CHAPTER 4:

RESEARCH RESULTS

4.0 Introduction

This chapter focuses on the presentation of the findings obtained through a series of statistical analysis. First section will describe the general profile of the companies as a whole and in two groups to have the general understanding of their firm related information, mainly average assets, annual sales and profits. It will follow by examining the relationship between degree of international diversification and firm performance as stated in hypothesis 1. The firm performance comparison between two groups will then be presented to find the answer for hypothesis 2.

4.1 Profiles of Samples

Out of the top 100 listed companies in Bursa Malaysia, 8 companies were discarded from this study due to incomplete information, the remaining 92 companies selected have significant difference in terms of the firm related profiles as shown in table 4.1.

The tabulated data reveals that about 10-15% of the companies are significantly larger than the rest of the companies in terms of size by assets, sales and profit values, these companies are mainly from finance sector as well as several conglomerates such as Maybank, Public Bank, Commerce Bank, Sime Darby, Genting and etc. As this study does not randomly choose the subjects / companies for the analysis, such variance of size is expected among the selected companies. The methodology described in the previous chapter has clearly stated the variation of size could influence the performance of the companies in some way or another, however its effects can be

controlled by inserting the control variables in the equation model, hence, the potential variation caused by size variance could be minimized. The further breakdown of company profiles into two group in terms of assets, average annual sales and profits are shown in Appendix 4.1 and 4.2

Table 4.1: Summary of Companies Profile

Group		Assets (Millions)	Profit (Millions)	Sales (Millions)
Diversified Firm (International Sales > 10%)	Mean	**18017.88**	**754.26**	**4189.31**
	N	**42**	**42**	**42**
	Std. Deviation	**42722.371**	**968.943**	**4369.475**
	Minimum	**247**	**20**	**210**
	Maximum	**213722**	**3888**	**20368**
Non Diversified Firm (International Sales <10%)	Mean	**11660.62**	**452.98**	**2399.47**
	N	**50**	**50**	**50**
	Std. Deviation	**21626.082**	**595.727**	**3597.198**
	Minimum	**294**	**39**	**236**
	Maximum	**91150**	**3809**	**20434**
Total	Mean	**14562.85**	**590.52**	**3216.57**
	N	**92**	**92**	**92**
	Std. Deviation	**32928.900**	**798.036**	**4046.380**
	Minimum	**247**	**20**	**210**
	Maximum	**213722**	**3888**	**20434**

Table 4.2: Summary of Company distribution by Assets

Value (RM Millions)	Count	Percent	Cumulative Count	Cumulative Percent
[200, 10200)	71	77.17	71	77.17
[10200, 20200)	6	6.52	77	83.70
[20200, 30200)	4	4.35	81	88.04
[30200, 40200)	3	3.26	84	91.30
[50200, 60200)	1	1.09	85	92.39
[60200, 70200)	2	2.17	87	94.57
[70200, 80200)	1	1.09	88	95.65
[90200, 100200)	1	1.09	89	96.74
[130200, 140200)	1	1.09	90	97.83
[140200, 150200)	1	1.09	91	98.91
[210200, 220200)	1	1.09	92	100.00
Total	92	100.00	92	100.00

Table 4.3: Summary of Company distribution by Sales

Value (RM Millions)	Count	Percent	Cumulative Count	Cumulative Percent
[100, 2100)	54	58.70	54	58.70
[2100, 4100)	18	19.57	72	78.26
[4100, 6100)	6	6.52	78	84.78
[6100, 8100)	5	5.43	83	90.22
[8100, 10100)	4	4.35	87	94.57
[12100, 14100)	1	1.09	88	95.65
[14100, 16100)	2	2.17	90	97.83
[20100, 22100)	2	2.17	92	100.00
Total	92	100.00	92	100.00

Table 4.4: Summary of Company distribution by Profits

Value (RM Millions)	Count	Percent	Cumulative Count	Cumulative Percent
[20, 220)	43	46.74	43	46.74
[220, 420)	17	18.48	60	65.22
[420, 620)	10	10.87	70	76.09
[620, 820)	3	3.26	73	79.35
[820, 1020)	4	4.35	77	83.70
[1020, 1220)	3	3.26	80	86.96
[1420, 1620)	3	3.26	83	90.22
[1820, 2020)	1	1.09	84	91.30
[2020, 2220)	2	2.17	86	93.48
[2220, 2420)	3	3.26	89	96.74
[3020, 3220)	1	1.09	90	97.83
[3620, 3820)	1	1.09	91	98.91
[3820, 4020)	1	1.09	92	100.00
Total	92	100.00	92	100.00

