CHAPTER 2

LITERATURE REVIEW

2.1 EFFICIENT MARKETS HYPOTHESIS

The efficient markets hypothesis (EMH) was originally developed in the late 1960s. It states that market prices should reflect all information known about a security. Scholars and practitioners have been investigating the extent to which EMH applies to real-world markets for more than 40 years.

Most research has been addressed to well developed markets such as those in the United States, United Kingdom, Europe and Japan. Some inefficiencies have been found, and a number of so-called anomalies have been discovered that we do not yet understand very well. But most tests show these well-developed markets are more efficient than many people believe.

Fama (1970,1976) has done a great deal to operationalize the notion of capital market efficiency. He defines three types of efficiency, each of which is based on a different notion of exactly what type of information is understood to be relevant in the phrase 'all prices fully reflect all relevant information.'

1. Weak-form efficiency: No investor can earn excess returns by developing trading rules based on historical price or return information. In other words, the information in past prices or returns is not useful or relevant in achieving excess returns.

2. Semistrong-form efficiency: No investor can earn excess returns from trading rules based on any publicly available information. Examples of publicly available information are annual reports of companies, investment advisory data such as 'Heard on the Street' in the Wall Street Journal, or ticker tape information.

3. Strong-form efficiency: No investor can earn excess returns using any information, whether publicly available or not.

Obviously, the last type of market efficiency is very strong indeed. If markets were efficient in their strong form, prices would fully reflect all information even though it might be held exclusively by a corporate insider. Suppose, e.g., we know that our company has just discovered how to control nuclear fusion. Even before we have a chance to trade based on the news, the strong form of market efficiency predicts that prices will have adjusted so that we cannot profit.

Rubinstein (1975) and Latham (1985) have extended the definition of market efficiency. The market is said to be efficient with regard to an information event if the information causes no portfolio changes. It is possible that people might disagree about the implications of a piece of information so that some buy an asset and others sell in such a way that the market price is unaffected. If the information does not change prices, then the market is said to be efficient with regard to the information in the Fama(1976) sense but not in the Rubinstein (1975) and Latham (1985) sense. The Rubinstein – Latham definition requires not only that there be no price change but also that there be no transactions. Hence it is a stronger form of market efficiency than even the Fama strong-form efficiency mentioned above.

2.2 THE CAPITAL ASSET PRICING MODEL (CAPM)

The CAPM is given by the equation :

$$E[r(j)] = r(f) + \{ E[r(m)] - r(f) \}\beta_j$$

Where $E[r(j)]$ = Expected return of a security
$r(f)$ = Risk-free rate of interest
$E[r(m)]$ = Expected Return from the Market
β_j (beta) = Systematic (or non-diversifiable) risk of the stock

gives an equation of the SML (Security Market Line) and shows that the expected return of a security is a linear function of the Beta factor, or systematic risk, of the security. Hence if the security is correctly priced, it will lie on the SML.

The SML, in turn, has been derived from the CML (Capital Market Line), which is drawn on expected return from any efficient portfolio {E[r(p)]} and standard deviation of a portfolio $\{\sigma_p\}$ space.

The major assumptions underlying the CAPM as set out in Copeland & Weston (1992) are :

a. Investors base their portfolio investment decisions on the Markowitz expected return and standard deviation criteria.
b. Investors may borrow and lend without limit at the risk-free rate of interest.
c. Investors have homogeneous expectations about future outcomes over a one-period time horizon.
d. Capital markets are in equilibrium

e. There are no market imperfections; investments are infinitely divisible, information is costless, there are no taxes, transaction costs or interest rate changes, and there is no inflation.

It can be seen that some of these assumptions are obviously unrealistic ; which brings us to the next question : 'Does the CAPM work ?'

There have been numerous empirical tests of the CAPM. Jensen (1969) provided one of the earliest evidence on the CAPM risk-return relationship. He computed the returns and beta coefficients of 115 mutual funds for the period 1955 to 1964 and concluded that mutual funds that have high returns are associated with high beta values. The study implies that average return is a positive and linear function of systematic risk.

