Mergers and Acquisitions and Corporate Financial Leverage – An Empirical Analysis of UK Firms

By

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Abstract

This thesis examines the link between mergers and acquisitions (M&As) and corporate financial leverage. The thesis proposes and tests various hypotheses regarding: (1) the relationship between the probability of firms undertaking M&As and corporate financial leverage; and (2) the changes in financial leverage prior to firms decision to initiate M&As. The empirical evidence on the proposed hypotheses is based on a large sample of firms in the UK during the period 1996 and 2006. The empirical analysis presented in this study contributes to the large and growing body of literature on the interdependence of corporate financing and investment decisions. Specifically, this study contributes to the literature in two ways.

First, the thesis investigates the link between firms' leverage deviations (i.e. the deviations of firms' observed leverage ratios from target leverage ratios) and the probability of undertaking M&As in the future. Building upon the earlier literature, it is argued that extreme leverage deviations lower the probability of undertaking M&As by impairing firms' ability to raise capital to finance these deals. The study's empirical analyses suggest that extremely overleveraged firms have lower probability of undertaking M&As. Moreover, the link between extreme overleverage and the probability of undertaking M&As is *weaker* for diversification-increasing acquisitions (i.e. deals in which the acquirer and the target firm operate in different industries); for domestic acquisitions (i.e. deals in which the acquirer and the target firm are domiciled in the same country); and for focused (i.e. single-segment) firms undertaking acquisitions. Thus, the leverage deviation effect is not symmetric for all types of acquisitions and for all firms. Second, the thesis examines how the pre-acquisition changes in corporate financial leverage may be influenced by: (1) the extent to which firms deviate from their target leverage ratios; and (2) firms' intentions to initiate M&As. Key empirical findings in this section suggest that firms that have higher leverage deviations adjust their leverage at a higher rate than those with lower deviations. More importantly, the empirical evidence suggests that firms that undertake M&As adjust their pre-acquisition leverage at a higher rate than those that do not. These findings suggest that, when making adjustments to corporate capital structure, managers tend to consider their firms' leverage deviations and their future acquisition plans. Furthermore, the study's findings partly explain the differences in the speeds of financial leverage adjustments reported in the existing literature.

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I am profoundly grateful to the Almighty God from whom I draw strength and inspiration. I am also hugely indebted to the Business School of Loughborough University for its interest in my development and financially sponsoring my Ph.D. study. My next thanks goes to my father, Alexander Agyei-Boapeah, and my sisters, Sylivian Splendilum Agyei and Millicent Adjei Ntriwaah, whose prayers, care, and moral support over the past years have been invaluable.

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Dedication

This thesis is dedicated to my beloved mother, Leticia Yaa Serwaa Ohenebeng, of blessed memory, in appreciation for all her love, care and sacrifice for my wellbeing, particularly for tirelessly and unselfishly working herself out to raise funds to support my education from the elementary through to the undergraduate level.

I also dedicate this thesis to my prospective wife and children for the additional joy and fulfilment that they will bring to my life.

Contents

List of definitions of key variables and terminologies

No.	Variable / terminology	Explanation / definition	See similar definitions in:
1	Acquirers	Unless otherwise stated, acquirers refer to firms making at least one acquisition within the 5 year period following the reference year (see definition for reference year below).	
2	Altman Z-score	Proxy for bankruptcy risk. Defined as, Z-score = {[Total asset (WC item 02999)] / [3.3*EBITDA (WC item 18198) + net sales (WC item 01001) + 1.4*Retained earnings (WC item 03495) + 1.2*((Current assets (WC item 02201) - (Current liabilities (WC item 03101)]}	Graham (1996), Leary and Roberts (2005), Harford et al. (2009)
3	Asset tangibility	Proxy for collateral for borrowing. Defined as, TANG = Net plant property and equipment (WC item 02501) / total assets (WC item 02999). Sometimes referred to as tangible asset ratio.	Xu (2007), Harford et al. (2009), Lemmon et al. (2008), Hovakimian et al. (2004)
4	Average market leverage (or Long-term leverage ratio)	The average market leverage based on the leverage for the previous 3 years.	Uysal (2011)
5	Book leverage 1	Financial leverage measured using the book value of the firm. BL 1= Total debt (WC item 03255) / [total debt + book equity (WC item 03501)].	Xu (2007)
6	Book leverage 2	Financial leverage measured using the book value of the firm. BL 2= Total debt (WC item 03255)/[total assets (WC item 02999)].	Antoniou et al. (2008), Lemmon et al. (2008), Lang et al. (1996)
7	Capital structure	The mixture of securities (mainly debt and equity) and the financing sources used by firms to finance their real investments. It is often used	Myers (2001, p.81)

		interchangeably with financial leverage.	
8	Cash/debt acquisitions	Those acquisitions identified by Thompson One as having cash only or debt as the consideration offered in the deal. It does not include those acquisitions with their considerations listed as newly issued ordinary shares. It also excludes those that mix cash with other forms of securities or payment means.	Harford et al. (2009)
9	Cash ratio	Proxy for firms' internal cash holdings. Defined as, CASH = Cash and cash equivalent (WC item 02001) / total asset (WC item 02999)	Xu (2007), Harford et al. (2009)
10	Cash reserve	See cash ratio	
11	Corporate takeovers	The practice where one business entity acquires (or mergers with) another business entity. Used interchangeably with mergers and acquisitions (M&As) and the market for corporate control. We draw no strict distinctions between an acquisition and a merger.	
12	Cross-border acquisitions	Those acquisitions identified by Thompson One as having the acquirer and the target firm domiciled in two different countries. Specifically, those acquisitions by UK firms having non-UK target firms. Sometimes referred to as international or cross-country acquisitions.	
13	Cross-industry acquisitions	See diversifying acquisitions below.	
14	Diversification index	See Product Herfindahl index (HHI) below.	

15	Diversified firms	Firms reporting more than one product segments on Datastream. These are simply multi-segment firms. This classification is done based on data in the reference year.	
16	Diversifying acquisitions	Those acquisitions identified by Thompson One as having the acquirer and the target firm operating in different industries as defined by the 2-digit SIC code. Sometimes referred to as cross-industry acquisitions.	
17	Domestic acquisitions	Those acquisitions identified by Thompson One as having the acquirer and the target firm domiciled in the same country. Specifically, those acquisitions by UK firms having UK target firms. Sometimes referred to as national or within-country acquisitions.	
18	Expectants	Firms that are anticipating acquisitions in the near future. Specifically, it is generally used in the study to refer to firms in year *t* that made no acquisitions in years *t*+1 to *t*+4 but made acquisitions in year *t*+5.	
19	Financial leverage	The amount of debt in the capital structure of a firm. Unless otherwise specified, it refers to market leverage (see market leverage and leverage below).	
20	Firm size	The natural log of total annual net sales (WC item 01001).	Rajan and Zingales (1995), Mittoo and Zhang (2008), Hovakimian et al. (2004)
21	Focused firms	Firms reporting only one product segment on Datastream. These are simply single-segment firms. This classification is done based on data in the reference year.	

22	Foreign sales ratio	The ratio of the sum of foreign sales across geographic segments to total sales. The computations are based on geographic segmental data from Datastream.	Mittoo and Zhang (2008)
23	Growth opportunities	Defined as the market to book ratio. GROW = [Total assets (WC item 02999) - book equity (WC item 03501) + market equity (WC item 08001)] / total assets (WC item 02999).	Antoniou et al. (2008), Hovakimian et al. (2004), Baker and Wurgler (2002)
24	Industry concentration	The sum of squares of the individual firms' sales of all firms within an industry in a given year divided by the square of the sum of sales within the industry.	Uysal (2011)
25	Industry M&A liquidity	The sum of the transaction values of all the acquisition deals in a year within an industry divided by the total sales of all firms in that industry for that year.	Schlingemann et al. (2002), Uysal (2011)
26	Leverage	Short version of financial leverage (see financial leverage above). Used interchangeably with financial leverage (see market leverage).	
27	Leverage deviation	The difference between actual leverage ratio and the target leverage ratio of a firm.	Harford et al. (2009), Uysal (2011)
28	Market leverage	Financial leverage measured using the market value of the firm. ML= Total debt (WC item 03255)/ [total debt + market equity (WC item 08001)].	Xu (2007), Antoniou et al. (2008), Mittoo and Zhang (2008), Harford et al. (2009), Lang et al. (1996)
29	Mergers and acquisitions	See corporate takeovers above	
30	Missing R&D expense dummy	A dummy variable of 1 for firms that do not report R&D expense on Datastream, and 0 otherwise.	

31	Multiple acquirer	Refers to an acquiring firm that makes more than one acquisition in the 5 years following the reference year. Sometimes referred to as serial acquirer.	
32	Net debt issues	Net debt issues (NDI) = Change in total debt (WC item 03255) / total assets (WC item 02999).	Xu (2007), Lemmon et al. (2008), Hovakimian et al. (2004)
33	Net equity issues	Net equity issues (NEI) = [Change in book equity (WC item 03501) - Change in retained earnings (WC item 03495)] / total assets	Xu (2007), Baker and Wurgler (2002)
34	Non-debt tax shelter	NDTS = Accumulated depreciation (WC item 02401) / total assets (WC item 02999).	Antoniou et al. (2008), Fama and French (2002)
35	Non-expectants	Firms that are not anticipating any acquisitions in the near future. Specifically, it is generally used in the study to refer to firms in year *t* that made no acquisitions in years *t*-5 to *t*+5.	
36	Non-serial acquirer	See single acquirer.	
37	Normleveraged firms	Refer to firms that have leverage ratios that are within “reasonable”/ “optimal” limits. They are firms whose actual leverage ratios are relatively close to their target debt ratios. Often refer to firms in the second and third quartiles (Q2 and Q3) when the leverage deviation variable is sorted. Q2 firms are sometimes referred to as normleverage 1 or moderately underleveraged. Similarly, Q3 firms are sometimes referred to as normleverage 2 or moderately overleveraged.	

38	Overleveraged firms	Refer to firms that have leverage ratios that are far above "reasonable"/ "optimal" limits. They are firms whose actual leverage ratios are "far" greater than their target debt ratios. Often refer to firms in the fourth quarter (Q4) when the leverage deviation variable is sorted in an ascending order.	Uysal (2011)
39	Product Herfindahl index (HHI)	HHI = 1 - (Sum of the squares of individual segment sales) / (the square of total sales). The computations are based on product segmental data from Datastream.	
40	Profitability	PROF = EBITDA (WC item 18198) / total assets (WC item 02999).	Uysal (2011), Xu (2007), Baker and Wurgler (2002)
41	Ratio of acquirers	The proportion of firms that are identified as acquirers. In other words, the ratio of number of acquirers to the total number of firms (i.e. both acquirers and non-acquirers).	Uysal (2011)
42	Ratio of normleveraged acquirers	The proportion of firms that are identified as normleveraged acquirers. In other words, the ratio of number of normleveraged firms making acquisitions (normleveraged acquirers) to the total number of firms (i.e. both acquirers and non-acquirers).	
43	Ratio of overleveraged acquirers	The proportion of firms that are identified as overleveraged acquirers. In other words, the ratio of number of overleveraged firms making acquisitions (overleveraged acquirers) to the total number of firms (i.e. both acquirers and non-acquirers).	

44	Ratio of underleveraged acquirers	The proportion of firms that are identified as underleveraged acquirers. In other words, the ratio of number of underleveraged firms making acquisitions (underleveraged acquirers) to the total number of firms (i.e. both acquirers and non-acquirers).	
45	Reference year	The year in which they leverage deviation variable is computed. It corresponds to one of the years in the sample period (1996 - 2006) and serves as the reference year for determining future acquisition decisions.	
46	Related acquisitions	Those acquisitions identified by Thompson One as having the acquirer and the target firm operating in the same industry as defined by the 2-digit SIC code. Sometimes referred to as within-industry acquisitions.	
47	Research and development expense ratio	R&D = R&D expense (WC item 01201) / total asset (WC item 02999)	Uysal (2011), Fama and French (2002)
48	Serial acquirer	See multiple acquirer	
49	Single acquirer	Refers to an acquiring firm that makes only one acquisition in the 5 years following the reference year. Sometimes referred to as a non-serial acquirer.	
50	Stock/equity acquisitions	Those acquisitions identified by Thompson One as offering any of the following securities as consideration in the acquisition deal: (1) ordinary share, (2) common stock, and (3) newly issued ordinary share. It excludes those that mix these identified securities with other forms of securities or payment means.	

51	Stock return	The average of the monthly stock return for the 12-month period.	
52	Tangible asset ratio	See asset tangibility	
53	Target leverage	It is the unobservable "normal"/ "optimal" level of leverage ratio that firms strive to achieve. Defined here as the fitted value of the leverage regression in Eq. (4.3) (i.e. the predicted leverage ratio).	Kayhan and Titman (2007), Harford et al. (2009), Uysal (2011)
54	Underleveraged firms	Refer to firms that have leverage ratios that are "far" below "reasonable"/ "optimal" limits. They are firms whose actual leverage ratios are "far" less than their target debt ratios. Often refer to firms in the first quarter (Q1) when the leverage deviation variable is sorted in an ascending order.	
55	Within-industry acquisitions	See related acquisitions	

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Chapter 1

Introduction

1.1 Introduction

Mergers and acquisitions (M&As) have long attracted the attention of academics and non-academics alike. Scholars, business administrators, government officials, and the media have all concentrated – each group in its own way – on the examination of these corporate activities. Among some of the primary reasons for this attention on M&As are their frequent occurrence and economic significance in terms of the resources involved. For example, Figures 1.1 and 1.2, which present the size of M&A activity in the United Kingdom (UK) during the 2002-2011 period, highlight the growing significance of these deals for domestic companies.

The Office for National Statistics (ONS)[1] estimates that during the period 2002-2011, there has been as many as 10,551 completed M&A deals that involve UK firms (ONS Bulletin, 2012). That is, on average, there were over 1,000 completed M&As per annum during this period.[2] In terms of the resources involved, the ONS values these M&A transactions to be around £941 billion (in current prices), representing 7.1% of UK's gross domestic product (GDP) for the same period. These statistics imply that the average value of an M&A transaction is around £89 million, which suggests a significant investment of corporate resources for most firms that choose to undertake an acquisition. When we consider only M&A deals undertaken by UK acquirers (i.e. excluding deals having UK targets but with non-UK acquirers), the average transaction value drops to around £61 million (see Table 1.1 below) which still indicates substantial outflow of resources for UK acquirers.

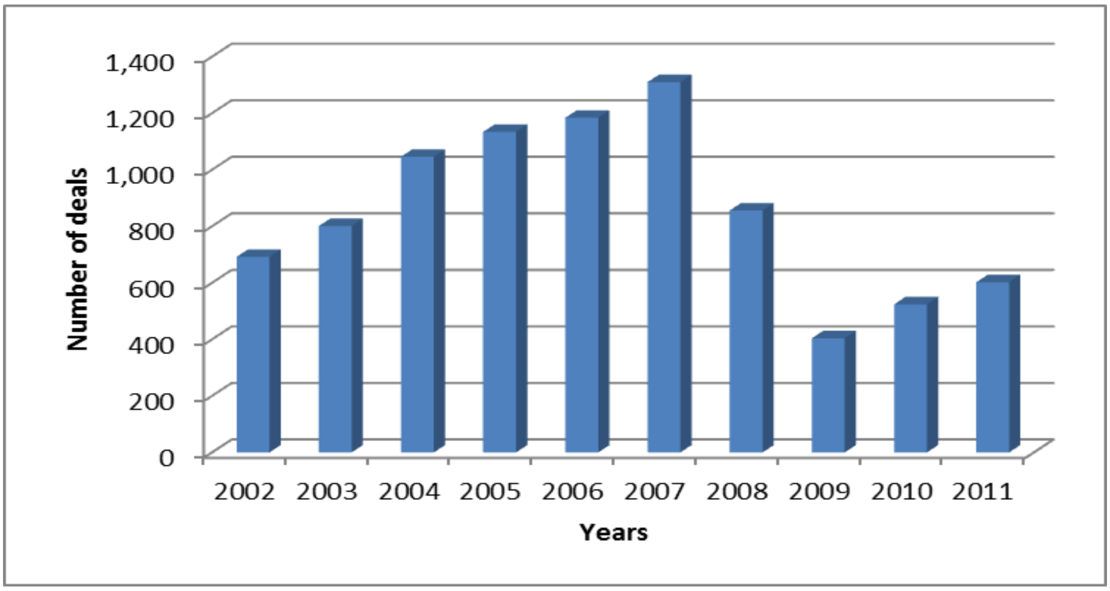
[1] The ONS is the national outfit which independently produces official statistics in the UK.

[2] The data from the ONS covers M&As involving UK firms (i.e. UK firms acquiring targets from home and abroad, and also foreign companies acquiring UK firms). The ONS statistics on M&As prior to 2010 exclude all M&As with transaction values below £0.1 million. However, the ONS raised its "M&A identification threshold" to £1 million in 2010. Hence, for years 2010 and 2011, M&A statistics from ONS exclude all transaction that are valued below £1 million.

Figure 1.1

The volume of completed M&As involving UK firms during 2002-2011

The chart shows the total number of acquisitions involving UK firms during 2002-2011. All acquisitions made between 2002 and 2009 are above £0.1m, and acquisitions in 2010 and 2011 are above £1m.

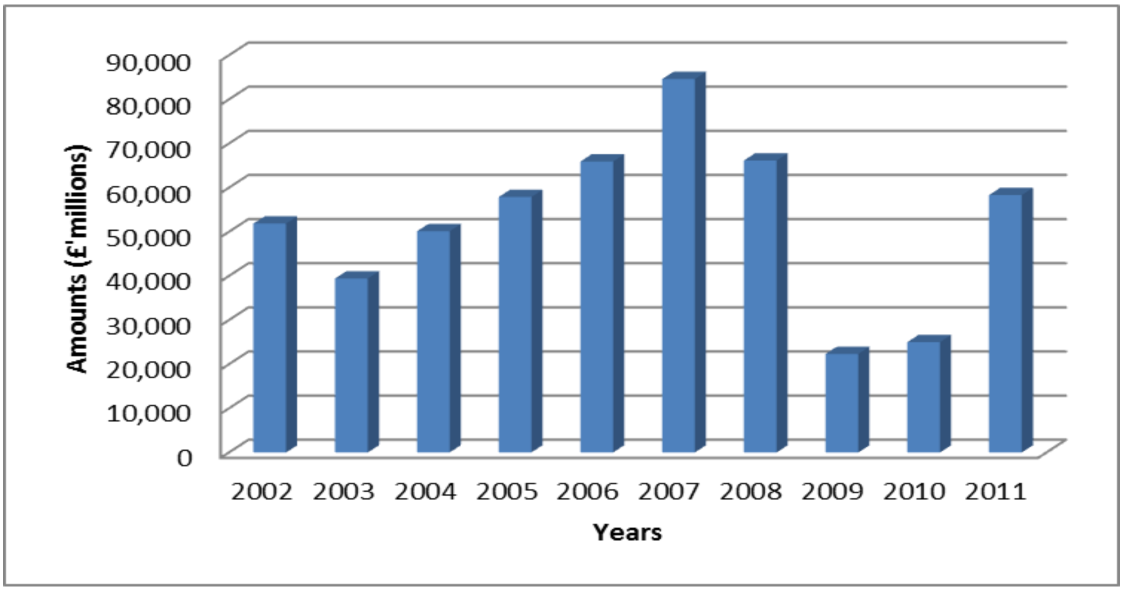


Source: *Office for National Statistics, 2012*

Figure 1.2

The value of completed M&As involving UK firms during 2002-2011

The chart shows the total value of acquisitions (in millions of pounds) involving UK firms during 2002-2011. All acquisitions made between 2002 and 2009 are above £0.1m, and acquisitions in 2010 and 2011 are above £1m.



Source: *Office for National Statistics, 2012*

Given the substantial corporate resources needed to execute M&As, it is very likely that there is a link between the size of M&A activity and the supply of external financing in the economy.[3] As shown in Figures 1.1 and 1.2, during the 2001-2007 period, which saw a substantial boom on the credit market (Ivashina and Scharfstein, 2010), M&A activity in the UK witnessed considerable growth. The M&A activity peaked in 2007 with around 1,310 completed transactions. However, after the 2008 Financial Crisis,[4] which resulted in a credit crunch, M&A activity in the UK started to decline. It could be argued that this dip in M&A activity is partially due to financing constraints imposed by the 2008 crisis.

It is also interesting to note that, at the height of the Financial Crisis (i.e. the 4th quarter of 2008 and the 1st quarter of 2009) when bank liquidity and lending were very low (see Ivashina and Scharfstein, 2010; Joyce, Tong, and Woods, 2011),[5] the size of M&A activity was at its lowest during the entire 10-year period, 2002-2011. Also, when the credit markets improved in 2010 (see Joyce, Tong, and Woods, 2011), there was a surge in the size of M&A activity in the UK. For instance, the value of M&As increased in 2011 to £58.3 billion from £25.0 billion in 2010, an increase of nearly 133%.

Overall, this anecdotal evidence is consistent with the notion that aggregate M&A activity is linked to the supply of credit in the economy (see Harford, 2005, p.530). This implies that, even when other conditions (e.g. growth opportunities) are conducive for firms to undertake M&A activity, general financing constraint (in the form of limited supply of credit leading to high cost of borrowing) could curtail the size of aggregate M&A activity observed in the economy.

[3] Firms can finance their investments (including M&As) from either their internal funds (e.g. retained earnings) or from external funds (new borrowing or new equity issues). When firms are faced with huge investments such as M&As, they are forced to seek additional funds from external capital markets, including banks. Depending on the supply of external capital (i.e. either capital liquidity or capital constraint), the levels of corporate investments may be affected via the cost of capital. The literature on capital structure is reviewed in Chapter 3.
[4] A comprehensive timeline for the recent financial crisis can be found at: http://timeline.stlouisfed.org/index.cfm?p=timeline.
[5] Ivashina and Scharfstein (2010) report that new lending to large borrowers fell by 47% during the peak period of the financial crisis (Q4 of 2008) relative to the previous quarter and by 79% relative to the peak of the credit boom (Q2 of 2007). In addition, Joyce et al. (2011) point out that the intensification of the financial crisis made the Bank of England cut the interest rate to a historically low of 0.5% and embark on a quantitative easing policy in March, 2009.

Another important feature of the UK M&A data is the growing importance of cross-border M&As. The number and value of domestic and cross-border M&As undertaken by UK firms over the period 2002-2011 are displayed in Table 1.1 and Figure 1.3. During the period 2002-2011, whilst the value of domestic acquisitions declined by 70%, there was a surge in the value of cross-border acquisitions from £26.6m in 2002 to £50.8m in 2011, representing an increase of 90.7%. The picture remains unchanged when the volumes (instead of the values) of domestic and cross-border acquisitions are considered. Specifically, the volume of domestic M&As dropped by about 21.9% between 2002 and 2011, whereas that of cross-border M&As increased by 1.5% over the same period.

In addition, as shown in Figure 1.3, although the number of domestic acquisitions always exceeded the number of cross-border acquisitions, the gap between the two types of acquisitions has decreased over time. The rise in the size of cross-border M&As in the UK seem to reflect a global trend. For example, Conn et al. (2005) report that the value of worldwide cross-border M&As has risen steadily from 0.5% of the world's GDP in the mid-1980s to over 2% in year 2000. This upward trend in the volume of cross-border acquisitions seems to have continued well beyond year 2000. In a more recent study, Erel, Liao, and Weisbach (2012) report that the global volume of cross-border M&A activity was 30% of the total M&A volume in 1998, but it jumped to 45% in 2007. These statistics underscore the need for recent studies on M&As to pay special attention to cross-border M&A deals.

Finally, Table 1.1 suggests that the average cross-border M&A transaction may require more external financing (e.g. borrowing) than the average domestic M&A deal. In particular, the average value of cross-border acquisitions is about 3 times the average value of domestic acquisitions (£102.4m vs. £39.7m), implying that any impact of external financing constraint on aggregate M&A activity could be more severe for cross-border acquisitions than for domestic acquisitions. It could be argued that, unlike large cross-border deals, relatively smaller domestic acquisitions could be undertaken using internal corporate funds without recourse to the external credit market.

Table 1.1

The volume and value of domestic and cross-border M&As undertaken by UK firms

The table shows the volume and value of domestic and cross-border acquisitions undertaken by UK firms during 2002-2011, distributed according to the year of acquisition. All acquisitions made between 2002 and 2009 are above £0.1m, and acquisitions in 2010 and 2011 are above £1m.

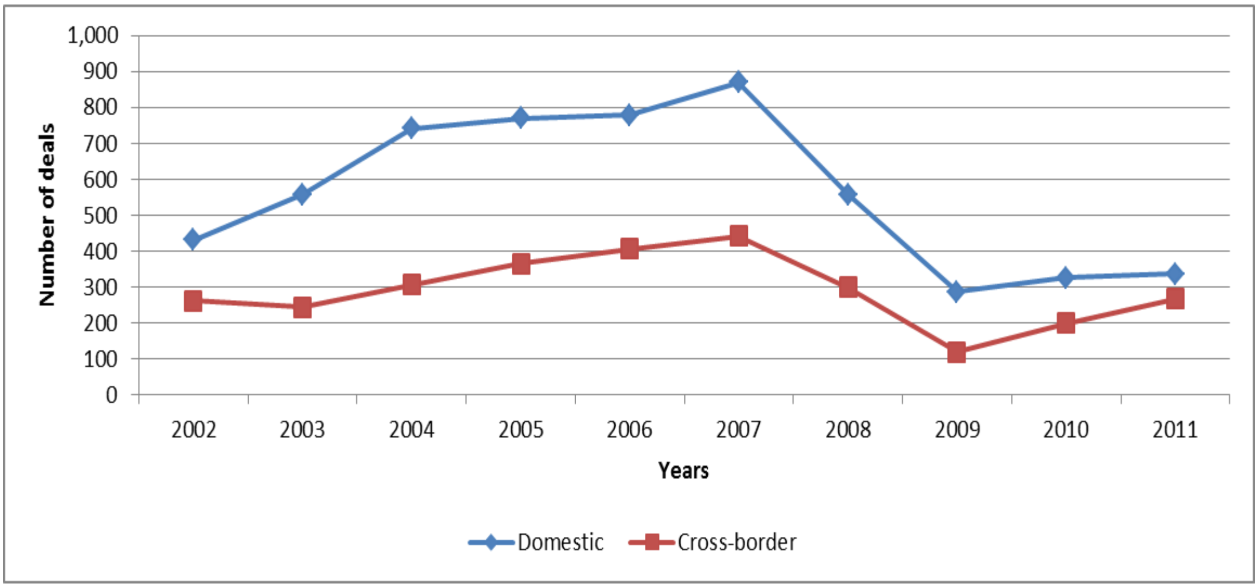
Years	Domestic		Cross-border		Total	
	Volume	**Value (£m)**	**Volume**	**Value (£m)**	**Volume**	**Value (£m)**
2002	430	25,236	262	26,626	692	51,862
2003	558	18,679	243	20,756	801	39,435
2004	741	31,408	305	18,709	1,046	50,117
2005	769	25,134	365	32,732	1,134	57,866
2006	779	28,511	405	37,412	1,184	65,923
2007	869	26,778	441	57,814	1,310	84,592
2008	558	36,469	298	29,670	856	66,139
2009	286	12,195	118	10,148	404	22,343
2010	325	12,605	199	12,414	524	25,019
2011	336	7,562	266	50,763	602	58,325
Total	**5,651**	**224,577**	**2,902**	**297,044**	**8,553**	**521,621**

Source: *(ONS, 2012)*

Figure 1.3

<u>The number of domestic and cross-border M&As undertaken by UK firms during 2002-2011</u>

The chart shows the total number of domestic and cross-border acquisitions made by UK firms during 2002-2011. All acquisitions made between 2002 and 2009 are above £0.1m, and acquisitions in 2010 and 2011 are above £1m.



Source: *Office for National Statistics, 2012*

1.2 Motivation for the study

Despite the general link between aggregate M&A activity and financial liquidity (or financial constraint) at the *macro level*, until recently, it was unclear how corporate M&A activity and financing constraints were related at the *firm-level*. Extending this link to the firm-level is important because, given the volume of credit supply in an economy, the ability of individual firms to access the credit market may differ depending on their past financial structures and risk profiles (Lemmon and Roberts, 2010). For example, Lemmon and Roberts (2010) show that riskier firms have a different response to credit contractions (i.e. reductions in the supply of credit) relative to less risky firms. Specifically, they report that riskier firms experience sharper decline in net security issuance and net investments relative to their less risky counterparts.

Two recent papers, Uysal (2011) and Harford, Klasa, and Walcott (2009),[6] provide a more detailed analysis of the potential link between M&A activity and debt financing constraint at the firm-level. These papers utilise the concept of *target leverage ratio* to classify firms into different groups in terms of their ability to raise external debt capital. The trade-off theory of capital structure suggests that firms have target leverage ratios that are based upon costs and benefits of debt financing (see Leland, 1998; Fama and French, 2005; Graham, 2000). However, it seems to be a common corporate practice for firms to deviate from their target leverage ratios (Leary and Roberts, 2005; Frank and Goyal, 2007; and Byoun, 2008), and these deviations could influence their abilities to access further debt capital (Hovakimian, Olper, and Titman, 2001; Harford et al., 2009).[7]

In fact, Uysal (2011) suggests that deviations from firms' target leverage ratio (leverage deviation, henceforth) create debt financing constraint, which, in turn, influences firms' subsequent M&A activities. Specifically, Uysal (2011) reports that leverage deviation (particularly overleveraging)[8] is associated with a reduced likelihood of undertaking an

[6] We comprehensively review these two studies, the concept of target leverage ratio, and the trade-off theory in Chapter 3. The target leverage ratio is the "optimal" leverage ratio that maximizes the market value of the firm's equity.
[7] Indeed, it is plausible that there is no optimal leverage ratio (as suggested by the pecking order literature reviewed in Chapter 3). However, this study is built upon the target leverage literature.
[8] Uysal (2011) uses the term leverage deficit instead of leverage deviation. He defines leverage deficit as the difference between actual leverage and target leverage. Overleveraging (underleveraging) refers to the situation

acquisition. His finding implies that the past and current leverage policies of a firm could impose financing constraints on it and subsequently restrict its ability to launch acquisitions in future. The present study is closely related to Uysal's (2011) work but also makes several important extensions to it, which helps us to contribute to this relatively new, but growing, strand of literature on the link between M&As and capital structure.[9]

1.3 Objectives and contributions of the study

Despite the voluminous research in the areas of M&As and capital structure, these two topics in corporate finance have been studied independently without much attention given to the linkage between them. This gap in the literature has led to some review papers in the area of capital structure call for research that focuses on the connections between corporate M&A and capital structure decisions (see Frank and Goyal, 2007, p.31; Welch, 2006, p.27-28). To the best of my knowledge, only two US studies have responded to this call. Therefore, this study contributes to this relatively new literature by exploring the relationship between corporate M&A activities and corporate financial leverage policies. Specifically, the study attempts to make contributions to the literature in two important ways. In particular, this study examines:

(1) how firms' past and current leverage deviations are related to their probability of undertaking acquisition; and

(2) the role of anticipation of acquisition in the capital structure rebalancing behaviour of firms.

In relation to the association between leverage deviation and acquisition probability, the study makes at least three important contributions to the literature. First, unlike Uysal (2011) who restricted his study to only *domestic* acquisitions made by US firms, the present study re-examines the association between leverage deviation and acquisition probability within a framework that incorporates *cross-border* acquisitions. As suggested in Section 1.1, globalisation has partly fuelled the growth of cross-border M&As across the globe, with the

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where a firm's actual leverage ratio is greater (less) than its target leverage ratio. Chapter 4 undertakes a detailed discussion on the leverage deviation variable.

[9] It is important to highlight that we started working on this idea (i.e. the association between M&A activities and financial leverage) in January, 2009, and later came across Uysal's article which then became one of the relevant papers that influenced our study. To be more specific, we first came across the working paper version of Uysal's work (dated November 17, 2010) in March, 2011. Later, we saw the peer-reviewed version of his article in January, 2012.

UK being no exception. Thus, cross-border acquisitions have become increasingly important in recent years, and thus deserve more research attention.

In the light of the relevance of cross-border acquisitions, the non-inclusion of cross-border M&As in Uysal (2011) leaves an important gap in our understanding of the link between leverage deviation and acquisition probability. More importantly, cross-border acquisitions tend to be larger than domestic acquisitions (see Table 1.1; Ozkan, 2012) and are therefore more likely to require external financing. Consequently, the association between leverage deviation and acquisition probability (i.e. the leverage deviation effect, henceforth) should be weaker in an acquisition sample comprising of only domestic M&As. Overall, the exclusion of cross-border acquisitions from Uysal's (2011) study does not only present a *partial* view of the association between leverage deviation and acquisition probability, but it is also likely to *underestimate* the strength of the association between the two variables (i.e. leverage deviation and acquisition probability). This study is, therefore, the first to present a relatively more *complete* view of the relationship between leverage deviation and acquisition probability by examining both domestic and cross-border acquisitions.

Second, this study is the first to examine the association between leverage deviation and acquisition probability within the context of corporate diversification. In this regard, we explore the role of diversification from two different perspectives:

(1) The pre-acquisition diversification characteristic of the acquiring firm (i.e. whether the acquirer is a diversified or focused firm); and

(2) The diversification characteristic of the acquisition deal (i.e. whether the acquirer undertakes a diversifying or a non-diversifying acquisition).

Despite the notion that diversified and focused firms differ in ways that make lenders adopt different lending policies towards them (Singhal and Zhu, 2011), prior studies assume that the association between leverage deviation and acquisition probability is symmetric for firms with different organisational structure (i.e. diversified vs. focused firms). Therefore, the present study attempts to distinguish between the varying effect of leverage deviation on acquisition probability for diversified acquirers and for focused acquirers.

In addition, this study examines how the leverage deviation effect may vary depending on the type of acquisition (diversifying vs. non-diversifying) being undertaken. This line of inquiry is mainly inspired by the view that the risk-reduction associated with diversifying acquisitions could improve the borrowing ability of a merged firm (Lewellen, 1971).[10] Overall, it seems no empirical study has so far examined how corporate diversification could influence the linkage between M&A activities and leverage deviation. This study attempts to fill this gap.

Third, the two prior studies on the association between leverage deviation and M&A activities were both based on US data. Thus, no empirical evidence exists on this subject for non-US firms. Therefore, this study becomes the first to re-examine the leverage deviation effect outside the US setting. In the light of the notion that corporate capital structure decisions may vary across countries (Rajan and Zingales, 1995; Antoniou et al., 2008), this contribution is significant because the leverage deviation effect is underpinned by firms' willingness to borrow in order to support their acquisitions (Uysal, 2011). Therefore, if the appetite for debt financing of US firms is substantially different from those of other countries, then Uysal's (2011) finding may not necessarily be applicable to firms in other parts of the world, necessitating the re-examination of the issue within a different environment.

In bridging this gap, the present study addresses the issue of the association between leverage deviation and acquisition probability based on UK firms. The UK is one of the countries which is very active on the market for corporate control. For instance, at the end of year 2000, the UK alone accounted for 31% of global cross-border M&As, making her the largest acquiring country globally (UNCTAD, 2000). Therefore, any study which focuses on the acquisition activities of UK firms could be of immense importance to several stakeholders (e.g. corporate managers and scholars).

[10] We also draw on the agency literature to show how the association between leverage deviation and acquisition probability may differ among the different types of acquisitions. We derive the testable hypotheses in Chapter 6.

The final contribution of this study relates to the literature on the existence and relevance of the concept of target leverage ratio. The debate in this literature is central in testing the trade-off theory of capital structure. This debate revolves around the view that if the trade-off theory is true, then firms will be quick in eliminating deviations from their target leverage ratios. A fast speed of adjustment (SOA) has been interpreted as evidence in support of the trade-off theory, while slow SOA is regarded as evidence against the trade-off theory (see Fama and French, 2002; Leary and Roberts, 2005; Frank and Goyal, 2007). The empirical evidence on this matter is mixed, and one explanation proposed in this study is that the SOA is *asymmetric* for different firms on two counts:

(1) the degree of leverage deviation (i.e. whether firms are very far away from or close to their target leverage ratios); and

(2) the anticipation of acquisitions (i.e. whether or not firms anticipate to undertake acquisitions in the immediate future).[11]

To the best of my knowledge and belief, this is the first study to incorporate the extent of leverage deviation and the anticipation of acquisition into the speed of adjustment framework, and this analysis could help in reconciling some of the conflicting findings in prior studies.[12]

More specifically, the objectives of this study are as follows:

(1) To verify whether the association between leverage deviation and acquisition probability (i.e. the leverage deviation effect) persists in a UK sample that also includes both domestic and cross-border M&A deals.

(2) To study the role of corporate diversification in either mitigating or accentuating the leverage deviation effect.

(3) To examine the extent to which firms' leverage deviations and their anticipation of acquisitions influence corporate speeds of adjustment towards target leverage ratios.

[11] The capital structure literature is reviewed in Chapter 3, and the hypotheses relating the SOA are formulated in Chapter 7.

[12] Different studies report different SOAs. For instance, Huang and Ritter (2005) report that firms have a "snail" pace SOA of 11% whereas Flannery and Rangan (2006) document a fast SOA of 34%.

The contributions of this study are directly related to the fulfilment of the above stated objectives. The issues outlined above have hardly been tested empirically, and a full empirical examination of these issues, to the best of our knowledge, has not been published before.

1.4 Outline of the thesis

Chapter 2 reviews the literature on M&As. It focuses on the principal motivations for M&As and how the method of financing, the diversification characteristic of M&A transactions, and agency considerations could influence the acquirers' shareholders' wealth following the announcement of M&As. It also considers how M&As affect the interests of bondholders. The review in this chapter helps to understand: (1) why value-increasing managers may prefer particular forms of acquisition financing to others; and (2) why shareholders and debtholders may prefer certain types of acquisitions to others. The issues arising from this review are later used to derive relevant hypotheses for testing.

Chapter 3 examines the general framework by which financial leverage policies (i.e. aggressive and conservative debt policies) of firms are related to corporate M&A activities, with the objective of setting the foundations for the derivation of the central hypotheses of the study. The chapter relates leverage deviation to debt financing constraint, tracking them back to the dominant theories of capital structure. The chapter also comprehensively reviews the two closely related studies by Uysal (2011) and Harford et al. (2009) and points out the various specific ways in which the present study is different from them. Next, the two central hypotheses of the study are formulated.

Chapter 4 examines the general empirical framework used in addressing the issues relating to both the leverage deviation effect and the speed of adjustment tests. It is worth noting that this study explores two broad empirical issues (i.e. the leverage deviation effect and the speed of adjustment tests) that require different methodologies. While the *specific* methodologies and data requirements are not covered here, the chapter covers the *general* data and methodological issues that transcend the two broad empirical issues. It considers the ways in which the sample firms and the M&A data were collected. Summary statistics on these samples are also discussed. The chapter also considers the definition and construction of the two key variables of the study, financial leverage and leverage deviation.

Chapter 5 presents the first set of empirical tests of the relationship between leverage deviation and acquisition probability. The specific empirical method (i.e. the acquisition probability model) and the subsamples needed to test the various hypotheses relating to the leverage deviation effect are discussed. It also considers the rationale for the choice of the probit regression model. Next, the chapter presents and discusses the findings on the test of the association between leverage deviation and acquisition probability. Further, the chapter presents and discusses the results on the leverage deviation effect for cash/debt-financed acquisitions and for equity-financed acquisition. Finally, robustness tests are conducted and discussed.

Chapter 6 provides an analysis of how corporate diversification could influence the leverage deviation effect. It derives and tests the hypotheses on why the leverage deviation effect may not be uniform for acquirers engaging in cross-industry (diversifying) acquisitions and those engaging in within-industry (related) acquisitions. It also formulates, and tests the hypotheses on the varying effect of leverage deviation on domestic acquisitions and cross-border acquisitions. The chapter finally considers how the pre-acquisition diversification characteristic of the acquiring firm (i.e. diversified or focused) could influence the leverage deviation effect identified in the previous chapter.

Chapter 7 provides an analysis of the speed of adjustment tests. It contains the specific empirical method (i.e. the partial adjustment model) and the various subsamples used in testing the hypotheses relating to the speed of adjustment (SOA) tests. It also derives the two SOA hypotheses that are tested in the chapter. Last, the chapter empirically examines the degree of deviation (DoD) hypothesis and the anticipation of acquisition (AoA) hypothesis.

Finally, Chapter 8 presents a summary of the results and the conclusions of the study as well as the limitations of the study. In addition, the chapter makes some suggestions for further inquiry.

Chapter 2

Mergers and Acquisitions: A Literature Review

2.1 Introduction

As noted in Chapter 1, the key objective of this study is to examine the relationship between firms' decision to engage in mergers and acquisitions (M&As) and their financial leverage. Specifically, this study endeavours to address two important questions:

1) Is there a link between firms' deviations from their target leverage and the probability of these firms undertaking M&As?
2) Do firms that anticipate M&As adjust their leverage faster or slower than those that do to anticipate M&As?

Moreover, the study examines the possible role of corporate diversification (industrial and geographic) and the methods of payment (debt and equity) within the context of the link between M&As and financial leverage.

This chapter provides a review of the related theoretical and empirical literature on M&As. This review, coupled with the brief review of the literature on capital structure provided in Chapter 3, will later be utilized to derive testable hypotheses on the link between M&As and financial leverage. The following four relevant strands of the M&As literature are reviewed in this chapter: (1) the literature on motives for M&As; (2) the literature on the impact of M&As on shareholders and bondholders; (3) the literature on the link between M&As and the extent of corporate diversification; and (4) the literature on the financing methods used for M&As.

The rest of the chapter is structured as follows. Sections 2.2 and 2.3 respectively review the theoretical and empirical literature on the motives for M&As. Section 2.4 reviews the literature on the impact of corporate diversification and the methods of payments in explaining the shareholder wealth effect of M&As as measured by stock price reaction around M&A announcements. Section 2.5 turns attention to the literature on the impact of M&As on bondholders, and Section 2.6 concludes the chapter.

2.2 Why do firms undertake mergers and acquisitions?

The management and finance literature on the reasons why firms undertake M&As is immense. This literature pays considerable attention to the following three motives for M&As:

1) M&As are undertaken by managers to utilise synergy gains (synergy motives);
2) M&As are undertaken by managers to benefit themselves at the expense of their shareholders (agency motives); and
3) M&As are undertaken by managers because of valuation errors (hubris/behavioural motives).

2.2.1 Synergy motives for M&As

A frequently cited rationale for M&As is the possible synergy gains associated with these deals (see DePamphalis, 2010). It is argued that firms are likely to obtain synergistic gains by acquiring:

a) poorly-run firms with the aim to improve efficiency by disciplining or eliminating inefficient managers (Manne, 1965; Palepu, 1986; and Bhagat et al., 1990);
b) in response to various market phenomena, such as industry shocks and technological changes (Mitchell and Mulherin, 1996; and Jovanovic and Rousseau, 2002); and/or
c) in response to financing opportunities (Lewellen, 1971; Myers and Majluf, 1984; and Fluck and Lynch, 1999).

The key assumption made in the synergy-based (motive) literature is that managers (especially those of acquiring firms) undertake M&As primarily to increase the wealth of their existing shareholders, and will, therefore, not engage in acquisitions that are likely to destroy the value of their firms (Berkovitch and Narayanan, 1993). The following subsections review the important synergistic benefits associated with M&As.

a. M&As and monopoly power

The early literature highlights that M&As (especially horizontal M&As) are motivated by the desire of firms to create market power (see Stigler, 1964). Stigler (1964) suggests that M&As, by reducing industry competition, provide unique opportunities to merging firms to easily collude with their rivals in order to restrict output to monopoly levels. As noted by Blair and Harrison (1993), without competition in output markets, firms have the power to raise prices and harm customers. Within this context, M&As enable firms to increase their shareholders' wealth at the expense of customers by charging higher prices. However, most of the M&A deals that are likely to fall under the market power hypothesis are challenged and blocked by the government under anti-trust (competitive) laws (see Manne, 1965; and Vickers, 2004). This reduces the possibility of generating merger gains for shareholders via this channel. Nonetheless, given the fact that a number of proposed acquisition transactions are challenged and sometimes prevented on anti-competitive grounds, obtaining market power may be an important motivation for managers to engage in M&As[13].

b. M&As and reduced bankruptcy

It is also argued that M&As may be beneficial when target firms are near the point of bankruptcy (see Dewey, 1964; and Manne, 1965). Dewey (1964) points out that bankruptcy often turns out to be costly to various stakeholders (e.g. shareholders, creditors, employees, etc.). He further notes that weaker firms that are close to bankruptcy often do not have the capacity to effectively compete with healthy firms. With dwindling sales and operating cash flows, such firms end up failing and exiting the market. He suggests that mergers, even if they result in increased industry concentration, could be better alternative to bankruptcy. In effect, acquisitions occur as an attempt to salvage failing firms, and in the process create "value" (i.e. secure a better deal) for the shareholders of both firms (healthy and failing firms) (see Dewey, 1964).

[13] Vickers (2004) notes that in the UK, the Office of Fair Trading (the state outfit charged with preliminary investigations into anti-competitive mergers) refers an average of between 10 to 15 proposed merger transactions (per annum) to the Competition Commission (the other regulatory authority charged with in-depth investigations and the determination of whether or not a merger is anti-competitive).

c. M&As and inefficient management

As an extension to Dewey (1964), Manne (1965) proposes the *inefficient management hypothesis*, which postulates that acquisitions provide opportunities for firms to compete for the right to control scarce corporate resources. Manne (1965) suggests that acquisitions occur when more efficient managers buy the right to manage (and control) the resources of poorly-managed firms from inefficient managers. He argues that if it is justified for mergers to be used to save failing firms, then it should be equally justified when it is used to acquire controlling rights of an inefficient firm in order to prevent the possibility of bankruptcies in the first place. The inefficient management hypothesis is usually tested on the basis of the assumption that stock prices of firms are strongly (and positively) related to the quality and efficiency of corporate managers (Manne, 1965, p.112). Therefore, when a poorly-managed firm fails to generate appropriate returns for its shareholders (as could be achieved under alternative managements), its share price declines relative to the prices of other firms in the industry or the market as a whole. This decline in stock price, in turn, facilitates acquisitions of the poorly-run firm, thereby placing their resources under the control of a more efficient management (Manne, 1965). Consequently, this transfer of resources to efficient managers is likely to create value for shareholders of both acquiring and target firms.

d. M&As, growth opportunities and technology

Based on the Q-theory of investment (see Hayashi, 1982)[14], Jovanovic and Rousseau (2002) suggest that synergistic gains are created when the existing capital stock, as well as, any remaining growth opportunities of firms with inferior technologies are transferred to firms with superior technologies. Their model considers a situation where the state of technology (encompassing all the methods, processes, and capabilities used in production) makes it possible for synergy to be realised when a high-Q firm acquires a low-Q firm. Firms' decisions to expand (by undertaking acquisitions, for example) and/or to exit (by becoming an acquisition target, for example) depend on a cut-off Q, which is considered as the minimum growth potential. The cut-off Q is a function of the required standard of technology in the industry. Jovanovic and Rousseau (2002) posit that firms below the cut-off Q (i.e. low-Q firms with inferior technology) must exit by liquidating or by being acquired, while firms above the cut-off Q (i.e. high-Q firms with superior technology) should seek further

[14] The Q-theory of investment postulates that a firm's investment rate should rise with its Q (i.e. the ratio of market value to the replacement value of assets).

expansion possibly through acquisitions. Consequently, M&As allow superior (high-Q) firms to apply their technologies to the existing assets and growth opportunities of inferior (low-Q) firms. This process, they conclude, is likely to create value for shareholders.

e. M&As, information asymmetries and debt capacity

As in the Q-theory-based explanation for M&As, Myers and Majluf (1984) and Fluck and Lynch (1999) present models in which M&As enable firms to transfer the internal financing capabilities (not technology, as in Jovanovic and Rousseau (2002)) of a superior firm (i.e. a financially unconstrained firm) to fund the growth opportunities of an inferior firm (i.e. a financially constrained firm). These papers argue that when a firm lacks the financial capacity (i.e. the firm is financially constrained possibly because it is unable to borrow and also has insufficient internal funds) to finance its own profitable growth opportunities, it could be motivated to seek a merger with another firm which has substantial financial capacity (e.g. a firm with large internal funds and borrowing ability).

Specifically, Myers and Majluf (1984) posit that, in the presence of information asymmetries in financial markets, firms facing high cost of raising external funds may resort to M&As as alternative means of financing profitable investments. In Myers and Majluf (1984), the sharing of internal corporate information between prospective merging firms and the scrutiny of the accounting books, which is usually an important element of M&As negotiations, mitigate the information asymmetry problem. Similarly, Fluck and Lynch (1999) postulate that, in the presence of severe agency problems, financially constrained firms with marginally profitable investment opportunities could avert underinvestment problems by identifying merger partners which have the financial capacity to fund their investments.

f. M&As, co-insurance and debt capacity

Lewellen (1971) also advances financial motives for M&As. In particular, he emphasizes how the benefits of external (debt) financing could motivate wealth-maximising firms to pursue M&As. Firstly, he notes that, given the benefits of debt financing such as tax savings (see Graham, 2000), wealth-maximising firms may attempt to acquire firms that have *unused debt capacity*. This is what has become known in the literature as the *unused debt capacity* *hypothesis*. The literature on capital structure[15] suggests that firms have a defined debt capacity, which represents the maximum amount of borrowing they can maintain (Myers, 1977). Firms that have debt levels below their debt capacity are deemed to be foregoing potential benefits of debt financing (see van Binsbergen, Graham, and Yang, 2010) and could become potential targets for acquirers that seek these benefits (Lewellen, 1971). Thus, M&As may be motivated by one firm's quests to exploit the untapped debt benefits (e.g. tax savings) of another firm. This may be consistent with Manne's (1965) inefficient management hypothesis.

