3.0 RESEARCH METHODOLOGY

3.1 DATA SELECTION

The analysis was based on 7 financial years commencing from 1994 to 2000. The period was selected because of the high transaction volumes (Table 3.1) that is, annual transaction volume of more than 20 billion units of shares trade on the KLSE (Bank Negara Malaysia 1999, p.311). The high volume is crucial in ensuring fair market pricing of equity.

Table 3.1: Annual transaction volume of KLSE Main Board

Calendar Year	Main Board Annual Volume (Billions Units)
1993	107.1
1994	60.3
1995	33.2
1996	52.8
1997	70.3
1998	54.3
1999	84.4
2000	66.3

(Source: KLSE – Annual Companies Handbook: Volume 24 Book 4)

One benefit of EVA is its ability to detect wealth destruction by companies with slow earning growth. When earnings growth is low, the company would be profitable but destroying shareholder wealth. This is because the company may not be earning sufficient return to compensate shareholders for lost of opportunity cost. Conventional accounting measures continue to show

positive results despite destruction of shareholders wealth (Refer Table 3.2). EVA that takes into account cost of equity is able to detect wealth destruction earlier. Therefore EVA appears to be superior to the conventional accounting measure (Byers & Myers 2000, p.326).

Table 3.2: Performance measure signalling

Financial Situation	Accounting Measures	EVA	Actual Impact Of Financial Situation On Shareholder Wealth
Loss making company	-	-	Wealth Destruction
Low earnings growth	+	-	Wealth Destruction
High earnings growth	+	+	Wealth Creation

Based on the above theoretical justification, the sample was selected from Plantation companies listed on the First Board of the Kuala Lumpur Stock Exchange (KLSE). This is because of the slow growth and low shareholder return in the sector (Refer to Table 3.3 and 3.4 below).

Table 3.3: Malaysian economic sectoral growth rate

Economic Sectors Growth Rate (%)	2000*	1999	1998	1997	1996	1995	1994	Average Growth Rate
Agriculture	0.50	3.80	-4.50	1.30	2.20	1.10	-1.00	0.49
Mining	0.60	-3.10	1.80	1.00	4.50	9.00	2.50	2.33
Manufacturing	17.00	13.50	-13.70	12.50	12.20	14.50	14.70	10.10
Construction	3.10	-5.60	-23.00	9.50	14.20	17.30	14.10	4.23
Services	4.90	3.30	-0.80	8.00	9.70	9.40	9.70	6.31
- Imputed Charges	2.80	2.20	-0.60	14.60	18.00	15.20	15.10	9.61
+ Import Duties	-7.50	20.10	-41.50	6.70	6.10	3.30	21.90	1.30
GDP	7.50	5.80	-7.50	7.70	8.60	9.50	9.20	5.83

Note: * - Estimated Annual Growth Rate

(Source: yearly Economic Report)

Table 3.4: Average shareholder returns by industries

Industry – KLSE First Board	ROE	ROE Ranking
Securities Investment	178.94	1
Food, Beverage & Tobacco	27.99	2
Infrastructure	6.18	3
Insurance	5.46	4
Retailing	(2.30)	5
Construction	(4.39)	6
Investment Holding	(7.55)	7
Finance	(10.46)	8
Property	(12.48)	9
Hotels	(13.46)	10
Banks	(15.88)	11
Mining	(20.34)	12
Building Materials	(20.42)	13
Industrial Products	(24.54)	14
Gaming	(36.99)	15
Publishing & Media	(47.63)	16
Trading & Services	(53.68)	17
Plantations	(54.58)	18
Transportation	(56.92)	19
Consumer Products	(184.55)	20

(Source: Corporate Handbook KLSE Main Board – February 2000)

Based on the criteria above, 33 companies in the plantation sector were selected from the Corporate Handbook – KLSE Main Board as at February 2000. This represents 10% of total number of companies listed on Main Board as at the end of 1993. Five companies were excluded because they were not listed as the start of 1994. Below is the list of the rejected (Table 3.5) and selected (Table 3.6) companies.