The first rigorous test of CAPM on a portfolio of stocks traded on the New York Stock Exchange (NYSE) was carried out by Fama and Macbeth (1973). The study looked into the average monthly return and beta of the stocks, spanning 34 years, from 1935 to 1968. It was found that over a long period of time on NYSE, the applicability of CAPM cannot be rejected. The market risk (as estimated by beta) of a security is a single factor, which has significant relation with average stock returns. The risk-return relationship is positively linearly correlated and beta coefficients are valid measures of risk.

In another study, Jacob (1971) covered 593 individual securities listed in the NYSE for the period 1946 to 1965 using both monthly and annual returns. The results indicate a significant positive relationship between the stocks' return and risk. However, the relationships of the stocks were weaker than predicted by the CAPM in that the intercept (alpha) was higher than the average risk free rate and the slope of the regression line between beta and the returns was lower than the theoretical values.

Sharpe and Cooper (1972) also carried out comprehensive research on the NYSE common stocks from 1931 to 1967. Again it was found that the expected returns and systematic risk are positively correlated.

Roll's (1977 and 1978) breakthrough articles questioned the relevance of all the empirical tests. As explained by Levy and Sarnat (1984) Roll's critique is as follows :

"If the market portfolio is ex-post mean-variance efficient, we necessarily obtain a linear relationship in the second pass regression. This is a technical result which neither confirms nor rejects the CAPM.."

However, Stambaugh (1982) in a subsequent study used various ex-post indexes and showed that inferences about the CAPM are not sensitive to the composition of the market index. Hence as long as common stocks are included one can construct an index that is highly correlated with the market portfolio.

In another study by Mullins (1982) some of the conclusions arrived at were as follows:

"a. As a measure of risk, beta appears to be related to past returns...

b. The relationship between past returns and beta is linear.....

c. The empirical SML appears less steeply sloped than the theoretical SML..."

Furthermore,

> "In corporate finance applications of CAPM several sources of error exists.....
> ..... the simple model may be an inadequate description of the behaviour of financial markets.....
> .....betas are unstable through time.....
> .....the estimates of the future risk-free rate and the expected return on the market are also subject to error....."

Nevertheless,

> "Tests of the model confirm that it has much to say about the way returns are determined in financial markets.....
> Financial decision makers can use the model in conjunction with traditional techniques and sound judgement to develop realistic, useful estimates of the costs of equity capital. "

2.3 THE SHARPE INDEX

The Sharpe Index measures the risk premium of the portfolio relative to the total risk of the portfolio. To determine the performance level, the Sharpe Index for a portfolio is compared with the market Sharpe Index. A higher Sharpe Index would indicate over performance while a lower Sharpe Index would indicate underperformance when compared with the market. The equation for the Sharpe Index performance measure is given in Section 3.

2.4 THE TREYNOR INDEX

The Treynor Index measures the risk premium of the portfolio relative to the systematic risk of the portfolio. As such, the Treynor Index is equal to the slope of a straight line connecting the position of the portfolio with the risk-free rate of interest. Accordingly, a greater Treynor Index for any portfolio shows a greater opportunity to lever at the risk-free rate of interest and hence a superior position. To determine the performance level, the Treynor Index for a portfolio is compared with the market Treynor Index. The equation for the Treynor Index performance measure is given in Section 3.

2.5 THE JENSEN INDEX

The Jensen Index uses the Security Market Line (SML) as a benchmark, and is the difference between the expected rate of return on the portfolio and what its expected return would be if the portfolio were positioned on the SML. In other words it is the vertical distance of each portfolio from the SML. Accordingly, if a portfolio has a positive Jensen Index, it is considered to have good performance. The equation for the Jensen Index performance measure is given in Section 3.

2.6 SHORTCOMINGS OF THE THREE INDICES

It is not unexpected to find that all three indices discussed above suffer from certain shortcomings.

Both the Jensen and Treynor Indices are criticised for focusing on management's ability to produce excess return without regard for its ability to generate excess returns for more than one security (i.e. breadth of performance).

The Treynor Index's main attribute lies in its recognition of the opportunity for investors to lever excess returns. As such it is considered a better measure than the Jensen Index.

