Ethical investing in Australia: Is there a financial penalty?

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Abstract

This study provides new evidence on the performance and investment style of retail ethical funds in Australia. By applying a conditional multi-factor model and after controlling for investment style, time-variation in betas and home bias, we observe no evidence of significant differences in risk-adjusted returns between ethical and conventional funds during 1992–2003. This result however is sensitive to the chosen time period. During 1992–1996 domestic ethical funds under-performed their conventional counterparts significantly, whereas during 1996–2003 ethical funds matched the performance of conventional funds more closely. This suggests that ethical mutual funds underwent a catching up phase, before delivering returns similar to those of conventional mutual funds.
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1. Introduction

Although investing based on ethical criteria appeals to many investors, the general perception is that an ethical investor is likely to suffer reduced portfolio performance.

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Following Markowitz (1952), financial theorists argue that ethical investing will under-perform over the long term because ethical portfolios are subsets of the market portfolio which lack sufficient diversification. Another frequently posed argument is that selecting stocks according to ethical screening can be an expensive practice that may ultimately have a negative impact on net return. Following Elton et al. (1993) and Carhart (1997) the negative correlation between fund expenses and risk-adjusted performance is used to question the expensive process of ethical screening. Hamilton et al. (1993) and Angel and Rivoli (1997) review these theoretical objections to ethical investing.

The existing empirical literature, however, has not been able to find a significant performance gap between ethical and non-ethical portfolios. For instance, Diltz (1995), Guerard (1997) and Sauer (1997) conclude that there were no statistically significant differences between the returns of ethically screened and unscreened portfolios in the US. Evidence on the performance of ethical mutual funds confirms this finding. Using the single factor Jensen alpha models, Statman (2000) and Gregory et al. (1997) find no significant difference between the financial performance of ethical and non-ethical unit trusts in the US and UK, respectively. In a more recent paper, Bauer et al. (2005) extend previous research in this field by applying a conditional multi-factor model. Using an international database containing 103 US, UK and German ethical mutual funds, they find no significant differences in risk-adjusted returns between ethical and conventional funds.

As most of these studies investigate similar markets and time periods, the evidence to date could be sample-specific. To tackle this critique, the analysis should be expanded to include other countries. The Australian market is particularly interesting as recently two important pieces of regulation were introduced. In March 2003 Australia introduced its new ethical disclosure requirements under the Financial Services Reform Act (FSRA). The ethical amendment is to oblige issuers of financial products (investment and superannu-ation) to disclose the extent to which labour standards, environmental, social or ethical considerations are taken into account in the selection, retention or realisation of an investment. Furthermore, the Australian Securities and Investments Commission (ASIC) now requires advisors providing personal financial advice to enquire whether environ-mental, social or ethical considerations are important to their clients. This makes Australia the first country to extend the ethical related regulations to the financial advisory process.

The objective of this study is twofold. First, we intend to provide evidence on ethical mutual fund performance. This paper examines the Australian ethical fund market, which has attracted little attention in the academic literature. To the best of our knowledge, only two published academic studies exist. Cummings (2000) investigates the performance of 7 ethical equity funds and observes no significant difference in their returns compared to both a large and a small cap benchmark for the period of 1986–1994. On the other hand, Tippet (2001) argues that the average of the three largest Australian ethical mutual funds significantly under-performed the All Ordinaries index by 1.5% per year during 1991–1998. Besides research on ethical mutual funds, a study by Ali and Gold (2002) examines the effect of removing shares in companies that operate in the so-called "sinful industries" from the market portfolio. Over a seven-year period (ending 2001), they concluded that Australian domestic investors avoiding shares in the "sinful industries" sacrificed returns of approximately 0.70% per annum. Our study goes beyond these studies and investigates Australian ethical fund performance during a more recent time period (1992–2003) for

more ethical funds (25) with different kinds of investment objectives (domestic and international) while taking into account survivorship bias.

The second purpose of our paper is to address potential benchmark problems when assessing the relative performance of ethical mutual funds in Australia. Among others, Dibartolomeo (1996), Guerard (1997), Kurtz (1997) and Bauer et al. (2005) find ethical portfolios to be tilted towards small-cap growth stocks. This potentially biased some of the previous results for the Australian market. In this study we follow Bauer et al. (2005) and apply a multifactor model in the spirit of Carhart (1997) and the conditional framework of Ferson and Schadt (1996). In doing so, we are able to investigate both ethical mutual fund performance and their investment style relative to conventional funds.

