

CHAPTER 4 RESEARCH RESULTS
SUMMARY STATISTICS OF VARIABLES

The summary statistics for the listing board of samples are provided in Table 2. Nearly 97.1% of the samples are listed on the Main Board, whilst only 2.9% are from the Second Board.

TABLE 2
Frequency for type of listing board

Board	Frequency	Percentage
Main	67	97.10%
Second	2	2.90%
Total	69	100.00%

Amongst the 33.33% of companies come from Trading/Services industry, about 26.09% from Finance industry, follows by Consumer Products of 14.49%. The others are ranked as follows :

TABLE 3
Frequency of type of industry

Industry	Frequency	Percentage
Consumer products	10	14.49%
Industrial products	6	8.70%
Construction	5	7.25%
Trading/Services	23	33.33%
Finance	18	26.09%
Properties	1	1.45%
Plantations	5	7.25%
Mining	1	1.45%
Total	69	100.00%

Data relating to the director ownership for the sample year is shown in Table 4. As the table illustrates, the percentage of shares owned by directors has increased over the period from 1995 to 1998, except in 1999, which decreased slightly. In 1995, the mean (medium) ownership was 23.29% (5.00%), which compares to a mean (median) 24.70% (17.59%) in 1998.

TABLE 4

Descriptive Statistics for Directors' Ownership (DIR%)

	1995	1996	1997	1998	1999
Mean	23.29%	23.64%	23.80%	24.70%	24.09%
Median	5.00%	15.01%	7.98%	17.59%	9.88%
Standard Deviation	25.91%	25.30%	26.90%	26.59%	26.51%
Minimum	0.00%	0.00%	0.00%	0.00%	0.00%
Maximum	74.83%	74.47%	89.02%	90.39%	86.99%

The maximum directors ownership reported highest in 1998, which is as high as 90.39%.

ANALYSIS OF MEASURES AND TESTING OF THE HYPOTHESIS

1995 Data

1. Multiple Regression Analysis

Table 5 presents the results of the hypothesis that the relationship between the performance of PLC and director ownership. For the ROSF regression, the coefficient for DIR^2 and DIR^3 are positive. The coefficient on the variable DIR^3 for the VAL regression is also positive. However, for both regressions, the coefficients for all DIR variables are insignificant.

The SIZE, GROWTH, DEBT control variables are, statistically insignificant in both regressions.

2. Coefficient of Multiple Determination (R^2)

There is 3.6% of the variation in the variable that can be explained by the control variable in the ROSF regression. For VAL regression, there is 3.4% of the variation in the variable that can be explained by the control variables.

TABLE 5

Regression estimates using 1995 directors' ownership data

Variables	Dependent variables	
	ROSF	VAL
	Coefficient	Coefficient
	t-statistic	t-statistic
DIR	-0.487000	-7.479000
	-0.431000	-0.322000
DIR ²	0.283000	-6.44900
	0.068000	-0.07600
DIR ³	0.781000	37.76900
	0.207000	0.48600
SIZE	0.006376	0.142000
	0.236000	0.255000
GROWTH	-0.005894	-0.115000
	-0.289000	-0.274000
DEBT	0.027860	-0.663000
	0.236000	-0.272000
INTERCEPT	0.051120	0.774000
	0.086000	0.063000
Adjusted R ²	0.036000	0.034000
F-statistic	0.609000	1.404000
Turning points	35.08%	20.62%
	59.24%	32.01%

Performance = $a + \beta_1 \text{DIR} + \beta_2 \text{DIR}^2 + \beta_3 \text{DIR}^3 + y \text{Control Variables}$

* Significant at 10% confidence level using two-tailed test, which its the critical value = 1.67.

** Significant at 5% confidence level using two-tailed test, which its the critical value = 2.00.

3. Testing Whether the Multiple Regression Model is Valid

The regression coefficients for the DIR, DIR² and DIR³ variables are represent by the symbols β_1 , β_2 and β_3 . I test whether the regression coefficient in the variable are zero as follows :

The null hypothesis is :

$$H_0 : \beta_1 = \beta_2 = \beta_3 = 0$$

The alternative hypothesis is :

$$H_1 : \text{Not all the } \beta_s \text{ are } 0.$$

If the null hypothesis is true, it implies the regression coefficients are all zero and logically, are of no use in estimating the control variables. To test the null hypothesis that the multiple regression coefficients are all zero, I employ the F statistic using .05 level of significance. From the table, the critical value is 2.25. Since the F statistic for ROSF and VAL regression are both less than the critical value, which is in region where H_0 is not rejected. The results suggest that there is non-linear relationship between the performance of PLC and directors ownership.