Secondly, Lewellen (1971) puts forward the *increased debt capacity hypothesis* as another motive for M&As. This hypothesis focuses on 'financial synergies' that result from conglomerate acquisitions (see DePamphalis, 2010). Lewellen (1971) argues that mergers (especially conglomerate mergers) have the potential to create additional value for firms by increasing their debt capacity through the "co-insurance effect". Specifically, Lewellen (1971) posits that mergers between two firms with imperfectly correlated cash flows create a combined entity that has less volatile cash flows. This enhanced stability in cash flow created by M&As induces lenders to increase the limits on lending (debt capacity) to the combined firm above the sum of the original limits. Therefore, due to M&As, firms are able to increase their debt capacity without necessarily increasing their default (bankruptcy) risks. In other words, the hypothesis predicts lower default risks and higher borrowing for the combined firm subsequent to M&As, especially after conglomerate mergers. Consequently, given the potential benefits from debt financing (see Graham, 2000; Korteweg, 2010), the increased debt capacity hypothesis suggests that some M&As may increase firm value.

g. M&As and misvaluation

The misvaluation hypothesis suggests that acquisitions occur when the market fails to price the stocks of firms correctly (Rhodes-Kropf and Viswanatham, 2004; Rhodes-Kropf, Robinson and Viswanatham, 2005). Consequently, managers may exploit the inefficiencies in the capital markets to create wealth for their shareholders. In general, managers have superior information about their own firms (Seyhun, 1992; Ataullah et al., 2012), and rational

[15] The theory of capital structure will be reviewed in the next chapter – Chapter 3.

managers can make gains for their shareholders (at least in the short-run before the market corrects itself) from timing anomalies resulting from irrationality in the capital market (Baker and Wurgler, 2002; Huang and Ritter, 2005).

Within the context of M&As, Shleifer and Vishny (2003) suggest that when managers perceive the market to have overvalued their equity, they are motivated to use their overvalued stock to acquire the real assets of other firms that are undervalued by the market. This implies that "smart" overvalued firms will inexpensively acquire undervalued (or less overvalued) firms by taking advantage of the market anomaly, and finance acquisitions with their overvalued stock (see van Bekkum et al., 2011). Shleifer and Vishny (2003) further posit that since market errors tend to get corrected in the long-term, overvalued firms undertaking stock acquisitions seek to cushion themselves against future downfalls by selecting relatively undervalued targets.

In summary, mergers can occur when the collective "mistake" of investors (or the capital markets) presents incentives for "insider" managers to take advantage of their superior information to create value for their shareholders. Rhodes-Kropf and Viswanatham (2004) deduce two main implications from the misvaluation arguments. First, mergers are expected to be prevalent during periods of high market (mis)valuation. Second, overvalued acquirers are more likely to use stock (rather than cash) as a currency in their acquisition transactions.

2.2.2 M&As and the agency theory

Agency theory is a fundamental building block of the modern corporate finance literature (see Jensen, 1986; Tirole, 2005). A key assumption in the corporate finance literature is that managers pursue policies primarily to benefit themselves even if these policies lead to a reduction in the value of their firms (see Becht et al., 2003; Tirole, 2005). Unlike the synergy literature, the M&A literature based on the agency theory suggests that the key driver of M&As is the self-interest of the acquirers' incumbent managers, which may diverge from the interests of their shareholders (e.g. Jensen, 1986; Shleifer and Vishny, 1989; Masulis et al., 2007).[16] A seminal contribution to the agency theoretic M&A literature is the “free cash flow hypothesis” by Jensen (1986). Jensen (1986) posits that managers assign low opportunity cost to their internal (free) cash flows that are not needed for re-investment into their normal business activities. Consequently, these managers misallocate the free cash flows on low-return, or even negative, net present value (NPV) acquisitions. The main implication of his theory is that firms with excess cash flow and limited investment opportunities are more likely to undertake value-destroying acquisitions (see also Stulz, 1990).

Managers may want to spend internally generated funds on low-yielding acquisitions for several reasons. First, Shleifer and Vishney (1989) show that managers might selectively acquire firms that enhance the dependence of the combined firm on their own knowledge and skills even when such acquisitions reduce shareholders’ wealth. For example, “specialist” managers may want to acquire firms in their own lines of business, so that the future prospects of the merged firm continually depends on their “specialist” skills and knowledge (see also Berkovitch and Narayanan, 1993). Second, Gorton et al. (2009) show that through acquisitions, managers are able to build “empires” as a means of defending their firms from being acquired. Similarly, Masulis et al. (2007) point out that managers make acquisition decisions in order to enlarge their firms, which, in turn, enables them to build spheres of influence and augment their compensation.

Overall, the main implication of the agency-based literature is that M&As are implemented by managers to extract benefits for themselves rather than to increase shareholders’ wealth. Consequently, M&As are likely to result in losses to shareholders, particularly when managers make gains.

2.2.3 M&As and managerial optimism (i.e. Hubris)

The hubris hypothesis was put forward by Roll (1986). Roll argues that managers pursue M&As because they are overconfident and/or over-optimistic in estimating the value of target

[16] It is also relevant to note that the literature suggests that the agency motive is important in explaining the existence of defense mechanisms used by target firms to reduce the likelihood of being acquired. However, since the study focuses on acquiring firms, the agency arguments in relation to target firms are not discussed.

firms and merger synergies. Moreover, due to their optimism, they may end up paying too much for their targets. As Roll (1986) notes, there may be fundamental reasons (e.g. synergy or agency) why a firm may want a merger. But those reasons alone may not be enough to spark an acquisition. What actually triggers an acquisition is the acquirers' managers' *subjective* estimate of the value of synergy gains. According to Berkovitch and Narayanan (1993), although managers always either overestimate or underestimate merger synergies, they undertake acquisitions only when there is overestimation of the value of potential synergies. Within this context, mergers take place when CEOs are over-optimistic (over-confident) about the potential synergies and their abilities to materialise these synergies.

Roll (1986) further suggests that when managers are over-optimistic about potential merger synergies and decide to put in a bid, they are more likely to overpay for the target firm, especially when they are competing against other bidding managers. This overpayment results in the so-called "winner's curse". It has been suggested that managers' overconfidence is not the only cause of the "winner's curse" problem (see Morck, Shleifer and Vishney, 1990). Genuine errors by managers due to their beliefs about the valuation of target companies may also lead them to overpay for acquisitions (DePamphilis, 2010). Also, Morck et al. (1990) point to agency as a possible driver of overpayment, since some acquirers systematically overpay for the right to control the resources of the target firm.

Overall, a pure-hubris driven merger is expected to result in zero gains for shareholders of the combined firm because any overpayment to targets' shareholders merely represents a transfer of wealth from acquirers' shareholders to targets' shareholders (Berkovitch and Narayanan, 1993).

2.3 A review of empirical studies on M&A motives

What actually drives corporate M&A activities? As discussed above, the theory on this issue offers several possible motives for M&As. Also, the above discussion suggests that these potential motives may have different implications for the impact of M&As on shareholders' wealth. On the one hand, when managers seek acquisitions to exploit synergies (i.e. the synergy motive), M&As are likely to create wealth for their shareholder. On the other hand, when managers seek acquisitions because they pursue their own interest at the expense of their shareholders (i.e. the agency motive), or managers engage in acquisitions because they overestimate their abilities to realise gains (i.e. the hubris explanation), M&As are likely to destroy shareholders' wealth. Thus, given these countervailing implications, it is important to empirically determine why firms undertake M&As.

The empirical literature on M&As is large. A major portion of this empirical literature examines the impact of M&As by utilising the event-study methodology to estimate abnormal returns around M&A announcements (see e.g. Jarrell, Brickley, and Netter, 1988; Healy, Palepu, and Ruback, 1992; Bhagat, Dong, Hirshleifer, and Noah, 2005). Due to space constraints, a comprehensive review of this literature is not provided here. More importantly, a comprehensive review of this literature is not the focus of this chapter[17] because most studies within this literature usually present the average wealth effect observed in a particular M&A sample, without making any conscious efforts to distinguish among the various merger motives that may be present in that M&A sample. However, some of these studies that incorporate the means of payment and corporate diversification into their analyses are later reviewed in this chapter.

The first study to be reviewed, Berkovitch and Narayanan (1993) employs US acquisition data, while the second study, Hodgkinson and Partington (2008), uses a sample of UK acquisitions. The final study, Goergen and Renneboog (2004), examines European M&As deals. Despite the differences in the sample composition of these studies, they share a common methodology, which is based on analysing the correlation between the M&A gains earned by the target firm, the acquiring firm, and the combined firm. To the best of my knowledge, this approach was first utilised by Berkovitch and Narayanan (1993). We briefly review the Berkovitch-Narayanan methodology before reviewing the three studies.

[17] See Jarrell et al. (1988) and Martynova and Renneboog (2008) for a comprehensive review of this literature.

2.3.1 The Berkovitch-Narayanan (1993) approach

Berkovitch-Narayanan (1993) propose a way to directly distinguish among the three major motives for mergers (i.e. synergy, agency, and hubris) by examining the partition of gains resulting from M&As between the shareholders of acquiring and target firms. The approach involves three steps. First, M&A gains for acquiring and target firms are estimated using the event-study methodology.[18] For instance, Berkovitch and Narayanan (1993) measure the acquisition gains in terms of cumulate abnormal return over a 6-day event-window. Second, total (net) gains associated with M&A deals are estimated. Researchers tend to define the total gains as the sum of acquirers' shareholders' gains and targets' shareholders' gains. Finally, correlation analyses between targets' gains and total gains and between targets' gains and acquirers' gains are conducted.

Berkovitch and Narayanan (1993) suggest that the three main motives for M&As have different implications for the relation between target gains and total gains. Firstly, they point out that, since synergy-driven acquisitions result in positive total gains, target firms can extract part of the synergies (gains) if they can threaten to resist the deal or when there is competition among acquirers. As a result, targets can make higher gains when synergy is high. Therefore, a positive correlation would exist between target gains and total gains if an acquisition is synergy-motivated. Secondly, a negative association between target gains and total gains is predicted for acquisitions motivated by agency. The authors argue that agency-motivated acquisitions result in negative total gains and negative gains to acquirers' shareholders because acquirers' managers attempt to extract wealth from their shareholders. However, they suggest that target shareholders may earn positive gains (provided they have bargaining power) and can appropriate part of the managerial rent. The greater the managerial rent, the more target shareholders can extract from acquirers' managers. Since managerial rent is inversely related to total gains, Berkovitch and Narayanan (1993) conclude that target gains and total gains should be inversely related in agency-driven mergers.

Finally, Berkovitch and Narayanan suggest a zero correlation between target gains and total gains for hubris-motivated acquisitions. They reach this conclusion by arguing that, since

[18] A brief overview of the event study methodology is provided in Section 2.4.

managers chase non-existent synergies in hubris-driven acquisitions, any gains made by targets' shareholders must be mere transfer of wealth from acquirers' shareholders. In other words, there are no synergies in hubris-motivated M&As, and thus, target gains and total gains must be uncorrelated. They however suggest a negative correlation between target gains and acquirer gains to represent the wealth transfer from acquirers' shareholders to targets' shareholders.

It is important to note here that these three motives may not be mutually exclusive. For example, managers may pursue synergy gains and at the same time also be partially driven by agency motive. However, the empirical studies reviewed in this section may not be able to detect this co-existence of different motives or may not be able to distinguish between the relative importance of these motives.

2.3.2 The US study

Applying their proposed methodology on a sample of 330 US tender offers completed during 1963-1988, Berkovitch and Narayanan (1993) find that the relation between target gains and total gains for the entire sample is positive and statistically significant. This indicates that the effect of synergy motive is stronger than the effect of both agency and hubris motives. They document that in about 75% of cases, acquisitions earned positive total gains. They conclude that synergy is the primary motive for acquisitions in their sample. However, when the entire sample is divided into those deals that generated positive total gains (positive gains subsample) and those that earned negative total gains (negative gains subsample), the authors reach a different conclusion regarding the motives for M&As. Specifically, Berkovitch and Narayanan find significantly positive correlation between target gains and total gains in the positive gains subsample. However, they find that, in the negative gain subsample, target gains and total gains are significantly negatively correlated. They interpret their results to be consistent with the view that agency motive dominates in value-destroying (negative total gains) acquisitions, while synergy motive dominates in value-enhancing (positive total gains) acquisitions.

Furthermore, they report some indirect evidence of hubris in the positive gain subsample. They hypothesize that if synergy is the sole motive for acquisitions in the positive gain subsample, then a positive correlation should exist between target gains and acquirer gains. However, they find the correlation between target gains and acquirer gains to be negative but insignificant, and attribute this to the effect of hubris in some of the acquisitions in the positive gain subsample. Overall, Berkovitch and Narayanan (1993) conclude that, while synergy is the driver in majority of acquisitions, there is evidence that some mergers are motivated by agency and hubris. They further stress that, it is agency, not hubris, which is mainly responsible for value-destroying acquisitions in the US.

2.3.3 The UK study

Applying Berkovitch and Narayanan's methodology on a sample of 208 UK firms engaged in M&As during the period 1984-1998, Hodgkinson and Partington (2008) investigate the motivations for UK domestic mergers based on both short-horizon and long-horizon return. They measure short-horizon total gains over 5-day period prior to and 5-day period subsequent to M&A announcements, whereas the long-horizon total gains are based on a 6-month period before and 2-year period after M&A announcements.

Based on the short-horizon window and the entire M&A sample, they report that value-enhancing acquisitions (those with positive total shareholder gains) were over twice as numerous as the value-decreasing deals, suggesting the dominance of synergy motive in UK acquisitions. This finding is consistent with the US study by Berkovitch and Narayanan (1993). However, as in Berkovitch and Narayanan (1993), Hodgkinson and Partington show that majority of the M&A gains (79%) accrues to shareholders of the target firm, which is consistent with other studies investigating the wealth effect of M&As on shareholders of acquiring and target firms (see e.g. Jarrell, Brickley, and Netter, 1988; Martynova and Renneboog, 2008). When they consider long-horizon returns, their results are similar, except that the proportion of cases involving negative total gains was significantly higher than the proportion that was recorded under the short-horizon analysis. This is also consistent with the view that event study results based on long-horizon windows tend to provide evidence of underperformance than short-horizon tests (see Martynova and Renneboog, 2008).

Furthermore, Hodgkinson and Partington (2008) separate the full M&A sample into value-increasing and value-destroying subsamples and attempt to investigate the drivers of these groups of M&A deals. The authors report a statistically significant (for both short and long windows) positive association between target gains and total gains in the value-enhancing subsample, suggesting that synergy may be the major motive for these mergers. However, the correlation between target gains and acquirer gains was positive but insignificant. They interpret this to imply the possibility of hubris motivating some of the deals in the value-enhancing subsample. When the value-destroying subsample is considered, the results fail to provide evidence to support the agency motive of merger. The correlation between total gains and target gains was negative (positive) but insignificant for the short-horizon (long-horizon) return analysis. Collectively, the results suggest that acquisitions in the UK are often motivated by either synergy or hubris.

2.3.4 The European study

Goergen and Renneboog (2004) also investigate the motivations for M&A activities of European firms for the period 1993-2000. They find a significantly positive correlation between target shareholders' gains and total gains as well as between target shareholders' gains and acquirer shareholders' gains. They conclude that synergy is the prime motivation for European M&As, and that acquirers and targets tend to share the wealth gains.

In addition, the authors provide evidence to support the view that not all mergers are synergy-motivated. For their sample of acquisitions with negative total wealth gains, Goergen and Renneboog report that, there is no significant correlation between target shareholders' gains and total wealth gains, suggesting that agency may not be the main driving motivation for the value-destroying acquisitions. They however provide evidence to suggest that value-destroying acquisitions are motivated by managerial hubris. In particular, they report a negative correlation between targets' shareholders' gains and acquirers' shareholders' gains, implying that the gains to targets' shareholders coincide with losses to acquirers' shareholders. They conclude that almost a third of European acquisitions that entail negative total gains are driven by managerial hubris.

In summary, the empirical papers reviewed in this section suggest that there is some evidence for the existence of all three major motives for merger. These studies do provide some evidence for synergy motive. However, there is lack of consensus on the key motivation for M&As, especially when the total gains from these deals are non-positive. Agency seems to drive value-destroying acquisitions in the US (Berkovitch and Narayanan, 1993), whereas value-destroying acquisitions by UK and European firms appear to be mainly influenced by managerial hubris (Hodgkinson and Partington, 2008; Goergen and Renneboog, 2004). Once again, it is important to stress that these three motives may not be mutually exclusive. However, the empirical studies may not be able to detect this co-existence of different motives or may not be able to distinguish between the relative importance of these motives.

2.4 Firm-specific and deal-specific characteristics and the M&A wealth effect

The review in the previous section suggests that while some M&As enhance the wealth of shareholders, others tend to be detrimental to their interests. Shareholders would therefore be interested in identifying those M&A deals that are likely to advance their interest and support (possibly finance) such deals. Several factors relating to the characteristics of the acquisition bid and the acquiring firms are often cited as being responsible for the wealth effect of M&As (see e.g. Martynova and Renneboog, 2011). The frequently cited determinants are the bid attitude (friendly vs. hostile), the legal status of the target firm (public vs. private), the geographic scope of the M&A transaction (domestic vs. cross-border), the industrial scope (related vs. diversifying), and the payment method (cash vs. equity) (see Servaes, 1991; Conn et al., 2005; Aw and Chatterjee, 2004; Martynova and Renneboog, 2006; Travlos, 1987). Other factors relating to the management, firm size, growth opportunities, internal cash flows, and financial leverage of the merging firms (particularly the acquirer) have also been highlighted as potential determinants of shareholders' wealth following M&A announcements (Moeller, 2005; Moeller et al, 2004; Servaes, 1991; Hubbard and Palia, 1999; Yook, 2003).

In order to relate the determinants of the M&A wealth effect to the main issues of the present study, the review undertaken in this section is more focused on the role of financing, diversification, and agency on the wealth of shareholders of acquiring firms. Therefore, studies which investigate the impact of the payment (and financing) methods and the diversification and agency effect on the wealth of shareholders (emphasis mostly on acquirers' shareholders) are selected and comprehensively reviewed. It is hoped that the review in this section will help to delineate the hypotheses tested in this study. As we will see, a large proportion of empirical studies in this area utilise the event study methodology. Thus, a brief overview of the event study methodology is provided before the review of the empirical literature on the effect of payment methods, diversification, and agency on the wealth of shareholders following M&A announcements.

2.4.1 The event study methodology

A large number of event studies examine the behaviour of firms' stock prices around corporate events, such as M&A announcements (e.g. Travlos, 1987; Andrade et al., 2001). The approach relies on the assumption that these corporate announcements bring new information about the future prospects of firms, which is then incorporated into stock prices (Martynova and Renneboog, 2008). Therefore, empirical researchers try to estimate the value of this new information and interpret it to represent the market's assessment of the value of the corporate event that is announced.

Within the context of M&As, empirical studies attempt to quantify the stock price reaction around M&A announcements. This is done by calculating the average return earned by the stock of a merging firm around the announcement date of the merger and making adjustments for the "normal" stock return that would have been earned had the M&A not been announced. In effect, event study estimates the abnormal returns, i.e., the difference between actual return and "normal" return measured over a period of time surrounding the announcement of M&As (see Kothari and Warner, 2005), and it is the value of this abnormal returns that is considered as the wealth effect associated with M&A announcements. In majority of event studies, the market model is utilised to estimate normal returns for stock.

It is important to highlight that the periods over which the abnormal returns are measured (i.e. the event window) tend to vary among studies. According to Kothari and Warner (2005), event studies may be classified into short-horizon studies and long-horizon studies, where short-horizon studies usually include event windows ranging from 2 to 21 days and long-horizon studies include event windows ranging from several months (or even years) around the event. Martynova and Renneboog (2008) note that empirical studies on M&As are usually based on the short-horizon abnormal return because long-horizon tests tend to be less reliable (see Kothari and Warner, 2005; DePamphilis, 2010). For instance, DePamphilis (2010, p.34) points out that the longer the periods over which the return is measured, the more difficult it is to isolate the M&A effect, as many other strategic and operational changes may have arisen. In view of this, most of the event studies reviewed in this section are based on short-horizon event windows.

2.4.2 M&A financing and its effect on shareholders' wealth

This subsection reviews the literature on the significance of the financing of M&As within the context of abnormal returns around these deals. The review seeks to establish why managers pursuing M&As might prefer one form of financing to the other. This literature can be classified into those studies that examine the means of payment (cash vs. equity) and those that examine the sources of financing (internal corporate cash reserves vs. external debt/equity). Accordingly, the review is structured along these two strands of literature.

Prior to conducting the review, it is important to briefly highlight why M&A financing could be relevant in explaining the M&A wealth effect of shareholders. It is argued that M&As financed with equity are likely to be considered as negative signals about the acquirers' value because investors are likely to think that the acquirers' equity is being used to finance M&As because it is overpriced (Myers and Majluf, 1984; Shleifer and Vishny, 2003). Consequently, stock-financed deals are likely to result in negative market reactions that correct for overpricing. Moreover, deals financed by cash may indicate size-increasing (but not value-increasing) M&As, which are motivated by managerial rent-seeking (Jensen, 1986). In contrast, deals financed by debt could be associated with benefits of debt financing

(Bharadwaj and Shivdasani, 2003).[19] With this background, the following subsections review the empirical evidence on the impact of the method of payment and sources of financing on the value effect of M&As. We first consider the payment method effect, and then turn our attention to the source of financing effect.

a. *The method of payment effect*

The empirical literature provides substantial evidence that suggests that announcements of all-equity M&As result in significantly negative abnormal returns to acquirers' shareholders, and that these all-equity M&A deals substantially underperform all-cash bids (e.g. Travlos, 1987; Andrade, Mitchelle, and Stafford, 2001; Georgen and Renneboog, 2004; and Martynova and Renneboog, 2006).

Travlos (1987) is one of the early studies to investigate the role of the method of payment (cash vs. equity) in explaining acquirers' announcement period stock returns. He argues that, since the differential methods of financing a project have signalling effect (Myers and Majluf, 1984), the method of payment employed in an acquisition bid should equally impact shareholders' wealth. Based on the event study methodology, and a sample of 167 US bidding firms engaged in successful acquisitions during the period 1972-1981, he shows that shareholders of bidding firms in cash offers earn "normal" return, but suffer significant losses in pure stock-financed acquisitions. The author reaches this conclusion after documenting announcement day average abnormal returns of -0.69% (significant at 1% level) for stock-financed deals, and 0.29% (insignificant) for cash offers. Travlos (1987) finds these results to hold in his subsample of mergers and tender offers, and thus concludes that irrespective of the mode of acquisition (merger vs. tender offer); all-equity deals substantially underperform relative to all-cash deals. He interprets his results to be consistent with the signalling hypothesis,[20] which implies that financing an acquisition through exchange of common stock conveys negative information about acquirers' equity.

[19] The costs and benefits of debt financing are reviewed in Chapter 3.

[20] The signalling hypothesis relates to the asymmetric information literature in capital structure research (see Ross, 1977; Myers and Majluf, 1984). The asymmetric information literature will be discussed in the next chapter.

Travlos' (1987) main finding of negative association between announcement return and stock-financed acquisitions has been confirmed in a relatively recent US study by Andrade, Mitchelle, and Stafford (2001). With a sample updated to include M&As in the 1990s (sample period of 1973-1998), Andrade et al. (2001) report that bidding firms that use at least some stock to finance their acquisitions have negative 3-day average abnormal return of around -1.5% (statistically significant), while acquirers that abstain from equity financing have average abnormal returns of 0.4% (statistically insignificant).

Martynova and Renneboog (2006) show that the underperformance of equity-financed deals is not restricted to the US by examining a large sample of 2,419 European M&A deals during the period 1993-2001. They examine the impact of the method of payment on the abnormal returns for several event windows between 60 days prior to and 60 days following the acquisition announcements (i.e. -60 to +60). They show that shareholders of acquiring firms react more favourably to announcements of cash bids than all-equity offers. Announcement day abnormal return for acquirers in all-cash bids and mixed deals are positive and significant (0.6% and 0.9% respectively), but the corresponding returns to acquirers' in all-equity offers are not statistically significantly different from zero.

Martynova and Renneboog (2006) further show that in the period following the M&A announcements, although stock prices of all acquirers experience a decline, the stock price declines are substantially greater in M&A deals involving equity payments than in all-cash deals. Specifically, the cumulative abnormal returns over a 6-month period is -0.09% (statistically insignificant) for all-cash offers, whereas those for all-equity offers and mixed bids are significantly negative (-2.2% and -2.8% respectively). The negative stock price reaction following M&A announcements imply that investors consider equity offers by acquirers to be signals of their overvalued stocks (Shleifer and Vishny, 2003), and thus, subsequently react to push stock prices downwards. This is consistent with the misvaluation hypothesis reviewed in section 2.2.

Finally, the underperformance of equity-financed deals relative to cash deals seems to persist even when a long-term perspective is taken in the estimation of wealth effect of M&As.

Unlike prior studies, Loughran and Vijh (1997) investigate the impact of the payment method on the long-term wealth effect of shareholders by basing their analysis on long-horizon abnormal return. They argue that it is not plausible for stock prices to fully adjust to reflect the likely efficiency gains from M&As during the short windows that characterise many studies analysing short-horizon returns of merging firms. Thus, Loughran and Vijh consider the abnormal return that is expected to accrue to an investor of a merged firm who holds her stock for 5 years post-merger. Accordingly, the authors compute abnormal return by the difference between 5-year holding period returns of sample (merged firms') stocks and matching (non-merging firms') stocks. The matching firms are chosen to control for size and book-to-market effect on stock returns.

Using a sample of 947 US acquisitions completed during 1970-1989, Loughran and Vijh (1997) report that stock acquirers earn significantly less than matched firms, whereas cash acquirers earn significantly more than matched firms. Loughran and Vijh contribute to the literature by suggesting that the method of payment is an important determinant of the long-horizon wealth effect of M&As. The evidence presented by Loughran and Vijh is in line with the predictions of the misvaluation hypothesis. However, the evidence of significant post-acquisition (long-run) under-and over-performance (based on stock prices) is inconsistent with market efficiency (Fama, 1970). In fact, Loughran and Vijh's evidence suggests that stock markets systematically overestimate or underestimate the synergistic gains from M&As. Therefore, their tests on long-horizon stock returns are joint tests of market efficiency and the wealth effect of M&As.

Overall, the studies reviewed in this section suggest that if managers of acquiring firms act in the interest of their shareholders, then they would prefer making cash offers to equity offers, since the former generally outperforms the latter. However, making cash offers in M&A transactions does not offer much insight into the role of financing in driving the M&A shareholder wealth effect. Thus, the next subsection reviews the literature exploring the role played by the sources of M&A financing in explaining shareholders' wealth effect.

b. The source of financing effect

As could be inferred from the review in the previous subsection, prior studies on the means of payment (e.g. Travlos, 1987; Loughran and Vijh, 1997) consider the term "means of payment" as synonymous to the "source of M&A financing". It is important to stress that failure to distinguish between the two terms may result in misleading conclusions and policy recommendations. This is because all-cash M&As are usually assumed to be financed from internally-generated cash flow (e.g. Loughran and Vijh, 1997), even though such acquisitions could be financed from either proceeds from bond issues (borrowing), or proceeds from new equity issues (see Martynova and Renneboog, 2009). Recognising this limitation, Schlingemann (2004) and Martynova and Renneboog (2009) make important contributions to the literature by focusing on the financing decisions of acquiring firms, rather than on the payment methods that are reported in several M&A databases (e.g. SDC Platinum by Thomson Financials). These two studies are reviewed in this subsection.

Schlingemann (2004) examines acquirers' gains in cash acquisitions in respect of three sources of cash, namely, internally-generated cash flow, cash from borrowing, and cash from new equity issues. He assumes that the source of cash that is available at the time an acquisition is announced (pre-merger financing decisions) is likely to be related to the actual financing of the M&A transaction. Consequently, Schlingemann (2004) investigates the impact of acquirers' financing decisions (i.e. the source of available cash) in the one year period before the announcement of the acquisition on M&As-related wealth effect.

In designing his test, Schlingemann (2004) employs a two-step procedure. In the first step, he identifies the various sources of cash of acquirers in the year preceding the M&A deals. It is *assumed* that these sources are utilised to finance any M&As undertaken in the following year. For his sample of 623 US cash acquirers from 1984-1998, he also computes the abnormal returns for the acquirers over a 3-day event window (-1, +1) and an 11-day event window (-5, +5).

In the second-step, Schlingemann (2004) uses several cross-sectional regressions to ascertain the relationship between acquirers' gains and the financing sources. The dependent variables in these regressions are abnormal returns around M&A announcements. The key independent variables of interest are either the free cash flow variable, the equity financing variable, or the debt financing variable. Other control variables include debt-to-equity ratio, relative transaction size, and dummy variables indicating whether the bid is tender offer, hostile, involves a private target, or is a cross-border transaction.

Schlingemann (2004) shows that, holding the form of payment constant, the firm's financing decisions before the acquisition is a significant factor in explaining the cross section of acquirer returns. Specifically, he finds a negative and statistically significant relationship between internally-generated free cash flow and acquirer gains. Using Tobin's Q as a proxy for investment opportunities, he further finds that the negative relations between internal cash financing and acquirer gains is restricted to low-Q firms, which is consistent with the free cash flow hypothesis (see Jensen, 1986). This is also consistent with the empirical results in Lang et al. (1991) which is based on a sample of 101 tender offers in the US.

Contrary to the negative abnormal return for acquirers in equity-related M&As documented in previous research (e.g. Travlos, 1987), Schlingemann finds acquirer gains to be positively and significantly related to the amount of cash raised through equity issuance during the fiscal year preceding the M&A announcement. He also shows that this finding is limited to a segment of the sample of high-Q firms and argues that investors expect value-creating acquisitions whenever a firm raises funds through a relatively expensive form of equity issue. It is, however, possible for the positive association between acquirer gains for high-Q firms and equity financing to be due to overvaluation of acquirers' stock, rather than a signal of its growth opportunities, since Tobin's Q can serve as proxy for both overvaluation and growth potential (van Bekkum et al., 2011).

Finally, Schlingemann (2004) reports positive but statistically insignificant relations between the amount of cash raised from debt financing and acquirers' shareholders' gains due to M&A announcements. He further finds that this relationship is stronger for firms with lower investment opportunities (low-Q firms). His result implies that debt could serve as a monitoring device for low-Q firms. Collectively, Schlingemann's findings suggest that there are large variations in the acquirer gains in cash offers depending on the source of cash. Cash flows generated internally result in losses to acquirers' shareholders, especially when these firms have below median investment opportunities. However, cash flows from borrowing (debt) neither enhance nor destroy acquirers' shareholder wealth, while cash flows from equity financing are associated with substantial gains for acquirers' shareholders, particularly when they relate to high-Q firms.

Schlingemann's work faces at least two important limitations. First, he examines only M&As that are paid for by cash. Stock exchange offers, which form about 89% of equity-related M&As are not examined (see Martynova and Renneboog, 2009). Therefore, it is unclear how these offers perform in relation to the various forms of cash financing. Second, he focuses on the *ex-ante* ability of acquirers to finance M&As with cash, equity or debt, and not the *actual financing* of the M&A transaction. The financing decisions of acquirers in the pre-merger year may not necessarily coincide with the actual financing of the M&A since some financing decisions of acquirers in the pre-merger years are motivated by rebalancing their capital structures towards target debt levels (Uysal, 2011). *It is important to note here that this rebalancing within the context of M&As is a key subject and contribution of the present study and will be empirically examined in Chapter 7*.

Martynova and Renneboog (2009) extend the empirical analysis of Schlingemann (2004). They base their examination on a large sample of 1,361 European (including UK) M&As (both cash and stock deals) from 1993-2001. A key contribution of their work is that they utilise hand-collected data on the source of financing for these completed M&As from a combination of data sources (i.e. Thomson's SDC, LexisNexis, the Financial Times, and Factiva), which enables them to investigate the valuation effect of the *actual source of M&A financing* on the wealth of shareholders of acquiring firms.

Martynova and Renneboog (2009) show that, over a 121-days event window (i.e. -60 to +60 days around M&A announcements), the cumulative abnormal returns for acquirers' shareholders are significantly negative when M&As involve equity payments (including cash-paid M&As involving new equity issue, stock exchange offers, and mixed-payments).

This finding appears to be inconsistent with Schlingemann (2004). However, the underperformance of equity offers is largely due to the post-M&A announcement share price correction. Prior to the bid, all-equity offers experience significant share price run-ups, which exceed that of all-cash offers. These results imply that negative price revisions often follow the announcement of M&As involving equity financing, and, thus, it is possible for the positive acquirer gains documented by Schlingemann (2004), whose findings were based on abnormal returns computed around the announcement day, to be reversed in the post-announcement periods. It is also plausible that the high share price run-ups associated with all-equity offers indicate overvaluation that incentivises managers to make equity offers (Baker and Wurgler, 2002).

Furthermore, Martynova and Renneboog (2009) report that only debt-financed M&As do not exhibit negative post-announcement price corrections. They find that, over the event window -60 and +60, debt-financed M&As result in substantial acquirer gains of about 3%. This abnormal return is substantially higher than the negative returns around M&As financed by equity (-3.4%) and internally-generated cash (-0.1%). They conclude that investors interpret debt financing of M&As as confirmation that the acquirer's share price is not overvalued and that the M&A is profitable (e.g. generates tax shield). The finding of superior performance by debt-financed M&As is consistent with Bharadwaj and Shivdasani (2003) and Ghosh and Jain (2000). Bharadwaj and Shivdasani find acquisitions that are financed by bank debt to be value-enhancing, and hence, suggest that investors consider banks' agreement to provide funding for M&As as a positive signal about the profitability of the acquisition. Ghosh and Jain (2000) show that the possibility of realising some benefits of debt financing (e.g. tax savings) makes leverage-increasing (i.e. debt-financing) acquisitions result in significant shareholder gains.

Overall, these results imply that wealth-maximizing managers of acquiring firms would prefer to fund their M&A transactions with debt, and if possible avoid financing M&A deals with internally generated cash flows or equity. Consequently, acquirers' inability to borrow would then result in equity-financed deals, which are usually associated with lower (and often negative) shareholders' M&A announcement return. Thus, an important implication of the extant M&A literature that is particularly relevant to this thesis is that the debt policy of acquiring firms is very important when it comes to the impact of these deals on shareholders' wealth. This matter is further explored in the next chapter, which elaborates this potential link between corporate debt policy and corporate M&A activities.

2.4.3 Diversification, agency and shareholders' wealth effect

An important element of this study is to examine how corporate diversification influences any potential linkage between leverage deviation and corporate M&A activities. As long as diversification impacts corporate risks and value, it could make shareholders and/or bondholders of merging firms (particularly those of acquiring firms) prefer one form of M&A to the other, depending on the extent of diversification involved. Thus, the objective of the review in this subsection is to explore the possible reasons why shareholders of acquiring firms may not be indifferent between diversifying and non-diversifying acquisitions.

In fact, the M&A and diversification literature suggests a variety of reasons why diversifying acquisitions (both industrial and geographic) could impact the M&A shareholders' wealth effect (see e.g. Martin and Sayrak, 2003). Diversification is generally associated with some costs and benefits that may influence shareholders' wealth. For example, diversifying M&As may results in an increase in the borrowing capacity of a firm, which, in turn, may increase shareholder wealth via an increase in tax savings (Lewellen, 1971; Ghosh and Jain, 2000). Conversely, geographic diversification could lower shareholders' wealth by exposing the firm to additional risks (e.g. foreign exchange risk, political risk, etc.) (see Bartov et al., 1996). Also, Shaked, Michel, and McClain (1991) suggest that the desire to enter foreign markets may cause an acquirer to pay premium for foreign targets above those that domestic firms are willing to pay. This may result in the "winners' curse" problem and losses to acquirers' shareholder.

The empirical evidence suggests that the cost of diversifying via M&A is higher than its benefits. Consequently, diversifying M&As often underperform relative to non-diversifying ones (see e.g. Aw and Chatterjee, 2004; Moeller and Schlingemann, 2005). However, not all diversifying M&As are value-destroying for shareholders of acquiring firms (see e.g. Goergen and Renneboog, 2004).

Moeller and Schlingemann (2005) examine the effect of diversification (particularly cross-border diversification) on the short-horizon announcement return (i.e. day -1 to day +1) of US acquirers. Using a sample of 4,430 M&As occurring during the period 1985-1995, they show that both industrial and geographic acquisitions are associated with significantly lower acquirer returns relative to other types of M&A deals. After estimating a model of abnormal return, they find significant and negative effect of about -1.0% and -0.63% for cross-border and cross-industry M&A transactions, respectively. The impact of acquisitions involving both geographic and industrial dimensions (captured by an interaction dummy between the cross-border and cross-industry dummies) on acquirer gains is also significantly negative and even stronger.

In addition, Moeller and Schlingemann show that the underperformance of cross-border acquirers (relative to domestic acquirers) continue to hold for performance measures based on operating cash flows. They report that the average M&A-induced change in industry-adjusted operating performance for the cross-border sample is -0.067%, while the average change for the domestic M&A sample is -0.002% (the difference between the two results is statistically significant at 5% level). Overall, these findings suggest that, compared to domestic M&As, cross-border M&As lead to greater deterioration in shareholders' wealth and operating performance. It should be noted that, given that cross-border acquirers are, on average, larger than domestic acquirers (Ozkan, 2012), Moeller and Schlingemann's findings may be consistent with the agency or hubris explanation for M&As.

In a related study, Morck, Shleifer and Vishny (1990) suggest a link between agency and the destruction in wealth associated with diversification. Specifically, based on a sample of 326 US M&As occurring over the period 1975 and 1987, they report that the quality of acquirers' management (measured as the three-year pre-merger equity return relative to industry) is positively and significantly associated with acquirer gains. This suggests that good managers undertake wealth-increasing M&As, while poor managers undertake wealth-reducing M&As. They further show that M&As motivated by growth and diversification (i.e. M&As that increase the size and the scope of acquirers) are, on average, associated with lower acquirer returns. In particular, they report that M&As resulting in industrial diversification (i.e. deals in which acquirer and target operate in different industries) are associated with about 4.2% lower acquirer returns compared to related M&As (i.e. deals in which acquirer and target operate in the same industry). They conclude that poor managers who try to diversify their own risk and improve their job security tend to make poor (value-reducing) acquisitions (Amihud and Lev, 1981; Shleifer and Vishny, 1990).

With a sample of 79 UK firms acquiring targets from Continental Europe, the US, and the UK over the period 1990-1996, Aw and Chatterjee (2004) replicate the findings in Moeller and Schlingemann (2005) regarding the effect of cross-border M&As on shareholders' wealth. However, unlike Moeller and Schlingemann (2005) who analysed short-horizon shareholder returns, Aw and Chatterjee (2004) focus on long-horizon returns. Aw and Chatterjee (2004) show that UK M&As, on average, result in significantly negative post-announcement (+24 months) returns of -17.87%. However, the negative cumulative abnormal returns vary considerably according to the country of the target firm. They report that UK acquirers acquiring UK targets (i.e. domestic deals) perform relatively well (-10.44%), followed by UK acquirers acquiring US targets (-22.36%). The worst post-acquisition losses were reported to involve UK acquirers acquiring targets from Continental Europe. These results are consistent with the "liability of foreignness" arguments which suggest that multinational corporations doing business abroad face some additional costs arising from the unfamiliarity of the environment and from the need for coordination across geographic distance (see Zaheer, 1995; Kwok and Reeb, 2000).

In a recent study of 147 completed M&As by UK firms over the period 1999-2005, Ozkan (2012) suggests that agency may be a key driver of the underperformance observed in cross-border M&As. She argues that CEOs have strong incentives to undertake cross-border M&As rather than domestic M&As because they receive larger compensations following cross-border M&As which tend to be larger than domestic M&A deals. After regressing executive compensation (salaries, bonuses, and stock options) on dummies for M&A activity and a number of controls (e.g. firm sales, Tobin's Q), she shows that cross-border M&As result in higher CEOs compensation than domestic M&As. Specifically, she runs separate regressions for cross-border and domestic M&As, and reports that the coefficient estimate for the cross-border M&A dummy on CEOs' compensation is positive and statistically significant, while the coefficient estimate for the domestic M&A dummy is also positive but lacks statistical significance.

Ozkan (2012) further investigates whether the merger-induced increases in cross-border acquirers' CEOs' compensation is sensitive to the M&A performance by examining the impact of an interactive dummy between cross-border M&As and post-acquisition performance (i.e. positive and negative announcement returns). She documents positive and significant (insignificant) coefficient for the interactive dummy involving positive (negative) return, and thus interprets her finding to imply that CEOs' compensations improve significantly following cross-border M&As, regardless of how poor firms perform. Overall, her results are consistent with the agency view which holds that corporate managers grow the size of their firms via mergers in order to make private benefits (Jensen, 1986; Shleifer and Vishny, 1990; Morck, Shleifer and Vishny, 1990). Also, by showing that cross-border M&A deals are, on average, larger than domestic M&A deals (average transaction values of £120.89 and £67.48), Ozkan's (2012) finding of underperformance in cross-border M&As is consistent with Moeller et al. (2004) who report large wealth destruction for shareholders of acquiring firms following *large* M&A transactions.

Goergen and Renneboog (2004) present contrary evidence on the cross-border effect on the wealth of acquirers' shareholders following M&As. They analyse the wealth effects for shareholders of acquirers in domestic and cross-border deals for a sample of 187 large intra-European M&As taking place during 1993-2000. They report two findings that combine to suggest that M&As (including cross-border deals) could prove beneficial to European acquirers. First, they find that acquirers' gains over the event window (-1, 0) in domestic M&As are negative but statistically insignificant. However, acquirers in cross-border M&A transactions earn significantly positive cumulative abnormal return of 2.38%. This finding is inconsistent with the other reviewed studies (e.g. Aw and Chatterjee, 2004; Moeller and Schlingemann, 2005) and implies that European bidding firms, on average, create value for their shareholders when they diversify their operations into foreign markets via M&As. Second, Goergen and Renneboog report that the announcement effect of domestic and cross-border M&As for target firms amounts to 10.2% and 11.3% respectively (the difference is not significant statistically), implying that the bid premiums paid by European acquirers for foreign targets generally do not differ from what they would pay for targets in their domestic countries. Again, this finding is inconsistent with Shaked et al. (1991) who suggest that managers of acquiring firms tend to pay higher premiums in cross-border M&A deals than in domestic M&A deals.

Collectively, the review in this subsection suggests that acquirers (particularly those in the US and the UK) fail to create value for their shareholders when they undertake diversifying M&As (both cross-industry and cross-border M&As). Instead, managers seem to gain from these diversifying M&A transactions which tend to grow the size of the firm and sometimes CEOs' compensation. An implication of this conclusion is that shareholders of firms (especially US and UK firms) will be less enthusiastic about diversifying M&As compared to domestic M&A deals. Therefore, when an acquiring firm faces debt financing constraints and requires equity capital to finance its M&A opportunities, shareholders are more likely to favourably respond to managers' request for capital when the proposed acquisition is non-diversifying (i.e. related or domestic M&As) than when it is diversifying (i.e. cross-industry or cross-border M&As).

2.5 M&A effect on bondholders

Although the present study is concerned with the link between corporate capital structure decisions (i.e. debt vs. equity financing) and corporate M&A activities, the review conducted so far has focused almost exclusively on how M&As affect the interest of shareholders. However, even when shareholders are unlikely to finance a proposed (or anticipated) M&A transaction, managers always have the choice to seek an alternative source of financing, i.e., debt capital. In fact, a large majority of M&A deals are financed with debt capital (see Martynova and Renneboog, 2009; Bharadwaj and Shivdasani, 2003). Therefore, in order to understand how leverage deviation (which could lead to financing constraint) relates to M&A activities,[21] it is important to explore how M&As influence the interest of bondholders. Accordingly, this section briefly reviews the literature on M&As and bondholders. It first

[21] The possible link between leverage deviation and financing constraint is discussed in Chapter 3.

reviews the theoretical predictions on the effect of M&As on bondholders and then provides a review of the empirical literature.

2.5.1 Theoretical background

The finance literature suggests that M&As affect bondholders primarily through their impact on corporate risk, particularly credit risk (Lewellen, 1971; Shastri, 1990). Early research posits that bondholders benefit from the co-insurance of cash flow, which, in turn, reduces credit risk faced by these investors (Lewellen, 1971; Higgins and Schall, 1975). Since reduction in credit risk increases bond prices (Higgins and Schall, 1975), the co-insurance effect suggests that bondholders gain from the announcements of M&As, particularly when they (the M&A transactions) are potentially risk-reducing (e.g. diversifying).

Kim and McConnell (1977) note that, when managers act to protect the interest of their shareholders, they take steps to reverse any bondholders' gains (resulting from the co-insurance) to shareholders. They argue that managers can re-distribute wealth from acquirers' bondholders to shareholders by increasing the leverage of the combined firm following the acquisition. When the leverage of the combined firm is increased post-merger, it is argued that, the combined firm is able to increase not only its profitability via the tax shelter of debt interest (to enhance shareholders' wealth), but it also increases the combined firm's credit risk back to the pre-merger level. Through this mechanism, the earlier gains made by bondholders (i.e. gain from co-insurance effect) are revered to shareholders. Kim and McConnell's (1977) argument implies that bondholders' wealth should be insensitive to M&As because the gains from risk-reduction (via co-insurance) are offset by losses from post-acquisition risk-increases (via more borrowing). However, bondholders stand the chance of making gains (losses) from M&A transactions when the risk-reduction from the co-insurance effect is greater (less) than the post-acquisition increases in risks via increased borrowing.

Shastri (1990) extends the literature on the effect of M&As on bondholders by comparing the pre-merger risk profiles of the acquiring and target firms. He suggests that corporate risks of the merged firm can differ from the individual risks of the merging parties (acquirer and target) unless they (the merging firms) are identical pre-merger. Shastri repeats the claim that, in general, risk reduction should increase bondholders' wealth, while an increase in risks should reduce bondholder wealth. He further suggests that bondholders of relatively risky firms should benefit the most from risk reduction following M&As, while bondholders of relatively safe firms should lose the most from a post-M&A risk increase.

Overall, the theoretical literature appears to agree that bondholders stand to gain when M&As result in significant risk reductions, but they face potential losses when the M&A deal adds to the risks of the combined firm. Bondholders' wealth will be unaffected when any risk-reductions from co-insurance are offset by risk-increases from increased financial leverage. These predictions have been empirically tested in two broad ways. First, by simply observing the risk effect of M&As, and second, by employing the event study methodology to analyse abnormal bond returns following announcement of M&As. The following subsections organise the review of the empirical literature along these two themes.

2.5.2 Empirical evidence on the effect of M&As on corporate risk

The main implications of Kim and McConnell's (1977) arguments have been largely supported by two US studies, Ghosh and Jain (2000) and Furfine and Rosen (2011). Both studies suggest that, on average, M&As may not be beneficial to bondholders since they increase the financial (default) risk of firms.

Ghosh and Jain (2000) employ a sample 239 M&As completed between 1978 and 1987 to provide some evidence in support of wealth re-distribution from bondholders to shareholders. They report that leverage (and financial risk) increases significantly following M&As, and that this increase in leverage is associated with gains to shareholders (in the form of positive abnormal returns) and losses to bondholders via increased credit risk (as measured by changes in credit ratings). They document positive and significant relationship between market-adjusted return to shareholder and the change in financial leverage (risk); but also report that the average bond rating of the merged firm declines significantly a year after the M&A is consummated. Overall, their findings suggest a form of wealth transfer from bondholders to shareholders via increased leverage (financial risk proxy) in an attempt to correct any earlier expropriation to bondholders (as suggested by Kim and McConnell, 1977).

In a recent study based on a large sample of 3,604 firms, Furfine and Rosen (2011) show a more direct link between changes in financial leverage and default risk following M&As. They measure default risk by Moody's KMV Expected Default Frequency (EDF). They find that, on average, default risk increases for acquiring firms irrespective of the direction of change (i.e. increase or decrease) in financial leverage. Thus, on average, M&As result in an increases corporate risk. The authors further report that the rise in default risks is substantially greater in M&As which result in leverage increases than in leverage-decreasing M&As. This is again consistent with the view that in an attempt to reverse any M&A gains that might have accrued to bondholders, managers of acquiring firms exploit the co-insurance effect to increase corporate leverage in order to increase corporate default risk.

In addition, Furfine and Rosen (2011) relate the M&A-associated default risks to the means of payment for the acquisition. They note that, while debt-financed M&As could increase the firm's default risk, equity-financed M&A deals require no assets to be pledged as collateral, thus, they (i.e. equity-financed M&As) should result in reduced financial distress cost. Consistent with this view, Furfine and Rosen report that M&As that are paid for, in part, with equity, lead to reductions in default risk. Overall, Furfine and Rosen suggest that M&As, especially leverage-increasing (debt-financed) M&As, increase corporate default risk. Consequently, equity-financed (risk-reducing) M&As may serve the interest of existing bondholders more than debt-financed (risk-increasing) M&A transactions.

