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ETHICAL FACTORS IN CAPITAL MARKET. SOCIALLY RESPONSIBLE VERSUS UNSCRUPULOUS INVESTMENT

Socially Responsible Investment (SRI) funds have been shown to underperform, primarily due to restricting their investments to a subset of the universe of investable assets. Rapid growth of SRI funds implies that there is a growing segment within the investment community who are willing to accept lower returns than the unrestricted investors. However, it also follows that investors' utility derived from ethical investments perhaps reflects an added dimension, or an ethical premium, that compensates them for this underperformance. This research questions whether investors, on average, would remain committed to ethical investments in the face of decreasing wealth. We attempt to answer this question, by first observing the differences between an ethical portfolio and an (un)ethical portfolio, created by using assets that are deemed uninvestable by ethical screens. Using market and style associated risk filtered premiums, we find that (i) increased demand for ethical assets results in a decrease in demand for non-ethical assets, and (ii) poor past market performance, that leads to general wealth decreases, results in increased demand for unethical assets and decreased demand for ethical assets.

Keywords: Socially Responsible Investment (SRI), ethics in capital market, Vector Autoregression (VAR), and Variance Decomposition (VDC).

JEL classification: G11, G20,

INTRODUCTION

The neo-classical theory of finance states that the only criteria of investment choice should be the relationship between expected return and systematic risk. This notwithstanding, we observe that people also take into account other considerations while making their investment decisions. For instance, they look at ethical and social values of the company they intend to invest in. There is now a special segment of the asset management industry – represented mainly by so-called Socially Responsible Investment (SRI) funds – that have been growing fast in the United States as well as in other

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developed capital markets (the U.K., France, Germany, and Switzerland). According to the Social Investment Forum (2003), the total value of assets management in socially responsible portfolios in the U.S. reached $2.16 trillion in 2002 which was 11.3% of all assets under management in the United States. In 1984, when the first statistics were taken, the value of socially responsible investment was estimated to be around $40 billion, and by 1995 it was already $639 billion. Between 1995 and 2002, it rose by another $1.52 trillion, showing the growth rate was 40% greater than the growth of total conventional assets under management (2003 Report on Socially Responsible Investing Trends in the United Stated, Social Investment Forum, www.socialinvest.org).

Ethical values in the SRI segment are not universal. Various SRI managers may use different criteria for the screening. At first, mainly negative exclusionary screens were in use. For instance, SRI funds would refrain from investing in companies obtaining their revenues from weapons, tobacco products, alcohol or gambling. In the time of apartheid, many SRI managers also eliminated from their portfolios companies with interests in South Africa (Teoh, Welch and Wazzan 1999). Later, some additional positive screens were added to the selection procedure, which look for good employee relations, environmental and sustainability responsibility, products benefiting society, etc.

The increasing popularity of socially responsible investment raises a question about returns offered to investors in exchange for their good ethical standards. From the point of view of finance theory, there are two main reasons why we should expect SRI to deliver rather lower than higher risk-adjusted returns. Putting any additional constraints on portfolio selection may only lead to long-term underperformance or – in the best case scenario – similar performance to conventional assets of the same risk characteristics. SRI investment opportunities are just a subset of the total investment universe. Restriction to this subset may lead to underdiversification and construction of sub-optimal portfolios. However, even if the amount of SRI opportunities is large and diverse enough to allow proper levels of risk reduction, there may be still another issue. If the financial strength of ethical investors is substantial, the increased demand for socially responsible stocks may move the prices up. This is only true if we assume that there are limits of action to unethical, but rational arbitrageurs, and that supply of SRI stocks is not perfectly elastic, i.e. companies can switch to become ethical only slowly and gradually in the response to the demand of ethical investors. Higher current stock prices will mean lower expected returns for investors, but also lower cost of capital for the ethical company. Heinkel, Kraus and Zechner

(2001) presented a formal model of equilibrium in which some investors have additional non-financial criteria while making investment decisions.

Empirically, the performance of socially responsible investment was tested in three main areas of research. Firstly, the returns of SRI funds were compared with those achieved by conventional mutual funds. Studies in this area include: Hamilton, Jo and Statman (1993), Statman (2000), Bauer, Koedijk and Otten (2002), Geczy, Stambaugh and Levin (2003), Schroeder (2003) [Schroeder (2003) presents a more detailed literature review on socially responsible investment both for the U.S. and European markets.], and Bello (2005). Overall, there were no major differences noticed in the performance of SRI funds and conventional funds both in the United States and in Europe. Therefore, the hypothesis that the ethical constraint on portfolio selection will lead to underperformance was not clearly proven. However, results from this type of studies should be interpreted with caution. There may be substantial differences in the level of risk among portfolios of various funds. Additionally, different investment styles and skills of fund managers may blur the picture.

Some of the above mentioned drawbacks could be avoided, if specially constructed social indexes, such as the Domini 400 Social Index, the Calvert Social Index, the Citizens Index, or the Dow Jones Sustainability Index, are used to approximate the performance of socially responsible investment. A number of studies assessed directly the changes in levels in a social index against the general market indexes (Sauer 1997, DiBartolomeo and Kurtz 1999, Statman 2000, Statman 2005, Schroeder 2003). Again, generally speaking, underperformance of SRI could not be proven, and in some cases the overperformance of the social index was observed. However, results from a comparison of indexes against the market should be treated perhaps with even greater caution than those from studies on returns achieved by SRI funds. Performance of social indexes seems to be highly sensitive to their construction method and index inclusion criteria may differ significantly among indexes and over time (Statman 2005).

The final approach in testing the SRI performance is to go directly to the individual data on stocks and to construct self-made portfolios of ethical assets that pass selected screens (Diltz 1995, Guerard 1997, Derwall et al 2004). Knowing characteristics of stocks included in portfolios helps to understand what really drives the returns of ethical assets and if they are different just because of being ethical or due to other characteristics. After accounting for size, book-to-market, sectoral momentum effects, prior

studies were generally unable to distinguish any difference in performance of ethical stocks compared to the overall market.

As the number of companies that care about ethics and social responsibility – or at least publicly declare to do so – dramatically increases, they constitute a larger share of the total universe of investment opportunities. Therefore, it may be difficult to spot any significant difference between the performance of a social portfolio and general market, because the proportion of purely unethical assets in the market is too small. This implies that the assets contained in social indexes are very similar to assets in ordinary indexes, as ordinary indexes include many "ethically neutral" stocks. One should, therefore, compare ethical assets with those which are extremely unethical, in order to exaggerate difference in characteristics and performance. We are not aware of any studies that do so.

