THE MEASUREMENT OF MUTUAL FUND PERFORMANCE IN AUSTRALIA

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Introduction

This brief paper discusses the methods and results of a recent study which attempted to measure the performance of a sample of Australian Mutual Funds and Unit Trusts over a four-year period. The actual performance of the funds was measured using rates of return which included dividends and which were adjusted to take account of the degree of risk that the funds were bearing. Risk-adjusted performance indices were then used to attempt to discover successful and unsuccessful funds. These indices measure the difference between the actual return of the fund and the return to be expected, given the degree of risk that the fund bears.

Methodology

The relation between returns on the ith portfolio, R_{ti}, over time periods t - 1 to t, and returns on the market R_{tm} is given by the equation

$$R_{ti} = a_i + B_i R_{tm} + u_{ti} \quad (1)$$

where t denotes the time, i denotes funds, u_{ti} is a residual, B_i is the beta coefficient for the ith fund and $a_i = R_f(1-B_i)$, where R_f is the risk-free rate of interest. This result is derived from the theory of efficient capital markets in books such as Fama and Miller (1972), Sharpe (1970) and Lorie and Hamilton (1972). Beta measures risk and equals one for the market. Values greater (or less) than one imply the stock or portfolio is either more (or less) risky than the market. The risk-adjusted performance measures for the ith fund, the Sharpe Index (SI_i) and the Treynor Index (TI_i) are defined by

$$SI_i = \frac{R_i - R_f}{a_i} \quad (2)$$

$$TI_i = \frac{R_i - R_f}{B_i} \quad (3)$$

where R_i is the average annual return and a_i is its standard deviation.

Sharpe (1966) devised an index to measure the risk Premium ($R_i - R_f$) per unit of total risk (a_i). This is satisfactory for portfolios but not for an individual share as a_i comprises the risk both of the share and the market. Treynor (1965) developed his index to measure risk premium per unit of market risk (B_i), which is adequate for shares and portfolios.

The sample of funds involved four Mutual Funds and twelve Unit Trusts, which, purely for example purposes, were chosen randomly from the funds in the fortnightly Cowan Investment Service Publication over the period March 1967 to March 1971. This provided buying prices, which, when dividends were included, gave 16 quarterly returns for each fund. Returns for the Market were estimated by using the Sydney Ordinary Shares Index No. 15 plus the Average Dividend Yield Series, adjusted for comparability with the Share Price Index.

Annual rates of return for each of the four years and their average are presented in Table 1 for the Index (Market), Mutual Funds (MI to M4) and Unit Trusts (U1a to U6), where numbers 1 to 4 and 1 to 6 denote different Investment Groups and a, b, c denote different funds of the one Investment Group. Table 1 also contains the ranks of the returns of the funds for each year and overall.

For each of the funds, a simple linear regression of fund return upon market return has been used to estimate a and B in equation (1) for the sixteen quarters. These estimates are given in Table 2 as a and b, together with S, the annual standard deviation of returns, and R^2, the proportion of variation explained by the regression. Table 2 also contains for each fund Sharpe and Treynor Indices (and their ranks), which have been estimated from equations (2) and (3) using estimates S and b from Table 2, average return from Table 1 and an annual risk-free rate of 4½% which was the average three month Treasury Bill rate over the period.

Interpretation of the Results

The average annual returns are 13.1% for Mutual Funds, 7.7% for Unit Trusts and 9.1% overall. This large difference between Funds and Trusts is also clear in the averages for the betas, dispersion measures and both Indices of Performance. These differences presumably reflect their different objectives in investment, in particular their attitudes to risk and their portfolio composition. There are also large differences between the average returns of the Mutual Funds, which range from 5.6% to 20.9% and also in the Unit Trusts which range from 4.4% to 10.4% over the four-year period.

It is clear from Table 1 that there is a moderate positive relations between returns on the funds and those of the Market (Index). In particular, this

reflects the experience of the Share Market over the four-year period March 1967 to March 1971, when the first two years were years of strong increases due to the 'mining boom', the third year saw a further small rise and the last year a substantial decline.

If all the funds are considered from the point of view of the number in the top eight and bottom eight every year, only 1 fund was in the bottom category (U1a) and never in the top. In fact, if fund performance is random from year to year, then we expect 1 in each category since $1 = 16 \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$. Although the ranks have not been tested formally, there seems a high degree of randomness amongst them which suggests there is little consistency of performance. This randomness was also apparent in the risk-adjusted performance indices, although the results have not been presented here.

The Sharpe and Treynor Indices give very similar ranks for all the funds. In fact, their rank correlation coefficient is .96, so they are very similar here.

The statistical significance of the estimated regression line can be measured by R^2 using a t test. Only M4 with $R^2 = 12\%$, was not significant at the five percent single tail level.

The risk-adjusted indices show very marked differences in the performances of the funds over the four years with M4 easily the best performer of the Mutual Funds and Unit Trusts. The best of the latter is either U3a or U2c, although, using the Treynor Index, which may be preferable as it applies to both funds and stocks, it would be U3a. Clearly, investment group U1 had the two worst performers and U4 the next two poorest of the Unit Trusts.