The Sharpe Index, on the other hand is considered a composite measure in that it takes into account both breadth and depth. Hence it is deemed to be a better measure than either the Jensen or Treynor indices.

All three indices require a correctly defined CAPM; in particular, the broadest possible Market Index which most closely approximates the Market Portfolio. In the event that this pre-requisite is not met, any misspecification of the market Portfolio would result in a bias in favour of low-risk portfolios. However, Dybvig and Ross (1985) maintain that this bias depends on the covariance between the portfolio in question and the proxy for the market portfolio.

Roll's (1977 and 1978) critique of the CAPM empirical tests also has strong implications for the Treynor and Jensen indices.

According to Levy and Sarnat (1984), Roll's interpretation is that " the market portfolio m used in the time series regression to determine the beta is simply mean-variance inefficient.....
the portfolio m is not actually the true market portfolio and hence the estimates obtained by regressing the returns on m, which we denote by β_I are not the true betas.....
consequently the performance indices calculated using these 'market' data do not really evaluate the quality of mutual fund managements....."

In spite of this strong criticism, one can justify the use of performance indices on the basis that using a market index that carries a wide number of stocks is a good market proxy.

Stambaugh (1982) found that tests of the CAPM were more sensitive to the composition of the assets tested rather than to the market portfolio proxy used. Hence Roll's criticism may in practice not be that severe in negating the results.

One should keep in mind the fact that the CAPM and capital market efficiency are joint and inseparable hypotheses. If capital markets are inefficient, than the assumptions of the CAPM are invalid and a different model is required. And if the CAPM is inappropriate, even though capital markets are efficient, then the CAPM is the wrong tool to use in order to test for efficiency.

It is probably appropriate to mention here that an alternative measure of performance, based on the Arbitrage Pricing Theory (APT) may be computed. However this alternative measure would require an additional in depth analysis, which is beyond the scope of this study.

2.7 PERFORMANCE OF UNIT TRUSTS AND EQUITIES

Koh & Koh (1987) analysed 19 unit trusts in Singapore over a five-year period from 1980 to 1984. They found that growth funds that were expected to yield the highest returns and to have the highest risks relative to the other types of funds do not have the highest returns nor do they possess the highest risk measured by both the standard deviation of the returns and the beta value of the fund. Hence, it can be concluded that returns and risk characteristics of these unit trusts are not fully constant with their stated objectives. The coefficient of determination (R2) of the

regression between the fund returns of the 19 funds with respect to the market returns ranged from 0.01 to 0.473 with a mean of 0.2513. Hence, these unit trust funds did not achieve a high degree of diversification. By using the Adjusted Sharpe Index (ASI), 16 or 84 % of the 19 funds had lower ASI than SES All Share Index (0.0170). The average ASI value of the unit trusts was –0.0575, which is well below that of the market index. This shows that the unit trusts were unable to outperform the market. The Spearman Rank Correlation (R5) calculated for each pair of years except for the period 1981 to 1982. The remaining pairs of years have negative but no significant R5. This means that unit trusts in Singapore were not able to report consistent performance over time.

Liow (1997) examined Singapore property share returns for 1975 - 1995 and concluded that property share do not perform better than the stock market and performed poorer on a risk-adjusted basis. A more recent study by Liow (2000) concluded that direct properties in Singapore outperformed property stocks and the stock market on a risk adjusted basis.

While these two studies are conducted on Singapore shares, there are few similar recent studies in the Malaysian context.

Neoh (1990) had made a study on five property stocks i.e. IGB, Bandar Raya, I & P, Sime Property and Pelangi for the 1981 to 1990 period and found the following :-

(a) the average return on shareholders equity of these five companies was only 6.9%;
(b) the average annual return is 1 to 4% per annum;
(c) high variability of annual returns.

Neoh (ibid) attributed the poor stock performance to :-

(a) Declining profit margin
The declining profit margin is on a declining trend for the past 10 years due to a maturing housing industry and a more competitive business environment;

(b) Low asset turnover ratios
The asset turnover ratios of the property companies are low and are declining steadily due to the large land banks owned by the property companies.