In our research we simulate the performance of self-constructed unethical index or portfolio and compare it against socially responsible assets represented by the Domini 400 Social Index (DS400). In this way, we eliminate "ethically neutral" companies from the general market from our analysis. We also focus only on the top five commonly accepted screens, in order to pick up the most unethical companies, namely assets connected with alcohol, tobacco, gambling, weapons, and those that are considered environmentally harmful. Our intention is to compare possibly extreme sides of the market in terms of (un)ethical investment. If there are any differences in performance to be noticed, it may be hypothesised that unethical companies are more likely to deliver higher returns. If there are many investors with strong ethical beliefs that are not met with unethical rational arbitrageurs, the "bad" companies should be penalized with higher cost of capital. This would also mean higher returns for those few who do not care about ethics and agree to hold "vice" stocks. We look at characteristics of both categories of assets (risk, size, book-to-market) and check for the momentum effect. This research also analyses how the return spread between unethical and ethical asset indexes ("unethical premium") changes over time and look for the factors that may influence the degree of investors' morality.

1. METHODOLOGY

Evaluation of how ethical assets (as represented by the DS400 index) behave similarly (or differently) from unethical assets is explored in three ways. First, we explore the styles of assets that are selected in each category

of investment, as well as observe how that style changes over time. (Style is analyzed in terms of growth versus value bias, and also in terms of capitalization.) Second, we observe the inter-temporal relationship between the two classes of investment. Finally, this research explores factors that affect the returns spread (that is also termed as unethical premium) of the two investments classes, and determine if those factors are important over time. As mentioned in the previous section, we use two sets of indexes, the first represents ethical assets and is proxied by DS 400, while the second index, representing vice investment, is a value weighted "unethical" sectors (the sectors are described in the next section) from the market.

First, the two types of assets are evaluated for 3-factor risk premia over the period of evaluation. Comparisons of risk premia are also made over two periods signified by low volatility and high volatility periods in the stock market. The break in the sample period is obtained by observing the graphical plot of the market index and then further tested using Chow's structural break test (the results are not reported but can be provided on demand). We utilize the following regression to obtain the risk premium for the Fama and French 3-factor model

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_m [r_{m,t} - r_{f,t}] + \beta_{SMB} [r_{Small\ Cap,t} - r_{Large\ Cap,t}] + \beta_{HML} [r_{Value,t} - r_{Growth,t}] + \zeta_{i,t}$$

Eq. 1a and 1b

where:

$r_{i,t}$ is the monthly returns on portfolio type i at time t; i can be either ethical (equation 1a) or unethical (equation 1b) assets.

$r_{m,t}$ is the monthly returns on Wilshire 5000 at time t

$r_{f,t}$ is the monthly riskfree rate of return at time t

$r_{Small,t}$ is the monthly returns for Wilshire Small Cap 250 Index at time t

$r_{Large,t}$ is the monthly returns for Wilshire Large Cap 750 Index at time t

$r_{Value,t}$ is the monthly returns for Wilshire All Value Index at time t

$r_{Growth,t}$ is the monthly returns for Wilshire All Growth Index at time t

$\zeta_{i,t}$ is the error term for the regression (please note that despite the same symbols, coefficients α_i , β_m , β_{SMB} , β_{HML} in equations 1-6 are the result of different regressions and therefore have different values).

If Fama and French's three factors account for all risk, the residuals from both regressions should be only white noise. However, where the two residual series contain information not accounted for by the 3 risk factors, it is important to understand the relationship with each other as well as with other market factors.

Second, after ensuring that the residuals series are not white noise, we can then proceed to evaluate any inter-temporal relationship that may exist between the two investment styles. Therefore, the second stage of this research analyses whether the two investment styles are cointegrated, as well as if any simultaneous relationship might exist. If any long-run relationship does exist, it should be modelled while attempting to capture any short-run relationship. As both types of assets exist in the same economy, long-term and short-term relationship should be observed. However, this research tries to evaluate the relationship between the two asset types based upon the demands due to investors' ethical preferences, other than known systematic risk factors, such as broad market effects and investment styles. Hence to model such a relationship these systematic and known investment style factors should be included as exogenous to the system. Also, since both types of assets are priced concurrently in the market place, it is essential to obtain their relationship on a simultaneous basis by using a Vector Autoregressive (VAR) model. Other reasons for using a VAR model include its ability to use non-stationary series without sacrificing coefficient validity, as well as being able to forecast out-of-sample effect of one endogenous variable on the other.

The results from such a simultaneous system of equations can then provide a multi-dimensional analysis of any remaining relationship that may exist. For example, we are able to gauge the speed of adjustment of the two assets to a long run average, if any long-term relationship exist. If ethical assets adjust faster than unethical ones, then it implies that there is less of an over-reaction by ethical investors and that unethical investments are less efficiently priced. The existence of any short-term relationship between the two investment styles will reveal how investors' demand for the two types of assets is affected by each other. For example, if current returns from a particular type of investment were affected by its own lagged returns, it would imply that past information has not been completely incorporated by the investors and that inefficiencies exist. Hence, a system of equations is also able to provide indications of any persistence of returns for each index, lending support for momentum based trading. Additionally, there may be evidence that either one type of investment affects the other, or feedback of information between the two asset types is revealed. It is of interest to evaluate the sign of lagged coefficient to determine the specific characteristics of any short-term relationship between ethical and vice asset groups.

To test for short run relationships between two series, Engle and Granger (1987) have provided a Vector Autoregression (VAR) specification of first

differences. In our case, the two series are return premiums from ethical ($r_{Ethical} - r_{f,t}$) and unethical ($r_{Unethical} - r_{f,t}$) indexes. As mentioned earlier, known systematic and investment styles are accounted for by including them as exogenous factors in the system of equations. Hence, our VAR model is expressed as follows:

$$r_{Ethical,t} - r_{f,t} = \sum_{l=1}^{n} \alpha_l (r_{Ethical,t-l} - r_{f,t-l}) + \sum_{l=1}^{n} \omega_l (r_{Unethical,t-l} - r_{f,t-l}) + \beta_m [r_{m,t} - r_{f,t}] + \beta_{SMB}[r_{Small\ Cap,t} - r_{Large\ Cap,t}] + \beta_{HML}[r_{Value,t} - r_{Growth,t}] + \Phi_{Ethical,t}$$

Eq. 2a

$$r_{Unethical,t} - r_{f,t} = \sum_{l=1}^{n} \gamma_l (r_{Ethical,t-l} - r_{f,t-l}) + \sum_{l=1}^{n} \chi_l (r_{Unethical,t-l} - r_{f,t-l}) + \beta_m [r_{m,t} - r_{f,t}] + \beta_{SMB}[r_{Small\ Cap,t} - r_{Large\ Cap,t}] + \beta_{HML}[r_{Value,t} - r_{Growth,t}] + \Phi_{Unethical,t}$$

Eq. 2b

where:
α_l and γ_l are the lag coefficient terms of ethical residuals and ω_l and χ_l are the lag coefficient terms of unethical residuals.

