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‘Benchmarking’ the benchmarks: How do risk-adjusted returns of Australian mutual funds and indexes measure up?

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Abstract

The primary aim of this study is to investigate whether equity fund managers are selecting appropriate self-nominated benchmark indexes for their funds. Specifically, we examine the performance of active Australian equity mutual funds and whether they demonstrate similar return performance and risk characteristics to their nominated benchmark indexes (e.g., ASX 200 or ASX 300) from 2008 to 2012. Our findings suggest that active Australian equity fund managers do *not* outperform their self-specified capitalization indexes after risk and

management fees and transaction costs. Further, managers appear to select stocks that are representative of investment characteristics associated with broad-based capitalization indexes. We also find that the ASX 200, ASX 300 and a range of alternative Australian capitalization indexes are highly positively correlated and demonstrate similar risk-return attributes. If fund managers cannot consistently match or better the performance of their nominated benchmark indexes after risk and transaction costs, than investors may be better off investing in low-cost index exchange traded funds (ETFs) or equivalent investment vehicles.

Key Words: Australia, Carhart, Equity, Mutual Funds, Stock Indexes, Performance

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1. Introduction

The impact of mutual funds on financial markets has increased substantially in recent times. At the end of 2011, the world mutual fund industry managed financial assets exceeding USD $30 trillion, more than three times the USD $6 trillion of assets managed at the end of 1996 (Investment Company Institute, 2014). In Australia, the managed funds industry quadrupled over a similar period with funds under management totaling AUD $2.5 trillion (Australian Bureau of Statistics, 2014).

Like many of its investment counterparts the mutual fund industry suffered during the global financial crisis (GFC), with funds under management declining from USD $26 trillion in 2006 to USD $23.8 trillion in 2011 (Investment Company Institute, 2013). Equity funds played a part in propagating the GFC. For instance, Hau and Lai (2012) suggest that some 10.5% of the 52% crisis-related decline in the U.S. stock market was attributed to distressed selling by equity mutual funds. However, the global mutual fund industry appears to have recovered from the large negative impact of the GFC.

Due to the economic significance of equity mutual funds - especially during economic downturns – understanding mutual fund performance is a major focal point in a large set of academic financial performance studies (Sharpe, 1966; Jensen, 1968; Roll, 1977; Fama and French, 1993; Gruber, 1996; Carhart, 1997). In order to evaluate the performance of equity fund managers it is necessary to have some type of nominal performance benchmark to draw comparison to. For instance, nominal fund returns are calculated and compared to the nominal returns of a benchmark index, as nominated by the fund manager. However, this perfunctory comparison of nominal performance does not take into account the inherent risks of the fund.

Given the intricacy of accounting for risk, both practitioners and academics have vigorously debated the risk-adjusted performance of equity mutual funds and associated

metrics. To effectively evaluate risk-adjusted performance it is necessary for a fund manager to specify a passive benchmark index (e.g., S&P 500, FTSE 100, ASX 200, etc) which reflects the risk characteristics of their investments.[1] An appropriate benchmark is one that can be used to gauge managerial performance and skill by closely tracking the fund's investment style.

A benchmark index is considered to be 'inappropriate' if it is not commensurate with the style/risk characteristics of the equity fund it is attempting to benchmark performance against. For instance, it would not be appropriate to assess the performance of an equity fund that is heavily weighted with small-cap growth stocks against a broad-based market benchmark index. If an incorrect benchmark index is selected by the equity fund manager this may inexorably lead to mediocre investment decisions and risk-adjusted return underperformance (Anderson, 2009). Therefore, an appropriate benchmark will not be one that can be easily beaten due to misrepresentation of the equity investments that comprise the fund.

While studies (Elton *et al* 2003; Costa and Jakob, 2006; Sensoy, 2009; Costa and Jakob, 2010; Costa *et al* 2011) suggest that U.S. equity fund managers appear to self-designate benchmark indexes that are misaligned from their risk profiles and investment styles, similar studies addressing this benchmarking issue in Australia are non-existent. To the best of the authors' knowledge, no study explores whether Australian funds are selecting the correct proxy or 'benchmark' index on the basis of well-known risk factors. As such, it is unclear whether Australian equity fund managers are selecting appropriate benchmark indexes for their funds. If Australian equity funds are found to be misspecifying self-selected benchmark indexes, then managers should be encouraged by market regulators to use risk-adjusted measures to report their performance and identify more appropriate benchmarks.

[1] A benchmark index should be clearly stated in the fund's product disclosure statement/prospectus.

