 reports summary statistics of the funds in our sample. Within a country we group funds by regional objective. Ethical and conventional fund returns are calculated based on an equally weighted portfolio of all funds. The return data are annualised with reinvestment of all distributions, based on local currencies. All returns are net of expenses. Besides fund returns we also provide summary statistics on relevant market-wide benchmarks for each country and/or region. Average fund sizes are in million US dollars as of 31/12/2000. Costs are presented as a percentage of the assets invested.

Table 3: Results CAPM model

| Country / region | Alpha | Market | R ² _{adj} |
|-----------------------|----------|-----------|-------------------------------|
| Germany | | | |
| <i>International</i> | | | |
| Ethical | - 4.94** | 0.65*** | 0.76 |
| Conventional | - 2.72 | 0.73*** | 0.76 |
| Difference | - 2.22 | - 0.08*** | 0.05 |
| United Kingdom | | | |
| <i>Domestic</i> | | | |
| Ethical | - 0.68 | 0.83*** | 0.80 |
| Conventional | - 1.02 | 0.92*** | 0.91 |
| Difference | 0.34 | - 0.09*** | 0.12 |
| <i>International</i> | | | |
| Ethical | 0.88 | 0.75*** | 0.63 |
| Conventional | - 0.17 | 0.87*** | 0.88 |
| Difference | 1.05 | - 0.12*** | 0.05 |
| United States | | | |
| <i>Domestic</i> | | | |
| Ethical | - 1.20 | 0.89*** | 0.87 |
| Conventional | 0.53 | 0.88*** | 0.79 |
| Difference | - 1.73* | 0.01 | 0.01 |
| <i>International</i> | | | |
| Ethical | - 2.13 | 0.97*** | 0.75 |
| Conventional | - 1.92 | 0.94*** | 0.75 |
| Difference | - 0.21 | 0.03 | 0.00 |

Notes:

The table reports the results of the estimation of equation (1) for the 1990:01 – 2001:03 period. Reported are the OLS estimates for each country and/or region, and within countries for both ethical and conventional funds. Difference is a portfolio which is constructed by subtracting conventional from ethical fund returns.

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it} \quad (1)$$

Where R_t is the fund return, R_{ft} the risk-free rate and R_{mt} the return on the relevant benchmark of the individual countries. All returns are in local currencies and net of costs. All alphas are annualised.

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

Table 4: Alternative indices 1994-2000

| Country / region | CAPM | | | DJSI | | | EIRIS | | | DSI | | |
|-----------------------------|--------|-----------|-------------------------------|----------|-----------|-------------------------------|--------|----------|-------------------------------|-------|---------|-------------------------------|
| | alpha | Market | R ² _{adj} | alpha | Market | R ² _{adj} | alpha | Market | R ² _{adj} | alpha | Market | R ² _{adj} |
| Germany | | | | | | | | | | | | |
| <i>International</i> | | | | | | | | | | | | |
| Ethical | - 2.14 | 0.69*** | 0.80 | - 3.20 | 0.69*** | 0.67 | | | | | | |
| Conventional | - 0.06 | 0.80*** | 0.83 | - 1.95 | 0.85*** | 0.78 | | | | | | |
| Difference | - 2.08 | - 0.11*** | 0.10 | - 1.25 | - 0.16*** | 0.11 | | | | | | |
| United Kingdom | | | | | | | | | | | | |
| <i>Domestic[#]</i> | | | | | | | | | | | | |
| Ethical | - 1.32 | 0.83*** | 0.80 | | | | - 1.12 | 0.82*** | 0.80 | | | |
| Conventional | - 1.40 | 0.92*** | 0.90 | | | | - 1.44 | 0.89*** | 0.86 | | | |
| Difference | 0.08 | - 0.09*** | 0.13 | | | | 0.32 | -0.07*** | 0.06 | | | |
| <i>International</i> | | | | | | | | | | | | |
| Ethical | 0.37 | 0.69*** | 0.55 | - 1.91 | 0.62*** | 0.50 | | | | | | |
| Conventional | - 2.06 | 0.87*** | 0.87 | - 5.04** | 0.80*** | 0.84 | | | | | | |
| Difference | 2.43 | - 0.18*** | 0.12 | 3.13 | - 0.18** | 0.13 | | | | | | |
| United States | | | | | | | | | | | | |
| <i>Domestic</i> | | | | | | | | | | | | |
| Ethical | - 1.99 | 0.90*** | 0.87 | - 0.27 | 0.66*** | 0.71 | | | | -1.83 | 0.84*** | 0.85 |
| Conventional | - 1.18 | 0.92*** | 0.78 | 0.69 | 0.67*** | 0.62 | | | | -0.87 | 0.84*** | 0.74 |
| Difference | - 0.80 | - 0.02 | 0.00 | - 0.96 | - 0.01 | 0.00 | | | | -0.96 | 0.00 | 0.01 |
| <i>International</i> | | | | | | | | | | | | |
| Ethical | - 1.93 | 0.95*** | 0.75 | - 3.12 | 0.90*** | 0.83 | | | | | | |
| Conventional | - 2.86 | 0.93*** | 0.75 | - 3.92* | 0.87*** | 0.81 | | | | | | |
| Difference | 0.93 | 0.02 | 0.00 | 0.80 | 0.03 | 0.01 | | | | | | |