The remainder of this paper is organized as follows: Section 2 provides an overview of the Australian ethical mutual fund market and discusses the data set. Section 3 presents our empirical results. Sensitivity to the chosen time-period is examined in Section 4 before we conclude in Section 5.

2. Data

2.1. Overview of the ethical fund market

Table 1 presents some figures on the size of the retail ethical fund market in several selected countries. While the US market for ethical mutual funds has risen from $12 billion in 1995 to $136 billion at the end of 2001, the European market for ethical funds is still at an early stage of development. For instance in France, Germany and Italy ethical funds account for less than 1% of the total domestic market for mutual funds. Frontrunners in Europe are the Netherlands and the United Kingdom at 1.9% and 1.66%, respectively. In Australia the size of the retail ethical market is still well below the international average.

Table 1
Overview of ethical mutual fund market as at the end of 2001

Country	# of ethical mutual funds	Ethical assets under management in billion Euro	As a % of total mutual fund assets
The Netherlands	24	1.70	1.93
United States	181	136.00	1.74
United Kingdom	62	5.90	1.66
Belgium	37	1.20	1.56
Italy	9	1.80	0.45
Germany	22	0.80	0.33
Australia	74	0.90	0.20
France	38	1.10	0.01

This table presents the characteristics of several selected retail ethical mutual fund markets. The first column presents the total number of ethical mutual funds within a country. These include equity, bond and balanced funds. The second column provides the total amount of ethical mutual fund assets under management (in Euro). The last column presents the % of the total domestic fund market that is possessed by ethical funds. Sources: Avanzi, VBDO, EIRIS, Morningstar, Ethical Investment Association and Socialinvest.

Overall, the entire ethical mutual fund market still represents only a marginal part of the traditional market.

2.2. Ethical mutual funds

Using Morningstar we identified all retail equity mutual funds that invested their assets based on ethical screening. As a reference group, we selected all other equity mutual funds that did not explicitly claim to use ethical screening. Furthermore, we divided funds into investment categories based on their regional focus (domestic versus international) to enhance comparability. We restrict our sample to pure retail equity funds with at least 12 months of data, excluding balanced and guaranteed funds.

Return data were then collected from Morningstar Australia. All returns are inclusive of any distributions, net of annual management fees and in Australian dollars. This leads to a total sample of 25 ethical open-ended equity mutual funds and 281 conventional funds with monthly returns from November 1992 through April 2003. In our subsequent empirical tests we form 2 equally weighted portfolios of ethical and conventional funds to test for differences in performance and investment style between the two portfolios.

As pointed out by Brown et al. (1992), leaving out dead funds leads to an overestimation of average performance. To limit possible survivorship bias we add back funds that were closed at any point during the sample period. This information was provided by Morningstar Australia (formerly FPG). Dead funds were included in the sample until they disappeared, after which the portfolios are re-weighted accordingly.

The influence of this becomes clear 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 for the domestic funds by 0.20% and for international funds by 1.13% per year.[1]

Table 2 describes the data we use in our subsequent analyses. If we look at some summary statistics on ethical mutual funds it seems the average fund is smaller in size and younger if compared to conventional funds. In addition to that, domestic ethical funds charge higher fees than conventional funds, while the opposite is true for international ethical funds.

2.3. Benchmarks

In this paper we make use of market wide equity indices supplied by Worldscope.[2] In comparison to MSCI indices, Worldscope aims at covering up to 98% of market capitalisation, while MSCI serves mainly as a large cap proxy.[3] This point is especially important as for instance Bauer et al. (2005) document that ethical funds tend to invest in

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[1] These figures are in line with previous research on Australian managed funds. For instance Bilson et al. (2005) find a bias of 0.24% for domestic funds and Benson and Faff (2002) find a 1.5% bias for international funds.

[2] This Thomson Analytics database has recently gained increased interest from academics. See for instance Otten and Bams (2002) and Bauer et al. (2004).

[3] Alternatively we used the relevant MSCI indices. Based on results not reported in the paper we conclude this did not have an influence on our results.