Table 3.5: List of rejected samples

Company Name	Date Listed
1. Kwantas Corporation Berhad	29/11/96
2. Ladang Perbadanan Fima Berhad	11/11/94
3. Johore Tenggara Oil Palm Berhad	15/08/96
4. PBB Oil Palm Berhad	12/08/97
5. TH Group Berhad	01/03/99

Table 3.6: List of selected samples

Company Name
1. Asiatic Development Berhad
2. Austral Enterprises Berhad
3. The Ayer Molek Rubber Co.
4. Batu Kawan Berhad
5. Best World Land Berhad/Multi Vest Resources Berhad
6. Bukit Katil Resources Berhad
7. Chin Teck Plantations Berhad
8. Far East Holdings Berhad
9. Golden Hope Plantations Berhad
10. Gula Perak Berhad
11. Guthrie Ropel Berhad
12. Highlands And Lowlands Berhad
13. INCH Kenneth Kajang Rubber PLC
14. IOI Corporation Berhad
15. Kluang Rubber Company Berhad
16. Kretam Holdings Berhad
17. Kuala Lumpur Kepong Berhad
18. Kuala Sidim Berhad
19. Kulim (Malaysia) Berhad
20. Kumpulan Guthrie Berhad
21. Kumia Setia Berhad
22. Lingui Developments Berhad

23. Mentakab Rubber Company Berhad
24. Negri Sembilan Oil Palms Berhad
25. North Borneo Corporation Berhad
26. Parit Perak Holdings Berhad
27. Riverview Rubber Estates Berhad
28. Sarawak Oil Palms Berhad
29. Sungei Bagan Rubber Company Berhad
30. TDM Berhad
31. United Malacca Rubber Estates Berhad
32. United Plantations Berhad
33. Westmont Land (Asia) Berhad/Techno Asia Holding Berhad

After reviewing all data, a few were discarded. The data of Sungei Bagan Rubber Company for financial year 1994 was rejected because the cost of equity was lower than costs of debt. This is inconsistent with the fact that shareholders are residual claimants and therefore bear all risk of financial failure. In addition, data for Ayer Molek Rubber Company for financial year 1995 and 1999 was also rejected. Financial year 1995 data was rejected because the computed raw beta was excessively high (68.40). The shareholders' fund at the start of financial year 1999 was negative and therefore it was rejected.

3.2 RESEARCH METHODOLOGY

In order to answer the research questions, the following tests were conducted:

1. What is the relationship between EVA and stock returns in Malaysia?
   Correlation coefficient test was used to determine the strength and sign of the relationship between EVA and stock returns.
2. Is EVA superior to Accounting performance measures in explaining stock returns for Malaysian companies?
   The bivariate linear regression was used to determine the explanatory ability of the variables.

The tests were base on the research by Chen & Dodd (1997) mentioned in the literature review. It is also the common procedure used to answer the above research question (Zikmund 1997, p.626 – 627).

The dependent variable, stock returns for the firm was based the specification in Brealey and Myers (2000, p. 63) and is as follows:

Stock Returns, $R_{i,t} = (D_{i,t} + P_{i,t} - P_{i,t-1})/P_{i,t-1}$

Where:

$D_{i,t}$ = Dividend received during the financial year t [Gross dividend per share X (1 - T)];

$P_{i,t}$ = Closing share price at the Balance Sheet year t;

$P_{i,t-1}$ = Opening share price at the start of the financial year t; and

T = Corporate tax rate applicable to companies.
The tax rates applied were as follows: 30% for financial year 1994 to 1996, 28% for financial year 1997 and 1998, 0% for financial year 1999 and 28% for financial year 2000.

The data for stock returns (Refer Appendix 1 for details) were sourced from:

1. Corporate Handbook – KLSE Main Board: Feb 2000 published by CEIC Holdings for financial year 1994 to 1998; and
2. The database Hydra version 2.0.0 and website www.klse-ris.com.my for the financial year 1999 and 2000.

The independent variables chosen for EVA and Accounting Measures are as follows:

1. EVA measure

Basic EVA was selected to represent the EVA variable (Refer Appendix 1 for details and next section 3.3 for detail description). Below is a table of individual company rankings of average EVA and average EVA per share (EVAPS) for the selected sample.