Notes:

Table 4 reports the results of using 3 alternative indices in estimating equation (1). The indices used are the Dow Jones Sustainability Indices (DJSI), the EIRIS balanced ethical index and the DSI index. As the DJSI was launched in 1994 we only consider the 1994-2000 period for both the CAPM and alternative benchmarks results.

[#] 1991:01 – 1999:05 *** Significant at the 1% level ** Significant at the 5% level * Significant at the 10% level

Table 5: 4-factor Carhart Model

| Country / region | 4-factor | | | | | R ² _{adj} |
|-----------------------|----------|-----------|-----------|-----------|----------|-------------------------------|
| | Alpha | Market | SMB | HML | Mom | |
| Germany | | | | | | |
| <i>International</i> | | | | | | |
| Ethical | - 3.81** | 0.73*** | 0.33*** | - 0.03* | 0.05** | 0.82 |
| Conventional | - 2.26 | 0.82*** | 0.15* | - 0.01 | 0.12** | 0.83 |
| Difference | - 1.55 | - 0.09*** | 0.18*** | - 0.02 | - 0.07** | 0.13 |
| United Kingdom | | | | | | |
| <i>Domestic</i> | | | | | | |
| Ethical | 0.37 | 0.83*** | 0.47*** | - 0.05*** | 0.04** | 0.93 |
| Conventional | - 0.24 | 0.92*** | 0.32*** | 0.03* | 0.03** | 0.98 |
| Difference | 0.61 | - 0.09*** | 0.15*** | - 0.07*** | 0.01 | 0.37 |
| <i>International</i> | | | | | | |
| Ethical | 2.26 | 0.80*** | 0.71*** | - 0.12*** | 0.13*** | 0.80 |
| Conventional | 0.09 | 0.90*** | 0.12*** | 0.04** | 0.11*** | 0.92 |
| Difference | 2.17 | - 0.10*** | 0.59*** | - 0.16*** | 0.02 | 0.26 |
| United States | | | | | | |
| <i>Domestic</i> | | | | | | |
| Ethical | - 0.46 | 0.91*** | 0.08*** | 0.01 | - 0.01* | 0.96 |
| Conventional | 0.73 | 0.93*** | 0.18*** | 0.03 | 0.03* | 0.96 |
| Difference | - 1.19 | - 0.02 | - 0.10*** | - 0.02 | - 0.04** | 0.19 |
| <i>International</i> | | | | | | |
| Ethical | - 0.97 | 0.92*** | - 0.04 | 0.06 | 0.20*** | 0.89 |
| Conventional | - 0.31 | 0.94*** | 0.20*** | 0.08** | 0.17*** | 0.94 |
| Difference | - 0.66 | - 0.02 | - 0.24*** | - 0.02 | 0.03 | 0.21 |

Notes:

The table reports the results of the estimation of equation (2) for the 1990:01 – 2001:03. Reported are the OLS estimates for each country and/or region, and within regions for both ethical and conventional funds. Difference is a portfolio which is constructed by subtracting conventional from ethical fund returns.