Table 2
Summary statistics on Australian mutual funds 1992:11–2003:04

Objective	Excess return	Standard deviation	Size	Expense ratio	Age in years	# of Funds
Domestic						
Ethical	1.73	8.30	25	1.75	4.4	15
Conventional	4.95	10.92	110	1.64	6.3	195
Worldscope Australia index	5.92	12.97				
International[§]						
Ethical	0.33	14.89	52	1.67	3.1	10
Conventional	−2.64	12.61	91	1.96	5.3	86
Worldscope global index	1.46	13.40				

This table reports summary statistics for the funds in our sample. Funds are grouped 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 $A. All returns are net of expenses. Besides fund returns we also provide summary statistics on relevant market-wide benchmarks for each region. Average fund sizes are in millions $A as of 2003:04. Costs are presented as a percentage of the assets invested and age is the average life of a fund in years.
[§] 1994:06–2003:04.

smaller stocks. In constructing our version of the Carhart (1997) 4-factor model we consider all stocks in the Worldscope universe for each region (domestic and international). For the excess market return we select all stocks in the Worldscope universe that have a market capitalization of at least $A5 million, minus the 3-month *t*-bill rate by the Reserve Bank of Australia (RBA). 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 difference in return between the small and large portfolios. 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 returns. These factor portfolios are constructed as value-weighted and re-balanced annually. 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 Mom, the momentum factor returns. This procedure is repeated every month to get to a rolling momentum factor.

3. Empirical results

3.1. Multi-factor model

The basic model used in studies on ethical mutual fund performance is a CAPM based single index model. Recent literature on the cross-sectional variation of stock

returns (see, e.g. Fama and French (1993, 1996) and Chan et al. (1996)) however leads us to question the adequacy of a single index model to explain mutual fund performance. The Fama and French (1993) 3-factor model is considered to give a better explanation of fund behaviour. In addition to a value-weighted market proxy, this model includes two additional risk factors, 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 and 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 the mean return attributable to four elementary strategies.

A recent study by Faff (2001) confirms multifactor models are able to explain the cross-sectional variation in Australian equity returns.

In addition, there is now evidence confirming that ethical mutual fund performance is indeed attributable to style tilts, which cannot be accounted for in a single-index environment. For example, Gregory et al. (1997) found that the small firm effect is significant in explaining U.K. ethical trust performance. Bauer et al. (2005) found evidence suggesting that ethical mutual funds are less exposed to the market portfolio compared to conventional funds, but are more small cap- and growth stock-oriented. Estimates of a mutual fund's factor loadings and alpha are therefore likely to be more reliable in a multivariate framework.

Formally, we estimate:

$$R_{it} - \mathrm{Rf}_t = \alpha_i + \beta_{0i}(\mathrm{Rm}_t - \mathrm{Rf}_t) + \beta_{1i}\mathrm{SMB}_t + \beta_{2i}\mathrm{HML}_t + \beta_{3i}\mathrm{Mom}_t + \varepsilon_{it} \tag{1}$$

where

α_i Jensen's alpha measure for fund i[4]
R_{it} the return on fund i in month t
Rf_t the return on a local three month T-bill in month t
Rm_t the return on the relevant equity benchmark in month t
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 12 months winners and a portfolio of past 12 month losers at time t
ε_{it} error term.

Table 3 presents the results of applying Eq. (1) on our database. Per each regional objective (domestic and international), we compute Jensen's alpha for both the portfolio of

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[4] See Jensen (1968).

Table 3
Australian ethical fund performance using a 4-factor Carhart model

Objective	4-factor Alpha	Market Beta	SMB	HML	Mom	R^2_{adj}	Distribution significant alphas %		
							Negative	Zero	Positive
Domestic									
Ethical	−2.17	0.47***	−0.06**	0.08**	0.10***	0.53	1	99	0
Conventional	−0.61	0.79***	−0.11***	0.00	0.07***	0.86	3	94	3
Difference	−1.56	−0.32***	0.05**	0.08**	0.03	0.48			
International[a]									
Ethical	−1.42	0.47***	−0.21*	−0.13	0.03	0.19	10	80	10
Conventional	−4.40	0.77***	−0.11*	−0.11	0.01	0.72	9	90	1
Difference	2.98	−0.30***	−0.10	−0.02	0.02	0.08			

This table reports the results of the estimation of Eq. (1) for the 1992:11–2003:04 period. Reported are the OLS estimates for each regional objective, and within objectives for ethical and conventional funds. Difference is a portfolio which is constructed by subtracting conventional from ethical fund returns.