A simple correlation analysis is carried out among the variables used in this study. Pearson Correlation analysis is used to describe the strength and direction of the linear relationship between two variables. It is useful to determine any correlation among the independent variables. The Pearson Correlation is conducted to ensure no direct relationship between independents variables in order to avoid multicollinearity that affects the regression model. The independent variables in this study are mainly FIRM SIZE and DOI. The correlations result displayed in table 4.5 does not show any problems of multicollinearity between these two variables in which the p-value is higher than significant value of 0.05

Table 4.5: Correlations Summary

Covariance Correlation Probability	DOI	SIZE
DOI	0.059981	
	1.000000	

SIZE	1.07E+08	1.83E+19
	0.101831	1.000000
	0.1483	-----

4.2 Result for Impact of International Diversification on Firm Performance

The hypothesis 1 is tested by running Eviews with both quadratic and cubic models as stated in previous chapter:

Quadratic Model:

$$PERF_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 DOI_{it} + \beta_3 I_1 + \beta_4 I_2 + \beta_5 I_3 + \beta_6 I_4 + \beta_7 I_5 + \beta_8 DOI^2_{it} + e_{it}$$

Cubic Model:

$$PERF_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 DOI_{it} + \beta_3 I_1 + \beta_4 I_2 + \beta_5 I_3 + \beta_6 I_4 + \beta_7 I_5 + \beta_8 DOI^2_{it} + \beta_9 DOI^3_{it} + e_{it}$$

Each model is tested with both ROA and ROS as the dependent variables and the significance of each independent variable is assessed to determine the effects

produced. The result shows that the S-shape relationship is well supported for both ROA and ROS as the performance indicators, the result is shown in table 4.6.

Table 4.6: International diversification effects on ROA and ROS

	Dependent Variables			
	ROA (Square)	ROA (Cubic)	ROS (Square)	ROS (Cubic)
Intercept-C	0.2821***	0.3898***	0.5155***	0.8459***
LOG(Size)	-0.0127**	-0.0160***	-0.0064	-0.0163*
DOI	-0.0573	-0.4406**	0.1775	-0.9981***
DOI^2	0.0544	1.1618*	-0.1022	3.2943***
DOI^3		-0.8365*		-2.5657***
I1	0.1078***	0.0938**	-0.2553***	-0.2983***
I2	0.0523	0.0467	-0.083	-0.1
I3	0.0907**	0.0797*	-0.3133***	-0.3470***
I4	0.1200***	0.1132*	-0.1885**	-0.2093***
I5	0.1282***	0.1201**	-0.3354***	-0.3607***
I6	0.0582	0.0466	-0.2367***	-0.2723***
Adjusted R-squared	0.151371	0.17414	0.3127***	0.3764***
F-statistic	5.0034	5.2594***	11.2094	13.1923
Total pool observations, N	203	203	203	203

*p < 0.05
**p < 0.01
***p <0.001

When ROA is treated as the performance indicator for quadratic equation model, DOI is found to be insignificant in the model, this model yield the adjusted R-squared of 0.15. When DOI^3 term is added to the model in the cubic equation, all the DOI terms (DOI, DOI^2 and DOI^3) are found to be significant to p-value of 0.01 and 0.05, moreover, the adjusted R-squared value also improves to 0.17, as such, it can be concluded that when ROA is used as the performance indicator, the relationship between DOI and firm performance follows the S-shape pattern, also by identifying

the sign of coefficient for the DOI's terms, it is suggested that the firm performance will initially in negative growth when the DOI increases in the stage 1, then the performance start to improve in state 2 as the DOI continue increasing to the point which the firm performance will reach the optimum, after that, the performance take a turn and will start to deteriorate with the increasing DOI.

When ROS is taken as the firm performance indicator, the same trend is being observed with even more significance p-value which is 0.001 for the 3 DOI terms (DOI, DOI^2 and DOI^3), the adjusted R-squared value also improve significantly from 0.31 to 0.37. There appears to be a wide difference in the variance explained between the model using ROA as performance indicator and the other model which uses ROS, it is plausible that the basis of ROA is likely to produce more variance among the firms as assets depreciation policies adopted always varies from firm to firm. Hence, the ROA indicator might be less "pure" compared to ROS indicator, this probably explain the cause of differences in the variance explained. It is also noted the significance of firm size and industry effect in both ROA and ROS models, which justify the decision to include these parameters as the control variables.