Testing for Granger causality of one variable to another is conducted through the joint test of significance for ω and γ. If ω is significant it reveals that the changes in unethical residuals causes changes in ethical residuals, while a significant γ shows that changes in ethical residuals Granger causes changes in unethical residuals. The appropriate lag length l is obtained by searching for the optimal Akaike (1974) Information Criterion over various intervals up to 4 lags. The results indicate that a lag of 2 for both series provides the optimal AIC. (We used E-views software to determine the optimal lag structure by optimizing AIC.) Hence, equations 2a and 2b look as follows:

$$r_{Ethical,t} - r_{f,t} = \sum_{l=1}^{2} \alpha_l (r_{Ethical,t-l} - r_{f,t-l}) + \sum_{l=1}^{2} \omega_l (r_{Unethical,t-l} - r_{f,t-l}) + \beta_m [r_{m,t} - r_{f,t}] + \beta_{SMB}[r_{Small\ Cap,t} - r_{Large\ Cap,t}] + \beta_{HML}[r_{Value,t} - r_{Growth,t}] + \Phi_{Ethical,t}$$

Eq. 3a

$$r_{Unethical,t} - r_{f,t} = \sum_{l=1}^{2} \gamma_l (r_{Ethical,t-l} - r_{f,t-l}) + \sum_{l=1}^{2} \chi_l (r_{Unethical,t-l} - r_{f,t-l}) + \beta_m [r_{m,t} - r_{f,t}] + \beta_{SMB}[r_{Small\ Cap,t} - r_{Large\ Cap,t}] + \beta_{HML}[r_{Value,t} - r_{Growth,t}] + \Phi_{Unethical,t}$$

Eq. 3b

The joint test of significance for ω_1 and ω_2, and for γ_1 and γ_2 provides evidence of existence and the direction of causality. However, any lead-lag relationship observed between variables using Granger causality testing reveals only in-sample effects but is unable to provide the dynamic nature of relationship between these variables. Also, the magnitude and direction outside the sample period cannot be gauged. Sims (1982) has shown that for a given systems of equations, its reaction to a random innovation can be observed for each variables by Impulse Response Function (IRF). Through this technology, one is able to observe the transitory as well as permanent effects on each variable in the system due to a random shock originating from one of the variables within the system. Graphically, one can observe the path of one of the variables due to a one standard deviation shock within the system.

Further, Sims (1982) has shown that if the forecasted error of each variable and for each time period can be attributed due to its own innovations and those due to the other variables in the system. This means that each variable's forecasted variance can be decomposed to provide understanding of its future direction through Variance Decomposition (VDC). For example, if ethical assets had a larger influence on unethical assets, then the ethical investments' forecasted variance would primarily be due to its own innovations, but the variance of the vice investment would show a much larger impact due to effects from the ethical investment innovations. VDC is derived from a moving average representation of the original VAR equation. (For further details see Sims (1980, 1982).)

The third aspect of this research evaluates the return spread between unethical and ethical asset indexes, and factors that help explain such a spread over various market conditions.

$$r_{Unethical,t}-r_{Ethical,t}=\alpha_i+\beta_m[r_{m,t}-r_{f,t}]+\beta_{SMB}[r_{Small\ Cap,t}-r_{Large\ Cap,t}]+\beta_{HML}[r_{Value,t}-r_{Growth,t}]+\varepsilon_{i,t}$$

Eq. 4

where:

$r_{Unethical,t}$ - $r_{Ethical,t}$ is the monthly portfolio return differences between ethical portfolios and unethical portfolios.

This research's primary hypothesis is that a decrease in the return spread between unethical and ethical asset indexes may be due to a higher demand

for ethical assets. Demand for ethical assets may be due to two reasons; first, if investors can accept lower returns in lieu of feeling "good" about encouraging ethical corporate behaviour and investment. Such a trade-off by investors would most likely take place when the investors feel confident about their wealth. The second reason for this demand may be if investors are aware of future market conditions and are able to gauge if "vice" assets will under perform in future. An alternative reason for a decrease in unethical-ethical returns spread may be that socially responsible (SR) fund managers may have gained experience over time and hence are able to produce better returns for their investors. To test the first theory, we analyze if unethical-ethical spread is related to past market conditions or contemporaneous ethical returns, by performing the following regression:

$$\Delta[r_{Unethical,t} - r_{Ethical,t}] = \alpha_i + \beta_{m\text{-}Lag}\, \Delta[r_{m,t-1} - r_{f,t-1}] + \beta_{Ethical\_premium}\, \Delta[r_{EThical,t} - r_{m,t}] + \eta_t \quad \text{Eq. 5}$$

where:

$\Delta [r_{Unethical,t} - r_{Ethical,t}]$ is the monthly change of the spread between unethical and ethical portfolios,

$\Delta[r_{m,t-1} - r_{f,t-1}]$ is the monthly change of the market premium,

$\Delta[r_{EThical,t} - r_{m,t}] r_{m,t}$ is the monthly change of the ethical premium.

If $\beta_{m\text{-}Lag}$ in the regression above is positive, it provides evidence that unethical assets improve returns in the period following higher market returns in the previous period, while a negative significant coefficient indicates the opposite. We hypothesize that the beta should be negative if investors' asset holdings move from ethical to unethical assets based upon negative changes in market conditions and hence investors' wealth. Thus a negative coefficient indicates that investors are ethical (in that they choose a lower return on ethical assets to vice assets) if they have higher levels of wealth. However, it may simply be the case that contemporaneous returns from ethical assets are high, and hence a negative significant $\beta_{Ethical\_premium}$ coefficient.

Our second hypothesis relates the experience of ethical fund managers with the performance of ethical funds. Since socially responsible investment style is a recent style of investments, it could be hypothesized that ethical fund managers do not have the same level of experience in fund management, as would managers of other styles, and this in turn implies

underperformance of SRI funds. This underperformance may lead to a decrease in investors' cashflows to such funds and hence a decreased demand for ethical assets under management. This decrease in demand may perhaps be one of the factors that may have lead to a temporary negative pressure on asset prices. Hence, if ethical fund managers gain experience and the ability to better manage ethical portfolios over time, then the unethical-ethical spread should also decrease over time. To evaluate this hypothesis, the following regression is estimated:

$$r_{Unethical,t} - r_{Ethical,t} = \alpha_i + \beta_{Time}\, time + \varphi_t \qquad \text{Eq. 6}$$

where:
time is the number of months since May 1990.

In the above regression, if our hypothesis holds, then β_{Time} should be negative, indicating decreased unethical-ethical spread over time. It is necessary to point out that changes in asset prices in response to fund manager decreased holdings should only occur if the fund managers are the majority shareholders for that asset.

