CHAPTER 5: RESEARCH RESULTS

5.1 Summary Statistics of Sample Companies

Table 4 Distribution of companies by EVA and EPS combination

Year	EVA (+) / EPS (+)	EVA (+) / EPS (-)	EVA (-) / EPS (+)	EVA (-) / EPS (-)	Total
1992	35	0	60	5	100
1993	39	0	58	3	100
1994	38	0	61	1	100
1995	42	1	57	0	100
1996	38	0	60	2	100

The companies' EVA-to-capital, MVA-to-capital, annual change in MVA-to capital and EPS for the period 1992 to 1996 is presented in Appendices 3, 4, 5 and 6 respectively. Table 4 reports that although most of the large Malaysian companies (95% to 99%) are profitable during the period 1992 to 1996, the majority of these companies are in fact value destroyers given their negative EVAs. Over the five years, the percentage of value destroying companies ranges between 57% and 61% while the percentage of value creating companies ranges between 35% and 42%. This study also finds that 19% of the companies are able to generate positive EVA for five consecutive years as opposed to 35% of the companies generating negative EVA for five consecutive years.

The very high percentage of profitable large Malaysian companies during 1992 to 1996 is expected given that this period coincides with the unprecedented economic boom enjoyed by Malaysia. Over the five-year period, Malaysia's economy grew at an average 8.7% annually. Given the robust economy and the strong wealth effect arising from the stock market boom in 1993, consumer demand for motor vehicles and residential properties, for instance, surged. Indeed, given the buoyant demand and the long wait list, the automotive companies are able to enjoy healthy profit margins particularly from hefty profits

made from the sale of car accessories. Property developers benefited from spiralling residential property prices, which more than outpace the rise in cost of building materials and labour.

Coupled with the implementation of many large scale infrastructure projects like the RM6bn North-South Expressway, the RM1.6bn Second Crossing, the RM9bn Kuala Lumpur International Airport and the RM2bn Petronas Twin Towers, the benefits from this construction sector boom also filtered through to the building material industries like cement, steel and quarry. With demand outstripping supply, most of the building material companies operated at full capacity. Even the tobacco and beverage sectors, which are victims of the government's move to impose a series of duties hike, remained very profitable as these companies are able to fully and immediately pass on the cost increases to consumers.

However, when it comes to creating value, a majority of these large Malaysian companies fail to live up to shareholders' expectations. By and large, the negative EVA implies that these companies fail to earn a rate of return that exceeds their cost of capital. A case in point is the period between 1994 and 1997, when Malaysian companies continue to invest heavily in the retail, office and hotel sectors despite an imminent oversupply in those markets. Intensifying competition and the ensuing property market slump in 1997 and 1998 cause property prices and margins to collapse and thus, resulting in inferior or negative returns to shareholders.

Table 5 shows that a very high percentage of the large Malaysian companies (ranging from 84% to 98%) have positive MVAs during 1992 to 1996. To recap, MVA is an external measure of the value a company has created in excess of the resources already committed in the company. However, it is also important to look at the changes in MVA as the levels of MVA in assessing a company's performance. Excluding 1993's result, there is a high proportion of companies having a negative annual change in MVA, ranging from 32% to 57% over the five

years. The exceptional results in 1993 is due to the fact that liquidity factor played an important role in underpinning share prices during the super-bull stock market run.

Table 5 Distribution of companies by MVA and annual change in MVA

Year	Positive	Negative	Total
	MVA	MVA	
1992	84	16	100
1993	95	5	100
1994	98	2	100
1995	96	4	100
1996	96	4	100
Year	Positive	Negative	Total
	chg in MVA	chg in MVA	
1992	52	48	100
1993	87	13	100
1994	53	47	100
1995	43	57	100
1996	68	32	100

An increasing MVA can be viewed as the reward conferred on a company that is earning or expected to earn a rate of return that exceeds its cost of capital. On the other hand, a decreasing MVA can be viewed as the penalty handed out to a company that has fallen short of shareholders' expectations and that have committed capital to new investments where the rate of return will not exceed its cost of capital. Therefore, the large number of Malaysian companies having negative annual change in MVA between 1992 and 1996 suggests that the stock market anticipates that these companies will destroy shareholders' wealth.

Consider the case of Technology Resources Industries (TRI), one of Malaysia's largest cellular phone operator. Its annual change in MVA hit a peak of RM8,376.1m in 1993, before plunging to –RM3,762.2m in 1994, -RM786.4m in

1995 and –RM2,421.1m in 1996. TRI's EVA was negative throughout 1992 till 1996 (see Appendix 3). Despite being the dominant player in the cellular phone industry, the negative annual change in MVA means that the market is anticipating tougher times ahead for TRI. Indeed, this coincides with the period where the Malaysian government is deregulating the telecommunication industry, where new licenses are issued (altogether seven) and pricing deregulation is introduced. With the cellular phone industry oversubscribed in terms of capacity and over competitive, the industry is expected to face intensified price war, squeezed margins and industry consolidation. Collectively, these factors are expected to result in TRI earning a rate of return that is below its cost of capital.

