RISK ADJUSTED PERFORMANCE: FROM DUST TO PAPER

Dominique Fischer, Md Nasir Bin Daud

Universiti Malaya, Kuala Lumpur

Corresponding author: Prof. Dominique Fischer domfischer@gmail.com

Abstract

The relative performance of Malaysian REITs and Property Developers are compared with non parametric tests and then re-compared with risk adjusted returns a la Modigliani Modigliani. The period covered is 2006-2007 from share and unit prices from the Kuala Lumpur Stock Market.

The results may not fully satisfy our financial rectitude but, at least, they may satisfy our yearning for economic morality: apparently 'Turning dust into paper pays more than simply turning brick into paper'.

Keywords: Malaysian REIT, Modigliani-Modigliani, non parametric tests, Performance measure adjustments, Willcoxon test.

---

1. Introduction

This article discusses the choice between investing in development or in established properties. The question is addressed to the `paperised' (securitized) forms of both activities. In other words we intend to compare investments in shares of development companies (from dust, to brick to paper) and in shares of REITs (from brick to paper).
This exploratory study uses the daily prices of shares and units transacted on the Kuala Lumpur stock market during the period January 2006 to August 2008.

This question is a variant of very similar questions concerning the relative risk adjusted performance of REITs compared to the general stock market performance that is a perennial feature of the US literature and has been already be treated in the Malaysian and Australian context: Newell and MacFarlane 1996) and Newell, Acheapong et al. 1998), Ting, K.H 1999, Ting, K.H, M. Wong and G. Newel, 1998, G. Newell, Ting KH and P. Acheampong (2002)

In the Australian context, contrary to some of the quoted material above, a more balanced view emerges. This view is that REITs and Australian Listed Property trusts cannot - in the long run – yield at the same time a higher return and a lower risk. To a financial economist this is an anathema of the same nature that a flat earth theory can be for a geologist. Indeed our previous treatment of the same question led to the conclusion that the Index of Australian Listed Property Trusts (ALPT) is cointegrated with the Australian Stock Exchange (ASX) all ordinary index

(Fischer and Monsingh 1998) and thus that paper-ALPT investors do not enjoy any particular specific return advantage over paper-ASX investors. In fact, since paper-ALPT is less diversified than paper-ASX the risk adjusted return of Listed property trust is lower than the ASX index return. This initial conclusion was confirmed in Fischer (2002) and Fischer (2003).

This more realistic view of the Australian LPT market seems to be confirmed by the market performance post 2005.

Furthermore, because the series are cointegrated, and because, in the Malaysian case, we have so few REITs (Only 13 REITs by the end of 2007) we cannot rely on results produced with standard parametric econometrics.

Previously a non-parametric analysis had concluded that 'Australian Listed Property Trusts' do not offer any particular timing or selectivity advantages among each other and, more importantly they do not provide any advantage over the Market Portfolio." (Fischer 1998).

The present analysis raised a more specific problem that could be simply phrased as 'do real estate developers perform better than real estate trust investors'. Thus - and to clarify our title - we compare two processes and their economic rewards.

a) Developers turn dust into bricks (by their development activities) and then they issue shares (Paper) that should reflect their performance as developers and marketers of the finished product. Thus the shortcut expression 'form dust to paper'.

b) REITs purchase and manage existing assets (In Malaysia REITs not allowed to participate directly in development activities). Their activities should also be reflected in the price of their units (paper). Thus the shortcut expression 'from brick to paper'.

The question will be answered in two stages.

1. In the first stage we proceed to non-risk adjusted an non-parametric approach based on median location comparisons (Wilcoxon sum o ranks). In this test, we compare the individual performances of 13 development companies with the performance of 13 REITs.

2. Then, the same comparison is 'risk adjusted' using a using a risk-return treatment suggested by Modigliani-Modigliani (henceforth noted as MM), (Modigliani and Modigliani 1997) and applied to U.S. real estate assets (Hopkins and Acton 1999) and to Australian Listed Property Trusts (Fischer, 2002). Thus, we build two notional equally weighted portfolios of Development shares and or REIT's units listed on the Kuala Lumpur Stock Exchange. This portfolio view could reasonably be applicable to an institutional investor who wants to invest in these sectors without having to pick and choose specific companies. In the story told here our Fund managers

purchase their shares on 3 January, 2006 and sell them off on 18 August, 2007. The holding period return is measured from this 'in and out' shares transactions. The choice of dates was not a real choice: it was simply the longest run of existing Malaysian REITs that could be collected (since some of REITs are quite recent – See appendix 2). Obviously a different timing would have provided different returns, however, such is life on the stock market: the effective returns are based on 'in and out' buying and selling decisions.