Given the importance of benchmark index specification and absence of studies that examine the risk-adjusted metrics of mutual funds and index appropriateness in Australian equity markets, an opportunity to make a contribution to the fund performance literature presents. Using Carhart's (1997) four factor model and several tests similar to those employed in Costa and Jakob (2006, 2010), Costa *et al* (2011) and Costa *et al* (2014), we address this gap by examining the efficacy of a multifactor risk adjustment model with Australian risk factors and Australian equity mutual fund and index total returns from 2008 to 2012. Specifically, we investigate the performance of Australian equity mutual funds and whether they demonstrate similar return performance and risk characteristics to their nominated benchmark indexes.

This paper adds to our understanding of the association of mutual funds and their benchmark indexes by supporting findings in the extant literature (Elton *et al* 2003; Costa and Jakob, 2006; Sensoy, 2009; Costa and Jakob, 2010; Costa *et al* 2011; Costa *et al* 2014). The main contribution of our paper is the development of a risk-adjusted return approach that quantifies whether Australian equity fund managers are aligning their performance and investment styles against appropriate benchmark indexes.

We would expect our results to be of interest to fund managers, financial planners, Australian regulatory agencies, investors and academics who examine mutual fund performance. Given the rapid growth of the Australian funds management industry, it is imperative that fund managers are employing relevant performance benchmarks and are more transparent in the way such benchmarks are reported. We further anticipate that the findings of this research will lead to ongoing research in this important field; thus, making a significant contribution to the overall body of research on global equity funds performance.

The remainder of the paper is organised as follows. Section 2 contains a brief review of the literature and establishes the research questions. Section 3 describes the data and

empirical approach adopted in the study. Section 4 presents the empirical results. Section 5 discusses the implications of our findings and offers suggestions for further research.

2. Literature Review

The pioneering work of Jensen (1968) underpins the equity funds performance literature. Jensen employs a capital asset pricing model (CAPM) approach to measure mutual fund manager performance. Following this method, the regression intercept (or 'alpha') is designed to capture the risk-adjusted net return of the mutual funds. Jensen finds that, on average, actively managed mutual funds produce negative alphas and therefore, consistently underperform the market on a risk-adjusted basis. With the critique of the CAPM by Roll (1977), researchers began to examine multiple risk factor models to potentially better explain stock returns. Fama and French (1993) identify three common risk factors in the returns of stocks. The three common stock market risk factors are: an overall stock market factor, a factor related to firm size, and a factor associated to the book-to-market ratio.

In the pursuit of measuring manager performance, recent studies have used the Carhart (1997) four factor regression method for estimating equity mutual fund performance. This four factor model uses the three factors from Fama and French (1993), as well as an additional factor to capture Jegadeesh and Titman's (1993) one-year momentum anomaly. With this regression method, an alpha, similar to the alpha in Jensen (1968), is designed to capture the risk-adjusted net return of equity mutual funds.

Despite the myriad of mutual fund risk-adjusted performance research, only a few studies have considered benchmark index appropriateness for equity mutual funds. Brown et al. (1992), Grinblatt and Titman (1989, 1994) and Daniel *et al (*1997) briefly cogitate the benchmarks selected by equity fund managers, however, it was not until Tierney and Bailey's (1995), Elton *et al*'s (2003) and Frost's (2004) work that benchmark index specification was

considered important in the context of fund performance. Tierney and Bailey (1995) and Frost (2004) claim that if benchmark index selection is not scrutinized by market regulators, managers will simply choose indexes that are predisposed to overstating the nominal return performance of their funds. Benchmarking fund returns with indexes that managers have performed well against historically or against large, 'well-known' indexes (i.e., S&P 500, FTSE 100, ASX 200, etc), misrepresents the fund's investment objectives, risk characteristics and overall performance. Further, Elton *et al* (2003) suggest that despite a plethora of available style indexes, U.S. equity fund managers appear to self-designate large capitalization benchmark indexes that are misaligned from their funds' investment styles. It could also be argued that fund investors may prefer familiar/popular benchmarks due to the complexities of fund selection and performance tracking.

Costa and Jakob (2006) have also shown that examining a fund's alpha can be misleading and that there is a clear disconnect when mutual funds report their performance against a suitable index. First, the reported raw performance measures fail to adjust for any risk in stock selection that the fund manager undertakes. Without a risk adjustment method it is unclear whether the fund manager made investments that are of greater or lesser risk than the comparison index. Next, when academic studies examine risk-adjusted returns they fail to compare fund performance with index performance after adjusting both for the inherent risks related to market structure. As such, Costa and Jakob claim that one must also look at the benchmark index alpha to determine if the fund is truly adding value on a risk-adjusted basis. They show that by employing the Carhart (1997) four factor performance model, indexes can generate statistically significant alphas and that fund alphas must be explicitly compared to the appropriate index alpha to get a meaningful measure of risk-adjusted fund performance. This indicates that for U.S. equity funds, manager performance attributed to a significant

alpha during a specific period must be adjusted relative to the alpha of the benchmark index over the same period.

