

## CHAPTER 7

### EMPIRICAL RESULTS

#### 7.1. INTRODUCTION

The preceding chapter developed the econometric approaches to resolving the identified research problem. This chapter reports the results generated by the estimated models. These models are carefully applied in order to generate meaningful and presentable results.

##### 7.1.1 Goal of this chapter

The main goal of this chapter is to report and discuss the results of the study in line with the objectives of the study.

##### 7.1.2 Layout of this chapter

The rest of the chapter is structured as follows: Section 7.2 performs basic statistical tests on the data and reports the summary statistics. Section 7.3 compares and contrasts the average values of leverage for different sets of firms across the pre and post liberalisation regime. Section 7.4 reports the regression outputs. Section 7.5 discusses the static panel data results. Section 7.6 discusses the firm specific determinants of capital structure and Section 7.7 documents the results of the long run target adjustment model and transaction costs. Section 7.8 summarises the chapter.

#### 7.2 BASIC TESTS AND SUMMARY STATISTICS

##### 7.2.1 Normality tests

Table 7.1 reports the summary statistics for all the variables used in the study. The tests of data integrity show that most variables are evenly distributed with skewness coefficients close to zero. The only exceptions are the internal finance (RE/TL) and growth variables with skewness coefficients of 3.76 and 1.33 respectively. The kurtosis coefficients for most

variables have values less than three, indicative of no positive excess kurtosis. The only exception is the internal finance variable which has a kurtosis coefficient of 15.45. Therefore, based on the statistics, the null hypothesis of normality cannot be rejected for all variables except for internal finance<sup>31</sup>.

**Table 7.1: Summary statistics for all the dependent and independent variables**

Variable	Mean	Median	Standard deviation	Min	Max	Skewness	Kurtosis
<b>TD/E(B)</b>	0.36924	0.37054	0.06731	0.000	1.000	0.09264	-0.4558
<b>TD/E(M)</b>	0.46126	0.46986	0.18651	0.000	1.000	0.25271	-1.0613
<b>TD/TA(B)</b>	0.15530	0.15599	0.01540	0.000	1.000	-0.17733	-0.0937
<b>TD/TA(M)</b>	0.14983	0.14949	0.02784	0.000	1.000	0.524	0.4419
<b>RE/TL</b>	0.21083	0.10861	0.41053	-0.1486	1.83370	3.76785	15.4539
<b>STD/TA</b>	0.07643	0.07691	0.00986	-0.54561	1.000	-0.60189	-0.4920
<b>Size</b>	5.90111	5.96215	0.27728	5.42848	6.35701	-0.17342	-1.1938
<b>Tangibility</b>	0.31744	0.31471	0.008123	0.30489	0.33501	0.578352	-0.4833
<b>Profitability</b>	0.14902	0.14681	0.025435	0.10277	0.19147	-0.02338	-0.5191
<b>Growth</b>	1.864833	1.678534	0.4755	1.317076	2.876098	1.33743	0.793151
<b>Tax</b>	0.24617	0.24457	0.069013	0.04981	0.38146	-0.82452	3.02459
<b>Ndts</b>	0.03569	0.03616	0.002828	0.03090	0.04249	0.496659	0.31324
<b>Dividend</b>	0.34911	0.33107	0.096705	0.17840	0.59054	0.801018	1.02567

Notes: TD/E (B) is the book value of the ratio of total serviced debt to equity. TD/E (M) is the market value of the ratio of total serviced debt to equity. TD/TA (B) is the book value of the ratio of total serviced debt to total assets. TD/TA (M) is calculated as (Total interest bearing debt/ (Total assets – Book equity + market equity)). RE/TL is the book value of the ratio of retained earnings plus depreciation to total liabilities. STD/TA is the book value of the ratio of short term interest bearing debt to total assets. Size is calculated as the natural logarithm of total assets. Tangibility is calculated as the ratio of fixed assets to total assets. Profitability is calculated as the ratio of earnings attributable to ordinary shareholders to total assets. Growth is calculated as the ratio of market value of equity to the book value of equity. Tax is calculated as the ratio of taxes paid to earnings before tax. Ndts is calculated as the ratio of depreciation to total assets. Dividend is calculated as the ratio of ordinary dividends paid to earnings attributable to ordinary shareholders.

## 7.2.2 Average values for leverage

Table 7.2 reports the average cross-sectional values of both the dependent and independent variables for each year. The book and market values of the total debt ratio have been fairly steady over the sample period. However, a general decline in the book and market values of the debt to equity ratio is evident for the period between 1989 and 1999. The average book value of the debt to equity ratio starts to increase after the year 2000. This general increase may be attributed to the decline in the market interest rates

<sup>31</sup> The internal finance variable is later dropped from the regression analyses because of its lack of significance with the regressors.

for the same period and the growth in the economy following the September 11, 2001 crisis. The average market value of the debt to equity ratio declined steadily up to 1999, and peaked in the years 2000 and 2001. For example, the market value of the debt to equity ratio declined from 60.49 percent in 1989 to 49.44 percent in the year 1999. The general decline in the average market value of the debt to equity ratio resumes in the year 2002, and continues to 2007.

**Table 7.2: Average values for variables over the sample period**

	TD/E(B)	TD/E(M)	TD/TA(B)	TD/TA(M)	RE/TL	STD/TA	Size	Tang	Profit	Growth	Tax	Ndts	Div
1989	0.3364	0.6049	0.1475	0.1376	0.1554	0.0746	5.4285	0.3049	0.1903	1.573785	0.3262	0.0309	0.3267
1990	0.3926	0.6172	0.1541	0.1651	0.0722	0.0876	5.5064	0.3100	0.1915	1.606582	0.2929	0.0335	0.3630
1991	0.3914	0.5873	0.1583	0.1685	0.1128	0.0838	5.5700	0.3097	0.1779	1.924902	0.3815	0.0347	0.4564
1992	0.3414	0.5885	0.1487	0.1549	0.0981	0.0845	5.6016	0.3121	0.1425	1.317076	0.2469	0.0363	0.4474
1993	0.3876	0.6530	0.1522	0.1540	0.1086	0.0817	5.6231	0.3177	0.1410	1.537299	0.1955	0.0338	0.3704
1994	0.2532	0.4699	0.1493	0.1437	0.0755	0.0871	5.6643	0.3138	0.1028	1.858157	0.2446	0.0331	0.3707
1995	0.3529	0.2361	0.1417	0.1065	0.0969	0.0633	5.7367	0.3096	0.1442	1.927663	0.2157	0.0333	0.2956
1996	0.2908	0.2184	0.1275	0.1069	0.2258	0.0597	5.8206	0.3177	0.1391	1.990512	0.2300	0.0362	0.3165
1997	0.2652	0.2394	0.1266	0.1413	0.1744	0.0667	5.8969	0.3269	0.1239	1.788195	0.2129	0.0345	0.1784
1998	0.2973	0.3855	0.1370	0.1495	0.2151	0.0561	5.9622	0.3299	0.1065	1.477086	0.2256	0.0362	0.5905
1999	0.4518	0.4944	0.1677	0.1831	0.4242	0.0843	6.0172	0.3350	0.1468	1.648197	0.0498	0.0366	0.2565
2000	0.5039	0.7389	0.1803	0.1891	1.8337	0.0839	6.0377	0.3243	0.1342	1.529298	0.1931	0.0378	0.2730
2001	0.4501	0.8234	0.1835	0.2158	0.0791	0.0906	6.0807	0.3245	0.1230	1.474732	0.1986	0.0377	0.2617
2002	0.4433	0.5520	0.1668	0.1649	-0.1487	0.0769	6.1071	0.3129	0.1525	1.678534	0.2670	0.0383	0.3644
2003	0.3705	0.4106	0.1624	0.1551	-0.0690	0.0789	6.1201	0.3147	0.1472	1.528826	0.3225	0.0387	0.3046
2004	0.3310	0.3457	0.1560	0.1346	0.0871	0.0714	6.1367	0.3227	0.1527	2.062700	0.2729	0.0425	0.3311
2005	0.3431	0.2787	0.1595	0.1271	0.0924	0.0695	6.1827	0.3227	0.1727	2.832847	0.2354	0.0385	0.4966
2006	0.3896	0.2630	0.1659	0.1303	0.2602	0.0756	6.2717	0.3104	0.1680	2.876098	0.2899	0.0336	0.2623
2007	0.4234	0.2573	0.1656	0.1189	0.1119	0.0760	6.3570	0.3119	0.1745	2.799341	0.2765	0.0320	0.3674

Notes: TD/E (B) is the book value of the ratio of total serviced debt to equity. TD/E (M) is the market value of the ratio of total serviced debt to equity. TD/TA (B) is the book value of the ratio of total serviced debt to total assets. TD/TA (M) is calculated as (Total interest bearing debt/ (Total assets – Book equity + market equity). RE/TL is the book value of the ratio of retained earnings plus depreciation to total liabilities. STD/TA is the book value of the ratio of short term interest bearing debt to total assets. Size is calculated as the natural logarithm of total assets. Tang is calculated as the ratio of fixed assets to total assets. Profit is calculated as the ratio of earnings attributable to ordinary shareholders to total assets. Growth is calculated as the ratio of market value of equity to the book value of equity. Tax is calculated as the ratio of taxes paid to earnings before tax. Ndts is calculated as the ratio of depreciation to total assets. Div is calculated as the ratio of ordinary dividends paid to earnings attributable to ordinary shareholders.

### **7.2.3 Correlation matrices and variance inflation factors**

Table 7.3 is a correlation matrix for all the independent variables used. The non-debt tax shields and tangibility variables have the highest correlation coefficient of 44.18 percent. This is followed by profitability and growth, which have a correlation coefficient of 40.99 percent. The majority of the correlation coefficients are fairly small, suggesting that multicollinearity is not a problem. Table 7.4 reports the variance inflation factor for the relationship between the independent and dependent variables. All the associated values are less than 10, again indicating that multicollinearity may not be a concern.

**Table 7.3: Correlation matrix for the independent variables**

	Growth	Tang	Ndts	Profit	Size	Tax	Div
Growth	1.0000						
Tang	-0.0202 (0.4623)	1.0000					
Ndts	0.0666** (0.0152)	0.442*** (0.0000)	1.0000				
Profit	0.409*** (0.0000)	-0.114*** (0.0000)	0.0692** (0.0116)	1.0000			
Size	0.324*** (0.0000)	0.230*** (0.0000)	0.1132*** (0.0000)	0.0432 (0.1152)	1.0000		
Tax	0.221*** (0.0000)	-0.0277 (0.3126)	0.0623** (0.0230)	0.402*** (0.0000)	0.073*** (0.0080)	1.0000	
Div	0.226*** (0.0000)	0.177*** (0.0000)	0.095*** (0.0005)	0.147*** (0.0000)	0.282*** (0.0000)	0.338*** (0.0000)	1.0000

Notes: \*, \*\*, \*\*\* indicate significance levels at 10, 5 and 1 respectively. p-values are in parentheses.

**Table 7.4: Variance inflation factors and Tolerance for the dependent variables**

Variable	TD/E(B)		TD/E(M)		TD/TA(B)		TD/TA(M)	
	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF
Size	1.23	0.811338	1.23	0.811338	1.23	0.811338	1.23	0.811338
Tang	1.17	0.854769	1.17	0.854769	1.17	0.854769	1.17	0.854769
Growth	1.15	0.869056	1.15	0.869056	1.15	0.869056	1.15	0.869056
Profit	1.11	0.902985	1.11	0.902985	1.11	0.902985	1.11	0.902985
Ndts	1.09	0.917127	1.09	0.917127	1.09	0.917127	1.09	0.917127
Tax	1.02	0.982193	1.02	0.982193	1.02	0.982193	1.02	0.982193
Div	1.02	0.984763	1.02	0.984763	1.02	0.984763	1.02	0.984763
Mean VIF	<b>1.11</b>		<b>1.11</b>		<b>1.11</b>		<b>1.11</b>	

Table 7.5 provides a detailed correlation matrix for all the variables. Most of the correlations presented in this table are confirming the predictions of some of the capital structure theories. Growth is negatively correlated to leverage, a confirmation of the contracting cost theory. This relationship is statistically significant for the market value debt ratios. The tangibility variable is positive and significant at the 1 percent level of significance for all the dependent variables. This shows that asset structure is an important criterion for assessing the firm's ability to access loans. The non-debt tax shield variable is positive and significant at the 1 percent level for all the dependent variables. The correlation coefficient for the non-debt tax shield and tangibility variables is positive and significant, signifying that firms with high non-debt tax shields have a high proportion of fixed assets. This may provide an incentive for firms to accumulate more debt.

The profitability variable is negatively related to leverage. This negative relationship confirms the pecking order hypothesis. The size variable is positively correlated to the book value measures of leverage, indicating that larger firms have more debt in their capital structure. However, a negative association is observed between size and the market values of leverage, suggesting low information asymmetries associated with large firms. Taxes and dividend payout are both negatively related to leverage. The correlations are significant at the 1 percent level.

**Table 7.5: Correlation matrix for all variables**

	TD/E(B)	TD/E(M)	TD/TA(B)	TD/TA(M)	STD/TA	RE/TL	Growth	Tang	Ndts	Profit	Size	Tax	Div
TD/E(B)	1.000												
TD/E(M)	0.781***	1.000											
TD/TA(B)	0.898***	0.768***	1.000										
TD/TA(M)	0.711***	0.826***	0.786***	1.000									
STD/TA	0.657***	0.589***	0.715***	0.659***	1.000								
RE/TL	-0.232***	-0.286***	-0.198***	-0.335***	-0.219***	1.000							
Growth	0.008	-0.473***	-0.012	-0.362***	-0.017	0.235***	1.000						
Tang	0.135***	0.115***	0.188***	0.202***	0.008	0.035	-0.020	1.000					
Ndts	0.113***	0.111***	0.119***	0.124***	0.062**	0.156***	0.066**	0.441***	1.000				
Profit	-0.229***	-0.381***	-0.215***	-0.323***	-0.175***	0.473***	0.409***	-0.114***	0.069**	1.000			
Size	0.024	-0.130***	0.052*	-0.071***	-0.051*	0.050*	0.324***	0.230***	0.113***	0.043	1.000		
Tax	-0.181***	-0.268***	-0.210***	-0.295**	-0.185***	0.162***	0.220***	-0.028	0.062**	0.402***	0.073***	1.000	
Div	-0.132***	-0.244***	-0.139***	-0.166***	-0.112*	-0.044	0.225***	0.177***	0.095***	0.147***	0.282***	0.338***	1.00

Notes: \*, \*\*, \*\*\* indicate significance levels at 10%, 5% and 1% respectively. The variables are as defined in Table 7.2.



#### 7.2.4 Outlier diagnostics

Outliers in the data could distort the predictive power of the regression models used. There are basically four methods that have been used to identify influential points in the data. These statistics include Studentised Residuals, Leverage, Cook's D and DFITS. These methods assess the overall impact of observations on regression results. Studentised Residuals are a basic means of identifying potential outliers in the data. An observation which has a Studentised Residual value that exceeds +2 or -2 is deleted from the analysis. Leverage measures the deviation of an independent variable from its mean. An observation that has Leverage value greater than  $2k+2/n$ , which is 0.021818, is examined with caution. K is the number of regressors and n is the number of observations.

Cook's D and DFITS combine the information on Studentised residuals and leverage. Zero is the lowest value for Cook's D. Therefore, the higher the value the more influential the observation is. Any observation above the cut-off point derived from the expression  $4/n$ , which is 0.00364, is noted and deleted. The cut-off point for DFITS is measured by the expression  $[2 \times \text{square root } (k/n)]$ , which equals 0.2 for this analysis. K is the number of regressors and n is the number of observations. The values for DFITS can either be negative or positive. A value close to zero is the least influential point. The total number of outliers identified by this exercise totalled 71, therefore, reducing the number of observations from 1100 to 1029.

### 7.3 THE CONTRASTING EFFECTS OF FINANCIAL LIBERALISATION ON CAPITAL STRUCTURE

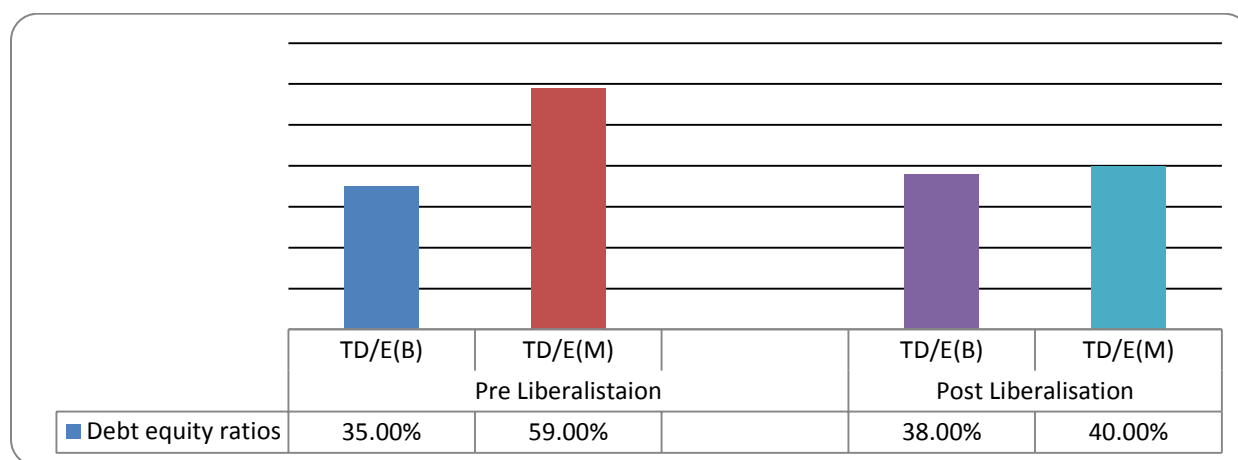
This section presents a set of figures aimed at highlighting the contrasting effects of financial liberalisation on three different sets of firms. These include the full set of all sampled firms, firms that actively participate in international equity markets and firms that have not accessed international equity markets. Two additional size adjusted sets of firms are included in the analysis. Firms with access to international equity markets

are those that are either ADR issuers<sup>32</sup> or firms that are cross-listed. Small firms are the ones with the average value of total assets less than the median value of total assets. Likewise, large firms have average total asset values higher than the median value of assets. The average value of assets is calculated for the period between 1989 and 1994.

### 7.3.1 Average leverage ratios for all firms (pre and post liberalisation)

Figure 7.1 reveals the contrasting effects of financial liberalisation on the book and market values of the debt to equity ratio for the full sample set. This preliminary analysis suggests that financial liberalisation may have a significant effect on the market value of the debt to equity ratio. The average market value of the debt to equity ratio declines by 19 percent. Schmukler and Vesperoni (2006: 188) report a similar reduction but for the book value ratio for a sample of firms in emerging market economies. This observation suggests that the opening up of the JSE, and further participation of local firms in the international equity markets increases the average market value of equity relative to debt. There is, however, a marginal increase in the average book value of the debt to equity ratio.