$$R_t - R_{f_t} = \alpha + \beta_0 (R_{m_t} - R_{f_t}) + \beta_1 \text{SMB}_t + \beta_2 \text{HML}_t + \beta_3 \text{Mom}_t + \varepsilon_{it} \quad (2)$$

Where R_t is the fund return, R_{f_t} the risk-free rate, R_m the return on the total Universe according to Worldscope, and SMB and HML the factor-mimicking portfolios for size and book-to-market. Mom is a factor-mimicking portfolio for the 12-month return momentum. All alphas in the table are annualised. T-stats are heteroskedasticity consistent.

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

Table 6: Unconditional versus Conditional performance evaluation

| | Unconditional 4f-alpha | R ² _{adj} | Conditional 4f-alpha | R ² _{adj} | Wald (p-value) |
|-----------------------|---------------------------|-------------------------------|-------------------------|-------------------------------|-------------------|
| Germany | | | | | |
| <i>International</i> | | | | | |
| Ethical | - 3.81** | 0.82 | - 3.45* | 0.85 | 0.004 |
| Conventional | - 2.26 | 0.83 | - 1.06 | 0.87 | 0.000 |
| Difference | - 1.55 | 0.13 | - 2.39 | 0.20 | 0.003 |
| United Kingdom | | | | | |
| <i>Domestic</i> | | | | | |
| Ethical | 0.37 | 0.93 | 1.13 | 0.95 | 0.000 |
| Conventional | - 0.24 | 0.98 | - 0.36 | 0.98 | 0.050 |
| Difference | 0.61 | 0.37 | 1.49* | 0.51 | 0.000 |
| <i>International</i> | | | | | |
| Ethical | 2.26 | 0.80 | 4.90*** | 0.85 | 0.000 |
| Conventional | 0.09 | 0.92 | - 1.01 | 0.92 | 0.120 |
| Difference | 2.17 | 0.26 | 5.91*** | 0.42 | 0.000 |
| United States | | | | | |
| <i>Domestic</i> | | | | | |
| Ethical | - 0.46 | 0.96 | - 0.58 | 0.97 | 0.000 |
| Conventional | 0.73 | 0.96 | 0.99 | 0.98 | 0.000 |
| Difference | - 1.19 | 0.19 | - 1.57** | 0.45 | 0.000 |
| <i>International</i> | | | | | |
| Ethical | - 0.97 | 0.89 | - 1.33 | 0.90 | 0.096 |
| Conventional | - 0.31 | 0.94 | - 0.54 | 0.94 | 0.004 |
| Difference | - 0.66 | 0.21 | - 0.79 | 0.24 | 0.340 |

Notes:

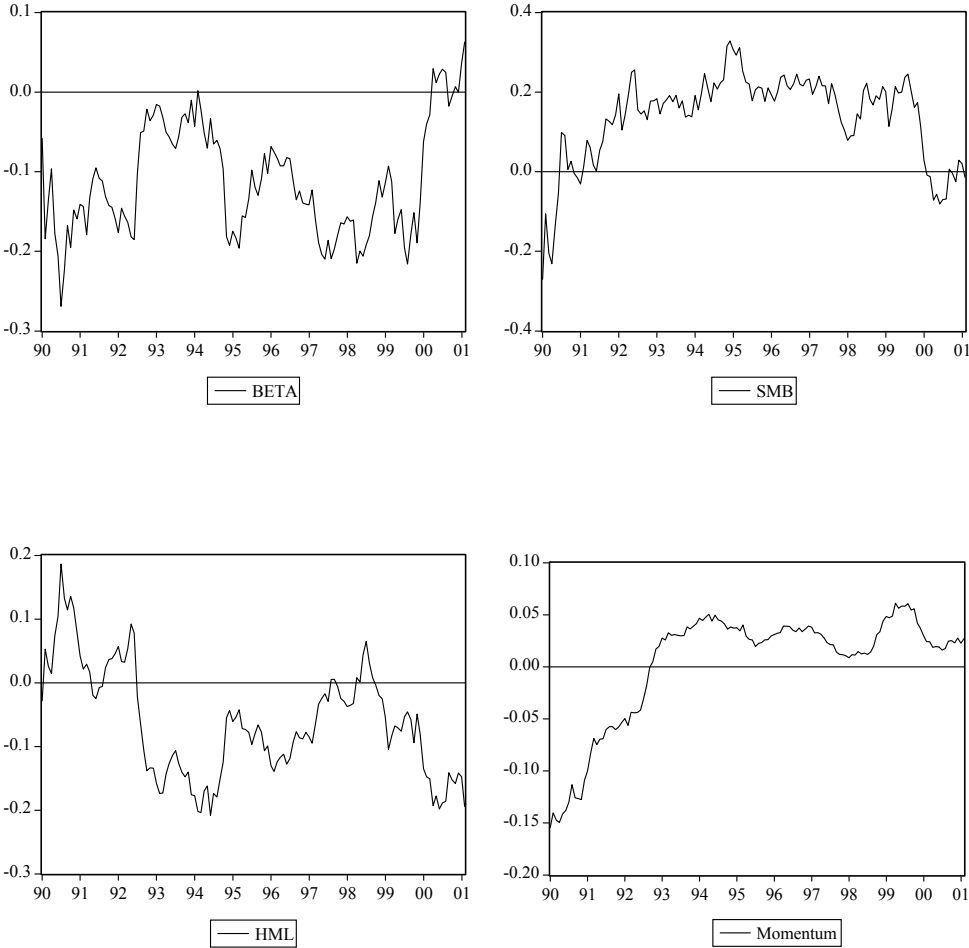
This table presents the results from the unconditional (column 2 and 3) and conditional (column 4 and 5) performance model. The results from the unconditional model are imported from table 5 column 2, the conditional model results stem from the multifactor version of equation (3). Here we allow the market, SMB, HML and PR6m betas to vary over time as a function of (1) the 1 month T-bill rate, (2) dividend yield (3) the slope of the term structure and (4) the quality spread. The last column of table 6 provides results for heteroskedasticity-consistent Wald tests to examine whether the conditioning information adds marginal explanatory power to the unconditional model. All alphas are annualised.

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

Figure 1: Time-variation in differences between UK ethical and conventional fund exposures (domestic)



Notes:

This figure presents the *differences* in time-varying market beta, SMB, HML and Momentum between domestic UK Ethical and Conventional mutual funds. These results are obtained by evaluating the difference portfolio using the conditional multifactor version of equation (3). In order to introduce time-variation we allow the market beta, SMB, HML and Momentum to vary over time as a function of (1) the 1 month T-bill rate, (2) dividend yield (3) the slope of the term structure and (4) the quality spread. Results are reported for the entire 1990:01-2001:03 period.

Table 7: Difference between Ethical and Conventional funds for 3 Sub-periods

| Country / region | 4 factor alpha 1990-1993 | 4 factor alpha 1994-1997 | 4 factor alpha 1998-2001 |
|-----------------------|-----------------------------|-----------------------------|-----------------------------|
| Germany | | | |
| <i>International</i> | - 2.56* | - 2.73* | 1.12 |
| United Kingdom | | | |
| <i>Domestic</i> | 0.65 | 1.33* | 0.08 |
| <i>International</i> | - 1.45 | 5.72** | 2.71 |
| United States | | | |
| <i>Domestic</i> | - 2.46* | - 1.66* | 1.63 |
| <i>International</i> | - 4.69** | - 0.53 | 1.18 |

Notes:

Table 7 presents the results of estimating equation (2) for 3 different sub-periods. Reported are the *differences* between 4 factor alphas for ethical and conventional funds.

$$R_t - R_{f_t} = \alpha + \beta_0 (R_{m_t} - R_{f_t}) + \beta_1 \text{SMB}_t + \beta_2 \text{HML}_t + \beta_3 \text{Mom}_t + \varepsilon_{it} \quad (2)$$

Where R_t is the fund return, R_{f_t} the risk-free rate, R_m the return on the total Universe according to Worldscope, and SMB and HML the factor-mimicking portfolios for size and book-to-market. Mom is a factor-mimicking portfolio for the 12-month return momentum. All alphas in the table are annualised. T-stats are heteroskedasticity consistent.