2.5.3 Empirical evidence on bondholders' M&A wealth effect

The review in the previous subsection suggests that some M&As result in increases in default risks while others reduce default risk, implying that the ultimate effect of M&As on bondholders' interest is an empirical matter which can be resolved by examining the M&A wealth effect on bondholders. We discuss the literature in this subsection under two themes: (a) the general evidence on the M&A wealth effect on bondholders; and (b) the specific role of diversification on the M&A wealth effect of bondholders.

a. General evidence

The empirical evidence on the risk implication (following M&A announcements) on the wealth of acquirers' bondholders is mixed. Kim and McConnell (1977) and Asquith and Kim (1982) empirically examine the presence of the co-insurance effect on bondholders' wealth using US sample of diversifying M&As, implicitly assuming that cash flows of merging firms in related M&As are perfectly correlated. Both studies provide evidence to suggest that M&As do not significantly impact bondholders' wealth. Kim and McConnell (1977) report negative but insignificant effect, while Asquith and Kim (1982) find insignificantly positive abnormal return for acquirers' bondholders.

Using Standard and Poors' credit ratings as a proxy for risk, Dennis and McConnell (1986) investigate the impact of acquirers' pre-merger risk profile on the wealth changes of their bondholders. Consistent with Furfine and Rosen (2011), they show that, on average, bondholders tend to lose rather than gain from M&As transactions. Furthermore, the authors report that it is rather the bondholders of junk-grade (risky) acquirers who suffer significant losses (negative and significant abnormal bond returns), a finding that is inconsistent with Shastri's (1990) prediction that relatively safe bonds should lose the most from risk increases following M&As.

On the contrary, Walker (1994) documents that high quality bonds (rated A or better) earn negative abnormal return, whereas low quality bonds (rated BBB or below) earn positive abnormal returns. He also performs a multivariate analysis of bondholder wealth changes and reports strong evidence that bondholders of junk-grade (risky) acquiring firms earn higher abnormal returns, implying that they benefit more from the M&A-related risk reduction (Shastri, 1990). However, Walker's results based on his entire sample of 65 US M&As announced between 1980 and 1988 suggest that, on average, bondholders neither gain nor lose from corporate M&A activities, since the average abnormal bond returns were statistically indistinguishable from zero.

Billet, King, and Mauer (2004) examine the wealth effect of M&A on bondholders of both acquiring and target firms using a relatively large sample of 940 M&As completed over the period 1979-1997. They provide evidence to suggest that target firms tend to be more risky than acquiring firms, and hence, bondholders of target firms tend to benefit from the co-insurance effect, while bondholders of acquiring firms lose from post-M&A risk increases. They report a higher bond rating index for acquirers compared with targets (16.53 vs. 14.47) and lower proportion of below-investment grade (risky) bonds for acquirers than targets (18% vs. 37%). Billet et al. (2004) further find that target bondholders earn significantly positive abnormal return of 1.09% during the announcement period. However, the target bond wealth effect was found to be highly sensitive to the risk of the bond. In particular, the investment grade (safe) target bonds experience abnormal return of -0.80% (significant), while below-investment grade (risky) target bonds earn abnormal return of 4.30% (significant). They interpret these findings to be consistent with the co-insurance effect, in that, risky bonds become safer post-M&As. In contrast, Billet et al. (2004) document negative abnormal returns of -0.17% (significant) for acquirers and find no statistical difference between abnormal return of investment grade (safe) acquirer bonds (-0.09, significant) and below-investment (risky) acquirer bonds (-0.55, significant).

In sum, Billet, et al.'s results imply that acquirers (especially those with relatively safe bonds) destroy the wealth of their existing bondholders when they acquire target firms with relatively risky bonds. However, bondholders of target firms (especially those with risky bonds) tend to significantly gain from M&A announcements. Therefore, the effect of M&As on acquirers' bondholders' wealth seems to depend on the risks associated with the target firm. Consequently, as long as the risks associated with the pursuit of foreign targets is different from that of a domestic targets, then debt providers (bondholders) may not be indifferent between cross-border M&As and domestic M&As. The same argument holds for cross-industry M&As and within-industry M&As. The next subsection briefly takes a closer look at this matter.

b. Diversification effect

Using a sample of European firms undertaking M&As during 1995-2004, Renneboog and Szilagyi (2006) investigate the M&A effect on bondholders outside the US settings. Contrary to earlier findings, Renneboog and Szilagyi report that bondholders of European acquiring firms earn economically significant positive abnormal returns of 0.56% following the announcement of M&As. Their results, however, appear to be driven by the presence of risk-reducing M&As. They document positive and significant bondholders' abnormal returns in M&A deals which reduce risk for the combined firm, and negative but statistically insignificant abnormal bond returns for risk-increasing M&As.

Renneboog and Szilagyi (2006) further investigate how the welfare of bondholders of European firms varies across some characteristics of the M&A deal. First, they provide strong evidence for the co-insurance effect in both diversifying (cross-industry) and non-diversifying (within-industry) M&As, albeit the bondholders' wealth gain was slightly greater in diversifying deals (0.58 vs. 0.55). This finding suggests that the potential gains for bondholders tend to be relatively higher in diversifying M&As than in related M&A deals. Also, the authors find abnormal returns for bondholders to be positive and significant in both domestic and cross-border M&As. The gains were, however, greater in domestic M&A deals than in cross-border M&A deals (0.84 vs. 0.41). They interpret the significant difference between bondholders' gains in domestic and foreign M&A to be due to greater information asymmetry and uncertainty associated with the default of internationally diversified firm.

Similarly, Ongena and Penas (2009) investigate the bondholders'gains within the context of bank M&As for both domestic and cross-border M&As of European acquirers during 1998-2002. Like Renneboog and Szilagyi, they report higher abnormal bond returns for domestic M&As than cross-border M&As, and conclude that bond investors perceive domestic M&As to be relatively safer because of the greater probability of a government bailout.

Overall, the review in this subsection suggest that diversification across industry could be viewed positively by bondholders possibly because of the risk reduction associated with diversification. However, the diversification benefits seem to disappear in cross-border diversification, probably because the increased uncertainty (risks) and information asymmetry associated with international diversification tend to outweigh the benefits of co-insurance. In effect, bondholders may prefer cross-industry M&As to within-industry M&As. Similarly, they would choose domestic M&As over cross-border M&As.

2.6 Conclusions

This chapter reviews the relevant literature on M&As with special emphasis on the role of the medium of payment, and diversification on the wealth effect of investors (shareholders and bondholders). Several interesting conclusions can be drawn from the review, which may prove useful in the development of the study's hypotheses in subsequent chapters. First, M&As are motivated by a host of reasons that can be broadly categorised into three – synergy, agency, and hubris. The empirical literature provides some evidence to support all the three major motives.

Second, the method of payment and the diversification potential of the M&A transaction are important determinants of shareholders' wealth following acquisitions. Acquirers' shareholders generally earn substantially lower returns in equity-financed M&As than in cash/debt-financed M&As. This implies that shareholders would prefer cash/debt-financed M&A deals to equity-financed M&A deals. Third, there is also evidence that acquirers' shareholders significantly underperform following diversifying (especially cross-border) M&As, compared with non-diversifying (e.g. domestic) M&As. Agency appears to partly explain the underperformance observed in diversifying M&As, since managers tend to gain in large diversifying (size-increasing) M&A deals. Therefore, shareholders are more likely to prefer non-diversifying (within-industry and domestic) M&A deals to diversifying (cross-industry and cross-border) M&A deals.

Finally, there is evidence that M&As do affect bondholders. Some bondholders, especially those of risky firms gain from risk reduction, while others lose from risk-increases following M&As. In particular, bondholders seem to perform worse in cross-border M&As than in domestic M&As. Also, bondholders seem to be slightly better off in cross-industry (diversifying) M&As compared to within-industry (non-diversifying) M&As. Overall, the review conducted in the chapter suggests that investors (both shareholders and bondholders) may view different M&A deals differently. Shareholders are likely to frown upon M&As that appear to be motivated by agency considerations, but embrace synergy-motivated deals. Likewise, bondholders are likely to be more worried about risk-increasing M&As but will welcome risk-decreasing M&A transactions.

Chapter 3

Mergers and Acquisitions and Financial Leverage

3.1 Introduction

The previous chapter highlighted the various motives behind firms' decisions to undertake mergers and acquisitions (M&As). It also showed that, the empirical evidence on why firms undertake M&As is mixed. In addition, we noted that the gains to acquirers' shareholder following M&A announcements appear to be higher when managers choose to finance these deals with debt/cash instead of financing with equity (see e.g. Martynova and Renneboog, 2009). This evidence suggests that there is a link between the source of financing and the performance of M&A transactions. The main objective of this chapter is to build upon the literature on M&As (reviewed in the previous chapter) and on capital structure (briefly reviewed in this chapter) to develop a link between firms' leverage deviation and their M&A activities.

More specifically, this chapter aims to outline a potential link between extremely aggressive debt policy (i.e. overleveraging) and extremely conservative debt policy (i.e. underleveraging) on the one hand, and corporate M&A activities on the other hand. Within this context, we build upon the capital structure literature to explain why the prevailing capital structures of prospective acquirers in the pre-acquisition periods could constrain their M&A activities. In addition, we review the relevant literature that relates capital structure to corporate investments, particularly M&As. This helps us to create a framework for the study's central hypotheses and for the empirical work in Chapters 5 to 7.

The rest of the chapter is organised as follows. Section 3.2 reviews the dominant views on the theory of capital structure. It covers the main elements of the trade-off theory and the capital structure models that lay emphasis on information asymmetries in capital markets. Section 3.3 draws a link between capital structure and corporate M&As by extracting the implications of the theory of capital structure on corporate M&As. Section 3.4 provides a critical review of the key studies that motivate the present study. Section 3.5 formulates the study's central hypotheses. Section 3.6 concludes the chapter.

3.2 The dominant views on the theory of capital structure

Following the seminal work of Modigliani and Miller (1958) that claimed that capital structure is irrelevant under perfect capital market conditions, an extensive body of research (both theoretical and empirical) has explored the determinants of corporate financing decisions in the real world with various market imperfections (e.g. Modigliani and Miller, 1963; Myers, 1977; Myers and Majluf, 1984; Graham, 2000; Rajan and Zingales; 1995). The dominant theme that runs through this stream of research is that market imperfections (such as transactions costs, taxation, bankruptcy costs, agency problems, and information asymmetries) may disproportionately affect the costs/benefits of debt and equity capital.[22] Although a detailed review of the capital structure literature is not possible in this section given the space/time constraint,[23] the following subsections provide a brief overview of the literature grouped under two broad headings, namely, the trade-off models and the asymmetric information-based models.

3.2.1 The trade-off models

As noted by Frank and Goyal (2007), the trade-off literature views financing decisions as involving rational evaluation of the various benefits and costs of alternative leverage arrangements. The trade-off theory suggests that there exists an optimal leverage ratio which maximises the value of the firm, and that this optimal leverage ratio is reached when the benefits of debt usage are just enough to offset the costs of debt (see Leland, 1998; Fama and French, 2005; Graham, 2000). As shown in Figure 3.1, firms that stay below this optimal leverage ratio (i.e. underleveraged firms) fail to maximize their shareholders wealth because they forfeit some debt-related benefits, which may be realised by simply increasing their debt usage. Likewise, those firms that borrow beyond the optimal debt ratio (i.e. overleveraged

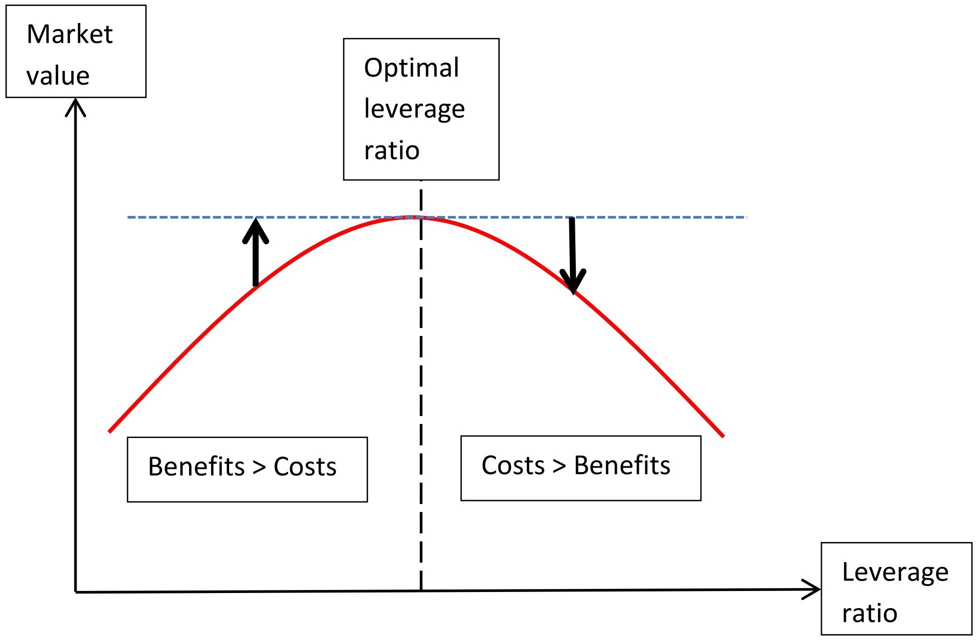
[22] Although firms can finance their operations and investments from three sources (i.e. internal funds, external debt, and external equity), most of the capital structure theories tend to hold internal funds constant and consider the choice between external debt and external equity (see e.g. Modigliani and Miller, 1958; Miller, 1977).
[23] See Harris and Raviv (1991) and Parsons and Titman (2008) for a comprehensive review of the capital structure literature.

firms) drive down shareholders' wealth because they incur debt-related costs that far outweigh the benefits of debt. Therefore, wealth-maximizing firms tend to target this optimal leverage ratio, and managers of firms that deviate from the optimal (target) leverage ratio could be viewed by investors as either inefficient or self-interested.

Figure 3.1

<u>The optimal leverage ratio</u>

The figure illustrates how the market value of firms changes with the level of debt usage. The market value of the firm increases when debt benefits are greater than the costs of debt (i.e. when firms with below-optimal leverage ratios choose debt). Beyond the optimal leverage ratio, the costs of debt outweigh the benefits of debt and market value of the firm declines when firms choose debt.



An important implication of the trade-off theory in terms of corporate financing choice is that it is the relationship between the target leverage ratio and the actual leverage ratio that determines corporate financing choices. Specifically, given an investment project, all else equal, underleveraged (overleveraged) firms would issue debt (equity) in order to move towards the optimal capital structure.

So, what are the specific costs and benefits that tend to determine the optimal leverage ratio? The trade-off literature emphasises the following costs/benefits of debt financing: (1) tax shield, (2) bankruptcy costs, and (3) agency costs/benefits of debt. These benefits and costs are briefly reviewed below.

a. Tax savings from debt financing

Modigliani and Miller (1963), Graham (2000) and van Binsbergen, Graham, and Yang (2010) note that the tax codes in many jurisdictions make debt capital advantageous because debt financing provides a shield against corporation tax. Whilst interests paid by corporations on their debt capital are deducted from earnings before computing their tax liabilities, no such protection exists for dividend payments on equity capital (Modigliani and Miller, 1963). Therefore, all else equal, choosing debt over equity may prove to be a value-enhancing corporate strategy.

Graham (2000) estimates the tax benefit of debt (i.e. interest deductibility) to be equal to 9.7% of asset value for an average firm in his sample of 87,643 firm-year observations from 1973 to 1994. Likewise, van Binsbergen et al. (2010) report an estimated tax benefit of debt of around 10.4% of the book value of total assets for their sample of 126,611 firm-year observations for the period 1980 to 2007. Overall, these estimates suggest that the presence of corporate taxation reduces the cost of debt capital, relative to the cost of equity capital, and therefore, all else equal, a firm using debt capital is expected to be worth about 10% more than the same firm with zero debt.

b. Bankruptcy costs of debt

Despite the significant gains from debt financing, Graham (2000) and Molina (2005) show that firms often adopt a conservative debt policy and tend to have lower leverage ratios than they should. For example, Graham reports that leverage ratios for around 44% of his sample firm-years (total sample of 87,643 firm-year observation) are extremely conservative. The literature suggests that the presence of financial distress (and bankruptcy) costs is partly responsible for the conservative debt policy adopted by some firms (e.g. Borio, 1990; Andrade and Kaplan, 1998; Molina, 2005).

Molina (2005), for instance, shows that increases in financial leverage are associated with debt rating downgrades and higher default probabilities. Given that bankruptcy and financial distress tend to be costly for firms (see Andrade and Kaplan, 1998), the author suggests that increases in debt may exacerbate bankruptcy costs, which could offset part or all of the tax related benefits of debt. In effect, the cost of financial distress (bankruptcy) makes debt capital more expensive relative to equity capital. Therefore, firms with extremely aggressive debt policy (extremely overleveraged firms) are likely to face a higher probability of bankruptcy and bankruptcy costs, which, in turn, may lead to higher cost of debt capital.

c. The agency benefits of debt

Several studies focus on the conflicts of interests between shareholders, bondholders, and managers and the way in which financing arrangements alter the incentives of managers (e.g. Jensen and Meckling, 1976; Myers, 1977; Jensen, 1986; and Stulz, 1990). Jensen (1986) and Stulz (1990) theorise that entrenched self-interested managers of corporations with free cash flow might lack discipline and, consequently, may waste corporate funds on unprofitable projects in order to maximise their own wealth (i.e. the overinvestment problem). Since debt capital commits managers to pay out free cash flow as interest payments, it restricts the availability of corporate funds at the disposal of managers (Stulz, 1990). Moreover, creditors' monitoring and debt covenants may align managerial interests to those of investors, and ensure that managerial investment decisions are value-creating (see Bharadwaj and Shivdasani, 2003; Chava and Roberts, 2008). Therefore, high (low) debt usage reduces (increases) the agency cost of free cash flow and the associated overinvestment problem.

Berger, Ofek, and Yermack (1997) and Jung, Kim, and Stulz (1996) provide evidence to support the linkage between debt/equity usage, managerial entrenchment and overinvestment. Using a panel data on 434 firms studied between 1984 and 1991, Berger, Ofek, and Yermack (1997) find that managers, particularly entrenched CEOs, prefer to issue debt conservatively, and lever up only when there is a threat to their job security. Their results imply that entrenched managers attempt to avoid the discipline of the bond markets by using debt conservatively in a way that might not be consistent with the shareholder wealth maximisation objective.

Jung, Kim, and Stulz (1996) directly link the agency problem to security issuance and investments. They suggest that managerial discretion causes some firms to issue equity (when they should issue debt) so that managers can build "empires". In particular, they find that, stock price reaction to equity issues is more negative when the issues are done by firms without valuable investment opportunities than when they involve firms with better investment opportunities. Jung, Kim, and Stulz (1996) further show that equity issuing firms without valuable investment opportunities tend to invest more than similar debt issuing firms. Since equity (debt) issues increase (reduce) the amount of discretionary funds under the control of corporate managers, their findings imply that equity financing encourages firms, particularly those without valuable investment opportunities to overinvest, whereas the discipline associated with debt financing discourages such firms from overinvestment. Thus, extremely underleveraged firms may be seen as "cash-rich non-maximisers" who invest inefficiently.

d. The agency costs of debt

Besides reducing the agency cost of free cash flow, debt financing may also generate agency costs related to "asset substitution" and "debt overhang" problems (see Jensen and Meckling, 1976; Myers, 1977). Jensen and Meckling (1976) and Myers (1977) postulate that when managers are assumed to act in the interest of shareholders, debt financing (in particular aggressive debt usage) could negatively impact firm value by creating conflicts between bondholders and shareholders.

Jensen and Meckling (1976) argue that shareholders can extract value from existing bondholders by pursuing risky (suboptimal) investment strategies (i.e. the asset substitution problem). This is because debt contracts provide that if an investment results in substantial returns beyond the face value of debt, shareholders enjoy most of the gains. However, if the investment fails, the principle of limited liability allows shareholders to walk away while bondholders bear the consequences (Harris and Raviv, 1991). Therefore, shareholders (via corporate managers) who control the firm's choice of capital structure and investment risk attempt to maximise the value of their claim by opting for risky investment strategies which reduce the value of other claimants, i.e. bondholders (Leland, 1998). This implies that employing debt in a firm's capital structure encourages the pursuit of risky investments, thus, extremely overleveraged firms may be deemed by bondholders as extremely risky, which could adversely impact on their future borrowing ability to undertake investments.

Myers (1977) links the present levels of corporate leverage to future investments by suggesting that high debt usage in a firm's current capital structure can result in underinvestment in the future. This cost of debt is higher for firms with valuable investment opportunities. He argues that shareholders sometimes forgo net present value (NPV) investments if benefits of these projects accrue to their firms' bondholders (i.e. the debt overhang or underinvestment problem). When new projects (including M&As) are undertaken, the cash flows and other gains (e.g. synergy in the case of M&As) are distributed between bondholders and shareholders. Myers (1977) notes that, given that improved cash flows from profitable investments alter the firm's default risks, the investment incentives of bondholders and shareholders are misaligned. Specifically, existing bondholders gain from reduced default risk by expropriating part of the pay-off of the new project, which reduces the net benefits of the project accruing to shareholders. Since shareholders hold the power to sanction major investment projects, they will refuse to support NPV projects that yield little or no pay-offs to them after fulfilling debt obligations and this leads to underinvestment.

Using industry-level data from 1965 to 1985, Smith and Watt (1992) provide evidence to suggest that firms consider their growth options when choosing their capital structure. They report that firms with more growth options have lower leverage. This is consistent with the view that firms with growth and valuable investment opportunities will resort to conservative debt policy in order not to forgo future NPV projects.

3.2.2 Information asymmetry-based models

Unlike the trade-off models, asymmetric information models of capital structure do not try to propose the existence of an optimal capital structure (Xu, 2007). Studies within this strand of literature suggest that, when making financing decisions, managers take advantage of their private information about the value of their firms (see Myers and Majluf, 1984; Myers, 1984; Baker and Wurgler, 2002). Therefore, information asymmetry between "insider" managers and "outsider" investors becomes the driving force influencing the types of financing arrangements that firms adopt. This literature is briefly reviewed below under the subheadings of the pecking order theory and the market timing theory. The review here will be very brief ***because the present study relies more on the assumptions of the trade-off theory than the views of the information asymmetry models***. The present study lays more emphasis on the trade-off theory because it is the trade-off theory that recognises the existence and importance of the target leverage ratio. By contrast, the information asymmetry-based models, particularly the pecking order theory disputes the significance of the target leverage ratio, and therefore, deviations from the target leverage ratio, if it does exists, will naturally be of less interest to proponents of the pecking order theory.

a. The pecking order theory

Myers and Majluf (1984) and Myers (1984) suggest that it is costly to raise external finance (debt and equity) because "outsider" investors perceive "insider" managers to have more information about their firms' prospects than they do. Specifically, Myers and Majluf (1984) theorise that information asymmetry gives managers incentives to issue overvalued securities. However, the market anticipates this and reacts negatively to security issuance. Myers (1984) predicts that, in these circumstances, managers follow a pecking order in their financing choices by first relying on internal funds and then on external capital. Furthermore, as equity issues are likely to have higher asymmetric information problem relative to debt issues, firms prefer to raise external capital via debt to raising external capital via equity. Therefore, a firm is expected to use debt only when its internal funds are insufficient to fully cover investment needs; and external equity is issued only after the firm has exhausted its debt capacity.

Shyam-Sunder and Myers (1999) show that leverage directly responds to variations in internal financing deficit (i.e. difference between corporate investment and earnings). They report that leverage increases (declines) when investment is greater (less) than earnings, which is consistent with the pecking order theory. More generally, the negative price reaction that follows equity issues (see e.g. Asquith and Mullins, 1986; and Andrande et al., 2001) is consistent with the Myers and Majluf's predictions. Nevertheless, the frequent equity issues by firms documented in studies like Frank and Goyal (2003) and Fama and French (2005) are inconsistent with the pecking order theory, since the pecking order theory implies that equity issues are a rare (infrequent) corporate phenomenon.

One of the key implications of the pecking order theory on the study's hypotheses (to be later formulated) is that the extent of deviations from a firm's target leverage ratio (i.e. leverage deviation), which largely influences a firm's borrowing ability may not be related to corporate M&A activities. This is because whether or not firms are overleveraged or underleveraged, their ability to initiate and complete acquisitions depends first and foremost on whether they have sufficient internal financing capacity, and not on their external financing ability. Thus, the pecking order theory suggests that external financing constraint may be irrelevant or at least of second order importance to the probability (and/or ability) of firms to undertake acquisitions.

b. The market timing theory

The market timing theory attempts to explain why firms may frequently issue equity capital despite the negative price reactions suggested by the pecking order theory. The theory suggests that firms prefer external equity when the cost of equity is very low, otherwise they prefer debt (Baker and Wurgler, 2002). Baker and Wurgler (2002) suggest that corporate managers sometimes perceive their equity to be misvalued by the market, and therefore, when they have financing needs, they issue equity (debt) when they perceive the relative cost of equity to be low (high). Huang and Ritter (2005) note that the market timing theory generates a form of pecking order different from the “standard” pecking order suggested by Myers (1984). They suggest that under “normal” market conditions, firms follow the standard pecking order. However, when equity is less expensive than debt (due to high equity valuation by stock markets), firms prefer equity if they require external financing. In other words, when equity is very cheap, then issuing equity is the first choice, and not a last resort as suggested by Myers (1984).

Similar to the pecking order theory, the market timing theory seems to also suggest leverage deviations may be unrelated to or at least may be of second order importance to the probability of firms undertaking acquisitions. Of primary importance to firms’ ability to launch acquisitions is the (mis) valuation of equity by the stock markets. When equity is highly valued by the stock markets, for example, both underleveraged and overleveraged firms may be able to issue equity capital to support their M&A activities.

Overall, capital structure theories offer several explanations why firms choose between debt and equity capital. The trade-off theory suggest that the possibility of earning tax savings and reducing the agency cost of free cash flow (and the associated overinvestment) encourage value-maximizing firms to use debt capital. On the other hand, the presence of increased investment risks (from asset substitution), and bankruptcy costs, and the risk of forgoing future NPV investments (underinvestment) make firms cautious in their use of debt capital. However, debt capital should always be chosen over equity capital as long as the benefits of debt offset the costs of debt. The pecking order theory reiterates the conclusion that debt capital should always be chosen over equity capital, albeit it employs a different reasoning. Finally, the market timing theory offers one important condition under which equity capital should be preferred to debt capital, and that is when a firm’s equity is highly valued by the stock markets. In the next section, we show how these conclusions could impact corporate M&A activities.

3.3 Implications of corporate leverage policies on corporate M&As

This section attempts to establish a link between the predictions of the main theories of capital structure and corporate M&As by summarising the main theoretical arguments and reviewing some empirical studies on the subject.

3.3.1 The major arguments

When internal funds are insufficient to fully cover major investment projects such as M&As, firms are faced with a choice between debt and equity to finance these projects.[24] In a pecking order world, as described by Myers (1984), corporations are likely to choose debt over equity as long as they have sufficient debt capacity (i.e. ability to borrow). Without debt capacity, firms will either have to completely forgo their planned M&A projects or reluctantly issue equity which does not only tend to be very costly under normal market conditions (i.e. stock markets not booming) with asymmetric information (see Lee, Lochhead, Ritter, and Zhao, 1996),[25] but also result in wealth-destroying M&As (see Travlos, 1987; Andrade et al., 2001).

A clear implication of the pecking order theory on the wealth effect of M&As is the importance of corporate debt capacity for firms anticipating M&As. Myers' (1977) debt overhang hypothesis suggests that the current debt policy (conservative or aggressive borrowing) of a firm could deplete its debt capacity, and subsequently constrain its borrowing ability to support future M&A activities. In particular, a key argument upon which this study is based is that ***firms with M&A prospects are expected to be more conservative (less aggressive) in their past and current debt usage in order to store up debt capacity for their future M&A deals*** (see, e.g. DeAngelo et al., 2011). This is because when prospective

[24] Bharadwaj and Shivdasani (2003) and Harford, Klasa, and Walcott (2009) suggest that since M&As tend to involve huge amounts of capital, they often require external funds (e.g. debt). This makes the assumption of insufficient internal financing more plausible when studying the link between investment projects and financing possibilities.

[25] Under asymmetric information theory, deep discounting of equity by investors makes equity capital relatively expensive (Myers and Majluf, 1984). In terms of the transaction costs of raising capital alone, Lee et al. (1996) document substantial difference between debt issues and equity issues. They show that the transaction cost of debt issue is only 2.2% of the issue proceeds compared to 7.1% of seasoned equity offerings and 11% of Initial Public Offerings (IPOs), implying a relatively higher cost for equity issues than for debt issues. It is also suggested that during periods of high stock market activity (booms), equity could be relatively cheaper, which induces firms to issue equity (rather than debt) to finance investment projects (Xu, 2007; Martynova and Renneboog, 2009).

acquiring firms give little or no attention to their future borrowing ability (debt capacity) by employing excessive debt in their current capital structures, they risk future debt financing constraints which could subsequently curtail their planned M&A activities. This hypothesis has been recently tested in some studies (e.g. Harford et al, 2009; Uysal, 2011; DeAngelo et al., 2011) and the present study hopes to contribute to this strand of literature.

3.3.2 Recent empirical evidence on leverage policy and financing constraint

The empirical literature provides evidence to suggest that aggressive debt policy could constrain debt financing and corporate investment activities, including M&A deals (see Martynova and Renneboog, 2009; Hovakimian, Olper, and Titman, 2001; Uysal, 2011). This section reviews studies that explore the relations between firms' current leverage policies and the possible financing constraint they could encounter in future. These studies suggest that corporate debt capacity and the risk of financial distress (which largely depend on the current and past leverage levels) influence the extent of debt financing constraint that firms face. One of the main challenges faced by these researchers is to do with distinguishing between aggressive and conservative leverage policies in order to assess a firm's future borrowing ability (debt capacity). Therefore, before reviewing the empirical evidence on M&As and leverage, the main proxies for debt capacity utilised by the recent literature are discussed.

a. Proxies for debt capacity

Debt capacity was originally defined by Myers (1977) as the point at which an increase in debt usage reduces the market value of the borrowing firm. More recently, Shyam-Sunders and Myers (1999) define it as "sufficiently high" debt ratios that make the cost of financial distress restrain further debt issues. Lemmon and Zender (2010) note that debt capacity offers an important instrument to gauge whether firms that require debt capital do face financing constraints.

Empirical researchers tend to proxy a firm's debt capacity and its related debt financing constraint by reference to its prior debt ratios, the level of tangible assets, its access to public debt, and/or its target leverage ratio[26] (see Hovakimian et al., 2001; Martynova and Renneboog, 2009; Lemmon and Zender, 2010). In general, low-leveraged firms, firms with more tangible assets (for collateral reasons), firms with greater access to public debt, and firms with below-target leverage ratios are deemed to possess greater debt capacity. Of the four proxies, the target leverage approach appears to be used most frequently, perhaps due to its theoretical appeal and the availability of data required in its estimation.

The target leverage approach is underpinned by the trade-off theory, which posits that firms tend to target pre-defined optimal leverage ratios[27] (as discussed in section 3.2 above). Therefore, the target leverage ratio provides a form of benchmark for “normal” leverage levels and an upper boundary for debt usage (Myers, 1977). Firms that keep their leverage ratios within the neighbourhood of the target leverage are usually regarded as having future debt (borrowing) capacity. In contrast, maintaining above-target leverage ratios is likely to result in costs that exceed potential benefits of debt. Thus, above-target (overleveraged) firms tend to be regarded as too risky and unattractive to bondholders (Uysal, 2011). In effect, firms that deviate from their target leverage (in terms of going beyond their target leverage ratios) are deemed as lacking the ability to source debt capital and are predicted to face debt financing constraints (Hovakimian et al., 2001; Harford et al., 2009; Uysal, 2011).

b. The empirical evidence on debt capacity and debt financing constraints

Using US data on 39,387 firm-years that covers the period 1979-1997, Hovakimian, Olper, and Titman (2001) report that excessive debt usage (overleveraging) could inhibit firms from obtaining further debt capital and force them to use expensive equity capital. They first determine leverage deficit as the “difference between target leverage and actual leverage”, and then examine the relationship between this variable (leverage deficit) and the security issuance activities of their sample firms. The leverage deficit variable is a measure of the extent to which firms in their sample deviated from their leverage targets. Their definition of leverage deficit implies that negative (positive) differences will denote overleveraging (underleveraging).

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[26] The target leverage ratio and its construction are discussed in detail in the Data and Methodology chapter (i.e. Chapter 4).

[27] In a survey 392 Chief Financial Officers (CFOs), Graham and Harvey (2001) report that 81% of CFOs claim to have target leverage ratios (i.e. they aim to achieve this optimal leverage ratio).

Using mean-comparison test, the authors compare the characteristics of firms that issue debt and equity capital. They find equity issuers (particularly preference equity issuers) to be significantly overleveraged (-0.067) and debt issuers (particularly for long-term debt issuers) to be significantly underleveraged (0.013). When they proxy debt capacity by pre-issue leverage ratio, equity issuers again have significantly higher leverage than debt issuers. Hovakimian et al. (2001) confirm most of their univariate findings with a multivariate logit regression analysis which predicted the choice between debt and equity issues. Collectively, their results indicate that overleveraged firms do face some constraints on the bond markets and are therefore forced to issue equity capital, assuming the pecking order theory holds.

A recent paper by Lemmon and Zender (2010) examines the role of debt capacity in the financing behaviour of US firms during the period 1971-2001. With a sample of 67,203 firm-year observations, they show that debt capacity plays an important role in explaining firms' decision to fund their financing deficit (i.e. their proxy for external funding needs) with debt or equity. They define financing deficit (net security issues) as the sum of net debt issues and net equity issues scaled by book assets. They estimate corporate debt capacity on the basis of a logit model by assessing whether firms with different characteristics (e.g. size) have high or low probability of being able to access the public debt markets. The authors argue that firms that can access the bond markets are able to borrow relatively cheaply and thus are expected to have higher debt capacity and less restrictive debt financing constraints. Accordingly, from the estimates of their logit regression, they segregate their sample into firms with lowest (bottom tercile) and highest (top tercile) predicted probabilities of being able to access public bond markets. They consider firms with the highest (lowest) probability of having bond rating as possessing unconstrained (limited) debt capacity, since they face less (more) restrictions on the bond markets.

Lemmon and Zender (2010) report that unconstrained debt capacity firms have lower average financing deficit than limited debt capacity firms. From this, they infer that firms with unconstrained debt capacity tend to use less external funds. The finding appears to be inconsistent with the idea that limited-debt capacity restricts all forms of external financing (both debt and equity). However, decomposing external financing into debt issues and equity issues reveals that firms with limited debt capacity have substantially lower debt issues than unconstrained debt capacity firms. In contrast, limited debt capacity firms tend to issue more equity than unconstrained debt capacity firms. These findings imply that unconstrained debt capacity firms face lower constraints on the bond markets and thus tend to use more debt (which is relatively cheap) to fund their external financing needs. On the contrary, limited debt capacity firms appear to face greater debt financing constraints and, therefore, rely heavily on external equity financing (which is relatively costly).

The authors further provide some evidence that offers insights into the potential reasons why unconstrained debt capacity firms are able to easily access the bond markets. Specifically, they document firm characteristics that suggest that unconstrained debt capacity firms face lower bankruptcy risk compared to limited debt capacity firms. In relation to limited debt capacity firms, unconstrained debt capacity firms tend to be larger, more profitable, have more tangible assets, and have less volatile stock return. These findings suggest that financial distress is a significant driver of debt capacity and debt financing constraint. Taken together, the results imply that bond investors pay considerable attention to the possibility of financial distress in their lending decisions. Also, Lemmon and Zender's (2010) results on the link between debt capacity and debt financing constraint are consistent with the findings of Hovakimian, et al. (2001), although the two studies used entirely different proxies for debt capacity.

Within the context of M&As, Martynova and Renneboog (2009) report findings that are largely in line with conclusions drawn by the prior reviewed studies. Using a sample of European bidders completing M&As over the period 1993-2001, they provide evidence to suggest that acquirers that have limited debt capacity may have to resort to expensive equity issues to finance their M&A deals. Using the pre-bid leverage ratio to serve as proxy for bidder's debt capacity, the authors show that bidders that financed M&A deals from equity capital had substantially lower debt capacity (i.e. higher pre-bid leverage) in relation their counterparts that used debt capital. Specifically, while the pre-bid leverage ratio is 0.46 for equity-financed M&As in their sample, it is only 0.32 for debt-financed M&As, suggesting that high pre-bid leverage ratios erode the ability of prospective acquirers to obtain further debt financing. Therefore, it seems high pre-bid leverage acquirers have to settle for a less preferable (more costly) equity capital.

Collectively, the review undertaken in this section suggests a link between past and present corporate debt policies and firms' ability to obtain further debt financing. Firms with extremely aggressive debt policies tend to have lower debt capacities and seem to be less able to raise further debt financing in the future. The next section reviews recent studies that consider how debt policy (specifically leverage deviation) and its associated debt financing constraints affect corporate M&A activities.

3.4 Critical review of key (related) empirical papers

The key objective of this thesis is to provide empirical evidence on the link between M&As and financial leverage. So far, to the best of my knowledge, only two papers based on US acquirers' data have explicitly looked at this issue. These are Harford, Klasa, and Walcott (2009) and Uysal (2011). These studies consider debt capacity and debt financing constraint in terms of firms' deviations from their target leverage ratio (i.e. the optimal leverage ratio), in line with Hovakimian et al. (2001). However, unlike Hovakimian et al., these studies compute firms' leverage deviation (or leverage deficit) as the difference between their actual leverage ratios and their target leverage ratios. It is important to note that the target leverage, if it does exist, is unobservable. Therefore, these studies use regression models to estimate the predicted values of leverage ratios, which are then used as proxies of target leverage. By their definition of leverage deviation, positive leverage deviations represent overleveraging (i.e. presence of debt financing constraints), whilst negative leverage deviations are indicative of underleveraging (i.e. presence of debt capacity). The detailed steps involved in the calculation of the target leverage ratios using regression models will be discussed in Chapter 4.

As mentioned in Chapter 1, both Uysal (2011) and Harford et al. (2009) are very closely related to the present study and their results and conclusions have substantially influenced the empirical analyses addressed by this thesis. Therefore, these studies are comprehensively reviewed in the following subsections before moving ahead to develop the central hypotheses of the present study.

3.4.1 Uysal (2011)

Using a sample of US firms during 1990-2007, Uysal (2011) examines the extent to which corporate leverage deficit[28] affects (1) the probability of undertaking an acquisition, (2) the method of payment, (3) the premiums paid for the target firm, and (4) the shareholder wealth effect. The review will place more emphasis on those aspects of his study that are of direct relevance to this thesis.

Uysal (2011) postulates that overleveraged firms have limited ability to raise capital, which, in turn, constrains them from issuing further debt to finance their acquisitions. As a result, overleveraged firms are impeded from bidding aggressively for acquisition targets. He employs data on *domestic* M&A transactions made by his sample firms to provide evidence to suggest that overleveraging constrains firms' ability to make acquisitions and to determine the terms of acquisitions. Specifically, using a probit model, Uysal (2011) estimates the probability of undertaking an acquisition. He finds that, after controlling for other factors (e.g. size, profitability, stock return, etc.) that may influence acquisition decisions, leverage deficit is significantly negatively related to the acquisition probability. This suggests that firms that deviate from their leverage targets have a significantly lower probability of undertaking acquisitions.

When Uysal (2011) segregates the leverage deficit effect into overleverage and underleverage effects, he concludes that his earlier finding is restricted to overleveraged firms. While the effect of overleverage on the acquisition probability is negative and significant, underleveraging has an insignificant effect on acquisition probability. Uysal (2011) confirms his findings based on probit regression by utilising tobit regressions that relates the acquisition size (measured as the ratio of total M&A transaction value to the firm's total assets) to the leverage deficit and a number of control variables. Specifically, his tobit

[28] Leverage deficit is the same variable that is sometimes termed as leverage deviation (see e.g. Harford et al., 2009).

regression results indicate that overleveraged (underleveraged) firms tend to engage in small (large) acquisitions. These results imply that overleveraging restricts firms' ability to undertake M&As, particularly when the acquisition is large and likely to require external financing.

Uysal (2011) also investigates the role of leverage deficit in the financing of M&As. In his sample of M&As, he conducts a probit analysis of the probability of making an all-cash offer. The dependent variable takes a value of one if the M&A deal is financed by cash and zero otherwise. The explanatory variable of interest is the leverage deficit. He reports that the average marginal effect of leverage deficit on the probability of an all-cash offer is negative and statistically significant. He again finds the negative effect of leverage deficit to be driven by overleveraging. Overleveraged firms are 5.6% (significant) less likely to offer cash in acquisition deals, while the effect of underleverage on the probability of making a cash offer is positive but not statistically significant at conventional levels. He repeats these tests using a tobit regression of the fraction of cash used in an acquisition offer on leverage deficit (and overleverage and underleverage dummies) and a number of control variables. Results from this tobit analysis suggest that leverage deficit, particularly overleveraging reduces the percentage of cash used in M&A deals. Since cash-financed deals are often debt-financed (Bharadwaj and Shivdasani, 2003; Harford et al., 2009), a plausible interpretation for these findings is that leverage deficit constrains overleveraged firms from issuing further debt.

Furthermore, Uysal (2011) examines the effect of leverage deficit on premiums paid for the target firm. He defines premium as the sum of cash, stock and other securities offered to target firms divided by the market capitalisation of target firms 40 days prior to the acquisition announcement date. He finds insignificant effect of leverage deficit on acquisition premium paid to target firms. However, when the effect of the leverage deficit is segregated into overleveraged and underleveraged firms, Uysal (2011) finds that overleveraged acquirers pay significantly lower premiums than underleveraged acquirers. These findings indicate that overleveraging constrains firms from paying higher premium, and could thus make them less competitive in takeover contests.

Uysal (2011) also examines capital structure adjustments and equity issuance decisions when corporate managers anticipate a high probability of undertaking an acquisition. He models equity issuance and changes in leverage deficit decisions. The models include indicator variables for overleveraged and underleveraged firms and an interaction variable between overleveraged firms and the probability of making acquisitions. He uses several proxies for the acquisition probability including (1) an estimated probability model, (2) industry M&A liquidity, and (3) volume of M&A transactions. He controls for the effect of stock return and growth opportunities on the acquisition probability. Uysal (2011) reports that overleveraged firms increase the size of equity issuance and are more likely to reduce their leverage deficits when they have a higher probability of undertaking acquisitions. This finding suggests that managers take steps to mitigate the negative effects of overleveraging when they anticipate acquisitions.

Finally, Uysal (2011) shows that overleveraged firms embark on the most value-enhancing acquisitions. He reports that the average cumulative abnormal return (CAARs) to overleveraged acquirers is significantly higher than to moderately leveraged firms, while the CAARs to underleveraged acquirers is insignificant (-0.3%). He interprets these results to imply that the financing restrictions faced by overleveraged firms make them more selective in their choice of acquisition targets. It may also imply that investors are willing to provide further financing to support the acquisition plans of overleveraged firms only when they are more confident in the profitability of the proposed M&A project.

In conclusion, the study by Uysal (2011) contributes to the literature by providing evidence that suggests that firms' deviation from their target leverage is likely to constrain their ability to raise new debt issues, which, in turn, is likely to restrict their corporate M&A activities by limiting their ability to participate in the bidding process.

3.4.2 Harford, Klasa, and Walcott (2009)

Harford, Klasa, and Walcott (2009) provide evidence on how deviations from leverage targets affect the choice of financing for an acquisition, and on how firms adjust their capital structures following acquisitions. They base their analyses on a sample of 1,188 *large* M&As

by US firms during1981 and 2001. They define a takeover to be large if the target firm is at least 20% of the bidder's size. As in Uysal (2011), Harford et al. (2009) define leverage deviation as the difference between actual leverage and target leverage. Thus, negative (positive) leverage deviations denote underleveraging (overleveraging).

Using the Wilcoxon rank-sum tests, they document a median pre-acquisition leverage deviation of -0.05, which suggests that bidders in their sample are underleveraged. This implies that most bidders have unused debt capacity in the pre-acquisition years, and could therefore borrow to fund their acquisitions. This finding is consistent with several other studies (see Bruner, 1988; Ghosh and Jain, 2000; Morellec and Zhdanov, 2008) and continues to hold irrespective of the method of payment. The median pre-merger leverage deviation is -0.04, -0.07, and -0.03 for cash, equity, and mixed deals, respectively. This seems inconsistent with the predictions of the pecking order theory since some bidders with unused debt capacity (e.g. equity-financed bidders) did not choose to finance their M&As with debt. However, additional results, presented by the authors appear to resolve this puzzle. They find that bidders paying with equity have higher growth opportunities (proxied by the market-to-book ratio) (1.85, compared with 1.30, and 1.41 for cash and mixed deals, respectively). Thus, it seems some high growth bidders with borrowing ability choose equity financing, possible because they wish to save up their current unused debt capacity for the future in order not to give up future investment prospects (see Myers, 1977).

Harford et al. (2009) also present evidence to suggest that most large M&As paid for with cash are financed with new debt issues, and that the cash component of M&As paid for with a mixture of cash and equity (i.e. mixed deals) is also financed with new debt issues. They suggest that, since bidders that made cash offers had the lowest pre-merger cash holding and the lowest growth prospects, they (cash bidders) might have relied heavily on borrowing. They explicitly test this conjecture and find some evidence to support it. They find that the merger-induced change in firms' leverage deviation from the fiscal year prior to the acquisition (year -1) to the effective year of the acquisition (year 0) is 0.12, -0.01, 0.04 for cash, equity, and mixed deals, respectively.

More directly, Harford et al. (2009) report the net debt issues during the acquisition year (year 0) to be 0.15, 0.00, and 0.06 for cash, equity, and mixed deals, respectively. Overall, their univariate results suggest that bidders, in general, tend to have unused debt capacity in the pre-M&A years, but it is only M&As paid for with cash (which tends to be debt-financed) which result in increases in the bidder's leverage deviation. Their conclusion of leverage increases following *cash* acquisitions is a slight modification of that of Ghosh and Jain (2000) who document a general increase in leverage following M&As. These findings of increased financial leverage for cash-financed M&As are consistent with Furfine and Rosen (2011) who suggest that cash/debt-financed M&As are likely to increase the financial risks of bidders (via increased financial leverage) more than is the case in equity-financed M&As.

In a multivariate tobit regression framework, Harford et al. (2009) investigate the impact of the pre-merger leverage deviation (i.e. debt capacity) on the choice of debt or equity for the financing of M&As. The dependent variable in the model is the fraction of the deal paid for with cash, while the pre-merger leverage deviation variable is the explanatory variable of interest. They also control for the effect of other factors (e.g. stock return performance, cash holdings, etc.). They find the co-efficient for the pre-merger leverage deviation variable to be negative (-3.96) and significant (at 1% level), suggesting that a one cent increase in a firm's leverage deviation per dollar of assets reduces the percentage of the deal that is cash-financed by nearly 4 percentage points. This finding is in line with Uysal (2011) and implies that, an already overleveraged firm has a lower propensity to pay for an acquisition with cash and take on more debt. Simply put, an overleveraged (underleveraged) firm is more likely to finance its acquisitions with equity (debt).

In addition, Harford et al. show that the negative effect of pre-merger leverage deviation on the proportion of cash-financed deals is stronger for bidders with higher growth opportunities. They reach this conclusion after including an interaction dummy of the leverage deviation and growth opportunities variables in the tobit model, and finding the coefficient of the interactive dummy to be significantly negative (-1.03). In unreported tests, the authors claim that this finding holds for both overleveraged and underleveraged bidders, though the effect is much stronger in firms with positive leverage deviations (overleveraged firms). They interpret their results to be consistent with Myers (1977) who predicts that overleveraged firms with large future investment potentials will avoid issuing further debt.

Another contribution by Harford et al. (2009) which has implications on the present study is the suggestion that acquiring firms use M&As as a vehicle to move their leverage ratios towards target levels. They hypothesize that, when managers of acquiring firms make decisions on the method of payment for the M&A, they incorporate how the M&A transaction changes the firm's target leverage. They argue that, if for example, an underleveraged bidder aims to move its leverage ratio towards target levels; it would finance the M&A with debt, rather than with equity. To empirically test their hypotheses, they cross-sectionally regress the actual change in leverage from year -1 to year 0 on the change in the target leverage ratio from year -1 to +1 around an acquisition,[29] and a number of explanatory variables (e.g. leverage deviation, market leverage, cash, etc.). Consistent with their prediction, they find a significantly positive (0.68) association between the merger-induced changes to the acquirer's actual and target leverage ratios. They interpret this finding to imply that when managers of bidding firms make decisions on how to finance large M&As, they incorporate more than two-thirds of the change in the merged firm's target leverage.

In effect, the authors suggest that bidders are more likely to engage in leverage-increasing (leverage-reducing) M&As if their target leverage ratios also increase (decrease) as a result of the M&A transaction. This seems to partly explain why acquirers (and cash acquirers in particular) tend to be underleveraged, whiles non-acquirers and equity-acquirers may be overleveraged. When underleveraged bidders wish to move their leverage ratios close to their target leverage ratios, they choose to pursue leverage-increasing M&A transactions (e.g. cash/debt-financed deals). In contrast, overleveraged bidders tend to either select leverage-reducing M&As (e.g. equity-financed deals) or simply avoid M&As, since M&As generally result in increased leverage (Ghosh and Jain, 2000). This matter is re-visited under the hypotheses development section.