On the other hand, the annual change in MVA for Carlsberg rose from RM74.5m in 1993 to RM645.8m in 1996 on the back of positive EVAs for five consecutive years from 1992 till 1996 (see Appendix 3). Indeed, an increasing trend in the annual change in MVA implies that the stock market views Carlsberg favourably, in the sense that the company is able and is expected to earn a rate of return that exceeds its cost of capital. Compared to the telecommunication industry, competition in the brewery industry is less severe as the other major brewery company is Guinness Anchor. Furthermore, Carlsberg is able to fully and immediately pass on any hike in excise and import duties on beer to consumers without experiencing a significant adverse impact on its NI during the economic boom period.

5.2 Correlation Analysis of Independent Variables

The correlation analysis in this section is used to indicate the possibility of multicollinearity problem in the multiple regression analysis. Table 6 reveals that both EVA-to-capital and EPS are significantly correlated at the 0.05 level for each of the years. The relationship is a positive one, with the correlation coefficients ranging from a low of 0.227 in 1994 to a high of 0.564 in 1995. This positive relationship is somewhat expected given that EVA is computed after adjustments are made to both NI and equity in order to arrive at NOPAT and IC respectively.

Table 6 Correlation analysis between EVA-to-capital and EPS

Year	Correlation coefficient	p-value
1992	0.525*	0.000
1993	0.435*	0.000
1994	0.227*	0.012
1995	0.564*	0.000
1996	0.498*	0.000
1992-1996	0.399*	0.000

*Note: Significant values at p<0.05 are indicated by an *.*

According to Green, Tull and Albaum (1988), one way researchers tackle the multicollinearity problem is to discard one of the predictors if the correlation coefficient of any pair of predictor variables exceeds 0.9. In this study, the correlation coefficients between EVA-to-capital and EPS over the five-year period is nowhere near 0.9. The impact of the multicollinearity problem is also mitigated by the fact that the multiple regression equation used in this study contains only two independent variables. Hence, it can be concluded that the regression analysis performed in this study does not face a major multicollinearity problem.

5.3 Regression Analysis with MVA-to-capital as Dependent Variable for 100 Large Companies

This section discusses the regression results for equations (1), (2) and (3) as stated in pages 19 and 20 of this study. The regression is run for each of the five years and the whole five-year period from 1992 to 1996 using SPSS version 10.0.

Table 7 Empirical results for regression equation (1)
MVA-to-capital = $a_1 + b_1$ EVA-to-capital + e_1

Year	a_1	b_1	Adj R^2	F-value	p-value	N
1992	1.329	11.714	33.8	51.54	0.000	100
		(7.18)*				
1993	3.496	3.351	1.8	2.85	0.094	100
		(1.69)				
1994	3.368	-13.300	24.5	33.11	0.000	100
		(-5.75)*				
1995	2.288	14.967	52.1	108.67	0.000	100
		(10.43)*				
1996	2.373	-0.427	0.0	0.09	0.762	100
		(-0.30)				
1992-96	2.554	-1.456	0.2	2.24	0.135	500
		(-1.50)				

Notes: 1. The t-statistic of the slope coefficient is shown in parentheses.
*2. Significant values at p<0.05 are indicated by an *.*

Table 7 shows the results of regression equation (1) between EVA-to-capital and MVA-to-capital for the period 1992 to 1996. Over the five-year period, the EVA-to-capital regression equation (1) produces a very low adjusted R-square of 0.2%, implying that EVA-to-capital is a poor predictor of MVA-to-capital during that period. The regression equation (1) is also not statistically significant (p-value > 0.05, F-value = 2.24) during the five-year period. Accordingly, hypothesis H_0 cannot be rejected and this means that the regression coefficient is equal to 0. Hence, there is no linear relationship between EVA-to-capital and MVA-to-capital during that five-year period.

However, on a yearly basis, the EVA-to-capital regression equation (1) is statistically significant at the 0.05 level in three out of the five years, that is during 1992, 1994 and 1995 (F-values = 51.54, 33.11 and 108.67). The adjusted R-squares during these three years are moderately high at 33.8%, 24.5% and 52.1% respectively.

Given that the EVA-to-capital regression equation (1) is statistically significant in 1992, 1994 and 1995, hypothesis H_o is rejected in favour of H_1. This means that the regression coefficient of EVA-to-capital is not equal to 0. Hence, there exists a linear relationship between EVA-to-capital and MVA-to-capital during these three years. However, the nature of this relationship between the two variables is not consistent. In 1992 and 1995, the regression coefficient of EVA-to-capital is 11.714 and 14.967 (t-statistics = 7.18 and 10.43) respectively. The positive relationship is consistent with general expectations that an increase in EVA will lead to an increase in MVA, and vice versa. In 1994, the regression coefficient is -13.300 (t-statistics = –5.75), meaning that there is an inverse relationship between EVA-to-capital and MVA-to-capital. Such a relationship is also possible because stock price, which is the key ingredient in the MVA calculation, depends also on expected future performance. Consequently, a company with negative EVA could still have a positive MVA if the stock market expects a turnaround in the company's EVA in the future. Likewise, a company with positive EVA may have a negative MVA if the market expects the company to face poorer prospects in the future.