2. DATA DESCRIPTION AND PRELIMINARY RESULTS

Our proxy for a portfolio of socially responsible companies is the DS400 Index, which was initiated in May 1990 by Kinder, Lydenberg, Domini & Copmany (KLD). It is a capitalization-weighted index that consists of 400 companies: approximately 250 of them are large-cap stocks that are also included in the S&P500 Index, there are about 100 non-S&P500 companies that are selected to provide proper industry representation, and there are approximately 50 non-S&P500 companies with particularly strong ethical characteristics. The exclusionary screens eliminate from the composition of the DS400 Index any company that derives any revenue at all from the manufacture of alcohol or tobacco products, or from the provision of products or services related to gambling, or firms that derive 2 per cent or more of its revenue from sales of weapons. Before 1993 there was also an additional screen that eliminated companies with interests in South Africa.

On the other extreme we construct a portfolio that includes unethical assets selected on the basis of the five most common screens, namely companies associated with alcohol, tobacco, gambling, weapons, and environmental harm. Our unethical portfolio is capitalization-weighted, rebalanced monthly, and consists of all companies included in Distillery&Vintners, Brewers, Tobacco, Gambling, Defence, Forestry, Mining, and Oil&Gas Exploration sectoral indexes of the US market, as provided by DataStream.

Our proxy for the market portfolio comes from the performance of the Dow Jones Wilshire 5000 Total Market Index, which provides broad market representation of all categories of stocks. We calculate the size premium (SMB) by subtracting the return on the Wilshire Top 750 Large Company Index from the return on the Wilshire Small Cap 250 Index. The Wilshire Small Cap 250 Index is a subset of the Wilshire Small Cap 750 Index. It is a market capitalization-weighted index of 250 stocks using proprietary sampling and construction techniques to minimize turnover and liquidity problems without altering the performance pattern of small cap stocks. A more detailed description of all indexes used in this study can be found on the Wilshire's webpage www.wilshire.com/indexes. We calculate the book-to-market value premium (HML) by subtracting the return on the Wilshire All Growth Index from the return on the Wilshire All Value Index. We check for cross-correlation between our SMB and HML and observe that they are statistically independent. All the above style-indexes are subsets of the Dow Jones Wilshire 5000 Composite Index, are capitalization-weighted and were taken on a monthly basis from DataStream. The risk free rate is assumed to be the US 13-week Treasury Bill rate, as provided by DataStream.

Our analysis comprises a 15-year period from May 1990, when the DS 400 Index was initiated, to the end of April 2005, when we concluded this study. This period is partitioned into two sub-periods. The period from May 1990 to July 1998 is of steady market growth and lower price volatility (3.9% per month for market, 4% for ethical and 4.2% for unethical assets), while the second period is characterised by higher price volatility (5% per month for market, 5.14% for ethical and 5.68% for unethical assets).

Table 1

Descriptive Statistics

Descriptive statistics for the market rate of return (r_m) proxied by Wilshire 5000, riskfree rate of return (r_f) proxied by the 90 day treasury bill rate, SMB obtained from the difference in returns between Wilshire 750 and Wilshire 250, HML obtained from the difference in returns between Wilshire All Growth Index from the return on the Wilshire All Value Index, return on ethical assets ($r_{ethical}$) proxied by DS400 Index and return on unethical assets calculated by forming a value-weighted from 4 sector indexes – Distillery & Vintners, Brewers, Tobacco, Gambling, Defence, Forestry, Mining, and Oil&Gas Exploration. All returns are on monthly basis over the whole sample and the two sub-sample periods: Low Volatility period (May 1990 - July 1998) and High Volatility period (August 1998 - April 2005).

Sample Period: May 1990 - April 2005

	r_m	r_f	r_m-r_f	SMB	HML	$r_{Ethical}$	$r_{Ethical}$ - r_f	$r_{Unethical}$	$r_{Unethical}$ - r_f	$r_{Unethical}$-$r_{Ethical}$
Mean	0.0071	0.0034	0.0037	0.0011	0.0022	0.0104	0.0070	0.0111	0.0078	0.0000
Median	0.0128	0.0038	0.0109	0.0047	0.0014	0.0108	0.0082	0.0112	0.0072	-0.0008
Std. Dev.	0.0429	0.0015	0.0429	0.0324	0.0328	0.0447	0.0447	0.0482	0.0481	0.0431

Low Volatility Period: May 1990 - July 1998

	r_m	r_f	r_m-r_f	SMB	HML	$r_{Ethical}$	$r_{Ethical}$ - r_f	$r_{Unethical}$	$r_{Unethical}$ - r_f	$r_{Unethical}$-$r_{Ethical}$
Mean	0.0102	0.0040	0.0062	-0.0028	-0.0001	0.0149	0.0109	0.0100	0.0060	-0.0054
Median	0.0146	0.0042	0.0104	-0.0006	0.0009	0.0180	0.0139	0.0112	0.0072	-0.0058
Std. Dev.	0.0390	0.0010	0.0389	0.0260	0.0175	0.0408	0.0408	0.0416	0.0415	0.0292

High Volatility Period: August 1998 - April 2005

	r_m	r_f	r_m-r_f	SMB	HML	$r_{Ethical}$	$r_{Ethical}$ - r_f	$r_{Unethical}$	$r_{Unethical}$ - r_f	$r_{Unethical}$-$r_{Ethical}$
Mean	0.0011	0.0026	-0.0015	0.0050	0.0046	0.0028	0.0003	0.0110	0.0085	0.0062
Median	0.0122	0.0022	0.0114	0.0083	0.0046	0.0028	0.0014	0.0083	0.0059	0.0044
Std. Dev.	0.0509	0.0015	0.0510	0.0395	0.0449	0.0514	0.0515	0.0568	0.0568	0.0551

Source: self-computed with E-views software

Table 1 presents detailed statistics. Over the 15 years, both the DS400 Index and our unethical portfolio on average outperformed the market, delivering not only higher absolute risk premiums, but also offering better Sharpe ratios. The unethical portfolio performed, on average, slightly better than DS400 and ethical assets. Interestingly, the first sub-period shows that ethical assets outperformed unethical assets by about 50% (1.5 times) on a monthly basis. The second period shows that unethical portfolios outperformed the ethical portfolios by almost 400% (4 times). (However, statistically the difference between ethical and

unethical risk premiums in the analyzed period and the two sub-periods is not significant at the 5% and 10% significance levels.)