[29] Harford et al. (2009) explain that they compute the change in target leverage ratio by reference to years -1 to +1 (and not -1 to 0) because the target leverage in year +1 is predicted based on firm characteristics in year 0 (Year 0 is the effective year of the acquisition).

In summary, the following empirical contributions of Harford et al. (2009) are relevant to the present study. First, they show that bidding firms have target leverage ratios, and deviating from these targets have implications on the consideration offered in acquisition deals. Second, they establish that cash offers in M&A deals are predominantly debt-financed, and therefore overleveraged bidders are less likely to make cash offers in M&A transactions. They also suggest that, apart from debt financing constraints imposed by overleveraging, bidders consider their target leverage ratios in choosing their method of financing. Thus, underleveraged (overleveraged) bidders are expected to choose debt (equity) financing in order to move their leverage upwards (downwards) towards target levels. Finally, they relate the effect of leverage deviation on the choice of acquisition financing to the size of the bidder's growth opportunity sets.

3.4.3 The contributions of the present study to the literature

As indicated earlier, the empirical analysis by Harford et al. (2009) and Uysal (2011) are directly related to this study. However, the present study differs in many ways from them, as well as, makes important contributions to the general literature on target leverage and M&A activities in the following ways.

First, unlike Harford et al. (2009) who limit their study to *large* M&As, the present study imposes no restrictions on the size of the M&As observed. Specifically, we study both *large* and *small* M&A deals. This distinction is significant because Moeller, Schlingemann and Stulz (2004) show that the wealth effect of large M&As tends to be significantly worse than that of small M&As. Therefore, studying the effect of leverage deviation (and the associated debt financing constraints) on corporate M&As within the context of large M&As (i.e. wealth-destroying M&As) is likely to overstate the average leverage deviation effect on corporate M&A activities. This is because investors may be more willing to finance wealth-enhancing M&As (i.e. small M&A deals) which were excluded from Harford et al.'s analyses. Therefore, by studying both large and small M&As, we are able to analyse and draw conclusions for M&As in general (both wealth-enhancing and wealth-destroying M&As), and not just for *large* M&As (wealth-destroying).

Second, this study examines the significance of cross-border acquisitions within the context of leverage deviations. Like Harford et al. (2009), Uysal's (2011) work was based on a sample that is less representative of "general" M&As. Without advancing any reasons, Uysal restricts his sample to *domestic* M&As, implying that the effect of leverage deviation on *cross-border* M&As has not yet been investigated. This leaves an important gap in the literature because globalisation and increased foreign direct investments (FDIs) have made cross-border M&As increasingly important in recent years (Shimizu et al., 2004). This is confirmed by the tremendous growth in cross-border M&A transactions in the last few decades. For example, global cross-border M&As rose steadily from 0.5% of the world's GDP in the mid-1980s to over 2% in year 2000 (Conn et al., 2005). Furthermore, Erel, Liao, and Weisbach, (2012) report that the worldwide volume of cross-border M&A activity was 30% of the total M&A volume in 1998, but it jumped to 45% in 2007. Given the surge in cross-border M&As, the present study attempts to fill the gap in our understanding of leverage deviation and *cross-border* M&As by analysing a sample which covers both domestic and cross-border M&As.

Third, an important extension of Uysal's (2011) study is the examination of the leverage deviation effect on different types of M&As that carry different risks and return implications for investors. Uysal (2011) implicitly assumes the effect of leverage deviation on the acquisition probability to be symmetric across all types of M&As (except cash vs. equity offers). This assumption seems implausible if investors give consideration to the risks and return associated with proposed M&A transactions. In Chapter 6, this matter will be further discussed when we develop the relevant hypotheses.

Fourth, both Harford et al. (2009) and Uysal (2011) do not examine the impact of the pre-bid organisational form (diversified vs. focused structure) of the acquiring firm on the association between leverage deviation and M&A activities. This study explicitly examines this issue. This line of inquiry is inspired by the different financing capacity available to diversified and focused firms (see Lewellen, 1971; Stein, 1997), as well as the difference in the extent of agency problems faced by them (Scharfstein, and Stein, 2000; Moeller et al., 2004). The hypotheses relating to this matter will also be formulated in Chapter 6.

Fifth, this study is the first to apply the standard partial adjustment methodology to the leverage adjustment behaviour of acquiring firms.[30] Harford et al. (2009) explore the subject by simply calculating percentage changes in leverage deviations between different years. Moreover, they examine the *post-acquisition* leverage adjustment behaviour of acquirers. In contrast, the present study explores the *pre-acquisition* leverage behaviour of acquiring firms. It is important to point out that Uysal (2011) also examines the pre-acquisition leverage adjustments for *only* overleveraged and underleveraged firms that have high acquisition probability. Uysal's (2011) research approach requires the estimation of firms' acquisition probabilities. However, the methodological approach (partial adjustment model) adopted by the present study does not require proxies for acquisition probability. An advantage of the partial adjustment model is that it is direct and summarises the leverage adjustment behaviour of firms into a single statistic, referred to as the speed of adjustment (Xu, 2007). Besides employing the partial adjustment model, this study is also the first to examine the capital structure rebalancing behaviour of overleveraged acquirers in relation to underleveraged acquirers, and non-acquirers (both underleveraged and overleveraged).

Finally, both Harford et al. (2009) and Uysal (2011) conduct their analyses using US firms. It remains unclear whether their conclusions on the link between leverage deviations and M&A activities could be extended to firms and M&As outside the US setting. The present study becomes the first to employ a sample of non-US acquirers (i.e. UK acquirers) in addressing this empirical issue (i.e. leverage deviation effect on M&A activities). Besides the US, the UK is one of the few countries with an active market for corporate control and developed bond markets which helps to present independent tests of the importance of leverage deviation in M&A activities in a setting different from the USA.[31] The study also aids our understanding of the operations of the UK market for corporate control.

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[30] The partial adjustment model is discussed in detail in Chapter 7. It is a dynamic model which estimates the speed at which firms move their leverage ratios towards their target leverage ratios. DeAngelo et al. (2011, p.251) describe the partial adjustment model as "the general approach of extant speed of adjustment (SOA) tests".

[31] By the end of year 2000, the UK was the largest acquiring country globally, with a contribution of 31% of global cross-border M&As (UNCTAD, 2000).

3.5 Formulation of the central hypotheses

In this section, we extract from the literature (most of which are reviewed in the previous sections) to develop the central hypotheses of this thesis which attempt to relate leverage deviations to corporate M&A activities.

3.5.1 Leverage deviation and the acquisition probability

As the review in the preceding sections and the prior chapter indicate, there are at least three reasons why firms' present deviations from their target leverage ratios could influence their subsequent M&A activities. These are: managerial inefficiency, debt financing constraints, and the desire to stay close to their leverage targets. Accordingly, the main arguments used to derive the central hypotheses are summarised under these themes.

a. Managerial inefficiency

According to the trade-off theory of capital structure, managers of firms that maintain leverage ratios that are substantially above or below their target leverage ratios may be viewed by investors as inefficient managers who do not maximize the value of their firms (Leland, 1998). Such managers could possibly be self-interested (Shleifer and Vishney, 1989) or simply inefficient (Manne, 1965). Whatever the reason for managers' suboptimal performance, they may find it difficult to command the support of shareholders for some major corporate decisions (including M&As) which require shareholders' approval. Since shareholders (at least in theory) have the power to sanction M&As, corporate M&A activities could be curtailed if shareholders are hesitant in supporting (and possibly financing) M&A projects proposed by managers they perceive to be poor (suboptimal), or possibly motivated by their own self-interest (Jensen, 1986; Berger, Ofek, and Yermack, 1997).

In effect, if extreme deviations from target leverage ratios are indicative of managerial inefficiency, then shareholders will be unwilling to approve M&As proposed by such "inefficient" managers, hence, leverage deviation and the acquisition probability will be negatively related. Consequently, we propose the following hypothesis:

H1a: *The probability of undertaking acquisitions decreases with leverage deviation, all else equal.*

Hypothesis H1a does not make any distinctions between overleveraging and underleveraging in terms of their impact on the probability of undertaking acquisitions. Therefore, in the following subsections, we discuss why the link between leverage deviation and the acquisition probability may be asymmetric for overleveraged and underleveraged firms.

b. Movement towards target leverage ratio

The trade-off theory suggests that it is important for firms to stay close to their target leverage ratios. M&As have been found to result in substantial increases in corporate financial leverage (Ghosh and Jain, 2000). M&As may, thus, be used as a means to move a firm's capital structure towards its target leverage ratio (Harford et al., 2009). In particular, underleveraged firms might be encouraged to pursue M&As as a leverage-increasing strategy in order to move their capital structures towards target leverage levels. In contrast, in an attempt to prevent further deviations from target leverage ratios, overleveraged firms may avoid M&As completely or at least avoid leverage-increasing (e.g. debt financing) M&As, especially if maintaining close to target leverage ratios is of paramount importance to their managers. Therefore, the negative association between leverage deviation and the acquisition probability (H1a) may not be applicable to underleveraged firms. Specifically, the negative leverage deviation effect on the acquisition probability may be restricted to overleveraged firms (Uysal, 2011). Similar conclusions are reached in the final subsection.

c. Debt financing constraint

Debt constraint considerations could also explain the possible association between leverage deviations (especially overleveraging) and the acquisition probability. Maintaining leverage ratios that are in excess of the target leverage ratio is associated with higher bankruptcy risks (Jensen and Meckling, 1976; Molina, 2005) and lower debt capacity (Hovakimian et al., 2001; Harford et al., 2009), all of which constrain further debt issues by overleveraged firms. Overleveraged (i.e. risky) bidders face higher bankruptcy probability and are therefore less likely to obtain new debt financing to fund their M&A activities (Harford et al., 2009). The lack of unused debt capacity by overleveraged firms implies that these firms are either completely denied debt capital by bond investors or can only access debt capital at excessively high costs. These debt financing constraints subsequently reduce the acquisition probability by overleveraged firms (Uysal, 2011). Underleveraged firms may however not face debt financing constraints because they have unused debt capacity. Therefore, the negative effect of leverage deviation on the acquisition probability will again be stronger for overleveraged firms relative to underleveraged firms.

On the basis of the above discussions (in subsections b. and c.), hypothesis H1b is specified below. Hypothesis H1b is simply a re-statement of H1a to reflect the relative effect of underleveraging and overleveraging.

> ***H1b:*** *The probability of undertaking acquisitions decreases more with overleveraging compared to underleveraging, all else equal.*

3.6 Conclusions

The chapter has utilised the existing literature to establish the linkage between corporations' financial leverage policies (overleveraging and underleveraging) and their investment (particularly M&A) activities. The literature suggests that the imperfections in capital markets (e.g. taxation, risks, agency costs, and information asymmetry) make the form of financing employed in M&As an important determinant of the M&A wealth effect. Managers of acquiring firms would therefore have preference for one form of financing to another. Each source of financing has its own benefits and costs. In the trade-off framework, debt financing has two main benefits (i.e. tax savings from interest deductions and a reduction in the agency cost of free cash flow), and two main costs (bankruptcy costs and agency costs in the form of asset substitution and debt overhang). Firms reach the optimal leverage ratio by balancing these debt benefits against the costs. The optimal leverage ratio maximises the value of the firm and therefore deviations from it could prove costly for firms.

The pecking order theory suggests that debt capital should always be chosen over equity capital because debt is generally cheaper than equity in the presence of information asymmetry. The implication is that acquiring firms generally prefer to raise debt capital to finance their M&A activities, provided they have debt capacity.

Overall, the past and present levels of debt do influence firms' debt capacity (future borrowing ability). High levels of pre-acquisition leverage do restrict acquirers' ability to issue further debt capital and subsequently constrain their M&A activities. M&A activities could again be constrained when acquirers that deviate substantially from the optimal leverage are perceived by investors to be inefficient. Therefore, leverage deviations are likely to be related to the M&A activities of firms. The issues outlined in this chapter together with the review undertaken in Chapter 2 will prove helpful in deriving the rest of the relevant hypotheses in Chapters 5, 6, and 7.

Chapter 4

Data and Methods for Empirical Analysis

4.1 Introduction

The key objective of this study is to examine the link between M&As and the leverage of acquiring firms. Specifically, as mentioned in Section 3.1 of Chapter 3, this study examines:

1) The link between firms' deviations from their target leverage (i.e. leverage deviation) and the probability of these firms undertaking mergers and acquisitions (M&As); and
2) The speed of leverage adjustment for firms that anticipate M&As and those that do not anticipate M&As.

This chapter explains the data utilised for the empirical analyses presented in the next three chapters. The present chapter also provides descriptive statistics for the core samples of data utilised in the study. As may be expected, the empirical designs required to address the above two empirical issues vary considerably, and thus, require separate discussions. Accordingly, detailed discussions of matters relating to the specific subsamples and methods used in addressing the two issues are deferred to Chapters 5, 6 and 7. This chapter focuses on the core samples and methods that are relevant to both empirical questions.

The remainder of the chapter is organised as follows. Section 4.2 describes the sample selection process and identifies the base sample and the M&A sample.[32] Furthermore, the section describes the features of the M&A sample. Section 4.3 defines the two key variables used in the study: financial leverage and leverage deviation. Section 4.4 presents and discusses summary statistics for the base sample and the main subsamples of the study. Finally, Section 4.5 concludes the chapter.

[32] The base sample refers to the main sample of firms from which subsamples are formed when testing specific research issues and hypotheses.

4.2 Sample data

This section outlines the sample selection process. The study relies on two data sources. First, the accounting and financial data for UK firms are obtained from Datastream. Second, the data on announcement dates, deal values, and other characteristics of M&As by UK firms are obtained from Thomson ONE.

4.2.1 The base sample

The first step in the data collection process is to identify all UK firms listed on Datastream. The Datastream codes for these firms are extracted from Datastream lists FBRIT and DEADUK1 to DEADUK7. These lists contain active and dead public listed firms in the UK. However, as the first task of this study is to examine the link between leverage deviation and the probability of undertaking M&As, we only keep those firms in our sample for which required data to calculate leverage deviation is available for the sample period 1996 to 2006.

The choice of the sample period is motivated by two considerations. First, the start period (i.e. 1996) is chosen to help minimize the problem of missing data since most of the financial statement observations needed for the empirical analyses are generally unavailable from Datastream for years prior to 1996 (e.g. R&D expense, retained earnings, etc.). Second, the cut-off year is pegged at 2006 as M&A information for a 5-year period is required to undertake the empirical analyses of the main hypotheses of the study. Specifically, tests of the relation between a firm's leverage deviation and its acquisition probability requires the leverage deviation of a firm in a particular year to be related to all the acquisitions that firm makes 5 years forward in time. For instance, if a firm in the sample is identified in year 2006, its acquisition activities in the next 5 years can only be observed between years 2007 and 2011. Beyond year 2006, the acquisition activities of sample firms for the period 5 years ahead become unobservable and this motivated the choice of 2006 as the cut-off date.

For the calculation of leverage deviation, this study relies on the existing empirical literature (e.g. Harford et al., 2009; Uysal, 2011). A detailed description of leverage deviation calculation is provided in subsection 4.3.2 of the present chapter.

The initial Datastream lists contained 1,744 active and 8,195 dead listed stocks. Following the extant corporate finance literature, (e.g. Fama and French, 2005; Kayhan and Titman, 2007; Mittoo and Zhang, 2008), we exclude 3,668 stocks of firms operating in the financial sector (with ICB codes 8000-8999) and regulated utilities (with ICB codes 7000-7999) industries.[33] Firms in these industries are generally excluded in the empirical literature on capital structure because their leverage ratios are likely to be very different from those of other (mostly industrial) firms in the sample, which tends to cause extreme heterogeneity in the data (see Ozkan, 2012).[34] We also exclude 2,919 stocks of firms that are not domiciled in the UK.[35] This filter helps to exclude all British companies that are geographically outside UK borders since they are likely to be influenced by different macroeconomic, institutional and environmental factors. The sample is further restricted to firms for which data are available to measure leverage deviation. This implies that the final number of sample firms fluctuates year by year across the sample period. The final sample consists of 11,206 firm-year observations for 1,993 public listed firms in the UK. Table 4.1 details the number of firms in the base sample by year and by industry.

It is important to highlight that this sample of 11,206 firm-year observations should be seen as the maximum number of observations used for our empirical analysis. The actual number of observations utilised in the empirical analysis tends to be *slightly smaller* and also *varies according to the specific empirical issue being addressed*. This is because the multivariate regression analysis that is used for our empirical analysis requires the inclusion of several other explanatory variables (see e.g. Table 4.5 for some of the explanatory variables). However, the data required for the estimation of some of these explanatory variables tends to be unavailable for some of our 11,206 firm-year observations, making them drop out of the analysis. Moreover, the number of explanatory variables entering a particular regression model tends to vary according the specific empirical issue under consideration. Therefore, the

[33] The identification of financial and utility firms is based on Datastream's Industry Classification Benchmarks (ICB). The Worldscope mnemonic for ICB is 07040.
[34] For instance, Ozkan (2012) notes that financial firms have special asset compositions and are also subject to stricter government regulations which make them different from other firms.
[35] The Datastream mnemonic for the ISO country code is GGISO. It is akin to the ISIN issuer code (GGISN). These codes classify firms based on their geographical locations, rather than their mere nationalities.

final number of observations reported for our summary statistics and our empirical analysis in Chapters 5 to 7 may vary, as well as, be smaller than 11,206 firm-year observations.

Table 4.1

Sample distribution by year and by industry

This table presents the number of firms in each of the sample years distributed according to industry. Industry classification is based on Datastream's Industrial Classification Benchmark (ICB).

Industry	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total	(%)
Oil & Gas	16	18	15	24	22	24	27	30	35	34	44	289	3
Chemicals	36	37	30	27	20	19	19	18	18	18	15	257	2
Basic Resources	24	24	21	24	23	21	26	23	26	31	34	277	2
Construction & Materials	64	66	61	54	48	44	41	42	37	37	35	529	5
Industrial Goods & Services	319	302	279	297	275	275	287	297	294	277	295	3197	29
Automobiles & Parts	11	10	9	7	7	9	8	7	8	9	7	92	1
Food & Beverage	59	57	52	49	47	43	39	36	37	33	35	487	4
Personal & Household Goods	137	134	122	112	98	91	89	83	74	70	69	1079	10
Health Care	36	40	43	57	56	54	66	68	69	73	85	647	6
Retail	97	93	93	100	99	97	93	88	87	84	79	1010	9
Media	70	67	59	59	55	61	90	87	87	80	84	799	7
Travel & Leisure	71	71	78	97	90	101	108	97	96	86	81	976	9
Telecommunications	5	5	11	14	13	15	17	17	15	13	16	141	1

Technology	71	71	77	109	113	134	180	173	164	161	173	1426	13
Total	**1,016**	**995**	**950**	**1,030**	**966**	**988**	**1,090**	**1,066**	**1,047**	**1,006**	**1,052**	**11,206**	**100**

4.2.2 The M&A sample

This subsection describes the sample of M&A deals utilised for the empirical analyses.

a. The sample selection process

The M&A data are collected from Thomson ONE. We obtain ***all completed*** M&As undertaken by ***UK firms*** during 1991-2011 (inclusive). It is important to highlight that it is the "base" sample period 1996-2006 and data requirements for testing the study's hypotheses that led to the M&A sample period of 1991-2011. This matter will be further discussed in subsequent paragraphs.

In order to address some of the limitations of the prior related studies (specifically Harford et al., 2009; and Uysal, 2011) discussed in Chapters 1 and 3, restrictions based on the transaction size of the M&A deal and the nationality of the target firms are not imposed. For example, in Uysal (2011), only domestic M&A deals by US firms are included. However, given the increasing importance of cross-border acquisitions by UK firms (as was pointed out in Chapters 1 and 3), it is important to examine whether the link between leverage deviation and M&As is contingent upon the geographic nature of these deals. However, for the same reasons outlined earlier, we exclude M&A transactions when: (1) the acquiring firm is not a public company, and (2) the acquiring firm operates in the financial and utility industries.

As earlier pointed out, the sample period for the M&A sample does not coincide with that of the base sample (described in subsection 4.2.1). This is because the M&A sample period is dictated by the sample period of the base sample (i.e. 1996-2006) and by the study's hypotheses. In testing some hypotheses, we need to observe the acquisitions made by firms in the base sample during the *past 5 years* prior to and/or the *next 5 years* after the reference year, *t*. Throughout this thesis, we use the term "reference year" to refer to the exact year in which the leverage deviation variable is first computed for a sample firm. Therefore, the reference year coincides with one of the years in the "base sample period", i.e., 1996-2006.

In order to be able to observe the acquisitions by sample firms during the relevant periods around the reference years (i.e. years 1996-2006), we extend our M&A observations to the 10-year period around the reference years (i.e. 5 years before and 5 years after the reference years), hence, our choice of years 1991-2011 as the M&A sample period. For example, if the leverage deviation is calculated in the year 1996 (the reference year), then for this reference firm-year, we look at the M&A history of the corresponding firms during the period 1991-2001. Similarly, where leverage deviation is calculated in the reference year 2006, our M&A observation covers the period 2001-2011. Fortunately, as we shall see, the choice of the M&A sample period does not seem to have any substantial influence on the distribution of the M&A sample. The salient features of the M&A sample transcend the other M&A subsamples based on different sample periods (see Table 4.2 below). We discuss these features in the next subsection.

b. The characteristics of the M&A sample

Table 4.2 presents the value (total and average) and the volume of M&A transactions after applying the filters identified above. The presentation of these statistics is done for different sample periods and for subsamples classified according to the types of M&As that are of interest to this study (i.e. medium of payment, industrial diversification, and geographic diversification). The first sample period is 1991-2011, which was described above. The second sample period covers deals announced between 1996 and 2011. It was decided to separately show statistics for this sample period because the empirical tests conducted in Chapters 5 and 6 are based on this sample period. Finally, the third sample period, 1996-2006, is constructed to coincide with that of the base sample period. As we shall see, the major conclusions drawn from the statistics in Table 4.2 hold across the three sample periods. Thus, in order to save space, the discussion of these statistics is largely based on the first sample period, 1991-2011 (M&A sample period, hereafter).

Table 4.2

The value and volume of M&A transactions completed by UK acquirers distributed according to the different sample periods and the different M&A types.

Item	Period	Full sample	Method of payment		Industrial diversification		Geographic diversification	
			Cash	**Equity**	**Related**	**Diversifying**	**Domestic**	**Cross-border**
Total transaction value	1991 - 2011	1,060,398.31	342,581.97	133,429.08	760,721.52	299,676.79	385,389.24	675,009.07
(Amounts in £'millions)	1996 - 2011	949,591.99	297,404.48	130,853.98	715,936.94	233,655.05	309,081.02	640,510.97
	1996 - 2006	806,029.94	218,435.03	118,610.36	615,984.32	190,045.62	272,899.84	533,130.10
Average transaction value	1991 - 2011	61.88	44.00	156.61[a]	86.59	35.89[a]	37.10	100.02[a]
(Amounts in £'millions)	1996 - 2011	71.26	50.48	191.31[a]	100.65	37.61[a]	39.41	116.82[a]
	1996 - 2006	78.17	47.16	222.53[a]	112.94	39.13[b]	43.77	130.80[a]
Total transaction volume	1991 - 2011	17136	7786	852	8785	8351	10387	6749
	1996 - 2011	13325	5892	684	7113	6212	7842	5483

	1996 - 2006	10311	4632	533	5454	4857	6235	4076

Transaction values are re-stated at year 2000 prices. Cash deals refer to deals financed with cash or debt, while equity deals refer to deals financed with common stock and new equity issues. Related deals refer to deals in which the acquirer and the target firm operate in the same industry (i.e. they share a common 2-digit SIC code). Diversifying deals have the acquirer and the target operating in different industries (i.e. the merging firms do not share a common 2-digit SIC code). Domestic deals refer to deals having the acquirer and the target firm residing in the same country. Finally, cross-border deals refer to deals in which the acquirer and the target firm reside in different countries. Differences between the average transaction values for the types of M&As are tested for statistical significance using the t-tests. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

Table 4.3

The value and volume of M&A transactions completed by UK acquirers distributed according to the effective year of the M&A transaction and the different M&A types.

	Full sample		Volume of UK M&A completed transactions					
			Method of payment		Industrial diversification		Global diversification	
Years	**Volume**	**Value (£m)**	**Cash**	**Equity**	**Related**	**Diversifying**	**Domestic**	**Cross-border**
1991	662	16,585.22	320	35	284	378	431	231
1992	674	17,236.73	324	24	260	414	470	204
1993	692	29,608.62	346	35	311	381	467	225
1994	855	26,734.40	456	38	379	476	572	283
1995	928	20,641.36	448	36	438	490	605	323
1996	943	36,897.12	462	48	438	505	610	333
1997	1142	44,835.39	524	59	550	592	721	421
1998	1228	67,199.94	670	38	641	587	785	443
1999	1186	138,623.20	523	59	632	554	670	516
2000	1258	316,991.25	469	97	636	622	729	529
2001	974	57,888.66	360	56	515	459	570	404
2002	669	39,997.05	311	35	377	292	428	241
2003	532	18,413.30	276	25	319	213	306	226
2004	684	23,252.69	323	35	385	299	425	259
2005	825	27,814.03	357	45	465	360	481	344

2006	870	34,117.30	357	36	496	374	510	360
2007	975	44,098.73	392	33	561	414	562	413
2008	695	28,302.53	300	39	381	314	358	337
2009	398	12,203.81	175	28	233	165	218	180
2010	472	11,471.52	204	23	250	222	256	216
2011	474	47,485.47	189	28	234	240	213	261
Total	**17,136**	**1,060,398.31**	**7,786**	**852**	**8,785**	**8,351**	**10,387**	**6,749**

Transaction values are re-stated at year 2000 prices. Cash deals refer to deals financed with cash or debt, while equity deals refer to deals financed with common stock and new equity issues. Related deals refer to deals in which the acquirer and the target firm operate in the same industry (i.e. they share a common 2-digit SIC code). Diversifying deals have the acquirer and the target operating in different industries (i.e. the merging firms do not share a common 2-digit SIC code). Domestic deals refer to deals having the acquirer and the target firm residing in the same country. Finally, cross-border deals refer to deals in which the acquirer and the target firm reside in different countries. Differences between the average transaction values for the types of M&As are tested for statistical significance using the t-tests. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

Over the M&A sample period, the total number (value) of M&As completed by UK firms stood at 17,136 deals (£1 trillion), with year 2000 representing the peak year (see Figures 4.1 and 4.2 and Table 4.3). Figure 4.1 suggests that firms in the UK joined in what Martynova and Renneboog (2008) describe as the fifth merger wave of the 1990s and the early 2000s. M&As were on the rise since 1991 until the stock market collapse in March, 2000 (Martynova and Renneboog, 2006). From year 2004, the market for corporate control picked up again and saw a steady growth in both the volume and value of completed M&As until the emergence of the recent financial crisis in year 2007. It is also re-assuring for the patterns in our M&A data to be largely consistent with those based on data from the Office for National Statistics, as was discussed in Section 1.1 of Chapter 1.

For instance, similar to the patterns shown in Figures 1.1 and 1.2 in Chapter 1, Figures 4.1 and 4.2 suggest that, at the height of the recent financial crisis (the credit crunch) in years 2009 and 2010, the size of M&A activity was among the lowest over the entire M&A sample period, implying a direct linkage between general financial liquidity (or constraints) and aggregate M&A activity.

The average value of M&As completed during the M&A sample period was around £62 million. However, the value of completed M&As is relatively higher when shorter sample periods are considered (i.e. £71 million and £78 million for the periods 1996-2011 and 1996-2006, respectively). In the bid to dampen the effect of inflation on these values, M&A transaction values are re-stated in year 2000 prices using the UK's Consumer Price Index (CPI) collected from Datastream.[36]

[36] Thomson ONE reports M&A transaction values in US dollars. So, we first use the annual Bank of England exchange rate (Datastream mnemonic is STUSBOE) to translate the transaction values to British pounds before re-stating the transaction values into year 2000 prices. Year 2000 (it's CPI) is chosen as the base period because it almost sits at the centre of the M&A sample period, 1991-2011.

Figure 4.1

Total number of M&A transactions completed by UK acquiring firms per effective year of the transaction

Data are collected from Thomson ONE and exclude deals made by non-public firms. Additionally, deals completed by financial and utility firms are excluded. The effective year of the M&A is the year in which all the negotiations for the transaction were concluded and the merger consummated.

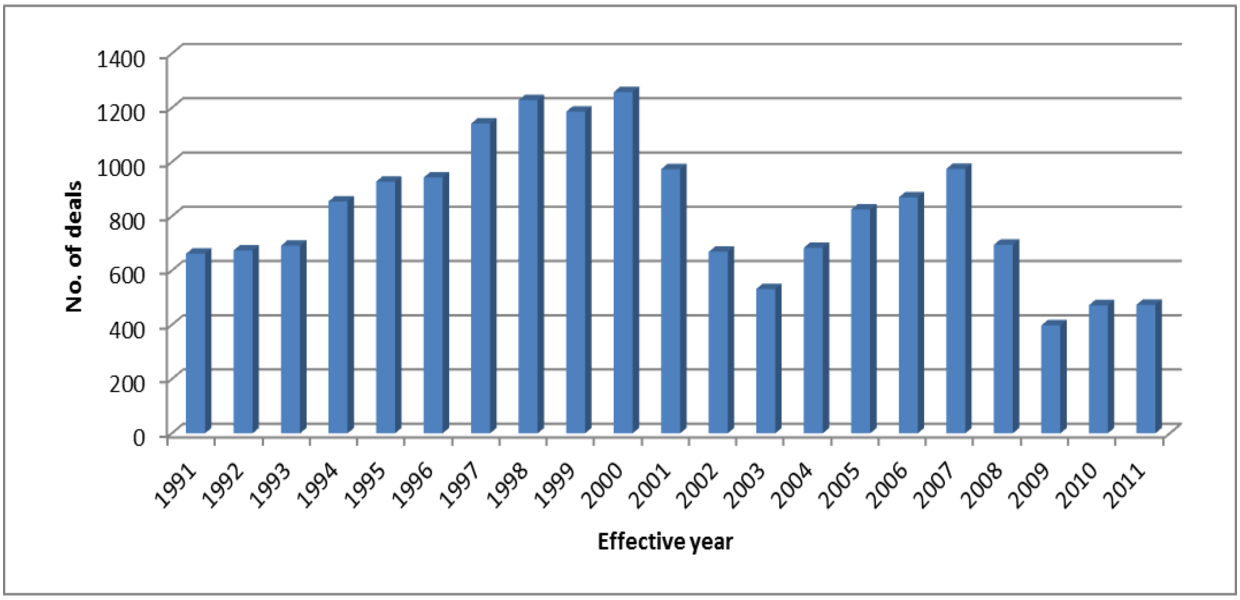
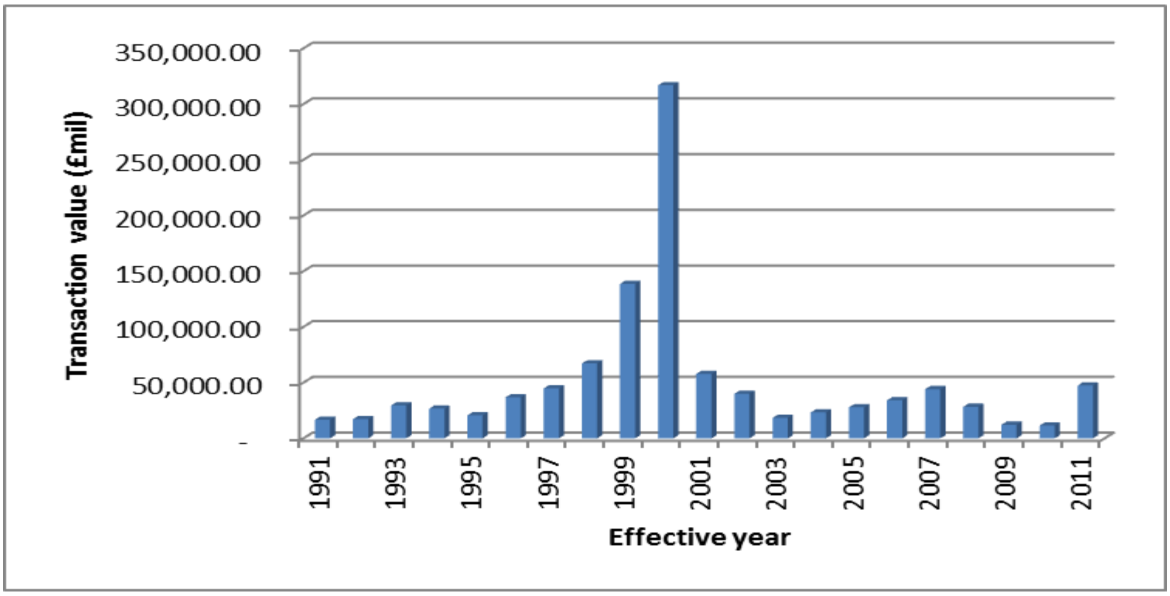


Figure 4.2

Total value of M&A transactions completed by UK acquiring firms per effective year of the transaction

Data are collected from Thomson ONE and exclude deals made by non-public firms. Additionally, deals completed by financial and utility firms are excluded. The effective year of the M&A is the year in which all the negotiations for the transaction were concluded and the merger consummated. Transaction values are re-stated in year 2000 prices.



In terms of the different types of M&As, the statistics indicate that cash/debt-financed M&As are more frequent than equity-financed M&A deals (7,786 vs. 852). Over 45% of all completed deals were purely cash/debt-financed, whereas only about 5% were purely equity-financed. The remaining half of the sample was either financed by a mixture of cash and equity or by some other means. We rely on Thomson ONE's information (i.e. the consideration offered to the target firm) in classifying deals as cash/debt or equity-financed. Deals are considered to be purely cash/debt-financed when the consideration offered is reported as cash only or debt. In contrast, we classify deals as equity-financed when the consideration offered is reported by Thomson ONE as newly issued ordinary shares or only common stock.

Interestingly, the dominance of cash deals over equity deals (in terms of transaction volume) is observed by the prior related studies that are based on US M&A data (see Harford et al., 2009; Uysal, 2011). However, the representation of equity-financed deals in our UK sample appears to be substantially *smaller* than those of the prior studies. While Harford et al. (2009) and Uysal (2011) report the percentage of equity deals in their respective samples to be 32% and 16%, our sample contains only 5% of equity deals. This suggests that, relative to the US, UK firms tend to rely less on equity in financing their M&As, and are therefore more likely to be heavily dependent on debt capital in financing their M&A activities.

It is important to note that, if indeed, UK acquirers tend to be more reliant on debt (relative to US acquirers), then it is possible for the effect of leverage deviation (and debt financing constraint) on M&A activities to be greater in a sample of UK acquirers compared to a sample of US acquirers. This is because the effect of overleveraging on corporate M&A activities is stronger in cash/debt-financed acquisitions than in equity-financed acquisitions (see Uysal, 2011). Thus, leverage deviation may have a more profound effect on the M&A activities of UK acquirers, who tend to be more reliant on debt, than on the M&A activities of US acquirers, who are less reliant on debt.

Figure 4.3 provides additional information to suggest that any potential linkage between leverage deviation and M&A activity is likely to be restricted to cash/debt-financed M&As. First, the number of cash/debt-financed deals far outweighs that of equity-financed deals in all the years covered. This implies that it is more likely for any observed linkage between leverage deviation and M&A activity to be unduly influenced by its effect via cash/debt-financed M&As. Second, the volume of equity-financed M&As appears to be relatively stable over the sample period and less sensitive to the external financial conditions. In particular, during both the stock market collapse in year 2000 and the credit crunch in 2007, equity-financed M&As were fairly resistant to these shocks (see Figure 4.3 below). In contrasts, we observe two sharp dips in the volume of cash/debt-financed M&As following major shocks in the external funding markets during the end of years 1999 and 2007. This further suggests that cash/debt-financed M&As may be more sensitive to financing constraints than equity-financed M&As.

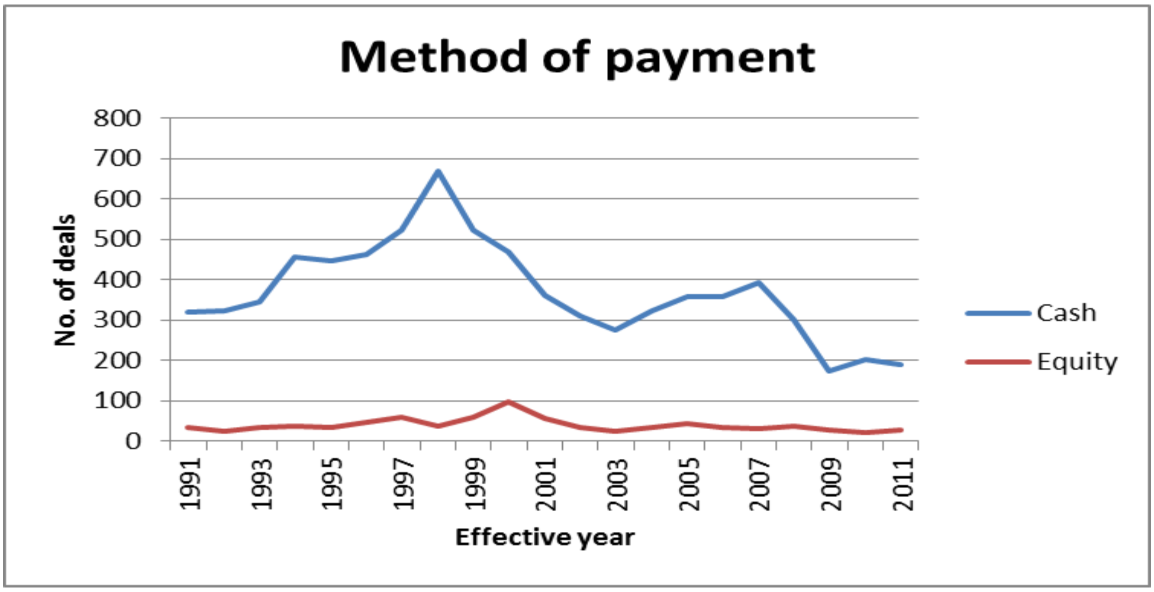
A possible reason for the low volumes of equity-financed M&As could be due to the negative stock price reactions around announcements of equity deals (see Travlos, 1987; Andrade et al., 2001). As mentioned in Chapter 2, investors tend to view equity-financed M&As as a signal that the acquirers' shares are overvalued, and accordingly react to push their share prices downwards.

Furthermore, if the size of the M&A transaction could be an indicator for the performance of the M&A deal and the extent of agency/hubris problems associated with the M&A transaction (Moeller et al., 2004), then the significant differences in the sizes of the different types of M&As could be quite interesting. As we can see from Table 4.2 above, the average size (as proxied by transaction value) of equity-financed M&As is nearly 4 times the size of an average cash/debt-financed M&A (£157 million vs. £44 million). Thus, investors may view these *large equity-financed* M&A deals to be either agency and/or hubris-motivated (see Moeller et al., 2004), and may therefore be less enthusiastic about such M&A deals. This is because investors may fear that such *large* M&A deals may be motivated by managers' desire to increase firm size and CEOs' influence (Jensen, 1986).

Figure 4.3

Total number of cash/debt-financed M&As and equity-financed M&As completed by UK acquiring firms per effective year

Data are collected from Thomson ONE and exclude deals made by non-public firms. Additionally, deals completed by financial and utility firms are excluded. The effective year of the M&A is the year in which all the negotiations for the transaction were concluded and the merger consummated. Cash/debt-financed deals have cash only or debt as the consideration offered to the targets' shareholders, whereas equity-financed deals offer newly-issued equity or common stock as consideration.



Similarly, the agency/hubris problem associated with *large* M&A transactions may be more severe in related and cross-border M&As, relative to diversifying and domestic M&As. Specifically, a typical related acquisition is over twice the size of a typical diversifying acquisition (£87 million vs. £36 million). The difference between the sizes of these two types of deals is statistically significant at 1% level. Also, the average cross-border M&A deal is significantly larger than the average domestic M&A deal (£100 million vs. £37 million, difference is statistically significant).

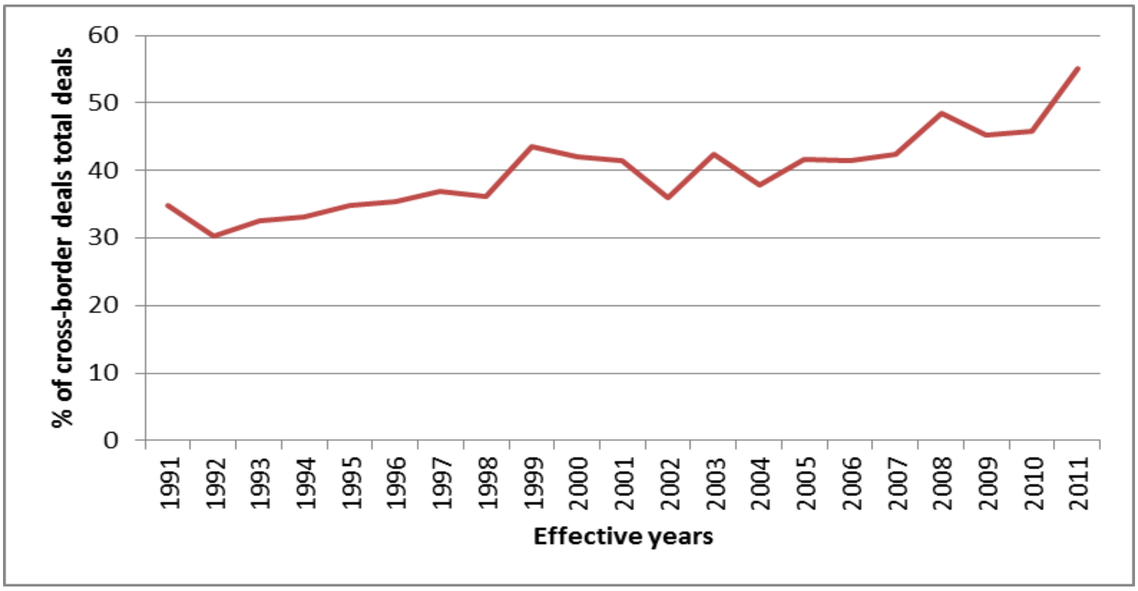
Collectively, given Moeller et al.'s (2004) finding that *large* M&A transactions, on average, are not synergy-motivated (i.e. value-enhancing), but result in large shareholder losses, these statistics on M&A size suggest that investors may be less willing to support equity-financed deals, related deals, and cross-border deals for fears of these deals being agency/hubris-motivated. We return to these arguments in Chapter 6 (under hypothesis development) when we consider the effect of leverage deviation on the acquisition probability of different types of acquisitions.

Finally, we discuss the frequency of the various types of acquisitions in our M&A sample. As shown in Table 4.2, the total number of completed M&As are roughly evenly split between related M&As (8,785 deals representing 51%) and diversifying M&As (8,351 deals representing 49%). For the classification based on geographic diversification, the number of completed domestic deals (10,387 deals representing 61%) outweighs that of cross-border deals (6,749 deals representing 39%). However, a careful analysis of the trend in the volume of domestic and cross-border M&As denotes a steady rise in the growth of cross-border acquisitions over the sample period (see Table 4.3 and Figure 4.4). Martynova and Renneboog (2006) also report findings that exhibit similar trends in cross-border M&As in their sample of European M&As which is dominated by UK M&As (i.e. about 50% UK deals). These findings underscore our earlier argument (advanced in Chapters 1 and 3) that cross-border M&As have grown in eminence in recent years and, thus, their exclusion from Uysal's (2011) study represents an important gap in our understanding of the effect of leverage deviation on corporate M&A activities.

Figure 4.4

The number of cross-border M&As as a percentage of the total M&As completed by UK acquiring firms per effective year

Data are collected from Thomson ONE and exclude deals made by non-public firms. Additionally, deals completed by financial and utility firms are excluded. The effective year of the M&A is the year in which all the negotiations for the transaction were concluded and the merger consummated. Cross-border M&As have the acquirer and the target firm domiciled in different countries.



4.3 Definition and construction of key variables

Having identified the core samples employed in the study, we now turn attention to the definition and construction of the key variables of the study. At the heart of this study is the extent to which firms deviate from their target leverage ratios – i.e. leverage deviation. Chapters 5 and 6 examine the association between leverage deviation and the probability that firms undertake acquisitions, and Chapter 7 explores the influence of leverage deviation (and the anticipation of acquisition) on the pre-acquisition leverage adjustment behaviour of firms. It is therefore crucial to clearly identify and define how leverage deviation is measured. Since leverage deviation is derived from measures of financial leverage, we first discuss our choice of financial leverage measure, before moving on to define and construct the leverage deviation variable.

4.3.1 Measurement of financial leverage

Financial leverage (hereafter, leverage) shows the relationship between debt and equity in terms of the overall value of the firm (Borio, 1990). The measurement of leverage often proves to be a difficult task, possibly because of its linkage to assets valuation (Borio, 1990, p.52). In fact, there seem to be no consensus on the best measure of financial leverage, albeit some leverage measures appear to be more popular in recent financial research than others.

Generally, two main issues arise in defining leverage. The first relates to whether leverage should be considered from the perspective of the financial market (i.e. market leverage) or from the viewpoint of firms' internal accounting records (i.e. book leverage). The second issue deals with whether the debt level should be related to either the total assets or the total capital of the firm.[37] These matters are discussed in turns below and the reasons for the adoption of the study's leverage measure are also pointed out. Later, summary statistics on the market and book measures of leverage are compared.

[37] It must be noted that the total capital (i.e. the sum of debt and equity) may not necessarily be equivalent to the total assets because of the presence of some accounting entries such as provisions.

a. Market leverage vs. book leverage

Researchers usually distinguish between book (accounting) leverage and market leverage. However, in most cases, the distinction between book and market leverage does not depend on the value of debt itself (i.e. the numerator), but on how the value of the firm (i.e. the denominator) is defined. To be specific, when the book value of debt is divided by the market value of the firm (e.g. the sum of debt and market value of equity), the resulting ratio is described as market leverage. Similarly, book leverage is defined as the book value of debt scaled by the accounting (book) value of the firm (e.g. the sum of debt and book value of equity).

This study follows the extant literature (e.g. Mittoo and Zhang, 2008; Harford et al., 2009; Morellec and Zhdanov, 2008; and Uysal, 2011) on capital structure by adopting market leverage as the primary leverage measure.[38] This decision is based on the strengths of the market leverage measure as well as the serious limitations associated with the book leverage measure. As noted by Borio (1990), market leverage captures the monetary value that investors (bondholders and shareholders) attach to their claims on the firm, and incorporates not just the assets-in-place but also the growth opportunities described by Myers (1977). In essence, market leverage measures are forward-looking. Furthermore, Morellec and Zhdanov (2008, p.578) and Harford et al. (2009) argue that market leverage is more appropriate for empirical research in capital structure because almost all the theoretical predictions about leverage are in respect of market leverage. For instance, in the classic papers by Modigliani and Miller (1958, 1963), capital structure is argued to be irrelevant or relevant to the market value of the firm, and not the book value of the firm.

In practice, however, market values (and by extension market leverage) are quite difficult to measure, especially for private firms whose shares are not transacted on stock markets and hence their market prices are unobservable. But, by restricting our base sample to public firms, we are able to avoid this limitation. A further limitation of market value measures is that equity prices tend to be volatile; making market leverage fluctuate even when actual debt levels remain unchanged, particularly when daily or weekly prices are employed in leverage

[38] The book leverage measure is used in the empirical chapters (Chapters 5 and 7) to test the robustness of the results.

computations. However, by utilising *annual* market capitalisation values in our leverage computations, it is hoped that the impact of this problem will be mitigated.

Another major reason behind our use of market leverage is that book leverage ratios are measured at historic costs (Rajan and Zingales, 1995). This makes book leverage ratios backward-looking, and hence, less relevant for decision making. In addition, Welch (2004) argues that the book value of equity (which is a constituent of book leverage) is essentially a “plug-in number” that is used to balance the left-hand side and the right-hand side of the balance sheet rather than being a “managerially relevant figure”. Welch (2004) also notes that book value of equity can even end up being negative which could increase data noise. Furthermore, book leverage lacks objectivity (Welch, 2006) because depreciation and other accounting provisions are often arbitrary, reflecting the specific policies of individual companies. This makes book leverage highly susceptible to management manipulation (Welch, 2006). Given the finding that managers of acquiring firms tend to manipulate their accounting information in an attempt to either paint a “rosy” picture or conceal “ugly” facts (see Erickson and Wang, 1999), book leverage which is based on accounting valuation of equity becomes less desirable for analysis in respect of acquiring firms.

b. Debt-to-asset ratio vs. debt-to-capital ratio

The next operational issue about the definition of financial leverage is whether to examine debt in relation to total asset (i.e. book value of total assets minus book value of equity plus market value of equity) or debt in relation to total capital (i.e. sum of total debt and market value of equity). We find the leverage measure based on total assets to be less desirable because it involves two accounting figures (i.e. book asset and book equity) which are subject to all the criticisms of the book-based measure of leverage enumerated earlier.

Moreover, Welch (2006) argues that the debt-to-asset ratio is flawed as a dependent variable in capital structure research because models of capital structure are primarily concerned with the mixture of debt and equity and not other accounting forms of financing such as provisions and reserves. Therefore, leverage ratios should be able to present indirect measures of the proportion of the firm which is equity-financed. For instance, a leverage ratio of 40% should theoretically imply that equity constitutes 60% of firm value. Welch argues that since accounting measures of total assets (proxy for firm value) are financed from debt, equity, and some other liabilities and provisions created by mere accounting entries, measuring leverage by debt-to-asset ratio does not give an indirect measure of the equity-to-asset ratio.