The performance of individual shares will be also ranked and finally, a last and unavoidable question will be raised: is it better to invest in the general economy (proxied by the Share market) than to invest in each of the paperised property assets (developers and REITs)?

2. A preliminary non-risk adjusted and non-parametric treatment.

The relative holding period returns of 13 REIT and 13 developers are presented in table 1

Table 1: Comparative returns and ranking of REIT and Developers firms listed on Kuala Lumpur Stock Exchange 2006 -2007

Reits		Developers	
Holding period returns			
Arreit	-4.17%	10%	Paramon
Stareit	-4.08%	18%	Negara
ALAQAR	-3.08%	22%	Simepty
Amfirst	4.40%	29%	Glomac
AXIS	9.12%	31%	LBS
Atrium	9.14%	43%	Mlkand
BSDreit	10.18%	49%	Ioprop
UQAreit	10.45%	55%	Cresndo
AHP	12.84%	66%	Metrok
TWREIT	14.18%	76%	Spetia
AHP2	15.76%	85%	Sunrise
Qcapita	29.02%	94%	EO
Hektar	41.19%	103%	Umland

The relative 'location' of their ranks is tested with the Wilcoxon procedure (see the results on table 2)

The null hypothesis (Ho = no difference in median location for both groups) is emphatically rejected. If fact, a cursory visual inspection of the data could have told us as much.

Table 2: Wilcoxon rank sum test (Z tested)

Wilcoxon rank sum test on REITs and Developers (before risk adjustment)		
Size of sample A		13
Size of sample B		13
H null : Reits and developers have equal median		
H Alternative: they don't have equal median		
Significance level		5%
Z value for alpha to the right		1.64
Rank sum for A		104.00
Rank sum for B		247.00
Z calculation (assuming large sample)		
	Numerator	-71.50
	Denominator	19.50
	Z	**-3.67**
The null hypothesis		**must be rejected**
The p-value for this z point is		0.01%

However, this 'first shot' result obviously does not take relative risks into account. We will now address the required risk adjustment to give a second look at the same results.

3. The MM framework

Modigliani-Modigliani analysis is based on the traditional risk-return dilemma: higher expected returns must be traded off against higher expected risk. Thus, when an investment vehicle offers higher returns than alternative investments, one must then ask whether this performance has been achieved by an increased exposure to risk. In other words, returns have to be risk adjusted to be truly comparable.

There are several well-known measures of risk-adjusted returns. The Sharpe ratio (1966) measures return per unit of total risk (dividing the risk premium by the standard deviation), the Treynor index (1966) measure the effect of systematic risk (the risk premium is divided by β) and the Jensen's (1968) alpha measures the excess return over a systematic risk adjusted benchmark (It compares the respective slopes for securities market lines).

The MM Risk Adjusted Performance (RAP) concept is very similar to the Sharpe ratio, but has the advantage of being intuitively clearer to investors since it compares percentage of returns instead of 'unit less' ratios.

The Modigliani Modigliani Risk Adjusted Performance (RAP) adjusts all portfolios to the level of risk in the market benchmark (here the Kuala Lumpur Composite Index: KLCI) and then measures the returns of this risk-matched portfolio.

4. Concepts and notations

The basic MM idea is to compare the performance of any specific 'subject' portfolio (p) to the performance of a relevant unmanaged market benchmark portfolio (m) that will, in our case, be the KLCI. Then the subject portfolio (p) is adjusted to reflect the same level of risk than the benchmark (m). The adjustment is performed by varying the degree of leverage of the subject (p) as explained below. Finally the risk-matched portfolio (p) returns are compared to the risk-comparable benchmark (m) and the differences in returns are simply measured in % points "which investors are familiar with and understand — and can be compared with the risk adjusted performance of any other portfolio [adjusted in the same way]...." [1]

The following description is based on MM initial article, but the notation has been modified for the sake of clarity.