Table 3.7: Ranking of the sample according to EVA values

Company Name	Average EVA (RM '000)	Ranking Average EVA	Average EVAPS (RM)	Ranking Average EVAPS
Lingui Developments Berhad	20,629.57	1	0.0525	3
IOI Corporation Berhad	8,891.71	2	0.0092	5
United Plantations Berhad	4,251.29	3	0.0281	4
Mentakab Rubber Company Berhad	994.57	4	0.7101	1
Chin Teck Plantations Berhad	(86.43)	5	(0.0016)	6
Bukit Katil Rubber Estates Berhad	(1,215.57)	6	0.3424	2
Kluang Rubber Company Berhad	(1,513.00)	7	(0.7541)	30
Riverview Rubber Estates Berhad	(2,393.14)	8	(0.2214)	18
Negri Sembilan Oil Palms Berhad	(2,681.43)	9	(0.0919)	10
Sarawak Oil Palms Berhad	(4,830.86)	10	(0.0518)	9
Inch Kenneth Kajang Rubber PLC	(5,675.86)	11	(0.6362)	26
Ayer Molek Rubber Company Berhad	(7,140.20)	12	(3.9668)	32
Far East Holdings Berhad	(8,485.86)	13	(0.1515)	16
Asiatic Development Berhad	(8,501.29)	14	(0.0115)	8
Sungei Bagan Rubber Company Berhad	(9,409.17)	15	(4.9774)	33
Kumpulan Guthrie Berhad	(9,704.86)	16	(0.0097)	7
Kumia Setia Berhad	(14,623.43)	17	(0.2827)	20
Kuala Sidim Berhad	(14,719.57)	18	(0.1355)	14
Austral Enterprises Berhad	(15,648.86)	19	(0.1357)	15
United Malacca Rubber Estates Berhad	(22,841.14)	20	(0.3019)	22
TDM Berhad	(28,318.43)	21	(0.3535)	23
Batu Kawan Berhad	(33,913.43)	22	(0.1280)	13
Guthrie Ropel Berhad	(36,654.29)	23	(0.2885)	21
Gula Perak Berhad	(58,776.43)	24	(0.2661)	19
Highlands And Lowlands Berhad	(63,304.00)	25	(0.1047)	11
Kretam Holdings Berhad	(68,004.86)	26	(0.6463)	27
Best World Land/Multi Vest Resources	(68,476.43)	27	(0.4634)	24
North Borneo Corporation Berhad	(78,884.43)	28	(1.1996)	31
Parit Perak Holdings Berhad	(78,991.29)	29	(0.6760)	28
Kuala Lumpur Kepong Berhad	(109,448.00)	30	(0.1637)	17

Table 3.7: Ranking of the sample according to EVA values

Company Name	Average EVA (RM '000)	Ranking Average EVA	Average EVAPS (RM)	Ranking Average EVAPS
Lingui Developments Berhad	20,629.57	1	0.0525	3
IOI Corporation Berhad	8,891.71	2	0.0092	5
United Plantations Berhad	4,251.29	3	0.0281	4
Mentakab Rubber Company Berhad	994.57	4	0.7101	1
Chin Teck Plantations Berhad	(86.43)	5	(0.0016)	6
Bukit Katil Rubber Estates Berhad	(1,215.57)	6	0.3424	2
Kluang Rubber Company Berhad	(1,513.00)	7	(0.7541)	30
Riverview Rubber Estates Berhad	(2,393.14)	8	(0.2214)	18
Negri Sembilan Oil Palms Berhad	(2,681.43)	9	(0.0919)	10
Sarawak Oil Palms Berhad	(4,830.86)	10	(0.0518)	9
Inch Kenneth Kajang Rubber PLC	(5,675.86)	11	(0.6362)	26
Ayer Molek Rubber Company Berhad	(7,140.20)	12	(3.9668)	32
Far East Holdings Berhad	(8,485.86)	13	(0.1515)	16
Asiatic Development Berhad	(8,501.29)	14	(0.0115)	8
Sungei Bagan Rubber Company Berhad	(9,409.17)	15	(4.9774)	33
Kumpulan Guthrie Berhad	(9,704.86)	16	(0.0097)	7
Kumia Setia Berhad	(14,623.43)	17	(0.2827)	20
Kuala Sidim Berhad	(14,719.57)	18	(0.1355)	14
Austral Enterprises Berhad	(15,648.86)	19	(0.1357)	15
United Malacca Rubber Estates Berhad	(22,841.14)	20	(0.3019)	22
TDM Berhad	(28,318.43)	21	(0.3535)	23
Batu Kawan Berhad	(33,913.43)	22	(0.1280)	13
Guthrie Ropel Berhad	(36,654.29)	23	(0.2885)	21
Gula Perak Berhad	(58,776.43)	24	(0.2661)	19
Highlands And Lowlands Berhad	(63,304.00)	25	(0.1047)	11
Kretam Holdings Berhad	(68,004.86)	26	(0.6463)	27
Best World Land/Multi Vest Resources	(68,476.43)	27	(0.4634)	24
North Borneo Corporation Berhad	(78,884.43)	28	(1.1996)	31
Parit Perak Holdings Berhad	(78,991.29)	29	(0.6760)	28
Kuala Lumpur Kepong Berhad	(109,448.00)	30	(0.1637)	17