Sensoy (2009) further argues the importance of using appropriate benchmark indexes, claiming that they should be aligned directly with the fund's investment style. For instance, Sensoy discovers that a third of U.S. equity fund managers choose benchmark indexes that are *not* consistent with the style characteristics of their funds. Also, Costa and Jakob (2010) and Costa *et al* (2011) incorporate a new measurement technique by using Carhart's (1997) four factor model and a statistical test to observe if there are any significant differences between the risk-adjusted performance of U.S. funds, their selected benchmark index and a range of alternative indexes. Their findings suggest that U.S. mutual fund managers are choosing benchmark indexes that may not be a true reflection of the risk characteristics associated with the funds' investment activities, thus overstating/understating the funds' risk-adjusted performance. They conclude that by considering alternative approaches to risk-adjusted return performance measurement, researchers can more accurately gauge the economic contribution of fund managers.

Similarly, Cremers *et al* (2013) show that large passive benchmark indexes (such as the S&P 500) are commonly employed by U.S. equity fund managers, and can demonstrate large alphas and exposure to systematic risk factors. Finally, Costa *et al* (2014) explore whether Australian stock indexes exhibit performance anomalies. They find that the initial full sample period analysis does not provide indication of significant alphas in the indexes examined. However, by carrying out 36-month rolling regressions, they discover significant alphas in the indexes and factor loading variability; thus, confirming similar issues discovered in the U.S. by Costa and Jakob (2006, 2010) and Costa, Jakob and Niblock (2011).

Given the alleged importance of mutual fund performance and benchmark index specification and absence of such studies in Australia, we extend this line of academic investigation by examining the Carhart (1997) alphas and risk factors produced by Australian equity mutual funds and their self-nominated benchmark indexes. Thus, we pose the following research questions:

Q$_1$ Do Australian equity fund managers outperform their self-nominated benchmark indexes?

Q$_2$ Do Australian equity fund managers select appropriate self-nominated benchmark indexes that reflect the investment style and risk-return characteristics of their funds?

3. Data and Methods

We commence our data collection by observing mutual funds listed on the Financial Express Analytics mutual fund database accessed via SIRCA, as of 23 July 2014. From this dataset, bond, balanced, specialty equity, currency, commodity, alternative and international/global funds are eliminated, leaving only 'active' Australian-domiciled equity funds.[2] While we are acutely aware that our data set may suffer from survivorship bias, the Financial Express Analytics database does not contain information on dead or inactive funds. The prospectuses of each of the 628 remaining active funds are examined. From this sample of equity funds we eliminate any funds solely designed for institutional investors, index funds and funds of funds. This leaves us with 397 retail equity funds. We then examine the prospectuses of each of the remaining funds to determine what index is specified as a benchmark for the fund (see Table 1).

[Insert Table 1]

[2] Fund selection is based on an 80% equity allocation or greater and operating as of December 2012.

Table 1 shows that the ASX 200 and ASX 300 Total Return indexes combined are the most popular benchmarks (by number of funds and size) in the Australian fund management industry. Therefore, we select funds which nominate these indexes as their benchmarks. As a final step we keep only those funds with return data available for the complete 60 month period from January 2008 through December 2012. This group of 123 funds, 51 with the ASX 200 as their self-nominated benchmark and 72 with the ASX 300, becomes our final data sample. Names for all of the funds in the sample are included in Appendix 1 and 2. The funds in the final sample represent the majority of the domestic Australian retail equity market by size and style. For example, the funds include a representation of stocks that are size (small, mid or large capitalized) and style (i.e., growth, value or blend) orientated. Our next step is to collect monthly returns for these 123 funds.

Our monthly return data is drawn from the Financial Express Analytics mutual fund database and are net of management fees and transaction costs. We collect 60 monthly total return observations from January 2008 through December 2012. For the same period we also gather 60 monthly total return observations for the respective nominated benchmark (i.e., ASX 200 and ASX 300) and alternative capitalization indexes from the Thomson Reuters Tick History (TRTH) database (see Table 2). Note: style indexes are not available for the Australian market in the period under investigation.

[Insert Table 2]

To ensure that our results are replicable and consistent with previous research, we use local Australian risk factor data for the values of monthly risk factors associated with the Carhart (1997) four factor model.[3] This data was generously provided by Mr. Mathew

[3] Griffin (2002) suggests that local factors outperform global and regional factors in explaining stock returns. Also, we reproduced descriptive statistics (untabulated) for the risk factors and find that the *RMRF*, *SMB* and *HML* values are virtually equivalent to the values reported by Brailsford et al. (2012). In addition, when comparing the factors to the Asian Pacific risk factors identified by Fama and French (2012) over the time period specified in this study, we observe no statistically significant differences in the average risk premia for each of the reported risk factors (i.e., *RMRF*, *SMB*, *HML*, and *WML*).