We will define:

R_f = the short-term risk-free interest rate;

R_p = average return of portfolio p

RAP_p = average return of risk-adjusted return of portfolio p (Risk Adjusted Performance of p);

$RAPX_p$ = average excess return of the risk adjusted portfolio = $RAP_p - R_f$

E_p = average excess return of portfolio p ($E_p = R_p - R_f$);

σ_p = standard deviation of R_p and E_p;

σ_{RAP} = standard deviation of the matched portfolio RAPP;

R_m = average return of the market portfolio;

E_m = average excess return of the market portfolio ($E_m = R_m - R_f$)

σ_m = standard deviation of R_m and E_m.

The matching of the risk level of the subject portfolio to the market portfolio is obtained by adjusting the level of leverage of p. The risk — measured as the dispersion of portfolio p returns — is increased by increasing the debt level in the portfolio composition and conversely, the level of risk can be decreased by selling risky assets in order to purchase risk-free assets (eg. Bank Bills).

The risk-adjusted return of portfolio p, RAP_p is the return of portfolio p, levered by an amount L_p, which may be positive or negative.

---

[1] MM art.cit. p 46

We can deduce the value of L_p from the definition:

$\sigma_{RAP} = (1 + L_p)\,\sigma_p \quad (1)$

and, since, by construction, we have :

$\sigma_m = \sigma_{RAP}$

We can write :

$$L_p = (\sigma_m/\sigma_p) - 1 \quad (2)$$

Levering up will increase the level of risk and the expected portfolio returns. Levering down will decrease the risk and the expected portfolio returns.

In a case of levering up, and if we assume, for simplicity sake, that the cost of debt is equal to safe return i_f , we can write the subject portfolio adjusted return as:

$RAP_p = (1+ L_p)\,R_p - L_p\,R_f \quad (3)$

Where the leveraged return $(1+ L_p)\,R_p$ is reduced by the interest to be paid on the debt L_p

Substituting equation (2) into equation (3) we get:

$RAP_p = (\sigma_m/\sigma_p)\,(R_p - R_f) + R_f \quad (4)$

Or, by using the portfolio excess return notation ($E_p = R_p - R_f$), we can rewrite:

$RAP_p = (\sigma_m/\sigma_p)\,E_p + R_f$

Since the excess portfolio return was written:

$RAPX_p = RAP_p - R_f$

We can also obtain:

$RAPX_p = (\sigma_m/\sigma_p)\,E_p$

The excess return of the risk-adjusted portfolio is equal to the excess return of the initial subject portfolio multiplied by the relative risk. This familiar measure is simply the equity premium required to compensate for the relative risk of the portfolio p compared to the benchmark market.

Since the difference between the risk adjusted return (RAP) and the risk adjusted excess return (RAPX) is constant (and equal to the risk free rate R_f), the ranking of portfolios will be the same for both measurements nevertheless, the excess return formulation (RAPX) may be a more intuitively common measure of differential performance.

For any portfolio, the best portfolio performance is obtained by maximising the RAP of the matched portfolio by making the best selection of assets. Then the manager can choose to reduce or increase his level of risk by buying or selling debt. This two steps treatment is quite

crucial for portfolio managers. They can independently select the optimal return for a given package of assets and then adjust their required level of risk by the appropriate leverage.

A simplified example may clarify the previous discussion.

Table 3: Construction table of the basic ratios

	Annual return	Risk	Sharpe index	Required leverage adjustment	Risk Adjusted Return	Excess return over market	Excess return due to risk	Excess return due to asset selection
Bank Bill	**4.00%**	0						
Market return	**15.00%**	10.0%	1.10	0.00	**15.00%**	0.00%		
Fund 1	**20.00%**	15.0%	1.07	-0.33	**14.67%**	5.00%	5.33%	-0.33%
Fund 2	**10.00%**	5.0%	1.20	1.00	**16.00%**	-5.00%	-6.00%	1.00%

In this example, the apparent best performer (Fund 1) is carrying too much risk. After adjustment, the market-matched portfolio would only have a return of 14.67%. The fund manager was not smarter (in fact her asset selection was not good); she was simply accepting too much dispersion of her returns. In order to judge her true asset selection performance, 1/3 of her assets—that are too risky—should be traded against risk-free assets.