Table 8 Empirical results for regression equation (2)
MVA-to-capital = $a_2 + b_2$ EPS + e_2

Year	a_2	b_2	Adj R^2	F-value	p-value	N
1992	0.477	0.041	15.7	19.50	0.000	100
		(4.42)*				
1993	2.584	0.038	1.6	2.60	0.110	100
		(1.61)				
1994	1.644	0.071	3.9	5.03	0.027	100
		(2.24)*				
1995	1.005	0.042	8.5	10.24	0.002	100
		(3.20)*				
1996	1.856	0.013	1.6	2.66	0.106	100
		(1.63)				
1992-96	1.708	0.031	3.4	18.47	0.000	500
		(4.30)*				

Notes: 1. The t-statistic of the slope coefficient is shown in parentheses.
*2. Significant values at p<0.05 are indicated by an *.*

Table 8 reports the results of regression equation (2) between EPS and MVA-to-capital for the period 1992 to 1996. Over the five-year period, the EPS regression equation (2) also yields a very low adjusted R-square of 3.4%. Therefore, EPS is also a poor predictor of MVA-to-capital during that five-year period. However, the EPS regression equation (2) is statistically significant (p-value < 0.05, F-value = 18.47) during the five-year period. Accordingly, hypothesis H_0 is rejected in favour of H_1 and this means that the regression coefficient is not equal to 0. There is a positive linear relationship between EPS and MVA-to-capital during the five-year period with a regression coefficient of 0.031 (t-statistic = 4.30).

Moreover, the EPS regression equation (2) is statistically significant at the 0.05 level in 1992, 1994 and 1995 (F-values = 19.50, 5.03 and 10.24). The adjusted R-square values during these three years range from 3.9% to 15.7%. Comparing the two regression results in Tables 7 and 8, the EVA-to-capital regression equation (1) on average produces an adjusted R-square that is higher than the

EPS regression equation (2). This suggests that EVA is a better predictor of MVA or company value than EPS.

Given that the EPS regression equation (2) is statistically significant in 1992, 1994 and 1995, there is a linear relationship between EPS and MVA-to-capital during these years. The regression coefficients of EPS are 0.041, 0.071 and 0.042 (t-statistics = 4.42, 2.24 and 3.20) in 1992, 1994 and 1995 respectively. This positive relationship between EPS and MVA-to-capital is consistent with general expectations.

Table 9 Empirical results for regression equation (3)
MVA-to-capital = $a_3 + b_{3(i)}$ EVA-to-capital + $b_{3(ii)}$ EPS + e_3

Year	a_3	$b_{3(i)}$	$b_{3(ii)}$	Overall Adj R^2	EVA R^2	EPS R^2	F-value	p-value	N
1992	1.066	10.279	0.014	34.5	33.8	0.7	27.08	0.000	100
		(5.39)*	(1.44)						
1993	2.923	2.413	0.025	1.8	1.8	0.0	1.90	0.155	100
		(1.09)	(0.98)						
1994	0.331	-15.415	0.113	35.8	24.5	11.3	28.56	0.000	100
		(-7.04)*	(4.27)*						
1995	2.929	16.696	-0.020	53.1	52.1	1.0	57.14	0.000	100
		(9.71)*	(-1.78)						
1996	1.597	-2.068	0.019	2.3	0.7	1.6	2.18	0.119	100
		(-1.29)	(2.06)						
1992-96	1.355	-3.684	0.043	5.6	2.2	3.4	15.82	0.000	500
		(-3.57)*	(5.41)*						

Notes: 1. The t-statistic of the slope coefficient is shown in parentheses.
*2. Significant values at p<0.05 are indicated by an *.*

Table 9 shows the results when both the EVA-to-capital and EPS variables are combined into multiple regression equation (3). Over the five-year period, the regression equation (3) produces a low overall adjusted R-square of 5.6%, which is only marginally better than the results obtained individually from regression equations (1) and (2). The adjusted R-square values of EPS and EVA-to-capital in regression equation (3) are 3.4% and 2.2% respectively. This confirms the

earlier findings in Tables 7 and 8, which suggests that both EVA-to-capital and EPS are poor predictors of MVA-to-capital during the whole five-year period spanning from 1992 to 1996.

During the same period, the regression equation (3) is statistically significant (p-value < 0.05, F-value = 15.82). The acceptance of hypothesis H_1 implies that at least one of the two regression coefficients is not equal to 0. In this instance, both regression coefficients are not equal to 0, with the regression coefficients of EPS and EVA-to-capital at 0.043 (t-statistic = 5.41) and –3.684 (t-statistic = –3.57) respectively. Hence, there is a linear relationship between MVA-to-capital with EVA-to-capital and EPS over the five-year period. Note that the results here contrast with the findings in equation (1), where the latter shows that statistically there is no linear relationship between EVA-to-capital and MVA-to-capital during the period 1992 to 1996.