3. DETAILED RESULTS AND DISCUSSION

Past research on ethical funds and assets has been restricted to the evaluation of risk premiums using various models. However, it is of importance also to observe time varying risk premium for not only ethical but also assets that will be excluded using basic screens. Assets that reside on the other extreme of the ethical scale due to the nature of their business can provide an insight into their characteristics, as well as time varying behaviour. Additionally, differences in composition and market behaviour between the two types of assets are also revealed. As mentioned previously, this research also focuses on two other aspects – first, the nature of inter-temporal relationship between the two types of assets, both long term and short term in nature. Second, this research also evaluates factors that affect the return spread between unethical and ethical assets.

We first evaluate the types of investments in terms of Fama and French 3-factor model, over a 15-year period, as well as over two sub-periods of low and high market volatility. The results are presented in Table 2 below:

Table 2

Fama and French 3-Factor model for Ethical and Unethical assets

This table summarizes the risk premia for ethical and unethical assets over the whole sample period - All (May 1990 - April 2005), as well as for two sub-sample periods: Low Volatility period (May 1990 - July 1998) and High Volatility period (August 1998 - April 2005). Ethical portfolio returns ($r_{ethical}$) proxied by DS400 Index and unethical portfolio returns are calculated by forming a value-weighted from 4 sector indexes – Distillery & Wintners, Brewers, Tobacco, Gambling, Defence, Forestry, Mining, and Oil&Gas Exploration. T-statistics are provided in parentheses.

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_m [r_{m,t} - r_{f,t}] + \beta_{SMB} [r_{Small\ Cap,t} - r_{Large\ Cap,t}] + \beta_{HML} [r_{Value,t} - r_{Growth,t}] + \zeta_{i,t}$$

where:

$r_{i,t}$ is the monthly returns on portfolio type i at time t; i can be either ethical (right hand side panel) or non-ethical (left hand side panel) assets,

$r_{m,t}$ is the monthly returns on Wilshire 5000 at time t,

$r_{f,t}$ is the monthly riskfree rate of return at time t,

$r_{Small,t}$ is the monthly returns for Wilshire Small Cap 250 Index at time t,

$r_{Large,t}$ is the monthly returns for Wilshire Large Cap 750 Index at time t,

$r_{Value,t}$ is the monthly returns for Wilshire All Value Index at time t,

$r_{Growth,t}$ is the monthly returns for Wilshire All Growth Index at time t,

$\zeta_{i,t}$ is the error term for the regression.

Independent Variable	Risk Premium for Ethical Assets			Risk Premium for Unethical Assets		
	All	Low Volatility	High Volatility	All	Low Volatility	High Volatility
Intercept	0.004 [a]	0.004 [a]	0.003 [a]	0.004	0.001	0.006
	(5.02)	(5.028)	(2.490)	(1.327)	(0.214)	(1.339)
r_m-r_f	1.032 [a]	1.039 [a]	1.012 [a]	0.767 [a]	0.831 [a]	0.689 [a]
	(58.58)	(48.654)	(39.603)	(11.382)	(11.279)	(7.028)
SMB	-0.219 [a]	-0.190 [a]	-0.225 [a]	-0.101	-0.114	-0.073
	(-9.90)	(-6.032)	(-7.140)	(-1.200)	(-1.047)	(-0.605)
HML	-0.040 [c]	-0.184 [a]	-0.022	0.677 [a]	-0.153	0.799 [a]
	(-1.76)	(-4.033)	(-0.762)	(7.796)	(-0.974)	(7.284)
Adj R-squared	0.96	0.96	0.96	0.45	0.60	0.50

Level of significance is specified as [a] for 1%, [b] for 5%, and [c] for 10%

Source: self-computed with the use of E-views software

The results reveal differences in characteristics between the two types of assets. For example, ethical assets have a beta close to 1, which is not surprising since 250 of the 400 companies in the DS 400 are also included in S&P 500. Unethical assets have lower levels of market risk suggesting that most assets are from mature and stable industries. In terms of size bias, ethical firms are larger, though no such bias was found for unethical assets. In terms of value or growth bias, both types of assets were very different. Ethical assets were growth orientated, as the betas were negative and significant (except during the high volatility period) while vice investments are statistically value biased (except during the low volatility period). Readers should note that the ADF test for unit root on the residual for all regressions was rejected in every case, and shows that the residuals are not white noise. Hence, we conclude that all risk factors have not yet been accounted for.

After filtering out market and style effects from the returns premiums, residuals from equations 1a and 1b are tested to observe if any relationship exists between ethical and unethical assets. For instance, it is of interest if there *does* exist any long run relationship and if one type of investment leads the other. Since Fama's 3-factor risk model has not accounted for all the risk in either indexes, we will proceed with the next aspect of this research in evaluating the relationship between the types of investments, as well as the factors that account for the unethical-ethical spread. To analyze the inter-temporal relationship between the two assets, both short and long term, it is important to ensure if any cointegrating relationship that may exist between the two investments is taken into consideration. Cointegration tests on the two index series, after filtering out known systematic risk factor and

investment styles, show that there does not exist any long-term relationship between unethical and ethical investments during the sample period or any sub-sample periods (we tested for the existence of unit root using ADF test and there was none). The resulting relationship is provided in Table 3 below:

Table 3

Vector Autoregression (VAR) Results

This table provides results from VAR model that includes premiums from Ethical ($r_{Ethical}$) and Non-ethical ($r_{Unethical}$) asset indexes as endogenous variables and market risk premium (r_m-r_f), HML (r_{Value} - r_{Growth}) and SMB ($r_{Small\ Cap}$ - $r_{Large\ Cap}$). T-statistics are provided underneath coefficient estimates. Results are reported over whole sample period: All (May 1990 - April 2005), as well as for two sub-sample periods: Low Volatility period (May 1990 - July 1998) and High Volatility period (August 1998 - April 2005). Significance levels are reported at 1, 5 and 10%.