**Figure 7.1: Book and market value debt ratios for all firms (pre and post liberalisation)**

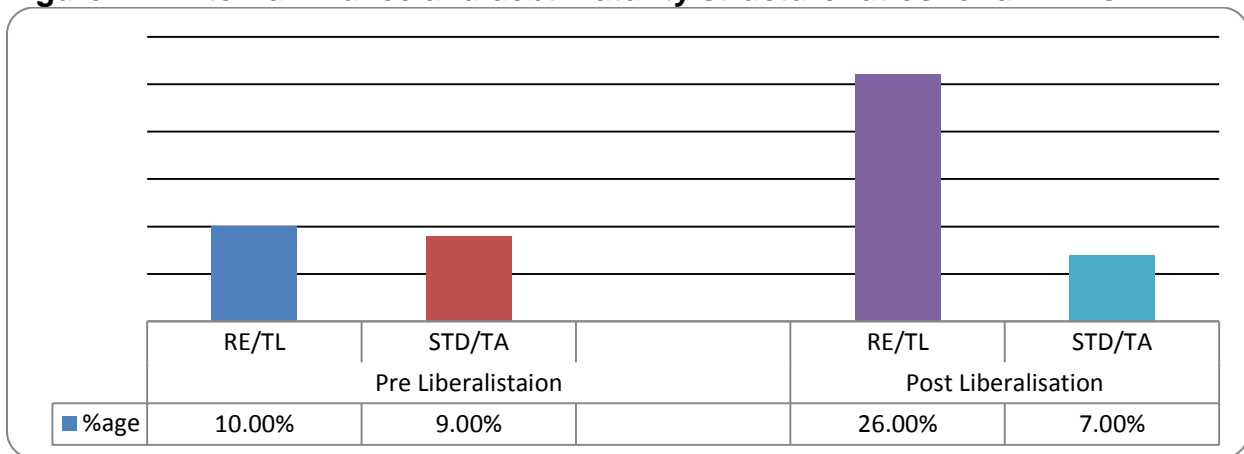


<sup>32</sup> See the appendix for details of these firms

### 7.3.2 Average retained earnings and debt maturity structure ratios for all firms

Figure 7.2 reports the importance of retained earnings and the maturity structure of debt in the context of financial liberalisation. The average value of retentions increases from 10 percent in the pre liberalisation period to 26 percent in the post liberalisation period. This increase implies that the importance of retained earnings has improved following financial liberalisation. The average short term debt ratio declines marginally from 9 percent to 7 percent. This decline suggests that financial liberalisation may have no significant effects on the maturity structure of debt for all firms.

**Figure 7.2: Internal finance and debt maturity structure ratios for all firms**



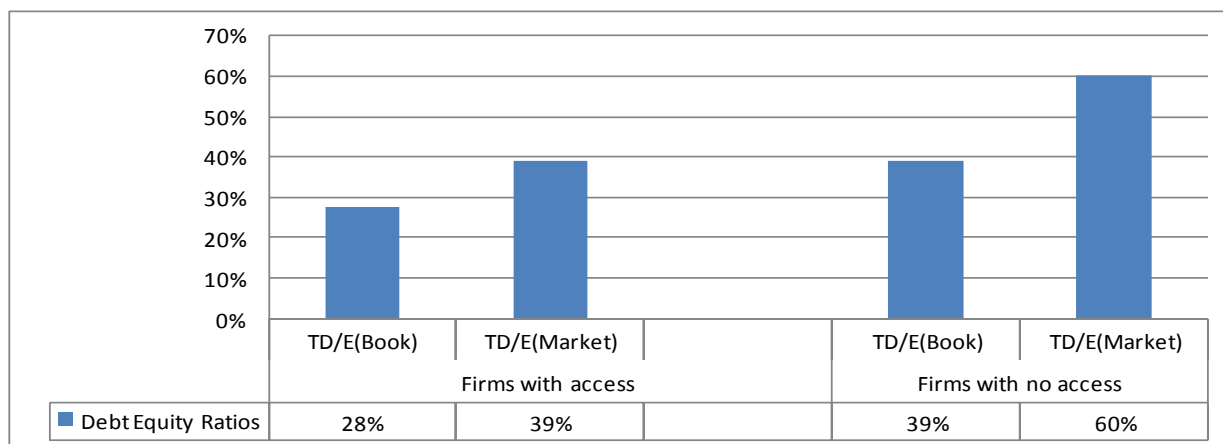
### 7.3.3 Average leverage ratios for internationally and domestically financed firms

To show the effects of firm participation in international equity markets, the data set is divided into internationally and domestically financed firms. Figure 7.3 shows the difference in the debt to equity ratios for both sets of firms. Internationally financed firms have lower average book and market value debt to equity ratios compared to domestically financed firms. The book value of the debt to equity ratio for domestically financed firms is 11 percent higher than that of the internationally financed firms. The market value ratio difference between the two sets of firms is even higher by 21 percent.

This observation is indicative that domestically financed firms rely principally on domestic debt. Hence, they have higher debt ratios. Similarly, internationally financed firms are expected to exhibit lower debt ratios. This is because firms with access to

international equity markets have the ability to access more equity through the process of cross listing and ADR issuing activity.

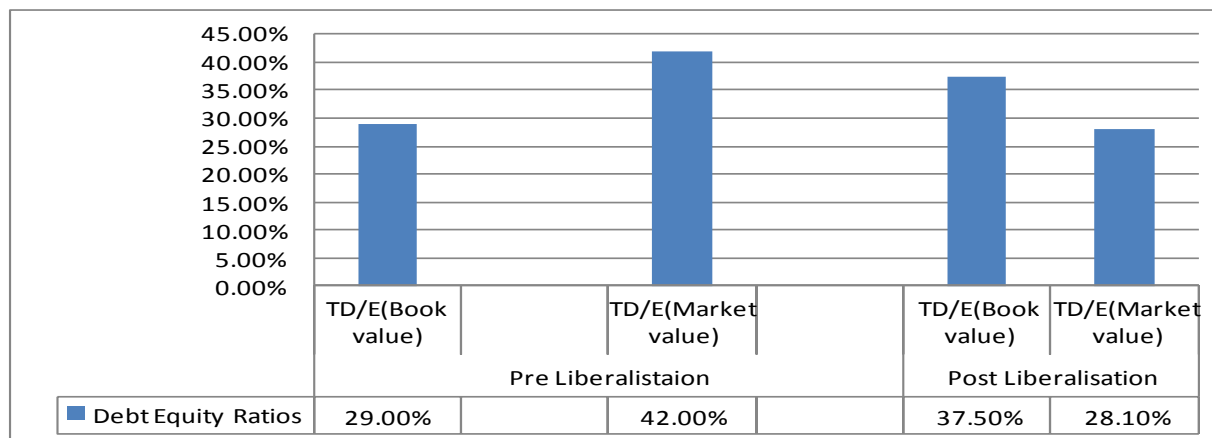
**Figure 7.3: Debt to equity ratios for internationally and domestically financed firms.**



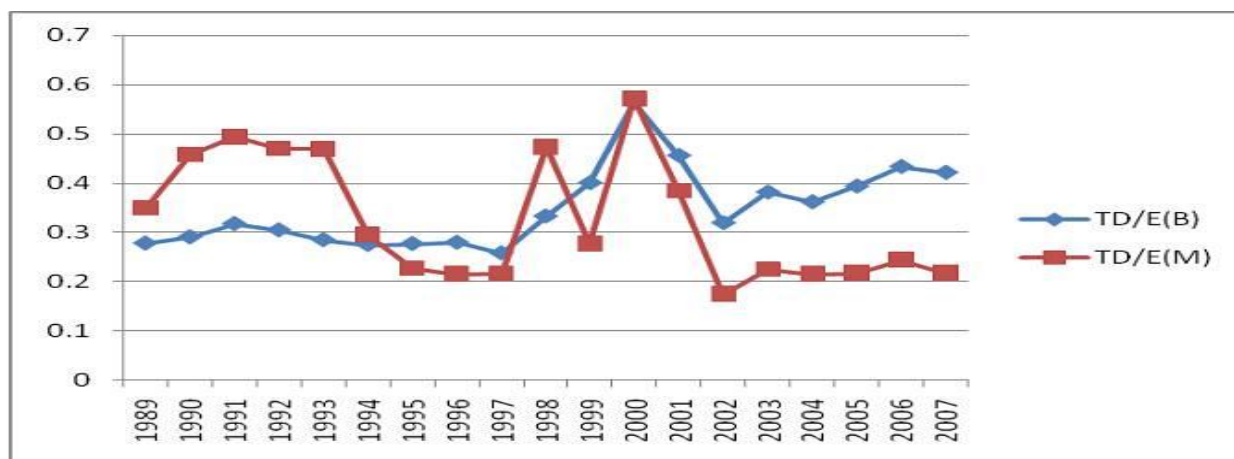
### 7.3.4 Average leverage ratios for internationally financed firms (pre and post liberalisation)

Figure 7.4 reports the average debt to equity ratios for internationally financed firms. The average book value of the debt to equity ratio increases with financial liberalisation, whereas the average market value of the debt to equity ratio reduces with financial liberalisation. An increase in the average book value ratio could suggest that firms are taking advantage of the lower cost of borrowing associated with financial liberalisation. As a result, debt becomes more appealing relative to equity. The reduction in the market value of the debt to equity ratio can be explained by the trend observed in figure 7.5. Before financial liberalisation, the average market value of the debt to equity ratio was higher than the average book value. After financial liberalisation, the opposite is observed. The average market value of the debt to equity ratio is substantially lower than the average book value.

**Figure 7.4: The effects of financial liberalisation on debt to equity ratios of internationally financed firms**



**Figure 7.5: The trend in the leverage ratios for internationally financed firms.**

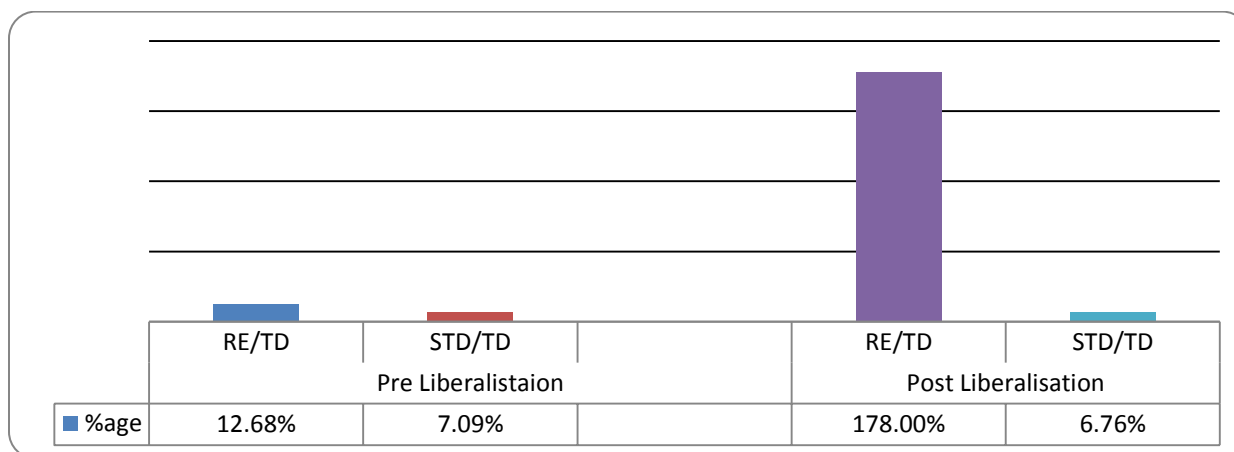


### 7.3.5 Average retained earnings and debt maturity structure ratios for internationally financed firms (pre and post liberalisation)

Figure 7.6 highlights the effects of financial liberalisation on internal finance and the maturity structure of debt for internationally financed firms. Again, the maturity structure of debt is not affected by financial liberalisation. This observation contrasts with Schmukler and Vesperoni (2006: 188) who document an increase in the average debt maturity structure of firms which participated in international equity issues. However, it can be observed that financial liberalisation impacts on firms' reliance on internal finance. The retained earnings ratio increases from 12.68 percent in the pre

liberalisation period to 178 percent after financial liberalisation. This increase is in line with the observed increase in retained earnings for the full sample set.

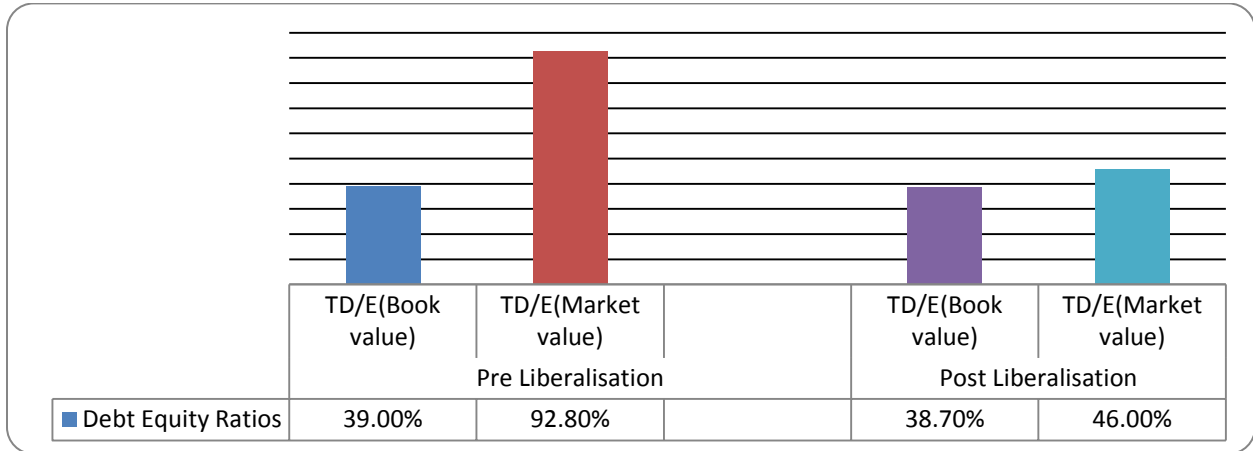
**Figure 7.6: The effects of financial liberalisation on internal finance and debt maturity structure of internationally financed firms**



### 7.3.6 Average leverage ratios for domestically financed firms (pre and post liberalisation)

Figure 7.7 shows a decline in the average debt to equity ratios for domestically financed firms. Although the average book value ratio did not change, the average market value ratio declined by 46.8 percent. This finding confirms Makina and Negash's (2005a: 154) observation that the cost of equity capital lowers following financial liberalisation. Consequently, financially constrained firms experience a rise in the market value of their equity, thereby experiencing a reduction in their debt ratios.

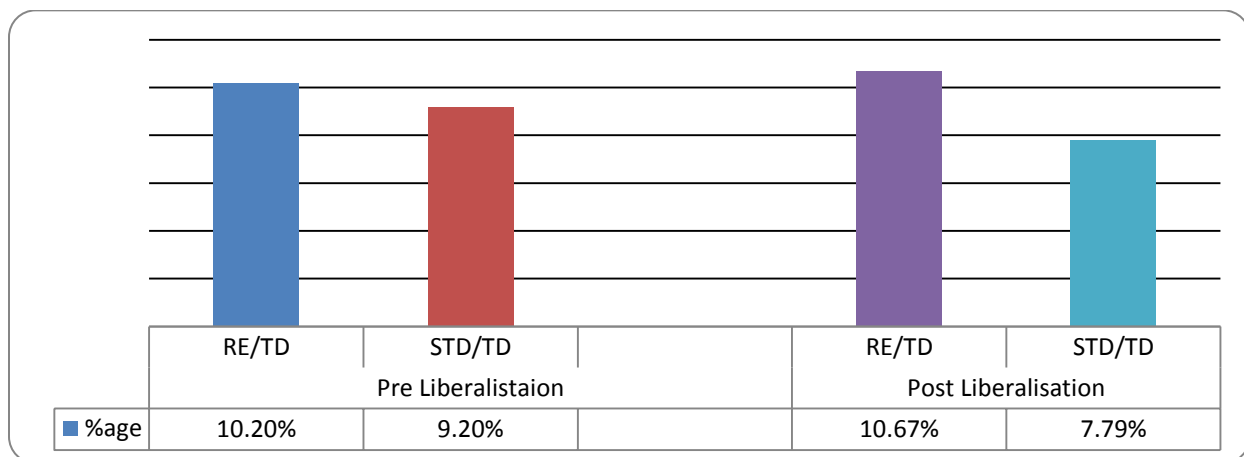
**Figure 7.7: The effects of financial liberalisation on debt equity ratios for domestically financed firms**



### 7.3.7 Average retained earnings and debt maturity structure ratios for domestically financed firms

Figure 7.8 reveals no material effects of financial liberalisation on the importance of internal finance and the maturity structure of debt for domestically financed firms. The observed ratios have not changed significantly.

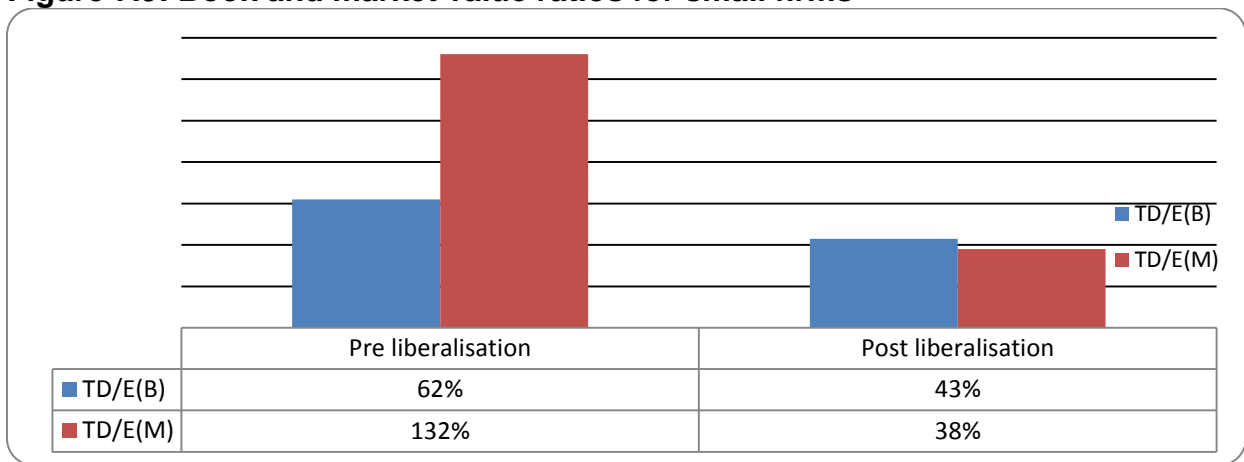
**Figure 7.8: The effects of financial liberalisation on internal finance and debt maturity structure for domestically financed firms**



### 7.3.8 Average leverage ratios for small firms (pre and post liberalisation)

Figure 7.9 shows the average book and market value of the debt to equity ratio for small firms. The average book ratio decreased by 19 percent and the average market ratio decreased by 94 percent. These reductions may indicate that financial liberalisation provides more financing opportunities for small firms. Particularly, smaller firms benefit from the lower cost of equity capital thus increasing their market value of equity relative to debt.

**Figure 7.9: Book and market value ratios for small firms**

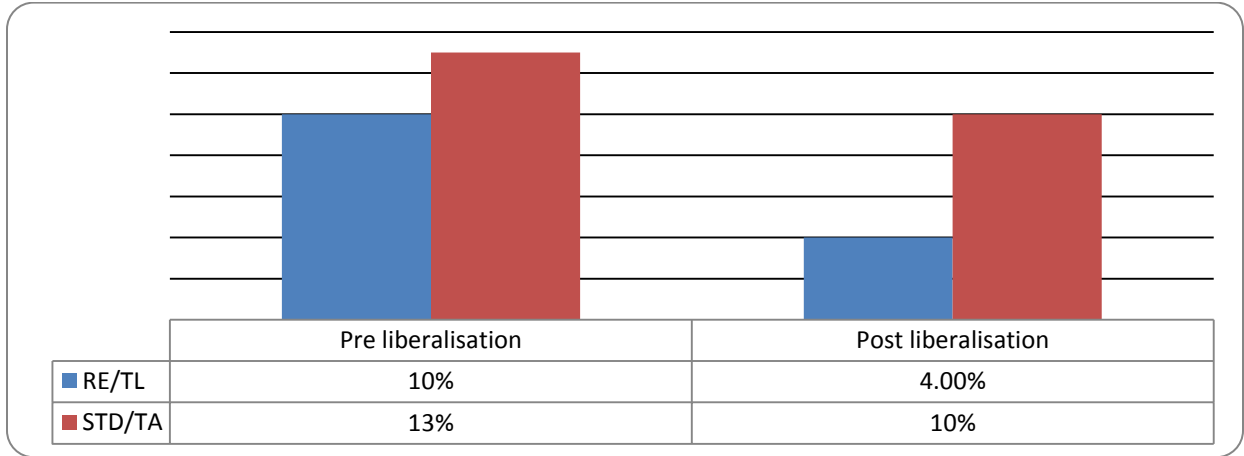


### 7.3.9 Average retained earnings and debt maturity structure ratios for small firms (pre and post liberalisation)

Figure 7.10 highlights the importance of retained earnings and the maturity structure of debt for small firms. Smaller firms retain less income in the period after financial liberalisation. The average retained earnings to total liabilities ratio reduces by six percent. The average debt maturity structure shifts from short term to long term. This provides some indication that smaller firms become less constrained following financial liberalisation. They begin to access more long term debt. However, the reduction in the short term debt ratio is only marginal.