Martineer and Prof. Richard Holden, University of New South Wales, Australia.[4] To quantitatively measure fund performance, we begin with the Carhart (1997) four factor regression method. The four factor model includes Fama and French's (1993) three factors and an additional factor to capture Jegadeesh and Titman's (1993) one-year momentum anomaly. With this regression method, the alpha is designed to capture the risk-adjusted net return of an equity mutual fund. For our initial analysis we use the following four factor model:

$$r_{i,t} = \alpha_{i,t} + \beta_{1i,t} RMRF_t + \beta_{2i,t} SMB_t + \beta_{3i,t} HML_t + \beta_{4i,t} WML_t + \varepsilon_{i,t} \quad (1)$$

where r_i is the monthly equity mutual fund return or benchmark index return minus 90-day Australian bank accepted bill return; *RMRF* is the excess return on the Australian market value-weighted index; and *SMB*, *HML*, and *WML* are returns on Australian value-weighted zero-investment, factor-mimicking portfolios for size, book-to-market equity, and one-year momentum in stock returns. Note: to check risk factor sensitivity, we also run our model with Asian-Pacific Carhart factors[5] and compare with the Australian Carhart factors specified. As expected, we find that Australian Carhart factors demonstrate greater explanatory power and are therefore the preferred choice for running the analyses.[6]

We run the four factor model regressions for the 123 mutual funds in our sample, as well as for the ASX 200 and ASX 300. Running the respective models for each fund and the benchmark index generates alphas and coefficients for the four risk factors. We statistically compare the alpha and coefficients from each fund with the alpha and coefficients from their appropriate benchmark using a two-tailed t-test. Using the designated benchmark, the t-tests

[4] For more detailed information about the Australian Carhart factors see:
https://www.business.unsw.edu.au/About-Site/Schools-Site/Economics-Site/Documents/Matthew_Martineer.pdf
[5] For more detailed information about the Asian-Pacific Carhart factors see:
http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html
[6] The Asian-Pacific Carhart factors yield an *RMRF* of 0.5155 for the ASX 200 index. This is significantly lower than what has been reported in U.S. studies (Costa and Jakob, 2006, 2010; Costa *et al* 2011). This could perhaps be explained by the regional constituents and weightings which make-up the Asian-Pacific market; thus, resulting in lower explanatory power for anticipating returns in the Australian market. Full Asian-Pacific Carhart factor results are available from the authors upon request.

comparing alphas indicates whether a manager statistically outperformed or underperformed the self-selected benchmark index over the 60-month holding period. By examining the regression results for the fund and the benchmark index side-by-side, we can also determine whether the factor loadings for the various risk factors statistically differ.

Under the traditional interpretation of the Carhart model, the loadings on the four risk factors (*RMRF*, *SMB*, *HML*, and *WML*) indicate how much of the fund's returns are derived from each measure of risk. However, the factor loadings for the fund on their own do not address whether the fund is aligned with its designated benchmark. To determine whether the manager is following through on his/her stated objectives, the factor loadings based on the fund's returns can be compared directly to the factor loadings for the self-selected benchmark index. Comparing the fund with the self-selected benchmark, the pair-wise t-tests for *RMRF*, *SMB*, *HML*, or *WML* indicate whether the manager has significantly deviated from the fund's stated objectives with regard to each risk factor. If we find significant differences between the factor loadings for the ASX 200 or ASX 300 and a particular fund, this suggests that the manager has potentially *not* chosen the most appropriate benchmark index for performance comparison purposes.

4. Results

Table 3 shows the four factor regression results for the ASX 200 index and the 51 funds that use the ASX 200 for their benchmark. The table only reports results for the five funds that have either a significant intercept or risk factor relative to their stated benchmark. There are no funds in the ASX 200 sample with an intercept, or alpha, which is significantly different from the benchmark alpha. Notably, the *RMRF* of the ASX 200 index is 0.8227. This is significantly higher than the Asian-Pacific *RMRF* factor (0.5155) reported previously but still lower than what has been reported in previous U.S. studies (Costa and Jakob, 2006, 2010;

Costa *et al* 2011).[7] This finding is consistent with Griffin (2002) in that local (Australian) factors offer greater explanatory power over global/regional (Asian-Pacific) factors when anticipating returns in local (Australian) markets.

[Insert Table 3]

The negative *HML* (-0.1021) and positive *WML* (0.1401) factors indicate that the ASX 200 is growth and momentum orientated, respectively. The *SMB* factor (0.2617) is positive, which suggests that the ASX 200 is small cap orientated. While this finding is unusual (particularly given the large cap nature of ASX 200 index constituents), it is consistent with past studies. For instance, Humphrey and O'Brien (2010) show that the Australian *SMB* value was positive for the period investigated. Martineer (2013, pp. 18-19) also suggests that "[t]he *SMB* factor has a large degree of explanatory power for the returns of Australian stocks, but the average *SMB* value (that is, the average premium for small stocks) has found to be both positive and negative (in roughly equal proportions) even when studies use a similar time period".

