



A NOTE ON PERFORMANCE EVALUATION OF NEW ZEALAND MUTUAL FUNDS

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Abstract

This paper reports on the performance of the New Zealand unit trusts over 11 years using the Fama-French three-factor model and the Cahart (1997) unconditional asset pricing test. The results reveal that the funds had negative Jensen's alphas and thus poor performance. The conditional model shows that funds underperformed the benchmark by 0.34 percent per month. These findings suggest that the funds had poor performance during the tested period. It is puzzling to observe a substantial growth of unit trusts in the same time period despite poor performance of these funds. It is very likely that the fund growth has more to do with regulatory effect of promoting savings than the effect of funds providing above-normal return for the growth of the market.

JEL Classification: G23

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1. Introduction

Unit trust or mutual fund investments in former colonies of Britain as well as developing markets have become one of the largest financial intermediaries in the leading world economies. Currently 7 trillion dollars in assets are being held in the U.S. and over 3 trillion Euros in assets are in place in Europe. Since the passing of the Unit Trusts Act in 1960 in New Zealand, investment in unit trusts has grown substantially, in particular in the 1990s. Approximately 16 trusts were registered at the end of 1986 and about 450 managed funds are actively marketed by fund managers in 2004. However, it is unknown as to whether one should link the increasing popularity of unit trust investment to its superior performance return: the results of this study casts doubts on the wisdom that performance drives the

growth of the unit trusts. This is the motivation for this research to estimate the out-performance, if any, of the funds, thus providing evidence for the growth as coming from the superior management of the funds.

One of the pioneer studies in the mutual fund performance is that of Jensen (1968). He employs the unconditional capital asset pricing model to estimate the intercept, resulting in the so-called Jensen's alpha measure as a measure of fund's performance. A significant positive value of alpha would justify the growth as having come from the attraction of the funds as a place to put savings to grow. The alpha is obtained by regressing excess unit trust returns on the excess market return. Jensen shows that the net performance of a fund after expenses is inferior to that of a comparable passive market proxy and that the individual fund hardly does better than expected from a mere random chance. Ippolite (1989) investigated 143 U.S. fund data for a 20-year period over 1965 to 1985. He finds that the industry alpha is not sufficiently large in the U.S. market to overcome the load charge. Thus the verdict in that economy would be that the growth is not coming from the attraction of superior performance of funds' managers. How about New Zealand?

Grinblatt and Titman (1989) consider the impact of survivorship bias, total transaction costs to the mutual fund performance as likely to lead to erroneous conclusion just using the alpha. They find that the unit trust funds do possess enough private information to offset the expenses they make and that there is the evidence of performance persistence over five-year return periods. Their later study, Grinblatt and Titman (1992) indicates that the strongest evidence of abnormal risk-adjusted performance was evident for one class of funds, growth funds.

In addition, the performance persistence cannot be explained by the firm size, dividend yield, past returns, skewness, interest rate sensitivity, or the systematic risk. Mutual fund performance is also found to persist over short-term horizon (Hendricks, Patel and Zeckhauser, 1993). They find that the persistence of relatively superior fund performance proves to be significant at least for the first four quarters and that there is a similar effect for underperforming funds.

Although Brown, Goetzmann, Ibbotson and Ross (1992) argue that the truncation by survivorship gives rise to an apparent persistence in performance, Brown and Goetzman (1995) still conclude that investors can use historical information to beat the pack. Taking into account the survivorship bias, Malkiel (1995) analyses equity mutual funds from 1971 to 1991, also in the U.S. He shows that the mean return of the surviving funds is substantially greater than the mean of the non-survivors. There is no relationship between betas and total returns. Furthermore, the performance persistence in the 1970s breaks down considerably for tests in the 1980s.

Given the inconclusive findings in the U.S. mutual fund performance, this study aims to examine the performance of New Zealand unit trusts using the

conditional and unconditional asset pricing model, to overcome biased results from alpha.

The rest of this paper is organized into three more sections. Section 2 contains a description of the data used and some descriptive summary statistics. Section 3 provides a discussion of results on performance presented in three sub-sections. The paper ends with a concluding final Section 4.