Annually, the multiple regression equation (3) is statistically significant at the 0.05 level in 1992, 1994 and 1995 (F-values = 27.08, 28.56 and 57.14). The overall adjusted R-squares during these respective years are moderately high at 34.5%, 35.8% and 53.1%. During these three years, EVA-to-capital is a better predictor of MVA-to-capital than EPS as evidenced by the former's larger adjusted R-square values. In 1992, 1994 and 1995, the adjusted R-squares of the EVA-to-capital variable are 33.8%, 24.5% and 52.1% while the incremental adjusted R-square values of the EPS variable are 0.7%, 11.3% and 1% respectively. In other words, a significant portion of the variation in MVA-to-capital can be better explained by the EVA-to-capital factor.

Hypothesis H_1 is accepted in 1992, 1994 and 1995 given that the regression equation (3) is statistically significant. Table 9 shows that there is a linear relationship between EVA-to-capital and MVA-to-capital during these three years but the nature of the relationship is not consistent. In 1992 and 1995, the regression coefficient of EVA-to-capital is 10.279 and 16.696 (t-statistics = 5.39

and 9.71) respectively while in 1994, the regression coefficient is -15.415 (t-statistics = –7.04). There is also a positive linear relationship between EPS and MVA-to-capital in 1994 with a regression coefficient of 0.113 (t-statistics at 4.27). The interpretation of these relationships has been explained in the results section of regression equations (1) and (2). Generally, the findings from regression equation (3) ties-in with the results from regression equations (1) and (2).

5.4 Regression Analysis with Annual Change in MVA-to-capital as Dependent Variable for 100 Large Companies

This section examines the regression results for equations (4), (5) and (6) as stated in page 20 of this study. The findings of regression equation (4) between EVA-to-capital and the annual change in MVA-to-capital is presented in Table 10. During the five-year period, the EVA-to-capital regression equation (4) yields an unimpressive adjusted R-square of 11.1%, implying that EVA-to-capital has a low predictive power of the annual change in MVA-to-capital. However, regression equation (4) is statistically significant (p-value < 0.05, F-value = 63.56) over the five-year period. Therefore, there exists a linear relationship between EVA-to-capital and the annual change in MVA-to-capital from 1992 to 1996 with a regression coefficient of -6.364 (t-statistic = –7.97).

Table 10 Empirical results for regression equation (4)
Annual change in MVA-to-capital = a_4 + b_4 EVA-to-capital +e_4

Year	a_4	b_4	Adj R^2	F-value	p-value	N
1992	0.229	1.982	0.7	1.75	0.189	100
		(1.32)				
1993	2.378	0.274	0.0	0.03	0.865	100
		(0.17)				
1994	0.797	-17.697	45.1	82.49	0.000	100
		(-9.08)*				
1995	0.171	3.928	8.7	10.46	0.002	100
		(3.23)*				
1996	0.682	-3.190	14.9	18.30	0.000	100
		(-4.28)*				
1992-96	0.822	-6.364	11.1	63.56	0.000	500
		(-7.97)*				

Notes: 1. The t-statistic of the slope coefficient is shown in parentheses.
*2. Significant values at p<0.05 are indicated by an *.*

Furthermore, the EVA-to-capital regression equation (4) is statistically significant at the 0.05 level in three out of the five individual years, that is in 1994, 1995 and 1996 (F-values = 82.49, 10.46 and 18.30). The adjusted R-square values during

these three years are 45.1%, 8.7% and 14.9% respectively. Except for 1994, the adjusted R-square values of the EVA-to-capital regression equation (4) are generally not outstanding.

There exists a linear relationship between EVA-to-capital and the annual change in MVA-to-capital in 1994, 1995 and 1996. Again, the nature of this relationship is not consistent throughout the years. The relationship between both variables is positive in 1995 with a regression coefficient of 3.928 (t-statistics = 3.23), but negative in 1994 and 1996 with regression coefficients of -17.697 and -3.190 (t-statistics at –9.08 and -4.28) respectively. The positive relationship is within general expectation as it implies that a company that is generating or is expected to generate positive EVAs should experience an increasing MVA, and vice-versa. However, the inverse relationship in 1994 and 1996 implies that although a company is presently generating positive EVAs, the negative annual change in MVA implies that the stock market is anticipating the companies' EVA to deteriorate in the future, and vice-versa. Another plausible explanation of the inverse relationship, particularly in 1994, is because of the stock market correction in 1994 after the strong run-up in share prices the year before. With most share prices closing lower by end 1994 compared to their peak prices at the beginning of 1994, the number of companies with a negative annual change in their MVA rose to 47 compared to 13 in 1993 (see Table 5).