4. Turning points

Calculations carried out on the coefficients of the variables DIR, DIR² and DIR³ reveal that, for ROSF model, the turning points on the cubic function of directors' ownership are approximately 35.08% and 59.24%. In terms of the sample, eighteen (18) companies lie between the two turning points and eight (8) companies exceed 59.24%. The results suggest, therefore, that the performance of PLC (as measured by ROSF) is negatively related to directors' ownership in the 0% to 35.08% range, positively related in the 35.08% to 59.24% range and positively related where directors' ownership exceeds 59.24%. Similarly, using VAL as the measure of the performance of PLC, the turning points are 20.62% to 32.01% respectively.

1996 Data

1. Multiple Regression Analysis

Table 6 gives the results of the hypothesis that the relationship between the performance of PLC and director ownership in 1996. For the ROSF regression, the coefficient on variable DIR and DIR³ is positive; while variable DIR² is negative. Only coefficient on variable DIR³ is positively for VAL regression.

Same as the results in 1995, the SIZE, GROWTH and DEBT control variables are statistically insignificant in both regressions.

TABLE 6

Regression estimates using 1996 directors' ownership data

Variables	Dependent variables	
	ROSF	VAL
	Coefficient t-statistic	Coefficient t-statistic
DIR	0.088860	-7.366000
	0.084000	-0.345000
DIR ²	-1.182000	-9.340000
	-0.303000	-0.118000
DIR ³	1.826000	42.932000
	0.501000	0.581000
SIZE	0.007646	0.140000
	0.277000	0.251000
GROWTH	-0.007073	-0.144000
	-0.245000	-0.246000
DEBT	0.003678	-0.741000
	0.030000	-0.302000
INTERCEPT	0.009730	0.932000
	0.016000	0.076000
Adjusted R ²	0.066000	0.037000
F-statistic	0.310000	1.429000
Turning points	4.14%	17.73%
	39.01%	32.24%

2. Coefficient of Multiple Determination (R²)

There is 6.6% of the variation in the variable that can be explained by the control variable in the ROSF regression. For VAL regression, there is 3.7% of the variation in the variable that can be explained by the control variables.

3. Testing Whether the Multiple Regression Model is Valid

I test whether the regression coefficient in the variable are zero as follows :

The null hypothesis is :

$$H_0 : \beta_1 = \beta_2 = \beta_3 = 0$$

The alternative hypothesis is :

$$H_1 : \text{Not all the } \beta_s \text{ are } 0.$$

I employ the F statistic using .05 level of significance. From the table, the critical value is 2.25. Since the F statistic for ROSF and VAL regression are both less than the critical value, which is in region where H_0 is not rejected. The results suggest that there is non-linear relationship between the performance of PLC and directors ownership.

4. Turning points

Calculations carried out on the coefficients of the variables DIR, DIR² and DIR³ reveal that, for ROSF model, the turning points on the cubic function of directors' ownership are approximately 4.14% and 39.01%. In terms of the sample, twelve (12) companies lie between the two turning points and twenty-six (26) companies exceed 39.01%. The results suggest, therefore, that the performance of PLC (as measured by ROSF) is positively related to directors' ownership in the 0% to 4.14% range, negatively related in the 4.14% to 39.01% range and positively related where directors' ownership exceeds 39.01%. Similarly, using VAL as the measure of the performance of PLC, the turning points are 17.73% to 32.24% respectively.

1997 Data

1. Multiple Regression Analysis

The results of the hypothesis for the relationship between the performance of PLC and director ownership in 1997 is presented in Table 7. For ROSF and VAL regressions, only the coefficient on variable DIR² is positive. However, coefficients on variables DIR and DIR³ are negative respectively.

The SIZE, GROWTH and DEBT control variables are statistically insignificant for both regressions.

TABLE 7

Regression estimates using 1997 directors' ownership data

Variables	Dependent variables	
	ROSF	VAL
	Coefficient	Coefficient
	t-statistic	t-statistic
DIR	-0.594000	-29.608000
	-0.652000	-1.578000
DIR ²	1.852000	89.337000
	0.601000	1.408000
DIR ³	-1.308000	-59.725000
	-0.514000	-1.140000
SIZE	0.005994	0.045550
	0.217000	0.080000
GROWTH	-0.006376	-0.078450
	-0.302000	-0.181000
DEBT	0.024790	-0.261000
	0.202000	-0.103000
INTERCEPT	0.041800	2.969000
	0.069000	0.237000
Adjusted R ²	0.080000	0.008000
F-statistic	0.171000	0.911000
Turning points	20.54%	20.99%
	73.80%	78.73%

2. Coefficient of Multiple Determination (R²)

There is 8% of the variation in the variable that can be explained by the control variable in the ROSF regression. For VAL regression, there is 0.8% of the variation in the variable that can be explained by the control variables.