2. Data and methodology

We use monthly data of entry price and exit price of 191 New Zealand unit trusts with data from August 1991 to July 2001.¹ The monthly return is adjusted for share distributions and dividend payments. It is not adjusted for management fees. Our sample excludes New Zealand insurance bonds and Superannuation trusts.

Morningstar classifies trusts into seven categories according to the asset class that the unit trusts hold. Table 1 shows that overseas financial markets accounts for a substantial amount in the New Zealand unit trusts. This table presents the monthly unit trust returns, the relevant risk factors, and the instrumental variables for conditional asset pricing factor model from August 1991 to June 2001

There are 42 international equity trusts and 54 multi-sector trusts. In addition, at least 22 unit trusts invest in international fixed-interest assets. Only 15 and 11

Table 1: Descriptive statistics on the New Zealand unit trust returns

| Trust Category | No. of Trusts | Average Return | Standard Deviation | Median Return |
|--|---------------|----------------|--------------------|---------------|
| Panel A: Cross-sectional Statistics of Unit Trusts | | | | |
| International Equity | 42 | 0.0057 | 0.0059 | 0.0056 |
| Multi-sector | 54 | 0.0030 | 0.0038 | 0.0030 |
| Fixed-Interest | 22 | 0.0021 | 0.0013 | 0.0019 |
| Cash | 15 | 0.0008 | 0.0017 | 0.0000 |
| Property | 11 | 0.0021 | 0.0026 | 0.0015 |
| Equity | 27 | 0.0020 | 0.0040 | 0.0023 |
| Mortgage | 16 | 0.0001 | 0.0004 | 0.0000 |
| All Trusts | 187 | 0.0029 | 0.0042 | 0.0024 |
| Panel B: Time-series Statistics of Risk Factors | | | | |
| Market Return (RM) | | 0.0092 | 0.0495 | 0.0110 |
| Size (SMB) | | -0.0163 | 0.0780 | -0.0187 |
| Value (HML) | | -0.0199 | 0.0727 | -0.0243 |
| Momentum (UMD) | | 0.0126 | 0.0793 | 0.0197 |
| Panel C: Time-series Statistics of Instrumental Variables | | | | |
| Lagged one month T-bill | | 0.0058 | 0.0012 | 0.0060 |
| Inflation | | 0.0097 | 0.0760 | 0.0083 |
| Industrial Production | | -0.0009 | 0.1127 | -0.0041 |
| Term Structure Slope | | 0.0002 | 0.0008 | 0.0002 |

¹ We are grateful to Tom Meyer for providing the data.

trusts invest in cash asset and property respectively. The last two groups are the equity trusts which invest in the domestic equity market and the mortgage trust. The monthly average return for all 187 funds is 0.29 percent (the value in the table multiplied by 100). The best performance is by the international equity trust whose average return is 0.57 percent and the worst one is the mortgage trust with 0.01 percent mean return. However, this does not necessarily imply that the international equity trusts outperform other funds because the international equity trust also has the highest volatility of 0.59 percent while the mortgage trust yields the lowest volatility of 0.04 percent. Moreover, to compare the fund performance, it is necessary to account for all relevant systematic risks that might drive the asset returns.

3. Findings and analysis

A: Unconditional performance evaluation

Jensen (1986) considers the abnormal return of a portfolio from a regression of the fund's performance on the market risk premium as unconditional return adjusted for risk. However, the single factor model is insufficient to explain several anomalies such as the size premium and the value premium. Fama and French (1992) propose the three-factor model, which they show that the beta or the market risk factor does not explain the cross-section of stock returns during 1963 to 1990 after both market-to-book factor (HMB) and size factor (SMB) are included in the asset pricing model.² The market-to-book factor is believed to capture the distress risk, while the size factor is a proxy for liquidity risk and estimation risk. As a result, we apply Fama-French three-factor model to evaluate the performance of mutual funds as follows:

$$R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + s_i \text{SMB}_t + h_i \text{HML}_t + \varepsilon_{it} \quad (1)$$

Where,

R_{it} : the fund return,

R_{ft} : the risk-free return,

$R_{mt} - R_{ft}$: the excess market return,

SMB_t : the return on the zero-cost portfolio of small cap portfolio and a large market capitalization portfolio, and

HML_t : the return on the zero cost portfolio of high market-to-book portfolio and low market-to-book portfolio.