To show how international diversification (DOI) affects the firm performance, a partial derivative of the cubic equation is taken with respect to DOI: $\frac{\partial(\mathrm{ROA})}{\partial(\mathrm{DOI})}$ and $\frac{\partial(\mathrm{ROS})}{\partial(\mathrm{DOI})}$;

And by letting $\frac{\partial(\mathrm{ROA})}{\partial(\mathrm{DOI})} = 0$ and $\frac{\partial(\mathrm{ROS})}{\partial(\mathrm{DOI})} = 0$, 2 thresholds of DOI values can be determined by solving the derivative equation:

$\frac{\partial(\mathrm{ROA})}{\partial(\mathrm{DOI})} = 0$, $\mathrm{DOI}_{\text{threshold 1}} = 0.1896$ (18.96%) and $\mathrm{DOI}_{\text{threshold 2}} = 0.5180$ (51.8%)

Similarly,

$\frac{\partial(\mathrm{ROS})}{\partial(\mathrm{DOI})} = 0$, $\mathrm{DOI}_{\text{threshold 1}} = 0.1515$ (15.15%) and $\mathrm{DOI}_{\text{threshold 2}} = 0.7263$ (72.63%)

In other words, when ROA is taken as performance indicator, the firm performance will stay negative as the firm increases degree of international diversification in the early stage until the threshold level of 19%, which the firm will start to improve in performance. This positive performance trend will continue till the second threshold level of 52% in which the firm performance will start to deteriorate as the firm continue to increase the degree of international diversification. By the same token, when ROS is treated as the performance indicator, the two threshold level of DOI are 15% and 72% respectively.

4.3 Result for Performance Comparison of International Diversified Firms and Non Diversified Firms

In Hypothesis 2, the study defines non-international diversified companies as those have less than 10% of total sales originating from foreign operation. The performance comparison between international diversified and non- international diversified firms is evaluated with Independent-sample T-test which provides an elegant means of comparing the means of two different groups or conditions. From the previous section's finding which identifies ROS as the better explanatory variable for the firm performance, this section of analysis shall only use ROS as the performance indicator. Prior to conducting this test, the distribution normality of dependent variable, ROS is assessed. Both Skewness and Kurtosis values are found to be 1.332 and 2.206 which are acceptable based on the criteria for normality as follow:

Normality acceptability: $-2 < \text{Skewness} < 2$ and $-3 < \text{Kurtosis} < 3$

Table 4.7: Normality Distribution Test

PERF ROS		
N	Valid	**440.000**
	Missing	**2.000**
	Mean	**.221**
	Std. Error of Mean	**.008**
	Std. Deviation	**.168**
	Skewness	**1.332**
	Std. Error of Skewness	**.116**
	Kurtosis	**2.206**
	Std. Error of Kurtosis	**.232**
	Minimum	**-.155**
	Maximum	**.885**

The descriptive statistics of T-test is shown in the following table:

Table 4.8: Descriptive Statistics of T-test

Group Statistics

	GROUP GROUP	N	Mean	Std. Deviation	Std. Error Mean
PERF ROS	Non Diversified Firms	**238**	**.258490**	**.1842514**	**.0119432**
	Diversified Firms	**202**	**.176163**	**.1326744**	**.0093349**

From the result table 4.8, it is found that non-diversified firms have ROS mean score of 25.8% compared to the ROS mean score for international diversified firms of 17.6%, meaning the non-international diversified firms actually perform better in terms of ROS as performance indicator than their more international diversified

counterparts. The following test will verify if the performance difference is statistically significant.

The Levene's test reveals that the variances for the two groups are not the same with p-value < 0.001, hence, the significance of the mean score difference is obtained without equal variance. Further investigation shows that the mean score difference is significant to p-value < 0.001 (2 –tail). Next, the effect size statistics is to be determined, it will provide an indication of the magnitude of the difference between these two groups. The most commonly used effect size statistic method is 'eta squared' introduced by Cohen (1988). According to Cohan (1988), value of eta squared could be interpreted in the following manner:

If Eta Squared = .01, the effect size is small

If Eta Squared = .06, the effect size is moderate

If Eta Squared = .14, the effect size is large

The eta squared for ROS performance is 0.063, which express as percentage, about 6.3 percent of the variance in ROS performance is explained by the two groups (non-international diversified firms and international diversified firms). The effect is deemed to be moderate.

Table 4.9: Result of Independent T-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PERF ROS	Equal variances assumed	**10.891**	**.001**	**5.292**	**438**	**.000**	**.0823268**	**.0155580**	**.0517492**	**.1129043**
	Equal variances not assumed			**5.431**	**427.083**	**.000**	**.0823268**	**.0151586**	**.0525321**	**.1121214**

In short, the result shows that there is significance difference in performance by mean score of ROS between non-international diversified firms (foreign sales less than 10%) and international diversified firms (foreign sales more than 10%).

4.4 Summary

It is therefore confirmed that the results obtained are well supporting Hypothesis 1 and Hypothesis 2. However, the Hypothesis 2 has also revealed that, other than indicating there is difference in performance between two groups of companies, indeed the domestic oriented firms in Malaysia top 100 listed companies outperform their more international diversified companies. Conclusion and recommendation discussion in the next chapter will be based on the results drawn from this study.