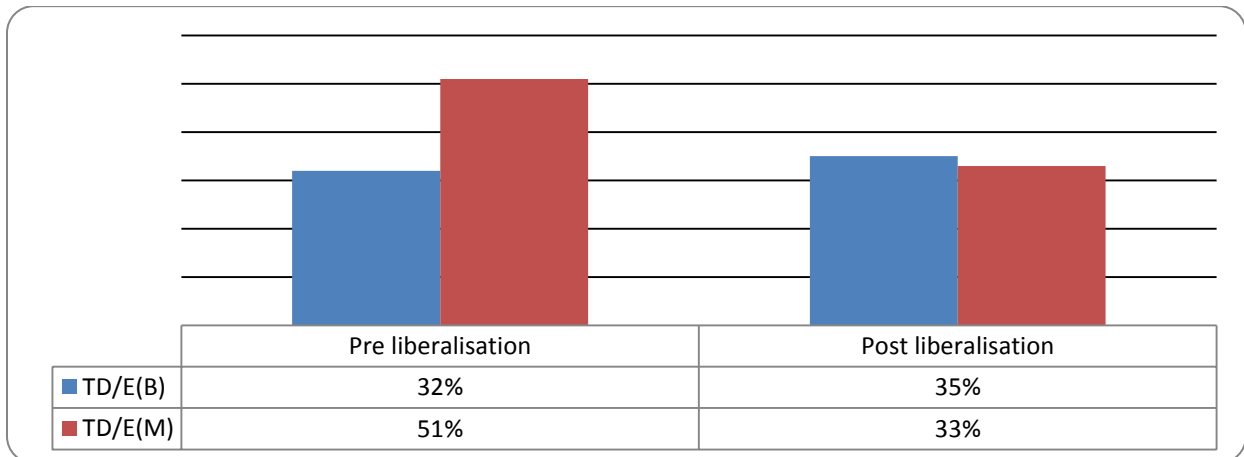
**Figure 7.10: Internal finance and debt maturity structure ratios for small firms**



### 7.3.10 Average leverage ratios for large firms (pre and post liberalisation)

Figure 7.11 shows the average debt to equity ratios for large firms. The average book value of the debt to equity ratio increases marginally over the period of observation. However, the average market value of the debt to equity ratio declines by 18 percent.

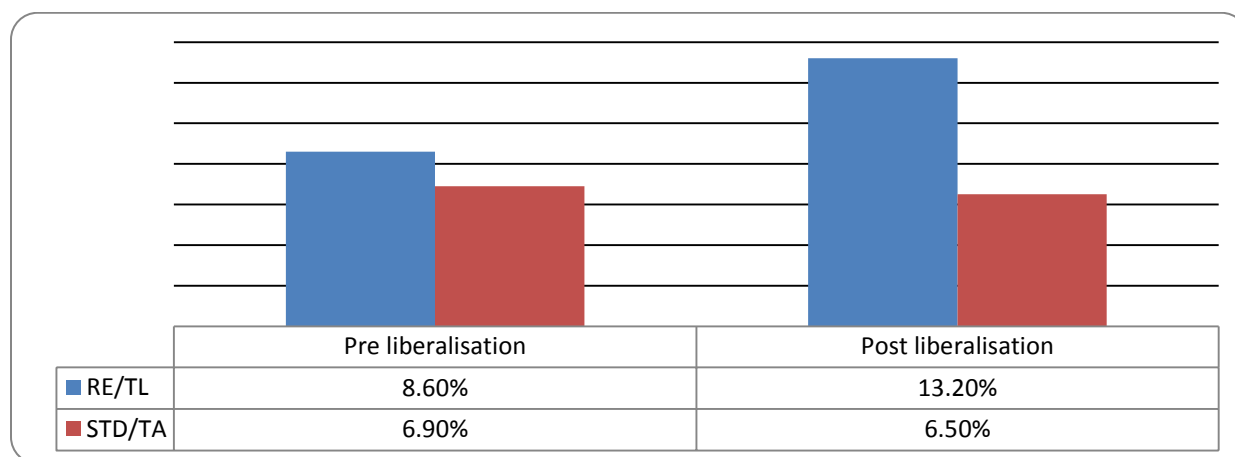
**Figure 7.11: Book and market value debt to equity ratios for large firms**



### 7.3.11 Average retained earnings and debt maturity structure ratios for large firms (pre and post liberalisation)

Figure 7.12 reveals that large firms retain more earnings, although the increase is only marginal. The maturity structure of debt is, however, stable over the two periods of observation.

**Figure 7.12: Internal finance and debt maturity structure ratios for large firms**



### 7.3.12 Summary of the contrasting effects of financial liberalisation

The descriptive statistics presented in this section imply that financial liberalisation may be associated with a lower average market value of the debt to equity ratio. This implication observed for the full sample set and for firms without access to international equity markets. Generally, the average book debt to equity ratio increases marginally for all sets of firms. However, a marginal reduction is observed for domestically financed firms. This observation can be attributed to the lower borrowing costs associated with debt in a liberalised economy. The maturity structure of debt seems to be unaffected by financial liberalisation. Nonetheless, internationally financed firms experience a large increase in the use of retained earnings for the period after financial liberalisation. This increase is in line with the increased use of internal finance for the average firm.

In terms of size, it appears that smaller firms are more responsive to the process of financial liberalisation compared to larger firms. Particularly, smaller firms experience a reduction in both the average book and market value of the debt to equity ratio. There is

also an indication that, following financial liberalisation, smaller firms retain less profits and access more long term debt. The next step is to test whether these effects are statistically significant while controlling for other factors that may influence firm leverage<sup>33</sup>.

## **7.4 REGRESSION OUTPUTS**

This section focuses specifically on presenting the regression outputs for the impact of financial liberalisation on capital structure. GLS regressions (with standard errors robust to heteroscedasticity) are reported for the fixed (within) and random effects models.

### **7.4.1 Organisation of the regression outputs.**

Tables 7.6 and 7.7 present regression results for the impact of financial liberalisation on the book and market values of leverage for all the firms in the data set. Tables 7.8 and 7.9 report the regression results for the impact of financial liberalisation on the book and market value measures of leverage for the full set of firms. Tables 7.10 and 7.11 show the regression outputs for the impact of financial liberalisation on the book and market values of leverage for large firms.

The Hausman (1978: 1251) specification test is used to establish which model (fixed or random effects) is suitable. Therefore, the pooled OLS and either the fixed or random effects models are presented in the results. This method of reporting is chosen because the fixed and random effects models report very similar correlations. To save on space, either of the two models is reported, based on the output from the Hausman (1978: 1251) test.

### **7.4.2 Models reported for the full sample set**

The p-values for the Hausman (1978: 1251) test are statistically significant at the 1 percent level for the book and market values of the debt to equity and the total debt ratios. Likewise, the p-value for the short term debt ratio is statistically significant at the

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<sup>33</sup> These are control variables discussed in section 5.4.2

5 percent level. The null hypothesis is thus rejected in favour of the fixed effects model. Therefore the fixed effects model is used to report the results for the full sample set.

#### **7.4.3 Models reported for small firms**

The p-values of the Hausman (1978: 1251) specification tests are statistically insignificant for the book and market values of the debt to equity ratio for the set of small firms. Therefore the null hypothesis cannot be rejected in favour of the fixed effects model. Hence, the random effects model is used to report the results for the book and market value measures of the debt to equity ratio of small firms. Nonetheless, the p-values for both measures of the total debt ratios are statistically significant. Therefore the fixed effects model is used to report the results for both measures of the total debt ratio for small firms.

#### **7.4.4 Models reported for large firms**

Using the same convention for the interpretation of the Hausman (1978: 1251) specification test, large firms' results are interpreted using the fixed effects model for the book value of the debt to equity ratio. The random effects model is used to report the results for the other measures of leverage. These are the book and market values of the total debt ratio and the short term debt ratio.

**Table 7.6: Panel data regression results for all firms**

Variables	Fixed Effects Model		Pooled OLS Model	
	Td/e(book)	Td/e(market)	Td/e(book)	Td/e(market)
<b>Growth</b>	0.01464 (0.329)	-0.06177 (0.16)	0.0137 (0.0189)	-0.0477 (0.0000)***
<b>Tangibility</b>	0.527163 (0.025)**	0.454448 (0.693)	0.0631 (0.000)***	0.0839 (0.3035)**
<b>Profitability</b>	-0.13973 (0.507)	5.51497 (0.056)*	-0.3899 (0.0000)	-0.4254 (0.0000)***
<b>Size</b>	0.438301 (0.082)*	-1.81533 (0.930)	-0.0423 (0.2039)	-0.0874 (0.0000)
<b>IFF</b>	(omitted)	(omitted)	0.0254 (0.6086)	0.0034 (0.9535)
<b>LIS</b>	-0.20215 (0.004)***	0.610091 (0.232)	-0.0527 (0.0011)***	-0.0759 (0.0000)***
<b>SML</b>	-0.0992 (0.309)	-1.10143 (0.031)**	-0.0416 (0.2180)	-0.1143 (0.0000)***
<b>CAL</b>	0.2510 (0.085)*	1.118458 (0.066)*	0.1405 (0.0218)**	0.2133 (0.0001)**
<b>DFSL</b>	0.205855 (0.094)*	-1.45157 (0.232)	0.0020 (0.9559)	0.0454 (0.0342)
<b>SMCGDP</b>	0.347038 (0.004)***	-0.33555 (0.358)	0.1525 (0.0000)***	0.1609 (0.0000)
<b>DCGDP</b>	-0.19859 (0.003)***	-0.311675 (0.309)	-0.0931 (0.0000)**	-0.0984 (0.0000)
<b>Constant</b>	-0.889 (0.238)	1.104962 (0.641)	0.7573 (0.0006)***	1.1603 (0.0000)***
<b>F(11,99)</b>	3.6	4.74		
<b>Prob &gt; F</b>	0.000	0.0000	0.0000	0.0000
<b>R-sq:</b>	0.0876	0.2549	0.5208	0.5642
<b>Wald chi2(11)</b>			41.4	119.97
<b>P&gt;chi2</b>			0.0000	0.0000
<b>Hausman Test:</b>				
<b>chi2(11)</b>	49.5	40.86		
<b>Prob&gt;chi2</b>	0.0000	0.0000		
<b>No. Of observations</b>	1029	1029	1029	1029

Notes: This table reports fixed (within) effects and pooled OLS regression outputs for the impact of financial liberalisation on the capital structure of all the firms. TD/E (B) is calculated as the book value of total interest bearing debt divided by the book value of equity. TD/E (M) is calculated as total interest bearing debt divided by the market value of equity. The control variables are Growth, Tangibility, Profitability and Size. IFF is a dummy variable capturing individual firm access to international equity markets. LIS is a dummy variable capturing the lifting of international sanctions. SML is a dummy variable representing stock market liberalisation. CAL is a dummy variable capturing capital account liberalisation. DFSL is a dummy variable representing domestic financial sector liberalisation. SMCGDP and DCGDP are measures of stock and banking sector development respectively. Standard errors are robust to heteroscedasticity. P-values are in parentheses and \*\*\*, \*\*, \* indicate levels of significance at the 1%, 5% and 10% levels respectively.

**Table 7.7: Panel data regression results for all firms**

Variables	Fixed Effects Model		Random Effects	Pooled OLS Model		
	Td/Ta(book)	Td/Ta(market)	Std/Ta	Td/Ta(book)	Td/Ta(market)	Std/Ta
<b>Growth</b>	0.003 (0.081)*	-0.0063 (0.034)**	0.001 (0.475)	0.0024 (0.4338)**	-0.0038 (0.3660)**	0.0046 (0.2862)
<b>Tangibility</b>	0.244 (0.001)***	0.248 (0.000)***	-0.017 (0.644)	0.2128 (0.0000)***	0.1986 (0.000)***	-0.0031 (0.8713)
<b>Profitability</b>	-0.2295 (0.017)**	-0.2012 (0.039)**	-0.1834 (0.084)*	-0.0959 (0.0051)**	-0.1342 (0.0584)**	-0.1028 (0.0000)*
<b>Size</b>	0.0388 (0.355)	0.0154 (0.615)	-0.0255 (0.015)**	0.0245 (0.4443)	-0.0357 (0.0001)	-0.029 (0.0129)**
<b>IFF</b>	Omitted	Omitted	0.0148 (0.490)	-0.0069 (0.8697)	-0.009 (0.7232)	0.0162 (0.3987)
<b>LIS</b>	-0.0346 (0.011)**	-0.0467 (0.006)***	-0.0027 (0.888)	-0.0198 (0.0002)**	-0.0134 (0.5255)***	0.0159 (0.0059)
<b>SML</b>	-0.0258 (0.101)	-0.0631 (0.003)***	-0.0288 (0.070)*	-0.0356 (0.0257)**	-0.0627 (0.0759)*	-0.0584 (0.000)***
<b>CAL</b>	0.0487 (0.049)**	0.0404 (0.337)	0.0328 (0.254)	0.0737 (0.0336)	0.0693 (0.3551)	0.0944 (0.000)
<b>DFSL</b>	0.0166 (0.441)	0.0084 (0.783)	-0.0340 (0.216)	-0.0006 (0.7177)	-0.0185 (0.6816)	-0.0075 (0.0000)
<b>SMCGDP</b>	0.0617 (0.029)**	0.0325 (0.382)	0.0390 (0.091)*	0.0526 (0.0035)***	0.0307 (0.4341)	0.0374 (0.000)***
<b>DCGDP</b>	-0.035 (0.023)**	0.0038 (0.828)	0.0001 (0.991)	-0.0422 (0.0193)*	-0.0075 (0.7832)	-0.0081 (0.1859)
<b>Constant</b>	-0.0378 (0.872)	0.0502 (0.765)	0.251 (0.000)***	0.10132 (0.6006)	0.3813 (0.0010)***	0.3195 (0.0000)***
<b>F(11,99)</b>	5.24	8.91	4.6			
<b>Prob &gt; F</b>	0.0000	0.0000	0.000	0.0000	0.0000	0.0000
<b>Adjusted R-sq:</b>	0.1021	0.2022	0.1108	0.5777	0.4431	0.3559
<b>Wald chi2(11)</b>			33.88			
<b>P&gt;chi2</b>			0.004			
<b>Hausman Test:</b>						
<b>chi2(11)</b>	54.44	24.69	13.73			
<b>Prob&gt;chi2</b>	0.0000	0.0101	0.248			
<b>No. Of observations</b>	1029	1029	1029	1029	1029	1029

Notes: This table reports fixed effects, random effects and pooled OLS regression outputs for the impact of financial liberalisation on the capital structure of all firms. Variables are as defined in the notes to table 7.6. STD/TA is the ratio of the book value of short term interest bearing debt to the book value of total assets. Standard errors are robust to heteroscedasticity. P-values are in parentheses and \*\*\*, \*\*, \* indicate levels of significance at the 1%, 5% and 10% levels of significance.

**Table 7.8: Panel data regression results for small firms**

Variables	Random Effects Model		Pooled OLS Model	
	Td/e(book)	Td/e(market)	Td/e(book)	Td/e(market)
<b>Growth</b>	0.0370 (0.102)	-0.0785 (0.183)	0.013702** (0.0189)	-0.04769 *** (0.0000)
<b>Tangibility</b>	0.3163 (0.201)	0.4038 (0.517)	0.281015*** (0.0000)	0.08393 (0.3035)
<b>Profitability</b>	-0.7240 (0.249)	-0.3107 (0.827)	-0.389931*** (0.0000)	-0.42539 *** (0.0000)
<b>Size</b>	0.2239 (0.217)	-0.2858 (0.658)	-0.042265 (0.2039)	-0.08744*** (0.0002)
<b>IFF</b>	0.3872 (0.133)	0.2903 (0.713)	0.025400 (0.6086)	0.003411 (0.9535)
<b>LIS</b>	-0.2961** (0.035)	1.1622 (0.346)	-0.052744 *** (0.0011)	-0.07594 (0.7210)
<b>SML</b>	-0.2087 (0.162)	-1.5648 (0.113)	-0.041570 (0.2180)	-0.11430 *** (0.0000)
<b>CAL</b>	0.1968 (0.428)	1.1067 (0.310)	0.140516 ** (0.0218)	0.213320 *** (0.0001)
<b>DFSL</b>	0.1746 (0.348)	-2.6193 (0.271)	0.001967 (0.9559)	0.045425 ** (0.0342)
<b>SMCGDP</b>	0.4378** (0.032)	-1.1008 (0.174)	0.152511 *** (0.0000)	0.160947 *** (0.0000)
<b>DCGDP</b>	-0.1865* (0.064)	0.9161 (0.187)	-0.093144*** (0.0000)	-0.09839 *** (0.0000)
<b>Constant</b>	-0.3510 (0.680)	2.1542 (0.454)	0.757314 *** (0.0006)	1.16030*** (0.0000)
<b>Adjusted R-sq:</b>	0.0778	0.1996	0.5209	0.5642
<b>Wald chi2(11)</b>	19.11	100.99		
<b>P&gt;chi2</b>	0.0591	0.0000		
<b>Prob (F Statistic)</b>			0.0000	0.0000
<b>Hausman Test:</b>				
<b>chi2(11)</b>	12.02	1.04		
<b>Prob&gt;chi2</b>	0.3620	0.9999		
<b>No. Of observations</b>	539	539	539	539

Notes: This table reports random effects and pooled OLS regression outputs for the impact of financial liberalisation on the capital structure of small firms. Variables are as defined in the notes to table 7.6. Standard errors are robust to heteroscedasticity. P-values are in parentheses and \*\*\*, \*\*, \* indicate levels of significance at the 1%, 5% and 10% levels of significance respectively.