Table 11 Empirical results for regression equation (5)
Annual change in MVA-to-capital = $a_5 + b_5$ EPS + e_5

Year	a_5	b_5	Adj R^2	F-value	p-value	N
1992	-0.068	0.015	3.2	4.26	0.042	100
		(2.06)*				
1993	2.316	0.025	0.0	0.02	0.894	100
		(0.13)				
1994	0.186	0.031	0.1	0.95	0.333	100
		(0.97)				
1995	-0.358	0.017	3.2	4.24	0.042	100
		(3.20)*				
1996	0.840	0.003	0.6	0.45	0.506	100
		(1.63)				
1992-96	0.744	0.006	0.0	0.76	0.384	500
		(0.87)				

Notes: 1. The t-statistic of the slope coefficient is shown in parentheses.
*2. Significant values at p<0.05 are indicated by an *.*

The results of regression equation (5) between EPS and the annual change in MVA-to-capital are reported in Table 11. Over the five-year period, the adjusted R-square of the EPS regression equation (5) is equal to zero. This implies that EPS is worst than EVA-to-capital when it comes to predicting the annual change in MVA-to-capital during that five-year period. Also, the EPS regression equation (5) is not statistically significant (p-value > 0.05, F-value = 0.76) during this period. Therefore, there is no linear relationship between EPS and the annual change in MVA-to-capital over the five-year period.

The EPS regression equation (5) is statistically significant at the 0.05 level in 1992 and 1995 (F-values = 4.26 and 4.24). However, the adjusted R-squares during each of these two years are very low at 3.2%. Comparing the regression results in Tables 10 and 11, the EVA-to-capital regression equation (4) again on average produces an adjusted R-square that is higher than the EPS regression equation (5). This implies that the variation in the annual change in MVA-to-capital is better explained by EVA-to-capital than EPS. Therefore, EVA is a relatively better predictor of the annual change in MVA or stock return than EPS.

In 1992 and 1995, the regression coefficients of EPS are 0.015 and 0.017 (t-statistics = 2.06 and 3.20) respectively. This indicates that there is a positive linear relationship between EPS and the annual change in MVA-to-capital during these two years.

Table 12 Empirical results for regression equation (6)
Annual change in MVA-to-capital = a_6 + $b_{6(i)}$ EVA-to-capital + $b_{6(ii)}$ EPS + e_6

Year	a_6	$b_{6(i)}$	$b_{6(ii)}$	Overall Adj R^2	EVA R^2	EPS R^2	F-value	p-value	N
1992	-0.038	0.522	0.014	3.2	0.0	3.2	2.16	0.121	100
		(0.30)	(1.59)						
1993	2.347	0.223	0.001	0.0	0.0	0.0	0.02	0.984	100
		(0.12)	(0.07)						
1994	-1.454	-19.265	0.084	51.4	45.1	6.3	53.25	0.000	100
		(-10.23)*	(3.67)*						
1995	0.060	3.629	0.003	8.7	8.7	0.0	5.25	0.007	100
		(2.46)*	(0.36)						
1996	0.354	-3.884	0.008	16.3	14.9	1.4	10.64	0.000	100
		(-4.56)*	(1.63)						
1992-96	-0.014	-7.920	0.030	14.5	11.1	3.4	43.47	0.000	500
		(-9.28)*	(4.57)*						

Notes: 1. The t-statistic of the slope coefficient is shown in parentheses.
*2. Significant values at p<0.05 are indicated by an *.*

Table 12 presents the results when both the EVA-to-capital and EPS variables are combined into multiple regression equation (6). Over the five-year period, the regression equation (6) produces a slightly higher overall adjusted R-square of 14.5%. The adjusted R-square of EVA-to-capital and EPS in regression equation (6) is 11.1% and 3.4% respectively. These results confirm the earlier findings in Tables 10 and 11 that suggest that EVA-to-capital and EPS are poor predictors of the annual change in MVA-to-capital for the period 1992 to 1996, although the EVA-to-capital factor has an edge over EPS.

During the five-year period, the regression equation (6) is statistically significant (p-value < 0.05, F-value = 43.47) and there is a linear relationship between MVA-to-capital with EVA-to-capital and EPS. The regression coefficients of EVA-to-

capital and EPS are –7.920 (t-statistic = -9.28) and 0.030 (t-statistic = 4.57) respectively.

Additionally, the regression equation (6) is statistically significant at the 0.05 level in 1994, 1995 and 1996 (F-values = 53.25, 5.25 and 10.64). The overall adjusted R-squares during these three years are 51.4%, 8.7% and 16.3%. The adjusted R-square values are generally considered low except for that in 1994. Nevertheless, in all these instances, EVA-to-capital is still a better predictor of the annual change in MVA-to-capital than EPS because of its larger adjusted R-square values. A comparison of the adjusted R-squares for both EVA-to-capital and EPS is shown in Table 12. For example, the adjusted R-squares of the EVA-to-capital variable are 45.1%, 8.7% and 14.9% in 1994, 1995 and 1996 whereas the respective incremental adjusted R-square values of the EPS variable are 6.3%, 0% and 1.4%. Therefore, the variation in the annual change in MVA-to-capital is better explained by the EVA-to-capital factor than EPS.