Despite the poor performance of property shares, Neoh (ibid) is confounded by the popularity of property stocks among small investors and why new companies continue to join the property development bandwagon. This paper updates on the comparative performance analysis of direct property, indirect property and shares.

Ting (2002) did a performance analysis study on listed property companies in Malaysia. The objectives of his study were to examine :-

(a) whether listed property companies achieved higher risk adjusted returns than shares and direct investment in residential properties;
(b) whether listed property companies could offer portfolio diversification potential when included in an investment portfolio;
(c) whether listed property companies could act as substitute for direct investment in residential property.

The first objective was answered by carrying out a risk-return analysis followed by the calculation of Sharpe Index. The second objective was answered by examining the correlation of returns between the listed

property shares and Kuala Lumpur Composite Index, EMAS Index and Second Board Index. The third objective was answered by comparing the risks-returns and the correlation of returns of the listed property shares with the Malaysian House Price Index (MHPI). The study covered a full property cycle. The property market recovered in 1989 from the 1986-87 recession. The property market downturn happened in 1998 after the currency crisis in 1997. Currently the property market still suffers from property oversupply and overhang particularly the commercial and high cost residential units.

The study concluded that selected property development and investment company shares are found to perform better than shares on a risk adjusted basis. However, overall property shares represented by the Property Sector Index do not perform better than shares.

The listed property shares do not offer portfolio diversification when included in an equity investment portfolio due to its high correlation with shares. Also property shares do not act as substitute to direct residential investment due to its low negative correlation.

2.8 PERFORMANCE OF MUTUAL FUNDS

Mutual Funds allege that they can provide two types of service to their clients. First they minimize the amount of unsystematic risk an investor must face. This is done through efficient diversification in the face of transaction costs. Second, they may be able to use their professional expertise to earn abnormal returns through successful prediction of future security prices. This second claim is contradictory to the semistrong form of capital market efficiency unless, for some reason, mutual fund managers can consistently obtain information that is not publicly available.

A number of studies have focused their attention on the performance of mutual funds. A partial list includes Friend and Vickers (1965), Sharpe (1966), Treynor (1965), Farrar (1962), Friend, Blume and Crockett (1970), Jensen (1968), mains (1977), Henricksson (1984) and Grinblatt and Titman (1986). Jensen (1968) used the Jensen Index to test the abnormal performance of 115 mutual funds using annual data between 1955 and 1964. The results obtained indicated that the average α (gross of expenses except brokerage commissions) was –0.4 % per year indicating that the average returns were nor sufficient to recoup even brokerage commissions. The results obtained are consistent with the hypothesis of capital market efficiency in its semistrong form because we may assume that at the very least mutual fund managers have access to publicly available information. However, they do not necessarily imply that rational investors will not hold mutual funds. On the average, the funds do an excellent job of diversification. This may itself be a socially desirable service to investors.

Mains(1977) had re-examined the issue of mutual fund performance. He criticises Jensen's work on two accounts. First, the rates of return were underestimated because dividends were assumed to be reinvested at year's end rather than during the quarter they were received and because when expenses were added back to obtain gross returns, they were added back at year's end instead of continuously throughout the year. By using monthly data instead of annual data, Mains was able to better estimate both net and gross returns. Second, Jensen assumed that mutual fund betas were stationary over long periods of time. Using monthly data, Mains obtained lower estimates of beta and argued that Jensen's estimates of risk were too high.

The abnormal performance results calculated for a sample of 70 mutual funds indicate that as a group the mutual funds had neutral risk-adjusted performance on a net return basis. On a gross return basis, 80 % of the funds sampled performed positively. This suggests that mutual funds are able to outperform the market well enough to earn back their operating expenses. It is also consistent with the theory of efficient markets given costly information. The theoretical work of Cornell and Roll (1981) and Grossman (1980) predicts a market equilibrium where investors who utilize costly information will have higher gross rates of return than their uniformed competitors. But because information is costly, the equilibrium net rates of return for informed and uninformed investors will be the same. This is just what Main's work shows. Mutual funds' gross rates of return are greater than the rate on a randomly selected portfolio of equivalent risk, but when costs (transaction costs and management fees) are subtracted, the net performance of mutual funds is the same as that for a naïve investment strategy.