In view of this, Welch (2006) suggests that debt-to-capital ratio (where capital is the sum of debt and equity) is a more appropriate measure of leverage. Accordingly, unless otherwise stated, market leverage used in this study is defined in relation to total capital, as follows:

$$MarketLeverage = \frac{TotalDebt}{(TotalDebt + MarketEquity)} \tag{4.1}$$

where total debt is the sum of long-term debt and short-term debt (Datastream item 03255), and market equity is the product of stock price at the end of the fiscal year and the number of common shares outstanding at the fiscal year end (Datastream item 08002). This measure of market leverage is employed in important capital structure studies such as Lang et al. (1996), Xu (2007), Antoniou et al. (2008), Mittoo and Zhang (2008), and Harford et al. (2009).

The book leverage version of Eq. (4.1) is employed to test the robustness of the findings. The book leverage measure simply replaces the market equity variable (Datastream item 08002) in Eq. (4.1) with the book equity variable (Datastream item 03501), as follows:

$$BookLeverage = \frac{TotalDebt}{(TotalDebt + BookEquity)} \tag{4.2}$$

The book equity in Eq. (4.2) is the accounting value of common shareholders' equity which could even be a negative number (Welch, 2006). As a consequence, book leverage tends to be extremely volatile and sometimes unbounded between zero and one.

c. Summary statistics for market vs. book leverage proxies

Finally, we present summary statistics on the final measures of market and book leverage for our base sample described in subsection 4.2.1. To aid comparison, we compute the statistics using data for the year prior to the reference year (pre-reference year, hereafter) and also for the reference year itself. The major conclusions hold irrespective of the data employed in the computations. Therefore, we only discuss the pre-reference year results. As shown in Table 4.4, the statistics appear to suggest that market leverage is a superior proxy for leverage (compared to book leverage). This confirms all the theoretical and practical reasons advanced earlier for the choice of market leverage as the primary leverage measure for the study.

First, market leverage has relatively lower variability than book leverage. Specifically, the standard deviation (and variance) of leverage is considerably lower for market leverage than for the book leverage. The standard deviation (variance) associated with market leverage is only 0.19 (0.04), compared to 0.35 (0.12) for book leverage. More importantly, the coefficient of variation (i.e. CV)[39] which is a relative measure of volatility confirms the fact that market leverage is less volatile than book leverage. The CV for market leverage is 1.01 in relation to 1.18 documented for book leverage. Overall, these statistics imply that inferences based on *average* values of leverage ratios could be made more confidently when market leverage proxy is used than when book leverage proxy is employed. This is because lower variances translate into lower standard errors and lower standard errors are better for valid inferences in econometric analyses (see Wooldridge, 2009). Consequently, analyses based on market leverage may result in sharper inferences than book leverage analyses.

Furthermore, the minimum and maximum statistics suggest another reason why market leverage seems more appealing than book leverage. Market leverage is bounded between zero and one which allows for easy and straight-forward interpretation of the leverage statistic. For instance, the minimum and maximum values of market leverage are 0.00 and 0.80, respectively. This implies that the least leveraged firm in the sample makes no use of debt in its capital structure (i.e. the firm is 100% equity-financed). Equally, the maximum leverage statistic indicates that the highest leveraged sample firm is 80% debt-financed and 20% equity-financed. On the contrary, interpreting book leverage statistics for firms with extreme values could be quite complicated. The minimum and maximum book leverage values are -0.58 and 2.15, respectively. Obviously, the interpretations of these values are not clear-cut. It could be argued, for instance, that firms with negative leverage ratios are net lenders and not

[39] The coefficient of variation is defined as the ratio of the standard deviation of a variable to the mean of that variable.

borrowers but these are generally not the views taken by capital structure theories. Theories of capital structure (e.g. Modigliani and Miller, 1958) view firms as either being all-equity financed (i.e. 0% debt) or being leveraged (i.e. partly-debt financed).

In summary, the fact that market leverage (by our definition) lies between zero and one makes it more consistent with theoretical analyses in capital structure research and hence more preferable than book leverage. Therefore, the following discussions on leverage deviations and all other leverage discussions and analyses of the study are done in the context of market leverage, unless otherwise stated.

Table 4.4

Summary statistics on market leverage (ML) and book leverage (BL) computed during the periods: one year prior to the reference year (*t*-1) and the reference year (*t*).

	Pre-reference year		**Reference year**	
Statistic	**ML**	**BL**	**ML**	**BL**
Mean	0.19	0.29	0.20	0.30
Median	0.14	0.24	0.15	0.25
Standard deviation	0.19	0.35	0.20	0.36
Variance	0.04	0.12	0.04	0.13
Coefficient of variation	1.01	1.18	1.00	1.21
Minimum	0.00	-0.58	0.00	-0.71
Maximum	0.80	2.15	0.83	2.22

4.3.2 The construction of the leverage deviation variable

In this subsection, we attempt to explain the process involved in constructing the leverage deviation variable. In fact, the first important step in testing the hypotheses of this study is to determine how far firms deviate from their target leverage ratios. As the review in Chapter 3 suggests, the trade-off theory of capital structure posits that there is a "target" leverage ratio, which varies across firms. Comparing this target leverage ratio to the actual leverage ratio helps to identify firms that are close to their targets as well as those that substantially deviate from their targets (i.e. firms with extreme or moderate leverage deviations).

Specifically, we define leverage deviation as the *actual* leverage ratio minus the *"target"* leverage ratio. This definition is consistent with Harford et al. (2009) and Uysal (2011). By this definition, positive deviations denote overleveraging and negative deviations imply underleveraging. As we shall see in Section 4.4, the leverage deviation variable serves as the basis for identifying firms that may be constrained in financing their M&A deals as they have already borrowed more than their target leverage; and thus, any additional borrowing by these firms with positive leverage deviations is likely to cost more than potential benefits that new debt may bring.

Although the definition of leverage deviation is fairly straight-forward, its construction is complex because of the unobservable nature of one of its components – the *target* leverage ratio. While the *actual* leverage ratio can be readily computed from the publicly available accounting and financial data, the *target* leverage ratio is unobservable and needs to be estimated. We discuss the empirical issues relating to the estimation of the target leverage ratio in the following subsections.

a. Estimation of target leverage ratio

The estimation of the target leverage ratio presents a challenge to empirical researchers. This is partly because, although the trade-off theory recognises the existence of a target leverage ratio, it does not explicitly specify how to measure it. As a consequence, researchers often disagree on what constitutes a good proxy for corporate target leverage ratio. Some frequently used proxies are the industry median leverage ratio (e.g. Hovakimian, 2004;

DeAngelo et al., 2011), the historical 3-year average leverage ratio (e.g. Shyam-Sunder and Myers, 1999), and the predicted (fitted) value from an estimate of a regression equation (as in Eq. 4.3 below).

The third approach (i.e. the predicted value approach) for estimating the target leverage ratio seems to have gained dominance in recent capital structure research (see Hovakimian et al., 2001; Kayhan and Titman, 2007; Harford et al., 2009; Uysal, 2011). This may be due to the fact that this method controls for a number of firm-specific variables, as well as, industry and other secular factors by including them in the estimation of the target leverage ratio. In other words, the predicted value approach recognises that the target leverage ratio varies across firms with different characteristics and should reflect wider industrial and macroeconomic developments.

The wide usage of the predicted value method demonstrates its acceptance in the field of capital structure (see e.g. Hovakimian et al., 2001; Kayhan and Titman, 2007; Harford et al., 2009; Uysal, 2011). In view of these considerations, the present study follows prior studies and estimates the target leverage ratio using the predicted value approach. Therefore, we compute the target leverage ratios by predicting firms' leverage ratios conditioned on a set of factors. However, it must be noted that by pursuing this method, the empirical analyses presented in this thesis face the same limitations and criticisms that other published studies in this area face. These limitations and weaknesses are duly acknowledged. Therefore, like the results of any other empirical study in the finance literature, the results presented in this thesis should be interpreted with caution.

Moreover, due to time constraint, this study did not test the robustness of the empirical analyses to the choice of the target leverage ratio proxy. Again, this criticism is duly acknowledged. However, since the alternative proxies for the target leverage ratio (i.e. the industry median leverage ratio and the historical 3-year average leverage ratio) could be argued to be inferior to the predicted value approach, it is hoped that this criticism does not seriously undermine the conclusions of the study. We highlight the following limitations of the alternative proxy measures which are avoided by the predicted value approach. First, the industry median approach proxies the target leverage ratio based on the actual leverage ratio of a ***single*** firm (i.e. the industry median firm), thus, disregarding the information on all other sample firms. Also, the 3-year historical leverage approach is based on ***average statistics which tend to be sensitive to extreme values***. Furthermore and perhaps even more serious is the fact that both the industry median approach and the 3-year historical leverage approach fail to recognise an important implication of the trade-off theory, which is, ***the target leverage ratio is a function of firm-specific factors*** (e.g. tax savings, bankruptcy costs, etc.) and may thus vary across firms. In regard of these considerations, it could be argued that there is little or no value in the use of an inferior proxy as robustness checks, especially when there is limited time available for the study.

Another relevant issue that needs to be settled is deciding whether to estimate a single regression which pools all firms in the entire sample period (1996-2006) together, as in Kayhan and Titman (2007), or run separate yearly regressions as in Harford et al. (2009). We decided to opt for the latter in order to account for any possible changes in macroeconomic variables that might impact firms' leverage. This is particularly desirable considering the length of the study's sample period (i.e. 11 years). For instance, the main corporation tax rate in the UK changed twice over the sample period and this could cause the tax benefits of debt to vary over those periods.[40]

Specifically, the target leverage ratios for our sample firms are estimated using Eq. (4.3) below:

$$Leverage_{it} = \alpha + \phi X_{i,t-1} + \varepsilon_i \tag{4.3}$$

In Eq. (4.3), market leverage of firm *i* in year *t* ($Leverage_{it}$) is regressed on several firm-specific explanatory variables in the year *t-1*, $X_{it\text{-}1}$. α is the constant term (i.e. the intercept), ϕ is a vector of coefficients, and ε_i is a random error term assumed to be homoscedastic and serially uncorrelated.

[40] The main UK corporation tax rate in 1996 was 33%; it dropped to 31% in 1997; and further dropped to 30% in 1999 (Source: HMRC archive accessed online. See link below). http://webarchive.nationalarchives.gov.uk/20090909205015/http://hmrc.gov.uk/stats/corporate_tax/rates-of-tax.pdf.

b. The determinants of the target leverage ratio

This subsection describes the explanatory variables used in the model of target leverage (in Eq. 4.3).[41] These variables are often used in studies examining the determinants of leverage (e.g. Rajan and Zingales, 1995; Antoniou et al., 2008). Following prior studies (e.g. Harford et al., 2009), the explanatory variables are measured in year *t*-1 in order to increase the likelihood that causality runs from the explanatory variables to the leverage ratio, and not vice versa. Table 4.5 summarises the explanatory variables in the target leverage ratios and the predicted signs of the coefficients to be estimated. The explanatory variables are as follows:

Non-debt tax shelter: One of the benefits of debt financing is the tax savings it offers via debt interest deductions under the tax codes (as discussed in Chapter 3). DeAngelo and Masulis (1980) posit that since debt is associated with bankruptcy cost, whenever firms can make tax savings without having to use debt (e.g. via depreciation, investment tax credit, etc.), they tend to rather exploit such less costly avenues (i.e. those options without any increased bankruptcy cost), thereby, making use of less debt. In brief, non-debt tax shelter can be seen as a substitute for debt capital in terms of tax savings. Therefore, firms with more avenues (other than debt) for tax savings use less debt. Leary and Roberts (2005) report a negative relationship between leverage ratio and non-debt tax shelter. Consistent with Antoniou et al. (2008) and Fama and French (2002), we measure non-debt tax shelter as the ratio of accumulated depreciation to total assets.

Growth opportunities: Leverage ratio is expected to decrease with growth opportunities since firms with high debt levels risk losing some profitable future investment opportunities due to financial inflexibility (Myers, 1977). Besides, bankruptcy costs are expected to be higher for growth firms, and hence they tend to use less debt. Consistent with Rajan and Zingales (1995) and Mittoo and Zhang (2008), market-to-book ratio is used as a proxy for growth opportunities.

[41] The precise definitions of the explanatory variables for the target leverage regression are contained in the list of definitions for key variables and terminologies (see pages 15-22).

Asset tangibility: The ratio of tangible assets to total assets is also included in the model to account for the effect of collateral availability on debt financing. Firms with high tangible assets are likely to borrow more (Jensen and Meckling, 1976; Rajan and Zingales, 1995) since they have a large pool of assets which they can use as collateral for loans. Also, firms with more tangible assets tend to be large, and large firms are deemed to have reduced risk of bankruptcy (Hovakimian et al., 2001).

Altman Z-score: In order to directly account for expected bankruptcy cost, a modified version of Altman's Z-score is included.[42] It is expected that firms with high bankruptcy risk avoid debt in order to prevent possible financial distress and bankruptcy (Titman, 1984; Harford et al., 2009). We follow Harford et al. (2009) in defining this variable as (total assets)/ (3.3 times earnings before interest and tax + sales + 1.4 times retained earnings + 1.2 times working capital). It is important to point out that the parameters of this variable are based on US firms and could therefore fail to validly capture the effect of bankruptcy on our sample of UK firms. We, however, hope that the other proxies of bankruptcy such as growth opportunities and firm size may help in capturing the influence of bankruptcy risks on the target leverage ratio.

Profitability: As reviewed in Chapter 3, the pecking order theory implies that asymmetric information considerations make external financing relatively more expensive. Firms therefore prefer internal financing and only choose external funds (debt included) when internal funds are insufficient to meet all their investment projects (Myers, 1984). To the extent that internal funds are built from profit, more profitable firms are expected to use less debt (Flannery and Rangan, 2006). Consistent with Baker and Wurgler (2002), the ratio of earnings before interest, tax, depreciation and amortization (EBITDA) to total assets is included to capture the effect of profitability on target leverage ratio.

[42] The modified Altman Z-score re-estimates Altman's model but without a leverage variable. This modified unleveraged version of Altman Z-score is suggested by Mackie-Mason (1990) and used by Graham (1996) and Leary and Roberts (2005).

Research and development (R&D) expense ratio: R&D-intensive firms tend to have greater growth opportunities and are therefore predicted to hold lower debt (Uysal, 2011). Further, it is suggested that high R&D firms face higher expected bankruptcy cost since they tend to produce more unique and specialised products (Titman, 1984; Titman and Wessels, 1988). The customers, suppliers and workers of such firms are likely to suffer more in event of bankruptcy and thus such firms tend to use less debt. The ratio of R&D expense to total assets is included in the regression model to account for the impact of R&D on debt financing.

Missing R&D expense dummy: Several sample firms had no reported values for R&D expense. In line with Uysal (2011), a dummy variable is created to differentiate the effect of these firms. Since these firms are more likely to have made no R&D expense, and high R&D firms tend to use less debt (Hovakimian et al., 2001), it is expected that the effect of the dummy variable for firms with no R&D expense on leverage will be positive.

Firm size: Typically, large firms tend to be more diversified and are therefore expected to enjoy more stable cash flow resulting from flexibility in income smoothing and cross-subsidisation of segments (Hovakimian et al., 2001). Hovakimian et al. (2001) further argue that large firms tend to have less volatile cash flow and are therefore less likely to go bankrupt. As a proxy for diversification and bankruptcy risk, firm size is expected to be positively related to debt ratio (Rajan and Zingales, 1995; Flannery and Rangan, 2006; Mittoo and Zhang, 2008). In an attempt to capture the effect of firm size on target leverage, the natural log of net sales is included in the model.

Stock return: The market timing theory of capital structure reviewed in Chapter 3 suggests that firms issue equity when their share prices are overvalued. This implies that in periods of high stock prices, firms may use little debt and resort to equity issues (Baker and Wurgler, 2002). Therefore, leverage ratios are expected to be negatively related to stock return of prior periods (Antoniou et al., 2008; Uysal, 2011). The 12-month average of monthly stock returns is used to proxy for stock return.

Industry fixed-effect: Finally, dummy variables for all the 14 industries listed in Table 4.1 (except Oil and Gas (O&G) because O&G serves as the reference industry) are included in the target leverage model. This is to control for other firm characteristics that may be common to firms in a particular industry. This follows recent cross-sectional research in the field of capital structure (e.g. Mittoo and Zhang, 2008; Harford et al., 2009; and Uysal, 2011).

Past levels of leverage: Lemmon, Roberts and Zender (2008) show that majority of the variations in debt ratios is driven by unobserved fixed effect that generates a stable capital structure. They suggest that these unobserved time-invariant factors are responsible for explaining the permanent component of leverage whilst the other known determinants of capital structure (discussed above) only explain the transitory aspects of leverage. Following Baker and Wurgler (2002) and Uysal (2011), the study accounts for this permanent component of leverage by including a lagged value of market leverage as an explanatory variable.[43]

[43] Including a lag of the dependent variable as an explanatory variable in a model makes it likely for the errors to be serially correlated. However, serial correlation does not, in general, make the OLS estimator biased or inconsistent. It only renders the usual OLS standard errors and test statistics invalid (Wooldridge, 2009, p.409 - 411). But since the objective of the model is to predict target leverage, and not to make inferences about specific parameters, serial correlation is unlikely to pose serious limitations on the study's conclusions. The alternative will be to drop the lagged leverage variable, which could lead to omitted variable bias, which presents a more serious problem for models designed for prediction purposes.

Table 4.5

Summary of explanatory variables in the target leverage ratio and their predicted signs

No.	**Variable**	**Definition**	**Predicted sign**
1	Non-debt tax shield	Accumulated Depreciation / Total Assets	-
2	Growth opportunities	[Total Assets - Book Equity + Market Equity] / Total Assets	-
3	Asset tangibility	Net Plant Property and Equipment / Total Assets	+
4	Altman's Z-score	Total Asset / [3.3*EBITDA + Net Sales + 1.4*Retained Earnings + 1.2*(Current Assets - Current Liabilities)]	-
5	Profitability	EBITDA / Total Assets	-
6	Research and development	R&D Expense / Total Asset	-
7	Firm size	Natural log of total annual net Sales	+
8	Stock return	The average of the monthly stock return for the 12-month period	-
9	Past levels of leverage	Total Debt / [Total Debt + Market Equity]	+

c. The target leverage regression results

Table 4.6 presents the result of the yearly target leverage regressions (see Columns "1996" to "2006") and the pooled regression (see Column "Pooled"). It is important to highlight that the regression results for the pooled regression is reported merely for comparison purposes. For the reasons mentioned earlier, in the empirical analysis presented in Chapters 5-7, target leverage ratios estimated from yearly regressions are utilised.

As shown in Table 4.6, the estimated coefficients (which are used in predicting the target leverage ratios) are largely consistent with expectations and prior findings. For example, we find that corporate leverage generally decreases with non-debt tax shield (Leary and Roberts, 2005), growth opportunities (Lemmon et al., 2008), R&D expenses (Titman and Wessels, 1988), and stock return (Antoniou et al., 2008), though there is lack of statistical significance in some years.

Generally, we also observe a positive relationship between leverage and asset tangibility (Mittoo and Zhang, 2008), firm size (Rajan and Zingales, 1995), and lagged leverage (Lemmon et al., 2008). Again, the estimates for these variables were not statistically significant in every single year. The positive association between leverage and profitability is inconsistent with the pecking order hypothesis. However, as pointed out by Antoniou et al. (2008), a positive association between leverage and profitability could be interpreted as being supportive of the disciplinary role of debt, since debt reduces the agency cost of debt and enhances efficient investment decisions (Jensen, 1986).

Table 4.6

Target leverage regressions

This table presents the regression results for the target leverage ratio. Those presented under the headings 1996 to 2006 are yearly regressions estimated using all the firms in that year. The results presented under the heading "Pooled" is based on a pooled regression of all the firms in the sample years. The p-values are reported in *italics* and are based on standard errors clustered by firm. All the regressions (yearly and pooled) include 13 industry dummies representing the 13 industries identified in Table 4.1 (Oil and Gas industry is left out for perfect multicolinearity reasons). The pooled regression also includes 10 year dummies (for years 1997 to 2006) to account for macroeconomic variables that might impact leverage. Variable definitions are in the list of definitions of key variables and terminologies on pages 15-22. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

	1996	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**Pooled**
Non-debt tax shelter t-1	-0.030	0.004	-0.040	-0.082[a]	-0.009	-0.052[c]	-0.061[a]	-0.033	-0.042[a]	-0.005	0.002	-0.038[a]
	(0.294)	*(0.862)*	*(0.108)*	*(0.002)*	*(0.731)*	*(0.055)*	*(0.011)*	*(0.197)*	*(0.013)*	*(0.779)*	*(0.898)*	*(0.000)*
Growth opportunities t-1	-0.004[a]	-0.001	-0.006[a]	-0.004[a]	-0.002[a]	-0.007[a]	-0.005	-0.002	-0.004[b]	-0.003	-0.002	-0.003[a]
	(0.010)	*(0.666)*	*(0.001)*	*(0.000)*	*(0.003)*	*(0.000)*	*(0.096)*	*(0.306)*	*(0.051)*	*(0.162)*	*(0.413)*	*(0.000)*
Asset tangibility t-1	0.056[a]	0.005	0.022	0.066[a]	0.055[a]	0.021	0.050[b]	0.051[b]	0.038[b]	-0.002	-0.005	0.037[a]
	(0.003)	*(0.819)*	*(0.326)*	*(0.001)*	*(0.012)*	*(0.339)*	*(0.019)*	*(0.024)*	*(0.039)*	*(0.890)*	*(0.795)*	*(0.000)*
Altman Z-score t-1	-0.003	0.001	0.002	-0.004[c]	0.002	0.002	0.001	0.001	0.000	-0.001	-0.001	0.000
	(0.395)	*(0.834)*	*(0.655)*	*(0.058)*	*(0.555)*	*(0.617)*	*(0.754)*	*(0.791)*	*(0.834)*	*(0.728)*	*(0.602)*	*(0.789)*
Profitability t-1	0.006	0.041[c]	0.022	0.017	0.016	0.000	-0.021	0.019	0.017	-0.006	0.033[c]	0.011[b]
	(0.752)	*(0.059)*	*(0.405)*	*(0.390)*	*(0.447)*	*(0.995)*	*(0.234)*	*(0.269)*	*(0.164)*	*(0.726)*	*(0.091)*	*(0.040)*
R&D expense ratio t-1	0.003	-0.237[a]	-0.013	0.057	0.108[b]	-0.067	-0.189[b]	-0.067	0.005	-0.105[c]	-0.012	-0.040[b]
	(0.970)	*(0.020)*	*(0.917)*	*(0.436)*	*(0.042)*	*(0.377)*	*(0.022)*	*(0.343)*	*(0.915)*	*(0.073)*	*(0.818)*	*(0.050)*
Missing R&D dummy t-1	0.008	-0.007	0.006	0.003	-0.002	-0.008	0.007	-0.006	-0.018[b]	0.015	0.019[b]	0.000

	(0.232)	*(0.460)*	*(0.544)*	*(0.733)*	*(0.823)*	*(0.476)*	*(0.524)*	*(0.593)*	*(0.027)*	*(0.097)*	*(0.029)*	*(0.908)*
Firm size t-1	0.002	0.000	0.003	0.004[b]	0.008[a]	-0.002	0.003	-0.001	-0.002	0.000	-0.002	0.001[c]
	(0.250)	*(0.921)*	*(0.239)*	*(0.036)*	*(0.000)*	*(0.469)*	*(0.112)*	*(0.747)*	*(0.266)*	*(0.945)*	*(0.200)*	*(0.056)*
Stock return t-1	-0.192	-0.544[a]	-0.258[c]	-0.122	-0.256[a]	-0.277[a]	-0.383[a]	-0.476[a]	-0.186[a]	-0.451[a]	-0.270	-0.330[a]
	(0.159)	*(0.000)*	*(0.058)*	*(0.240)*	*(0.003)*	*(0.004)*	*(0.000)*	*(0.000)*	*(0.011)*	*(0.000)*	*(0.007)*	*(0.000)*
Market leverage t-1	0.788[a]	0.805[a]	0.859[a]	0.796[a]	0.779[a]	0.803[a]	0.878[a]	0.760[a]	0.721[a]	0.856[a]	0.758[a]	0.803[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Industry fixed-effect	..	..	..	..	..	..	..	..	..	..	..	..
No. of observations	**1,016**	**995**	**950**	**1,030**	**966**	**989**	**1,091**	**1,067**	**1,048**	**1,007**	**1,053**	**11,206**
F-statistic	**75.71**	**54.70**	**66.42**	**94.14**	**91.14**	**74.29**	**143.87**	**90.77**	**98.62**	**105.56**	**68.90**	**711.17**
Prob. > F	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
R-squared	**0.71**	**0.65**	**0.65**	**0.67**	**0.68**	**0.65**	**0.70**	**0.67**	**0.74**	**0.73**	**0.66**	**0.69**

d. Estimation of leverage deviation

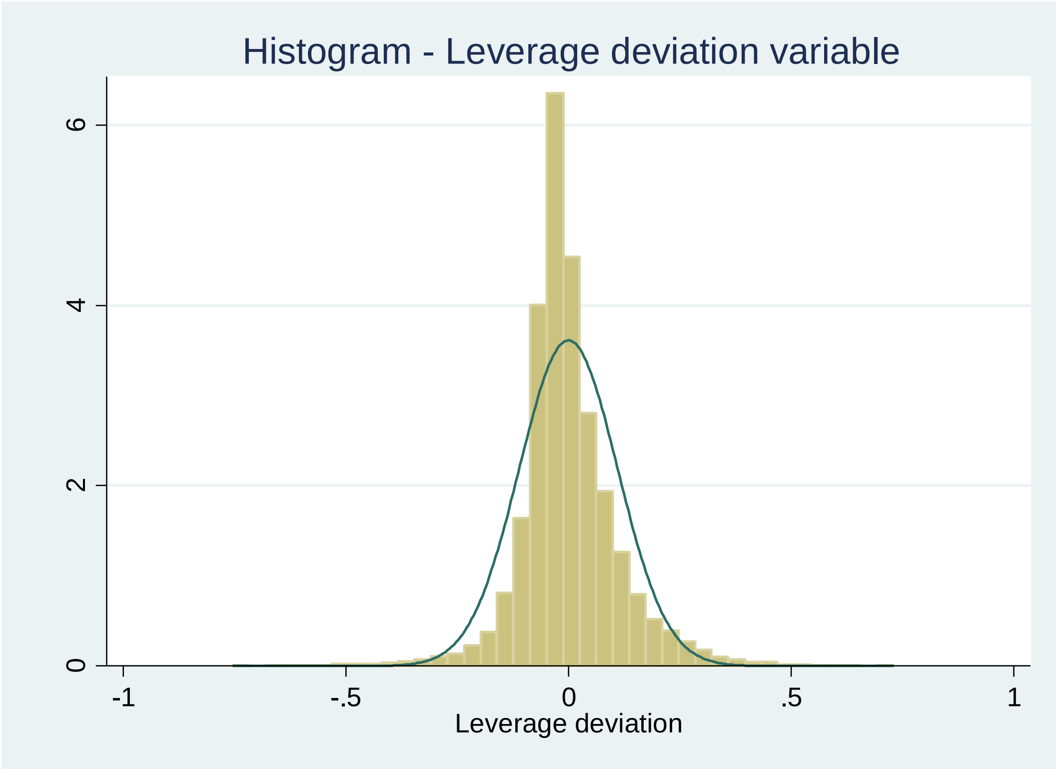
Using the coefficient estimates of the various regressors from the target leverage model (specified in Eq. 4.3), the target leverage ratio for each sample firm is predicted conditioned on its characteristics. This predicted (fitted) value of leverage becomes the proxy for the firm's target leverage ratio. Leverage deviation for each firm in the sample is then estimated by subtracting the firm's *predicted* leverage ratio from its *actual* leverage ratio. In effect, the leverage deviation for a sample firm is simply its *residuals* from the regression model in Eq. (4.3).

The results from the estimates of leverage deviation indicate that the average leverage deviation of the sample firms is 0.000. The median leverage deviation is -0.014, suggesting that, overall, the sample firms are more likely to be below their target leverage ratios (i.e. underleveraged). There is, however, huge variation around the mean as indicated by the standard deviation of 0.11. Further, an examination of the spread of observations around the mean approximates to a normal distribution (see Figure 4.5), indicating that most of the sample firms maintain close-to-target leverage ratios with only few firms moving extremely away from their target leverage ratios.

In other words, only few firms tend to be either extremely underleveraged or extremely overleveraged, and it is the M&A activities and leverage adjustment behaviours of these firms (in relation to firms that stay close to their leverage targets) that is of prime interest to this study. Specifically, in the next two chapters (Chapters 5 and 6), we shall examine how the M&A activities of extremely overleveraged and extremely underleveraged firms may differ from those of moderately overleveraged and moderately underleveraged firms. Furthermore, in Chapter 7, we shall investigate how the need to quickly adjust towards the target leverage ratio may vary for firms with extreme leverage deviations and those with moderate leverage deviations.

Figure 4.5

Histogram showing the distribution of the leverage deviation variable



4.4 The main subsamples and descriptive statistics

In order to examine the role played by leverage deviation in corporate M&A activities and in corporate leverage adjustment behaviour, the base sample of 11,206 firm-year observations is segregated into four subsamples according to the degree to which a firm deviates from its target leverage ratio. The four main subsamples are as follow:

1) Extremely underleveraged subsample,
2) Moderately underleveraged subsample,
3) Moderately overleveraged subsample, and
4) Extremely overleveraged subsample.

These subsamples are formed by sorting the sample observations (based on the leverage deviation variable) in ascending order. The sorted sample is then divided into quartiles. The extremely underleveraged subsample includes observations in the first quartile. They have large negative leverage deviations. The moderately underleveraged subsample includes observations in the second quartile and has small negative leverage deviations. The moderately overleveraged subsample includes observations in the third quartile and has small positive leverage deviations. Finally, the extremely overleveraged subsample consists of observations in the fourth quartile and has large positive leverage deviations.

Arguably, firms that stay close to their leverage targets (i.e. moderately underleveraged and moderately overleveraged firms) would not find it difficult to source new external funds (particularly debt) for at least three important reasons. First, they are not overburdened by debt (i.e. no debt overhangs). Second, their managers may not be perceived as "inefficient" since they employ leverage levels that are close to the optimal leverage level. Third, the firms presumably have what it takes (e.g. collateral and good lender-borrower relationship) to attract debt capital since they have already secured reasonable amount of debt capital. Accordingly, in the empirical analyses to follow in Chapters 5-7, these firms are used as benchmark for "unconstrained" access to debt capital. Throughout the rest of the thesis, these firms are referred to as "normleveraged" or "moderately leveraged" firms.

In contrast, firms that substantially deviate from their target leverage ratios could face huge constraints in raising funds (especially debt) to finance their planned acquisitions (Harford et al., 2009; Hovakimian et al., 2001). As outlined earlier, substantial deviations from target leverage could be in one of two ways: (a) maintaining leverage ratios that are far above the target leverage ratio (i.e. extreme overleveraging); or (b) maintaining leverage ratios that are far below the target leverage ratio (i.e. extreme underleveraging). Unless otherwise indicated, overleverage and underleverage (without any qualifications) are used to refer to extreme deviations from target leverage ratios.

Both overleveraging and underleveraging (in the extreme sense) could be indicative of potential financing difficulties. As discussed in Chapter 3, extremely overleveraged firms are more likely to have exhausted their borrowing capacity. Furthermore, if debt reduces internal cash flow (Stulz, 1990; Jensen, 1986), then it is more likely for extremely overleveraged firms to face liquidity problems and higher bankruptcy risks. This should, therefore, make it extremely difficult for overleveraged firms to obtain new debt capital, which could constrain their planned M&A activities (Myers, 1977; Uysal, 2011).

Whilst the financing problems associated with extreme overleveraging are more apparent, those of extreme underleveraging are quite subtle. Though underleveraging could imply the presence of unused debt capacity, it is important to point out that *extreme* underleveraging could suggest borrowing difficulties. Since there are benefits associated with debt financing (see Graham, 2000), if firms are assumed to be value-maximizing (see Tirole, 2005), then huge untapped benefits of debt financing (arising from extreme underleveraging) would be a perverse corporate action, especially when huge tax savings are sacrificed over a long periods of time. Therefore, extreme underleveraging could simply indicate that such firms, though willing to borrow, are unable to attract debt capital.

It is, however, possible that underleveraging could represent deliberate debt avoidance to store up debt capacity for future investments (DeAngelo et al., 2011). The empirical analyses in Chapter 5 may help to throw some light on to this matter (i.e. whether extreme underleveraging represents the presence of debt financing constraint or "quality" unused debt capacity). Specifically, a significantly negative (positive) effect of extreme underleveraging on the acquisition probability may suggest the presence of debt financing constraint ("quality" unused debt capacity).

4.4.1 Summary statistics

Table 4.7 presents the descriptive statistics on the main variables of the study for the base sample and the four identified subsamples. The reported statistics are 6-year averages computed from information on the variables for the years starting from the *reference year*, *t*, to the 5 years following the reference year, i.e., *t*+1, *t*+2, *t*+3, *t*+4, and *t*+5. As we shall see in Chapter 5, aspects of our empirical design require a sample firm to be followed over a 5 year period after identifying its leverage deviation.[44] As previously noted, the *reference year* refers to the year in which the leverage deviation variable is constructed. We also use the term *"acquisition observation period"* to refer to the 5 years following the reference year. Reporting 6-year average statistics ensures that the reported statistics capture (or represent) the characteristics of the sample firms over the entire observation period (i.e. the reference year and the acquisition observation period).

A comparative analysis of the descriptive statistics across the various subsets of the sample reveals some interesting observations. First, the mean leverage deviation of 0.002[45] for all firms indicates that, on average, firms stay close to their target leverage ratios. There is however considerable variations across the subsamples. As expected, underleveraged firms (for both extreme and moderate deviations) have negative leverage deviations of -0.035 (extreme deviants) and -0.013 (moderate deviants), while overleveraged firms (both extreme and moderate deviants) were associated with positive deviations of 0.006 (moderate deviants) and 0.051 (extreme deviants).

[44] Detailed discussion of this matter is undertaken in Chapter 5.

[45] The mean leverage deviation reported in this subsection is 0.002 which is different from the mean leverage deviation of 0.000 which was presented in subsection 4.3.2 of this chapter. The difference between these two values is due to the fact that the mean value of 0.000 reported in subsection 4.3.2 is based on data for a single year (i.e. the reference year). However, all the statistics presented in Table 4.6 (including the leverage deviation variable of 0.002) are based on a 6-year average data.

The differences between extreme and moderate deviations (e.g. extremely overleveraged and moderately overleveraged subsamples) are statistically significant at 1% levels. Given that these statistics are 6-year averages, they are reassuring because they suggest that although the classification of firms as extremely underleveraged, moderately underleveraged, moderately overleveraged, and extremely overleveraged is based on data observations in the reference year, *t*; the classification seems to capture a long-term characteristic (i.e. over a 6-year period) of the firms in each subsample.

This view is further supported by the descriptive statistics on the other leverage variables, namely, long-term leverage and market leverage.[46] The mean values of the long-term leverage ratio are highest among the firms in the overleverage subsamples. The statistic is 33.7% and 18.3% for extreme overleveraged deviants and moderate overleveraged deviants, respectively (difference is statistically significant). The values are relatively lower for underleveraged firms (i.e. 16.8% for extreme deviants and 12.5% for moderate deviants).

Similar patterns are displayed by the reported values of the market leverage ratios in Table 4.7. The market leverage ratio for extreme overleveraged deviants, moderate overleveraged deviants, extreme underleveraged deviants, and moderate underleveraged deviants are 36.7%, 20.0%, 16.0%, and 13.9%, respectively. Again, differences between extreme and moderate deviations are significant statistically. Overall, the statistics on the leverage variables (i.e. leverage deviation, long-term leverage, and market leverage) suggest that overleveraged firms typically employ more debt in their capital structures than underleveraged firms. And thus, it is imperative to examine the corporate M&A activities in the subsample of extremely overleveraged firms in relation to that of the other subsamples.

[46] The exact definitions of variables are contained in the next chapter (Chapter 5) and the list of definition of key variables and terminologies (see pages 15-22). The long-term leverage ratio is sometimes referred to as the average market leverage.

Table 4.7

Summary statistics on main variables for the full sample and the four main subsamples

The table reports summary statistics for the base sample and also for the subsamples classified according to leverage deviation. Mean values based on a 6-year period are reported for each variable. The number of firms in a (sub) sample is reported under the mean values in *italics and parentheses*. The subsamples are extremely underleveraged (Extreme underlev), moderately underleveraged (Moderate underlev), moderately overleveraged (Moderate overlev), and extremely overleveraged (Extreme overlev). Variable definitions are in the list of definitions and key variables on pages 15-22. Two-sample mean comparison tests are conducted to test the statistical significance of the differences in the mean values for the subsamples of extreme and moderate deviations. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

		Quartile 1	**Quartile 2**	**Quartile 3**	**Quartile 4**
Variables	**Full sample**	**Extreme underlev**	**Moderate underlev**	**Moderate overlev**	**Extreme overlev**
Leverage deviation	0.002	-0.035[a]	-0.013	0.006	0.051[a]
	(11206)	*(2802)*	*(2801)*	*(2801)*	*(2802)*
Long-term leverage	0.203	0.168[a]	0.125	0.183	0.337[a]
	(11206)	*(2802)*	*(2801)*	*(2801)*	*(2802)*
Market leverage	0.217	0.160[a]	0.139	0.200	0.367[a]
	(11206)	*(2802)*	*(2801)*	*(2801)*	*(2802)*
Net debt issues	0.025	0.006[a]	0.022	0.030	0.042[a]
	(11206)	*(2802)*	*(2801)*	*(2801)*	*(2802)*
Net equity issues	0.066	0.055	0.055	0.084	0.070[b]
	(11184)	*(2790)*	*(2796)*	*(2799)*	*(2799)*
Firm size	11.245	11.107[a]	11.293	11.438	11.142[a]
	(11181)	*(2787)*	*(2796)*	*(2799)*	*(2799)*
Growth opportunities	1.815	1.697[a]	1.858	2.014	1.692[a]
	(11206)	*(2802)*	*(2801)*	*(2801)*	*(2802)*
Profitability	0.047	0.056[b]	0.070	0.056	0.007[a]
	(11196)	*(2796)*	*(2800)*	*(2799)*	*(2801)*
Stock return	0.004	0.006[b]	0.005	0.004	0.001[a]
	(11206)	*(2802)*	*(2801)*	*(2801)*	*(2802)*
Cash ratio	0.135	0.141[a]	0.163	0.139	0.097[a]
	(11206)	*(2802)*	*(2801)*	*(2801)*	*(2802)*

Tangible asset ratio	0.295	0.298[a]	0.278	0.285	0.319[a]
	(11197)	*(2794)*	*(2801)*	*(2801)*	*(2801)*
Altman Z-score	0.496	0.482	0.452	0.506	0.545
	(11177)	*(2786)*	*(2796)*	*(2798)*	*(2797)*
R&D expense ratio	0.022	0.015[a]	0.024	0.031	0.016[a]
	(11206)	*(2802)*	*(2801)*	*(2801)*	*(2802)*
Non-debt tax shelter	0.239	0.234[b]	0.224	0.236	0.262[a]
	(11152)	*(2775)*	*(2792)*	*(2797)*	*(2788)*

When we turn attention to the statistics on net debt issues, the statistics are in line with expectations. Specifically, overleveraged firms are the highest debt issuers with net debt issues of 0.042 and 0.030 for extreme and moderate deviants, respectively. In comparison, extremely underleveraged firms and moderately underleveraged firms have net debt issues of only 0.006 and 0.022, respectively. When it comes to equity issues, surprisingly, underleveraged firms lag behind overleveraged firms, suggesting that underleveraged firms generally use external capital (debt and equity) less frequently.

A potential reason for high equity issuance among overleveraged firms could be that they attempt to move their capital structures back to their target leverage ratios (Xu, 2007; Uysal, 2011). This matter is given special attention in Chapter 7. It is also suggested that smaller firms tend to be disadvantaged when it comes to raising external capital, especially debt capital (see Hovakimian et al., 2001). But, since underleveraged and overleveraged firms are fairly of the same size (i.e. 11.11 and 11.29 for underleveraged firms vs. 11.44 and 11.14 for overleveraged firms), the low level of security issuance by underleveraged firms may not be attributable to size.

It however appears that underleveraged firms resort less to external capital markets because they tend to have greater internal funding capacity which is evidenced by their superior performances in terms of profitability, stock return and cash ratio. The subsample with the highest (lowest) profitability, in terms of operating performance, is moderately underleveraged (extremely overleveraged firms) with the mean profitability ratio of 7.0% (0.7%). Also, the highest (lowest) stock market performers are extremely underleveraged firms (extremely overleveraged firms) with an average annual stock return of 0.6% (0.1%). In addition, the cash flow performance indicator (i.e. cash ratio) implies that moderately underleveraged firms are the most liquid, with a cash ratio of 16.3%, while firms in the extremely overleveraged subsample have the worst cash position (i.e. they have cash ratio of only 9.7%).

In fact, the relatively poor performance of overleveraged firms does not only explain their overreliance on external funds but also suggests that they may be less attractive to lenders in future, and are therefore likely to face future debt financing constraints. In contrast, underleveraged firms (with better performance indices) stand a better chance of accessing debt capital at reasonable prices, and are therefore unlikely to face debt financing constraint. In addition, the bankruptcy risk proxy, Altman's Z-score, provides further evidence that overleveraged firms may be associated with higher credit (bankruptcy) risks and consequently face higher borrowing cost. Extremely overleveraged firms record the highest risk of bankruptcy (0.545), whereas moderately underleveraged firms face the lowest risk of bankruptcy (0.452).

The only statistic, relevant to borrowing ability that seems to favour overleveraged firms is the tangible asset ratio, which is often used as a proxy for collateral (see e.g. Rajan and Zingales, 1995). Extremely overleveraged (moderately underleveraged) firms have the highest (lowest) volume of collateral (31.9% vs. 27.8%). However, given the fact that extremely overleveraged firms have had higher levels of debt in the past, it is reasonable to expect a large pool of their existing collateral to be tied up to past debt (existing creditors), and hence, most of the existing collateral may be unavailable for present and future borrowings. In such cases, the mere presence of large pools of tangible assets may not necessarily translate into greater future borrowing ability.

In summary, the descriptive statistics present four general conclusions about firms in the overleveraged and underleveraged subsamples. First, overleveraged firms use more debt than underleveraged firms. Second, overleveraged firms are more dependent on external funds for their activities than is the case for underleveraged firms. Third, firms in the overleveraged subsample underperform their counterparts in the underleveraged subsample. And finally, firms in the overleveraged subsample face higher bankruptcy risks compared to those in the underleveraged subsample.

Collectively, these conclusions suggest that it may be more difficult for firms in the overleveraged subsample (relative to the underleveraged subsample firms) to access debt capital for their future M&A activities, and thus, face a higher risk of having their M&A

activities curtailed. This seems to provide some preliminary evidence for hypothesis H1b. The next chapter (Chapter 5) is devoted to the empirical investigation of this issue.

4.5 Conclusion

The chapter has identified the core samples and subsamples of the study and has also defined the key variables of the study. First, we have outlined the sample selection process for the two main samples utilised in the study's empirical analyses – (1) the base sample; and (2) the M&A sample. Second, the important features of the M&A sample are highlighted. In particular, the collapse of M&A waves seems to coincide with periods of external financial turmoil, suggesting a direct link between financial liquidity (and constraints) and the volume and value of M&A activities. Also, the link between external finance and M&A activity also seems to be almost limited to cash/debt-financed deals. In addition, we observe a growing trend in the proportion of cross-border M&As in recent years. Further, related M&As and cross-border M&As seem to be more likely to be agency and/or hubris-motivated because they tend to be larger, on average, than other M&A deals.

The chapter has also established the rationale for the choice of market leverage as the study's main measure of financial leverage. Also, the choice of the "predicted value" approach to estimating the target leverage ratio was justified as well its estimation procedures outlined. Finally, the leverage deviation variable is estimated and used as a basis to segregate the base sample into four main subsamples: (1) extremely underleveraged firms, (2) moderately underleveraged firms, (3) moderately overleveraged firms, and (4) extremely overleveraged firms. The descriptive statistics on these subsamples suggests that extremely overleveraged firms are likely to face financing constraints, which could in turn constrain their M&A activities.

Chapter 5

Leverage Deviation and Acquisition Probability

5.1 Introduction

The literature review and summary statistics presented in the previous chapter suggest a link between corporate M&A activities (especially cash/debt-financed deals) and financial leverage. Moreover, as noted in Chapter 1, the recent financial crisis, which resulted in a decrease in the amount of debt capital available to firms, has been accompanied by a substantial decline in the volume of M&A activities in the UK. Within this context, this chapter presents a more systematic analysis of the link between leverage deviation and the probability of undertaking M&As by UK acquirers during 1996-2006.

The main contribution of this chapter is to provide a refinement/development of the existing literature, particularly the work by Uysal (2011). First, the chapter extends the analysis of the association between leverage deviation and acquisition probability (i.e. the leverage deviation effect) to the UK environment. Second, the chapter conducts the analysis of the leverage deviation effect using a more *"complete"* sample of both domestic and cross-border acquisitions. Third, unlike Uysal (2011) who relates the leverage deviation of a firm to all its acquisitions undertaken over a 17-year period, the analysis of this chapter relates leverage deviation to acquisitions made by a firm within a more specific and shorter time frame, i.e. 5 years. By this design, the chapter's analysis recognises that with the passage of time, firms may make adjustments to their leverage, and may thus eliminate past deviations in their leverage ratios. Overall, the analysis contained in this chapter suggests that the negative leverage deviation effect documented by Uysal (2011) for US firms undertaking domestic acquisitions persists, ***and is even stronger***, in a sample of UK firms undertaking both domestic and cross-border acquisitions within 5 years of their deviations from their target leverage. We further confirm that the leverage deviation effect is restricted to cash/debt-financed acquisition deals, but not equity-financed deals.

The hypotheses for this empirical chapter are based on the extant theoretical and empirical literature. A detailed review of the related literature and hypotheses development are presented in Chapters 2 and 3. To facilitate the empirical analysis in this chapter, Section 5.2 summarises the related theoretical arguments and then re-states the hypotheses to be tested. Section 5.3 discusses the empirical method utilised to test our hypotheses. The section also presents summary statistics on acquiring and non-acquiring firms. Sections 5.4 and 5.5 present the empirical results based on probit regressions. Section 5.6 presents results of the robustness tests. Section 5.7 concludes the chapter and highlights the implications of the results on the theories of capital structure and M&As.

5.2 Related literature and hypotheses

As argued in Chapter 3, the trade-off theory of capital structure suggests that managers of firms that substantially deviate from their target leverage ratios (i.e. deviant firms) may be viewed by investors as inefficient (see Leland, 1998; Fama and French, 2005). Consequently, investors may be reluctant to finance the proposed acquisitions of these "inefficient" managers. This, in turn, is likely to reduce the ability of deviant firms to undertake acquisitions. Thus, we propose the following hypothesis:

> ***H1a:*** *The probability of undertaking acquisitions decreases with leverage deviation, all else equal.*

The above hypothesis does not make any distinction between overleveraging and underleveraging in terms of their impact on the probability of undertaking acquisitions. However, there are at least two major reasons why such a distinction may be important. *First,* Ghosh and Jain (2000) and Bruner (1988) show that M&As generally result in leverage increases. Moreover, the trade-off theory implies that firms should aim to stay close to their leverage targets. Therefore, it could be argued that M&As present an opportunity for ***underleveraged firms*** to move towards their leverage targets by increasing their leverage ratios (Harford et al., 2009). This implies that underleveraged firms may be more willing to undertake acquisitions. In contrast, ***overleveraged firms*** pursuing M&As risk moving further away from their leverage targets. Thus, if staying close to the target leverage ratio is important for firms, then overleveraged firms may be less willing to undertake M&As.

Second, leverage deviation and the acquisition probability may be related through debt financing constraints. As was reviewed in Chapter 3, overleveraged firms tend to face debt financing constraints because they are associated with high bankruptcy probability (Molina, 2005) and limited debt capacity (Hovakimian et al., 2001). As a result, overleveraged firms may find it difficult to raise new debt capital since they might have to borrow at an excessively high cost. In contrast, underleveraged firms may find it easier to borrow to finance their M&As deals.

In sum, if firms are assumed to have preference for staying close to their target leverage ratios, and M&As, on average, result in leverage increases, then underleveraged (overleveraged) firms may be more (less) willing and able to raise capital to undertake acquisitions. In the light of this argument and Hypothesis H1a above, we propose the following hypothesis which highlights the opposite impact of negative and positive leverage deviations on the probability of undertaking M&As.