**Table 7.9: Panel data regression results for small firms**

Variables	Fixed Effects Model			Pooled OLS Model		
	Td/Ta(book)	Td/Ta(market)	Std /Ta	Td/Ta(book)	Td/Ta(market)	Std/Ta
<b>Growth</b>	0.0028 (0.216)	-0.0074* (0.053)	0.0008 (0.8360)	0.002443 (0.4338)	-0.00375 (0.3660)	0.00462 (0.2862)
<b>Tangibility</b>	0.2638*** (0.009)	0.3072*** (0.001)	0.0551 (0.4430)	0.21278*** (0.0000)	0.19855*** (0.0000)	-0.00306 (0.8713)
<b>Profitability</b>	-0.0928 (0.301)	-0.0852 (0.535)	-0.0737 (0.3150)	-0.09596 *** (0.0051)	-0.13417* (0.0584)	- 0.10281*** (0.0000)
<b>Size</b>	0.0792* (0.093)	0.0031 (0.952)	0.0386 (0.2270)	0.02452 (0.4443)	-0.0357*** (0.0010)	-0.02960** (0.0129)
<b>IFF</b>	(Omitted)	(Omitted)	(omitted)	-0.00691 (0.8697)	-0.00945 (0.7232)	0.01623 (0.3987)
<b>LIS</b>	-0.0453** (0.040)	-0.0743** (0.014)	-0.0208 (0.2910)	-0.01979 *** (0.0002)	-0.0133 (0.5255)	0.01596*** (0.0059)
<b>SML</b>	0.0004 (0.987)	-0.0174 (0.485)	-0.0224 (0.2630)	-0.03559 ** (0.0257)	-0.0627* (0.0759)	- 0.05837*** (0.0000)
<b>CAL</b>	-0.0357 (0.276)	-0.0892 (0.215)	0.0163 (0.6370)	0.073747 ** (0.0336)	0.06927 (0.3551)	0.09441*** (0.0000)
<b>DFSL</b>	0.0098 (0.778)	0.0222 (0.647)	-0.0265 (0.3230)	-0.00606 (0.7177)	-0.0185 (0.6816)	- 0.07521*** (0.0000)
<b>SMCGDP</b>	0.0014 (0.969)	0.0085 (0.812)	0.0253 (0.3830)	0.05255 *** (0.0035)	0.03066 (0.4341)	0.04269** (0.0374)
<b>DCGDP</b>	-0.0133 (0.592)	0.0276 (0.308)	-0.0064 (0.7110)	-0.04221 ** (0.0193)	-0.0075 (0.7832)	-0.00807 (0.1859)
<b>Constant</b>	-0.2010 (0.358)	0.1120 (0.653)	-0.0588 (0.6920)	0.101324 (0.6006)	0.38134 (0.0010)	0.31955*** (0.0000)
<b>F(11,48)</b>	5.42	4.60				
<b>Prob &gt; F</b>	0.0000	0.0001			0.0000	
<b>Adjusted R-sq:</b>	0.1899	0.149		0.5777	0.4431	0.3559
<b>Prob (F Statistic)</b>				0.0000	0.0000	
<b>Hausman Test:</b>						
<b>chi2(11)</b>	38.48	28.29				
<b>Prob&gt;chi2</b>	0.0001	0.0029				
<b>No. of observations</b>	539	539		539	539	

Notes: This table reports fixed effects and pooled OLS regression outputs for the impact of financial liberalisation on the book and market measures of total debt ratios for small firms. Variables are as defined in the notes to table 7.6. Standard errors are robust to heteroscedasticity. P-values are in parentheses and \*\*\*, \*\*, \* indicate levels of significance at the 1%, 5% and 10% levels of significance.



**Table 7.10: Panel data regression results for large firms**

	Fixed Effects Model	Random effects	Pooled OLS	
Variables	Td/e(book)	Td/e(market)	Td/e(book)	Td/e(market)
<b>Growth</b>	-0.01282 (0.452)	-0.02426 (0.315)	0.002172 (0.7403)	0.0001 (0.9455)
<b>Tangibility</b>	0.508597* (0.072)	-0.22785 (0.501)	0.270410*** (0.0033)	0.1619* (0.0593)
<b>Profitability</b>	1.412357*** (0.003)	-3.01285*** (0.000)	0.312108** (0.0379)	-2.1194*** (0.0000)
<b>Size</b>	0.210367*** (0.009)	-0.11084 (0.497)	0.063573* (0.0817)	-0.0122 (0.7213)
<b>IFF</b>	(omitted)	-0.01368 (0.934)	0.003948 (0.9446)	-0.0489 (0.3163)
<b>LIS</b>	-0.15872*** (0.006)	0.120288 (0.371)	-0.028727 (0.3793)	0.02401 (0.4686)
<b>SML</b>	-0.01343 (0.870)	-0.55625*** (0.004)	-0.0759 (0.1124)	-0.1728*** (0.0002)
<b>CAL</b>	0.158736 (0.166)	1.021253*** (0.002)	0.1631* (0.0831)	0.3242*** (0.0005)
<b>DFSL</b>	0.234635* (0.058)	-0.24554 (0.396)	0.0287 (0.5943)	-0.0509 (0.3520)
<b>SMCGDP</b>	0.356991*** (0.006)	0.098856 (0.603)	0.1382** (0.0142)	0.0402 (0.4734)
<b>DCGDP</b>	-0.16191** (0.045)	-0.18894** (0.012)	-0.0421 (0.2919)	-0.018** (0.012)
<b>Constant</b>	-1.2353** (0.011)	2.120165** (0.032)	-0.3070 (0.2436)	0.5258** (0.0357)
<b>F(11,48)</b>	3.67			
<b>Prob &gt; F</b>	0.008			
<b>Adjusted R-sq:</b>	0.2648	0.1996	0.5455	0.6127
<b>Wald chi2(11)</b>		100.99		
<b>P&gt;chi2</b>		0.0000		
<b>Prob (Fstatistic)</b>			0.0000	0.0000
<b>Hausman Test:</b>				
<b>chi2(11)</b>	99.98	4.61		
<b>Prob&gt;chi2</b>	0.0000	0.9488		
<b>No. Of observations</b>	539	539	539	539

Notes: This table reports fixed effects, random effects and pooled OLS regression outputs for the impact of financial liberalisation on the book and market measures of debt to equity ratios of large firms. Variables are as defined in the notes to table 7.6. Standard errors are robust to heteroscedasticity. P-values are in parentheses and \*\*\*, \*\*, \* indicate levels of significance at the 1%, 5% and 10% levels of significance.

**Table 7.11: Panel data regression results for large firms**

Variables	Random Effects Model			Pooled OLS Model		
	Td/Ta(book)	Td/Ta(market)	Std/Ta	Td/Ta(book)	Td/Ta(market)	Std/Ta
<b>Growth</b>	0.0076*** (0.000)	-0.0038 (0.253)	0.0041 (0.225)	0.0051*** (0.0033)	-0.0045*** (0.0035)	0.0008 (0.4753)
<b>Tangibility</b>	0.0996 (0.205)	0.1089 (0.137)	-0.0786 (0.087)*	0.136925*** (0.0001)	0.1732*** (0.000)	-0.0355** (0.0256)
<b>Profitability</b>	-0.3662*** (0.000)	-0.3146*** (0.000)	-0.3067*** (0.001)	-0.2884*** (0.0000)	-0.2696*** (0.0000)	-0.2192*** (0.000)
<b>Size</b>	0.0099 (0.826)	0.0245 (0.256)	-0.0335 (0.109)	0.021095 (0.1128)	0.0224* (0.0607)	0.0008 (0.9167)
<b>IFF</b>	0.0043 (0.911)	-0.0387 (0.216)	0.0248 (0.247)	0.035517 (0.2168)	-0.0305** (0.0255)	0.0107 (0.2767)
<b>LIS</b>	-0.0261* (0.097)	-0.0162 (0.379)	0.0131 (0.699)	-0.0071 (0.4788)	-0.0042 (0.7314)	0.0064 (0.3782)
<b>SML</b>	-0.0466** (0.028)	-0.1031*** (0.001)	-0.0423** (0.023)	-0.0379** (0.0131)	-0.0610*** (0.0003)	-0.0249** (0.0128)
<b>CAL</b>	0.1203*** (0.000)	0.1653*** (0.000)	0.0696* (0.094)	0.0669** (0.0247)	0.0932*** (0.0053)	0.0357* (0.0710)
<b>DFSL</b>	0.0357 (0.256)	0.0059 (0.881)	-0.0339 (0.482)	0.0060 (0.7115)	-0.0042 (0.8318)	-0.0080 (0.4976)
<b>SMCGDP</b>	0.0978*** (0.002)	0.0309 (0.644)	0.0483* (0.056)	0.0563*** (0.0012)	0.0157 (0.4441)	0.0205* (0.0992)
<b>DCGDP</b>	-0.0548*** (0.005)	-0.0192 (0.400)	-0.0095 (0.448)	-0.0164 (0.2937)	-0.0035 (0.7835)	-0.0061 (0.4234)
<b>Constant</b>	0.1679 (0.539)	0.0477 (0.695)	0.3407** (0.011)	-0.0608 (0.5818)	-0.0256 (0.7521)	0.0838 (0.1081)
<b>Adjusted R-sq:</b>	0.2355	0.1495	0.1861	0.7658	0.62818	0.5029
<b>Wald chi2(11)</b>	726.78	151.9	64.03			
<b>P&gt;chi2</b>	0.0000	0.0000	0.0000			
<b>Prob (Fstatistic)</b>				0.0000	0.0000	0.0000
<b>Hausman Test:</b>						
<b>chi2(11)</b>	6.64	5.67	6.52			
<b>Prob&gt;chi2</b>	0.8274	0.8944	0.9583			
<b>No. of observations</b>	539	539	539	539	539	539

Notes: This table reports fixed effects and pooled OLS regression outputs for the impact of financial liberalisation on the book and market value measures of total debt ratios of large firms. Variables are as defined in the notes to table 7.6. Standard errors are robust to heteroscedasticity. P-values are in parentheses and \*\*\*, \*\*, \* indicate levels of significance at the 1%, 5% and 10% levels of significance.

## 7.5 RESULTS AND PRESENTATION OF HYPOTHESES

This section discusses the results that have been reported for the fixed (within), random and pooled OLS models. The results are presented in terms of the formulated hypotheses. The null and alternative hypotheses are either confirmed or rejected by the empirical findings.

### 7.5.1 Results and presentation of hypothesis one

Hypothesis one is restated as follows:

**$H_o$  = Stock market liberalisation has no significant impact on the book and market values of leverage ratios of all sets of listed firms.**

**$H_a$  = Stock market liberalisation has a significant impact on the book and market values of leverage ratios of all sets of listed firms.**

According to Makina and Negash (2005a: 145), stock market liberalisation is associated with a significant decline in the cost of equity capital for most of the South African listed firms. If this is the case, then leverage ratios are expected to decline due to the subsequent increase in equity prices. The empirical relationship which has been tested is whether stock market liberalisation has a significant impact on firm leverage. The independent variables of interest are the *IFF*, *DFF* and *SML*. *IFF* is a dummy that represents internationally financed firms. It captures individual firm access to international equity markets. *DFF* is a dummy that represents domestically financed firms. Given the observation in figure 7.1, in section 7.2.4, financial liberalisation, in general, is associated with a general decline in the average value of the market value ratio of leverage. This observation needs to be assessed further while controlling for other factors in the robust regressions.

- **Regression results for all the firms**

Tables 7.6 and 7.7 report the regression results for the full sample of firms using the fixed (within) effects and pooled OLS models. Due to perfect collinearity, the dummy variable *IFF*, which represents firm participation in international equity markets, is dropped by the fixed (within) effects model. However, both the random effects and pooled OLS models report negative and insignificant coefficients for this variable. Furthermore, the *SML* dummy is interacted with both the *IFF* and *DFE* variables for all regressions, and the results are insignificant<sup>34</sup>. It appears that firms with access to international equity markets and domestically financed firms are not significantly affected by stock market liberalisation. Hence, there is no need to include interaction dummies in the regression output.

The impact of stock market liberalisation on leverage for the full sample reveals some important facts. Figure 7.1 showed that the average market value of the debt to equity ratio declined from 59 percent in the pre liberalisation period to 40 percent in the post liberalisation period. This observation is confirmed by the regression results. The *SML* variable is inversely correlated with the debt to equity ratios. The relationship is significant at the 5 percent level for the market value debt to equity ratio.

The pooled OLS model also reports a significant reduction in leverage at the 1 percent level. Again, a statistically significant negative association is reported for the market value of the total debt ratio. An increase of 1 percent in the *SML* variable is associated with a 6.3 percent reduction in the market value of the total debt ratio. The pooled OLS model reports a similar correlation for the market value of the total debt ratio. From these observations, the null hypothesis is rejected in favour of the alternative that stock market liberalisation is associated with a reduction in the market value of leverage. These findings corroborate favourably with Galego and Loayza (2000: 28), Bhaduri (2000: 413), Schmukler and Vesperoni (2006: 192) and Flavin and O'Connor

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<sup>34</sup> The *DFE* dummy is not reported in the regression output because it is insignificant for all the regressions.

(2010: 195) that stock market liberalisation is associated with a significant reduction in leverage for firms in emerging markets.

- **Regression results for small firms**

According to Figures 7.9 and 7.10 the average book and market value ratios for small firms reduce following financial liberalisation. Further analysis as reported in Tables 7.8 and 7.9 confirms this reduction but the associated coefficients for the book and market values of the debt to equity ratios are statistically insignificant. The pooled OLS model reports a significant negative association for the market value of the debt to equity ratio. The fixed effect model reports insignificant results for the total debt ratios, but the correlations are negative. The pooled OLS model documents some moderate evidence of a significant negative impact of stock market liberalisation on the total debt ratios for small firms.

Overall, there is a consistent negative correlation between stock market liberalisation and small firm leverage, but the significance of this impact is mildly supported. The null hypothesis cannot be rejected in favour of the alternative that stock market liberalisation is associated with a significant reduction in leverage for small firms. The only exception is the pooled OLS model which confirms the alternative hypothesis for the market value of the debt to equity ratio and both measures of the total debt ratios for small firms.

- **Regression results for large firms**

Figure 7.12 shows that the average market value of the debt to equity ratio declines by 18 percent over the period of financial reforms. This observation has been confirmed by the regression analysis. Furthermore, Tables 7.10 and 7.11 show that large firms are more responsive to the process of financial liberalisation than small firms. The coefficients for the market values of leverage are statistically significant at the 1 percent level. The coefficient for the book value of the total debt ratio is negative and significant at the 5 percent level. The correlation coefficient for the book value of the debt to equity ratio is negative and insignificant. Therefore, the book and market values of total

leverage and the market value of the debt to equity ratio confirm the alternative hypothesis that stock market liberalisation has a significant impact on leverage. These negative correlations are confirmed by the pooled OLS. The null hypothesis is accordingly rejected in favour of the alternative that stock market liberalisation has a significant impact on the market value of leverage for large firms.

These results compare favourably with Demirguc-Kunt and Maksimovic (1996: 341) who document a significant decrease in leverage ratios for large firms in developing countries. Similarly, Bhaduri (2000: 413) finds that financial liberalisation reduces the marginal propensity to debt, and the effect is more pronounced for larger firms. This evidence seems to imply that the opening up of the stock market causes foreign investors to prefer larger firms over their smaller counterparts.

### **7.5.2 Results and presentation of hypothesis two**

Hypothesis two is restated as follows:

***$H_o$  = The lifting of international sanctions has no significant impact on the book and market leverage ratios of all sets of listed firms.***

***$H_a$  = The lifting of international sanctions has a significant impact on the book and market leverage ratios of all sets of listed firms***

- **Regression results for all firms**

The *LIS* variable captures the impact of the lifting of international sanctions on leverage. It is associated with a significant reduction in the book value of the debt to equity ratio for all the firms in the analysis. As shown in Table 7.6, an increase of 1 percent in the *LIS* variable is associated with a 20.2 percent reduction in the book value of the debt to equity ratio. The relationship for the market value of the debt to equity ratio is insignificant. The pooled OLS model reports similar correlations but both measures of leverage are affected significantly. Table 7.7 reports a significant negative association

between the *LIS* variable and the book value of the total debt ratio. The coefficient is statistically significant at the 5 percent level for the book value of the debt to equity ratio. The same negative association is revealed for the market value of the total ratio. The coefficient is significant at the 1 percent level. Both the fixed effects and pooled OLS models have yielded similar correlations.

This outcome suggests that the lifting of international sanctions causes a reduction in leverage for the full sample. The negative correlation between the *LIS* variable and leverage is not surprising, due to the detection of a structural break in the cost of equity variable at the end of 1992 by Makina and Negash (2005b: 61). The lifting of international sanctions could have reduced the risk associated with the sanctions and hence lowered the required rate of return on equities. The reduction in leverage at this point indicates that besides direct legal barriers, economic and political impediments are significant constraints to firm access to equity. The null hypothesis is therefore rejected in favour of the alternative that the lifting of international sanctions has a significant impact on leverage for all firms.

- **Regression results for small firms**

The lifting of international sanctions has a negative impact on small firms' leverage. As seen in Tables 7.8 and 7.9, the coefficient of the *LIS* variable is significant at the 5 percent level for the book value debt to equity ratio and both measures of the total debt ratio. The coefficient for the market value of the debt to equity ratio is statistically insignificant. A similar relationship is reported by the pooled OLS model. The picture that is emerging out of this finding is that economic and political factors (particularly, the lifting of international sanctions) seem to have a stronger impact on leverage for small firms than direct legal barriers (particularly, the opening up of the stock market). Therefore, the null hypothesis is rejected in favour of the alternative that the lifting of international sanctions has a significant impact on small firm leverage.

- **Regression results for large firms**

The correlations reported in Tables 7.10 and 7.11 show mild support for the alternative hypothesis that the lifting of international sanctions has a significant impact on leverage for large firms. The only strong correlation reported is for the book value of the debt to equity ratio. The associated p-value is statistically significant at the 1 percent level. The book value of the total debt ratio is negatively correlated to the *LIS* variable at the 10 percent level of significance. All the correlations for the market measures of leverage are insignificant. This outcome leads to two conclusions. Firstly, large firms do not respond to economic and political barriers as much as small firms do. Secondly, large firms are less affected by economic and political constraints than they are to direct legal barriers, particularly with stock market liberalisation. The null hypothesis is therefore rejected in favour of the alternative hypothesis that the lifting of international sanctions has a significant impact on the book value measures of leverage for large firms. Nonetheless, the null hypothesis cannot be rejected for the market value measures of leverage.

### 7.5.3 Results and presentation of hypothesis three

Hypothesis three is restated as follows:

***H<sub>0</sub> = Exchange control relaxations have no significant impact on the book and market leverage ratios of all sets of listed firms.***

***H<sub>a</sub> = Exchange control relaxations have a significant impact on the book and market leverage ratios of all sets of listed firms.***

- **Regression results for all firms**

The results shown in Tables 7.6 and 7.7 indicate a direct relationship between exchange control relaxations and leverage for the full sample set. The variable of importance here is *CAL* which captures the effect of exchange control relaxations on



firm leverage. The results show that exchange control relaxations are associated with an increase in most measures of leverage for the full sample. The relationship is significant at the 10 percent level for the market value of the debt to equity ratio. The pooled OLS model reports significant positive correlations between the *CAL* dummy and leverage. The relationship is significant at the 5 percent level for both the book and market value of the debt to equity ratio. In terms of the total debt ratios, only the book value of total debt ratio is statistically significantly correlated to the exchange control relaxations. The coefficient is statistically significant at the 5 percent level.

This outcome may suggest that as exchange controls are relaxed, domestic firms respond by repatriating more investment funds abroad. These funds could be sourced from the local financial institutions. Given that debt is cheaper than equity, firms may issue debt to finance foreign investment.

Schmukler and Vesperoni (2006: 196) also document a positive but insignificant association between capital account liberalisation and leverage for a sample of firms in emerging market economies. The null hypothesis is accordingly rejected in favour of the alternative that exchange control relaxations are associated with an increase in the book and market values of the debt to equity ratio and the book value of the total debt ratio respectively. The null hypothesis is, on the other hand, not rejected for the market value of the total debt ratio.

- **Regression results for small firms**

Tables 7.8 and 7.9 show that exchange control relaxations are associated with an increase in leverage for small firms, but this relationship is statistically insignificant. The coefficient of the *CAL* variable is positive and statistically insignificant for all the measures of leverage. In contrast, the pooled OLS model reports significant positive coefficients for both measures of the debt to equity ratio. The same effect is documented for the book value of the total debt ratio. This contradiction could be as a result of the difference in the assumptions of both models as the pooled OLS fails to account for firm effects. Ozkan (2001: 186) argues that the presence of unobserved firm

specific effects leads to biased OLS estimation because of the possible correlation between the firm effects and the covariates. Based on the strength of the fixed (within) and random effects models, the null hypothesis cannot be rejected in favour of the alternative that exchange control relaxations are associated with a significant increase in the book and market value measures of leverage for small firms.

- **Regression results for large firms**

The effect of relaxing exchange controls is more pronounced for large firm leverage. According to Tables 7.10 and 7.11, the coefficients of the *CAL* variable are strongly significant for most of the measures of leverage except for the book value of the debt to equity ratio. The high levels of significance suggest that, compared to small firms, large firms benefit most from exchange control relaxations. This finding is plausible because large firms have the capacity to borrow more funds compared to their smaller counterparts (Eriotis, *et al.* 2007: 325). Therefore, as exchange controls are relaxed, large firms take advantage of their credit worthiness to borrow from the domestic banking sector, and even from abroad.

Given these observations, the null hypothesis is rejected in favour of the alternative that exchange control relaxations have a significant impact on leverage for large firms. On the other hand, the null hypothesis cannot be rejected for the book value of the debt to equity ratio.