- *** Significant at the 1% level
- ** Significant at the 5% level
- * Significant at the 10% level

Table 8: Old versus Young Ethical Funds, 1998:01 – 2001:03

| Country / region | 4-factor Alpha | Market | SMB | HML | Mom | R ² _{adj} |
|-----------------------|---------------------|-----------------------|-----------------------|-----------------------|---------------------|-------------------------------|
| Germany | | | | | | |
| <i>International</i> | | | | | | |
| Old | 4.06 | 0.72 ^{***} | 0.44 ^{***} | - 0.18 ^{**} | - 0.07 | 0.78 |
| Young | - 1.30 | 0.90 ^{***} | 0.09 | - 0.00 | 0.01 | 0.80 |
| Difference | 5.36 ^{**} | - 0.18 ^{***} | 0.35 ^{***} | - 0.18 ^{**} | - 0.08 | 0.27 |
| United Kingdom | | | | | | |
| <i>Domestic</i> | | | | | | |
| Old | 0.33 | 0.83 ^{***} | 0.42 ^{***} | - 0.08 ^{**} | 0.05 [*] | 0.94 |
| Young | 0.16 | 0.93 ^{***} | 0.27 ^{***} | 0.03 [*] | 0.03 [*] | 0.97 |
| Difference | 0.17 | - 0.10 ^{***} | 0.15 ^{***} | - 0.11 ^{**} | 0.02 | 0.51 |
| <i>International</i> | | | | | | |
| Old | 9.57 [*] | 0.65 ^{***} | 0.78 ^{***} | - 0.42 ^{***} | - 0.01 | 0.77 |
| Young | - 2.83 | 0.82 ^{***} | 0.46 ^{***} | - 0.15 [*] | 0.01 | 0.84 |
| Difference | 12.59 ^{**} | - 0.17 ^{***} | 0.32 ^{***} | - 0.27 ^{***} | - 0.02 | 0.40 |
| United States | | | | | | |
| <i>Domestic</i> | | | | | | |
| Old | 1.26 | 0.97 ^{***} | 0.05 ^{***} | - 0.13 ^{**} | - 0.01 | 0.98 |
| Young | - 3.54 | 1.09 ^{***} | 0.28 ^{***} | - 0.12 ^{**} | - 0.01 | 0.90 |
| Difference | 4.80 [*] | - 0.12 ^{**} | - 0.23 ^{***} | 0.01 | 0.00 | 0.47 |
| <i>International</i> | | | | | | |
| Old | 4.18 | 0.92 ^{***} | - 0.02 | 0.05 | 0.32 ^{***} | 0.91 |
| Young | - 0.97 | 0.96 ^{***} | - 0.03 | 0.18 ^{**} | 0.14 ^{***} | 0.88 |
| Difference | 5.15 ^{**} | - 0.04 ^{**} | - 0.01 | - 0.13 ^{**} | 0.18 ^{**} | 0.70 |

Notes:

Table 8 presents the results of estimating equation (2) for 2 sub-groups of ethical funds. All funds launched before 1998 go into the “Old” portfolio, while funds launched after 1998 are in the “Young” portfolio. Reported are the OLS estimates for each country and/or region, and within regions for both old and young ethical funds. Difference is a portfolio which is constructed by subtracting young from old fund returns.

$$R_t - R_{f_t} = \alpha + \beta_0 (R_{m_t} - R_{f_t}) + \beta_1 \text{SMB}_t + \beta_2 \text{HML}_t + \beta_3 \text{Mom}_t + \varepsilon_{it} \quad (2)$$

Where R_t is the fund return, R_{f_t} the risk-free rate, R_m the return on the total Universe according to Worldscope, and SMB and HML the factor-mimicking portfolios for size and book-to-market. Mom is a factor-mimicking portfolio for the 12-month return momentum. All alphas in the table are annualised. T-stats are heteroskedasticity consistent.