² There is as yet unanimity on the Fama-French factors, although textbooks have started to include this model along with the CAPM, etc. One criticism of the method is that, unlike the other theory-based performance models such as the alpha, Fama-French is based essentially on empirical regularity with no theoretical derivation of the model. Further, attempts to replicate the results are heavily dependent on the specific methodology used by Fama and French to measure the value stock variable, which is the book-to-market ratio. Nevertheless, we apply this to produce another set of results.

Fama and French point out that their three-factor model does not explain the cross-sectional variation in momentum sorted portfolio return. Carhart (1997) extends the Fama and French model by introducing a fourth factor which represents the momentum risk factor-mimicking portfolios, UMD.

$$R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + s_i \text{SMB}_{it} + h_i \text{HML}_{it} + u_i \text{UMD}_{it} + \varepsilon_{it} \quad (2)$$

Panel B of Table 1 presents the descriptive statistics of the above risk factors. The New Zealand market has the monthly average return of 0.92 percent while the average risk-free return is 0.58 percent. SMB and HML factors have negative return of 1.63 percent and 1.99 percent respectively. The momentum risk factor earns 1.26 percent monthly return.

B: Conditional performance evaluation

The limitation of unconditional performance evaluation is that it assumes that the publicly available information is fully reflected in the corresponding risk factor, beta, so it is excluded from the model. The conditional asset pricing model allows the public information to play a role in the performance evaluation. Ferson and Schadt (1996) extend the unconditional Jensen measure by incorporating the change of the state of economy into the model as follows:

$$R_{i,t+1} = \alpha + \beta(Z_t) R_{m,t+1} + \varepsilon_{i,t+1} \quad (3)$$

$$E(\varepsilon_{i,t+1} | Z_t) = 0$$

$$E(\varepsilon_{i,t+1} R_{m,t+1} | Z_t) = 0$$

Where,

$\beta(Z_t)$: refers to beta conditional on the publicly available information at time t or Z_t ; $E(\varepsilon_{i,t+1} | Z_t) = 0$ and $E(\varepsilon_{i,t+1} R_{m,t+1} | Z_t) = 0$ refer to the assumption in the conditional CAPM.

If the fund manager uses no more information than Z_t so $\beta(Z_t)$ is only a function of Z_t and by applying Taylor series expansion, the linear approximation of $\beta(Z_t)$ is

$$\beta(Z_t) = \delta_0 + \delta_1 Z_t \quad (4)$$

Then, the conditional performance evaluation model will become

$$R_{i,t+1} = \alpha + \beta R_{m,t+1} + \delta_1 (Z_t R_{m,t+1}) + \varepsilon_{i,t+1} \quad (5)$$

The instrumental variable used in the conditional model are the lagged level of the one-month Treasury bill, the term structure or the difference between 10-year

Treasury bond and the one-year Treasury bill, the inflation rate, and the industrial production index. Panel C of Table 2 shows that the one-month Treasury bill has the average return of 0.58 percent which still falls short of the inflation of 0.97 percent. The term structure is positively sloped of 0.02 percent, where the average industrial production is a negative of 0.09 percent.