#### **7.5.4 Results and presentation of hypothesis four**

Hypothesis four is restated as follows:

***H<sub>0</sub> = Domestic financial sector liberalisation has no significant impact on the book and market leverage ratios of all sets of listed firms.***

***H<sub>a</sub> = Domestic financial sector liberalisation has a significant impact on the book and market leverage ratios of all sets of listed firms***

- **Regression results for all firms**

Domestic financial sector liberalisation is captured by the lowering of reserve requirements that were effected in the early 1990s. An examination of the correlations reported in Tables 7.6 and 7.7 reveal that the lowering of reserve requirements has no significant impact on leverage of all the firms, except for the book value of the debt to equity ratio. A positive and significant relationship is observed at the 10 percent level of significance. From this, it appears that the lowering of reserve requirements has a mildly significant impact on firm leverage for the full sample. The null hypothesis is therefore, not rejected for the market value ratio of the debt to equity ratio and both measures of the total debt ratio results. The alternative hypothesis is, nevertheless, accepted for the book value of the debt to equity ratio results.

- **Regression results for small firms**

Tables 7.8 and 7.9 show that domestic financial sector liberalisation is associated with an increase in leverage for small firms. The only exception is the market value of the debt to equity ratio which is negatively correlated to the *DFSL* variable. The associated coefficient is mildly significant at the 10 percent level. However, all correlations for the small firm sample are statistically insignificant. The same relationship is observed for the pooled OLS results. The lack of significance in these correlations shows that small firms are not significantly affected by the lowering of reserve requirements. On balance, the null hypothesis cannot be rejected in favour of the alternative that domestic financial sector liberalisation has a significant impact on the book and market value measures of leverage for small firms.

- **Regression results for large firms**

The results reported for large firms are similar to those reported for the firms in the full sample set. The correlations reported in Tables 7.10 and 7.11 reveal that the lowering of reserve requirements has no significant impact on leverage for large firms. The only exception is the relationship between the *DFSL* variable and the book value of the debt

to equity ratio. The coefficient of the *DFSL* variable is statistically significant at the 10 percent level. Overall, it can be inferred that there is mild support for the alternative hypothesis that domestic financial sector liberalisation has a significant impact on large firm leverage. The null hypothesis is, however, accepted that domestic financial sector liberalisation has no significant impact on the market value of the debt to equity ratio and both measures of the total debt ratio.

### **7.5.5 Results and presentation of hypothesis five**

Hypothesis five is restated as follows:

***H<sub>0</sub> = Financial liberalisation has no significant impact on the debt maturity structure of all sets of firms***

***H<sub>a</sub> = Financial liberalisation has a significant impact on the debt maturity structure of all sets of firms***

The results of the debt maturity structure for small firms yield insignificant correlations. This is not surprising because inspection of Figure 7.10 shows that there is no significant shift in the average debt maturity structure of small firms. However, examination of the results generated by the pooled OLS model (which ignores firm specific effects) suggests that the debt maturity structures of small firms respond significantly to the lifting of international sanctions, stock market liberalisation, exchange control relaxations and domestic financial sector liberalisation. On the strength of the fixed and random effects models (which control for firm effects), the null hypothesis is supported that financial liberalisation has no significant impact on the debt maturity structures of small firms.

An examination of the correlations reported for the full sample set and the large firms provides a different picture. For the average firm, stock market liberalisation is associated with a significant reduction in the short term debt ratio. The coefficient is significant at the 10 percent level. For large firms, similar results are observed. Table 7.11 reports that stock market liberalisation is associated with a reduction in the short

term debt ratio. The coefficient is statistically significant at the 5 percent level. This finding suggests that the debt maturity structure of the average firm and large firms increases following stock market liberalisation. Based on these observations, the null hypothesis is rejected in favour of the alternative that stock market liberalisation has a significant impact on the debt maturity structure of both the average firm and large firms.

The coefficients of the *CAL* and *DFSL* dummies are insignificant for the average firm. The null hypothesis is therefore accepted that capital account and domestic financial sector liberalisation have no significant impact on the debt maturity structure of the small, and the average firm. However, the coefficient of the *CAL* variable is positive and significant at the 10 percent level for the set of large firms. From this, it appears that exchange control relaxations reduce the debt maturity structure of large firms, although the effect is mildly supported.

#### 7.5.6 Results and presentation of hypothesis six

Hypothesis six is restated as follows:

***H<sub>0</sub> = Financial liberalisation has no significant impact on the importance of internal financing.***

***H<sub>a</sub> = Financial liberalisation has a significant impact on the importance of internal financing.***

Figure 7.2 provides an indication that the average retained earnings figures for all the firms increase by a reasonable amount, suggesting that financial liberalisation is associated with higher retentions by domestic firms. However, the correlations for the importance of retained earnings in all the regressions are insignificant. Hence, the results have not been included in the regression output. Accordingly, the null hypothesis cannot be rejected in favour of the alternative that financial liberalisation has a significant impact on retentions for all sets of firms.

### 7.5.7 Results and presentation of hypothesis seven

Hypothesis seven is restated as follows:

**$H_0$  = Stock and banking sector development has no significant impact on book and market value leverage for all sets of firms.**

**$H_a$  = Stock and banking sector development has a significant impact on book and market value leverage for all sets of firms.**

It has been hypothesised that the development of the stock market leads to a substitution of equity for debt, and the size of the banking sector is associated with an increase in the debt ratios for all sets of firms. The general finding from all the regressions is that there is a significant positive correlation between stock market development and leverage and a strong negative association between the size of the banking sector and firm leverage. The possible explanation for the first observation is that stock market development promotes good corporate governance and transparency rules thereby improving the credibility of listed firms. This improved outlook provides creditors with the incentive to lend more money to listed firms (Dermiguc-Kunt & Maksimovic, 1996: 361).

The second observation that banking sector development exerts a negative influence on leverage is surprising. Hence, more empirical work needs to be conducted to assess the underlying impetus behind the inverse correlation between banking sector development and leverage. However, it could be argued that the momentum behind the growth in credit extensions to the private sector shows that firms are capable of taking on more debt. As the signalling theory goes, the market value of equity increases with an issue of debt.

- **Regression results for all firms**

Tables 7.6 and 7.7 reveal consistent significant positive correlations between stock market development and all the measures of leverage. An increase of 1 percent in the stock market development variable leads to a 20.58 and a 6.17 percent increase in the book values of the debt to equity ratio and the total debt ratio respectively. The banking sector development variable is negatively correlated to all the measures of leverage.

The size of the stock market is positively associated with the short term debt ratio of all firms. This relationship indicates that, as the stock market develops, firms increase the maturity structure of their debt. This relationship is statistically significant at the 10 percent level. There are no significant effects of the size of the banking sector on the debt maturity structure of all firms. This lack of significance in this relationship shows that the development of the banking sector does not cause firms to borrow on a longer term basis. This finding is a stark contrast to Galego and Loayza (2000: 28) who observe a positive association between banking sector development and debt maturity structure for Chilean data.

- **Regression results for small firms**

The stock market development variable shown in Tables 7.8 and 7.9 has a positive sign. The coefficient is statistically significant at the 5 percent level for the book value of the debt to equity ratio. The relationship between the size of the banking sector and the book value of the debt to equity ratio is negative but mildly significant at the 10 percent level. Insignificant correlations are found between banking sector development and the book value of the debt to equity ratio and both measures of the total debt ratio.

The impact of stock and banking sector development on the debt maturity structure of small firms is insignificant. The pooled OLS model reports a positive and significant association between stock market development and the book and market value measures of the debt to equity ratio. A similar strong relationship is reported for the book value of the total debt ratio. A negative relationship is revealed for the association between banking sector development and most measures of leverage. The extent of the

significance is strong for the book value of the debt to equity ratio. The only exception is for the market value measures of leverage which are positive and insignificant.

Overall, the null hypothesis is rejected in favour of the alternative that stock and banking sector development has a significant impact on the book value measure of the debt to equity ratio and the book and market value measures of the total debt ratio. These observations are consistent with the arguments postulated by Demirguc-Kunt and Maksimovic (1998: 2107) that differences in capital structures can be attributed to the development of stock markets and banks.

- **Regression results for large firms**

According to Tables 7.10 and 7.11, the stock market development variable is significantly positively associated with the book values of the debt to equity and the book value of the total debt ratios. The coefficients are statistically significant at the 1 percent level. This implies that, as the stock market develops, large firms access more debt relative to equity. Again, this observation is attributable to the increased credibility of firms associated with the stringent transparency and corporate governance rules. Hence, the creditworthiness of large listed firms is enhanced.

A strong and negative relationship is reported between the banking sector development variable and the market value of the debt to equity ratio. The relationship is significant at the 5 percent level. Furthermore, a strong negative coefficient is observed for the book value of the total debt ratio. The associated p-value is significant at the 1 percent level. An insignificant association is seen for the market value of the total debt ratio. Given these observations, the alternative hypothesis is accepted that stock market development has a significant impact on the book value leverage ratios for large firms. The alternative hypothesis is also accepted for the impact of banking sector development on both measures of the debt to equity ratio and the book value of the total debt ratio.



A weak positive relationship is found between stock market development and the debt maturity structure. The associated p-value is statistically significant at the 10 percent level. This means that as the stock market develops, large firms reduce the maturity structure of their debt, though not very significantly. The banking sector development variable is insignificantly related to the debt maturity structure of large firms. Given these observations, the alternative hypothesis is mildly supported for the impact of stock market development on debt maturity structure of large firms, and the null hypothesis cannot be rejected for the impact of banking sector development on the large firm debt maturity structure.

The evidence reviewed thus far indicates that the development of the stock and banking sectors have a significant impact on large firm leverage. However, the debt maturity structure of large firms is mildly affected by the size of the stock and the banking sectors.

#### **7.5.8 Results and presentation of hypothesis eight**

Hypothesis eight is restated as follows:

**$H_o =$  *There is no significant structural shift in the regression parameters for the period of analysis***

**$H_a =$  *There is a significant structural shift in the regression parameters for the period of analysis***

The null hypothesis established in chapter four is based on the equality of coefficients across the two regimes. The dummy variable estimation technique has been used to test for structural shifts in each of the regression parameters.

Table 7.12 shows the results of the impact of various aspects of financial liberalisation on the stability of firm specific determinants of the debt to equity ratio. The output shows that financial liberalisation, particularly the lifting of international sanctions and stock

market liberalisation, have a significant impact on the stability of the firm profitability parameter. The coefficients for both measures are significant at the 1 percent level. This result shows that the lifting of international sanctions causes profitability to increase the book value of the debt to equity ratio and to reduce the market value of the debt to equity ratio. Stock market liberalisation causes the profitability variable to reduce the book value of the debt to equity ratio and to increase the market value of the debt to equity ratio.

Exchange control relaxations have a mild effect on the stability of the profitability coefficient for the book value of the debt to equity regression. The growth parameters are also affected by stock market liberalisation and exchange control relaxations. The effect is more pronounced for the exchange control relaxation dummy. The interaction between the exchange control relaxation dummy and growth has a significant positive impact on the book value of the debt to equity ratio. The associated p-value is statistically significant at the 1 percent level. It can thus be concluded that the growth variable changes significantly with stock market liberalisation and exchange control relaxations. This relationship is only significant for the book value of the debt to equity ratio regression.

Stock market liberalisation affects the stability of the non-debt tax shield parameter. The coefficient of the interaction is significant at the 5 percent level. The lifting of international sanctions has a mild effect on the stability of the non-debt tax shield coefficient for the market value of the debt to equity regression. This relationship is significant at the 10 percent level. Nonetheless, for the book value relationship, the tax variables seem to be significantly affected by the lifting of international sanctions and stock market liberalisation. The relationship is significant at the 1 percent level.

In conclusion, there is strong evidence that the lifting of international sanctions and stock market liberalisation have a significant impact on the stability of the regression parameters. Particularly, profitability, growth and taxes are the most affected. There is mild support for the impact of stock market liberalisation on the stability of the non-debt tax shield variables. Overall, the null hypothesis is rejected in favour of the alternative

that the regression coefficients are affected significantly by financial liberalisation. Predominantly, the profitability coefficients in the book and market value of the debt to equity ratio relationship are the most affected.

**Table 7.12 Interactive dummy regression outputs for the debt to equity ratios**

Variable	TD/E(B)		TD/E(M)	
	Coefficient	P-value	Coefficient	P-value
LIS*Profitability	1.732234	0.0000***	-2.366159	0.0066***
SML* Profitability	-1.803100	0.0000***	3.079457	0.0000***
CAL* Profitability	-0.504395	0.0391**	-0.395767	0.2656
DFSL* Profitability	0.147730	0.7985	-0.886476	0.5201
LIS*Growth	-0.006361	0.7416	-0.066874	0.0650*
SML*Growth	-0.035193	0.0798*	0.018390	0.5269
CAL*Growth	0.062777	0.0001***	0.016561	0.4065
DFSL*Growth	-0.003060	0.9178	0.041193	0.4192
LIS*Tangibility	-0.223743	0.3699	-0.611268	0.1623
SML* Tangibility	-0.235481	0.1987	0.226831	0.4123
CAL* Tangibility	0.121860	0.4245	0.244573	0.2750
DFSL* Tangibility	0.592699	0.1209	0.509160	0.4481
LIS*Ndts	-0.260575	0.9018	10.38302	0.0553*
SML* Ndts	4.641944	0.0163**	-7.581566	0.0336*
CAL* Ndts	-2.097623	0.1129	-1.310293	0.5697
DFSL* Ndts	-3.798348	0.2251	-6.012290	0.4720
LIS*Tax	-0.356939	0.0082***	0.213693	0.5121
SML* Tax	0.256402	0.0062***	-0.143685	0.4626
CAL* Tax	0.034604	0.4288	0.083250	0.3414
DFSL* Tax	0.125458	0.5253	-0.338794	0.5392
LIS*Dividends	-0.183876	0.1481	0.102625	0.7076
SML* Dividends	0.056614	0.1333	-0.049338	0.5062
CAL* Dividends	-0.010997	0.6191	-0.023305	0.7117
DFSL* Dividends	0.247384	0.3087	-0.085803	0.8706
LIS*Size	5.53E-05	0.9990	-0.049393	0.6523
DUM_95* Size	-0.033787	0.3696	0.129742	0.1303
CAL* Size	0.046523	0.1821	0.018546	0.7883
DFSL* Size	0.004217	0.9519	0.060690	0.7072
Adjusted R-squared	<b>0.535083</b>		<b>0.510110</b>	
S.E. of regression	<b>0.485307</b>		<b>1.460137</b>	
F-statistic	<b>37.19651</b>		<b>33.74811</b>	
Prob(F-statistic)	<b>0.000000</b>		<b>0.000000</b>	
Durbin-Watson stat	<b>2.188057</b>		<b>2.111824</b>	

Notes: This table reports panel least squares regression results for the interaction between financial liberalisation dummies and firm specific determinants of capital structure. The dependent variables are TD/E (Book) and TD/E (Market). Only interactive results are reported. \*, \*\*, \*\*\* indicate levels of significance at the 10%, 5% and 1% respectively.

Table 7.13 shows the results of the impact of various aspects of financial liberalisation on firm specific determinants of the book and market values of the total debt ratio and

the short term debt ratio. It appears that the lifting of international sanctions has no significant impact on the stability of the profitability variables. However, stock market liberalisation causes a structural break in the profitability parameter. The relationship is significant at the 5 and 1 percent levels for the book and market value ratio regressions respectively. The effect of the firm growth prospects on the book and market value ratios does not change significantly with time. However, the stability of the asset tangibility variable breaks with the lifting of international sanctions and domestic financial sector liberalisation. The interaction coefficient is statistically significant at the 5 percent level for both regressions.

The tax variable is not stable with the interaction of stock market liberalisation. The coefficient for the interaction variable is statistically significant at the 5 percent level for only the market value ratio regression. Exchange control relaxations cause a significant structural break in the tax variable. The relationship is statistically significant at the 1 percent level for the market value regression. Domestic financial sector liberalisation has mild effects on the stability of the dividend payout parameter. This moderate effect is indicated by the p-value of 0.09. The stability of the size variable is affected significantly by exchange control relaxations. The associated coefficient is significant at the 5 percent level.

In terms of the debt maturity structure, the stability of the profitability coefficients is affected with stock market liberalisation. The change is significant at the 1 percent level. In addition, there is mild support that exchange control relaxations affect the profitability and non-debt tax shield parameters. Stock market liberalisation and exchange control relaxations affect the stability of the tangibility and size estimates. The associated coefficient is significant at the 5 percent level.

In sum, it appears that the stability of the profitability, tangibility and tax variables is affected significantly by financial liberalisation, particularly stock market, capital account and domestic financial sector liberalisation. There is no evidence to suggest that the impact of growth on the total debt ratio changes significantly over the period of financial liberalisation. In terms of the short term debt regression, the most prominent

observation is that the profitability estimate changes significantly with stock market liberalisation. Overall, the null hypothesis is rejected in favour of the alternative that regression parameters are not stable over the period of analysis.

**Table 7.13 Interactive dummy regression outputs for the total debt and short term debt ratio**

Variable	TD/TA(B)		TD/TA(M)		STD/TA	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
LIS*Profitability	0.022458	0.8503	-0.030650	0.7976	-0.157577	0.1213
SML* Profitability	0.209886	0.0358**	0.307054	0.0033***	0.402314	0.0000***
CAL* Profitability	-0.108544	0.1393	-0.170394	0.0191**	-0.093754	0.0802*
DFSL* Profitability	-0.094510	0.5446	-0.046287	0.7730	-0.090558	0.5117
LIS*Growth	-0.001394	0.7286	-0.005217	0.2095	-0.000898	0.8505
SML*Growth	-0.003346	0.5054	-0.001319	0.7920	0.001513	0.7227
CAL*Growth	0.002068	0.5883	0.003147	0.3976	-0.001343	0.6595
DFSL*Growth	0.005538	0.3588	0.005990	0.3155	-0.000628	0.9317
LIS*Tangibility	-0.147181	0.0249**	-0.174406	0.0228**	-0.022049	0.6429
SML* Tangibility	0.026429	0.5926	0.024422	0.6659	0.064832	0.0498**
CAL* Tangibility	-0.010322	0.8200	-0.066845	0.1922	-0.016631	0.5573
DFSL* Tangibility	0.226763	0.0188**	0.349018	0.0024***	0.039148	0.6081
LIS*Ndts	0.235909	0.6758	0.363889	0.5936	-0.405290	0.3577
SML* Ndts	0.252245	0.6267	0.228310	0.6824	0.033619	0.9194
CAL* Ndts	-0.252552	0.5108	-0.209186	0.6176	-0.431047	0.0641*
DFSL* Ndts	-0.767371	0.3354	-1.206677	0.2408	-0.044415	0.9488
LIS*Tax	-0.028618	0.4560	-0.066355	0.1652	0.027283	0.3194
SML* Tax	-0.018951	0.4848	-0.075455	0.0246**	-0.018968	0.3537
CAL* Tax	0.014119	0.2703	0.069021	0.0000***	0.006384	0.5031
DFSL* Tax	0.068591	0.2389	0.088524	0.2521	-0.021947	0.5755
LIS*Dividends	0.051342	0.1205	0.077342	0.0759	0.002911	0.9128
SML* Dividends	-0.009236	0.4016	-0.007477	0.4994	-0.002194	0.7734
CAL* Dividends	0.005825	0.4756	0.007301	0.4053	0.003706	0.4661
DFSL* Dividends	-0.108090	0.0889*	-0.157053	0.0580*	-0.016079	0.7521
LIS*Size	0.000208	0.9877	0.002538	0.8763	-0.012308	0.2525
DUM_95* Size	-0.003092	0.7880	-0.000703	0.9582	0.001258	0.8847
CAL* Size	0.028763	0.0142**	0.019945	0.1433	0.019669	0.0143**
DFSL* Size	0.016816	0.3461	-0.004948	0.8281	0.023162	0.1386
Adjusted R-squared	<b>0.771457</b>		<b>0.703376</b>		<b>0.536124</b>	
S.E. of regression	<b>0.080003</b>		<b>0.106998</b>		<b>0.066923</b>	
F-statistic	<b>107.1606</b>		<b>75.57640</b>		<b>37.34826</b>	
Prob(F-statistic)	<b>0.000000</b>		<b>0.000000</b>		<b>0.000000</b>	
Durbin-Watson stat	<b>2.091209</b>		<b>2.197382</b>		<b>2.157117</b>	

Notes: This table reports panel least squares regression results for the interaction between financial liberalisation dummies and firm specific determinants of capital structure. The dependent variables are TD/TA (Book) and TD/TA (Market). Only interactive results are reported. \*, \*\*, \*\*\* indicate levels of significance at the 10%, 5% and 1% levels respectively.