3. Testing Whether the Multiple Regression Model is Valid

To test whether the regression coefficient in the variable are zero, I use the hypothesis as follows :

The null hypothesis is :

$$H_0 : \beta_1 = \beta_2 = \beta_3 = 0$$

The alternative hypothesis is :

$$H_1 : \text{Not all the } \beta_s \text{ are } 0.$$

I employ the F statistic using .05 level of significance. From the table, the critical value is 2.25. Since the F statistic for ROSF and VAL regression are both less than the critical value, which is in region where H_0 is not rejected. The results suggest that there is non-linear relationship between the performance of PLC and directors ownership.

4. Turning points

Calculations carried out on the coefficients of the variables DIR, DIR^2 and DIR^3 reveal that, for ROSF model, the turning points on the cubic function of directors' ownership are approximately 20.54% and 73.80%. In terms of the sample, thirty (30) companies lie between the two turning points and only two (2) companies lie above the maximum point. The results suggest, therefore, that the performance of PLC (as measured by ROSF) is negatively related to directors' ownership in the 0% to 20.54% range, positively related in the 20.54% to 73.80% range and negatively related where directors' ownership exceeds 73.80%. Similarly, using VAL as the measure of the performance of PLC, the turning points are 20.99% to 78.73% respectively.

1998 Data

1. Multiple Regression Analysis

Table 8 shows the results of the hypothesis that the relationship between the performance of PLC and director ownership for 1998. For the ROSF regression, only the coefficient on variable DIR^2 is positive. The coefficient on variable DIR^2 is positively significant at .10 level of significant; while that on the variable DIR is negatively significant for VAL regression.

The SIZE, GROWTH, DEBT control variables are statistically insignificant in both regressions.

2. Coefficient of Multiple Determination (R^2)

There is 8.4% of the variation in the variable that can be explained by the control variable in the ROSF regression. For VAL regression, there is 2.0% of the variation in the variable that can be explained by the control variables.

3. Testing Whether the Multiple Regression Model is Valid

To test whether the regression coefficient in the variables are zero, I use the hypothesis as follows :

The null hypothesis is :

$$H_0 : \beta_1 = \beta_2 = \beta_3 = 0$$

The alternative hypothesis is :

$$H_1 : \text{Not all the } \beta_s \text{ are } 0.$$

I employ the F statistic using .05 level of significance. From the table, the critical value is 2.25. Since the F statistic for ROSF and VAL regression are both less than the critical value, which is in region where H_0 is not rejected. The results suggest that there is non-linear relationship between the performance of PLC and directors ownership.

TABLE 8

Regression estimates using 1998 directors' ownership data

Variables	Dependent variables	
	ROSF Coefficient t-statistic	VAL Coefficient t-statistic
DIR	-0.532000	-32.150000
	-0.623000	-1.816000 *
DIR ²	1.781000	105.594000
	0.626000	1.789000 *
DIR ³	-1.349000	-78.583000
	-0.580000	-1.628000
SIZE	0.004536	-0.076200
	0.168000	-0.136000
GROWTH	-0.006820	-0.128000
	-0.326000	-0.295000
DEBT	0.026630	0.090740
	0.219000	0.036000
INTERCEPT	0.068090	5.549000
	0.114000	0.449000
Adjusted R ²	0.084000	0.020000
F-statistic	0.136000	0.785000
Turning points	19.03%	19.44%
	68.94%	70.14%

4. Turning points

Calculations carried out on the coefficients of the variables DIR, DIR² and DIR³ reveal that, for ROSF model, the turning points on the cubic function of directors' ownership are approximately 19.03% and 68.94%. In terms of the sample, twenty-eight (28) companies lie between the two turning points and six (6) companies lie above the maximum point. The results suggest,

therefore, that the performance of PLC (as measured by ROSF) is negatively related to directors' ownership in the 0% to 19.03% range, positively related in the 19.03% to 68.94% range and negatively related where directors' ownership exceeds 68.94%. Similarly, using VAL as the measure of the performance of PLC, the turning points are 19.44% to 70.14% respectively.