Table 12 shows that there is a linear relationship between EVA-to-capital and the annual change in MVA-to-capital in 1994, 1995 and 1996. For 1994 and 1996, the regression coefficient of EVA-to-capital is -19.265 and -3.884 (t-statistics = -10.23 and -4.56) respectively, meaning that there is a negative linear relationship between EVA-to-capital and the annual change in MVA-to-capital. With a regression coefficient of 3.629 (t-statistic = 2.46), there is a positive linear relationship between EVA-to-capital and the annual change in MVA-to-capital in 1995. Meanwhile, there is a positive linear relationship between EPS and the annual change in MVA-to-capital in 1994 with a regression coefficient of 0.084 (t-statistics = 3.67). The interpretation of these relationships has been explained in the results section of regression equations (4) and (5). Overall, the findings from regression equation (6) are in line with the results from regression equations (4) and (5).

5.5 Regression Analysis for the Wealth Creators and Wealth Destroyers

This section discusses the regression results for both the wealth creators and wealth destroyers. Apart from examining the predictive power of EVA on MVA and the annual change in MVA, the strength of the EVA and MVA relationship as well as the EVA and the annual change in MVA relationship for the wealth creators and wealth destroyers is also discussed.

Table 13 Empirical results of EVA-to-capital and MVA-to-capital regression for the wealth creators

Year	a	b	Adj R^2	F-value	p-value	N
1992	0.728	22.508	41.1	24.69	0.000	35
		(4.97)*				
1993	1.303	34.991	69.8	88.89	0.000	39
		(9.43)*				
1994	2.130	14.586	61.2	59.35	0.000	38
		(7.70)*				
1995	1.399	20.040	83.3	225.92	0.000	46
		(15.03)*				
1996	1.911	11.645	59.4	55.05	0.000	38
		(7.42)*				
1992-96	1.690	18.270	58.8	279.84	0.000	196
		(16.73)*				

Notes: 1. The t-statistic of the slope coefficient is shown in parentheses.
*2. Significant values at $p<0.05$ are indicated by an *.*

Table 13 presents the regression results between EVA-to-capital and MVA-to-capital for the wealth creators. It is interesting to note that the cross-sectional regression statistics now reveal significantly higher adjusted R-squares ranging from a low of 41.1% in 1992 to a high of 83.3% in 1995. Over the five-year period, the adjusted R-square is also relatively high at 58.8%. This finding compares favourably with the earlier average cross-sectional results reported in this study and in other studies. For the wealth creators, a significant portion of the variation in MVA-to-capital can be explained by the EVA-to-capital factor.

Furthermore, the regression equation for the wealth creators is statistically significant in each of the five years and for the whole five-year period from 1992 to 1996 (see Table 13 for the respective p- and F-values). These results indicate a strong positive linear relationship between EVA-to-capital and MVA-to-capital for the wealth creators (see Table 13 for the slope coefficients and t-statistics). This means that when EVA-to-capital is positive and large, the corresponding MVA-to-capital variable is also positive and large. Therefore, this finding supports the view that EVA has a positive effect on companies' MVA.

Table 14 Empirical results of EVA-to-capital and MVA-to-capital regression for the wealth destroyers

Year	a	b	Adj R^2	F-value	p-value	N
1992	0.405	-1.463	0.1	1.08	0.303	65
		(-1.04)				
1993	1.513	-7.253	28.3	24.65	0.000	61
		(-4.97)*				
1994	0.005	-30.481	86.8	400.57	0.000	62
		(-20.01)*				
1995	1.205	-3.926	0.0	1.02	0.317	54
		(-1.01)				
1996	0.579	-12.116	59.0	88.91	0.000	62
		(-9.43)*				
1992-96	0.230	-17.895	53.7	352.19	0.000	304
		(-18.77)*				

Notes: 1. The t-statistic of the slope coefficient is shown in parentheses.
*2. Significant values at p<0.05 are indicated by an *.*

Table 14 reports the regression results between EVA-to-capital and MVA-to-capital for the wealth destroyers. Here, the regression equation is statistically significant over the five-year period and in three out of the five individual years (see Table 14 for the respective p- and F-values). Over the five-year period, the adjusted R-square value is 53.7% while during the three years where the results are significant, the adjusted R-square values range from a low of 28.3% in 1993

to a high of 86.8% in 1994. For the wealth destroyers, a significant portion of the variation in MVA-to-capital can also be explained by EVA-to-capital.

However, for the wealth destroyers, there is a negative linear relationship between EVA-to-capital and MVA-to-capital over the five-year period as well as in 1993, 1994 and 1996 (see Table 14 for the slope coefficients and t-statistics). This means that for the wealth destroyers, both EVA-to-capital and MVA-to-capital has an inverse relationship. This finding implies that expectations of future positive EVA could have an impact on companies' MVA, although a company may currently have a negative EVA.