To determine whether the manager is following through on his/her stated asset allocation objectives, the factor loadings based on the fund's returns can be compared directly to the factor loadings for the self-selected benchmark index. Comparing the fund with the self-selected benchmark, the pair-wise t-tests for *RMRF*, *SMB*, *HML*, or *WML* indicate whether the manager has significantly deviated from the fund's stated objectives with regard to each risk factor. We find that there are only three funds with significant *RMRF* factor loadings relative to the ASX 200 index. The *RMRF* magnitudes (0.3913, 0.6188 and 0.6229, respectively) suggest that these three funds have significantly less market-based risk than their stated benchmark. There are no funds with significant *SMB* coefficients. Two funds

[7] The Australian Carhart factors are based on approximately 2,300 companies, representing 96% of the entire Australian market capitalization. Given that the ASX 200 represents 80% of the market, this could perhaps explain why *RMRF* is *not* closer to 1.

differ significantly and positively with respect to the value/growth metric, *HML*. The positive coefficients reported (0.2275 and 0.1954, respectively) imply that these funds are more value orientated than their stated benchmark. There is only one fund with a significantly different and negative *WML* factor loading (-0.0194). This suggests that the fund does *not* follow a momentum strategy and may be following a contrarian strategy of buying losers and selling winners.

Table 4 highlights the four factor regression results for the ASX 300 index and the 72 funds that use the ASX 300 for their benchmark. The table reports results for the seventeen funds that have either a significant intercept or risk factor relative to their stated benchmark. There are no funds in the ASX 300 sample with an intercept which is significantly different from the benchmark. There are seventeen funds with significant *RMRF* factor loadings relative to the ASX 300. Ten funds (seven funds) have significantly less (more) market-based risk than their stated benchmark. There are no funds with significantly different *SMB, HML* or *WML* coefficients from the ASX 300 index.

[Insert Table 4]

While analyzing the 123 funds against their two respective indexes we noticed that the intercepts and factor loadings for the ASX 200 and ASX 300 looked very similar. To formally test this relation we utilized t-tests for the differences of the intercepts and risk factors for the ASX 200 and ASX 300. There were no significant differences between the two indexes. Table 5 further illustrates this relationship by presenting correlation measures for all of the main Australian capitalization indexes. The ASX 200 and ASX 300 revealed a 0.9998 [rounded to one] correlation coefficient during the 60 month sample period. Notably, all 28 pairwise correlation coefficients were above 0.800 and 18 were greater than 0.900.

[Insert Table 5]

5. Conclusion

Using Carhart's (1997) four factor model and several tests similar to those employed in Costa and Jakob (2006, 2010) and Costa *et al* (2011), we examine the efficacy of a multifactor risk adjustment model with Australian risk factors and Australian equity mutual fund and index total returns from 2008 to 2012. Specifically, we investigate the performance of Australian equity mutual funds and whether they demonstrate similar return performance and risk characteristics to their nominated benchmark indexes.

Our findings suggest that Australian equity fund managers, on the whole, are unable to add economic value in their investment activities or outperform their nominated benchmark on a risk-adjusted return basis and after costs. For instance, the funds examined generated negative and insignificant alphas. Arguably, the market forces at work (e.g., GFC) during the sample period under investigation may have influenced risk-adjusted return performance, particularly given the dominance of two of the most challenged sectors, financials and resources, in Australian funds and indexes. It is debatable whether a skilled fund manager with well-developed investment strategies could be blamed for underperforming the market during the GFC and its aftermath. However, the events that unfolded during the sample period become less of a distraction when one considers if fund managers are selecting appropriate self-nominated benchmark indexes, especially those that reflect the investment style and risk-return characteristics of their funds.

While the majority of funds demonstrate significant risk factor loadings with the traditional Carhart approach, they are not significantly different from the Carhart risk factor loadings for the ASX 200 and ASX 300 benchmarks. This shows that the statistical significance of factor loadings change dramatically with our approach relative to the traditional Carhart method. For example, in the ASX 200 sample, there are no significant *SMB* factor loadings when compared to the benchmark, but the traditional Carhart method shows that 40 of

51 funds investigated have significant *SMB* loadings relative to zero. The traditional approach suggests that these managers are using a *SMB* strategy. However, the revised approach indicates that this is merely an artifact of the methodology. Once the *SMB* is correctly compared to the benchmark index *SMB* loadings, statistical significance disappears. As such, managers appear to be selecting capitalization benchmark indexes that are consistent with their funds' investment style and risk characteristics. We also discover that local (Australian) factors offer greater explanatory power over regional (Asian-Pacific) factors when anticipating returns in local (Australian) markets, which supports Griffin's (2002) work.