$$R_t - \mathrm{Rf}_t = \alpha + \beta_0(\mathrm{Rm}_t - \mathrm{Rf}_t) + \beta_1 \mathrm{SMB}_t + \beta_2 \mathrm{HML}_t + \beta_3 \mathrm{Mom}_t + \varepsilon_{it} \tag{1}$$

where R_t is the fund return, Rf_t the risk-free rate, Rm 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. The last three columns indicate results based on individual funds. Presented is the % of significantly negative, positive, and insignificant alphas. All alphas are annualised. *T*-stats are heteroskedasticity consistent.
  * Significant at the 10% level.
 ** Significant at the 5% level.
*** Significant at the 1% level.
  [a] 1994:06–2003:04.

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 performance and investment style between the two investment approaches. Besides reporting results based on our equally weighted portfolios of funds, we also run Eq. (1) for all funds individually. The distribution of significant alphas based on individual regressions is reported in the last 3 columns of Table 3.

Our main conclusions are four-fold. First, all ethical funds exhibit significantly less market exposure compared to conventional funds. This was also observed by Tippet (2001), who attributes the lower market risk to the conservative nature of the management of ethical funds in Australia.[5] Second, domestic ethical funds are relatively more exposed to small caps. Third, domestic ethical funds are more value-oriented than growth-oriented if compared to conventional funds. This is in sharp contrast to Guerard (1997) and Bauer et al. (2005) who find a growth bias for ethical funds. Fourth, after controlling for market risk, size, book-to-market and momentum, the difference in return

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[5] For the Australian domestic funds we also used both the ASX All ordinaries and ASX Small cap as an alternative for the Worldscope Australia index. This did not alter our conclusions with respect to alpha, beta and R^2_{adj}.

between ethical and conventional funds is statistically insignificant for both domestic and international funds.[6]

In Section 2.2 we indicated that the average ethical mutual fund is younger than the average conventional funds. Although this is a feature of a developing ethical fund market, we investigate the influence this can have on our main results. Adkisson and Fraser (2003), for instance, report an age bias when using Morningstar star ratings. They argue that because younger funds are typically smaller they are better able to achieve extreme performance, compared to older and larger funds that regress towards the mean. As our ethical funds are on average smaller than conventional funds, this type of bias could influence our results.[7] To test for this we perform a matched pair analysis. Each ethical fund is matched to three conventional funds that are closest with respect to age (measured in years) and size (in millions of AUD). This creates a sample of conventional funds that is of similar age and size to the ethical funds, therefore limiting the possible effect of an age bias.

Based on results not reported here we conclude that this age and size matching procedure does not alter our conclusions with respect to the difference in performance and investment style.[8] The alphas for the difference portfolios remain insignificantly different from zero. Furthermore our observations with respect to differences in investment style are unaffected.

3.2. Home bias

In our previous analysis we compared the international funds to an international (global) benchmark. Based on informational advantages we could however expect fund managers to prefer local investments over international investments. The evidence on such a home bias is overwhelmingly present in the finance literature.[9] To test for this we add a local benchmark to the Carhart 4-factor model. Note that we now construct the Market, SMB, HML and Momentum factors based on an ex-country index. This means, for Australia we construct all factors using the Global ex-Australia universe, and then add the Australia index as a final factor.

$$R_{it} - Rf_t = \alpha_i + \beta_{0i}(Rm_t - Rf_t) + \beta_{1i}SMB_t + \beta_{2i}HML_t + \beta_{3i}Mom_t$$

$$+ \beta_{4i}(AU_t - Rf_t) + \varepsilon_{it} \qquad (2)$$

where

AU_t the return on the AU Worldscope equity benchmark at time t.

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[6] As ethical funds are constructed using several ethical, social and environmental screens, the common equity benchmarks used here might not be perfectly suited for measuring performance. To assess such possible bias we alternatively use an ethical index to measure ethical fund performance. For that purpose we substitute the Worldscope Australia index by the Westpac Monash Eco index. Our results however are robust to the inclusion of this index, no significant difference in return exists. These results are available upon request from the authors.

[7] We thank an anonymous referee for pointing this out.

[8] These results are available upon request from the authors.

[9] For a comprehensive overview on the home bias puzzle, see Lewis (1999).