C: Empirical evidence

Table 2: Unconditional unit trust performance in New Zealand

| Trust Category | Alpha | RM-RF | HML | SMB | UMD | Alpha distribution. (+ / -) |
|---|----------|---------|---------|---------|---------|--------------------------------|
| Panel A: Fama-French 3 Factors Model | | | | | | |
| International Equity | -0.0015 | 0.0143 | -0.0806 | 0.0070 | | 14 / 28 |
| Multi-sector | -0.0035* | -0.0198 | -0.0302 | -0.0170 | | 5 / 49 |
| Fixed-Interest | -0.0036* | -0.0108 | 0.0064 | -0.0029 | | 0 / 22 |
| Cash | -0.0045* | 0.0266 | 0.0114 | -0.0048 | | 1 / 14 |
| Property | -0.0043* | 0.0091 | -0.0024 | -0.0243 | | 1 / 10 |
| Equity | -0.0072 | -0.0157 | -0.0955 | -0.0640 | | 3 / 24 |
| Mortgage | -0.0052* | 0.0056 | -0.0019 | 0.0023 | | 0 / 16 |
| <i>All Trusts</i> | -0.0039* | -0.0029 | -0.0393 | -0.0145 | | 24 / 163 |
| Panel B: Cahart 4 Factors Model | | | | | | |
| Multi-sector | -0.0026 | -0.0201 | -0.0344 | -0.0214 | -0.0312 | 7 / 47 |
| Fixed-Interest | -0.0036* | -0.0117 | 0.0066 | -0.0028 | -0.0025 | 0 / 22 |
| Cash | -0.0045* | 0.0256 | 0.0113 | -0.0051 | -0.0033 | 1 / 14 |
| Property | -0.0038 | 0.0087 | -0.0018 | -0.0251 | -0.0369 | 1 / 10 |
| Equity | -0.0074 | -0.0123 | -0.0959 | -0.0634 | 0.0222 | 3 / 24 |
| Mortgage | -0.0052* | 0.0056 | -0.0019 | 0.0023 | 0.0001 | 0 / 16 |
| <i>All Trusts</i> | -0.0033* | -0.0055 | -0.0417 | -0.0178 | -0.0259 | 34 / 153 |

Table 2 presents the unconditional performance of New Zealand unit trusts based on the Fama-French three-factors model and Cahart's (1997) four-factor model. The results show clearly yet again a negative Jensen alpha in both models across all seven unit trusts categories. Except for the international equity trust and the equity trust, the alphas of all funds are significantly negative at the 5 percent level. The coefficients of the market return, the growth factor (HML), and the size factor (SMB) are negative (but insignificant). The momentum factor has the negative association with the unit trusts return, which is consistent with a study of Otten and Bams (2000), reporting the negative association of momentum factor in the European mutual fund returns. We found 163 unit trusts and 153 unit trusts which have negative Jensen alphas under the Fama-French model and the Cahart model respectively.

Table 3 shows the conditional performance. For equity trust, the coefficient on the impact from conditional inflation and industrial production are positive, but the mortgage trust has the positive impact from conditional inflation but negative association from the industrial production.

Table 3: Conditional unit trust performance in New Zealand

| Trust Category | Alpha | R _M -R _F | Alpha distribution (+ / -) |
|----------------------|----------|--------------------------------|-------------------------------|
| International Equity | -0.0011 | -1.1165 | 15 / 27 |
| Multi-sector | -0.0030 | -0.1854 | 4 / 50 |
| Fixed-Interest | -0.0040* | -0.1803 | 0 / 22 |
| Cash | -0.0041* | 0.3071 | 1 / 14 |
| Property | -0.0064* | -0.4665 | 0 / 11 |
| Equity | -0.0048 | -0.4897 | 2 / 22 |
| Mortgage | -0.0052* | 0.0724 | 0 / 16 |
| All Trusts | -0.0034* | -0.3928 | 25 / 162 |

The estimated conditional alphas support the findings of the unconditional performance. All trust categories exhibit the negative conditional alpha. Four out of seven groups have significant negative alphas. There are 162 funds out of 187 unit trusts which have negative conditional alphas. Only 25 or about 14 percent of the funds had positive returns with the vast majority of funds underperforming a given benchmark.

4. Conclusions

This study examines the performance of New Zealand unit trusts using the unconditional and conditional asset pricing models. The results from tests using two models suggest that New Zealand unit trusts under-perform the benchmark by 0.33 percent to -0.39 percent per month. It remains unclear whether the diversification benefit provided by these unit trusts could offset their poor performance to attract the fund owners to continue to invest in the funds. Perhaps the alternative investments are also underperforming some other benchmarks, which mean that the additional growth in the volume of funds coming to the industry is still going up despite poorer performance. This anomaly needs further query.

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