We also found that the ASX 200, ASX 300 and a range of alternative Australian capitalization indexes are highly positively correlated and demonstrate similar risk-return characteristics. This begs the question: how diversified are investments in funds which benchmark their performance against such indexes? Australia has relatively few large capitalized firms and a large amount of small capitalized firms, with most large 'cap' companies being categorized as either Financial or Resource companies. These large firms carry heavy index weightings and determine the vast amount of movement in the major indexes selected by managers. This could perhaps explain why the ASX 200 and ASX 300 behave almost identically. More controversially, it highlights the lack of diversification opportunities associated with well-known Australian stock market investments.

So, given the similarities reported, does the specification of the ASX 200 or ASX 300 benchmark index really matter for Australian equity fund managers? For instance, would one broad-based capitalization index suffice? Further, if there are no statistical differences in risk-adjusted return performance between the ASX 200 and ASX 300 indexes and Australian funds which employ these indexes as their respective benchmarks, essentially 'active' fund managers are selecting stocks that are representative of broad-based capitalization indexes. If this is the case how is the charging of active fees and transaction costs by Australian equity

fund managers justified, particularly when they appear to consistently underperform ‘passive’ (or ‘buy-and-hold’) indexes? And why does Australia have so many active equity funds that represent the risk-return characteristics of broad-based capitalization indexes? If Australian fund managers cannot match or better the performance of these indexes after risk and transaction costs, than investors may simply be better off in low-cost index exchange traded funds (ETFs) or equivalent investment vehicles.

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Table 1: Fund data sample

	No. of funds	% of funds	Average fund size ($m)
Initial sample of Australian-domiciled equity funds	397	100%	76.01
Funds without specified benchmark index	9	2.3%	77.86
Funds with missing benchmark index	118	29.7%	118.55
Funds with ASX 200 Total Return benchmark index	79	19.9%	65.28
Funds with ASX 300 Total Return benchmark index	105	26.4%	45.09
Funds with other benchmark index	86	21.7%	67.93

Source: Financial Express Analytics

Table 2: Australian stock indexes by market capitalization

Index Source	Index Name	Descriptor
Fund Nominated		
S&P	ASX 200	ASX200
S&P	ASX 300	ASX300
Alternative		
S&P	ASX 20	ASX20
S&P	ASX 50	ASX50
S&P	ASX Midcap 50	ASXMC50
S&P	ASX 100	ASX100
S&P	ASX Small Ordinaries	ASXSO
S&P	ASX All Ordinaries	ASXAO

Source: Thomson Reuters

Table 3: Four factor regressions for ASX 200 and funds with ASX 200 as self-selected benchmark index

The table presents the four factor regression results for the ASX 200 index and the 51 funds that use the ASX 200 for their benchmark. The table only reports results for the five funds that have a significant risk factor relative to their stated benchmark. Funds included have data available for the 60 month sample period from January 2008 through December 2012. All four factor models listed had f-stats significant at better than the one percent level. The starred levels of significance are t-stats that compare the coefficients from the index to the coefficients of the funds.

Comparison Index	**Intercept**	**RMRF**	**SMB**	**HML**	**WML**
ASX 200 Index	0.0014	0.8227	0.2617	-0.1021	0.1401
Fund Name					
Austock - Australian Shares	0.0000	0.3913***	0.2942	0.2275*	0.0097
Bnp Paribas - Arnhem Long Short Australian Equity	0.0042	0.6784	0.2904	0.1954*	0.0600
Fidante - Merlon Australian Share Income	-0.0065	0.6188**	0.1486	0.0181	0.0686
Fidante - Merlon Wholesale Australian Share Income	0.0003	0.6229**	0.1265	-0.0118	0.0617
MLC - Navigator Access Schroder Australian Equity	0.0043	0.7305	0.0113	0.1254	-0.0194*
Number of Significant coefficients	0	3	0	2	1

Levels of Significance	* 10%
	** 5%
	*** 1%

Table 4: Four factor regressions for ASX 300 and funds with ASX 300 as self-selected benchmark index

The table presents the four factor regression results for the ASX 300 index and the 72 funds that use the ASX 300 for their benchmark. The table only reports results for the seventeen funds that have a significant intercept or risk factor relative to their stated benchmark. Funds included have data available for the 60 month sample period from January 2008 through December 2012. All four factor models listed had f-stats significant at better than the one percent level. The starred levels of significance are t-stats that compare the coefficients from the index to the coefficients of the funds.