The Sharpe Index showed that only one fund (M4) did better than the Market (Index), whereas, using the Treynor Index, there were five beating it.

The results above are interesting as, although they have certain limitations, they are generally in agreement with the major studies on American Funds – these are Treynor (1965), Sharpe (1966) and Jensen (1968). Their main conclusions were the inability of funds to systematically perform better than the market and the inconsistent (random) nature of fund performance from year to year.

B. Cook has made an interesting attempt to measure the performance of Superannuation Funds in Australia. It is a very thorough and systematic study which has treated carefully the problem of time-weighted rates of return to account for varying cash-flows. No risk adjustment has been attempted for several sensible reasons. One of these is that the funds are similar in their attitude to risk and, in general, are fairly conservative, although this proposition has not been measured. The values of the risk measures in Table 2 for the Unit Trusts suggest very considerable variation, varying from .31 to .64 for beta and 4.5% to 8.4% for S. Thus risk measures of superannuation funds may vary considerably and may need to be taken into account in measuring performance.

Conclusions

The general conclusions are that, in respect of examples chosen, there is little consistency of fund performance over time, the inability of funds to out-perform the market and the importance of the market factor in fund behaviour.

Weaknesses of the study are the presence of non-equity investment, an imperfect market index, the small sample, the a-typical four years implying a longer period is possibly needed, the possible invalidity of equation (1) and an imperfect rate-of-return. Returns were based on fund buying prices, whereas they need to use fund market values and to be time weighted. In fact, these deficiencies in the returns are probably not very serious at all.

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TABLE 1
Annual Rates of Return (%) and Ranks of Funds

Fund	Year 1		Year 2		Year 3		Year 4		Averages	
	Return	Rank	Return	Rank	Return	Rank	Return	Rank	Return	Rank
Index	**47.0**	–	**47.2**	–	**4.1**	–	**-18.6**	–	**16.4**	–
M1	38.2	2	56.1	1	5.9	5	-21.9	15	15.6	2
M2	31.7	3	36.5	5	1.0	12	-18.9	14	10.2	4
M3	65.3	1	37.3	4	21.5	2	-54.9	16	5.6	14
M4	10.2	14	38.7	3	26.4	1	10.6	1	20.9	1
U1a	14.3	11	24.0	14	-0.5	13	-15.7	13	4.4	16
U1b	17.9	5	27.2	11	-1.7	16	-4.8	3	8.9	8
U1c	17.2	6	15.3	16	-1.3	15	-10.4	9	4.6	15
U2a	15.1	8	28.6	9	5.3	6	-7.7	5	9.5	5
U2b	14.4	10	27.8	10	5.0	8	-10.3	8	8.3	9
U2c	16.2	7	30.6	8	1.6	9	-7.8	6	9.2	7
U3a	12.4	13	34.7	6	9.6	4	-10.6	10	10.4	3
U3b	6.9	15	42.5	2	5.2	7	-11.1	11	9.2	6
U4a	20.1	4	26.8	12	12.4	3	-12.2	12	7.9	10
U4b	14.1	12	26.3	13	-0.9	14	-9.7	7	6.6	13
U5	14.5	9	17.9	15	1.2	10	-3.7	2	7.1	11
U6	1.3	16	33.9	7	1.1	11	-5.4	4	6.7	12

TABLE 2
Measures of Fund Performance

Fund	a	b	S(%)	R^2(%)	Sharpe Index	Rank (Sharpe)	Treynor Index	Rank (Treynor)
Index	**0**	**1.00**	**10.8**	–	**1.10**	–	**.12**	–
M1	.01	.74	11.3	51	.98	2	.15	2
M2	-.01	.78	9.7	75	.58	7	.07	9
M3	-.03	1.43	18.5	70	.06	14	.01	14
M4	.04	.33	10.0	12	1.63	1	.50	1
U1a	-.01	.62	7.3	84	-.01	16	-.00	16
U1b	-.00	.61	8.4	61	.52	9	.07	10
U1c	-.01	.63	7.6	82	.01	15	.00	15
U2a	.01	.40	6.6	43	.76	5	.13	5
U2b	.01	.32	7.4	22	.52	10	.12	6
U2c	.01	.37	5.3	58	.89	3	.13	4
U3a	.01	.40	7.3	36	.81	4	.14	3
U3b	.01	.44	7.6	40	.62	6	.11	7
U4a	-.01	.64	7.7	81	.44	11	.05	12
U4b	-.00	.51	6.4	76	.33	13	.04	13
U5	.00	.31	4.5	57	.57	8	.08	8
U6	.00	.40	6.3	47	.35	12	.06	11
Average (M)	.003	.82	12.4	52	.81		.18	
Average (U)	.001	.47	6.9	57	.49		.08	
Average (M & U)	.001	.56	8.3	56	.57		.10	