1999 Data

1. Multiple Regression Analysis

Table 9 presents the results of the hypothesis that the relationship between the performance of PLC and director ownership in 1999. For both ROSF and VAL regressions, the coefficient on variable DIR is positive; while variables DIR and DIR³ are negative respectively.

The SIZE, GROWTH and DEBT control variables are statistically insignificant in both regressions.

2. Coefficient of Multiple Determination (R²)

There is 9% of the variation in the variable that can be explained by the control variable in the ROSF regression. For VAL regression, there is 5.3% of the variation in the variable that can be explained by the control variables.

3. Testing Whether the Multiple Regression Model is Valid

I test whether the regression coefficient in the variable are zero as follows :

The null hypothesis is :

$$H_0 : \beta_1 = \beta_2 = \beta_3 = 0$$

The alternative hypothesis is :

$$H_1 : \text{Not all the } \beta_s \text{ are } 0.$$

I employ the F statistic using .05 level of significance. From the table, the critical value is 2.25. Since the F statistic for ROSF and VAL regression are both less than the critical value, which is in region where Ho is not rejected. The results suggest that there is non-linear relationship between the performance of PLC and directors ownership.

TABLE 9

Regression estimates using 1999 directors' ownership data

Variables	Dependent variables	
	ROSF Coefficient t-statistic	VAL Coefficient t-statistic
DIR	-0.240000	-28.274000
	-0.244000	-1.373000
DIR ²	0.687000	93.784000
	0.205000	1.338000
DIR ³	-0.454000	-71.991000
	-0.164000	-1.242000
SIZE	0.001210	-0.123000
	0.045000	-0.218000
GROWTH	-0.007802	-0.106000
	-0.368000	-0.240000
DEBT	0.032660	0.349000
	0.270000	0.138000
INTERCEPT	0.144000	6.470000
	0.241000	0.517000
Adjusted R ²	0.090000	0.053000
F-statistic	0.068000	0.431000
Turning points	22.54%	19.41%
	78.34%	67.43%

4. Turning points

Calculations carried out on the coefficients of the variables DIR, DIR² and DIR³ reveal that, for ROSF model, the turning points on the cubic function of directors' ownership are approximately 22.54% and 78.34%. In terms of the sample, thirty-two (32) companies lie between the two turning points and only one (1) company lie above the maximum point. The results suggest, therefore, that the performance of PLC (as measured by ROSF) is negatively

related to directors' ownership in the 0% to 22.54% range, positively related in the 22.54% to 78.34% range and negatively related where directors' ownership exceeds 78.34%. Similarly, using VAL as the measure of the performance of PLC, the turning points are 19.41% to 67.43% respectively.

SUMMARY OF RESEARCH RESULTS

The present results indicate that the non-linear relationship between exists between performance and director ownership for both accounting and market measures of performance.

1. Accounting Measures (ROSF)

The positive relationship for DIR^2 is found to exist for accounting measures of performance except in 1996. For DIR^3 , the positive relationship is found exist only in 1995 and 1996 for accounting measures of performance.

2. Market Measures (VAL)

The relationship for DIR (negative coefficient) between performance and directors ownership is found to non-exist for market measures of performance for the entire sample years from 1995 to 1999. However, the positive relationship for DIR^2 found exist as the directors ownership in firm increases from 1997 onward. The positive relationship for DIR^3 is found exist in 1995 and 1996, thereafter it is found non-exist (negative coefficient).

3. Control Variables

The SIZE, GROWTH and DEBT control variables are statistically insignificant in both regressions for the entire sample years from 1995 to 1999.

4. Compares with Other Findings

It confirms the general finding of Morck et al. (1998), Short and Keasey (1999) that there is non-linear relationship between the performance of firms and managerial ownership. However, their overall results shown a general functional form of relationship between the performance of firms and managerial ownership; that is, management move from alignment, to entrenchment (pursuing self interests), to alignment as their ownership stakes

in the firm increase, which their coefficients on the variables DIR and DIR³ are positive, while that on the variable DIR² is negative.

The results for both regressions for SIZE and GROWTH contrast with that of Short and Keasey (1999), who reports a statistically significant in their regressions, and DEBT is statistically insignificant in the both regressions.

PROBLEMS ENCOUNTERED

Several difficulties and problems were encountered in the selection of the sample companies and deriving their financial ratios from the company's files at KLSE. The main problem was to ensure that a sufficiently large proportion of the total number of companies chosen had at least a year before the date of their accounting year-end for 1995.

Some of the company's files, particularly the annual reports were unavailable due to a number of reasons such as missing and incomplete information in the KLSE records.