Comparison Index	**Intercept**	**RMRF**	**SMB**	**HML**	**WML**
ASX 300 Index	0.0012	0.8226	0.2794	-0.1070	0.1407
Fund Name					
OnePath - Optimix Geared Australian Share EF	-0.0069	1.7214***	0.5706	-0.3970	0.2354
Austock - Australian Equity	-0.0001	0.4846***	0.2415	0.1225	0.0538
ANZ - OA Inv Pfolio Optimix Geared Australian Share EF	-0.0065	1.6754***	0.5691	-0.3383	0.2324
OnePath - OA Inv Pfolio Optimix Geared Australian Share Trust EF	-0.0066	1.6756***	0.5671	-0.3390	0.2317
ANZ - Investment Bond Russell Australian Shares	-0.0002	0.5398***	0.2201	0.0092	0.0828
ANZ - OA Inv Pfolio Investors Mutual Australian EF	0.0024	0.6567*	0.1886	0.0550	0.1289
CFS - FirstChoice Geared Boutique Australian Share	-0.0060	1.6614***	0.5485	-0.1327	0.2166
MLC - Navigator Access IML Australian Share	0.0028	0.6575*	0.1485	0.0887	0.1011
CFS - First Choice Wholesale Geared Boutique Australian Share	-0.0046	1.6649***	0.5423	-0.1381	0.2155
AMP - FLI Future Directions Geared Australian Share	-0.0046	1.5067***	0.5074	-0.0519	0.2617
OnePath - OA Inv Pfolio Investors Mutual Australian Shares Trust EF	0.0025	0.6582*	0.1900	0.0502	0.1300
OnePath - Investment Savings Bond Optimix Australian Shares EF	-0.0007	0.4918***	0.2980	-0.0272	0.0942
BT - Wholesale Geared Imputation	-0.0024	1.4404***	0.3620	-0.2443	0.2449
BT - Investors Mutual Australian Share	0.0025	0.6593*	0.2042	0.0591	0.1357
CFS - First Choice Investors Mutual Australian Share	0.0021	0.6459**	0.1972	0.0718	0.1272
CFS - First Choice Investors Mutual Wholesale Australian Share	0.0026	0.6483*	0.1979	0.0790	0.1277
OnePath - Investment Savings Bond Australian Shares EF	-0.0004	0.5834***	0.1773	-0.1744	0.1279
Number of Significant coefficients	0	17	0	0	0

Levels of Significance

* 10%

** 5%

*** 1%

Table 5: Correlation matrix of eight major Australian capitalization indexes

Correlation results are based on the returns for the 60 month period from January 2008 through December 2012.

	ASX20	*ASX50*	*ASXMC50*	*ASX100*	*ASX200*	*ASX300*	*ASXSO*	*ASXAO*
ASX20	1.000							
ASX50	0.991	1.000						
ASXMC50	0.857	0.903	1.000					
ASX100	0.829	0.864	0.873	1.000				
ASX200	0.975	0.995	0.941	0.881	1.000			
ASX300	0.973	0.993	0.944	0.883	1.000	1.000		
ASXSO	0.819	0.870	0.954	0.835	0.912	0.918	1.000	
ASXAO	0.962	0.986	0.952	0.888	0.997	0.998	0.935	1.000

Appendix 1: 51 Funds with ASX 200 as self-selected benchmark index

Includes all funds with ASX 200 stated as the benchmark. Funds included have data available for the 60 month sample period from January 2008 through December 2012.

Aberdeen - Australian Equities
Aberdeen - Classic Series Australian Equities
Advance - Alleron Australian Equity Growth Wholesale Units
Advance - Australian Equity Growth
Advance - Concentrated Australian Share
Advance - Sharemarket
AMP - FLI AMP Australian Share Enhanced Index
AMP - FLI Responsible Investment Leaders Australian Share
AMP - FLI Schroder Australian Equities
Antares - Australian Equities Professional
Antares - Australian Shares Personal
Antares - Elite Opportunities Professional
Antares - Elite Opportunities Shares Personal
Antares - High Growth Shares Personal
Antares - High Growth Shares Professional
ANZ - OA Inv Pfolio Schroder Australian Equity EF
Austock - Australian Shares in AU
AXA - Generations Aviva High Growth Australian Equity
AXA - Generations BlackRock Australian Equity
AXA - Generations Schroders Australian Equity
BlackRock - Australian Share
Bnp Paribas - Arnhem Australian Equity
Bnp Paribas - Arnhem Concentrated Australian Equity
Bnp Paribas - Arnhem Long Short Australian Equity
BT - Schroder Australian Share
CFS - First Choice Australian Share Core
CFS - First Choice BlackRock Australian Share
CFS - First Choice Maple-Brown Abbott Imputation
CFS - First Choice Maple-Brown Abbott Wholesale Imputation
CFS - First Choice PM Capital Wholesale Australian Share
CFS - FirstChoice Schroder Australian Equity
CFS - FirstChoice Schroder Wholesale Australian Equity
EQT - Flagship
EQT - Wholesale Flagship
Fidante - Greencape Wholesale High Conviction
Fidante - Merlon Australian Share Income
Fidante - Merlon Wholesale Australian Share Income
Invesco - Wholesale Australian Share
Macquarie - High Conviction
Maple-Brown Abbott - Australian Geared Equity Wholesale
Maple-Brown Abbott - Imputation Ordinary
MLC - Navigator Access Portfolio Partners High Growth Shares
MLC - Navigator Access Schroder Australian Equity
OnePath - OA Inv Pfolio AMP Cap Responsible Inv Leaders Australian Shr Trust EF
OnePath - OA Inv Pfolio Schroders Australian Equity Trust EF
Tyndall - Australian Share Portfolio
Tyndall - Australian Share Value
Tyndall - Suncorp Australian Shares
Tyndall - Suncorp Imputation
CFS - First Choice BlackRock Wholesale Australian Share
CFS - First Choice Wholesale Index Australian Share