For Fund 1, the matching of the risk level of the subject portfolio to the market portfolio is obtained by reducing the level of leverage of p by L%:

$L_p = (10\%/15\%) - 1 = -0.33\%$

Thus, the risk adjusted return is obtained as:

$RAP_p = (1+ L_p) R_p - L_p R_f$

$= (1 - 0.33) * 20\% + 0.33*4\%$

$= 14.67\%$

The excess return over the market is simply:

$R_p - R_m = 5\%$

The excess return due to the higher leverage (higher risk) is derived as:

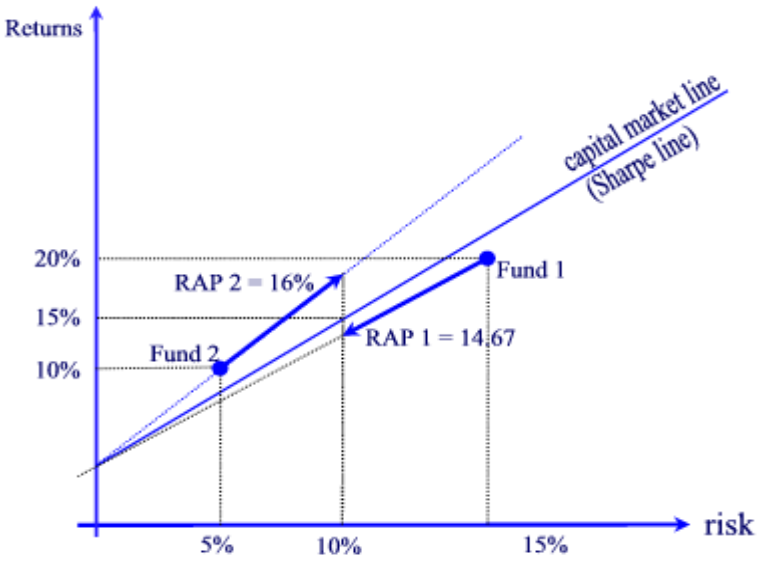
$R_p - RAP_p = 5.33\%$

The return due to the asset selection is:

$RAP_p - R_m = - 0.33\%$

The following graph may facilitate the interpretation of the previous results.

Figure 1



5. Comparing risk adjusted performance of Malaysian developers and REIT

The present analysis uses the MM procedure described previously. The full table of computations is provided in appendix 1.

Table 4 presents the results of the 'After MM adjustments' where we re-test the Wilcoxon ranking both for individual shares and for the two combined portfolios of REIT units and Developers shares. The sum of rankings for developers is still larger for the REITs (247 over 104). Here again the null hypotheses must be rejected. Developers 'dominate' REIT (the median of their adjusted return distribution lies to the right).

However the significance is now much less convincing than before the MM adjustments (the p-value for our Z measurement is now 3.43 while it was 0.1 in the previous comparison before adjusting for risk).

Table 4: Z test on Wilcoxon sum of rank test after MM risk adjustments

Wilcoxon rank sum test after risk adjustment		
Size of sample A		13
Size of sample B		13
H null : Reits and developers have equal median		
H Alternative: they don't have equal median		
Significance level		5%
Z value for alpha to the left		-1.64
Rank sum for A		140.00
Rank sum for B		211.00
Z calculation (assuming large sample)		
	Numerator	-35.50
	Denominator	19.50
	Z	**-1.82**
The null hypothesis		**must be rejected**
The p-value for this z point is		3.43%

6. Comparing with the Market

Table 5 and 6 now compares the 'hit score' of each group under study when compared with the market (the KL composite index). A score of 1 is given to the shares that have over-performed over the market ($r_i > r_m$). Developers beat the market in 76.92% comparisons and REITs do the same in only 15.38 % of their comparisons. It appears thus that: `dust to paper' seems to be valued over the market whereas 'brick to paper' does not.