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

Table 9: Differences between ethical and conventional funds by age, 1998:01 – 2001:03

| Country / region | 4-factor Alpha | Market | SMB | HML | Mom | R ² _{adj} |
|-----------------------|-------------------|----------|-----------|-----------|----------|-------------------------------|
| Germany | | | | | | |
| <i>International</i> | | | | | | |
| Difference Old | 3.26 | - 0.17** | 0.32*** | - 0.02 | - 0.10* | 0.28 |
| Difference Young | - 2.09 | 0.00 | - 0.01 | 0.15** | - 0.02 | 0.24 |
| United Kingdom | | | | | | |
| <i>Domestic</i> | | | | | | |
| Difference Old | 0.26 | - 0.09** | 0.15*** | - 0.11** | 0.01 | 0.51 |
| Difference Young | 0.16 | - 0.05 | 0.04 | - 0.13** | 0.03 | 0.25 |
| <i>International</i> | | | | | | |
| Difference Old | 10.39* | - 0.22** | 0.68*** | - 0.45*** | - 0.06 | 0.61 |
| Difference Young | - 2.76 | - 0.14* | 0.40*** | - 0.17** | - 0.02 | 0.30 |
| United States | | | | | | |
| <i>Domestic</i> | | | | | | |
| Difference Old | 0.63 | - 0.07** | - 0.13*** | - 0.03 | - 0.05** | 0.72 |
| Difference Young | - 4.16 | 0.05 | 0.10* | - 0.04 | - 0.04 | 0.13 |
| <i>International</i> | | | | | | |
| Difference Old | 3.75* | 0.00 | - 0.20** | - 0.11* | 0.08* | 0.51 |
| Difference Young | - 1.41 | 0.05 | - 0.21** | 0.02 | - 0.10* | 0.35 |

Notes:

Table 9 presents the results of estimating equation (2) for 2 sub-groups of ethical funds. All funds launched before 1998 go into the “Old” portfolio, while funds launched after 1998 are in the “Young” portfolio. Reported are the OLS estimates for the *difference* between old ethical funds and conventional funds (difference old) and the *difference* between young ethical fund and conventional funds (difference young).

$$R_t - R_{f_t} = \alpha + \beta_0 (R_{m_t} - R_{f_t}) + \beta_1 \text{SMB}_t + \beta_2 \text{HML}_t + \beta_3 \text{Mom}_t + \varepsilon_{it} \quad (2)$$

Where R_t is the fund return, R_{f_t} the risk-free rate, R_m the return on the total Universe according to Worldscope, and SMB and HML the factor-mimicking portfolios for size and book-to-market. Mom is a factor-mimicking portfolio for the 12-month return momentum. All alphas in the table are annualised. T-stats are heteroskedasticity consistent.

*** Significant at the 1% level

** Significant at the 5% level

* Significant at the 10% level

NOTES

¹ The term Ethical Investing will be used throughout this paper, instead of the US equivalent, Socially Responsible Investing (SRI).

² Ethical investing has ancient origins. In biblical times, Jews made laws with directives on how to invest according to ethical values. In the US, George Fox founded the Quakers in the 16th century. This was a group of investors that applied social criteria to investing, based on their beliefs in human equality and non-violence. They were considered to be the first group of ethical investors.

³ Figures by Social Invest Forum (2001 Trends Report)

⁴ As we are not interested in individual ethical fund performance we will concentrate on the ethical market as a whole, by grouping funds into portfolios. Although we acknowledge that ethical funds employ a wide variety of ethical screens (for instance exclusion versus best-in-class) we think grouping funds enables us to address the question whether the ethical industry is efficient enough *as a whole*.

⁵ Worldscope covers over 98% of total market capitalization per country. Which is much broader than the average MSCI index coverage (70%).

⁶ The construction of these factor portfolios was done using the on-line research tool by Style Research Ltd.

⁷ See Jensen (1968)

⁸ Pesaran and Timmerman (1995) discuss several studies that emphasize the predictability of returns based on interest rates and dividend yields.

⁹ An alternative explanation for the under-performance of young ethical funds could be the recent bear market, starting at the end of 1999. As our multi-factor model however controls for market risk and style deviations this cannot fully explain the under-performance. Possibly the setting up of a new fund leads to high costs, which hurts investment performance.