Appendix 2: 72 Funds with ASX 300 as self-selected benchmark index

Includes all funds with ASX 300 stated as the benchmark. Funds included have data available for the 60 month sample period from January 2008 through December 2012.

OnePath - Optimix Geared Australian Share EF
BT - Classic Investment BT Ethical Share
Zurich - Managed Investments Australian Share
Macquarie - Australian Equities
CFS - First Choice Acadian Australian Equity
Austock - Australian Equity in AU
ANZ - OA Inv Pfolio Optimix Geared Australian Share EF
OnePath - OA Inv Pfolio BlackRock Scientific Australian Equity Trust EF
OnePath - OA Inv Pfolio Optimix Geared Australian Share Trust EF
ANZ - Investment Bond Russell Australian Shares in AU
ANZ - OA Inv Pfolio Investors Mutual Australian EF
ANZ - OA Inv Pfolio BlackRock Scientific Australian Shares EF
CFS - FirstChoice Geared Boutique Australian Share
CFS - First Choice Acadian Australian Equity Long Short
MLC - Navigator Access IML Australian Share
CFS - First Choice Acadian Wholesale Australian Equity
AMP - FLI BT Australian Share
CFS - First Choice Wholesale Geared Boutique Australian Share
OnePath - OA Inv Pfolio Optimix Australian Shares Trust EF
IOOF - Flexi Trust Perennial Growth Shares
CFS - First Choice ING Australian Share
OnePath - Optimix Australian Share Trust EF
AMP - FLI Future Directions Geared Australian Share
Ventura - Australian Opportunities
Fidante - Alphinity Wholesale Socially Responsible Share
AXA - Generations UBS Australian Equity
Fidante - Alphinity Wholesale Concentrated Australian Share
BT - Integrity Core Australian Share
OnePath - OA Inv Pfolio Perennial Value Share Trust EF
AMP - FLI Perennial Value Australian Share
ANZ - OA Inv Pfolio Onepath Australian Shares EF
OnePath - OA Inv Pfolio Investors Mutual Australian Shares Trust EF
IOOF - Flexi Trust Perennial Value Shares
ANZ - OA Inv Pfolio Optimix Australian EF
OnePath - OA Inv Pfolio Vanguard Australian Shares Index Trust EF
ANZ - OA Inv Pfolio Perennial Value Share Trust EF
OnePath - Investment Savings Bond Optimix Australian Shares EF in AU
OnePath - OA Inv Pfolio Onepath Australian Shares EF
BT - Wholesale Geared Imputation
AMP - FLI Future Directions Australian Share
ANZ - ASA Onepath Australian Shares in AU
CFS - First Choice BT Wholesale Core Australian Share
CFS - First Choice Perennial Value Australian Share
Prime Value - Imputation A
BT - Investors Mutual Australian Share
CFS - First Choice Perennial Value Wholesale Australian Share
Ironbark - Karara Australian Share
CFS - First Choice Investors Mutual Australian Share
Ventura - Australian Shares
CFS - First Choice Investors Mutual Wholesale Australian Share
CFS - First Choice Index Aust Share
CFS - First Choice Ausbil Wholesale Australian Active Equity
Fidante - Alphinity Wholesale Australian Equity
CFS - Integrity Australian Share No 2

CFS - First Choice Ausbil Australian Active Equity
CFS - First Choice Imputation
SGH - 20
WaveStone - Wholesale Australian Share
CFS - FirstChoice Australian Share
OnePath - Investment Savings Bond Australian Shares EF in AU
Advance - Australian Shares Multi Blend
CFS - First Choice Wholesale Australian Share
BT - Wholesale Focus Australian Share
Fidante - Alphinity Wholesale Australian Share
Fidante - Greencape Wholesale Broadcap
BT - Classic Investment BT Core Australian Share
BT - Wholesale Australian Share
Prime Value - Growth A
BT - Wholesale Ethical Share
Hyperion - Australian Growth Companies
BT - Wholesale Imputation
BT - Wholesale Core Australian Share