Table 5: Developers vs. KLCI (The Market)

A Z test on Developers beating the market		
Population proportion to be tested	x/n	50.00%
1 - pi		50.00%
Sample size		13
Number of reits that beat the market		10
Sample proportion= p	p	76.92%
q = 1-p	q	23.08%
Is the proportion significantly equals to (H0 null)		50.00%
Is the proportion significantly superior to x (H Alternative)		50.00%
Significance level		5%
Standard error	sqrt(p*q/n)	0.13868
The **z** value for	76.92%	**1.94145**
For the confidence limits of Z		
Z lower		-1.959963985
Z higher		1.959963985
The Z equivalent to the surveys results being	is in between the critical values	
The null hypothesis	**cannot be rejected**	

Table 6: REIT vs the KLCI

A Z test on REITs beating the market		
Population proportion to be tested	x/n	50.00%
1 - pi		50.00%
Sample size		13
Number of reits that beat the market		2
Sample proportion= p	p	15.38%
q = 1-p	q	84.62%
Is the proportion significantly equals to (H0 null)		50.00%
Is the proportion significantly superior to x (H Alternative)		50.00%
Significance level		5%
Standard error	sqrt(p*q/n)	0.13868
The **z** value for	15.38%	**-2.49615**
For the confidence limits of Z		
Z lower		-1.959963985
Z higher		1.959963985
The Z equivalent to the surveys results being	is outside the critical values	
The null hypothesis	**should be rejected**	

If the Z test strongly confirms the dominance of the KLCI index over the REITs portfolio, the same conclusion cannot apply to the Developer at a 95% confidence level. However this result is very marginally convincing: the Null hypothesis would be rejected at the 94% confidence level.

A mere visual inspection of the ranking scores would however convince us that - at least for the period chosen - the shares of Development firms do beat the market convincingly (10 winners out of 13) whereas only 2 REITs beat the market.

7. Conclusion

Our results may satisfy our yearning for some 'economic morality' but does it satisfy our financial rectitude?

Our sense of 'economic morality' (if this is not oxymoronic….) could be satisfied by the fact that actors that generate more value added to the economic process (turning dust into bricks) are better rewarded that those who simply manage existing assets and do not seem to add much value.

In fact, when we compare developers results with the performance of the whole economy (the KL composite index) we could be tempted to conclude that their risk taking activities are rewarded (slightly) over and above all other firms.

And what about our financial rectitude?

In fact – when we observe the results in column 5 of the calculation presented in the appendix – we should conclude, with some surprise, that the 'winners' are not the firms that exhibit the highest degree of financial leverage as expected. In fact, most of the worst 'losers' have the highest degree of financial leverage. Normally we would have expected the 'efficient market' adjustment for leverage risk of the share prices.

Should we conclude by assuming that the difference in operational leverage (the operational leverage is much higher for developers than for other sectors of the economy) is sufficient to explain the higher return? The data presented here cannot answer this question but the question deserves a more detailed analysis.

We could also conjecture that the short period surveyed (less than two years), the IPO effects on the new REITS and the possible timing distortions presented by the use of holding period returns measurements could be the explanation of our results. Here again, we can't answer yet since most of the REITs are not old enough to track further back (see the table in appendix 2 to observe the effects of using holding rates instead of equivalent annual rates).

Thus we are left, for the time being, with a satisfactory economic moral tale: adding value to the economic process seems to be rewarded by the capital market in other words:

Turning dust into paper pays more than simply turning brick into paper.

Appendix 1

Ranked Comparative return, leverage effect and MM risk equivalent returns

1	2	3	4	5	6
	Holding period returns	St. deviation	Sharpe Index	Leverage %	MM Risk equivalent return
Risf free rate	**3%**				
Rm	**28%**	**19.42**	0.012642		
Ioprop	48.95%	26.37	0.017262	-0.2633	36.97%
Hektar	41.19%	21.95	0.017191	-0.1152	36.84%
Cresndo	54.72%	32.40	0.015826	-0.4005	34.18%
Metrok	66.14%	44.21	0.014180	-0.5607	30.99%
AHP2	15.76%	8.71	0.014144	1.2301	30.92%
Umland	102.50%	71.85	0.013788	-0.7296	30.23%
Glomac	28.52%	20.95	0.011969	-0.0728	26.69%
Spetia	75.91%	60.89	0.011902	-0.6810	26.56%
AHP	12.84%	8.05	0.011666	1.4121	26.10%
Atrium	9.14%	5.04	0.011312	2.8548	25.42%
Sunrise	84.85%	72.34	0.011253	-0.7315	25.30%
EO	93.73%	82.47	0.010948	-0.7645	24.71%
Negara	17.65%	13.37	0.010624	0.4530	24.08%
Qcapita	29.02%	24.51	0.010435	-0.2076	23.71%
BSDreit	10.18%	6.72	0.010025	1.8913	22.92%
Simepty	21.83%	18.95	0.009707	0.0252	22.30%
TWREIT	14.18%	11.30	0.009500	0.7183	21.90%
Mlkand	43.18%	42.11	0.009437	-0.5387	21.77%
LBS	31.18%	30.65	0.009050	-0.3662	21.02%
UQAreit	10.45%	8.18	0.008564	1.3738	20.08%
AXIS	9.12%	9.27	0.006124	1.0949	15.34%
Paramon	10.38%	13.10	0.005295	0.4828	13.73%
Amfirst	4.40%	3.84	0.002482	4.0607	8.27%
Stareit	-4.08%	6.64	-0.011334	1.9254	-18.57%
ALAQAR	-3.08%	2.59	-0.025188	6.5034	-45.48%
Arreit	-4.17%	2.94	-0.025927	5.6173	-46.92%