This study has also run a regression test using EPS as the independent variable and MVA-to-capital as the dependent variable for both the wealth creators and wealth destroyers. This study finds the adjusted R-square values for the wealth creators and wealth destroyers to be very low at between 0.1% and 5.5% for the former and between 0.8% and 7% for the latter over the five years. By and large, the regression results are also not statistically significant.

When the EVA-to-capital and EPS variables are combined, the overall adjusted R-square values of the multiple regression do not increase significantly. For the wealth creators, the combined adjusted R-square values range between 39.5% and 87.4% over the five years. For the wealth destroyers, the combined adjusted R-square values range between 27.1% and 87.8% during the years where EVA-to-capital is a significant variable. When the companies are grouped as wealth creators and wealth destroyers, this study finds that a significant portion of the variations in MVA-to-capital can be explained by the EVA-to-capital factor.

Table 15 Empirical results of EVA-to-capital and the annual change in MVA-to-capital regression for the wealth creators

Year	a	b	Adj R^2	F-value	p-value	N
1992	0.679	-1.541	2.8	0.08	0.774	35
		(-0.29)				
1993	0.383	24.945	61.9	62.86	0.000	39
		(7.93)*				
1994	-0.410	4.730	11.2	5.66	0.023	38
		(2.38)*				
1995	-0.300	5.830	24.5	15.63	0.000	46
		(3.95)*				
1996	0.829	-0.751	0.9	0.68	0.416	38
		(-0.82)				
1992-96	0.307	5.845	11.9	27.29	0.000	196
		(5.22)*				

Notes: 1. The t-statistic of the slope coefficient is shown in parentheses.
*2. Significant values at p<0.05 are indicated by an *.*

The regression results between EVA-to-capital and the annual change in MVA for the wealth creators are presented in Table 15. Over the five-year period, the regression equation is statistically significant (p-value < 0.05, F-value = 27.29) but the adjusted R-square is low at 11.9%. Annually, the regression results are statistically significant at the 0.05 level only in 1993, 1994 and 1995 (F-values = 62.86, 5.66 and 15.63). The adjusted R-squares fluctuate from 61.9% in 1993, 11.2% in 1994 to 24.5% in 1995.

The cross-sectional regression statistics show that during these years there is a positive linear relationship between EVA-to-capital and the annual change in MVA-to-capital for the wealth creators. For 1992 to 1996, the slope coefficient of the regression equation is 5.845 (t-statistic = 5.22). For 1993, 1994 and 1995, the slope coefficients of the EVA-to-capital variable are 24.945, 4.730 and 5.830 (t-statistics = 7.93, 2.38 and 3.95) respectively. For the wealth creators, this finding generally supports the view that a company that is generating or is expected to

generate positive EVAs should have an increasing MVA. Therefore, EVA also has a positive effect on companies' annual change in MVA and annual returns.

Table 16 Empirical results of EVA-to-capital and the annual change in MVA-to-capital regression for the wealth destroyers

Year	a	b	Adj R^2	F-value	p-value	N
1992	0.114	1.514	2.4	2.58	0.113	65
		(1.61)				
1993	1.107	-7.212	30.5	27.38	0.000	61
		(-5.23)*				
1994	-1.731	-31.063	86.5	391.95	0.000	62
		(-19.80)*				
1995	0.122	0.028	1.9	0.000	0.994	54
		(0.01)				
1996	0.088	-6.422	33.5	31.74	0.000	62
		(-5.63)*				
1992-96	-0.635	-16.611	48.5	286.15	0.000	304
		(-16.92)*				

Notes: 1. The t-statistic of the slope coefficient is shown in parentheses.
*2. Significant values at p<0.05 are indicated by an *.*

Lastly, table 16 reports the regression results between EVA-to-capital and the annual change in MVA-to-capital for the wealth destroyers. Over the five-year period, the regression result is statistically significant (p-value < 0.05, F-value = 286.15) with a moderately high adjusted R-square of 48.5%. Yearly, the regression results are statistically significant at the 0.05 level in 1993, 1994 and 1996 (F-values = 27.38, 391.95 and 31.74). The adjusted R-squares during these years are 30.5%, 86.5% and 33.5%.

It is interesting to note that the adjusted R-squares from the EVA-to-capital regression for both the wealth creators and wealth destroyers (see Tables 15 and 16) are generally larger than those in regression equations (4) and (6) (see Tables 10 and 12 respectively). When the companies are grouped into either wealth creators or wealth destroyers, the predictive power of the EVA-to-capital

factor vis-à-vis the variation in the annual change in MVA-to-capital becomes more pronounced.