### 7.5.9 Robustness checks

The results estimated by the static model could be biased due to the possibility of endogeneity in the explanatory variables. Endogeneity occurs when the explanatory variables are correlated with the error term. This correlation may occur as a result of the following: reverse causation in the regression equation, omitted variables or some measurement error. Ozkan (2001: 186) demonstrates that the shocks affecting firm financing behaviour may also likely affect the market value of equity. The subsequent change in the market value of equity could affect some regressors such as the market to book value of equity. Schumkler and Vesperoni (2006: 200) advise that regressors with cross-firm variation may also cause endogeneity, because the macro variables are likely to be exogenous in the firm level analysis.

To resolve this potential problem, the instrumental variable technique is used to control for endogeneity biases in the reported results. The lagged explanatory variables are used for control and continuous variables. The object here is to use variables that are uncorrelated with their contemporaneous error terms and at the same time, correlated with their contemporaneous values. An examination of the instrumental variable regression results reported in Table 7.14 indicates that the previous results reported in section 7.3.1 are robust to the endogeneity problem. Bekaert *et al.* (2005: 3), Mitton (2006: 642), Schumkler and Vesperoni (2006: 200) and Flavin and O'Connor (2010: 202) control for potential endogeneity in their analyses. They all conclude that controlling for endogeneity does not affect the causal relationships in their estimations. These observations provide a reasonable basis to conclude that the results estimated using fixed and random effects models, are robust to the endogeneity problem.

Specifically, individual firm access to international equity markets is an insignificant determinant of firm leverage. International sanctions have a negative impact on firm leverage. Stock market liberalisation reduces all the measures of leverage and increases the debt maturity structure of firms. Exchange control relaxations are associated with higher leverage and the impact of domestic financial sector liberalisation on firm leverage is mildly supported. The development of the stock market

causes firms to access more debt, and the size of the banking sector is inversely related to all measures of leverage.

It has been argued that the fixed (within) effects and random effects GLS estimators may be inconsistent and biased in a dynamic panel data model (Antoniou, *et al.* 2006: 175), particularly where  $N$  is large and  $T$  is fixed. Furthermore, the instrumental variable technique does not take into account all the available moment conditions. Given these arguments, the Arellano and Bond (1991: 277) two-step GMM procedure is used to resolve this problem. The two-step procedure is more efficient than the one-step estimation model especially when heteroscedasticity is present in a large panel spanning over a long period of time. The Sargan test of overidentifying restrictions is satisfied. Tests for lack of first order autocorrelation are not satisfied because transformation induces first order serial correlation in the first differenced residuals. This presence of first order autocorrelation is expected. However, tests for lack of second order autocorrelation are satisfied for all the measures of leverage.

The results are reported in Table 7.15. It appears that the correlations reported by the dynamic model are similar to those generated by the fixed (within) effects GLS, random effects GLS and the instrumental variable estimations. However, the GMM estimation technique produces stronger correlations, which are mostly significant at all conventional levels. Again, it is observed that the lifting of international sanctions and stock market liberalisation are associated with a reduction in leverage. Capital account liberalisation causes firms to access more debt and there is mild support for domestic financial sector liberalisation. Stock market liberalisation provides avenues for firms to increase their debt maturity structure. The size of the stock market is positively associated with leverage and banking sector development is negatively correlated to leverage. From these analyses, it can be concluded that stronger estimation techniques confirm the correlations reported by the static panel and instrumental variable techniques<sup>35</sup>.

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<sup>35</sup> To save on space, only instrumental variable and GMM estimates are reported for the full sample set. The results for the small and large firms are estimated separately and similar correlations are observed.



**Table 7.14: Instrumental variable results**

Variables	TDE (Book)		TDE (Market)		TDTA (Book)		TDTA (Market)		STDTA	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
<b>Growth</b>	0.0059	0.4530	-0.0874***	0.0000	0.0018	0.5510	-0.0270***	0.0000	0.0008	0.7630
<b>Tangibility</b>	0.3164***	0.0000	0.1643**	0.0230	0.1995***	0.0000	0.1519***	0.0000	-0.0203	0.3570
<b>Profitability</b>	-0.6078***	0.0000	-0.6388***	0.0000	-0.2370***	0.0000	-0.2125***	0.0000	-0.0886**	0.0270
<b>Size</b>	-0.0282	0.2460	-0.0346	0.1620	-0.0053	0.6060	-0.0121	0.2960	-0.0303***	0.0000
<b>IFF</b>	0.0128	0.8270	0.0026	0.9650	-0.0014	0.9570	-0.0132	0.6310	0.0218	0.1880
<b>LIS</b>	-0.0543	0.2150	-0.0385	0.4070	-0.0237	0.1580	-0.0297	0.1690	0.0074	0.6250
<b>SML</b>	-0.0612	0.1890	-0.1290***	0.0090	-0.0276	0.1220	-0.0504**	0.0280	-0.0373**	0.0200
<b>CAL</b>	0.2139**	0.0220	0.2969***	0.0030	0.0785**	0.0290	0.0720	0.1190	0.0655**	0.0420
<b>DFSL</b>	0.0061	0.9220	-0.0030	0.9640	0.0060	0.8000	-0.0087	0.7760	-0.0494**	0.0210
<b>SMCGDP</b>	0.2009***	0.0060	0.1558**	0.0460	0.0613**	0.0300	0.0614*	0.0920	0.0372	0.1430
<b>DCGDP</b>	-1.4203	0.0020	-1.2686***	0.0090	-0.4682***	0.0080	-0.2200	0.3320	-0.0703	0.6570
<b>Constant</b>	0.7249***	0.0000	0.9339***	0.0000	0.2431***	0.0000	0.3044***	0.0000	0.2995***	0.0000
<b>R-Squared</b>	0.10		0.25		0.13		0.16		0.14	
<b>Wald chi2(11)</b>	57.04		43.86		18.06		142.76		43.23	
<b>Prob &gt; chi2</b>	0.0000		0.0000		0.0000		0.0000		0.0000	
<b>No. of Observations</b>	912		912		912		912		912	

Notes: This table reports instrumental variable results for the impact of financial liberalisation on capital structure. The instruments used are lagged values of the explanatory variables. The variables are as defined in the notes to Table 7.6. Standard errors are robust to heteroscedasticity. \*\*\*, \*\*, \* indicate the levels of significance at the 1%, 5% and 10% levels respectively.



**Table 7.15: Arellano-Bond two-step GMM results**

Variables	TDE (Book)		TDE (Market)		TDTA (Book)		TDTA (Market)		STDTA	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Lagged -1 (Dep Var)	0.50306***	0.0000	0.46767***	0.0000	0.58584***	0.0000	0.30115***	0.0000	0.39241***	0.0000
Growth	0.00533	0.3110	-0.05909***	0.0000	0.00571**	0.0170	-0.02232***	0.0000	-0.00160	0.2230
Tangibility	0.29046***	0.0010	0.32786***	0.0000	0.15771***	0.0000	0.14479***	0.0000	-0.07209***	0.0040
Profitability	-0.41802***	0.0000	-0.56727***	0.0000	-0.24233***	0.0000	-0.18578***	0.0000	-0.02479	0.1750
Size	0.27427***	0.0000	0.33572***	0.0000	0.12894***	0.0000	0.10893***	0.0000	0.04918***	0.0020
LIS	-0.03565**	0.0270	-0.01586	0.3500	-0.00083	0.9010	-0.00631	0.3810	0.01226**	0.0230
SML	-0.08927***	0.0000	-0.13017***	0.0000	-0.04353***	0.0000	-0.05946***	0.0000	-0.03959***	0.0000
CAL	0.22624	0.0000	0.28529***	0.0000	0.09766***	0.0000	0.09335***	0.0000	0.04243***	0.0000
DFSL	-0.01177	0.6090	-0.04247*	0.0930	-0.01505	0.1410	-0.04514***	0.0000	-0.04569***	0.0000
SMCGDP	0.16517***	0.0000	0.03387	0.2800	0.01544	0.1820	0.01320	0.3100	0.03394***	0.0000
DCGDP	-0.11602***	0.0000	-0.09002***	0.0000	-0.03677***	0.0000	-0.01413**	0.0280	-0.00167	0.7020
Constant	-1.22997***	0.0000	-1.43638***	0.0000	-0.59685***	0.0000	-0.42841***	0.0000	-0.19704**	0.0160
Wald (Joint)	0.0000		0.0000		0.0000		0.0000		0.0000	
Sargan	49.32		62.97		43.99		64.21		56.75	
Prob > chi2	0.4201		0.720		0.6376		0.1011		0.1811	
Correlation 1	0.0004		0.0003		0.0000		0.0390		0.0337	
Correlation 2	0.1547		0.1468		0.170		0.1565		0.4766	
No. of Observations	801		801		801		801		801	

Notes: This table reports Arellano-Bond two-step GMM results for the impact of financial liberalisation on capital structure. Results are robust to panel-specific heteroscedasticity and autocorrelation. The variables are as defined in the notes to Table 7.6 \*\*\*, \*\*, \* indicate the levels of significance at the 1%, 5% and 10% levels respectively.

### **7.5.10 Summary of the effects of financial liberalisation on capital structure**

The empirical analysis of the contrasting effects of financial liberalisation on firm capital structures has revealed several important facts. The main findings indicate that stock market liberalisation has a significant negative impact on both the book and market value measures of leverage for all firms. The impact is more pronounced for larger firms.

International sanctions are associated with a significant reduction in both the book and market value measures of leverage for all sets of firms. The impact is more pronounced for larger firms. Exchange control relaxations are associated with an increase in both the book and market value measures of leverage. The impact is more pronounced for large firms.

There is moderate support for the effects of domestic financial sector liberalisation on firm leverage. The significant correlations observed suggest that the lowering of reserve requirements is associated with an increase in leverage. Stock market development causes all sets of firms to increase both of the measures of leverage and the size of the banking sector is surprisingly negatively associated with both the book and market value measures of leverage.

Firm access to international equity markets has no significant impact on the choice of capital structure. Stock market liberalisation is associated with an increase in the maturity structure of debt for all sets of firms. The importance of retained earnings is not significantly affected by all variables capturing financial liberalisation.

The next section employs the Difference and System GMM models to examine two aspects of the dynamics of firm leverage. Firstly, firm specific determinants of capital structure are analysed. Secondly, the results of the long run target adjustment model are assessed for two dynamically different periods.

## 7.6 FIRM SPECIFIC DETERMINANTS OF LEVERAGE

This section discusses the seven determinants of leverage and their correlations with firm leverage for the periods prior to and after financial liberalisation.

To assess the determinants of capital structure in two dramatically different regimes, the sample is split into two distinct time periods (pre liberalisation, and post liberalisation). GMM estimates are used to model the partial adjustment process of firms operating pre and post financial liberalisation. In the process, the potential determinants of capital structure are determined in tandem with the nature of adjustment. Firm specific effects are controlled for by estimating the model in first differences and estimating level and differenced equations simultaneously using the System GMM estimation technique.

### 7.6.1 Results for the dynamic panel data specification tests

The Wald test for joint significance for all regressions is satisfied at the 1 percent level of significance. The Wald test for the significance of the time effects is significant for all post liberalisation results. The time specific effects for the pre liberalisation period are mostly insignificant. The significance of the time dummies for the post liberalisation period suggests that aggregate factors have a significant influence on firm financing behaviour.

The Sargan test of overidentifying restrictions is valid for all regressions with the exception of the pre liberalisation results for the market value debt to equity ratio. The associated p-value is 0.0146 and 0.0073 for the Difference and System GMM models respectively. This suggests that the instruments used for the lagged variables are invalid. The tests for lack of first order serial correlation are not satisfied for the post liberalisation market debt to equity ratio regression, the total debt regressions and the short term debt ratio regression. This is expected because according to Ozkan (2001: 196) transformation induces first order serial correlation in the first differenced residuals. The GMM estimators are consistent based on the assumption that  $E(\mu_{i,t}, \mu_{i,t-2})$  are uncorrelated, hence second order serial correlation should not be

present. As demonstrated in Arellano and Bond (1991: 279), the efficiency of the GMM estimation technique relies heavily on the absence of second order correlation. Second order correlation is absent in all the reported results, suggesting that the models used are correctly specified.

Given these observations, it may not be appropriate to report on the effects of firm specific characteristics on the market value of the debt to equity ratio for the pre liberalisation period. Nevertheless, all the other results are valid and the target adjustment model of capital structure can thus be interpreted accordingly.

### **7.6.2 The book value of the debt to equity ratio (pre and post liberalisation)**

Table 7.17 reports the GMM estimates for capital structure determinants for the book value of the debt to equity ratio. The results are presented for the pre and post liberalisation periods.

**Table 7.17: GMM estimates of target capital structure (Book debt to equity)**

Variable	Pre liberalisation		Post liberalisation	
	DIFF GMM Coefficient	SYS GMM Coefficient	DIFF GMM Coefficient	SYS GMM Coefficient
$TD/E(B)_{i,t-1}$	0.4509***	0.6096***	0.14765***	0.1343***
Growth	0.0049	0.0251	0.17456***	0.2079***
Tangibility	0.2134	0.5360	1.62173***	1.3956***
Ndts	-3.6717***	-4.2821*	-2.90957***	-2.8801***
Profitability	1.4052***	1.6005***	0.37083***	0.6054***
Size	0.7831***	0.6595***	0.75315***	0.7396***
Taxes	0.0525***	0.0168	0.05324***	0.0602***
Dividends	5.65E-07	-0.0234**	0.01781***	0.0194***
<b>Wald (Joint)</b>				
Prob>chi2	0.0000	0.0000	0.0000	0.0000
<b>Wald</b>	0.3710	0.8790	0.0000	0.0000
<b>(Dummy)</b>				
<b>Sargan</b>				
Prob>chi2	0.4018	0.8175	0.75	0.2827
Correlation 1	0.3995	0.3881	0.1029	0.0898
Correlation 2	0.1809	0.1929	0.1146	0.1006

Notes: This table reports the two-step Arellano-Bond/Bover dynamic panel results for the book value measures of total debt to equity ratio. Results are robust to panel-specific heteroscedasticity and autocorrelation. Results including the lagged coefficients are reported for the pre and post liberalisation periods. \*, \*\*, \*\*\* indicate significance levels at the 10%, 5% and 1% respectively.

- **Pre liberalisation results**

### ***Non-debt tax shields***

The coefficient for the non-debt tax shield variable is negative and significant at the 10 percent level for the pre liberalisation regime. This observation is in line with the prediction of DeAngelo and Masulis (1980: 3) that firms with higher non-debt tax shields are less likely to borrow more. These results confirm the findings of Bennet and Donnelly (1993: 54) for firms in the United Kingdom, De Miguel and Pindado (2001: 77) for firms in Spain and Ngugi (2008: 620) for firms in Kenya.

### ***Profitability***

Contrary to the prediction of Myers and Majluf (1984: 188), a positive and significant association between profitability and the book value of the debt to equity is observed for

both periods. This finding confirms the predictions of the trade-off and the agency cost theory. The trade-off theory posits that more profitable firms will accumulate more debt to take advantage of the interest tax shields. This observation is expected because firms in the pre liberalisation period were subject to higher effective tax rates than firms in the post liberalisation period. The agency cost theory hypothesises that more profitable firms will borrow more to force managers to disgorge cash to bondholders.

### ***Size***

The coefficient of the size variable is statistically significant at the 1 percent level. This finding shows that the firms operating in the pre liberalisation regime used asset structure as collateral for access to debt. Mutenheri and Green (2003: 166) also document a positive correlation for the size variable for the Zimbabwean pre-reform period. However, their coefficient of the size variable is statistically insignificant.

### ***Dividend payout***

The dividend payout ratio is negatively correlated to the book value of the debt to equity ratio. The coefficient is mildly significant at the 10 percent level. This suggests that an increase in the payout ratio is an indication that firms have generated enough earnings to finance growth. Therefore, there may be no need to borrow more.

- **Post liberalisation results**

### ***Growth***

The growth variable is directly correlated to the book value of the debt to equity ratio. The coefficient is statistically significant at all conventional levels. This observation lends support to the theory that firms with high growth prospects have an added value advantage and hence this increases the firms' debt capacity. This relationship supports

the findings of Gupta (1969: 520), Titman and Wessels (1988: 4) and Abor and Biekpe (2005: 44), among others.

### ***Asset tangibility***

Asset tangibility exerts a positive influence on the book value of the debt to equity ratio. The associated coefficient is statistically significant at the 1 percent level. This result is not surprising given that a high proportion of fixed assets serves as collateral for further access to debt (Rajan & Zingales: 1995: 1451).

### ***Non-debt tax shields***

Non-debt tax shields are negatively correlated to firm leverage. The coefficient of the non-debt tax shield variable is statistically significant at the 1 percent level. This result confirms DeAngelo and Masulis' (1980: 3) prediction that firms with more non-debt tax shields have less incentive to accumulate more debt.

### ***Profitability***

The profitability coefficient is positively associated with leverage. This result supports the trade-off theory, which hypothesises that profitable firms accumulate more debt to take advantage of the interest tax shields associated with debt. The positive association also supports the agency cost hypothesis that profitable firms will borrow more to mitigate the conflicts of interest associated with the high levels of free cash flow. Consequently, managers are forced to disgorge cash to bondholders in the form of interest payments. There are not many studies that confirm this prediction. For example, Gwatidzo and Ojah (2009: 1) perform an extensive analysis of firm determinants of capital structure for firms in five African countries. The only positive correlation uncovered in their study is for Nigerian firms.

## **Size**

The size coefficient is positive and significant at the 1 percent level. This observation is consistent with two theories. Firstly, large firms have lower information asymmetries and hence are capable of issuing information sensitive securities such as equity with relative ease. Secondly, large firms have a better capacity to assume more debt than smaller firms. This result corroborates the finding by Gwatidzo and Ojah (2009: 10) who use the same proxy for size as used in this study.

## **Taxes**

Corporate taxes are positively related to leverage. The coefficient of the tax variable is positive and significant at the 1 percent level. The trade-off theory prediction that the tax deductibility of interest will induce firms to borrow more is safely confirmed by the data for the post liberalisation period. This means that firms operating in such an environment could have shielded their profits from higher taxes through the accumulation of more debt. This finding corroborates well with the prediction posited by Modigliani and Miller (1963: 433), and the evidence documented by Graham (2001: 41) that taxes are directly related to leverage.

## **Dividend payout**

The coefficient of the dividend payout variable is positive and significant at the 1 percent level. This observation could be due to the following two reasons; Firstly, large dividend payments reduce firms' free cash flows thereby reducing the funds available for investment projects. This forces corporate managers to seek additional finance from the capital markets. This conjecture is consistent with Jensen's (1986: 323) free cash flow hypothesis. Secondly, many listed firms use dividends as a credible signal that the prospects for their future earnings are sound. This signalling incentive provides avenues for dividend paying firms to seek further borrowing from the capital markets.



### 7.6.3 The market value of the debt to equity ratio (pre and post liberalisation)

Table 7.18 reports the GMM estimates for the capital structure determinants of the market value of the debt to equity ratio. The results are shown for the pre and post liberalisation periods.