Appendix 2

This table compares the rates used in the paper (holding period rates) with more conventional annual equivalent rates. The holding period rates were chosen in this study because some REITS have not existed for a full year. The 'annual equivalent rates' used for those 'juniors' were caculated on the number of recording days. The holding period rates may differ from the holding period rates however the ranking and thus the general conclusions are not different.

REITs				Developers			
	Annual equivalent	Holding period rates	number of days			Holding period rates	number of days
Arreit	-4.08%	-4.17%	123	Paramon	9.83%	10.38%	404
Stareit	-3.62%	-4.08%	404	Negara	17.28%	17.65%	404
ALAQAR	-4.29%	-3.08%	256	Simepty	21.83%	21.83%	404
Amfirst	4.49%	4.40%	165	Glomac	29.38%	28.52%	404
AXIS	8.59%	9.12%	404	LBS	32.52%	31.18%	404
Atrium	9.57%	9.14%	98	Mkand	47.68%	43.18%	404
BSDreit	10.71%	10.18%	133	Ioprop	55.59%	48.95%	404
UQAreit	9.90%	10.45%	404	Cresndo	63.89%	54.72%	404
AHP	12.30%	12.84%	404	Metrok	81.68%	66.14%	404
TWREIT	15.23%	14.18%	339	Spetia	98.41%	75.91%	404
AHP2	15.30%	15.76%	404	Sunrise	115.07%	84.85%	404
Qcapita	33.64%	29.02%	156	EO	133.00%	93.73%	404
Hektar	50.89%	41.19%	178	Umland	152.17%	102.50%	404
average	12.20%	11.15%	267		52.27%	52.27%	404

References

Achour-Fischer (1998). Non Parametric evaluation of Australian Listed Property Trusts. PRRES conference, Kuala Lumpur, 1999.

Achour-Fischer, D. and V. Monsingh (1998). Australian Listed Property Trusts: a cointegrating approach. PRRES, Kuala Lumpur, Malaysia.

Hopkins, R. and R. Acton (1999). "Where Does the Return Come From? Using the Risk-Adjusted Performance in Real Estate." Real Estate Finance **Summer**: 23-29.

Liang, Y. and W. McIntosh (1998). "Sharpe's alpha: a new performance measure." Real Estate Finance **15**(3): 13-21.

Modigliani, F. and L. Modigliani (1997). "Risk-Adjusted Performance, How to measure it and why?" Journal of Portfolio Management **23**(2): 45-54.

Newell, G., P. Acheapong, et al. (1998). Assessing the level of direct property in property trust performance.

International Real Estate Society Conference, Kuala Lumpur.

Newell, G. and J. MacFarlane (1996). "What does property trust performance tell us about commercial property returns?" Australian Land Economics Review: 2-10. Newell, G, Ting K.H and P. Acheampong (2002). "Listed Property Trust in Malaysia"; Journal of Real Estate Literature, 10 -1

Ting, K.H "The Listed Property Trust industry in Malaysia: factors constraining it's growth and development, PRRES proceedings, 1999, Kuala Lumpur.

Ting, K.H, M. Wong and G. Newell: The development of Listed Property Trusts in Malaysia, Australian Property Journal, 1998, 35:4