Table 4
Home bias test for Australian ethical funds investing internationally

Objective	4-factor Alpha	Market Beta	SMB	HML	Mom	Local	R^2_{adj}
Ethical	−1.50	0.32***	−0.04	−0.03	0.04	0.39***	0.29
Conventional	−4.41*	0.74***	−0.08	−0.08	0.01	0.07	0.72
Difference	2.91	−0.42***	0.04	0.05	0.03	0.32***	0.17

This table reports the results of the estimation of Eq. (2) for the 1994:06–2003:04 period. Reported are the OLS estimates for each investment objective, and within objectives for ethical and conventional funds. Difference is a portfolio which is constructed by subtracting conventional from ethical fund returns.

$$R_t - \mathrm{Rf}_t = \alpha + \beta_0(\mathrm{Rm}_t - \mathrm{Rf}_t) + \beta_1 \mathrm{SMB}_t + \beta_2 \mathrm{HML}_t + \beta_3 \mathrm{Mom}_t + \mathrm{AU}_t + \varepsilon_{it} \qquad (2)$$

where R_t is the fund return, Rf_t the risk-free rate, Rm the return on the total Universe according to Worldscope, and SMB and HML the factor-mimicking portfolios for size and book-to-market, mom a factor-mimicking portfolio for the 12-month return momentum and AU the return the Worldscope Australian equity index. All alphas in the table are annualised. *T*-stats are heteroskedasticity consistent.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

The results in Table 4 indicate a strong and significant home bias for the international ethical funds. All our previous observations however are still valid. The difference in return between ethical and conventional funds remxains statistically insignificant.

3.3. 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 risk vary over time. Therefore Chen and Knez (1996) and Ferson and Schadt (1996) advocate conditional performance measurement.[10]

Consider the following case where 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 $\beta_{it} = \beta_{i0} + \boldsymbol{B}'_i \boldsymbol{Z}_{t-1}$, where $\boldsymbol{B}'_i$ is a vector of response coefficients of the conditional beta with respect to the instruments in $\boldsymbol{Z}_{t-1}$.

For a single index model the equation to be estimated then becomes

$$R_{it} - \mathrm{Rf}_t = \alpha_i + \beta_{i0}(\mathrm{Rm}_t - \mathrm{Rf}_t) + \boldsymbol{B}'_i \boldsymbol{Z}_{t-1}(\mathrm{Rm}_t - \mathrm{Rf}_t) + \varepsilon_{it}. \qquad (3)$$

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

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[10] Sawicki and Ong (2000), and Gallagher and Jarnecic (2004) provide evidence on the added value of conditional performance measures for Australian funds.

Table 5
Australian mutual fund performance using both unconditional and conditional performance measurement

Objective	Unconditional 4f-alpha	R^2_{adj}	Conditional 4f-alpha	R^2_{adj}	Wald (p-value)
Domestic					
Ethical	−2.17	0.53	−1.13	0.70	0.00
Conventional	−0.61	0.86	−0.40	0.88	0.03
Difference	−1.56	0.48	−0.73	0.52	0.00
International[§]					
Ethical	−1.42	0.19	2.81	0.36	0.00
Conventional	−4.40	0.72	−3.26	0.78	0.04
Difference	2.98	0.08	6.07	0.19	0.00

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 3 column 2, the conditional model results stem from the multifactor version of Eq. (3). Here we allow the market, SMB, HML and Mom betas to vary over time as a function of (1) the 3 month *T*-bill rate, (2) dividend yield (3) the slope of the term structure and (4) the quality spread. The last column of Table 5 provides results for the heteroskedasticity-consistent Wald test to examine whether the conditioning information adds marginal explanatory power to the unconditional model. All alphas are annualised.
§ 1994:06–2003:04.

studies.[11] They are (1) the 3-month *T*-bill rate (RBA), (2) dividend yield on the Worldscope Australia total market index, (3) the slope of the term structure (10-year *t*-bill yield - 3 month *t*-bill yield by RBA) and finally (4) the quality spread, by comparing the yield of the Datastream Australian corporate bond index and the 10-year government bond index.[12] All instruments are based on local values and lagged 1 month.

Table 5 presents the results of the conditional Carhart 4-factor model for Australia. While column 2 repeats the unconditional alphas from Table 3, the conditional alphas are in column 4. In all 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, none of the differences are statistically significant.