**Table 7.18: GMM estimates of target capital structure (Market debt to equity)**  
**Arellano-Bond/Bover dynamic panel estimation (Two-step results)**

Variable	Pre liberalisation		Post liberalisation	
	DIFF GMM Coefficient	SYS GMM Coefficient	DIFF GMM Coefficient	SYS GMM Coefficient
TD/E(M) <sub>i,t-1</sub>	-0.0108***	-0.0159***	0.2777***	0.2739***
Growth	-0.0485	-0.0616	-0.0191***	-0.0600***
Tangibility	-1.1238	-1.0191*	2.5327***	2.2671***
Ndts	30.5210***	14.9813***	-3.8978***	-10.4066***
Profitability	-2.5456***	-2.9629***	-2.3996***	-2.6728***
Size	-0.8125**	-0.8654***	1.0861***	-0.1825***
Taxes	-0.2095***	-0.0896	-0.0702***	-0.0192***
Dividends	0.0684	0.0786**	-0.0117***	-0.0390***
<b>Wald (Joint)</b>				
Prob>chi2	0.0000	0.0000	0.0000	0.0000
<b>Wald (Dummy)</b>				
Prob>chi2	0.0280	0.0000	0.0000	0.0000
<b>Sargan</b>				
Prob>chi2	0.0146	0.0073	0.6099	0.2527
Correlation 1	0.8188	0.8141	0.0730	0.0702
Correlation 2	0.1889	0.1391	0.5063	0.1292

Notes: This table reports the two-step Arellano-Bond/Bover dynamic panel results for the market value measures of the total debt to equity ratio. The results are robust to panel specific heteroscedasticity and autocorrelation. The results are reported for the pre and post liberalisation periods. \*, \*\*, \*\*\* indicate significance levels at the 10%, 5% and 1% respectively.

As reported earlier, the Sargan test of overidentifying restrictions for both the Difference and System GMM estimation techniques is not satisfied. This is evident for the market value of the debt to equity ratio for the pre liberalisation period. As a result it may not be appropriate to report on the results for the pre liberalisation period shown in Table 7.18. However, the expected signs for the determinants of capital structure for the pre liberalisation period appear to confirm the predictions of the capital structure theories. Because of this violation, only the post liberalisation period is analysed for the market value of the debt to equity ratio.

- **Post liberalisation results**

### ***Growth***

The growth prospects for firms operating in the post liberalisation period are negatively related to the market value of the debt to equity ratio. The correlation coefficient is significant at the 1 percent level. This result confirms the predictions made by Myers (1977: 150) that growth firms will generally avoid debt to avoid the potential future under investment problem. These results corroborate favourably with Barclay and Smith (1996: 210), Frank and Goyal (2009: 15) and Ovtchinnikov (2010: 249).

### ***Asset tangibility***

The asset tangibility variable is significantly positively correlated with the market debt to equity ratio. This means that firms in the post liberalisation regime use their fixed assets as collateral to acquire loans. This result is consistent with Jensen and Meckling's (1976: 305) argument that the agency costs of debt can be mitigated if the collateral value of assets is high. Hence, a large proportion of tangible assets is likely to be associated with high levels of leverage. Huang and Song (2006: 30) document a similar correlation for Chinese listed firms and Gwatidzo and Ojah (2009: 15) observe a comparable relationship for firms in Nigeria and South Africa.

### ***Non-debt tax shields***

The non-debt tax shield variable is significantly negatively correlated to leverage at the 1 percent level. This revelation confirms Negash's (2002: 26) observation that taxes are inversely correlated to leverage for South African firms. Frank and Goyal (2009: 15) also document a negative association for the book values of leverage. The result of the dynamic model contrasts with the static model utilised by Gwatidzo and Ojah (2009: 13) who document insignificant correlations for firms in South Africa.

### ***Profitability***

The coefficient of the profitability variable is negative and significant at the 1 percent level. The pecking order hypothesis is confirmed by the dynamic model for the market leverage. This observation corroborates the results of the static panel data models of Mutenheri and Green (2003: 166), Abor and Biekpe (2005: 44) and Gwatidzo and Ojah (2009: 9). The dynamic models of capital structure employed by Ozkan (2001: 187) and Ngugi (2008: 620) also confirm an inverse relationship between firm profitability and leverage.

### ***Size***

The size coefficient is positive and significant at the 1 percent level. This positive association lends support to the theory that larger firms can negotiate for loans on more favourable terms. This enables them to take on more debt at lower interest rates. Furthermore, Eriotis *et al.* (2007: 325) reason that larger firms are less risky than smaller firms, hence banks are willing to loan them more funds. This lowers their probability of default. These results are consistent with the findings of Booth *et al.* (2001) for a sample of firms in emerging markets, Deesomsak *et al.* (2004: 399) for firms in the Asia Pacific region and Huang and Song (2006: 28) for firms in China.

### ***Taxes***

An inverse association is observed between the tax variable and the market debt to equity ratio. This indirect association confirms the findings of Negash (2002: 26). Ngugi (2008: 620) uses the same measure of tax paid to this study and finds negative and insignificant results for Kenya.

### ***Dividend payout***

The dividend payout coefficient is negative and significant at all conventional levels. This observed relationship confirms the credibility of the signals conveyed by dividend

paying firms. A payment of dividend increases the market value of firms thereby reducing leverage. This observation is consistent with the dividend signalling theory, which suggests that dividend increases are associated with managements' confidence about the stability of future cash flows. All things being equal, the market value of equity should increase and, consequently, the market value of the debt to equity ratio should decrease.

#### **7.6.4 The book value of total debt ratio (pre and post liberalisation)**

Table 7.19 reports the GMM estimates for the capital structure determinants of the book value of the total debt ratio. The results are shown for the pre and post liberalisation periods.

**Table 7.19: GMM estimates of target capital structure (Book total debt ratio)**  
**Arellano-Bond/Bover dynamic panel estimation (Two-step results)**

Variable	Pre liberalisation		Post liberalisation	
	DIFF GMM Coefficient	SYS GMM Coefficient	DIFF GMM Coefficient	SYS GMM Coefficient
TD/TA(B) <sub><i>i,t-1</i></sub>	0.71915***	0.7434***	0.4441***	0.5350***
Growth	0.00332**	0.0068*	0.0062***	0.0067***
Tangibility	0.14824*	0.0084	0.4205	0.3574***
Ndts	-1.20415**	-1.1840**	-0.2373	-0.6486
Profitability	-0.21671***	-0.2570***	-0.1411***	-0.1688***
Size	0.02039	0.0221*	0.1633***	0.0113**
Taxes	0.01331***	0.0079	-0.0033***	-0.0064*
Dividends	0.00354	0.0048	-0.0047***	-0.0040*
<b>Wald (Joint)</b>				
Prob>chi2	0.0000	0.0000	0.0000	0.0000
Wald (Dummy)	0.1080	0.1630	0.0000	0.0000
<b>Sargan</b>				
Prob>chi2	0.8300	0.1203	0.9500	0.5664
Correlation 1	0.0038	0.0029	0.0001	0.0001
Correlation 2	0.7014	0.5142	0.2256	0.1109
No. of observations	280	350	688	768

Notes: This table reports the two-step Arellano-Bond/Bover dynamic panel results for the book value measures of the total debt ratio. Results including the lagged coefficients are reported for the pre and post liberalisation periods. \*, \*\*, \*\*\* indicate significance levels at the 10%, 5% and 1% respectively.

- **Pre liberalisation results**

***Growth, Non-debt tax shields, Profitability and Size***

The growth variable is positively correlated to the book value of the total debt ratio. However, the correlation is mildly significant at the 10 percent level. This relationship suggests that high growth firms operating in the pre liberalised regime accumulated more debt to finance their growth prospects. Al Najjar (2011: 12) uses the same proxy for growth as the one used in this study and finds a similar correlation for Jordanian firms. The non-debt tax shield variable is negatively correlated to the book value of total debt, again confirming the predictions of DeAngelo and Masulis (1980: 3). The negative association depicted between profitability and the book value of the total debt ratio confirms the pecking order hypothesis for the pre liberalisation regime. The associated coefficient is significant at the 1 percent level. The negative relationship is similar to the findings of Chang *et al.* (2009: 209) for firms in the Compustat Industrial Files and

Gwatidzo and Ojah (2009: 9) for firms in South Africa and Ghana. Size is positively correlated to the book value of the total debt ratio, but the correlation is mildly significant at the 10 percent level.

- **Post liberalisation results**

### ***Growth***

Firm growth prospects are positively related to the book value of the total debt ratio. From this outcome, it can be concluded that growth firms in the post liberalisation regime continue to accumulate debt to finance growth. This observation corroborates the findings of Titman and Wessels (1988: 4) for firms listed in the annual Compustat industrial files and Al Najjar (2011: 12) for firms in Jordan.

### ***Tangibility***

The asset tangibility variable is positively related to leverage and the associated coefficient is significant at the 1 percent level. This result suggests that firms in the post liberalisation regime use their assets as collateral for debt. Most empirical studies on firm specific determinants of capital structure have found a similar positive association. For example, Rajan and Zingales (1995: 1453) find a direct relationship between asset tangibility and book value of total leverage. Booth *et al.* (2001: 112) observe a similar relationship for a sample of emerging market economies. Mutenheri and Green (2003: 166) document a strong positive association for Zimbabwean listed non-financial firms for the post reform period (1995-1999). Similarly, Gwatidzo and Ojah (2009: 15) report a statistically significant positive relationship with total debt ratios for firms in Nigeria and South Africa. These findings are a confirmation of Jensen and Meckling's (1976: 305) argument that agency costs of debt can be mitigated by a high collateral value of assets.

## ***Profitability***

The profitability variable is negatively correlated to the book values of the total debt ratio. The associated p-value is 0.001. The negative association reported here confirms the prediction of Myers and Majluf (1984: 188), and is consistent with the empirical findings for the financing decisions of firms in both the developed and emerging market economies. For example, Rajan and Zingales (1995: 1457) and Wald (1999: 169) document similar results for firms in the industrialised economies. Furthermore, the results are consistent with Booth *et al.* (2001: 112) for firms in emerging markets and Gwatidzo and Ojah (2009: 9) for firms in South Africa and Ghana. The evidence documented here suggests that firms operating in both the developed and developing economies follow a pecking order when financing investment.

## ***Size***

The size coefficient is positively correlated to the book value measure of the total debt ratio. The observed relationship is consistent with the predictions of capital structure theory suggesting that larger firms have more capacity to access debt finance than their smaller counterparts. Irrespective of the proxy used, most empirical studies confirm the positive association between size and leverage, as documented in this study. This is mainly because larger firms can negotiate for loans on more favourable terms. This enables them to take on more debt at lower interest rates. Furthermore, Eriotis *et al.* (2007: 324) emphasise that larger firms are less risky than smaller firms. Therefore, banks are willing to loan them more funds.

## ***Taxes***

The expected sign for the tax coefficient is negative and significant at the 10 percent level. The evidence documented here suggests that taxes play a mildly significant role in the determination of leverage. The negative association observed in the post liberalisation regime confirms the results for Negash (2002: 26) who observes South

African firms over a relatively similar period. Given that tax rates in South Africa were on a declining trend, there could have been little incentive for firms to take advantage of the tax deductibility of interest through the accumulation of more debt. Frank and Goyal (2009: 13) draw similar conclusions for the book value measures of total leverage.

### ***Dividend payout***

The dividend payout variable is negatively correlated to the book value of the total debt ratio. The correlation coefficient is mildly significant at the 10 percent level. This negative association is consistent with the dividend relevancy theory of Lintner (1962: 243) and Gordon (1963: 264). They have argued that investors value the next dollar of dividends more than future capital gains. In effect, the perceived riskiness of a dividend paying firm should be lower than that of a non dividend payer. The required return of a dividend paying firm reduces with an increase in dividends thereby increasing the market value of equity. All else being equal, the subsequent increase in the market value of equity should reduce the debt ratio for dividend increasing firms.

Furthermore, the evidence documented here is consistent with the dividend signalling theory, which suggests that dividend increases are associated with managements' confidence about the stability of expected cash flows. Specifically, Bhattacharya (1979: 259) and John and Williams (1985: 1053) predict a positive correlation between dividends and future cash flows. The subsequent increase in the market value of equity reduces the debt ratio.

### **7.6.5 The market value of the total debt ratio (pre and post liberalisation)**

Table 7.20 reports the GMM estimates for the capital structure determinants of the market value of the total debt ratio. The results are shown for the pre and post liberalisation periods.



**Table 7.20: GMM estimates of target capital structure (Market total debt ratio)**  
**Arellano-Bond/Bover dynamic panel estimation (Two-step results)**

Variable	Pre liberalisation		Post liberalisation	
	DIFF GMM Coefficient	SYS GMM Coefficient	DIFF GMM Coefficient	SYS GMM Coefficient
TD/TA(M) <sub>i,t-1</sub>	0.60510***	0.5698***	0.2685***	0.2918***
Growth	-0.00192	0.0098	-0.0056***	-0.0029***
Tangibility	0.27142***	0.4929***	0.5159***	0.3477***
Ndts	0.34665	-0.7956	-1.2753***	-1.8271***
Profitability	-0.03422	-0.0916**	-0.0169**	-0.0050
Size	0.00538	-0.0044	0.1138***	0.0098***
Taxes	-0.00105	-0.0032	-0.0334***	-0.0036***
Dividends	-0.00143	0.0028	-0.0056***	-0.0067***
<b>Wald (Joint)</b>				
Prob>chi2	0.0000	0.0000	0.0000	0.0000
Wald (Dummy)	0.0580	0.0360	0.0000	0.0000
Sargan	0.3500	0.1792	0.7951	0.1167
Prob>chi2				
Correlation 1	0.0010	0.0285	0.0051	0.0068
Correlation 2	0.1600	0.526	0.2103	0.4548
	280	350	688	768

Notes: This table reports the two-step Arellano-Bond/Bover dynamic panel results for the market value measures of the total debt ratio. Results are robust to panel specific heteroscedasticity and autocorrelation. The results are reported for the pre and post liberalisation periods. \*, \*\*, \*\*\* indicate significance levels at the 10%, 5% and 1% respectively.

- **Pre liberalisation results**

### **Tangibility**

The coefficient of the tangibility variable is positive and significant at the 1 percent level. This direct association indicates that asset tangibility in the pre liberalisation regime served as collateral for access to debt finance.

### **Profitability**

The profitability variable is inversely correlated to the market value of the total debt ratio. The correlation coefficient is significant at the 5 percent level. This observation suggests that firms in the pre liberalised regime followed a pecking order in their financing decisions. The inverse association observed confirms the empirical results of the static panel data models employed by Abor and Biekpe (2005: 44) for firms in Ghana,

Delcours (2007: 411) for firms in European transitional economies and Gwatidzo and Ojah (2009: 9) for firms South Africa.

The dynamic model of capital structure employed by Ozkan (2001: 187) also confirms an inverse relationship between firm profitability and leverage. This relationship demonstrates that firms operating in the pre liberalisation era followed a pecking order in their financing decisions. These empirical findings support the predictions of Myers and Majluf (1984: 188) that firms that are more profitable will prefer to use retained earnings. Therefore, they will have lower debt ratios. However, Mutenheri and Green (2003: 166) document a positive, but insignificant association for the Zimbabwean pre reform period.

- **Post liberalisation results**

### ***Growth***

The growth variable has an expected negative sign, and the coefficient is statistically significant at the 1 percent level. Overall, this direct relationship corroborates the empirical findings of Titman and Wessels (1988: 4) and Delcours (2007: 414), among others. The positive association suggests that growth firms require external funding to finance their future growth prospects.

### ***Tangibility***

As predicted by the theoretical models of capital structure, the coefficient of the asset tangibility variable is positive and significant at the 1 percent level. A high proportion of fixed assets in the firm's balance sheet can serve as collateral for lenders of finance. Moreover, in the event of bankruptcy, a higher proportion of tangible assets could enhance the salvage value of the firm's assets. Lenders of finance are thus willing to advance loans to firms with a high proportion of tangible assets.

This relationship is a direct confirmation of one of the trade-off theory predictions that firms with relatively safe tangible assets will be less exposed to costs of financial distress. These results are supported by most of the empirical evidence on the effects of asset structure on leverage. For example, Rajan and Zingales (1995: 1453) document a positive correlation for firms in seven industrialised economies. Likewise, Booth *et al.* (2001: 112) find a similar correlation for a sample of firms in emerging market economies. In contrast, Abor and Biekpe (2005: 43) and Sheikh and Wang (2011: 127) report negative correlations between asset tangibility and leverage for firms in Ghana and Pakistan respectively.

### ***Non-debt tax shields***

The non-debt tax shield coefficient is negative and significant at all conventional levels. This negative effect shows that firms with high depreciation charges have little incentive to access more debt. This relationship supports the DeAngelo and Masulis (1980: 3) hypothesis that tax advantages of debt are lower for those firms with opportunities to avoid tax through other related non-debt tax shelters. The dynamic panel data models employed by De Miguel and Pindado (2001: 77) and Ozkan (2001: 187) also document the negative association found in this study. However, Bradley *et al.* (1984: 873), Barclay *et al.* (1996: 210) and Chang *et al.* (2009: 209), among others, provide evidence suggesting that non-debt tax shields have a positive impact on firm leverage.

### ***Size***

The coefficient of the size variable is positive and statistically significant at the 1 percent level. This relationship confirms the prediction of the theory that size can be considered as an explanatory predictor for variations in firm leverage. The results support the empirical findings of Booth *et al.* (2001: 112), Deesomsak, *et al.* (2004: 399), Huang and Song (2006: 28) and Eriotis *et al.* (2007: 328), among others. However, Qiu and La (2010: 284) document a negative relationship between size and

total leverage for Australian firms. Similarly, Nunkoo and Boateng (2010: 987) find a negative but insignificant association between size and leverage for Canadian firms.

### ***Taxes***

The coefficient of the tax variable is negative and significant at the 1 percent level. The documented inverse coefficient is an indication that firms in the post liberalisation regime respond to increased effective tax rates by issuing less debt. The evidence documented here suggests that taxes play a mildly significant role in the determination of leverage. The negative association observed in the post liberalisation regime confirms the empirical work of Negash (2002: 26) who observes South African firms over a relatively similar period. Given that tax rates in South Africa were on a declining trend, there could have been little incentive for firms to take advantage of the tax deductibility of interest through the accumulation of more debt. Ngugi (2008: 620) and Gwatidzo and Ojah (2009: 13) find insignificant correlations between taxes and leverage for Kenya and South Africa respectively. However, Frank and Goyal (2009: 13) find strong and positive correlations between taxes and the market value of total leverage for non-financial firms in the United States of America.

### ***Dividend payout***

The dividend payout variable exerts a negative influence on the market value of the total debt ratio. The coefficient is statistically significant at the 1 percent level. The negative dividend association provides evidence that dividend increases are associated with a significant decrease in total leverage. The evidence documented here is consistent with the dividend signalling theory, which suggests that dividend increases are associated with managements' confidence about the future stability of cash flows thereby increasing the market value of equity relative to debt. The subsequent increase in the market value of equity reduces the debt ratio.

## 7.6.6 Firm specific determinants of debt maturity (pre and post liberalisation)

Table 7.21 reports the GMM estimates for the capital structure determinants of the book value of the short term debt ratio. The results are shown for the pre and post liberalisation periods.