Westmont Land (Asia)/Techno Asia Berhad	(117,250.43)	31	(0.5694)	25
Golden Hope Plantations Berhad	(120,393.00)	32	(0.1200)	12
Kulim (Malaysia) Berhad	(135,581.57)	33	(0.7172)	29

2. Conventional Accounting measures

The accounting variables selected were based on the literature review and accounting measures commonly appearing in local business magazines (Refer Table 3.8). The variables chosen were sourced from the Corporate Handbook – KLSE Main Board (February 2000) for financial year 1994 to 1998 and website www.klse-ris.com.my for financial year 1999 and 2000 (Refer Appendix 1 for details).

Table 3.8: List of selected accounting measures

Performance Measure	Definition
Price/Earnings (PE)	Closing share price at balance sheet date,t divided by the financial year's earnings per share.
Earnings Per Share (EPS)	Profit after tax and minorities divided by the number of issued and fully paid up ordinary shares as at balance sheet date,t.
Return On Equity (ROE)	Profit after tax & minority interest (before extraordinary items and after deducting preference dividend) divided by the common shareholders' fund.
Return On Total Asset (ROTA)	Profit before tax divided by total assets.

Below is a table of descriptive statistics for all the variables:

Table 3.9: Summary Of Descriptive Statistics

Variables	Minimum	Maximum	Mean	Standard Deviation
Stock Returns (%)	-87.17	463.46	10.47	79.70
EVA (RM '000)	-362,128	148,014	-33,443.91	73,863.51
EVAPS (RM)	-23.56	12.18	-0.44	2.30
PE Ratio	-107.45	1,500.00	37.51	133.34
EPS (RM)	-14.50	20.42	0.27	2.20
ROE (%)	-985.12%	357.60%	-12.86%	130.58%
ROTA (%)	-909.20%	61.65%	2.15%	62.67%

3.3 MEASURING EVA

Most of the research indicated in the Literature Review used Disclosed EVA purchased from Stern Steward & Company. However, there is no such data available in Malaysia and therefore a model of EVA must be created. The EVA formula in this research was based on that used by Ameen and Yau (1998). It however differs from the Ameen and Yau model with the weighted average cost of capital (WACC) and capital based on figures at the start of the financial period (Bacidore, Boquist, Milbourn and Thakor (1997)). This approach was used because providers of capital (debt and equity) have made the financial resources available at the start of the year. Therefore WACC and capital must also be based on rates or estimates prevailing at the start of the period. The resulting formula is consistent with the recommended specification by Al Erhbar (1998, p.178-181). It is the same as the Basic EVA formula. In using this Basic EVA, the accounting adjustments were assumed to be insignificant in their contribution towards explaining stock returns (Chen & Dodd (1997) and Briddle, Bowen & Wallace (1997)). For the purpose of this research, the figures generated by this formula will be called EVA. The EVA formula is follows: -

EVA = NOPAT – WACC * Capital

Where: -

NOPAT= Net Operating Profit After Tax;

WACC = Weighted Average Cost of Capital;
$[K_E * (E/(D+E))] + [K_D(1-T)* (D/(D+E))]$.

Capital = Equity and Interest Bearing Debt;

A detail description of the above EVA elements is given in table 3.10 below.