	Period: All		Low Period: Volatility		High Period: Volatility	
Dependent Variable	$r_{Ethical,t}$	$r_{Unethical,t}$	$r_{Ethical,t}$	$r_{Unethical,t}$	$r_{Ethical,t}$	$r_{Unethical,t}$
$r_{Ethical,t-1}$	0.0332 [c]	-0.1518 [b]	0.0418	0.0730	0.0280	-0.2105 [b]
	(1.7456)	(-2.0830)	(1.2555)	(0.6054)	(1.0676)	(-2.1568)
$r_{Ethical,t-2}$	-0.0296	0.0364	-0.0488	-0.0586	-0.0295	0.1004
	(-1.6216)	(0.5202)	(-1.5867)	(-0.5262)	(-1.1450)	(1.0484)
$r_{Unethical,t-1}$	-0.0190	0.0608	-0.0387	-0.0258	-0.0089	0.0586
	(-1.1028)	(0.9220)	(-1.3334)	(-0.2458)	(-0.3758)	(0.6625)
$r_{Unethical,t-2}$	0.0408 [b]	-0.0411	0.0674 [b]	0.0554	0.0272	-0.0788
	(2.3571)	(-0.6198)	(2.2927)	(0.5205)	(1.1446)	(-0.8925)
Intercept	0.0065 [a]	0.0075 [b]	0.0077 [a]	0.0037	0.0054 [a]	0.0089 [c]
	(8.6097)	(2.5678)	(7.9443)	(1.0619)	(4.2849)	(1.8746)
r_m-r_f	1.0255 [a]	0.7807 [a]	1.0327 [a]	0.8542 [a]	1.0045 [a]	0.7117 [a]
	(56.9827)	(11.3189)	(46.3467)	(10.5791)	(37.8568)	(7.2127)
HML	-0.0501 [b]	0.7046 [a]	-0.1841 [a]	-0.1602	-0.0326	0.8523 [a]
	(-2.1373)	(7.8384)	(-4.0527)	(-0.9737)	(-1.0627)	(7.4810)
SMB	-0.2271 [a]	-0.0828	-0.1995 [a]	-0.1706	-0.2292 [a]	-0.0430
	(-9.8764)	(-0.9398)	(-5.8266)	(-1.3754)	(-6.9701)	(-0.3513)
R-squared	0.96	0.47	0.97	0.60	0.96	0.53
Adj. R-squared	0.96	0.45	0.96	0.57	0.95	0.49

Level of significance is specified as [a] for 1%, [b] for 5%, and [c] for 10%

Source: self-computed with the use of E-views software

The results in Table 3 show that the magnitude and signs of risk premia for the market, SMB and HML are similar to those when each investment's risk premium was determined (see Table 1) over each sample period. Table 3 also reports how investment-specific excess returns are affected by their own and their counterpart's lagged excess returns. We define investment-specific excess returns as returns from either ethical, or vice investments, after filtering out returns due to market and style factors. Our results show that neither investment types are affected by their own past returns and hence no evidence of persistence in returns is revealed. As monthly returns on indexes are used in this research, it is not surprising that investment-specific autocorrelation of returns is absent. However, there is evidence that excess returns from one type of investment affects the other, though this relationship is not stable over time. Results from Table 3 provide evidence of ethical excess returns being positively affected by two period lagged information from the vice investments during the overall sample period as well as periods of low volatility. During periods of high volatility, returns from ethical investment are not affected by its own, or unethical, lagged returns. Interestingly, one period lagged ethical excess returns had a negative influence on unethical investments, during the complete sample period and also during periods of high volatility.

Since results of the complete sample may be an aggregated effect of what really occurred during sub-periods, it is necessary to confirm if the observed relationships were significant in nature. We conducted block causality testing to reach any conclusion with regards to the relationship between excess returns from the two investment classes. Returns from assets are due to systematic and non-systematic factors. After accounting for Fama's (1993, 1996) systematic and style factors, excess returns from the two indexes should be due to idiosyncratic sources. Since our analysis is related to investors' preference based indexes, firm specific risk is diversified across firms and industries. Thus investment-specific excess returns should be due to investors' preference for that particular type of investment. This further implies that if investors' preference for either ethical or unethical investments does not change, there would be no resultant change in excess returns for either asset types. Alternatively, if majority investors' affinity (dislike) for a certain type of investment increases, its return would also increase (decrease) relative to its counterpart. Table 4 provides results of short-term relationship below:

Table 4

Block Causality Test Results

This table provides results from Block Causality Tests using the Vector Autoregressive model (Table 3). Results are reported over whole sample period: All (May 1990 - April 2005), as well as for two sub-sample periods: Low Volatility period (May 1990 - July 1998) and High Volatility period (August 1998 - April 2005). Significance levels are reported at 1, 5 and 10%.

Dependent variable: $r_{Ethical,t}$			
Excluded	**All**	**Low Volatility**	**High Volatility**
$r_{Unethical}$	6.3757[a]	7.2767[a]	1.3719
Dependent variable: $r_{Unethical,t}$			
Excluded	**All**	**Low Volatility**	**High Volatility**
$r_{Ethical}$	4.4097	0.6332	5.3187[c]

Level of significance is specified as [a] for 1%, [b] for 5%, and [c] for 10%

Source: self-computed with the use of E-views software

Granger causality test results from Table 4 indicate that excess returns from ethical investment are caused by excess returns from unethical investments during our sample period of 15 years. We do observe causality in the other direction as well but at 11% significance level, which we feel is too high to be judged as concrete evidence. However, once the sample period is split into low and high volatility periods, this unidirectional causal relationship is only observed during periods of low volatility. During a high volatility period, the direction of causality between the two investment types is reversed in that unethical investments are affected by ethical returns. These causality results provide some evidence that socially responsible investments are in demand during good times but during a period when vice investments provide higher returns, ethical investors' demand changes. During periods of low volatility, ethical assets provide significantly higher returns than both market and unethical investments (1.49% against 1.02% and 1% per month respectively). During this period, causality was observed from the second lag of unethical specific excess returns to ethical specific excess returns and the relationship was positive. During high volatility period, ethical investments returns were more than twice of the market (0.28% against 0.11% per month) but significantly underperformed vice investments that returned 1.1% per month. During this period, 1 period lagged ethical excess returns negatively affected unethical excess returns. We take this as evidence that during bad times investors' demand for ethical assets dropped in favour of vice investments over the next period.

Analysis of the systems of equations is further conducted by decomposing the errors for each investment type. Table 5 shows the results of Variance Decomposition (VDC) below:

Table 5

Results of Variance Decomposition of Non-ethical and Ethical Indexes

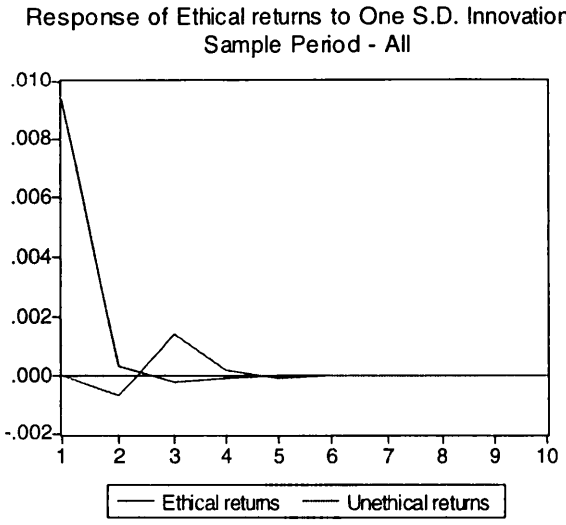
This table reports the results of Variance Decomposition of Ethical and Unethical risk filtered residuals using equation 1a and 1b on a monthly basis for the complete sample period, All (May 1990 - April 2005), as well as for two sub-sample periods: Low Volatility period (May 1990 - July 1998) and High Volatility period (August 1998 - April 2005).