4. Sensitivity to the time period

A final test that is performed relates to the development of relative performance through time. In order to detect whether the rather young ethical investment industry is undergoing changes, we divide our sample period into three equal, non-overlapping sub-periods. Table 6 reports the results for the Carhart 4-factor model using 3 different sub-periods.

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[11] Pesaran and Timmerman (1995) discuss several studies that emphasize the predictability of returns based on interest rates and dividend yields.
[12] Given the relative underdevelopment of the Australian corporate bond market we alternatively consider dropping the Quality spread instrument. Based on results not reported we conclude this does not alter our conclusions with respect to the difference in return between ethical and conventional funds. These results are available upon request from the authors.

Table 6
Difference between Australian ethical and conventional fund alpha for 3 equal sub-periods

Country/region	4 factor alpha 1992:11–1996:04	4 factor alpha 1996:05–1999:10	4 factor alpha 1999:11–2003:04
Domestic	− 3.36**	2.91**	− 0.34
International[§]	2.74*	0.70	1.83

This table presents the results of estimating Eq. (1) for 3 different sub-periods. Reported are the *differences* between 4 factor alphas for ethical and conventional funds.

$$R_t - \mathrm{Rf}_t = \alpha + \beta_0(\mathrm{Rm}_t - \mathrm{Rf}_t) + \beta_1 \mathrm{SMB}_t + \beta_2 \mathrm{HML}_t + \beta_3 \mathrm{Mom}_t + \varepsilon_{it} \qquad (1)$$

where R_t is the fund return, Rf_t the risk-free rate, Rm 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.
§The first sub-period runs from 1994:06–1996:04.
* Significant at the 10% level.
** Significant at the 5% level.

Examining the differences in alpha between ethical and conventional funds indicate an interesting development. Where the domestic ethical funds under-perform their conventional peers significantly during the first 3.5 years of our sample period (− 3.36%), this difference turns significantly positive in the second 3.5 years (2.91%). Over the last 3.5 years the difference again turns slightly negative (− 0.34%), albeit statistically insignificant. It appears the domestic ethical funds went through a catching up phase in which they first trailed conventional funds significantly, while recently they have matched conventional fund performance more closely. This is in line with evidence for the US, UK and German ethical funds examined in Bauer et al. (2005).[13]

To investigate this finding in more detail we additionally performed rolling regressions for the Carhart 4-factor model. This enables us to investigate the development of alpha, market beta, SMB, HML and Momentum through time. The results of this exercise are reported in Fig. 1 (domestic) and Fig. 2 (international), where the rolling *differences* in alpha and factor exposures between ethical and conventional fund are displayed. In addition to the point estimates we report the 95% confidence bounds to enable us to assess the significance of the observed time variation.

The results in Figs. 1 and 2 reveal significant changes in performance and investment style of all ethical funds, when compared to their conventional peers. For instance, domestic ethical funds first under-perform the conventional funds significantly, then significantly outperform between 1998–2000, followed by a period of no significant difference. This obviously is in line with our previous sub-period results. More interestingly however, we also witness a drastic change in investment style over time. The significantly lower market beta, lower SMB and higher momentum factor all revert to a significantly higher market beta, higher SMB and lower momentum during the last few years of our sample period. A