**Table 7.21: GMM estimates of target capital structure (short term debt ratio)**

Arellano-Bond/Bover dynamic panel estimation (Two-step results)				
Variable	Pre liberalisation		Post liberalisation	
	DIFF GMM Coefficient	SYS GMM Coefficient	DIFF GMM Coefficient	SYS GMM Coefficient
STD/TA <sub><i>i,t-1</i></sub>	0.5035***	0.5710***	0.3179***	0.3745***
Growth	0.0001	-0.0008	0.0023***	0.0099***
Tangibility	-0.2379***	-0.0363	0.1931***	-0.0501***
Ndts	-0.1626	-0.1367	-0.4833***	0.1040
Profitability	-0.1850***	-0.2676***	-0.0218***	-0.1012***
Size	-0.0031	0.0226***	0.0699***	0.0124***
Taxes	0.0031	0.0090*	0.0016	-0.0093***
Dividends	0.0000	0.0081	0.0009***	0.0061***
<b>Wald</b>				
Prob>chi2	0.0000	0.0000	0.0000	0.0000
Wald (Dummy)	0.3190	0.0001	0.0000	0.0000
Sargan	0.2684	0.1237	0.7502	0.2406
<b>Prob&gt;chi2</b>				
Correlation 1	0.0174	0.0079	0.0005	0.0006
Correlation 2	0.3342	0.3276	0.0920	0.2406
No. of Observations	280	350	688	768

Notes: This table reports the two-step Difference and System GMM dynamic panel results for the book value measures of the short term debt ratio. Results are robust to panel specific heteroscedasticity and autocorrelation. \*, \*\*, \*\*\* indicate significance levels at the 10%, 5% and 1% respectively.

- **Pre liberalisation results**

### ***Profitability, Size and Taxes***

The System GMM output generates significant results for profitability, size and taxes. The coefficients for profitability and size are negative and statistically significant at the 1 percent level. Profitability is associated with a longer debt maturity structure. This implies that profitability is a significant criterion for securing longer term finance in the

pre liberalisation period. Similarly larger firms have longer debt maturity structures. This indicates that larger firms possess the reputational capital to borrow on a longer term basis. On the other hand, taxes are positively related to the maturity structure of debt. However, the correlation coefficient is mildly significant at the 10 percent level. This relationship suggests that firms that are subject to higher effective tax rates reduce their maturity structure of debt.

- **Post Liberalisation results**

### ***Growth***

The coefficients of the growth variable for firms in the post liberalisation regime are all statistically significant at the 1 percent level. Growth prospects are associated with an increase in the short term debt ratio. This implies that growth firms are associated with shorter debt maturities. The plausible explanation to this observation is that the variability in earnings associated with growth firms makes it difficult for them to access long term debt. Hence debt with shorter maturities is more accessible for these firms. As observed by Barclay and Smith (2005: 14), high growth firms tend to borrow on a short term basis. The rationale given for this observation is that, in the event of financial distress, short term debt allows growth firms to reorganise their debt position easily.

### ***Tangibility***

The asset tangibility variable has a negative sign. The coefficient is statistically significant at the 1 percent level. This inverse relationship is an indication that firms with a high proportion of tangible assets increase the maturity structure of their debt. This relationship lends support to the theory that a high value of tangible assets allows firms to borrow on a longer term basis. In the event of bankruptcy, the tangible assets can easily be collateralised.

## ***Profitability***

The profitability variable is negatively correlated to the short term debt ratio. The coefficient is statistically significant at the 1 percent level. This negative association indicates that profitable firms operating in the post liberalised regime increase the maturity structure of their debt. This is expected, since higher profits provide credibility for firms to take on longer term debt.

## ***Size***

The size variable is positively correlated to the short term debt ratio, suggesting that large firms operating in the post liberalised regime issue debt with shorter debt maturities. This finding contradicts the theoretical predictions that large firms have a lower probability of financial distress, and that they have lower information asymmetries associated with debt issues. This should allow them to borrow on a longer term basis.

## ***Taxes***

The tax variable has a negative coefficient which is statistically significant at the 1 percent level. Hence, it can be deduced that corporate tax rates are negatively associated with short term debt. This finding suggests that an increase in the effective tax rate is associated with longer debt maturities. This result supports the tax clientele argument of Newberry and Novack (1999: 1) that firms that are subject to high effective tax rates will increase their debt maturity structure. The results reported here support the empirical work by Antoniou *et al.* (2006: 187). They observe that the increase in the effective tax rate causes a statistically significant increase in the maturity structure of debt for firms in Germany. Furthermore, higher effective taxes could be associated with higher profitability<sup>36</sup>. Hence, the negative sign is not surprising. Due to the increased

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<sup>36</sup> According to Table 7.3, the correlation coefficient between tax and profitability variable is 0.40 indicating that effective tax rates and profitability are correlated.

profitability, firms that pay higher taxes will have easier access to longer term financing than firms with lower effective taxes.

### ***Dividend payout***

The dividend payout ratio is positively correlated with the short term debt ratio. The coefficient is significant at the 1 percent level. The positive correlation suggests that an increase in the dividend payout is associated with a reduction in the debt maturity structure of firms.

## **7.7 THE LONG RUN TARGET ADJUSTMENT MODEL AND TRANSACTION COSTS**

This section discusses the dynamics of transaction costs and the associated speed of adjustment for the target adjustment model of capital structure. The effect of relaxing Modigliani and Miller's (1958: 201) capital structure irrelevance assumption suggests that there are firm specific impediments that constrain firms from achieving the desired level of target leverage. Such imperfections include taxes, flotation costs, adjustment costs and other constraints (Ozkan, 2001: 176).

In the context of financial liberalisation, a constrained economy is characterised by an underdeveloped financial system with relatively fewer financing options. Consequently, borrowing costs should be high. Inevitably, firms operating in this environment will adjust to the optimal target with a relatively low speed of adjustment.

Accordingly, firms operating in a liberalised economy should face fewer impediments in their efforts to adjust to a target level of leverage. The presence of an active and developed stock market, the re-emergence of international financial institutions and an active public debt market promotes competition in the domestic financial sector. This lowers borrowing costs. Effectively, the speed of adjustment to the desired target level of leverage should be higher.



Table 7.22 summarises the results of the target adjustment model for the book and market value measures of leverage. The results of the coefficient of the lagged dependent variables are reported using the System GMM output. The results for the target adjustment model confirm the existence of transaction costs for both regimes. However, the coefficients of the lagged dependent variables are lower for the post liberalisation period. This finding confirms the earlier conjecture that the easing of financial constraints causes firms to adjust to the optimal leverage ratio relatively fast.

**Table 7.22: Summary of the coefficients of the lagged dependent variables**

Variable	Pre liberalisation		Post liberalisation	
	DIFF GMM	SYS GMM	DIFF GMM	SYS GMM
	Coefficient	Coefficient	Coefficient	Coefficient
$TD/E(B)_{i,t-1}$	0.4509***	0.6096***	0.14765***	0.1343***
$TD/E(M)_{i,t-1}$	-0.0108***	-0.0159***	0.2777***	0.2739***
$TD/TA(B)_{i,t-1}$	0.71915***	0.7434***	0.4441***	0.5350***
$TD/TA(M)_{i,t-1}$	0.60510***	0.5698***	0.2685***	0.2918***
$STD/TA_{i,t-1}$	0.5035***	0.5710***	0.3179***	0.3745***

Notes: This Table summarises the coefficients on the lagged dependent variable for the Difference and System GMM models.  $TD/E(B)_{i,t-1}$  is the book value of the lagged total debt to equity ratio.  $TD/E(M)_{i,t-1}$  is the market value of the lagged total debt to equity ratio.  $TD/TA(B)_{i,t-1}$  is the book value of the lagged total debt to total assets ratio.  $TD/TA(M)_{i,t-1}$  is the market value of the lagged total debt to total assets ratio.  $STD/TA_{i,t-1}$  is the ratio of the lagged short term debt to total assets. \*\*\*, \*\*, \* indicate levels of significance at the 1, 5 and 10 per cent levels respectively.

### 7.7.1 Transaction costs for the book value of the debt to equity ratio

The coefficient of the lagged dependent variable is a measure of the transaction costs. The transaction costs reduce dramatically from 0.61 in the pre liberalisation period to 0.13 in the post liberalisation period. Both coefficients are significant at the 1 percent level. The speed of adjustment ( $1 - \delta$ ) to the desired level of leverage increases from 0.39 in the pre liberalisation period, to 0.87 in the post liberalisation period.

### 7.7.2 Transaction costs for the market value of the debt to equity ratio

The Sargan test for the results of the pre liberalisation period suggests that the instruments used for the lagged variables are not valid. On that account, the results provided in the first two columns of Table 7.17 cannot be relied on. However, the results

presented for the post liberalisation period are valid. The coefficient for the lagged dependent variable for the post liberalisation period is 0.27 and is significant at the 1 percent level. The speed of adjustment to the desired target level of leverage is 0.73, which is relatively fast.

### **7.7.3 Transaction costs for the book value of the total debt ratio**

The coefficient of the lagged book value of the total debt ratio variable adjusts from 0.74 in the pre liberalisation period to 0.54 in the post liberalisation period. Two conclusions can be drawn from this finding. Firstly, transaction costs reduce significantly thereby confirming an increased speed of adjustment to the desired level of leverage for the post liberalisation period. Secondly, transaction costs for the total debt ratios are higher than transaction costs for the debt to equity ratios for both periods. This suggests that the speed of adjustment to the desired total debt ratio is slower than the target adjustment speed observed for the debt to equity ratios.

### **7.7.4 Transaction costs for the market value of the total debt ratio**

The coefficient of the lagged dependent variable for the pre liberalisation period is 0.57, and it reduces to 0.29 in the post liberalisation period. As documented for the other measures of leverage, a reduction in transaction costs is also observed here. The speed of adjustment to the desired level of the market value of leverage increases from 0.43 in the pre liberalisation period, to 0.71 in the post liberalisation period.

### **7.7.5 Transaction costs for the short term debt ratio**

Transaction costs for the post liberalisation regime are lower than the costs observed for the pre liberalisation period. This reduction provides evidence that the adjustment to the desired debt maturity structure is faster for the post liberalisation period. The coefficient of the lagged short term debt variable reduces from 0.57 in the pre liberalisation regime, to 0.37 in the post liberalisation regime. The speed of adjustment

increases accordingly, from 0.43 (before financial liberalisation), to 0.63 (after financial liberalisation).

#### **7.7.6 A comparison of the adjustment costs for select countries**

Table 7.23 compares the adjustment costs and the related speed of adjustment to the desired level of total debt for firms in selected countries. The fifth row shows the transaction costs and the associated speed of adjustment found in this study<sup>37</sup>. The transaction costs for South Africa are relatively comparable to those of the firms in the United States, the United Kingdom and France. This shows that the financial environment in the South African post liberalisation period exhibits some attributes of a well developed market.

As a result, firms operating in such an environment will face relatively high costs of being in disequilibrium. That being the case, they will adjust to their desired level of optimal leverage relatively fast. It is noted, however, that firms in Spain and Kenya adjust to their target leverage faster than the rest of the firms in the other countries. The authors (De Miguel and Pindado (2001: 90) and Ngugi (2008: 618)) attribute these high adjustment speeds to the low proportion of debt finance in these countries. Even though the capital markets in these countries may be less developed, marginal adjustments of leverage may be accomplished relatively fast.

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<sup>37</sup> All studies estimate their dynamic models on the total debt ratio. The only exception is De Miguel and Pindado (2001: 90) who uses market value measures of the long term debt to long term debt plus equity ratio. This study uses the post liberalisation book value total debt ratio for comparison purposes.

**Table 7.23: A comparison of transaction costs for firms in selected countries**

Country	Transaction costs	Speed of Adjustment <sup>38</sup>	Reference
France	0.61	0.39	Antoniou <i>et al.</i> (2008: 78)
Germany	0.76	0.24	Antoniou <i>et al.</i> (2008: 78)
Japan	0.89	0.11	Antoniou <i>et al.</i> (2008: 78)
Kenya	0.30	0.70	Ngugi (2008: 618)
<b>South Africa</b>	<b>0.54</b>	<b>0.46</b>	<b>This Study</b>
Spain	0.21	0.79	De Miguel and Pindado (2001: 90)
United Kingdom	0.59	0.41	Ozkan (2001: 188)
United States	0.68	0.32	Antoniou <i>et al.</i> (2008: 78)

<sup>38</sup> The speed of adjustment is reported from the System GMM estimates

### 7.7.7 The determinants of the adjustment speed

**Table 7.24: Determinants of adjustment speed**

	Pre Liberalisation		Post Liberalisation	
	TDTA(B)	TDTA(M)	TDTA(B)	TDTA(M)
$LEV_{i,t-1}$	2.3794*	7.5881***	-0.0030	0.2662
$GROWTH*LEV_{i,t-1}$	0.0191	0.0723	-0.0004	0.1486***
$SIZE*LEV_{i,t-1}$	-0.3983**	-1.4652***	0.1639***	-0.0830***
Sargan	0.1002	0.1208	0.3491	0.1061
Correlation 1	0.0022	0.0081	0.0512	0.0469
Correlation 2	0.3600	0.2279	0.4961	0.4716
Wald test (Prob>Chi2)	0.0000	0.0000	0.0000	0.0000
Number of observations	350	350	826	688
Number of groups	70	70	69	69

Notes: This Table reports the determinants of the adjustment speed towards the target level of capital structure.  $LEV_{i,t-1}$  is the lagged dependent variable for the book and market values of the total debt ratio.  $GROWTH*LEV_{i,t-1}$  is the interaction between the growth and the lagged leverage variables.  $SIZE*LEV_{i,t-1}$  is the interaction between size and the lagged leverage variable. \*\*\*, \*\*, \* indicate significance levels at the 1, 5, and 10 per cent levels respectively.

Table 7.24 summarises the determinants of the adjustment speed for the pre and post liberalisation regime. In the pre liberalisation period, the coefficient on the interaction term between growth and lagged leverage for both measures is insignificant. This evidence suggests that firm growth prospects are not significant determinants of the adjustment speed for firms operating in the pre liberalisation regime. However, the interaction term on the coefficient of the market value of total leverage is positive and statistically significant at the 1 percent level. The interpretation of this relationship is that growth firms reduce their adjustment speed. Following Myers and Majluf (1984: 188), firms with high growth prospects will avoid debt due to the potential costs of financial distress. This result contradicts the conjecture that growth firms will adjust rapidly to their target level of leverage.

The impact of size on leverage for both regimes is statistically significant. For the pre liberalisation period, the coefficient on the interaction term is negative and statistically significant. This outcome lends support to the conjecture that large firms will adjust rapidly to their target levels of leverage. Consistent with Banerjee, Heshmati and Wihlborg (2004: 275), large firms are more concerned about capital structure decisions than their smaller counterparts. However, the expected signs for the post liberalisation period are contradictory. This inconsistency was also found by Drobetz and

Wanzenried (2006: 954). Hence, it is difficult to interpret the post liberalisation results accordingly.

### **7.7.8 Summary of the results presented by the dynamic model of capital structure.**

The main results emanating from the dynamic model of capital structure provide some confirmations of the major theories of capital structure; there is little evidence suggesting that firm specific determinants of capital structure are significantly correlated to all measures of leverage for the pre liberalisation regime. Firm growth prospects are positively related to the book value of the debt to equity ratio for the post liberalisation regime. A negative relationship is observed for the market value of the debt to equity ratio for the post liberalisation regime. Firm growth prospects are also positively related to the book value of the total debt ratio for both regimes, and negatively correlated to the market value of the total debt ratio for the post liberalisation regime.

Asset tangibility is mostly directly correlated with all measures of leverage. The effect is significant for both regimes. Non-debt tax shields are mostly negatively associated with all measures of leverage. The effect is mostly significant for the post liberalisation regime.

Profitability is positively correlated with the book value of the debt to equity ratio for both regimes, and is positively associated with the market value of the debt to equity ratio for the post liberalisation regime. Profitability also exerts a negative influence on both measures of the total debt ratio.

Size is directly related to most measures of leverage with the exception of the market value of the debt to equity ratio for the post liberalisation regime. The direct relationship is prominent for both regimes. Taxes are positively associated with the book value of the debt to equity ratio and negatively associated with the market value of the debt to equity ratio. The negative correlation is persistent with the rest of the measures of leverage.

Dividend payout is positively correlated to the book value of the debt to equity ratios and negatively related to the rest of the measures of leverage. Growth firms are associated with shorter debt maturities. This is significant for the post liberalisation period. Firms with a higher proportion of fixed assets increase the maturity structure of their debt. This relationship applies to both regimes.

Profitable firms increase the maturity structure of their debt. This is evident for both periods. Larger firms operating in both regimes reduce the maturity structure of their debt. Firms that are subject to higher effective tax rates increase their debt maturities. This observation is significant for the post liberalisation regime.

Firms that increase their dividend payout reduce their debt maturity structure. This result is significant for the post liberalisation period. Transaction costs reduce in the post liberalisation regime and the associated speed of adjustment increases accordingly for all measures of leverage. The size of the firm is a significant determinant of the adjustment speed. Particularly, large firms adjust their target relatively fast. This is true for the pre liberalisation period.

## **7.8 CHAPTER SUMMARY**

In this chapter, the results of the static and dynamic panel data models of capital structure were reported and discussed extensively. The first empirical issue was to establish whether financial liberalisation has a significant impact on the book and market value measures of leverage. The sample was split into three different sets, owing to the possibility that firms of varying sizes may respond differently to the process of financial reforms.

The results obtained have empirical significance. Particularly, stock market liberalisation has a significant negative impact on all measures of leverage. The effect is more pronounced for larger firms. Larger firms respond more to this process due to their ability to issue informational sensitive securities with relative ease. Furthermore, larger

firms' securities are more liquid and actively traded on the stock exchange. Hence, a strong and significant reduction in leverage for large firms is observed.

The removal of sanctions has a negative influence on all the measures of leverage. This is expected due to documented evidence that the cost of equity lowers following the lifting of economic sanctions. There is little support for the impact of domestic financial liberalisation on firm capital structures. Despite the fact that the lowering of the reserve requirements affects banks' ability to provide loans, these measures may not have a significant impact on banks' ability to finance the private sector. Hence, an insignificant impact is expected.

Capital account liberalisation has a significant positive impact on firm leverage. As exchange controls are eased, firms finance their repatriations with debt. Furthermore, capital account liberalisation provided opportunities for firms to borrow from abroad. The foreign borrowing could have contributed to the increase in the debt ratios for domestic firms. Larger firms appear to benefit more from capital account liberalisation than smaller firms. As the theory goes, large firms have more credibility and reputation in the markets. They can thus manage to raise foreign debt easily compared to smaller firms. Hence, this observation is expected.

There is strong evidence that the development of the stock market contributes to further domestic borrowing. Contrary to expectations, the size of the banking sector is negatively related to leverage. The internationally financed firms and financially constrained firms do not appear to be affected significantly by the process of financial liberalisation. Furthermore, the importance of internal finance is insignificant in all the models.

In terms of debt maturity structures, the notable finding is that stock market liberalisation increases the debt maturity structure of all the firms. The liberalisation of the JSE causes firms to access more long term finance. This finding suggests that the improved



corporate governance and transparency laws associated with the development of the capital markets provides more credibility for firms to borrow on a longer term basis.

Using regime dummies, there is sufficient evidence to infer that the impact of profitability on leverage shifted in 1993 and 1995. Similarly, the impact of effective taxes on the book value of the debt to equity ratio shifted in 1993 and 1995.

The results of the dynamic model of capital structure provide evidence of transaction costs for firms operating in both regimes. The speed of adjustment to the desired target level of leverage increases dramatically in the period after financial liberalisation. This increase in the speed of adjustment is supported by the lower cost of external finance for the post liberalisation period. The capital structure model has documented relationships that support most of the theories of capital structure. Therefore, there is strong evidence that firms in the post liberalisation regime follow a pecking order in financing investment. Growth prospects are positively correlated to both measures of the debt to equity ratio and negatively correlated to both measures of the total debt ratio.

Asset tangibility and size are positively related to leverage, suggesting that firms use their assets as collateral for debt and that larger firms have a better capacity to accumulate more debt. Taxes are negatively related to leverage, thus contradicting Modigliani and Miller's (1963: 433) proposition that higher taxes encourage firms to borrow more. Dividend payout is negatively correlated to the market value of the debt to equity ratio and to both measures of total leverage. Strong evidence is found for the DeAngelo and Masulis (1980: 3) hypothesis that non debt tax shields are inversely related to leverage.

The growth and size variables were interacted with the lagged leverage variable. It was found that size has a significant impact on the adjustment speed of capital structure. In particular, larger firms adjust rapidly to their target leverage. The next chapter concludes the overall study.