> ***H1b:*** *The probability of undertaking acquisitions decreases more with overleveraging compared to underleveraging, all else equal.*

Hypotheses H1a and H1b above do not differentiate the effect of leverage deviation (overleveraging and underleveraging) on the probability of undertaking cash/debt-financed acquisitions and equity-financed acquisitions. However, as pointed out in Chapters 3 and 4, extreme leverage deviation results in *debt* financing constraint (Hovakimian et al., 2001), and *not* necessarily *equity* financing constraint. Thus, it could be suggested that, it is firms' ability (or inability) to raise *debt capital* that constraints their M&A activities. By definition, debt-financed M&As will require further issuance of debt capital, whereas there may not be any borrowing required for equity-financed deals. Since most cash-financed deals are partially debt-financed (see Bharadwaj and Shivdasani, 2003; Harford et al., 2009), we expect any effect of debt financing constraint on corporate M&A activities to be limited to cash and/or debt-financed deals. Thus, the link between leverage deviation and the acquisition probability may also be restricted to cash/debt-financed M&As. Therefore, we formulate hypothesis H2a as follows:

> ***H2a:*** *The probability of undertaking cash/debt-financed acquisitions decreases with leverage deviation, all else equal.*

Furthermore, the asymmetric impact of overleveraging/underleveraging on cash/debt-financed acquisitions could be established through the effect of debt financing on internal corporate funds. The regular debt interest payments associated with debt financing forces managers to pay out cash (Stulz, 1990), which depletes the amounts of corporate cash available to managers to support cash M&A deals and other expenditures (Jensen, 1986). This suggests that firms with excessive debt burdens (e.g. overleveraged firms) face greater pay-outs of cash flow in the form of interest payments and debt repayments. Consequently, overleveraged firms tend to exhaust their internal financing capability and are therefore faced with a lower probability of making cash-financed acquisitions (assuming they have no borrowing capacity). However, underleveraged firms may not face this problem.

In brief, since overleveraging exhausts the internal financing capacity (i.e. ability to finance from internal corporate funds) and the borrowing capacity of firms (i.e. ability to issue new debt capital), overleveraged firms are expected to have a lower probability of making a cash/debt-financed acquisition. Accordingly, we propose the following hypothesis:

> ***H2b:*** *The probability of undertaking cash/debt-financed acquisitions decreases more with overleveraging compared to underleveraging, all else equal.*

Finally, the above arguments indicate that overleveraging restricts firms from mobilizing both internal cash and external debt capital to pursue their acquisition activities. It therefore appears that the only source of financing available to overleveraged firms is external equity, which tends to be costly under asymmetric information conditions (Myers and Majluf, 1984). In fact, the evidence suggests that overleveraged firms do rely on "expensive" equity capital during acquisitions. For instance, Uysal, (2011) finds that overleveraged firms, on average, issue more equity in an attempt to rebalance their capital structures ahead of anticipated acquisitions.[47] Similarly, Harford et al. (2009) report that it is more likely for overleveraged firms to issue equity to finance acquisitions than to borrow for that purpose. In sum, the negative link between leverage deviation (especially overleveraging) and acquisition probability may not be applicable to equity-financed deals. This motivates hypothesis H3 below:

> ***H3****: The probability of undertaking equity-financed acquisitions does not decrease with leverage deviation, all else equal.*

5.3 The main method used to test hypotheses

In an attempt to test these hypotheses, which examine the association between a firm's current leverage deviation and its future M&A activities, we adopt an empirical strategy similar to Uysal (2011). This method involves a two-step estimation procedure. In the first step, leverage deviation is estimated for each firm-year. This is presented in Chapter 4. In the second-step, cross-sectional probit regressions are utilised to examine the link between leverage deviation and the probability of undertaking acquisitions. The estimation of the cross-sectional probit regressions naturally calls for a sample of acquirers and non-acquirers. The next subsection, subsection 5.3.1, devotes attention to the construction of these subsamples, while subsection 5.3.2 specifies the probit regression model (acquisition probability model, hereafter).

5.3.1 The acquirer vs. non-acquirer subsamples

In constructing the subsamples to be used in the estimation of the acquisition probability, we rely on information from our two core samples identified in Chapter 4 (i.e. the base sample and the M&A sample) to form our subsamples of acquirers and non-acquirers. Since the objective of the empirical analyses is to relate the current leverage deviations of firms to their future M&A activities, we require information on the future acquisition decisions of firms. We adopt an empirical design similar to Offenberg (2009) by studying the firms in the base sample over a 6-year period, *t* to *t*+5, where *t* is the reference year. Figure 5.1 explains the timing of our variables used in the empirical analysis.

[47] This matter is re-visited in Chapter 7.

Specifically, based on the history of completed acquisitions during 1996-2011 of firms in the base sample, firm *i* is classified as an acquirer in year *t*, (i.e. the reference year),[48] if it has at least one completed acquisition during the periods *t*+1 and *t*+5 (i.e. the acquisition observation period, hereafter) and non-acquirer otherwise. The rationale behind restricting our M&A observations to only acquisitions made by sample firms during the first 5 years following the reference year (i.e. *t*+1 and *t*+5) is to enable us to relate a firm's current level of leverage deviation to its M&A activities for a *specific* future time period.

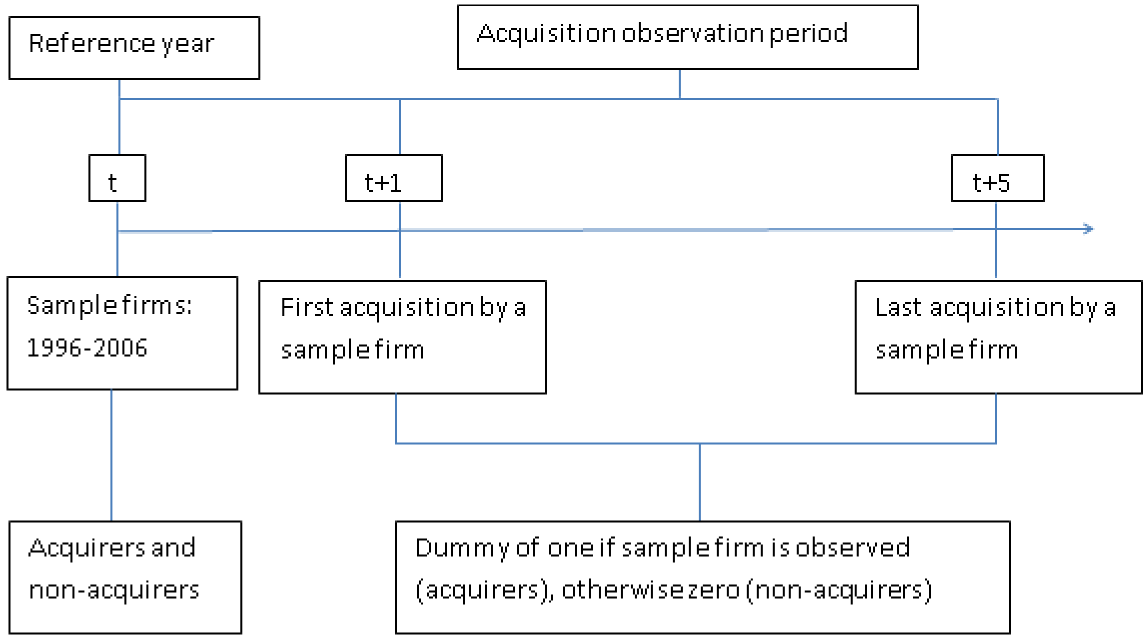
By restricting the acquisitions to a specific (and shorter) time period in the post-reference year, the present study adds to the empirical analysis conducted by Uysal (2011). In Uysal (2011), the relationship between leverage deviation and the acquisition probability is based on all acquisitions made by his sample firms during the entire 17-year sample period. This aspect of Uysal's (2011) research design faces at least one serious limitation, which is a potential weak (or even insignificant) association between leverage deviation and acquisition probability.

[48] As explained earlier, the reference year (i.e. year *t*) refers to the year in which a sample firm is first identified. It also refers to the year in which the leverage deviation variable is calculated for a sample firm. The reference year is therefore thought of as the current year for the purposes of observing past and future M&A activities of a sample firm.

Figure 5.1

Timeline describing the formation of acquirer subsample

In the reference (current) year, *t*, we observe all the M&A activities of firms in the base sample for the 5 years following the reference year (i.e. from periods *t*+1 to *t*+5). Firms that made at least one acquisition during periods *t*+1 and *t*+5 are deemed as acquirers and assigned a dummy of 1. In contrast, firms in the base sample that made no acquisitions during the acquisition observation period were deemed to be non-acquirers and assigned a dummy of 0.



In fact, when the leverage deviation of a firm in a given year is related to its acquisitions made 17-years later, it is possible for the strength of association between leverage deviation and acquisition probability to be *underestimated*. This is because firms often make annual adjustments to their leverage (see Leary and Roberts, 2005; Fama and French, 2002), particularly when they anticipate acquisitions (see Uysal, 2011), and 17-years is long enough for a firm to remedy its leverage deviation prior to undertaking a planned acquisition.[49]

For instance, a firm anticipating acquisitions in the "distant future", say in 10 years time, has ample time to make adjustments to its leverage in order to mitigate the impact of leverage deviation on its acquisition probability. For example, an overleveraged (i.e. financially constrained) firm in year *t* may not be able to obtain debt capital, on short notice, to undertake an acquisition in year *t*+1 or *t*+2 (i.e. in the "immediate future"). However, assuming a speed of leverage adjustment of 25% per annum, as suggested by Lemmon et al. (2008), such a firm may be able to return its leverage ratio to target levels within 4 years (i.e. by the end of year *t*+4), thus, easing any potential debt constraints it might face in future.

In this case, a firm's leverage deviation in year *t* may affect its acquisition activities in the following 4 to 5 years (i.e. "immediate future"), but are less likely to affect acquisitions undertaken beyond year *t*+5 (i.e. in the "distant future") because leverage deviations may be eliminated by the end of year *t*+4. Accordingly, this study relates a firm's current leverage deviation to its M&A activities undertaken in the immediate (or near) future. We define M&As in the "immediate future" to cover all acquisitions made by a firm during the years commencing *t*+1 to *t*+5, where year *t* is the reference year. M&As undertaken after year *t*+5 are deemed to be in the "distant future" and are therefore not covered by this study.

This distinction between "immediate" and "distant" corporate M&A activities is based on the assumption that firms take an average of 5 years to remedy extreme deviations from their target leverage ratios (i.e. speed of adjustment of 20%), so as to neutralise any possible link between leverage deviation and the acquisition probability. This assumption appears to be

[49] In Chapter 7, we report some evidence which seems to suggest that when firms anticipate acquisitions, they tend to take aggressive steps to eliminate deviations from their target leverage.

reasonable given the finding by Harford et al. (2009) that overleveraged acquiring firms remove almost 75% of the deviations in their leverage ratios within 5 years following leverage-increasing M&As.

In sum, firms in the base sample that are observed to have undertaken at least one acquisition in the 5 years following the reference year are classified as acquirers. Firms that did not engage in any M&A activities during the acquisition observation period (i.e. *t*+1 to *t*+5) are classified as non-acquirers for the relevant years.

5.3.2 The acquisition probability model

As noted earlier, we employ probit regression models to examine the relationship between leverage deviation and the probability of undertaking an acquisition during the sample period. The probit regression models specify the probability, P_{ij}, that a firm, *i*, will belong to an outcome *j*, (e.g. being an acquirer if *j*=1, or a non-acquirer if *j*=0) as a function of leverage deviation and a vector of measured characteristics, X_i, of the firm. To test Hypotheses H1a, H2a and H3, the acquisition probability model specified is as follows:

$$P_{it+1,t+5}(Acquirer = 1) = \beta_1 + \beta_2 Deviation_{it} + \sum_{k=1}^{k} X^1_{kit}\beta_k + u_{it} \qquad \text{(Eq. 5.1)}$$

where $P_{it+1,t+5}$ is the probability of firm *i* making at least one acquisition during the observation period (i.e. 5 years after the reference year). The βs represent the intercept (β_1), the coefficients for the leverage deviation variable (β_2), and for the control variables (β_k). In Eq. (5.1), X_{ki} represents one of *k* control variables. These control variables are firm-specific characteristics that may affect the acquisition probability. These variables are discussed in the next subsection. Finally, u_{it} is the random error term assumed to be serially uncorrelated and homoscedastic.

We are interested in the sign, magnitude and significance of β_2 as it represents the extent of association between leverage deviations and the probability of undertaking acquisitions. As mentioned in Chapter 4, $Deviation_{it}$ is a continuous variable, which estimates the gap between a firm's actual leverage and its target leverage.

In order to test Hypotheses H1b and H2b, the acquisition probability model specified is as follows:

$$P_{it+1,t+5}(Acquirer = 1) = \beta_1 + \beta_2 Deviation_{it} + \sum_{k=1}^{k} X_{kit}^{1} \beta_k + u_{it} \qquad \text{(Eq. 5.2)}$$

where *Deviation* now represents indicator variables for overleveraged firms or underleveraged firms. Specifically, *Overleverage* is a dummy variable that takes the value of 1 for those sample firms classified as extremely overleveraged, and 0 otherwise, and *Underleverage* is a dummy variable that takes the value of 1 for those sample firms classified as extremely underleveraged, and 0 otherwise.

5.3.3 The control variables

This subsection turns attention to the explanatory variables included in Eqs. (5.1) and (5.2) (other than leverage deviation), which may be related to a firm's decision to undertake acquisitions. The choice of variables in the model is based upon the extant theoretical and empirical literature discussed in Chapter 2. Overall, nine (9) control variables are included in the acquisition probability model utilised in the present chapter. These control variables are now discussed in turns.

Long-term leverage: The aim of the chapter's empirical analyses is to examine the association between current deviations from target leverage ratios and future M&A activities of firms. Although leverage deviations may be correlated with average leverage levels, it is important to highlight that high debt levels, for instance, may not necessarily represent extreme overleveraging. It is conceivable for a firm to have high leverage ratio, and yet not be extremely overleveraged. Therefore, to disentangle the effect of leverage deviation (i.e. departure from target leverage ratio) from "ordinary" leverage levels, the long-term leverage ratio, which is based on a firm's leverage for the last three (3) years is included in the probit regression model. In fact, besides the effect of leverage deviation, Uysal (2011) shows that the trailing three-year average leverage ratio of firms is negatively related to the probability of making acquisitions, implying that firms with historically high leverage ratios are less likely to pursue acquisitions. In this study, we follow Uysal (2011) and define long-term leverage as the average leverage ratio based on a firm's leverage data for the past 3 years.

Firm size: Compared with small firms, large firms may find it easier to raise funds for acquisitions. Moreover, large firms may stand a better chance to have access to greater internal funding capacity. In fact, Myers and Majluf (1984) and Fluck and Lynch (1999) suggest that firms with superior internal financing capacity do acquire other firms facing financing distress. Therefore, large firms are more likely to make acquisitions. We define firm size as the natural log of sales.

Profitability: The inefficient management hypothesis discussed in Chapter 2 implies that better performing firms acquire poorly-managed firms. Harford (1999) also suggests that better performing firms are more likely to make acquisitions. To account for this effect, the ratio of earnings before interest, tax, depreciation and amortization (EBITDA) to total asset is included as a proxy for firms' profitability level.

Cash ratio: Jensen's (1986) free cash flow hypothesis posits that firms with excess internal funds (i.e. cash reserves) are more likely to spend their excess cash on M&As, even if they do not create value for shareholders. This implies that high free-cash flow firms are more likely to make acquisitions. Accordingly, the ratio of cash and cash equivalents to total assets is included to control for this effect. This variable is expected to be positive for almost all acquisition types, except stock acquisitions, because by definition, stock acquisitions are not paid out of corporate internal cash.

Stock return: Average annual stock return is included in the probit regression model to account for two effects, i.e., the performance effect suggested by Manne (1965) and the misvaluation effect posited by Shleifer and Vishny (2003) and Rhodes-Kropf and

Viswanatham (2004). Firms with high stock return could be seen as better performing and are thus more likely to make acquisitions. Moreover, they may be deemed as overvalued and hence more likely to make acquisitions, especially stock exchange deals, since acquisitions become less expensive for them. Therefore, a positive association is expected between stock return and acquisition activities.

Growth opportunities: If firms use M&As as a vehicle to enhance their growth, then firms with more growth opportunities are more likely to make acquisitions. Further, Jovanovic and Rousseau (2002) suggest that synergistic-motivated M&As tend to be between high-Q firms and low-Q firms, which implies that high growth firms may be more likely to undertake acquisitions. Thus, the market-to-book ratio is included in the regression model to control for growth opportunities.

Industry M&A liquidity: It is a well-known fact that M&As come in waves (see Martynova and Renneboog (2008a); and Figure 4.1 of Chapter 4) and a firm is more likely to make an acquisition when other firms within the industry are aggressively pursuing acquisition strategies. To capture the effect of M&A waves on the acquisition probability, we include the industry M&A liquidity variable suggested by Schlingemann et al. (2002). This variable is measured as the sum of the transaction values of all acquisitions made in a year by all firms in a particular industry divided by the total sales of the industry in that year. Since corporate acquisitions tend to be high (low) during M&A waves (drought), this variable is expected to positively impact on the acquisition probability.

Industry concentration: Corporate acquisitions could also be influenced by the extent of industry concentration. Uysal (2011) argues that firms in highly concentrated industries have fewer targets available for acquisition within the industry which could limit related acquisitions but enhance diversifying acquisitions. It could also be argued that, it is more difficult to undertake acquisitions into concentrated industries since the industry might deem such a move as a threat to its "monopoly" powers, and thus find ways to collectively resist it. We therefore include the industry Herfindahl index in the regression to capture the extent of industry concentration.

Time dummies: In order to account for changes in macroeconomic conditions over the sample period (i.e. 1996-2006), year dummies are included in the acquisition probability model. It must be stressed that year 1996 is excluded from the model, in order for this year to serve as the base year and to prevent the perfect colinearity problem. The year dummies are expected to capture the effects of factors like interest rates and inflation rates which fluctuate within and across different years. For instance, Harford (2005) argues that the interest rate spread which gives an indication of general liquidity in the economy influences the level of M&A activity. In the interest of brevity, the coefficients for these time dummies are not reported during the presentation and discussion of the results.

The summary statistics of the above-mentioned control variables will be discussed in the next section. Meanwhile, Table 5.1 displays the correlation matrix for the explanatory variables contained in the acquisition probability models (i.e. Eq. (5.1) and (5.2)). In general, the results indicate very low correlation among the explanatory variables. The highest correlation value is only 0.40, which is reported for the correlation between firm size and profitability. We find the low correlation among regressors to be quite comforting because it implies that the problem of multicolinearity is not likely to pose any serious threats to the study's findings.

Table 5.1

Correlation matrix for the explanatory variables contained in the acquisition probability model.

This table shows the correlation matrix for the explanatory variables contained in the acquisition probability model. The precise definitions of these variables are contained in subsection 5.3.3 of this chapter and in the list of definitions of key terms and variables on pages 15-22.

Explanatory variables	**Deviation**	**Leverage**	**Growth**	**Size**	**Profit**	**Stock**	**Cash**	**Liquidity**	**Concentration**
Leverage deviation **(Deviation)**	1.00								
Long-term leverage **(Leverage)**	0.22	1.00							
Growth opportunities **(Growth)**	-0.05	-0.29	1.00						
Firm size **(Size)**	0.01	0.18	-0.20	1.00					
Profitability **(Profit)**	-0.10	-0.01	-0.20	**0.40**	1.00				
Stock return **(Stock)**	-0.25	-0.02	0.15	0.02	0.17	1.00			
Cash ratio **(Cash)**	-0.13	-0.38	0.30	-0.31	-0.23	0.05	1.00		
Industry M&A liquidity **(Liquidity)**	0.01	-0.08	0.19	-0.08	-0.04	0.06	0.08	1.00	
Industry concentration **(Concentration)**	0.00	-0.08	0.11	-0.10	-0.10	0.02	0.16	0.20	1.00

5.3.4 The choice of the probit model

It is important to note that, besides the probit model, the acquisition probability models in Eqs. (5.1) and (5.2) could be estimated using other binary probability models such as the logit model or the linear probability model (LPM). The logit and probit models are generally more popular with researchers examining takeover probabilities (e.g. Palepu, 1986; Powell, 1997; and Uysal, 2011) than LPMs. In fact, the logit model is quite similar to the probit model, in that, they both estimate the parameters of a model (e.g. β_1, β_2, and β_k) using maximum likelihood (ML, hereafter) (see Dougherty, 2007). By contrast, the coefficient estimates of the LPM are based on the ordinary least squares (OLS) regression. It seems the strengths of the ML estimator over the OLS estimator partly explain the popularity of the probit and logit models over the LPMs.

For example, Powell (1997, p.1012) notes that the standard errors, as well as the *t*-statistics, produced by ML procedures are asymptotic, implying that when the sample size is large, the ML estimator is more likely to produce valid standard errors and *t*-statistics. In essence, the ML estimator has desirable statistical properties when the sample size is large. Since the base sample of the present study is fairly “large” (11,206 observations), the study could benefit from the large sample properties of the ML estimator (e.g. consistency, asymptotic normality and asymptotic efficiency, see Wooldridge, 2002, Chapter 13; Wooldridge, 2009, p.579).

However, under model misspecifications, the ML estimator loses some of its desirable properties. Fortunately, White (1982) suggests that it is still possible to compute the variance of ML estimators based on random sample even if the model is misspecified by computing standard errors that are insensitive (“robust”) to the misspecification. Accordingly, in all the probit models, we employ robust standard errors but also allow for clusters within firms when computing the standard errors.[50]

[50] Standard errors are allowed to cluster by firm because, as indicated in Chapter 4, a typical firm in the base sample appears over 5 times during the sample period. Observations (and errors) on such firms may not be cross-sectionally independent of each other. In order to deal with these potential correlation problems, the study instructs STATA (the statistical software used for the empirical analyses) to adjust the standard errors by treating same firms as such.

Another reason why logit and probit models appear to be favoured in the literature (over the LPMs) is that their predicted probabilities of outcomes are bounded between zero and one, which is theoretically sound and easy to interpret. On the contrary, LPM can predict probabilities greater than one or less than zero, especially when the regressors contain extreme values (see Dougherty, 2007, Wooldridge, 2009). As a result, LPMs sometimes generate parameter estimates that are either difficult to interpret or have little interpretational value. In the end, these considerations mean that the LPM is thought of to be less appropriate for estimating the parameters of Eqs. (5.1) and (5.2) above. Therefore, the real choice is between the probit and the logit models.

As already indicated, probit and logit models are largely similar. The main difference between them lies in their cumulative distribution functions (cdf, hereafter) (see Espahbodi and Espahbodi, 2003). While the probit model assumes the standard normal distribution for the error term, the cdf under the logit model is the logistic function. This difference in the functional specifications of the probit and logit models results in different parameter estimates between the models. However, Cameron and Trivedi (2010, p.465) note that the marginal effects (i.e. the changes in probabilities given unit changes in explanatory variables) and the predicted probabilities generally tend to be similar between the two models.

Furthermore, in a comparative study of binary models, Espahbodi and Espahbodi (2003) report similar optimum cut-off probability of 0.260 and 0.265 for logit and probit, respectively. In view of these considerations, the choice of probit over logit is purely a matter of preference. More importantly, the choice of the probit model is primarily driven by our desire to compare our findings with the prior US study (i.e. Uysal, 2011) which employs the probit model in testing the association between the acquisition probability and leverage deviation.

5.3.5 Summary statistics

As noted earlier in Subsection 5.3.1, depending on whether firms in the base sample made acquisitions during an observation period (between years *t*+1 and *t*+5), we classify firms as acquirers or non-acquirers. Out of the 11,206 firm-year observations, 5,851 observations are classified as acquirers and 5,355 observations as non-acquirers. Table 5.2 reports the descriptive statistics for these subsamples of acquirers and non-acquirers. As we can see from Table 5.2, due to missing data for some items, it was not possible to construct *all* the explanatory variables for *all* the 11,206 firm-year observations (i.e. acquirer and non-acquirer subsamples). Thus, during the empirical analyses in Sections 5.4 and 5.5, such firm-year observations with at least one missing explanatory variable drop out of the analyses. For example, in Tables 5.4 and 5.6, 89 observations drop out leaving 11,117 firm-year observations.

Another issue that needs to be highlighted is that the descriptive statistics reported in Table 5.2 are measured in the reference year (year *t*). This is to help capture the pre-acquisition characteristics of the acquirer and non-acquirer subsamples. We also attempt to mitigate the effect of outliers and data errors by winsorising all variables employed in the study (except leverage deviation and dummy variables) at the upper and bottom one-percentiles. The leverage deviation variable is not winsorised because, as we saw in Chapter 4, it is a "derivative" variable, which is constructed from other variables (i.e. actual leverage and target leverage) that had already been winsorised. Furthermore, it is the observations in the extreme tails of the leverage deviation variable that are of particular interest to the study.

As shown in Table 5.2, the financing variables largely suggest that acquirers tend to be relatively less leveraged. Despite issuing relatively more debt and less equity in the reference year, on average, acquirers still have negative leverage deviation (-0.01) while non-acquirers deviate positively from their leverage targets (0.01). The difference between the levels of leverage deviation for acquirers and non-acquirers is statistically significant at 1% level. This suggests that acquirers and non-acquirers are significantly different in terms of how they deviate from their target leverage ratios. While acquirers tend to be underleveraged, non-acquirers are generally overleveraged.

Also, the current leverage ratio (i.e. the market leverage) and the "long-term" leverage ratio (i.e. the average of previous 3-year leverage ratios) of acquirers are significantly lower than those of non-acquirers. In particular, while acquirers have market leverage (long-term leverage) of 0.18 (0.18), non-acquirers display market leverage (long-term leverage) of 0.22 (0.20). These findings are in line with Morellec and Zhdanov (2008), Sorensen (2000), and Bruner (1998) who find that, prior to M&As, acquirers are significantly underleveraged relative to non-acquiring firms. More importantly, these findings provide preliminary evidence on the role of excessive leverage in corporate M&A activities by suggesting that higher leverage is associated with lower involvement in M&A activities. Further, the significantly higher net debt issues observed for acquirers is indicative of the high borrowing ability associated with low levels of leverage.

Another important pattern that emerges from Table 5.2 is that acquirers are well-performing firms that seem to use M&As as a vehicle to exploit their high growth potentials (Sorensen, 2000). This is indicated by the performance and growth prospects variables. Except the cash flow indicator, the performance indicators suggest that, in comparison with non-acquirers, acquirers exhibit significantly superior profitability (0.08 vs. 0.01) and stock returns (0.01 vs. 0.00). Similarly, the market-to-book ratio indicates that acquirers have significantly higher growth opportunities compared to non-acquirers (2.04 vs. 1.86). These statistics may perhaps explain why acquirers tend to be underleveraged, since leverage tends to be inversely related to profitability, stock return and growth opportunities (see Flannery and Rangan, 2006; Lemmon et al., 2008; Antoniou et al., 2008).

Further, acquirers seem to be significantly larger and perhaps more diversified as indicated by the natural log of sales. These statistics are further evidence to suggest that relative to non-acquirers, acquirers are more likely to have higher debt capacity since large and diversified firms are able to take on more debt (see Rajan and Zingales, 1995; Anderson et al., 2000). Finally, the industry M&A liquidity variable implies that M&As are more likely to be found in industries experiencing a merger wave.

Table 5.2

Summary statistics for acquirers and non-acquirers

The table reports descriptive statistics on the subsamples of acquirers and non-acquirers. Acquirers are firms that made at least one acquisition within the 5 years following the reference year. Non-acquirers made no acquisitions within the 5 years following the reference year. See the list of definitions of key terms and variables on pages 15-22 for the definitions of the variables. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

		Acquirers					Non-acquirers				
Dimension	**Variables**	**Obs.**	**Mean**	**Std dev.**	**Min.**	**Max.**	**Obs.**	**Mean**	**Std dev.**	**Min.**	**Max.**
Financing	Leverage deviation	5851	-0.01[a]	0.10	-0.75	0.64	5355	0.01	0.12	-0.66	0.73
	Net debt issues	5847	0.01[b]	0.12	-0.58	0.37	5332	0.00	0.13	-0.58	0.37
	Net equity issues	5851	0.03	0.22	-1.09	0.99	5354	0.04	0.24	-1.09	0.99
	Market leverage	5851	0.18[a]	0.17	0.00	0.83	5355	0.22	0.22	0.00	0.83
	Long-term leverage	5851	0.18[a]	0.15	0.00	0.73	5355	0.20	0.19	0.00	0.73
Performance	Profitability	5841	0.08[a]	0.25	-1.65	0.42	5335	0.01	0.31	-1.65	0.42
	Stock return	5851	0.01[a]	0.04	-0.12	0.17	5355	0.00	0.05	-0.12	0.17
	Cash ratio	5851	0.14	0.17	0.00	0.85	5354	0.14	0.18	0.00	0.85
Size	Natural log of sales	5832	11.61[a]	2.20	5.25	16.12	5312	10.62	2.02	5.25	16.12
Growth prospects	Growth opportunities	5851	2.04[a]	1.73	0.57	12.57	5354	1.86	1.85	0.57	12.57
Industry	Industry M&A liquidity	5851	0.08[a]	0.13	0.00	0.95	5355	0.07	0.11	0.00	0.95
	Industry concentration	5851	0.11	0.11	0.02	0.43	5355	0.11	0.10	0.02	0.43

In sum, acquirers and non-acquirers seem to significantly differ across several dimensions including their leverage deviations and debt usage in general. In the next section, we take a closer look at the association between corporate financial leverage and corporate M&A activities. Specifically, we directly examine the link between leverage deviation and corporate acquisition probability.

5.4 Tests of the leverage deviation effect (Hypotheses H1a and H1b)

In this section, we empirically examine the link between leverage deviation and the probability of undertaking acquisitions. Specifically, we investigate (1) whether a firm's deviation from their target leverage ratios are associated with a lower probability of undertaking acquisitions (Hypothesis H1a); and (2) whether any association between leverage deviation and the acquisition probability is equal for underleveraged and overleveraged firms (Hypothesis H1b). We test these hypotheses by utilising both univariate and multivariate analyses.

5.4.1 The univariate tests

This subsection opens the study's empirical examinations with a univariate analysis of the relations between leverage deviation and corporate M&A activities. In conducting this analysis, we compute and compare the *ratio of acquirers*[51] across the four main subsamples described in Chapter 4 (i.e. extremely underleveraged firms, moderately underleveraged firms, moderately overleveraged firms, and extremely overleveraged firms). The differences between the ratios of acquirers for the relevant subsamples are tested for statistical significance using the two-sample equality of proportion tests.[52]

The results reported in Table 5.3 show that for the entire sample, the proportion of firms engaged in M&A activities during the acquisition observation period is 52.2%, indicating that M&As do occur frequently among UK firms. More importantly, Table 5.3 presents the first

[51] The ratio of acquirers is computed as the number of acquirers divided by the total number of firms in the (sub) sample. Almazan et al. (2010) and Uysal (2011) used the ratio of acquirers in making judgements about acquisition likelihood.
[52] The STATA command for running this test is prtest.

direct evidence in support of the assertion that substantial deviations from target leverage ratios are associated with a reduced probability of undertaking acquisitions. The proportion of observed acquisitions (which could proxy for acquisition likelihood) is lowest among firms with extreme leverage deviations (i.e. 11.0% for extremely overleveraged firms, and 13.0% for extremely underleveraged firms). In comparison, firms that kept their leverage ratios close to their target leverage ratios (i.e. moderately underleveraged and moderately overleveraged firms) are more active in the market for corporate control. The ratios of acquirers (i.e. acquisition rates or acquisition likelihood, henceforth) for these firms are approximately 14%, which is about 3 and 1 percentage point(s) higher than the acquisition rates for extremely overleveraged firms and extremely underleveraged firms, respectively.

In Rows 6, 7, and 8, the reported statistics indicate that extremely overleveraged firms have significantly (at 1% levels) lower acquisition rate in relation to all the other firms in the sample. For example, relative to moderately overleveraged firms, the observed acquisitions for extremely overleveraged firms are about 3.3 percentage points lower, suggesting that extremely overleveraged firms may have reduced acquisition probability (significant at 1% levels).[53]

These results are largely consistent with Hypothesis H1a and are also in line with the prior study by Uysal (2011). By way of comparison, Uysal (2011) reports acquisition rates of 13.2%, 14.2%, 12.1%, and 8.8% for extremely underleveraged firms, moderately underleveraged firms, moderately overleveraged firms, and extremely overleveraged firms, respectively. These estimates are very close to those displayed in Table 5.3, except that the acquisition rate for extremely overleveraged firms seems to be slightly higher in the present study than in Uysal's work (11.0% vs. 8.8%). The difference is likely to be due to the fact that the current study covers both domestic and cross-border acquisitions while Uysal's study was limited to domestic acquisitions. As we shall see later in Chapter 6, when we restrict our analyses to only domestic M&As, as in Uysal (2011), we observe an acquisition rate of 8.4%, which is similar to the 8.8% acquisition rate documented by Uysal (2011).

[53] Since the association between leverage deviation and acquisition probability is restricted to overleveraging (rather than underleveraging), according to Uysal (2011); much of the discussions of the specific findings compares the results for extremely overleveraged firms against those of moderately overleveraged firms.

Table 5.3

The proportion of acquisitions across the main subsamples

The table shows the rates of acquisitions among firms with different levels of leverage deviation. Leverage deviation is the difference between actual leverage and target leverage. Q1 firms have large negative leverage deviations, Q2 firms have small negative leverage deviations, Q3 firms have small positive leverage deviations, and Q4 firms have large positive leverage deviations. The differences in the ratios are tested using the two-sample equality of proportion tests. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

No.	Sample/subsamples	Ratio
1	Ratio of acquirers	0.522
2	Ratio of extremely underleveraged acquirers (Q1)	0.130
3	Ratio of moderately underleveraged acquirers (Q2)	0.139
4	Ratio of moderately overleveraged acquirers (Q3)	0.143
5	Ratio of extremely overleveraged acquirers (Q4)	0.110
6	Difference (2 - 5)	0.020[a]
7	Difference (3 - 5)	0.029[a]
8	Difference (4 - 5)	0.033[a]

5.4.2 The multivariate tests

The univariate analyses in the previous subsection fail to account for several important factors that may be related to the probability of undertaking acquisitions (those discussed in subsection 5.3.3). Therefore, in this section, we incorporate the control variables into the analyses by estimating the acquisition probability models specified in Eqs. (5.1) and (5.2). Using the acquisition probability (probit) model, we examine the link between leverage deviations and the probability of undertaking acquisitions.

The dependent variable is a binary variable that takes value 1 when a firm is an acquirer and 0 for the firm that is a non-acquirer. Column (a) of Table 5.4 displays the result of the regression model in which the leverage deviation variable is included in the model as a continuous variable. In Column (b), the leverage deviation variable is substituted with two indicator variables: Overleveraged effect (Q4) is an indicator variable that takes value 1 when a firm-year exhibits extreme overleveraging and 0 otherwise, and the underleveraged effect (Q1) is an indicator variable that takes value 1 when a firm-year exhibits extreme underleveraging and 0 otherwise. These extreme leverage deviation indicator variables are included in the model (i.e. Eq. (5.2)) to disentangle the specific links between overleveraging/underleveraging and corporate M&As activities (Hypothesis H1b).

The findings reported in Table 5.4 are largely consistent with the univariate results and strongly support hypotheses H1a and H1b. Specifically, the results in Column (a) show that the coefficient (i.e. the marginal effect) of the leverage deviation variable is negative (-0.127) and statistically significant at 1% level of significance.[54] This finding suggests that a unit deviation from a firm's current target leverage ratio is, on average, associated with a 12.7% reduced probability of making an acquisition in the near future (i.e. within the next 5 years). In other words, firms that deviate from their target leverage ratios are less likely to undertake acquisitions in the near future. An important implication of this finding is that firms that are planning to undertake acquisitions in the near future may have to move their leverage ratios towards target levels, if they want to enhance their chances of completing acquisitions. This issue will be given special attention in Chapter 7.

[54] In running the probit regressions, we follow Uysal (2011) by requesting STATA to report the marginal effects of the independent variables. This helps to directly compare our findings with those of Uysal (2011). The STATA command for running this probit regression is dprobit.

The finding presented in Column (a), however, does not clearly distinguish between how the leverage deviation effect (i.e. the link between leverage deviation and acquisition probability) could differ between positive and negative leverage deviations. As a result, the leverage deviation effect is further examined, with special attention given to extreme deviations (extreme overleveraging and extreme underleveraging). The results for this analysis are presented in Column (b) of Table 5.4. The results suggest that the negative association between leverage deviation and acquisition probability is limited to extremely overleveraged firms. To be specific, the dummy variable for extremely overleveraged firms is negative (-0.051) and statistically significant (p-value of 0.000), while the extremely underleveraged dummy is negative (-0.014) but lacks statistical significance at conventional levels (p-value of 0.280). This finding seems consistent with the view that the cost of being overleveraged is greater than the cost of being underleveraged (see Byoun, 2008; van Binsbergen et al, 2010), since extreme overleveraging constrains M&A activities more than extreme underleveraging.[55]

[55] In drawing this conclusion, we assume that M&As are value-enhancing, and therefore when they are constrained, corporations pass out on some positive NPV projects. Thus, reduced acquisition probability could be seen as costly for firms.

Table 5.4

Leverage deviations and the probability of making an acquisition

Variables	(a)	(b)
Leverage deviation	**-0.127[a]**	..
	(0.003)	..
Overleverage effect (Q4)	..	**-0.051[a]**
	..	*(0.000)*
Underleverage effect (Q1)	..	**-0.014**
	..	*(0.280)*
Long-term leverage	-0.271[a]	-0.245[a]
	(0.000)	*(0.000)*
Growth opportunities	0.020[a]	0.019[a]
	(0.000)	*(0.000)*
Firm size	0.063[a]	0.063[a]
	(0.000)	*(0.000)*
Profitability	0.036	0.033
	(0.224)	*(0.263)*
Stock return	0.846[a]	0.862[a]
	(0.000)	*(0.000)*
Cash ratio	0.105[c]	0.100[c]
	(0.060)	*(0.072)*
Industry M&A liquidity	0.190[a]	0.191[a]
	(0.004)	*(0.004)*
Industry concentration	0.001	-0.002
	(0.990)	*(0.984)*
No. of firm-years	**11,117**	**11,117**
Wald Chi-squared test	**312.41**	**312.68**
P-value (Chi-squared)	**0.000**	**0.000**
Pseudo R-squared	**0.064**	**0.065**

This table presents results from a probit analysis with the dependent variable taking a value of one if the firm undertakes an acquisition in the next 5 years following the reference year. It summarises results from the estimation of Eqs. (5.1) and (5.2).

The reported coefficient estimates are average marginal effects. Variable definitions are in the list of definitions for key terms and variables on pages 15-22. The p-values are reported in *italics and parentheses* and are adjusted for standard errors clustered by firm. All models include 10 year dummies. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

The average marginal effect estimate (of -0.051) on the extremely overleveraged dummy is statistically, as well as, economically significant. The estimate implies that extremely overleveraged firms in time *t* are 5.1% less likely to make acquisitions in the near future (i.e. during years *t+1* to *t+5*). Given that the relations between extreme underleveraging and acquisition probability is statistically insignificant, this finding strongly supports Hypothesis H1b that the probability of undertaking acquisitions decreases more with overlevraging compared to underleveraging. Further, it appears the negative leverage deviation effect reported in Column (a) is driven by the effect of extreme overleveraging. An implication of this result is that, firms that have *far exceeded* their borrowing targets may face serious difficulties raising further debt capital (as suggested by Hovakimian et al., 2001; and Harford et al., 2009), and this can subsequently constrain their M&A activities (Uysal, 2011).

In general, the findings so far are largely consistent with the US study by Uysal (2011), suggesting that the institutional differences between the UK and the US may not fundamentally alter the link between overleveraging and M&A activities (the overleverage effect). However, the present study's results indicate that the overleverage effect is stronger than what Uysal (2011) suggests. In particular, we report a marginal effect of 5.1% for extremely overleveraged firms compared with 0.9% documented by Uysal (2011). This suggests that the constraint of extreme overleveraging on acquisition activities is more severe for UK firms than for US firms. More specifically, a UK overleveraged firm is almost 6 times (5.1% vs. 0.9%) less likely to make an acquisition compared with a US overleveraged firm. The difference may also be due to the choice of the sample period. Our sample period includes acquisitions during the period 2006-2011, which coincides with the recent credit crunch brought about by the financial crisis of 2008.

It must also be emphasised that the difference in the research designs and the sample compositions of the two studies might contribute to explaining the difference in the magnitude of the overleveraged effect. To be precise, the present study relates leverage deviation computed in a specific year (i.e. reference year, *t*) to acquisitions made within 5 years following the reference year. This allows leverage deviation in a current period for a firm to be related to its acquisitions activities occurring within a relatively *shorter* time space (i.e. 5 years). In contrast, the prior study (i.e. Uysal, 2011) relates all acquisitions made in the sample period (i.e. 1990-2007) to a measure of leverage deviation. Uysal's research design makes it possible for leverage deviation (for a firm) computed in year 1990, for instance, to be related to its acquisitions undertaken in year 2007 (i.e. 16 years afterwards), which could result in reduced overleveraged effect on acquisition probability. It is generally plausible to expect stronger (weaker) association between leverage deviation and acquisition probability when the two variables are closer to (further away from) each other; and this could partly explain why the estimate of the overleverage effect is higher in the present study than that of the prior study.

Finally, as highlighted in Chapter 4, our sample has fewer proportion of equity-financed deals (about 5%) compared to that of Uysal (2011) (16%). Since equity-financed deals may be less affected by leverage deviation (Harford et al., 2009; Uysal, 2011), it is possible for the association between leverage deviation and the acquisition probability to be stronger (weaker) in a sample dominated by cash/debt (equity) M&A deal like ours.

5.4.3 Control variables

The coefficients for the control variables are broadly consistent with expectations. First, growth opportunities are found to be positively and significantly (p-value of 0.000) related to the likelihood that a firm undertakes an acquisition. This is in line with the view that firms with high growth opportunities tend to use M&As as a vehicle to expand their operations (Jovanovic and Rousseau, 2002; Espabodi and Espabodi, 2003). Second, firm size which serves as a proxy for internal resources and agency considerations is also positively and significantly related to the acquisition probability, implying that managers of large firms are more likely to acquire other firms. Third, stock return and cash ratio are all positively and significantly related to the acquisition probability. This suggests that firms experiencing high share price performance and those with high internal cash reserve are more likely to make acquisitions. Similarly, profitability is positively related to the acquisition probability, although the coefficient on profitability is not statistically significant.

Fourth, acquisitions seem to be high in industries with high M&A liquidity, suggesting a form of "herding" in acquisition decisions, i.e., firms are encouraged to undertake acquisitions when other firms in their industries are doing same. This finding also supports the phenomenon of waves and droughts in M&A activities (Martynova and Renneboog, 2008a). Fifth, consistent with Uysal (2011), we find the long-term leverage ratio to be inversely related to corporate acquisition activities, indicating that besides the effect of deviating from leverage targets, high-debt usage firms are less likely to undertake acquisitions. And finally, the effect of industry concentration is statistically insignificant. This implies that firms in both competitive and monopolistic industries are equally likely to undertake acquisitions.

In sum, in this section, we establish a statistically and economically significant link between leverage deviations and corporate M&A activities, in general terms. However, firms do engage in different types of acquisitions that carry different risk and value implications for investors. This suggests that the constraint of debt financing (via leverage deviation) may be more or less severe in some types of acquisitions than others. The next section (Section 5.5) and Chapter 6 deal with this subject.

5.5 Leverage deviations and cash vs. stock M&As

This section tests whether the leverage deviation effect is symmetric for cash/debt-financed and equity-financed M&As. Hypothesis H2a predicts that leverage deviation will be negatively related to the probability of undertaking a cash/debt-financed acquisition while hypothesis H3 predicts that there is no impact of leverage deviation on the probability of undertaking equity-financed acquisitions. In testing these hypotheses, we make a distinction between cash/debt-financed acquisitions and equity-financed acquisitions. To this end, firm-year observations in the base sample are considered as cash/debt (equity) acquirers if they make at least one cash/debt-financed (equity-financed) acquisition within the acquisition observation period (i.e. between years t+1 and t+5). We then compute and compare the ratios of acquirers across the four subsamples in the univariate analysis and estimate Eq. (5.1) with modified dependent variables (discussed below) in the multivariate analysis. To test hypothesis H2b regarding the link between the probability of undertaking acquisitions (cash/debt-financed vs. equity-financed) and overleveraging/underleveraging, we again estimate Eq. (5.2) with a modified dependent variable.

Prior to conducting the empirical analysis, we note the reasons why we consider the cash-financed acquisitions and the debt-financed acquisitions together, rather than analyse them separately. First, at the data collection stage, we only collected from Thomson ONE the means of payment data. The key classifications by Thomson ONE for the means of payment are cash only, stock deals, and new equity issues. In fact, the cash only deals do not distinguish between cash sourced from debt finance and cash sourced from internal reserve; hence, we were unable to distinguish between debt-financed and cash-financed acquisitions. Second, as indicated in Section 5.2, the prediction (based on the extant literature) of the leverage deviation effect on acquisition probability is the same for both debt-financed acquisitions and cash-financed acquisitions. In particular, leverage deviation (especially overleveraging) could create debt financing constraint (by eroding borrowing capacity) and internal cash constraint (via high debt interest payments and debt repayments), and eventually curtail firms' ability to undertake future acquisitions. Thus, analysing the cash-financed and debt-financed deals together does not present any serious problems. It is, however, important to acknowledge that by not distinguishing between debt-financed and cash-financed acquisitions, this study fails to point out the relative importance of any debt constraint or internal cash constraint on the probability of firms undertaking acquisitions. This limitation is duly acknowledged.

We now turn attention to the univariate and multivariate tests of Hypotheses H2a, H2b and H3.

5.5.1 The univarite tests

Table 5.5 depicts that the UK acquirers tend to engage more in cash/debt-financed acquisitions than in equity-financed acquisitions. Specifically, the rate of cash/debt-financed acquisitions is 32.9%, compared to 4.2% equity-financed acquisition rate. Also, the results in Columns (a) and (b) of Table 5.5 suggest that whilst extreme overleveraging significantly constrains acquisitions in cash/debt-financed deals, it has no significant effect on equity-financed acquisitions. In cash/debt-financed deals, the ratios of acquirers for moderately overleveraged (Q3) and extremely overleveraged (Q4) firms are 8.7% and 6.6%, respectively.

The difference of 2.1% between these two ratios is significant at 1% level, implying that extreme overleveraging significantly reduces acquisition probability. In contrast, moderately overleveraged and extremely overleveraged firms have fairly the same ratios of acquirers (1.1% vs. 1.0%; the difference of 0.001 is statistically insignificant at conventional levels). This suggests that moderately overleveraged (Q3) and extremely overleveraged (Q4) firms have equal chance (likelihood) of undertaking equity-financed acquisitions.

The significance of these results is that though overleverage, on average, reduces the probability of making acquisitions in general, the overleverage effect is restricted to cash/debt acquisitions (i.e. those that need to be either financed from internal funds or external debts). For equity-financed acquisitions (i.e. stock exchanges and deals financed solely from issuing shares), overleveraging does not seem to reduce their likelihood.

Table 5.5

The proportion of cash/debt-financed and equity-financed acquisitions across the main subsamples

The table shows the rates of cash/debt-financed and equity-financed acquisitions among firms with different levels of leverage deviation. Leverage deviation is the difference between actual leverage and target leverage. Q1 firms have large negative leverage deviations, Q2 firms have small negative leverage deviations, Q3 firms have small positive leverage deviations, and Q4 firms have large positive leverage deviations. The differences in the ratios are tested using the two-sample equality of proportion tests. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

		(a)	(b)
No.	**Sample/subsamples**	**Cash/debt**	**Equity**
1	Ratio of acquirers	0.329	0.042
2	Ratio of extremely underleveraged acquirers (Q1)	0.084	0.010
3	Ratio of moderately underleveraged acquirers (Q2)	0.092	0.011
4	Ratio of moderately overleveraged acquirers (Q3)	0.087	0.011
5	Ratio of extremely overleveraged acquirers (Q4)	0.066	0.010
6	Difference (2 - 5)	0.018[a]	0.000
7	Difference (3 - 5)	0.025[a]	0.001
8	Difference (4 - 5)	0.021[a]	0.001

5.5.2 The multivariate tests

Under the multivariate tests, we estimate Eq. (5.1) using modified dependent variables according to the type of acquisition being predicted. In the analysis in the previous section, the dependent variable is a binary variable that takes value 1 when a firm is an acquirer and 0 for the firm that is a non-acquirer. In this section, we use two dependent variables, which are binary variables that take value 1 for a firm-year when the acquisition (within the next 5 years following the reference year) is listed on Thomson ONE's M&A database as having cash/debt (equity) as the sole consideration offered for the target firm by the acquirer, and 0 for the firm that is a non-acquirer.

Table 5.6 presents evidence to suggest that the negative association between leverage deviation (and overleveraging) and corporate M&A activities is restricted to those M&A deals that are paid for with cash/debt. This finding is in line with the univariate analyses and hypotheses H2a and H3. To be specific, while leverage deviation is negatively (-16.4%) and significantly (p-value of 0.000) related to the probability of making a cash/debt-financed acquisition, it has a positive (0.5%) but insignificant (p-value of 0.757) association with the probability of undertaking equity-financed acquisitions (see Columns (a) and (c) of Table 5.6).

Similarly, the relations between extreme overleveraging and cash/debt-financed acquisitions probability is negative (-4.6%) and significant (p-value of 0.000) but it lacks statistical significance in equity-financed acquisitions (coefficient of -0.1% and p-value of 0.827). Similar to the results for the general acquisition model (discussed in Section 5.4), the association between extreme underleveraging and the probability of undertaking cash/debt-financed acquisitions or equity-financed acquisitions is statistically insignificant. This further supports hypothesis H2b.