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[13] To examine the influence of a possible age bias on our sub-period analysis we alternatively use a conventional fund portfolio matched by age and size. Based on results not reported here we conclude that using the matched conventional portfolio does not alter our conclusion with respect to the development of performance through time. These results are available upon request from the authors.
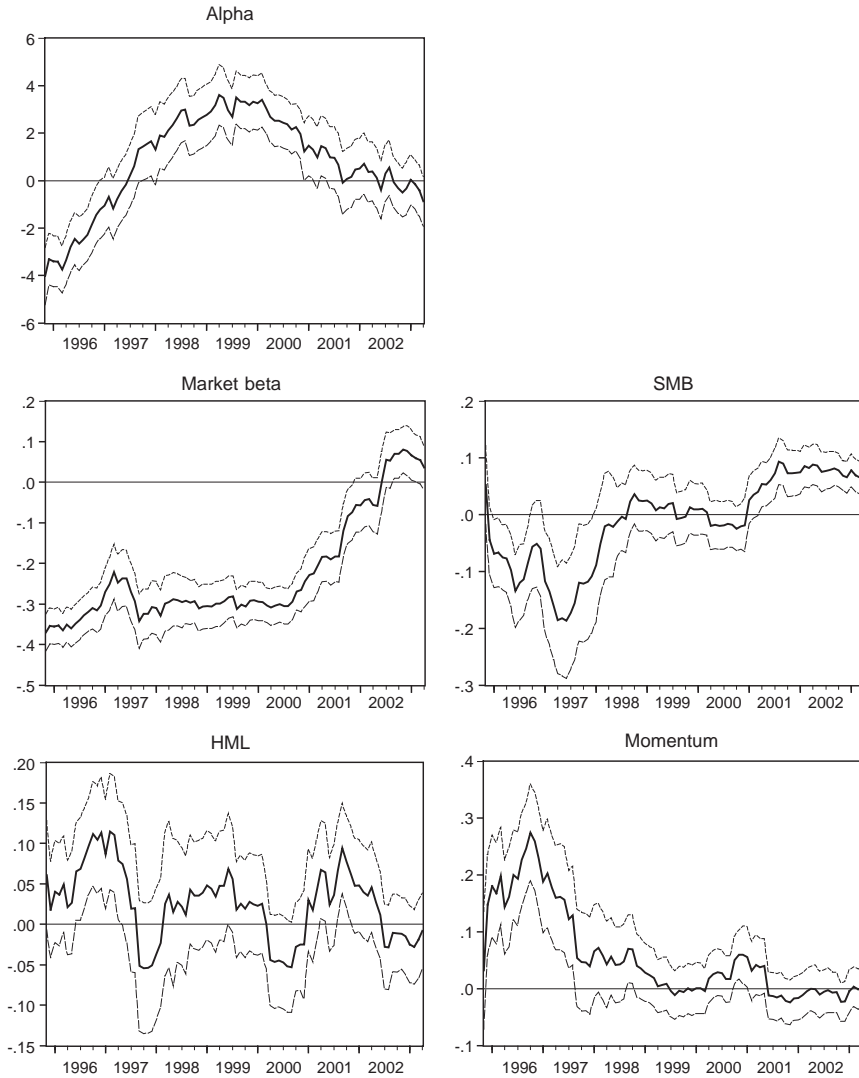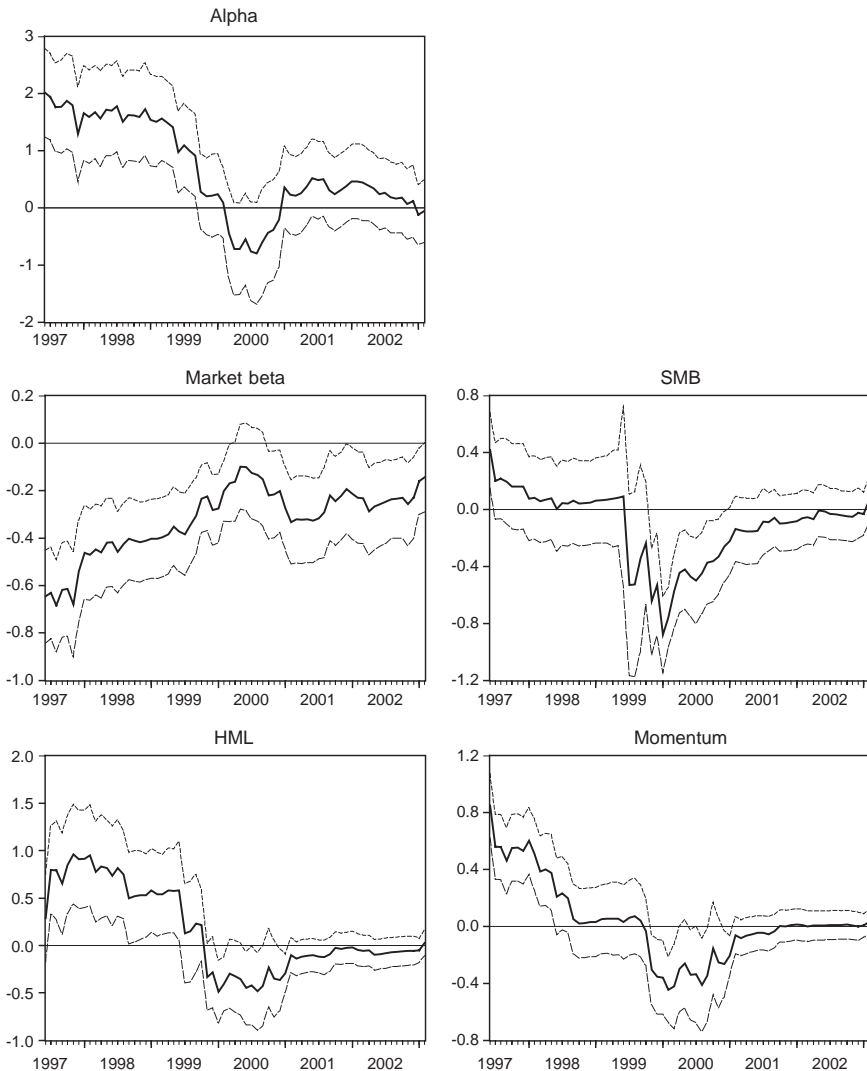
Fig. 1. Rolling alpha, market beta, SMB, HML and momentum for the *difference* between domestic ethical and conventional funds. This figure presents the *differences* in alpha, market beta, SMB, HML and Momentum between domestic ethical and conventional funds over time. These results are obtained by performing 36-month rolling window regressions using Eq. (1). As input we use the difference portfolio. Given are the rolling parameter estimates (solid line), while 95% confidence bounds are presented as dashed lines.