Variance Decomposition of $\xi_{Ethical,t}$						
	All		Low Volatility		High Volatility	
Month	$\xi_{Unthical,\ All}$	$\xi_{Ethical,\ All}$	$\xi_{Unethical,\ Low}$	$\xi_{Ethical,Low}$	$\xi_{Unethical,\ High}$	$\xi_{Ethical,\ High}$
1	0.0000	100.0000	0.0000	100.0000	0.0000	100.0000
2	0.5256	99.4744	1.9210	98.0790	0.1089	99.8911
3	2.6866	97.3134	7.2160	92.7840	1.0471	98.9529
4	2.7210	97.2790	7.2168	92.7832	1.0611	98.9389
5	2.7276	97.2724	7.2168	92.7832	1.0697	98.9303
10	2.7283	97.2717	7.2169	92.7831	1.0704	98.9297
Variance Decomposition of $\xi_{Unethical}$						
	All		Low Volatility		High Volatility	
Month	$\xi_{Unthical,\ All}$	$\xi_{Ethical,\ All}$	$\xi_{Unethical,\ Low}$	$\xi_{Ethical,Low}$	$\xi_{Unethical,\ High}$	$\xi_{Ethical,\ High}$
1	99.9942	0.0058	99.9834	0.0166	98.8232	1.1768
2	99.8418	0.1582	99.9415	0.0585	98.4382	1.5618
3	99.8390	0.1610	99.9145	0.0856	98.3586	1.6414
4	99.8380	0.1620	99.9144	0.0856	98.3499	1.6501
5	99.8380	0.1620	99.9144	0.0856	98.3495	1.6505
10	99.8380	0.1620	99.9144	0.0856	98.3493	1.6507

Source: self-computed with the use of E-views software

The results show differences between the two investment types over various periods. For example, ethical investments derive 100% of their variability of returns from their own innovations during the first period, while unethical investments don't. However, the adjustment process is much faster during the low volatility period (4 periods for both investment types) than during the high volatility period (6 periods for both investment types). During a low volatility period, ethical investments derive much of their information from unethical assets (more than 7% after the 2nd period) while vice investments derived less than 1% from socially responsible investments. High volatility period VDC results show that only 1% of ethical returns variance is determined by unethical assets variations. The results are similar for unethical investment returns, with about a 1.7% variation due to ethical returns.

Figures 1 (whole sample period), 2 (Low volatility period) and 3 (High volatility period) present results from impulse response functions (IRF) of the VAR estimates in Table 3.



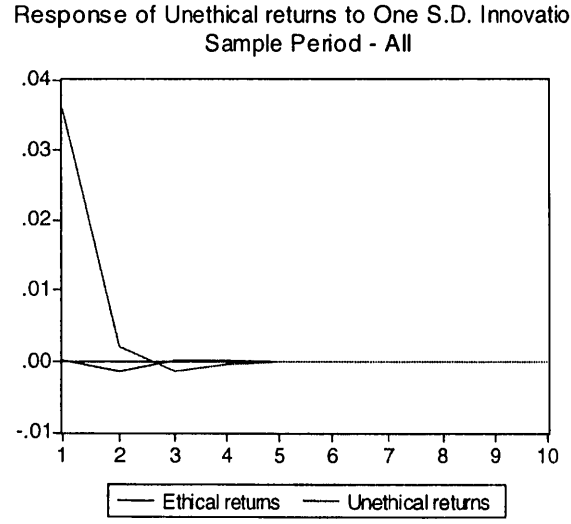


Figure 1. Results of Impulse Response Function for the whole sample period

Source: own analysis with the use of E-views software

The graphs above provide impulse-responses of 1 standard deviation shock of ethical and unethical returns to ethical returns (upper graph) and unethical returns (lower graph). Excess market returns, SMB and HML are exogenous factors. The sample period is ALL (May 1990 - April 2005).

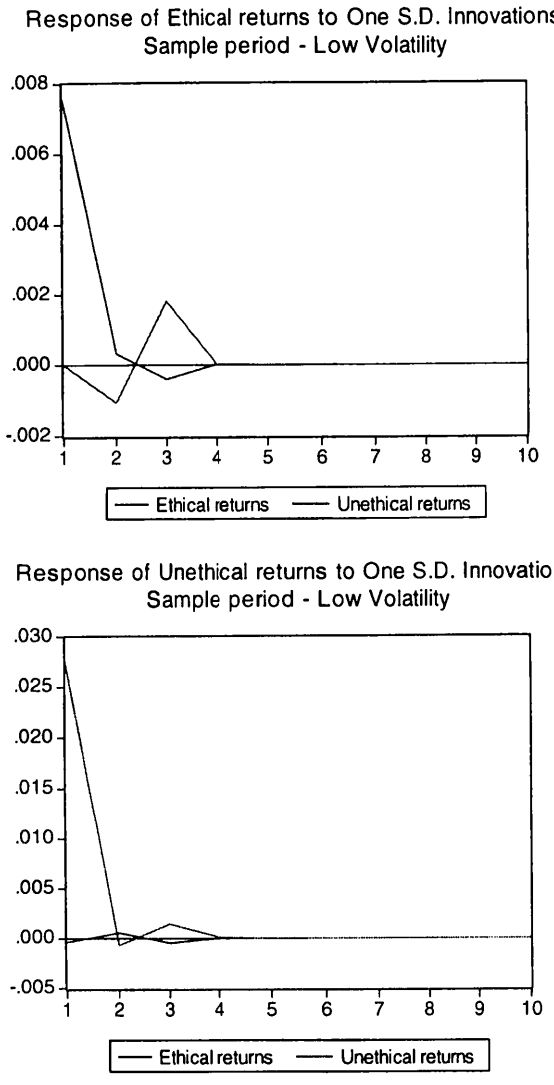


Figure 2. Results of Impulse Response Function over Low Volatility period.

Source: own analysis with the use of E-views software

The graphs above provide impulse-responses of 1 standard deviation shock of ethical and unethical returns to ethical returns (upper graph) and unethical returns (lower graph). Excess market returns, SMB and HML are exogenous factors. The sample period is Low Volatility period (May 1990 - July 1998).