The cross-sectional regression statistics also reveal that there is a negative linear relationship between EVA-to-capital and the annual change in MVA-to-capital for the wealth destroyers. For the period 1992 to 1996, the slope coefficient of the regression equation is -16.611 (t-statistic = -16.92). In 1993, 1994 and 1996, the slope coefficients of the EVA-to-capital variable are –7.212, -31.063 and –6.422 (t-statistics = -5.23, -19.80 and –5.63) respectively. This negative linear relationship implies that expectations of future positive EVA could have an impact on companies' MVA although these companies may currently have a negative EVA.

This study has run a regression test using EPS as the independent variable and the annual change in MVA-to-capital as the dependent variable for the wealth creators and wealth destroyers. This study also finds the adjusted R-square values for the wealth creators and wealth destroyers to be very low at between 0.2% and 5.9% for the former and between 0.3% and 6.5% for the latter over the five years. The regression results are also not statistically significant during the five years.

Again, when the EVA-to-capital and EPS variables are combined, the overall adjusted R-square values of the multiple regression do not increase significantly. For the wealth creators, the combined adjusted R-square values range between 13.4% and 67.1% over the five years where EVA-to-capital is a significant variable. For the wealth destroyers, the adjusted R-square values range between 29.7% and 87.3% during the years where EVA-to-capital is a significant variable. When the companies are grouped into wealth creators and wealth destroyers, this study finds that a significant portion of the variations in the annual change in MVA-to-capital can be explained by the EVA-to-capital factor.

Overall, the adjusted R-square or the explanatory level of the EVA-to-capital factor vis-à-vis the variation in MVA-to-capital, in the years where the regression equation is statistically significant, is generally consistent with the other studies mentioned in the literature review section. These studies are namely by Grant (adjusted R-square = 31.6%), Chen and Dodd (41.5%), O'Byrne (31%), Ehrbar (50%), and Milunovich and Tsuei (42%). Where the results are significant, this study reports an adjusted R-square ranging from 24.5% to 52.1%.

The adjusted R-square or the explanatory level of the EVA-to-capital factor vis-à-vis the variation in the annual change in MVA-to-capital is also generally consistent with Lefkowitz's (1999) study. The latter reports an adjusted R-square of 16.4% for individual companies and 35.2% when companies are grouped into industries. Where the results are significant, this study reports an adjusted R-square ranging from 8.7% to 45.1%.

For the wealth creator and wealth destroyer studies, the significantly higher adjusted R-square values reported in this study are consistent with Grant's (1996) study. For the fifty largest U.S. wealth creators at year-end 1993, Grant (1996) reports an adjusted R-square of 83%. However, the adjusted R-square of the fifty largest U.S. wealth destroyers at year-end 1993 is not disclosed. This study reports an adjusted R-square ranging from 41.1% to 83.3% for the wealth creators and an adjusted R-square ranging from 28.3% to 86.8% for the wealth destroyers.

By comparing the adjusted R-square values obtained from the various regression tests, this study also establishes that on average EVA is a relatively better predictor of MVA and the annual change in MVA than EPS. Hence, this study supports the view that EVA can better explain company values and stock returns than traditional accounting measures like EPS.

Furthermore, the results from multiple regression equations (3) and (6) suggest that when both EVA and EPS are used jointly, their combined explanatory power does not increase significantly. For instance, in regression equation (3), the adjusted R-squares of the EVA-to-capital variable are 33.8%, 24.5% and 52.1% in 1992, 1994 and 1995 while the incremental adjusted R-square values of the EPS variable are 0.7%, 11.3% and 1% respectively. Similarly in regression equation (6), the adjusted R-square values of the EVA-to-capital variable are 45.1%, 8.7% and 14.9% in 1994, 1995 and 1996 whereas the respective incremental adjusted R-square values of the EPS variable are 6.3%, 0% and 1.4%. Notwithstanding the technical superiority of the EVA measure, this study feels that companies, investment analysts, business press and policy makers will still make use of EPS given the simplicity and familiarity of this measure as well as the availability of EPS forecasts by stock broking companies.

This study also finds that the relationship between EVA-to-capital and MVA-to-capital, and the relationship between EVA-to-capital and the annual change in MVA-to-capital is not consistent throughout the years. For the wealth creators, EVA-to-capital is highly significant in all the years, which shows that it is highly valued by the market. This strong positive relationship between EVA-to-capital and MVA-to-capital is consistent with Grant's (1996) findings. The results also support Stewart's (1991) views that once EVA turns positive, there is a very high correspondence between EVA and MVA.

For companies with negative EVA, the correlation is less evident. According to Stewart (1991), market values are based on expectations of future EVA (or cash flows). Hence, the current EVA can never explain current stock prices very well. Stewart (1991) adds that until EVA becomes positive, the market values are decoupled from EVA.

This study is also of the view that there are many other factors that will influence stock prices and hence, valuation of companies. These can range from

companies' future earnings generating capabilities, government policies and regulations, political stability, technological changes, competitive environment and economic environment (such as business cycles, economic growth, inflation and interest rates). Furthermore, the insignificant and unexpected sign of coefficients could be due to the fact that the relationship between the independent and dependent variables is not linear (Belkaoui 1978).