similar development holds for the international funds in Fig. 2. The lower market beta, higher SMB and Momentum factor all revert back to point where there is no significant difference with their conventional peers. Finally, the difference in alpha for the international funds slowly decays to an insignificant value, after a period of significant out-performance for the ethical funds during the first few years of our sample period.

Fig. 2. Rolling alpha, market beta, SMB, HML and momentum for the *difference* between international ethical and conventional funds. This figure presents the *differences* in alpha, market beta, SMB, HML and Momentum between international ethical and conventional funds over time. These results are obtained by performing 36-month rolling window regressions using Eq. (1). As input we use the difference portfolio. Given are the rolling parameter estimates (solid line), while 95% confidence bounds are presented as dashed lines.

The rolling regressions performed here create an interesting picture of ethical fund performance and investment style through time. Whereas at the beginning of the 1990s ethical funds clearly deviated from conventional funds with respect to performance and investment style, this difference largely disappears during the last

part of our sample period. By 2003 ethical funds employ an investment style that does not seem to differ too much from conventional funds, which inevitably leads to a performance that also does not deviate too much. There remains of course the question whether nowadays, ethical funds are really following distinct ethical investment styles, or whether they are conventional funds in disguise.

5. Conclusion

This study provides new evidence on the performance and investment style of retail ethical funds. By comparing 25 ethical equity funds to several benchmarks and their conventional peers we examine whether there is a financial penalty for being an ethical investor in Australia. While most of the previous work on ethical mutual fund performance is conducted using market wide indices, we utilize powerful multi-factor models. This not only improves performance measurement but also enables us to investigate ethical mutual fund investment styles in more detail.

As such, we employ 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, the difference in return between ethical and conventional funds is statistically insignificant for both domestic and international funds. Second, ethical funds exhibit distinct investment styles when compared to conventional funds. For instance, all ethical funds exhibit significantly less market exposure compared to conventional funds and domestic funds are relatively more exposed to small caps. Third, we document a strong and significant home bias for all international ethical funds.

Fourth, we investigate the relative returns of ethical versus conventional funds through time, using 3 equal sub-periods. This provides support for the idea that the under-performance of the Australian domestic ethical funds is mainly caused by a strong and significant under-performance during the first sub-period. During the second sub-period they out-perform their conventional peers significantly, while the last sub-period shows no significant difference. In addition, we perform rolling regressions, which create an interesting picture of ethical fund performance and investment style through time. Whereas, at the beginning of the 1990s ethical funds clearly deviated from conventional funds with respect to performance and investment style, those differences largely disappear during the last part of our sample period. By 2003 ethical funds provide an investment style that appears to be similar to that of conventional funds, which inevitably leads to a similar performance. It looks like the Australian domestic ethical funds went through a catching-up phase, possibly caused by learning effects. After significant under-performance in the beginning of the 1990s, they match conventional fund performance more closely during the 1996–2003 period.

In conclusion, using Australian data we document corroborative evidence that ethical funds do not under-perform relative to conventional funds. This suggests there is no financial penalty for being an ethical investor in Australia during the 1992–2003 period.

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