Table 3.10: Description of EVA elements

EVA Elements	Description
NOPAT = EBIT(1-T)	NOPAT indicates the ability of a manager to generate operating profit without considering the impact of financing mix. Therefore interest charges (I) are added back in profit before tax (PBT) (Bringham et. al. 1999, p.44-45). Figures for NOPAT computations were sourced from: 1. Corporate Handbook – KLSE Main Board: Feb 2000 for financial year 1994 to 1998; and 2. Website www.klse-ris.com.my for financial year 1999 and 2000.
E = Book value of equity	It comprises of shareholders' funds. The figures were sourced from: 1. Corporate Handbook – KLSE Main Board: Feb 2000 for financial year 1994 to 1998; and 2. Website www.klse-ris.com.my for financial year 1999 and 2000.
D = Book value of debt	Book value of interest bearing short-term and long-term debts. Short-term loans consist of bank overdrafts and short-term loans from financial institution. Long-term loans on the other hand consist of secured and unsecured term loans, loan stocks, bonds and floating rate note payable after 12 months from balance sheet date. Short-term and Long-term debt figures were sourced from: 1. Corporate Handbook – KLSE Main Board: Feb 2000 for financial year 1994 to 1998; and 2. Website www.klse-ris.com.my for financial year 1999 and 2000.
T = Corporate tax rate	The tax rates applied were as follows: 30% for financial year 1994 to 1996, 28% for financial year 1997 and 1998, 0% for financial year 1999 and 28% for financial year 2000.

K_D = Cost of Debts	It is based on average lending rate from commercial banks (Ameen & Yau 1998) for the first month of the selected financial year. This rate of interest was selected because it represents the return demanded by providers of debt capital at the start of the financial year. The use of current cost of borrowing and was more appropriate than using existing rate of interest on the debts according to Al Erhbar (Al Erhbar 1998, p.180). K_D was source from various Bank Negara – Monthly Statistics.
K_E = Cost of Equity	Refer section 3.4 for detail description.

3.4 COST OF EQUITY

The cost of equity (K_E) is the returns that shareholders could be earning on alternative investment of equal risk. In this research, this was estimated using the "Capital Asset Pricing Model" (CAPM) indicated below (Brigham et. al. 1999, p.412-416).

$$K_E = \text{Risk Free} + \text{Risk Premium}$$
$$= K_{RF} + (K_M - K_{RF})b_i$$

Where:

K_{RF} = Risk Free Rates

$K_M - K_{RF}$ = Market Risk Premium

b_i = Beta

Risk Free Rates (K_{RF})

The 3-month Malaysian Government Treasury bill (Brigham et. al. 1999, p.412-413) was used to determine the risk free rate. This is because the discount rates on illiquid long-term government bond (Maturity more than 1 year) may not be reflective of normal market conditions (Bank Negara Malaysia 1999, p.339-342). In application of CAPM on the selected stocks, K_{RF} was based on the average rate of discount for the first month of the selected financial year. K_{RF} was be sourced from Bank Negara Malaysia: Monthly Statistics.

Market Risk Premium ($K_M - K_{RF}$)

The risk premium (Table 3.12) was based on the historical data for 12 years from 1988 to 1999. It is arithmetic average of the difference between Market returns and risk free rate (Brigham et. al. 1999, p.413-414). It is assumed to be stable over the period of testing.

Table 3.11: Description of risk premium elements

Risk Premium Elements	Description
Market return, K_M	Growth of the Kuala Lumpur Stock Exchange Composite Index from 1988 to 1997. This was sourced from the "Investor Digest".
Risk free rate, K_{RF}	The average rate of discount for the 3-Month Treasury Bills for the respective calendar year. This was sourced the yearly "Economic Report" published by the Ministry of Finance.

Beta (b_i)

The Blume adjusted beta was used to estimate beta for the financial year (Refer below for formula). Beta had to be estimated for the financial year because shareholders must inform management of the returns required in exchange continued provision of equity capital at the start of the financial period. The Blume method was selected because it was found to the best method for estimating beta in Malaysia for the early part of 1990s (Kok 1997). Therefore it was assumed that it is also applicable for period of this study. Historical beta was computed by carrying out a regression of the weekly returns on the stock (no adjustment for dividends) against the returns on the Kuala Lumpur Stock Exchange Composite Index (Corporate Handbook – KLSE Main Board: Feb 2000). As historical data is only available at the start of the financial year, it was computed for each stock base on the latest 2 year

just before the start of the financial year. This was carried out using a "Bloomberg Professional Terminal" as it enables beta computation for selected and specified periods.

Blume Adjusted Beta = 0.3333(Historical beta) + .6667(1.00)