Table 5.6

Leverage deviation and the probability of undertaking cash/debt-financed vs. equity-financed acquisitions

Variables	(a)	(b)	(c)	(d)
	Cash/debt-financed		Equity-financed	
Leverage deviation	**-0.164[a]**	..	**0.005**	..
	(0.000)	..	*(0.757)*	..
Overleverage effect (Q4)	..	**-0.046[a]**	..	**-0.001**
	..	*(0.000)*	..	*(0.827)*
Underleverage effect (Q1)	..	**0.000**	..	**-0.001**
	..	*(0.978)*	..	*(0.730)*
Long-term leverage	-0.141[a]	-0.122[b]	-0.013	-0.012
	(0.013)	*(0.037)*	*(0.464)*	*(0.518)*
Growth opportunities	0.011[b]	0.011[b]	0.002[c]	0.002[c]
	(0.026)	*(0.029)*	*(0.078)*	*(0.080)*
Firm size	0.060[a]	0.059[a]	-0.006[a]	-0.006[a]
	(0.000)	*(0.000)*	*(0.001)*	*(0.001)*
Profitability	0.117[a]	0.115[a]	-0.023[a]	-0.023[a]
	(0.000)	*(0.000)*	*(0.001)*	*(0.001)*
Stock return	0.542[a]	0.565[a]	0.119[a]	0.118[a]
	(0.000)	*(0.000)*	*(0.002)*	*(0.002)*
Cash ratio	0.042	0.039	-0.004	-0.004
	(0.459)	*(0.487)*	*(0.804)*	*(0.794)*
Industry M&A liquidity	0.048	0.048	0.022	0.022
	(0.438)	*(0.440)*	*(0.177)*	*(0.177)*
Industry concentration	-0.085	-0.085	0.084[a]	0.084[a]
	(0.352)	*(0.352)*	*(0.001)*	*(0.001)*
No. of Observations	**11,117**	**11,117**	**11,117**	**11,117**
Wald Chi-squared test	**293.23**	**296.98**	**117.98**	**118.310**
P-value (Chi-squared)	**0.000**	**0.000**	**0.000**	**0.000**
Pseudo R-squared	**0.073**	**0.073**	**0.069**	**0.069**

This table presents results from probit analysis with the dependent variable taking a value of one if the firm undertakes a cash/debt-financed acquisition or an equity-financed acquisition within the acquisition observation period. The reported coefficient estimates are average marginal effects. Variable definitions are in the list of definitions of key variables and terminologies on pages 15-22. The p-values are reported in *italics* and *parentheses* and are adjusted for standard errors clustered by firm. All models include 10 year dummies. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

These findings imply that firms that deviate from their target leverage ratios, especially those that substantially go beyond their leverage targets have a reduced probability of undertaking cash/debt-financed acquisitions, but their probability of making equity-financed acquisitions remain unaffected. This suggests that the already documented negative association between leverage deviation (and extreme overleveraging) is linked to cash/debt financing of acquisitions. The results seem to be consistent with the argument that overleveraging constrains firms from obtaining new debt financing on short notice, which consequently restricts their ability to make competitive cash bids (Harford et al., 2009; Morellec and Zhdanov, 2008).

Also, the findings on cash/debt-financed acquisition probability appear to support the view that overleveraging (via the regular debt interests payments) restricts the internal cash reserves available to corporate managers for discretionary spending (Stulz, 1990) such as M&As. Finally, the results on equity-financed acquisitions indicate that, leverage deviation is irrelevant in acquisitions where firms either swap their shares as consideration for the M&A deal, or mangers (of the acquiring firm) turn to their shareholder for new funds (newly issued shares). In other words, extremely overleveraged firms, extremely underleveraged firms, moderately underleveraged firms, and moderately overleveraged firms have reasonably equal chances of launching equity-financed acquisitions.

Collectively, the findings on the cash/debt-financed and equity-financed acquisitions imply that leverage deviation (or overleveraging) is related to M&A activities via its effect on internal cash financing and external debt financing. Another important implication is that extremely overleveraged firms that need to undertake acquisitions are more likely to resort to relatively expensive equity financing.

5.5.3 Control variables

The effects of the control variables in the cash/debt-financed and equity-financed acquisition models are generally similar to those earlier reported for the general acquisition model. It is however important to highlight the results on three control variables that have implications on the means of financing an acquisition – i.e. cash ratio, firms size, and profitability.

Surprisingly, the cash ratio which measures the available corporate cash reserve prior to the acquisitions is statistically insignificant in both the cash/debt-financed and equity-financed acquisition probability models. The coefficient estimates are nonetheless economically significant and consistent with intuition. In particular, firms with more (less) cash reserve are more likely to undertake cash/debt-financed (equity-financed) acquisitions. Furthermore, other variables that could denote internal financing capacity of acquiring firms (i.e. firm size and profitability) are significantly positively (negatively) related to the probability of making a cash/debt-financed (equity-financed) acquisition. These findings are consistent with Myer's (1984) pecking order theory, in that, firms are unlikely to issue equity to fund acquisitions when they have huge internal financing capacity.

5.6 Robustness tests

This section considers three (3) main issues. First, it tests whether the key finding of negative association between leverage deviation (overleveraging) and the acquisition probability is sensitive to the time span (i.e. number of years) between the reference year, *t*, and the actual acquisition decision, *t*+n. Second, it tests whether the conclusions are primarily driven by the acquisition activities of multiple (serial) acquirers. Finally, it tests the sensitivity of the main finding to an alternative measure of financial leverage – the book leverage.

In the interest of brevity, the analyses in this section are restricted to the association between overleveraging and underleveraging and the acquisition probability. The role of the medium of payment for the acquisitions is not re-examined here.

5.6.1 Time span between leverage deviation and acquisition activity

Throughout the empirical analysis so far, firms are deemed to be acquirers if they made at least one acquisition within the next 5 years following the reference year. This subsection examines the question of how far into the future will a firm's current leverage deviation significantly impacts its future acquisitions. In other words, is the negative association between leverage deviation and acquisition decisions sensitive to how the main dependent variable is defined? This analysis is necessary because deviation from target leverage is not a permanent state for firms. Firms can adjust their leverage deviations over time (see Frank and Goyal, 2007), rendering leverage deviation to be statistically insignificant to acquisition activities that are far into the future.

Therefore, in this subsection, we relate a firm's current leverage deviation (determined in the reference year, *t*) to the specific acquisitions it makes in the first, second, third, fourth and fifth years following the reference year, (i.e. *t*+1, *t*+2, *t*+3, *t*+4, and *t*+5). In Columns (a) to (e) of Table 5.7, the variables of interest (overleveraging and underleveraging) are always measured in the reference year, *t*, while all other explanatory variable are measured in the one year prior to the year of the acquisition (i.e. *t*+*n*-1, where *n* is the acquisition year). For example, in Column (d) which models the acquisition probability in year *t*+4 (i.e. 4 years after a firm deviates from its target leverage ratio), a firm in year 1996 will have its leverage deviation estimated in 1996 related to its acquisitions in year 2000. All control variables are measured in the year prior to the acquisition (in this example, year 1999). The explanatory variables are measured in the year closest to the acquisition decision in order to improve the performance of the model.

As displayed in Table 5.7, a number of observations indicate that the negative overleverage effect on acquisition probability is limited to (or at least stronger in) acquisitions closer to the reference year. First, extreme overleveraging is negatively related to only acquisitions made in the first three (3) years following the reference year. Second, the negative overleveraging effect is only significant in the first and second years following the reference year. Third, among the 5 years following the reference year, the magnitude of the coefficient estimate on overleveraging is biggest (-3.1%) in the closest year to the reference year (i.e. in the first year after the reference year (*t*+1)). Fourth, in the fourth and fifth years following the reference year (*t*+4, and *t*+5), overleveraging is *positively* associated with acquisition probability, but only significant in the fourth year. With the exception of the third year, the coefficient on Underleveraging is statistically insignificant. Overall the results here are qualitative in line with our key findings.

Table 5.7

Leverage deviations and the probability of making an acquisition

	(a) t+1	(b) t+2	(c) t+3	(d) t+4	(e) t+5	(f) SA	(g) BL 1	(h) BL 2
Overleverage effect	**-0.031[a]**	**-0.030[a]**	**-0.019**	**0.028[b]**	**0.001**	**-0.002**	**-0.006**	**0.006**
	(0.008)	*(0.014)*	*(0.153)*	*(0.050)*	*(0.931)*	*(0.868)*	*(0.694)*	*(0.658)*
Underleverage effect	**-0.017**	**0.005**	**0.025[b]**	**-0.002**	**-0.009**	**0.009**	**-0.031[c]**	**0.001**
	(0.106)	*(0.646)*	*(0.032)*	*(0.844)*	*(0.465)*	*(0.382)*	*(0.056)*	*(0.961)*
Long-term leverage	-0.209	-0.129	-0.137	-0.236	-0.189	-0.063	-0.302	-0.290
	0.000	*0.002*	*0.002*	*0.000*	*0.000*	*0.103*	*0.000*	*0.000*
Growth opportunities	0.016	0.014	0.012	0.009	0.012	-0.002	0.019	0.019
	0.000	*0.000*	*0.002*	*0.035*	*0.010*	*0.595*	*0.000*	*0.000*
Firm size	0.054	0.056	0.056	0.054	0.053	-0.006	0.064	0.063
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.088*	*0.000*	*0.000*
Profitability	0.087	0.101	0.101	0.121	0.102	0.025	0.039	0.040
	0.001	*0.000*	*0.001*	*0.000*	*0.004*	*0.259*	*0.182*	*0.169*
Stock return	0.961	1.017	1.033	0.822	0.771	0.114	0.938	0.930
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.232*	*0.000*	*0.000*
Cash ratio	0.042	0.101	0.123	0.101	0.110	-0.009	0.109	0.110
	0.279	*0.018*	*0.007*	*0.033*	*0.020*	*0.807*	*0.049*	*0.049*
Indus. M&A liquidity	0.159	0.149	0.222	0.107	0.061	0.073	0.190	0.187
	0.001	*0.003*	*0.001*	*0.025*	*0.058*	*0.085*	*0.004*	*0.004*
Industry concentration	-0.073	-0.147	-0.109	-0.093	-0.096	0.125	-0.008	0.000
	0.259	*0.033*	*0.090*	*0.136*	*0.122*	*0.032*	*0.934*	*0.997*
No. of Observations.	**11,117**	**10,069**	**9,136**	**8,297**	**7,564**	**11,117**	**11,117**	**11,112**
Wald Chi-squared	**491.33**	**477.83**	**441.61**	**377.61**	**330.47**	**27.81**	**304.94**	**302.63**
P>Chi-squared	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.114**	**0.000**	**0.000**
Pseudo R-squared	**0.083**	**0.086**	**0.093**	**0.088**	**0.086**	**0.004**	**0.064**	**0.064**

This table presents results from several probit analyses. In Column (a), the dependent variable takes a value of one if the firm undertakes an acquisition in the first year following the reference year (*t*+1). In Column (b), the dependent variable takes a value of one if the firm undertakes an acquisition in the second year following the reference year (*t*+2). In Column (c), the dependent variable takes a value of one if the firm undertakes an acquisition in the third year following the reference year (*t*+3). In Column (d), the dependent variable takes a value of one if the firm undertakes an acquisition in the fourth year following the reference year (*t*+4). In Column (e), the dependent variable takes a value of one if the firm undertakes an acquisition in the fifth year following the reference year (*t*+5). In Column (f), the dependent variable takes a value of one if the firm undertakes only one acquisition in the 5 years following the reference year. SA refers to single acquirers. In Column (g), the dependent variable takes a value of one if the firm undertakes at least one acquisition in the 5 years following the reference year. Leverage deviation based on book leverage (BL) 1, which is defined as the ratio of total debt to the sum of total debt and book value of equity. In Column (h), the dependent variable takes a value of one if the firm undertakes at least one acquisition in the 5 years following the reference year. Leverage deviation is based on book leverage (BL) 2, which is defined as the ratio of total debt to total assets. All the results are based on estimation of Eq. (5.2). The control variables in the results reported in Columns (f), (g), and (h) are measured in the reference year, *t*. The reported coefficient estimates are average marginal effects. Variable definitions are in the list of definitions of key variables and terminologies on pages 15-22. The p-values are reported in *italics* and *parentheses*, and they are adjusted for standard errors clustered by firm. All models include 10 year dummies. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

The implication of these findings is that firms' current deviations from their target leverage may significantly negatively impact only the acquisitions it plans to undertake in the next 2 years. In other words, the present deviation from the target leverage of a firm might be unrelated to its acquisition plans for the next 3 years and beyond. This conclusion is plausible given the fact that firms can make alterations in their leverage ratios from year to year (Harford et al., 2009), hence correcting any severe deviations ahead of acquisitions that have been planned far in advance.

With regards to the conclusions drawn from the empirical analyses in this chapter, it is possible that the finding that overleveraging significantly decreases the probability of undertaking acquisitions within the next 5 years following the reference year are actually driven by those acquisitions made only in the first two years. Given this possibility, the negative overleveraging effects on the acquisition probabilities reported in the empirical sections (Sections 5.4 and 5.5) may be underestimated due to the weak effect of acquisitions during years t+3, t+4, and t+5.

5.6.2 Multiple acquisition effect

Next, we turn attention to examine whether the findings in the empirical sections could be driven by some particular firms that made more than one acquisitions within the 5 years following the reference year. This test is carried out indirectly by running the probit regression only for firms that made single acquisitions (SA) within the 5 years following the reference year. The results of this regression are reported in Column (f) of Table 5.7. The results show that overleveraging has a negative but insignificant effect on the acquisition probability for non-serial acquirers (i.e. single acquirers), suggesting that the earlier conclusion of negative and significant overleveraging effect may be unduly influenced by multiple acquirers.

However, the conclusion in this subsection (i.e. overleveraging has no effect on single acquirers) should be considered with extreme caution given the model's poor performance. The Pseudo R-squared is only 0.4% and the Wald test fails to reject the null hypothesis that the coefficient estimates of the model are all zero. In other words, the explanatory variables are not jointly significant in explaining acquisition decisions.

5.6.3 Sensitivity to target book leverage deviations

Lastly, we examine the sensitivity of the findings to two measures of book leverage. The first proxy is BL 1 which is defined as the ratio of total debt to the sum of total debt and book value of equity. Since book equity can be negative, this measure can be very noisy. In fact, some of the leverage ratios were negative while others exceeded one. In order to keep this leverage measure within the boundaries of zero and one, we follow Kayhan and Titman (2007) by employing tobit regression to estimate the target leverage ratios. The results reported in Column (g) of Table 5.7 suggest that overleveraging has negative but insignificant effect on acquisition probability. However, the effect of underleveraging is negative and significant at 10% level, which is inconsistent with Hypothesis H1b.

Repeating the analysis with another book leverage variable (BL 2), the ratio of total debt to total assets, reveals that both overleveraging and underleveraging do not significantly impact on acquisition probability. These results are reported under Column (h) of Table 5.7. Unlike the target leverage ratios for the results in Column (g), the target leverage ratios for the book leverage results under Column (h) was estimated using OLS regression.

Though the book leverage results cast some doubts on the robustness of the main findings and conclusions of this study which are based on market leverage, it is worth emphasizing that book leverage has some serious limitations that make it less preferable in capital structure research (see Subsection 4.3.1 of Chapter 4 for a detailed discussion of the merits and demerits of market vs. book leverage).

5.7 Conclusions and implications

This chapter contributes to the body of research that links capital structure decisions to investment decisions by showing that deviations from a firm's target leverage ratio, especially positive deviations (overleveraging), decrease the probability of undertaking an acquisition activity in the near future (within the next 5 years). Our results also suggest that, by ignoring the possibility of firms making adjustment to their leverage ratios when they anticipate acquisitions, Uysal's (2011) empirical design underestimates the relationship between leverage deviation and acquisition probability.

We find that the leverage deviation effect is asymmetric on one important front – the method of payment. Specifically, overleveraging decreases the acquisition probability only for those acquisitions financed from internal cash reserves and/or external debt capital (i.e. cash/debt financed acquisitions). Overleveraging has no effect on the probability of undertaking equity-financed acquisitions. These findings collectively suggest that overleveraging reduces both corporate internal cash flow (Stulz, 1990) and unused debt capacity which, in turn, diminishes a firm's ability to make attractive competitive bids in takeover contests (Morellec and Zhdanov, 2008; Uysal, 2011). These financing constraints tend to constrain corporate acquisitions.

Finally, if internal financing and external financing constraints may be the driving forces influencing the link between leverage deviation and M&A activities, then corporate diversification and the diversification characteristics of an acquisition could moderate or accentuate the strength of association between leverage deviations and M&A activities. Accordingly, the next chapter focuses on the role of diversification within the context of the leverage deviation effect. Prior to undertaking this analysis in the next chapter, we point out the main implications of the chapter's findings on the theories of capital structure and M&As.

An important implication of the results on the capital structure theory is ***the relevance of the target leverage ratio (and the trade-off theory) to managerial decisions.*** The pecking order theory disputes the existence and/or relevance of the target leverage ratio and suggests that the financing choices of managers is *purely* a matter of preference of one financing source (debt) to another (equity) (see e.g. Myers, 2001). However, by these results, it seems plausible to expect a manager of a firm who has preference for external debt capital to choose external equity capital (instead of debt) if using debt capital would make the firm exceed its target leverage ratio (i.e. overleveraged). This is particularly so when the firm expects to undertake acquisitions in the near future, in order that its planned acquisitions are not constrained. In brief, our key results imply that the trade-off theory (via the current/past deviations from corporate target leverage ratio) offers one potential reason why firms may not always follow the standard pecking order of internal funds, external debt, and external equity. When a firm is almost overleveraged and expects to undertake acquisitions, its managers may not follow the standard pecking order in their financing choices.

In addition, the chapter’s key results add to our understanding of the theories of M&As. It seems firms are more (less) likely to undertake M&As when they are close to (far away from) their target leverage ratios. In general, our findings seem to provide evidence in support of the inefficient management hypothesis/theory, but against the unused debt capacity hypothesis/theory of M&As reviewed in Chapter 2. This is because while we fail to find support for the view that extremely underleveraged firms (i.e. those with more unused debt capacity) are more likely to undertake M&As, we find that moderately under/overleveraged firms (i.e. those close to their target leverage ratios) are frequent acquirers. Since the trade-off theory implies that managers of firms that are close to (far away from) their target leverage ratios are efficient (inefficient), we view our findings to be more related to the inefficiency management theory of M&As. In other words, firms that manage their capital structures efficiently/optimally tend to be successful in their acquisition attempts, and hence are more likely to become acquirers.

Chapter 6

Leverage Deviation, M&As and Corporate Diversification

6.1 Introduction

The main finding of the previous chapter is that extreme positive deviation from a firm's target leverage ratio (i.e. overleveraging) is negatively related to the probability of undertaking cash/debt-financed M&As. It was argued in the previous chapters (i.e. Chapters 3-5) that extremely overleveraged firms are likely to find it difficult to raise new debt capital to finance their planned M&A activities because lenders consider them to be too risky (Jensen and Meckling, 1976). However, before making lending decisions, lenders consider the credit risks of borrowers and how their proposed investments alter those risks (Llewellen, 1971). Since corporate diversification may reduce corporate risk as well as enhance the borrowing abilities of firms (Llewellen, 1971), we investigate whether corporate diversification could ease the debt financing constraints faced by overleveraged acquirers.

Specifically, the present chapter examines how corporate diversification may lead to variations in the leverage deviation effect on the probability of undertaking M&A activities. In this regard, we consider corporate diversification from two broad perspectives: (1) the acquiring firm's existing (pre-merger) level of diversification; and (2) the merged firm's level of diversification after the M&A transaction. More specifically, the chapter's empirical analysis extends the existing literature on the link between M&As and leverage deviation by investigating the following three issues:

(a) Is the leverage deviation effect related to *industrial diversification* (i.e. acquirers' choice to pursue either diversifying M&As or related M&As)?
(b) Is the leverage deviation effect related to *geographic diversification* (i.e. acquirers' choice to pursue either domestic M&As or cross-border M&As)? and
(c) Is the leverage deviation effect related to the acquirer's pre-merger *organisational form* (i.e. acquirers' level of diversification prior to the acquisition)?

The key contributions of this chapter are directly related to the answering of the above-stated questions. Broadly speaking, the analyses contained in the present chapter make a contribution to the existing knowledge in this area by being the first study to suggest a clear asymmetry in the leverage deviation effect for focused acquiring firms and for diversified acquiring firms. Furthermore, the chapter contributes to the existing literature by highlighting that the leverage deviation effect may be unequal for acquiring firms pursuing targets in their own industries and those pursuing targets in other industries. Similarly, the chapter shows that the leverage deviation effect may again be unequal for acquiring firms pursuing targets in their home countries and those pursuing targets in foreign countries.

The rest of the chapter is organised as follows. Section 6.2 briefly reviews the relevant literature and derives the various hypotheses therefrom. Section 6.3 empirically examines the connections between the leverage deviation effect and industrial diversification; while Section 6.4 explores that of geographic diversification. Section 6.5 considers how the leverage deviation effect may vary between diversified and focused acquiring firms. Section 6.6 concludes the chapter and also draws attention to the implications of the main findings on the theory of capital structure and the theory of M&As.

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6.2 Related literature and Hypotheses development

This section builds on prior literature to formulate three hypotheses (Hypotheses H4, H5, and H6) for testing in the subsequent sections.

6.2.1 Hypothesis H4 (Leverage deviation and industrial diversification)

As pointed out above, the negative association between leverage deviation (overleveraging) and the acquisition probability may be influenced by corporate diversification because lenders tend to consider the default risk of borrowers before making their lending decisions (Lewellen, 1971). Within this context, since some M&As carry greater risk-reduction potential than others (see Llewellen, 1971), the leverage deviation effect is likely to be asymmetric between risk-reducing M&A deals and risk-increasing M&A deals.

The co-insurance effect of M&As (discussed in Chapter 2) suggests that a merger between firms that have imperfectly correlated cash flows is associated with the benefits of reduced default risk and increased borrowing capacity (Lewellen, 1971; Higgins and Schall, 1975; Ghosh and Jain, 2000). In fact, Walker (1994) and Renneboog and Szilagyi (2006) report significantly positive abnormal returns for bondholders of acquiring firms in risk-reducing M&As. For instance, Walker (1994) shows that bondholders of risky acquiring firms tend to gain from the risk reduction resulting from M&A activities. Based on a limited sample of 65 US M&As announced between 1980 and 1988, he documents that low quality bonds (rated BBB or below) earn positive abnormal returns following the announcements of M&As. In his multivariate regression analysis of bondholders' wealth changes on the type (risk level) of bonds, he reports strong evidence that bondholders of junk-grade (risky) acquiring firms earn higher abnormal returns, relative to those of investment-grade (less risky) acquiring firms. This implies that bondholders of risky firms (perhaps overleveraged firms) tend to benefit more from the M&A-related risk reduction (Shastri, 1990).

It is interesting to note that acquiring firms do not need to wait until the consummation of the merger deals before realising the co-insurance benefits, since investors do anticipate this co-insurance effect and react accordingly at the announcements of corporate takeovers (see Bruner, 1988; Ghosh and Jain, 2000). Therefore, if lenders could anticipate the co-insurance effect on acquirers'default risk and debt capacity, then it is possible for the *ex-ante* debt financing constraint faced by some overleveraged firms to be lessened, if not completely removed. This is likely to be the case when overleveraged firms propose to undertake M&As that have the tendency to reduce corporate risks and improve their debt capacities. In other words, lenders may be more willing to lend to overleveraged bidders that pursue M&As which could improve acquirers'credit worthiness.

It was also mentioned in our discussions in Chapter 2 that, the co-insurance effect and its associated risk-reduction and debt capacity improvements vary according to the extent of correlation between the cash flows of the merging firms (i.e. acquiring and target firms). To be more specific, the co-insurance effect is stronger in diversifying (cross-industry) acquisitions than in non-diversifying (within-industry or related) acquisitions (Lewellen, 1971). This implies that risk-reduction and the ease on debt financing constraints would be greater in diversifying M&A deals than in related M&A deals. Renneboog and Szilagyi (2006) confirm this conjecture by showing that bondholders greet the announcement of diversifying acquisitions more positively than the announcement of non-diversifying deals. Thus, if bankruptcy risk and debt capacity considerations contribute to the debt financing constraints faced by overleveraged firms, then the negative relation between overleveraging and the acquisition probability should be relatively less severe in diversifying acquisitions compared to related acquisitions.

Similar conclusions can be drawn on grounds of the agency theory of M&As. Shleifer and Vishney (1989) suggest that managers do selectively acquire firms that enhance the dependence of the combined firm on their own knowledge and skills even if such takeovers are value-reducing. Since related (within-industry) acquisitions allow "specialist" managers to increase the amount of assets under their control, related acquisitions seem to be a more convenient vehicle (compared to diversifying acquisitions) for these managers to connect the future prospects of the merged firm to the continual dependence on their "specialist" skills and knowledge. As a result, investors may perceive related acquisitions by overleveraged firms to be agency-motivated, and therefore may be less willing to provide funds to support such deals. This should lead to the leverage deviation (overleveraging) effect being stronger (weaker) in related (diversifying) M&A deals. It is however possible for diversifying acquisitions to be also perceived to be more agency-motivated than related acquisitions since managers may use diversifying acquisitions to diversify their own "employment" risk (Amihud and Lev, 1981).

Overall, the corporate risk argument suggests that diversifying acquisitions (relative to related acquisitions) may mitigate the impact of leverage deviation on the acquisition probability. The predictions based on the agency literature are, however, mixed and could thus neutralise each other. Consequently, we formulate Hypothesis H4:

> ***H4:*** *The association between leverage deviation (overleveraging) and the probability of undertaking acquisitions is less pronounced in diversifying M&A deals than in related M&A deals.*

6.2.2 Hypothesis H5 (Leverage deviation and geographic diversification)

We now turn our attention to the issue of how the *nationality* of the target firm (rather than the *industry* of the target firm) may influence the association between leverage deviation and the acquisition probability. In other words, we explore the significance of *geographic* diversification via acquisitions within the context of the leverage deviation effect.

There are two main reasons that could explain why the leverage deviation effect may be different for bidders undertaking domestic acquisitions and those undertaking cross-border (foreign) acquisitions. The first is related to the implications of the acquisition on the risk of the acquiring firms (see Hughes, Logue, and Sweeney, 1975; Lee and Kwok, 1988; Bartov et al., 1996), and the second is related to agency costs (see Mittoo and Zhang, 2008; Aw and Chatterjee, 2004; Morck et al., 1990).

The literature relating corporate risks and/or leverage to international (geographic) diversification is mixed. One strand of the literature suggests that due to the co-insurance effect, the cash flows of geographically diversified firms are less volatile, which, in turn, makes these firms less risky and increase their debt capacities (see Hughes, Logue, and Sweeney, 1975; Reeb, Mansi, and Allee, 2001). To these scholars, risks (borrowing ability) are typically lower (higher) for multinational corporations (MNCs) in comparison to domestic corporations (DCs). From this perspective, it might be expected that overleveraged cross-border acquirers (in relation to overleveraged domestic acquirers) may face lower debt financing constraints because their acquisitions could diversify their cash flows internationally and make them less risky.

However, other studies argue that geographic diversification may increase corporate risk (see Lee and Kwok, 1988; Bartov et al., 1996; Mittoo and Zhang, 2008). It is suggested that geographic diversification exposes firms to additional risks (e.g. foreign exchange rate risks and political risks) and other complexities (e.g. accounting reporting requirements) (see Lee and Kwok, 1988; Bartov et al., 1996; Mittoo and Zhang, 2008). These scholars conclude that these factors tend to make firms with exposures to foreign markets more risky and less attractive to lenders. Therefore, if investors incorporate the risk implications of the proposed

M&A into their lending decisions, then the link between debt financing constraint and the acquisition probability (i.e. the overleverage effect) may be more severe for overleveraged cross-border acquirers than for overleveraged domestic acquirers.

In addition, the agency theory suggests some reasons why the leverage deviation effect may be asymmetric for cross-border acquirers and domestic acquirers. As noted in Chapter 3, the higher the agency costs, the lower is the borrowing ability of the firm because bondholders will have to devote more resources to monitor the firm (Jensen and Meckling, 1976). It is argued that geographically diversified firms have higher agency costs than domestic corporations (DCs). For instance, Lee and Kwok (1988) and Mittoo and Zhang (2008) argue that multinational corporations (MNCs) tend to have higher agency cost of debt than DCs because geographic diversification makes it more difficult for lenders to gather information and monitor the foreign operations of MNCs. Also, Burgman (1996) posits that differences in language and legal systems across countries could lead to higher monitoring costs for lenders of MNCs. These arguments suggest that the higher agency cost of debt associated with foreign operations could worsen the debt financing constraints faced by overleveraged cross-border acquirers. On the contrary, overleveraged domestic acquirers may have lower monitoring and agency cost of debt, and could therefore face lesser debt financing constraints.

Another agency-related reason why overleveraged acquirers in domestic and cross-border acquisitions may face different degrees of debt financing constraints is that managers in cross-border acquisitions may be perceived to be more self-interested than those in domestic M&A deals. As the review in Chapter 2 suggests, whilst shareholders of bidders in cross-border acquisitions make losses (relative to those of domestic acquisitions) (see e.g. Aw and Chatterjee, 2004; Moeller and Schlingemann, 2005), managers of bidding firms tend to gain more in cross-border acquisitions than in domestic acquisitions (see e.g. Ozkan, 2012). The implication is that investors may perceive managers of overleveraged firms undertaking cross-border acquisitions to be agency-motivated, and thus, may be less willing to finance such acquisitions. This could lead to greater debt financing constraints for overleveraged cross-border acquirers than for overleveraged domestic acquirers.

Overall, the discussions based on corporate risks are mixed and could neutralise each other. However, the discussions based on the agency literature seem to suggest that costs of geographic diversification weights its benefits. Thus, the negative leverage deviation effect is expected to be stronger for cross-border acquirers than for domestic acquirers.

Accordingly, we propose the following hypothesis:

> ***H5:*** *The association between leverage deviation (overleverage) and the probability of undertaking acquisitions is more pronounced in cross-border acquisitions than in domestic acquisitions.*

6.2.3 Hypothesis H6 (Leverage deviation and organisational form)

Unlike the first two hypotheses (Hypotheses H4 and H5) formulated above, the final hypothesis considers the relation between diversification and the leverage deviation effect by focusing on the diversification characteristic of the *acquiring firm*, rather than on the diversification characteristic of the *proposed M&A transaction*. Specifically, Hypothesis H6 relates the pre-acquisition organisational form of the acquiring firm (i.e. whether acquirer is a diversified or a focused firm) to the association between leverage deviation and the acquisition probability. In fact, lenders determine different lending policies towards firms with different forms of organisational structure (Singhal and Zhu, 2011). We use the term organisational form to refer to the degree to which the acquiring firm is diversified in the pre-acquisition years.[56]

Again, we extract from the agency costs literature to explore the reasons why the link between leverage deviation and corporate M&A activities may differ between diversified acquirers and focused firms. Prior to that, it is interesting to note that the corporate diversification literature may, on the surface, seem to suggest that diversified firms may face lower debt financing constraints. First, the co-insurance effect predicts lower bankruptcy risks and higher debt capacity for diversified firms, compared to focused firms, because the

[56] It should be noted, however, that the literature on organizational structure is extensive and various other ways to measure organizational structure have been suggested (e.g. Jacquemin and Berry, 1979; Martin and Sayrak, 2003). However, given the time and space constraint, and the focus of this study, we will only concentrate on one aspect of organizational form, namely, the level of corporate diversification.

cash flows from the different segments of diversified firms help them to smooth their earnings (see Lewellen, 1971; Bhide, 1990; Anderson, Bates, Bizjak, and Lemmon, 2000; Singhal and Zhu, 2011). It is however conceivable to expect the advantage enjoyed by diversified firms (over focused firms) in terms of lower borrowing costs to elude overleveraged firms, since overleveraged firms, by definition, have no “unused debt capacity”. Thus, there may not be any significant difference between overleveraged diversified acquirers and overleveraged focused acquirers in respect of the debt financing constraint associated with their M&A activities.

Second, similar conclusion can be reached from the perspective of the financing flexibility that internal capital markets offer to managers of diversified firms (see Stein, 1997; Matsusaka and Nanda, 2002). Matsusaka and Nanda (2002) argue that diversification provides the means by which diversified firms can avoid having to raise costly external finance (debt and equity). This is because diversified firms tend to have several business segments operating under one “umbrella” where corporate headquarters have the flexibility to shift resources across segments (Stein, 1997). Thus, in firms with diversified organisational structures, investment projects of one segment could be financed from the excess cash flow from other business segments, without the need to resort to external funds (e.g. borrowing). Again, since high debt usage forces firms to disgorge cash via interest payments and loan repayments (Jensen, 1986), it is plausible to expect overleveraged diversified firms to lose their advantage of large pool of internal cash flow. Therefore, we may not expect any significant difference between the debt financing constraint faced by overleveraged diversified acquirers and overleveraged focused firms.

However, a clear hypothesis could be formulated on grounds of agency costs which emphasise the costs of diversification. As already noted, diversified firms (other than the overleveraged ones) are generally able to access both external (debt) and internal capital (cash flow from other segments) relatively more cheaply than is possible for focused firms. This increased pool of capital is not always invested efficiently, especially when growth opportunities are limited, thus, making diversified firms more likely to face greater debt financing constraint (Rajan, Servaes, and Zingales, 2000; Matsusaka and Nanda, 2002; Berger and Ofek, 1995; Ahn et al., 2006).

There are at least two important reasons why diversified firms are likely to face higher agency costs. First, Matsusaka and Nanda (2002) suggest that the high levels of internal funds available to managers of diversified firms tend to insulate them against the constraint and monitoring of external lenders (e.g. banks). This absence of monitoring, according to the authors, leads to overinvestment since managers are incentivised to grow the size of the firm and benefit themselves from running larger organisations (see Amihud and Lev, 1981; Jensen, 1986; Shleifer and Vishney, 1989; Stulz, 1990).

Second, the size differences between diversified firms and focused firms could suggest differences in the agency costs faced by these two types of firms. Specifically, diversified firms tend to be significantly larger than focused firms (see Berger and Ofek, 1995; Singhal and Zhu, 2011) and could thus be argued to be more prone to making agency-motivated acquisitions. In fact, Moeller et al. (2004) link the size of the acquiring firm to the quality of acquisitions made by firms' managers. They show that managers of large firms, on average, engage in acquisitions which result in significant losses to their shareholders, while the acquisitions by managers of small firms generally result in significant gains to their shareholders. To the extent that diversification proxies for firm size, managers of diversified (large) firms may be more likely to be perceived by investors as agency-motivated when they propose to undertake acquisitions.

Taken together, the agency-related views suggest that diversified firms are more susceptible to overinvestment and investment inefficiency. Such a view or perception (when held by providers of capital) could prove costly for diversified firms that may need to access external capital markets to finance their planned investments. Therefore, from the agency viewpoint, the debt financing constraint is expected to be more severe for overleveraged diversified firms than for overleveraged focused firms. Accordingly, the following hypothesis is formulated for testing:

> ***H6:*** *The leverage deviation effect is more pronounced for diversified acquirers than for focused acquirers.*

Having derived the relevant hypotheses, the next three sections, in turns, are devoted to the empirical testing of the hypotheses. It is important to point out that the empirical analysis in this chapter follows the same approach that was utilised in the previous chapter. Therefore, we do not repeat the description of the empirical procedures here. Specifically, we utilise the ratio of acquirers and the acquisition probability models described in Subsections 5.3.2 and 5.4.2, respectively. However, any modifications to the empirical design will be specifically mentioned in the relevant sections.

6.3 The empirical tests of the leverage deviation effect and industrial diversification (Hypothesis H4)

This section empirically examines the role of industrial diversification in moderating or accentuating the effect of leverage deviation on the acquisition probability. In other words, it examines whether the leverage deviation effect differs between acquirers along *the lines of the similarities (or differences) between the industries of the acquirers and their targets*. In this regard, we distinguish between diversifying acquisitions and related acquisitions. Diversifying (related) acquisitions are defined as those M&A deals involving acquirers and target firms that operate in different (the same) industries. These classifications are based on the 2-digit SIC codes reported by Thomson ONE.

As was done in the previous chapter, the hypotheses of this chapter are tested using both univariate and multivariate analyses. The univariate procedures are two-sample proportion tests which test for significant differences between the ratios of acquirers found in different subsamples. The multivariate tests are based on probit regressions.

6.3.1 The univariate tests

Within the univariate framework (based on the two-sample proportion test), we test Hypothesis H4 by calculating the ratio of acquirers (as was done in Chapter 5) for subsamples of diversifying acquirers and related acquirers. Diversifying acquirers are defined to include those firms in the base sample that made at least one diversifying acquisition in the

5 years following the reference year. Diversifying acquisition refers to buying a target firm from outside acquiring firm's industry as defined by the 2-digit SIC code.[57] Thus, in diversifying acquisitions, acquiring and target firms do not have the same 2-digit SIC code. In contrast, related acquirers include firms in the base sample that made at least one related acquisition in the 5 years following the reference year. A related acquisition must involve M&A deals in which acquiring and target firms have the same 2-digit SIC code.[58]

It is important to highlight that some firm-year observations drop out from the final sample used in Chapter 5 (i.e. 11,117 observations). This is due to missing data in respect of the SIC codes for some acquirers and target firms and also missing segmental data needed in calculating two additional variables – the diversification index and the foreign sales ratio – included in the probit regressions. These two explanatory variables will later be discussed in Subsections 6.3.2 and 6.4.2. Specifically, the inclusion of the diversification index in the empirical analysis in Section 6.3 leads to about 1,252 firm-year observations dropping out of the final sample that was used in the empirical analyses in Chapter 5 (11,117 observations vs. 9,865 observations). Similarly, in Section 6.4, we lose 869 firm-year observations mainly due to missing segmental data required for the computation of the foreign sales ratio (11,117 vs. 10,248).

The ratios of acquirers (proxy for acquisition rates) for diversifying and related M&A deals are respectively reported in Columns (a) and (b) of Table 6.1. The rates of diversifying acquisitions and related acquisitions are quite similar for our sample firms (25.1% vs. 24.2%, see Table 6.1). As was done in Chapter 5, the ratios of acquirers are computed across the four main subsamples grouped according to the extent of leverage deviation. Also, to conserve space, we discuss the results only in terms of moderately overleveraged (Q3) firms and extremely overleveraged (Q4) firms.

[57] The results reported in this section remain qualitatively unchanged when classification of M&As into diversifying and related is conducted based on the 4-digit SIC codes of acquiring and target firms. The results tend to be even more supportive of Hypothesis H4a when the 4-digit SIC codes are used to classify M&As into diversifying and related. These results are available upon request.
[58] There was no conscious effort made to ascertain whether some sample firms made both diversifying and related acquisitions in the same year. If there are such firms, it is conceivable that they will appear in both the subsamples of diversifying and related acquisitions.

Table 6.1 shows that acquisition rates are significantly lower among extremely overleveraged firms in both diversifying and related acquisitions. However, the acquisition rate for overleveraged acquirers in diversifying acquisitions (5.3%) is higher than that of related acquisitions (4.8%). This is consistent with hypothesis H4, since overleveraging appears to constrain related acquisitions more than diversifying acquisitions.

Among diversifying acquisitions, the rates of acquisition are relatively similar for moderately overleveraged and extremely overleveraged firms (i.e. 6.7% and 5.3%). The difference between these two rates is only 1.4%. However, when we consider related acquisitions, we find a relatively wider gap between the acquisition rates of extremely overleveraged firms and the other subsamples. For instance, the difference in acquisition rates between extremely overleveraged and moderately overleveraged firms in related acquisitions 1.8%. Overall, the overleveraging effect appears to be more pronounced in related acquisitions than in diversifying acquisitions.

Table 6.1

The proportion of diversifying and related acquirers across the main subsamples

The statistical differences between the ratios for the subsamples are tested using the two-sample proportion tests. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

No.	Sample/subsamples	(a) Diversifying	(b) Related
1	Ratio of acquirers	0.251	0.242
2	Ratio of extremely underleveraged acquirers (Q1)	0.063	0.060
3	Ratio of moderately underleveraged acquirers (Q2)	0.067	0.067
4	Ratio of moderately overleveraged acquirers (Q3)	0.067	0.067
5	Ratio of extremely overleveraged acquirers (Q4)	0.053	0.048
6	Difference (2 - 5)	0.010[a]	0.012[a]
7	Difference (3 - 5)	0.014[a]	0.019[a]
8	Difference (4 - 5)	0.014[a]	0.018[a]

6.3.2 The multivariate tests

Table 6.2 presents the results for the multivariate logit regression based on the acquisition probability models in Eqs. (5.1) and (5.2). We however make two modifications. Firstly, the dependent variable takes a value of 1 if a firm is classified as a diversified acquirer (or related acquirer in the case of the related acquisition model), and 0 otherwise. Secondly, in addition to the other control variables in the original models, we include the pre-acquisition Herfindahl diversification index of the acquirer to account for the effect of firms' existing diversification strategies. Since firms may use acquisitions to enhance their existing corporate strategies, we expect that diversified (focused) firms are more likely to undertake diversifying (related) acquisitions. Intuitively, a firm pursuing a diversification (specialised) strategy is likely to undertake a diversifying (related) acquisition because it may already have the organisational set-up to effectively run the combined firm created post-acquisition.

Columns (a) and (b) of Table 6.2 present the results for the diversifying acquisition model, while the results for the related acquisition model are contained in Columns (c) and (d) of the same table. The results suggest that the impact of leverage deviation (and extreme overleveraging) is larger for related acquisitions than for diversifying acquisitions. Specifically, we find the negative association between leverage deviation and the probability of making a related acquisition to be significant at 1% significance level (the coefficient is -16.8%). In comparison, the association between leverage deviation and the probability of undertaking diversifying acquisitions is smaller (-5.2%) and statistically insignificant (p-value of 0.215).

Similarly, the analyses based on the indicator variable for extreme overleveraging, which is defined as a dummy of 1 for all firms with large positive leverage deviations (Q4 firms) and 0 otherwise, confirm the conclusion that overleveraging reduces the probability of undertaking a related acquisition (-5.6%, significant at 1% level) more than the probability of undertaking a diversifying acquisition (-2.3%, significant at 10% level). This supports Hypothesis H4. One possible explanation for these findings is that lenders view diversifying (related) acquisitions as carrying greater (little or no) potential to reduce the risk of overleveraged acquirers (Lewellen, 1971). Consequently, lenders are more willing (reluctant) to supply funds for diversifying (related) acquisitions. Also, due to the finding that related acquisitions tend to be large (see Table 4.3 in Chapter 4), it is possible that investors perceive related acquisitions by overleveraged firms to be agency-motivated and are therefore reluctant to finance them. These results are also economically significant because they suggest that an overleveraged firm attempting to undertake an acquisition is likely to be more successful in its attempts to secure funds from investors if it chooses to pursue a diversifying rather than a related acquisition.

6.3.3 Control variables

Results for the control variables are generally similar across the two models predicting diversifying and related acquisitions. Few interesting differences are highlighted. First, the coefficient on industry M&A liquidity is positive and significant in the diversifying acquisition model, but statistically insignificant in the related acquisition model. This suggests that when a particular industry experiences M&A waves, its firms often buy targets from outside the industry. Second, firms in concentrated industries seem to make significantly less (more) diversifying (related) acquisitions, suggesting that when competition is limited in an industry, firms use M&As to further reduce competition by buying out other competitors. Last, the diversification index (i.e. product Herfindahl index) is positively (negatively) and significantly related to the probability of undertaking diversifying (related) acquisitions, indicating that firms that are more diversified are more (less) likely to make diversifying (related) acquisitions.

Table 6.2

Leverage deviation and the probability of undertaking diversifying vs. related acquisitions

Variables	(a)	(b)	(c)	(d)
	Diversifying M&As		Related M&As	
Leverage deviation	**-0.052**	..	**-0.168**[a]	..
	(0.215)	..	*(0.000)*	..
Overleverage effect (Q4)	..	**-0.023**[c]	..	**-0.056**[a]
	..	*(0.075)*	..	*(0.000)*
Underleverage effect (Q1)	..	**-0.001**	..	**-0.011**
	..	*(0.962)*	..	*(0.394)*
Long-term leverage	-0.184[a]	-0.170[a]	-0.203[a]	-0.177[a]
	(0.001)	*(0.003)*	*(0.001)*	*(0.004)*
Growth opportunities	0.017[a]	0.017[a]	0.019[a]	0.018[a]
	(0.001)	*(0.001)*	*(0.001)*	*(0.001)*
Firm size	0.048[a]	0.048[a]	0.055[a]	0.055[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
Profitability	0.001	-0.001	0.039	0.036
	(0.981)	*(0.973)*	*(0.227)*	*(0.266)*
Stock return	0.567[a]	0.560[a]	0.857[a]	0.885[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
Cash ratio	0.068	0.066	0.065	0.062
	(0.239)	*(0.254)*	*(0.241)*	*(0.263)*
Industry M&A liquidity	0.163[a]	0.164[a]	0.088	0.088
	(0.008)	*(0.008)*	*(0.173)*	*(0.176)*
Industry concentration	-0.389[a]	-0.389[a]	0.356[a]	0.355[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
Diversification index	0.204[a]	0.204[a]	-0.079[b]	-0.078[b]
	(0.000)	*(0.000)*	*(0.033)*	*(0.034)*
No. of Observations	**9,865**	**9,865**	**9,865**	**9,865**
Wald Chi-squared	**242.43**	**243.090**	**271.46**	**275.76**

P-value>Chi-squared	**0.000**	**0.000**	**0.000**	**0.000**
Pseudo R-squared	**0.071**	**0.071**	**0.056**	**0.057**

This table presents results from probit regressions with the dependent variable taking a value of one if the firm undertakes a diversifying acquisition (or related acquisition) within the acquisition observation period. The reported coefficient estimates are average marginal effects. Variable definitions are in the list of definitions of key variables and terminologies on pages 15-22. The p-values are reported in *italics* and *parentheses* and are adjusted for standard errors clustered by firm. All models include 10 year dummies. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

6.4 The empirical tests of the leverage deviation effect and geographic diversification (Hypothesis H5)

As we saw in the empirical analyses in section 6.3 above, acquirers may be able to reduce the debt financing constraints faced by overleveraged firms by choosing target firms that operate outside their (the acquirers') industries. Put differently, *industrial* diversification seems to enhance the chances of an overleveraged firm undertaking an acquisition. This section conducts a similar empirical analysis, but it focuses on *geographic* (international) diversification. To be more specific, the section empirically tests Hypothesis H5, which explore whether the link between overleveraging and the acquisition probability varies between acquirers undertaking domestic acquisitions and those undertaking cross-border acquisitions. The univariate and multivariate tests of Hypothesis H5 are respectively presented below.

6.4.1 The univariate tests

We compare the ratios of acquirers (acquisition rates) for the (sub) samples of domestic and cross-border acquirers. Domestic (cross-border) acquirers are defined to include those firms in the base sample that made at least a single domestic (cross-border) acquisition during the acquisition observation period (i.e. 5 years after the reference year). Acquisitions are classified as domestic if the acquirer and the target firm are listed on Thomson ONE to be UK firms. We classify all other deals with non-UK target firms to be cross-border acquisitions.[59]

The results for the univariate analyses are reported under Columns (a) and (b) of Table 6.3. Firms in our sample appear to undertake more domestic acquisitions (38.4%) than cross-border acquisitions (25.9%). With regards to the link between leverage deviation and acquisition probability, the first observation is that overleveraged firms have the lowest acquisition rates across both domestic and cross-border deals. There is however a greater overleverage effect in cross-border deals which are likely to be risk-increasing (Bartov et al., 1996) and prone to agency problems (Ozkan, 2012). In cross-border M&As, while moderately overleveraged firms have acquisition rate of 7.7%, acquisition rate is only 4.7%

[59] There was no conscious effort made to ascertain whether some sample firms made *both* domestic and cross-border acquisitions in the same year. If there are such firms, it is conceivable that they will appear in both the subsamples of domestic and cross-border acquisitions.

for extremely overleveraged firms. The difference of 3.0% is significant at 1% levels. However, the acquisition rates are closer for moderately overleveraged (9.9%) and extremely overleveraged acquirers (8.4%) in domestic deals which tend to face relatively less risks and agency costs. A direct comparison of the acquisition rates for overleveraged firms between domestic and cross-border acquirers present a much clearer picture (8.4% for domestic acquirers and 4.7% for cross-border acquirers). These findings are supportive of Hypothesis H5, and imply that the leverage deviation (overleverage) effect is weaker in less risky M&A deals that carry lower agency costs.

Table 6.3

The proportion of domestic and cross-border acquirers across the main subsamples

The statistical differences between the ratios for the subsamples are tested using the two-sample proportion tests. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

		(a)	(b)
No.	**Sample/subsamples**	**Domestic**	**Cross-border**
1	Ratio of acquirers	0.384	0.259
2	Ratio of extremely underleveraged acquirers (Q1)	0.100	0.059
3	Ratio of moderately underleveraged acquirers (Q2)	0.101	0.075
4	Ratio of moderately overleveraged acquirers (Q3)	0.099	0.077
5	Ratio of extremely overleveraged acquirers (Q4)	0.084	0.047
6	Difference (2 - 5)	0.015[a]	0.012[a]
7	Difference (3 - 5)	0.017[a]	0.028[a]
8	Difference (4 - 5)	0.015[a]	0.030[a]

6.4.2 The multivariate tests

Based on modified versions of Eqs. (5.1) and (5.2), we estimate the two acquisition probability models: (1) the probability of undertaking a domestic acquisition; and (2) the probability of undertaking a cross-border acquisition. In the first (second) model, the dependent variable is an indicator variable that takes the value 1 if the acquirer is classified as domestic (cross-border) and 0 otherwise. We also include the foreign sales ratio in the two models to proxy for a firm's experience in foreign markets. If experience in foreign markets plays a role in a firm's decision to engage in international business, then we expect firms lacking foreign market experience to be less (more) likely to undertake cross-border (domestic) acquisitions. Thus, we expect firms with high (low) foreign presence to be more likely to pursue cross-border (domestic) acquisitions.