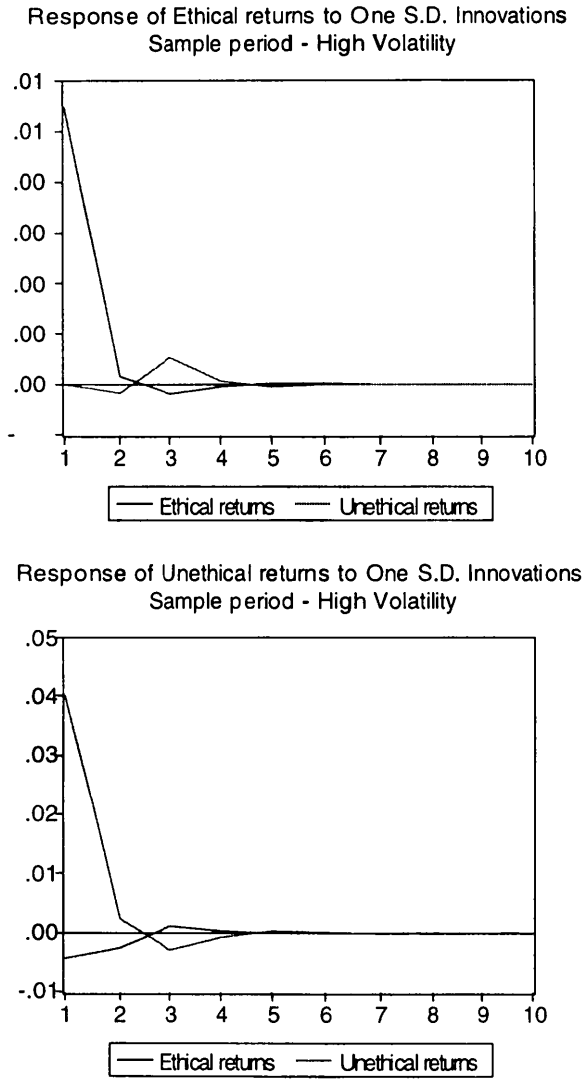


Figure 3. Results of Impulse Response Function over High Volatility period.

Source: own analysis with the use of E-views software

The graphs above provide impulse-responses of 1 standard deviation shock of ethical and unethical returns to ethical returns (upper graph) and unethical returns (lower graph). Excess market returns, SMB and HML are exogenous factors. The sample period is High Volatility period (August 1998 - April 2005).

Each figure provides a graphical representation of the effect of a one standard deviation shock to each variable by itself and by the other variable (the returns were not orthogonalized. We used one standard deviation shock to see the response on the dependent and independent variable.). The two variables under consideration are excess returns from ethical and unethical investments. As mentioned earlier, excess market returns, SMB and HML are exogenous variables in the VAR estimation to extract excess returns from each investment type. IRF during a low volatility period (Figure 2) show that a one standard deviation shock to ethical returns has a negative effect in the first period that adjusts to a positive effect in the second period. However, during the same sample period, a one standard deviation shock to unethical assets by ethical assets produces very little deviation. A high volatility period shows a slightly different effect. Ethical assets response to an unethical investment shock is not as much pronounced, but the response of vice investments to ethical shock starts with a negative effect over two periods. This is consistent with our proposition that ethical investments are negatively affected during bad times (high volatility period).

We next analyse the factors that affect the return spread between unethical and ethical assets. The two factors are one-month lagged excess market returns (above the riskfree returns) and contemporaneous ethical premium, defined as the returns of ethical investments above the riskfree rate. Equation 5 is used to provide the results as follows:

Table 6

Factors that Affect Non-ethical Return Spreads

This table reports the regression results of changes in unethical return spreads ($\Delta [r_{Unethical} - r_{Ethical}]$) as the dependent variable and changes in lagged market risk premium ($\Delta [r_m - r_f]$) and changes in ethical premium ($\Delta [r_{Ethical} - r_m]$) using Equation 5 on a monthly basis. The sample periods are All (May 1990 - April 2005), Low Volatility period (May 1990 - July 1998) and High Volatility period (August 1998 - April 2005).

Dependent Variable: Unethical Spread			
	Period		
	All	Low Volatility	High Volatility
Intercept	0.000	0.000	-0.001
	(0.076)	(-0.042)	(-0.098)
Market Risk premium(-1)	-0.171[a]	-0.101	-0.176[b]
	(-2.716)	(-1.112)	(-1.940)
Ethical Market premium	-0.736[a]	-0.084	-1.074[a]
	(-3.288)	(-0.258)	(-3.346)
Adjusted R-squared	0.078	-0.008	0.147

Level of significance is specified as [a] for 1%, [b] for 5%, and [c] for 10%

Source: self-computed with the use of E-views software

The results show that lagged excess market returns and ethical premium are not significantly related to return spread between unethical and ethical assets during good times (low volatility period) but are significantly and negatively related during bad times (high volatility period). This provides yet additional evidence of investors changing their preferences during bad times.

Our last concern with the results obtained may be that SRI fund managers may have undergone a learning curve since this is a recent development in terms of an investment class. This implies that returns from ethical investments would improve over time. We employ equation 6 and the results are presented in Table 7 below:

Table 7

Learning ability over time

This table presents results of the following regression:

$r_{Unethical,t} - r_{Ethical,t} = \alpha_i + \beta_{Time}\, time + \varphi_t$

where:

$r_{Unethical,t} - r_{Ethical,t}$ is the monthly portfolio return differences between *ethical* portfolios and *unethical* portfolios,
time - is the number of months since May 1990,
φ is the error term for the regression.

Intercept	-0.009
t-stat	-1.265
p-value	0.208
β_{Time}	0.689
t-stat	1.582
p-value	0.115
Adj R-squared	0.008

Source: self-computed with the use of E-views software

Our results show that there is no evidence that returns from SRI have improved over time. Additionally, SRIs have underperformed vice investments during recent periods.

CONCLUSION

Our research asks if it is possible that investors choose to invest on ethical principles rather than returns. Our empirical evidence suggests, overwhelmingly, this is not the case. Our research shows that during periods of low market risk, investors remain ethical, though during periods of high risk investors are more concerned with regards to their wealth. We explore

this hypothesis in a three-step process, by using returns from extreme investment-preference based indexes that are adjusted for known risk factors. First, the two investment types are checked for any cointegrating relationship, and account for such a relationship if it did exist. We also check for contemporaneous simultaneous relationships between the two classes of investments. Our results show no long run relationships but there is evidence of a simultaneous relationship between ethical and vice investments. This relationship changes from low market risk period to higher risk period and provides some evidence of investors changed behaviour with regards to their ethical preference. We also use impulse response function (IRF) and decomposition of variance (VDC) of residuals from simultaneous relationship to provide further evidence of this changed behaviour.

This research then explores the factors that contribute to this changed investor preference. We find that past market conditions, which perhaps leads to changes in their wealth position, is an important factor to changes in investors maintaining ethical investments. Yet another aspect that is explored is the management ability of ethical investments over time. We do not find any evidence of improved management ability over time.

Our research points to the fact that ethical investment may be a fad over the last decade. If this is true, perhaps further research in asset pricing should include this ethical premium to provide better forecasting ability.

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