The findings of these models are reported in Columns (a), (b), (c), and (d) of Table 6.4. The results are mixed. Comparing results in Columns (a) and (c) show that leverage deviations constrain domestic acquisitions more than cross-border acquisitions. In particular, the coefficient on the leverage deviation variable is -13.9% (p-value of 0.001) in the domestic acquisition model, but it is only -3.9% and insignificant (p-value of 0.334) in the cross-border model. This is inconsistent with Hypothesis H5 but seems to rather follow the view that because cross-border M&As offer acquirers the opportunity to geographically diversify their cash flows, lenders tend to perceive cross-border acquirers to be less risky compared to domestic acquirers. Thus, cross-border acquirers face less financing constraints than domestic acquirers.

Table 6.4

Leverage deviation and the probability of undertaking domestic vs. cross-border acquisitions

Variables	**(a)**	**(b)**	**(c)**	**(d)**
	Domestic M&As		**Cross-border M&As**	
Leverage deviation	**-0.139**[a]	..	**-0.039**	..
	(0.001)	..	*(0.334)*	..
Overleverage effect (Q4)	..	**-0.023**[c]	..	**-0.045**[a]
	..	*(0.070)*	..	*(0.000)*
Underleverage effect (Q1)	..	**0.005**	..	**-0.028**[a]
	..	*(0.722)*	..	*(0.010)*
Long-term leverage	-0.162[a]	-0.159[a]	-0.282[a]	-0.248[a]
	(0.005)	*(0.007)*	*(0.000)*	*(0.000)*
Growth opportunities	0.008[c]	0.008	0.016[a]	0.016[a]
	(0.102)	*(0.109)*	*(0.000)*	*(0.000)*
Firm size	0.038[a]	0.038[a]	0.053[a]	0.053[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
Profitability	0.041	0.042	0.047	0.042
	(0.173)	*(0.163)*	*(0.127)*	*(0.172)*
Stock return	0.593[a]	0.633[a]	0.676[a]	0.673[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
Cash ratio	0.058	0.059	0.169[a]	0.163[a]
	(0.306)	*(0.298)*	*(0.002)*	*(0.003)*
Industry M&A liquidity	0.211[a]	0.210[a]	0.124[b]	0.124[b]
	(0.001)	*(0.001)*	*(0.024)*	*(0.024)*
Industry concentration	-0.368[a]	-0.369[a]	0.211[b]	0.209[b]
	(0.000)	*(0.000)*	*(0.019)*	*(0.021)*
Foreign sales ratio	-0.261[a]	-0.260[a]	0.416[a]	0.415[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
No. of firm-year obs.	**10,248**	**10,248**	**10,248**	**10,248**
Wald Chi-squared	**203.44**	**197.82**	**479.64**	**493.07**

P>Chi-squared	**0.000**	**0.000**	**0.000**	**0.000**
Pseudo R-squared	**0.043**	**0.043**	**0.167**	**0.168**

This table presents results from probit regressions with the dependent variable taking a value of one if the firm undertakes a domestic acquisition (or cross-border acquisition) within the acquisition observation period. The reported coefficient estimates are average marginal effects. Variable definitions are in the list of definitions of key variables and terminologies on pages 15-22. The p-values are reported in *italics* and *parentheses* and are adjusted for standard errors clustered by firm. All models include 10 year dummies. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

However, a different conclusion is reached when the leverage deviation effect is separated into extreme overleverage and extreme underleverage effect (see Columns (b) and (d)). For instance, in Column (b), extreme overleveraging reduces the probability of making domestic acquisitions by 2.3% (significant at 10% levels) but has a much bigger effect (4.5%, significant at 1% levels) in cross-border acquisitions (see Column (d)). These results are supportive of Hypothesis H5 and the univariate analyses. These findings suggest that the additional risks such as foreign exchange and political risks (Bartov et al., 1996) and the increased agency cost of monitoring (Mittoo and Zhang, 2008) associated with foreign business make cross-border acquisitions potentially more risky than domestic deals. Therefore, overleveraged acquirers seem to face more financing constraint when they engage in cross-border acquisitions than when they pursue domestic acquisitions.

It is quite puzzling for the leverage deviation effect (shown in Columns (a) and (c)) and the overleveraging effect (in Columns (b) and (d)) to reach different conclusions on the issue of geographic diversification. However, it is possible for leverage deviation to produce a greater effect for domestic acquisitions if domestic acquirers, on average, deviate *more* from their leverage targets than the average deviations observed for cross-border acquirers. However, the overleverage effect captures the leverage deviation of the extreme deviants (i.e. extremely overleveraged firms and extremely underleveraged firms) relative to other firms (i.e. the moderately overleveraged and moderately underleveraged firms) in the same (sub) sample. Being a relative measure, the overleverage effect may be a more appropriate way of comparing the debt financing constraints faced by domestic and cross-border acquirers. Consequently, subsequent discussions and references to the conclusions on domestic and cross-border acquisitions will place more emphasis on the overleverage effect and less on the leverage deviation effect. Another reason why we lay more emphasis on the overleverage effect (over the leverage deviation effect) is because the association between debt financing constraint and the acquisition probability is primarily through extreme overleveraging (as was reported in Chapter 5).

Therefore, we conclude that the negative association between overleveraging and the acquisition probability is stronger in cross-border acquisitions than in domestic acquisitions. This implies that managers of overleveraged firms have better prospects of raising new debt capital to support their acquisition plans when they choose to acquire targets in their domestic countries, than when they opt for foreign targets.

As in the earlier empirical analyses, before closing the discussion on the influence of geographic diversification on the leverage deviation effect, we highlight a few interesting findings on some control variables in the acquisition models presented above. First, the cash ratio – a proxy for internal cash reserve prior to acquisitions – is significantly positively related to cross-border acquisitions but not to domestic acquisitions. Given that corporate managers tend to benefit more from cross-border M&A deals (often large in size) than from domestic M&A deals (often small in size), this finding appears to support the agency theory of M&A because high cash flow firms are more likely to engage in (large) cross-border deals than in (small) domestic deals. Second, the foreign sales ratio – a proxy for firms' prior exposure to foreign markets – indicates that firms that already have high foreign presence are more (less) likely to undertake cross-border (domestic) acquisitions.

Overall, the empirical tests above suggest that an overleveraged acquiring firm can mitigate the negative leverage deviation effect (i.e. debt financing constraint) by selecting acquisitions that have the potential to reduce corporate risks and/or those that are less likely to be agency-motivated. Moreover, diversifying acquisitions seem to carry "risk-reduction" potentials and are less likely to be agency-motivated, if transaction size is a good proxy of agency-motivated M&A deals (see Chapter 4). However, acquirers in related deals seem to face higher financing constraint, which, in turn, severely curtails their M&A activities. The impact of geographic diversification on the leverage deviation/overleveraging effect is mixed – i.e. while the leverage deviation effect is stronger in domestic acquisitions, the overleverage effect is stronger in cross-border deals.

6.5 The empirical tests of the leverage deviation effect and organisational form (Hypothesis H6)

So far, we have analysed the relation between diversification and the leverage deviation effect by focusing on the diversification characteristics of the *proposed M&A transaction* (e.g. industrial diversification and geographic diversification), without paying attention to the diversification characteristic of the *acquiring firms* themselves. In this final empirical analysis, we focus on how the organisational form of the acquirer in the pre-acquisition year could influence the leverage deviation effect. To this end, we rely on segmental data from Datastream to classify the base sample into diversified firms and focused firms. Diversified firms are defined to include firms reporting more than one product (sales) segments on Datastream. These are simply multi-segment firms. On the contrary, focused firms are defined to include single-segment firms, i.e. firms reporting only one product (sales) segment on Datastream.

As indicated earlier, missing segmental data tends to reduce our sample for analyses that depend on segmental data. This problem was relatively more severe in our subsamples of diversified and focused firms since several of our sample firms did not report their segmental data on Datastream. All such firms were dropped. In the end, there were 5,378 (4,556) observations classified as diversified (focused) firms. Moreover, not all of these observations had all the required data needed for the computation of all the explanatory variables utilised in the multivariate regression models. Therefore, only 5,361 (4,504) observations were left in the subsamples of diversified (focused) firms for the empirical analysis conducted in this section (see Table 6.7).

Prior to conducting the empirical tests of Hypothesis H6, we present descriptive statistics for the subsamples of diversified and focused firms. These statistics portray some sharp differences between the two types of firms which could suggest why these firms may have different borrowing abilities.

6.5.1 Descriptive statistics on diversified vs. focused firms

Table 6.5 presents results of the differences in the mean tests comparing the characteristics of diversified and focused firms measured in the reference year, *t*. The firm characteristics are grouped into five broad dimensions, namely financing, performance, size, growth prospects, and risks. Generally, investors' decision to finance the future investments of a firm would largely depend on their analyses of the present and past profile of that firm. Thus, by presenting the statistics based on year *t*, we may be able to better assess a firm's borrowing ability prior to when the firm actually undertakes some acquisitions (i.e. years *t*+1 to *t*+5).

The reported descriptive statistics generally offer some preliminary evidence to suggest that any potential debt financing constraint on corporate M&A activities (that emanates from leverage deviation) could have a differing impact on firms with different organisational structure (i.e. diversified or focused). First and foremost, the financing variables suggest that both diversified and focused firms, on average, are pretty close to their leverage targets and are statistically indistinguishable from each other in terms of their leverage deviations. However, if recent debt and equity issues are good indicators of borrowing ability (i.e. investors' willingness to lend to a firm), then focused firms seem to have greater success in accessing external financing than diversified firms. In fact, in the year closest to the launch of a corporate acquisition (year *t*), both net debt issues and net equity issues are significantly (at 1% significant level) higher for focused firms than for diversified firms.

In addition, the two leverage variables, market leverage (proxy for current debt levels) and long-term leverage (proxy for past debt levels), suggest one potential explanation for the relatively lower external financing activities observed for diversified firms. Consistent with prior studies (e.g. Berger and Ofek, 1995), diversified firms appear to have significantly higher current and past debt ratios (relative to focused firms) as indicated by the respective market leverage and long-term leverage ratios. This suggests that the high (low) present and past leverage ratios of diversified (focused) firms inhibit (facilitates) their present and future borrowing abilities.

On the second dimension (i.e. performance), the picture seems mixed. The operating profitability measure of performance (measured as the ratio of EBIT to total assets) implies that diversified firms are significantly more profitable than focused firms. From the viewpoint of the pecking order hypothesis, this could offer an alternative explanation as to why diversified firms had relatively lower levels of external financing. They probably rely more on their internal funds (reserves) built out of past superior profitability. However, the cash-based and stock return-based measures of performance do suggest otherwise. The cash ratio suggests that diversified firms tend to perform significantly poorer than focused firms.

In this case, the low usage of external finance by diversified firms (discussed earlier) could indicate real external financing difficulties due to weak cash position. Both the operating profitability and cash ratio measures of performance are based on firms' accounting values which tend to be subjective and vulnerable to management manipulation.

We therefore consider a third performance measure (average stock return), which avoids the limitations of the accounting-based performance measures. The average stock return is constructed from the monthly stock price data for the past 12 months. According to the stock return performance indicator, diversified firms are as good as focused firms, and thus, profitability may not be the driving factor for the difference in the external financing activities of diversified and focused firms.

The third dimension is firm size. When the natural log of sales is used to proxy for firm size, diversified firms are significantly larger than focused firms. In addition, the Herfindahl (product) index and the foreign sales ratio indicate that diversified firms tend to be more diversified (relative to focused firms) across industries and geographical locations. These results are in line with the findings of prior work (e.g. Singhal and Zhu, 2011). As argued earlier, being large and diversified could indicate superior borrowing abilities in which case diversified firms should be able to more easily raise external funds. But the evidence from the financing variables suggest otherwise. Therefore, it is plausible that investors view large diversified firms to be prone to agency problems and are more likely to overinvest, hence, they (the investors) are reluctant to release funds to them (the large diversified firms).

Table 6.5

Comparison of key variables across diversified vs. focused firms

The statistical differences between the two samples are tested using the two-sample mean comparison tests. Variable definitions are in the list of definitions of key variables and terminologies on pages 15-22. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

Dimensions	Variables	*N=5,378* Diversified	*N=4,556* Focused
Financing	Leverage deviation	-0.001	0.002
	Net debt issues	0.003	0.010[a]
	Net equity issues	0.015	0.053[a]
	Market leverage	0.223	0.179[a]
	Long-term leverage	0.215	0.169[a]
Performance	Profitability	0.083	0.024[a]
	Stock return	0.006	0.006
	Cash ratio	0.111	0.159[a]
Size	Sales (natural log)	11.982	10.468[a]
	Diversification (product) index	0.439	0.000[a]
	Foreign sales ratio	0.268	0.191[a]
Growth prospects	Growth opportunities	1.739	2.130[a]
	R&D expense ratio	0.016	0.034[a]
Risk	Altman’s Z-score	0.529	0.427[a]
	Cash ratio	0.111	0.159[a]

Fourth, the growth opportunity proxy (i.e. the market-to-book ratio) and the ratio of research and development expense to total assets (proxy for a firm's investment into technology) all suggest that focused firms are likely to be more promising investments (from the investors' perspective) than diversified firms. In particular, diversified firms have relatively lower growth prospects in relation to focused firms, and this could adversely affect the future borrowing abilities of diversified firms, since investors may suspect that the managers of diversified firms may invest the funds in value-decreasing projects.

Finally, the descriptive statistics suggest that a typical diversified firm may be significantly riskier than a focused firm. The Altman's *Z*-score predictor of bankruptcy is significantly higher for diversified firms than for focused firms. More so, the cash ratio is significantly lower in diversified firms than in focused firms, implying that diversified firms stand a greater chance of experiencing financial distress. Again, these statistics suggest that investors may be less (more) willing to lend to our sample of diversified (focused) firms.

Overall, the summary statistics imply that the ability of firms to source external funds for their investments (or the willingness of investors to finance firms' investments) differ between diversified and focused firms. Generally, focused firms may find it relatively easier to raise external funds to support their investments. Therefore, the negative association between leverage deviation (overleveraging) and corporate M&A activities may be more severe for diversified firms than for focused firms (Hypothesis H6). It is important to point out that the conclusions drawn from these summary statistics do not change when the analyses are limited to a subsample of *acquiring* firms sub-divided into diversified and focused firms.

6.5.2 The univariate tests

We now formally test Hypothesis H6. The results of the univariate tests (based on the ratios of acquirers) are reported in Table 6.6 and are generally supportive of Hypothesis H6. The results also indicate that acquisition rates are similar between our subsamples of diversified and focused firms (57.3% vs. 48.1%). In addition, the results show that the general conclusions about the relations between leverage deviation and corporate M&A activities hold irrespective of the organisational form. For both diversified and focused firms, the acquisition rates are highest (lowest) among the firms with moderate (extreme) levels of leverage deviations. Also, the differences between the rates of acquisition for extremely overleveraged firms and the other firms are always (except one) statistically significant at 1% significance level for both diversified and focused firms (see Rows 6, 7, and 8 of Table 6.6).

Despite the fact that the general link between leverage deviation and the acquisition probability cuts across diversified and focused firms, a careful examination of the findings in Rows 6, 7, and 8 of Table 6.6 suggest that the leverage deviation (overleveraging) effect is stronger in diversified firms than in focused firms. Specifically, the differences between the acquisition rate for extremely overleveraged firms (i.e. Q4 firms) and the firms in the other subsamples (i.e. Q1, Q2, and Q3 firms) are higher for diversified firms (see Column (a)) than those of focused firms (see Column (b)). For instance, the reported result in Row 8, Column (a) suggest that an extremely overleveraged firm with a diversified organisational form has about 4.4% lower acquisition rate, compared with a similar diversified firm that only deviates moderately from its target leverage ratio. However, the difference between the acquisition rates for extremely overleveraged and moderately overleveraged firms that operate a focused organisational structure is only 2.0% (see Row 8, Column (b)).

These findings suggest that investors are stricter in their lending to overleveraged diversified firms than they are to overleveraged focused firms. It seems investors are about 2.4% less likely to resist (by not providing funds) the acquisition of an overleveraged focused firm (2.0%) than the acquisition of an overleveraged diversified firm (4.4%). Perhaps, this behaviour of investors may be due to their perception that acquisitions by diversified firms, which tend to be large, are agency-motivated and could grow the firm beyond the “optimal” size. Overall, these findings are consistent with Hypothesis H6 which posits that the negative relation between overleveraging and corporate M&A activities is more severe for diversified firms than for focused firms.

Table 6.6

The proportion of diversified and focused acquirers across the main subsamples

The statistical differences between the ratios for the subsamples are tested using the two-sample proportion tests. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

No.	Sample/subsamples	(a) Diversified	(b) Focused
1	Ratio of acquirers	0.573	0.481
2	Ratio of extremely underleveraged acquirers (Q1)	0.145	0.116
3	Ratio of moderately underleveraged acquirers (Q2)	0.150	0.131
4	Ratio of moderately overleveraged acquirers (Q3)	0.161	0.127
5	Ratio of extremely overleveraged acquirers (Q4)	0.117	0.107
6	Difference (2 - 5)	0.029[a]	0.009
7	Difference (3 - 5)	0.033[a]	0.024[a]
8	Difference (4 - 5)	0.044[a]	0.020[a]

6.5.3 The multivariate tests

Further analysis designed to tease out the impact of a firm's organisational form on the "leverage deviation effect" is reported in Columns (a)-(d) of Table 6.7. These results are based on the subsamples of diversified and focused firms. Apart from the samples employed, the empirical model and all the variables employed in these analyses are the same as those specified in the acquisition probability model that was discussed in Chapter 5 (i.e. Eqs. (5.1) and (5.2)).

As shown in Table 6.7, the multivariate results are in line with the conclusions drawn from the univariate analysis. In Column (a), the coefficient on the leverage deviation variable is large (-20.2%) and significant in the acquisition probability model estimated for diversified firms. However, as we can see in Column (c), the coefficient on leverage deviation is small (-6.1%) and statistically insignificant (p-value of 0.361) in the probit regression model estimated for focused firms. These results suggest that the leverage deviation effect is actually limited to our sample of diversified firms.

This conclusion remains largely unchanged when the effect of leverage deviation is segregated into extreme overleveraging and extreme underleveraging, as shown in Columns (b) and (c) of Table 6.7. While extremely overleveraged diversified firms have a 6.9% reduced probability of making acquisitions (statistically significant at 1% level), overleveraged focused firms only face a 3.4% less likelihood of undertaking acquisitions. More importantly, the overleverage effect for focused firms is statistically weak (i.e. significant only at 10% level). Collectively, these findings are consistent with Hypothesis H6.

Table 6.7

Leverage deviation effect and organisational form

Variables	(a)	(b)	(c)	(d)
	Diversified firms		**Focused firms**	
Leverage deviation	**-0.202[a]**	..	**-0.061**	..
	(0.002)	..	*(0.361)*	..
Overleverage effect (Q4)	..	**-0.069[a]**	..	**-0.034[c]**
	..	*(0.000)*	..	*(0.101)*
Underleverage effect (Q1)	..	**-0.005**	..	**-0.020**
	..	*(0.778)*	..	*(0.313)*
Long-term leverage	-0.313[a]	-0.281[c]	-0.175[b]	-0.156[c]
	(0.000)	*(0.001)*	*(0.034)*	*(0.065)*
Growth opportunities	0.028[a]	0.028[a]	0.019[a]	0.018[a]
	(0.002)	*(0.003)*	*(0.006)*	*(0.007)*
Firm size	0.084[a]	0.083[a]	0.037[a]	0.037[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
Profitability	0.036	0.032	0.077[c]	0.073[c]
	(0.458)	*(0.513)*	*(0.058)*	*(0.070)*
Stock return	1.102[a]	1.125[a]	0.748[a]	0.759[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
Cash ratio	0.142[c]	0.141[c]	0.030	0.026
	(0.106)	*(0.108)*	*(0.680)*	*(0.725)*
Industry M&A liquidity	0.222[b]	0.219[b]	0.162[c]	0.162[c]
	(0.031)	*(0.034)*	*(0.084)*	*(0.084)*
Industry concentration	0.056	0.057	-0.015	-0.019
	(0.684)	*(0.681)*	*(0.913)*	*(0.888)*
No. of firm-year obs.	**5,361**	**5,361**	**4,504**	**4,504**
Wald Chi-squared	**250.58**	**248.25**	**98.87**	**99.40**
P>Chi-squared	**0.000**	**0.000**	**0.000**	**0.000**
Pseudo R-squared	**0.096**	**0.097**	**0.034**	**0.034**

This table presents results from probit regressions with the dependent variable taking a value of one if the firm undertakes an acquisition within the acquisition observation period, and zero otherwise. The reported coefficient estimates are average marginal effects. Variable definitions are in the list of definitions of key variables and terminologies on pages 15-22. The p-values are reported in *italics* and *parentheses* and are adjusted for standard errors clustered by firm. All models include 10 year dummies. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

An important implication of these results is that the leverage deviation (and overleverage) effect is not symmetric for diversified and focused firms, thus making a distinction between these two types of firms is economically significant. The results suggest that leverage deviation could prove more costly for diversified firms than for focused firms, assuming M&As are generally profitable. Consequently, the importance of target leverage ratio to corporate managers may greatly depend on whether their firms have diversified or focused organisational structure. *It appears managers of diversified firms may give more regard to their target leverage ratios than those of focused firms.*

In addition, since diversified firms tend to be larger (see Table 6.5; Berger and Ofek, 1995), the results suggest that investors tend to suspect acquisitions by diversified firms to be motivated by agency considerations, and are thus less willing to provide capital for the M&A activities of overleveraged diversified firms. Therefore, an overleveraged firm with an existing diversification strategy seems to lose the co-insurance benefit of diversification which gives diversified firms borrowing advantage over their focused counterparts. In other words, the increased borrowing capacity associated with diversification has its limits and does not cut across diversified firms with different levels of leverage deviation.

Furthermore, the results do not seem to support the assertion that diversified firms can fall on their large pool of internal financial resources to circumvent debt constraints (Matsusaka and Nanda, 2002). This is not surprising because overleveraged diversified firms may have been forced to pay out their excess cash in the form of high interest expense on their huge debts (Stulz, 1990), which then depletes their internal cash pool, and subjects overleveraged diversified firms to the discipline and constraints of the external debt market.

6.6 Conclusion and implications

We have shown in this chapter that corporate diversification influences the negative link between leverage deviation and the acquisition probability. In particular, we report three important findings. First, the leverage deviation effect is stronger in related (within-industry) acquisitions than in diversifying (cross-industry) acquisitions. Second, the evidence on the effect of leverage deviation/overleveraging on acquisition probability is mixed in respect of cross-border and domestic acquisitions. Finally, the leverage deviation effect is more pronounced in diversified firms than in focused firms.

One striking observation running through these three findings is that the leverage deviation effect tends to be stronger in relatively larger deals (related acquisitions, see Table 4.3 of Chapter 4) and larger firms (diversified firms, see Table 6.5). Since larger M&A deals by larger firms are likely to be value-destroying (see Moeller et al., 2004), our findings appear to support the view that agency problems are crucial in explaining why diversification influences the leverage deviation effect.

At least two important implications of our results are that; (1) managers of overleveraged firms can select some types of acquisitions which could enhance their acquisition probabilities, and (2) managers of diversified firms may be more concerned about their leverage deviations when they anticipate acquisitions, since they face greater overleverage costs.

Finally, in nearly all the acquisition models estimated, extreme leverage deviations (both underleveraging and overleveraging) are negatively related to the acquisition probability, indicating the need for rational managers to try and always keep their leverage ratios close to their target leverage ratios, especially when they anticipate acquisitions. The next chapter (Chapter 7) examines this matter.

As was done in the previous chapter, prior to undertaking this analysis in the next chapter, we point out the main implications of the present chapter's findings on the theories of capital structure and M&As.

One major implication of the results on the capital structure theory is that ***the importance managers of acquiring firms place on the target leverage ratio (and the trade-off theory)***

may depend, to some extent, on: (1) the type of target firm they pursue, and (2) the organisational form of the acquirers. In particular, acquirers undertaking related (within-industry) acquisitions (i.e. related acquirers) and acquirers with diversified pre-acquisition organisational structure (i.e. diversified acquirers) would pay more attention to their target leverage ratios since they tend to face greater debt financing constraint. Since the target leverage ratio is considered to be important under the trade-off theory of capital structure, it could be argued that the trade-off theory may find more support in an environment of related acquirers and diversified acquirers. On the contrary, the trade-off theory may be rejected in favour of the pecking order theory in an environment of diversifying (cross-industry) acquirers and focused (single-segment) acquirers.

Further, the chapter's key results throw more light on the theories of M&As. To the extent that the size of the acquisition transaction and the acquirers' size proxy for value-destroying acquisitions (Moeller et al., 2004), our key findings here are supportive of the agency theory of M&As. It seems investors fail to support managers of related acquirers (via denying them financing) because they (investors) probably view them (managers) as selectively choosing target firms that enhance the dependence of the combined firm on the specialised skills of the incumbent managers (Shleifer and Vishney, 1989). Thus, the agency theory of M&As is likely to find more support in related (within-industry) acquisitions, compared to diversifying (cross-industry) acquisitions. Likewise, the agency theory of M&As may be more applicable to diversified acquirers than to focused acquirers, since investors appear to be less willing to lend to diversified acquirers, possibly because they (investors) suspects them (managers) to grow the size of the firm beyond optimal levels (Jensen, 1986).

Chapter 7

Leverage Adjustments and Acquisition Anticipation

7.1 Introduction

The key finding of the previous chapters is that deviations from firms' target leverage are negatively related to the probability of undertaking acquisitions in the immediate future. Within this context, it is possible that corporate managers view deviations from their target leverage ratios as costly since they face the risk of not being able to initiate and/or complete M&As.[60] Consequently, it is important to ask the following question:

> *Do managers – especially those of firms with extreme leverage deviations – take steps to align their actual leverage ratios with their target leverage ratios when they expect to undertake acquisitions in the near future?*

The empirical analyses in this chapter seek to answer this question. The chapter examines whether managers of different firms would attach different degrees of importance to the need to rebalance their capital structures, since (depending on the circumstances) the costs associated with leverage deviation (e.g. M&A constraints) may vary among different firms. Specifically, the empirical analyses in this chapter investigate the following two issues:

1) Are corporate leverage adjustments related to the degree of current leverage deviations?
2) Are corporate leverage adjustments related to the anticipation of corporate takeovers?

In answering the above questions, the analyses contained in this chapter make at least one important contribution to the capital structure literature. We show that when firms are slow in moving towards their target leverage ratios (i.e. eliminating their leverage deviations), it does not necessarily imply a rejection (an acceptance) of the trade-off (pecking order) theory of capital structure. This chapter points out two key factors that could explain why a firm

[60] Throughout the analyses, we assume that leverage deviation is costly. In the light of most of the literature reviewed in Chapters 2 and 3 as well as our empirical findings in Chapters 5 and 6, this seems a reasonable assumption to make.

may/may not haste to move towards the target leverage ratio. These two factors are: (1) the extent of present/past leverage deviation of a firm, and (2) the anticipation of an acquisition by a firm.

In fact, the two factors above influence the two hypotheses proposed for testing in this chapter. First, it is argued that managers of firms with *extreme* leverage deviations will be more aggressive in rebalancing their capital structures, compared with their counterparts in firms with *moderate* leverage deviations. For simplicity, we refer to this hypothesis as the degree of deviation (DoD) hypothesis. Second, it is posited that when a manager anticipates acquisitions in the near future, she *aggressively* rebalances her firm's capital structure, in order to reduce any possible negative effect of extreme leverage deviations. We refer to this hypothesis as the anticipation of acquisition (AoA) hypothesis.

The remaining sections are organised in the following order. Section 7.2 briefly reviews the related literature and develops hypotheses. Section 7.3 outlines the main method employed in addressing the issue of corporate leverage adjustment. Sections 7.4 and 7.5 respectively present the empirical analyses of the DoD and AoA hypotheses. Robustness tests are conducted in Section 7.6 and Section 7.7 concludes the chapter as well as point out the implications of the main findings on the theory of capital structure and the theory of M&As.

7.2 Related literature and Hypotheses

As pointed out earlier, this chapter empirically tests two hypotheses – (1) the degree of deviation (DoD) hypothesis; and (2) the anticipation of acquisition (AoA) hypothesis. In this section, we rely on the prior literature to develop these two hypotheses.

7.2.1 The DoD hypothesis (Hypothesis H7)

The concept of leverage adjustments towards target levels is based on the trade-off theory.[61] The *traditional* (*static*) trade-off theory suggests that firms attempt to immediately eliminate

[61] The trade-off theory was reviewed in Chapter 3.

every gap that arises between their actual and target debt ratios in order to always stay optimal (see Frank and Goyal, 2007). However, proponents of the *dynamic* trade-off theory (e.g. Fischer, Heinkel, and Zechner, 1989; Leary and Roberts, 2005) suggest that adjustment towards leverage targets involves transaction costs (e.g. security issuance costs) which could be substantial. Consequently, leverage adjustment is often infrequent. They argue that, when these adjustment costs are considered, responding to trivial deviations from leverage targets could rather end up becoming a suboptimal exercise, since the adjustment costs may exceed the cost of staying off-target (i.e. deviation costs). An example of a deviation cost is the cost of underinvestment (suggested by Myers, 1977) which arises when firms stay far above their leverage targets, and are therefore unable to secure new debt financing for their planned investments. Therefore, in making leverage adjustment decisions, firms weigh the adjustment costs against the deviation costs (Frank and Goyal, 2007).

Fischer et al. (1989) argue that at *moderate* levels of leverage deviations, the deviation cost tends to be lower than the adjustment cost, and firms can afford not to move towards leverage targets or be slow in their capital structure rebalancing. However, at *extreme* levels of deviations from target (the lower and upper limits, as the authors put it), it becomes too costly for firms to remain off-target; thereby making it worthwhile for firms to incur the adjustment costs and eliminate the deviations. In these situations (i.e. when the deviation costs exceed the adjustment costs), firms are expected to be quick in rebalancing their capital structures.

The main implication of Fischer et al.'s argument is that firms would exhibit asymmetric adjustment behaviour depending on the extent of deviations between their actual and target leverage ratios. Specifically, firms with *moderate* deviations from their leverage targets will *slowly* adjust towards target levels, while those with *extreme* leverage deviations will exhibit *fast* adjustment behaviour. This prediction ties into our prior findings in Chapters 5 and 6. Leverage deviation constraints the M&A activities of extreme deviant firms (especially extremely overleveraged firms) but not moderate deviant firms. Based on the discussions above, we propose the following hypothesis for testing:

H7: *Firms with extreme leverage deviations will be faster in rebalancing their capital structures, relative to firms with moderate leverage deviations.*

7.2.2 The AoA hypothesis (Hypothesis H8)

As discussed in Chapter 3, Myers (1977) posits that the debt overhang problem (a form of deviation cost) is more severe for firms with growth opportunities. Assuming that acquirers tend to have greater growth opportunities (see Jovanovic and Rousseau, 2002; Sorensen, 2000), the debt overhang problem suggests that firms anticipating acquisitions might face greater deviation costs (in the form of increased risk of forgoing planned acquisitions) than those with no immediate acquisition plans.

In fact, the debt financing constraints that are often imposed on overleveraged bidders (see Harford et al., 2009; Uysal, 2011) confirm the presence of a relatively higher leverage deviation costs for firms that have immediate acquisition plans. A firm that has no immediate intentions of soliciting external funds may worry less about the current deviations from their leverage targets. Such a firm may be slow in adjusting its leverage ratio towards target levels. On the contrary, managers of firms that are likely to turn to investors for capital to fund their planned acquisitions are likely to be much concerned about their current levels of leverage deviations and take more aggressive steps to eliminate their leverage deviations.

Recently, Uysal (2011) shows that when overleveraged firms have a high likelihood of undertaking acquisitions, they attempt to rebalance their capital structures (to possibly mitigate the negative overleverage effect) by issuing equity capital. His finding implies that firms (especially overleveraged firms) anticipating acquisitions will be quicker in returning their capital structures towards target levels, compared to those with no immediate acquisition plans.[62] Therefore, the following hypothesis is proposed:

> ***H8:*** *The speed of adjustment will be higher for firms that are anticipating acquisitions in the immediate future than for firms with no acquisition expectations in the near future.*

[62] As indicated in Chapter 3, Uysal's (2011) empirical approach in testing corporate leverage adjustments is different from the approach adopted in the present study. While the present study utilises the standard partial adjustment model to compute and compare the speeds of adjustment for acquirers and non-acquirers, Uysal (2011) models the equity issuance decisions of overleveraged and underleveraged firms that have high probability of making acquisitions.

7.3 The main method used to test the hypotheses

In an attempt to address the chapter's hypotheses, we examine how the firms in our base sample adjust their leverage ratios towards their "target" leverage ratios (i.e. eliminate their leverage deviations) over a 5-year period (from year *t* to *t*+4). Year *t* is still the reference year; and it represents the year in which the leverage deviation of firm *i* is determined. We therefore follow the base sample firms during this period (year *t* to year *t*+4) and construct a panel data, which is then used in testing the leverage adjustment hypotheses (i.e. the DoD and AoA hypotheses).

The main empirical tool used in testing the leverage adjustment hypotheses is the partial adjustment model (PAM). As defined by Xu (2007), a partial adjustment model is a dynamic model that estimates how fast (or slow) a firm adjusts its leverage ratio towards its target leverage ratio. The PAM summarises the adjustment behaviour of firms in a single statistic called the *speed of adjustment (SOA)*. The next two subsections give special attention to the PAM. Section 7.3.1 specifies the model while section 7.3.2 attempts to justify why the two-stage system generalised method of moments (SYS-GMM) is chosen as the estimation method for the PAM.

7.3.1 The partial adjustment model (PAM)

The leverage adjustments hypotheses seek to examine how fast (or slow) managers react to deviations that arise in their firms' leverage ratios. Where the costs of leverage deviations are expected to be large (small), managers are expected to be quick (slow) in rebalancing their capital structures. Addressing this question of how fast or slow firms eliminate deviations in their leverage ratio is an empirical question that has been explored by prior studies using the PAM (see Flannery and Rangan, 2006; Fama and French, 2002; Antoniou et al., 2008; Lemmon et al., 2008).

Although the actual speed of adjustment (SOA) remains an unsettled issue in the empirical literature (Frank and Goyal, 2007), a large number of studies rely on the PAM as a standard methodology. For example, DeAngelo et al. (2011, p.251) note that the PAM is the *"general approach to extant speed of adjustment tests"*. Specifically, the PAM is a dynamic model that attempts to estimate the pace at which deviations from target leverage ratios are removed over time. As earlier noted, in a partial adjustment model, the pace of leverage deviation elimination is summed up in a single measure: the speed of adjustment (SOA), which is modelled as follows:

$$Leverage_{it} - Leverage_{it-1} = \lambda(Leverage^{*}_{it} - Leverage_{it-1}) \qquad \text{Eq. (7.1)}$$

where:

$Leverage_{it}$ is the actual leverage ratio for firm *i* in the current year, *t;*

$Leverage_{it-1}$ is the actual leverage ratio for firm *i* in the previous year, *t*-1;

λ is the estimated speed of adjustment (SOA) over the period *t*-1 to *t*; and

$Leverage^{*}_{it}$ is the unobservable target leverage ratio for firm *i* in the current year, *t.*

In Eq. (7.1) above, λ measures the fraction of the gap between the current year's target leverage ratio and last year's actual leverage ratio that a firm chooses to close in a year. If λ =1, there is *complete* adjustment (i.e. the actual change in leverage is equal to the desired change). This will imply an expectation of huge leverage deviation costs by corporate managers. In contrast, if λ =0, there is *no* adjustment in leverage and denotes an expectation of zero leverage deviation cost by corporate managers.[63]

The other element in Eq. (7.1) that requires estimation is the target leverage ratio ($Leverage^{*}_{it}$). As discussed in Chapter 4, the target leverage ratio is unobservable but could be estimated by regressing the actual leverage ratio on a number of explanatory variables documented in the capital structure literature. The target leverage ratio, $Leverage^{*}_{it}$, is assumed to be:

[63] Leverage deviation costs denote how much it costs a firm to stay-off target. For example, as discussed in Chapter 3, being underleveraged could be associated with missed tax savings while overleveraging could also lead to missed profitable future investment projects.

$$Leverage_{it}^{*} = X_{kit}^{1}\phi_k + \varepsilon_{it} \qquad \text{Eq. (7.2)}$$

where ϕ_k is a vector of k unknown parameter estimates; X_{kit} is a vector of k explanatory variables for firm i at time t; and ε_{it} is the composite error term ($\varepsilon_{it} = \mu_i + \nu_t + u_{it}$) made up of μ_i which represents time-invariant unobservable firm-specific effects (e.g. management ability, firm reputation, etc.); ν_t representing time-specific effects (e.g. inflation, interest rates, demand shocks, etc.); and u_{it} is the time-varying disturbance term with zero mean and assumed to be serially uncorrelated and homoscedastic.

The explanatory variables are non-debt tax shelter, growth opportunities, firm size, profitability, asset tangibility, bankruptcy risk (Altman's *Z*-score), R&D expense, missing R&D dummy, stock return, and dummy variables to control for industry and time fixed effects. How these variables are measured and are expected to affect the target leverage ratio are discussed in Chapter 4 (see Table 4.5). Also, the correlation matrix presented in Table 7.1 indicates very weak correlation among these explanatory variables, suggesting that the multicolinearity problems in ordinary least square regressions are unlikely to be present. In fact, correlation coefficients among variables are always less than 0.40.

Alternatively, the partial adjustment model in Eq. (7.1) can be re-written as:

$$Leverage_{it} = (1-\lambda)Leverage_{it-1} + \lambda Leverage_{it}^{*} \qquad \text{Eq. (7.3)}$$

Substituting Eq. (7.2) into Eq. (7.3) results in the following model:

$$Leverage_{it} = (1-\lambda)Leverage_{it-1} + \lambda\phi_k X_{kit} + \lambda\varepsilon_{it} \qquad \text{Eq. (7.4)}$$

In this model (Eq. 7.4), $1-\lambda$ measures the speed of adjustment (SOA) which lies between 0 and 1.

Table 7.1

Correlation matrix for the explanatory variables in the partial adjustment model

Explanatory variables	**NDTS**	**GROW**	**SIZE**	**PROF**	**TANG**	**Z-SCORE**	**R&D**	**MISS R&D**	**AR**
Non-debt tax shelter **(NDTS)**	1.00								
Growth opportunities **(GROW)**	0.01	1.00							
Firm size **(SIZE)**	**0.00**	-0.21	1.00						
Profitability **(PROF)**	-0.05	-0.25	0.40	1.00					
Asset tangibility **(TANG)**	0.32	-0.18	0.14	0.17	1.00				
Altman Z-score **(Z-SCORE)**	-0.03	-0.10	0.07	0.11	0.11	1.00			
R&D expense ratio **(R&D)**	0.05	0.34	-0.24	-0.35	-0.17	-0.09	1.00		
Missing R&D dummy **(MISS R&D)**	-0.08	-0.14	0.00	0.06	0.19	0.06	**-0.39**	1.00	
Stock return **(AR)**	**0.00**	0.12	0.02	0.16	0.01	0.03	**0.00**	0.01	1.00

7.3.2 The choice of the estimation method

The parameters of the partial adjustment model in Eq. (7.4) could be estimated using a number of estimation methods. For example, Shyam-Sunder and Myers (1999) use ordinary least squares (OLS), Flannery and Rangan (2006) use fixed-effect (FE), and Antoniou et al. (2008) employ the two-stage system generalised method of moments (SYS-GMM) technique in estimating the partial adjustment model.

Unfortunately, different estimation methods tend to produce different parameter estimates and (by extension) different SOAs. For instance, when we apply these three estimation methods (OLS, FE, and SYS-GMM) on our base sample, we obtain different SOA estimates. In particular, SOAs are 21%, 73%, and 28% per annum using OLS, FE, and the SYS-GMM methods, respectively.[64] These differences in the estimates arise because in dynamic econometric models (as in Eq. 7.4), the lagged dependent variable ($Leverage_{it-1}$) tends to be correlated with the time-invariant unobservable firm-specific effect (μ_i) and the various estimation methods deal with this problem differently (see Hsiao, 1982; Bond, 2002; Arellano and Bover, 1995; Blundell and Bond, 1998).

The specific econometric problem here is "endogeneity", which generally arises when an independent variable (*X*) depends on some unmodelled causes that also drive other variables in the model, thus, leading to a correlation between *X* and the error term (ε_{it}) (see Antonakis et al., 2012). Endogeneity can arise from different situations such as omitted variables, measurement errors, simultaneity, and the inclusion of a lagged dependent variable, as in Eq. 7.4 (Cameron and Trevidi, 2010; Wooldridge, 2009; Xu, 2007; Antonakis et al., 2012). Clearly, the type of endogeneity problem envisaged in this chapter flows from including the lagged dependent variable ($Leverage_{it-1}$) in the leverage model. Since a firm's leverage depends on the individual firm effect (μ_i), the lagged dependent variable would be correlated with the error term ($\varepsilon_{it} = \mu_i + \nu_t + u_{it}$). As a result, both OLS and fixed-effect parameter estimates for the lagged dependent variable will be biased and inconsistent (see Xu, 2007).

[64] These results are not reported here (to save space) but are available upon request.

As noted by Antonakis et al. (2012), the two-stage least squares (2SLS) or Instrumental Variable (IV) estimation technique makes it possible for models with endogenous regressors to be consistently estimated. In general, the 2SLS method generates consistent estimates by removing the portion of variance in X that correlates with ε_{it}. This is done by relying on instrumental variables which are exogenous regressors of the endogenous variable. Obviously, using IV estimation requires the “external” valid instruments which could proof difficult to find (Roodman, 2007). Thus, the generalised method of moments (GMM) estimation technique which works in a similar fashion as the IV estimation technique, but draws “internal” instruments from the available dataset (see Roodman, 2007) was considered to be a more preferable choice for the estimation of Eq. 7.4. In general, the system GMM technique instruments with the lags of the regressors contained in the dataset.

In fact, recent studies on dynamic capital structure (e.g. Xu, 2007; Antoniou et al., 2008) recognise the strengths of the two-stage system generalised method of moments (SYS-GMM) estimation over the other alternatives. For example, Xu (2007) points out that while the OLS and the FE estimators produce extremely biased parameter estimates, the SYS-GMM estimator results in an unbiased parameter estimate which lies in between the two extremes (i.e. the estimates of the OLS and FE estimators). Specifically, with his sample of US firms observed during 1970-2004, he shows that the OLS estimator underestimates the SOA (11%), while the FE estimator overestimates the SOA (57%). He argues that the unbiased estimator is the SYS-GMM, which leads to a SOA of 14% (lying in between 11% and 57%).

Comparing our SOA estimate of 28% (based on the SYS-GMM) to Xu’s (2007) estimate of 14% suggests that UK firms rebalance their capital structures more aggressively than US firms. In other words, within a year, managers of UK corporations are twice faster (than their US counterparts) in eliminating their leverage deviations. Perhaps, this reflects the higher leverage deviation costs faced by UK overleveraged firms, since the negative leverage deviation (overleveraging) effect on the acquisition probability seems to be stronger among UK firms (as reported in Chapter 5) than among US firms (as reported by Uysal (2011)).

In addition, our preference for the two-step SYS-GMM is influenced by the fact that it is superior to the other estimation methods because it can control for heteroscedasticity across firms, correlation of errors over time, and simultaneity problems (see Antoniou et al., 2008, p.70). It is also reassuring for our SOA estimate of 28% to be relatively similar to the 32% estimated by Antoniou et al. (2008) for their sample of 1,562 UK firms for the period 1989 to 2000. However, the difference in the SOA estimates between the two studies (i.e. 28% vs. 32%) that differ in terms of the sample period suggests that UK firms are now slower in rebalancing their capital structures than they did in the pre-2000 era.

In light of the issues discussed, unless otherwise stated, all empirical examinations of the corporate leverage adjustment behaviour are based on estimation of Eq. (7.4) using the two-step SYS-GMM. It is, however, important to mention that the two-step SYS-GMM (and to some extent GMM in general) is not without limitations. Prominent among the limitations is the problem of "many instruments" which could be problematic in finite samples (Roodman, 2007, p.13). Fortunately, as Roodman (2007, p.42-43) notes, the magnitude of the Hansen/Sargan test statistic and the number of instruments in relation to the sample size should highlight such problems when they arise.[65]

7.4 The empirical tests of the degree of deviation (DoD) hypothesis

This section presents the empirical tests of the DoD hypothesis formulated in section 7.2. The hypothesis predicts that the speed of adjustment towards leverage targets will be faster among firms with extreme leverage deviations, compared to firms with moderate leverage deviations. The empirical tests begin with the partial adjustment model tests and later present some further evidence based on the financing patterns exhibited by the sample firms over a period of time.

[65] A Hansen statistic of 1.00, for example, must be a cause for concern. It is also worrying where the number of instruments exceeds the number of observations. These guides could highlight potential problems and suggest that the GMM estimator may produce unreliable estimates (Roodman, 2007).

7.4.1 The partial adjustment model tests

We test the DoD hypothesis by employing the partial adjustment model (PAM) in Eq. (7.4) to estimate and compare the speeds of adjustment (SOA) for the four subsamples classified according to the extent of deviations from their leverage targets – (1) extremely underleveraged firms, (2) moderately underleveraged firms, (3) moderately overleveraged firms, and (4) extremely overleveraged firms. These are the same subsamples used in the empirical analyses in Chapters 5 and 6.

Table 7.2 reports the results for the tests of the DoD hypothesis. The findings reported under Columns (a) to (d) assume that the explanatory variables (except the lag of leverage) are exogenous. However, since the exogeneity assumption appears to be violated in the regression results under Column (d), the analysis is repeated and reported under Column (e). The additional regression in Column (e) treats the lag of leverage, profitability and stock return as non-exogenous. We briefly return to this matter shortly.

As displayed in Table 7.2, the coefficient of the one-period lagged dependent variable ($Market\,Leverage_{t-1}$) is positive and significant across all the subsamples. Such a positive effect is consistent with Frank and Goyal (2004) and Antoniou et al. (2008). The reported coefficients are not just positive but lie between 0 and 1, implying that there is partial adjustment towards target leverage over time. This confirms the existence of dynamism in capital structure decisions, in that firms adjust their debt ratios over time in order to achieve their leverage targets (Leary and Roberts, 2005).

When the speed of adjustment (SOA) is estimated (i.e. $\lambda = (1 - Leverage_{t-1})$) and compared across the subsamples, the results suggest the existence of asymmetry in the SOA for firms in the different subsamples. Specifically, the SOA is fastest among extremely overleveraged firms (30%), followed by extremely underleveraged firms (26%), moderately overleveraged firms (25%), and moderately underleveraged firms (24%). This is consistent with the view that the cost of being off-target (deviation cost)[66] may be greater for extremely overleveraged firms (see Byoun, 2008; van Binsbergen et al., 2010), in the sense that they may not be able to borrow in future to support their investments (Uysal, 2011). Extremely overleveraged firms, therefore, seem to take more aggressive steps in dealing with their leverage deviations than all the other subsample of firms.

The reported diagnostic statistics are generally comforting since they suggest that the findings are statistically "credible". First, the F-statistics show that the explanatory variables are jointly significant in explaining the leverage model. Second, the Arellano and Bond AR (2) test suggest the absence of a second-order serial correlation which is essential for GMM to produce valid estimates (see Roodman, 2007). Third, the Hansen tests for overidentifying restrictions (instrument validity) and for the exogeneity of instruments indicate that instruments are valid and exogenous, except for the overleveraged firms' model (under Column (d)).[67]

However, when the exogeneity of regressors assumption is relaxed for the performance variables (i.e. profitability and stock return) (see Column (e) results), the Hansen tests fail to reject the null. Since firm performance is likely to be influenced by leverage (the dependent variable), the performance variables are more likely to be endogenous rather than being strictly exogenous. Thus, we suspect that the first differences that are used as instruments for exogenous regressors (the performance variables) in the leverage model under Column (d) may be correlated with the error term, and are therefore invalid as instruments. This problem seems more pronounced in the subsample of extreme overleverage. However, when the performance variables are considered to be endogenous, and are thus instrumented similarly to the lagged dependent variable ($Leverage_{it-1}$), the Hansen test fails to reject the null of instrument validity. Consequently, the performance variables (profitability and stock return) lagged two or more periods are utilised in the leverage model reported under Column (e) to

[66] Interpreting the negative effect of overleveraging on acquisitions as costly implicitly assumes that those forgone acquisitions are positive NPV projects. This might not be a realistic assumption since the review on M&As in Chapter 2 shows that some acquisitions tend to be value-destroying.

[67] The rejection of the null by the Sargan test is less worrying since the Sargan test is known to be less robust (Roodman, 2007). It must also be noted that the Hansen test is weak in the presence of many instruments. However, given the sample size (8,054 observations) in relation to the number of instruments (41 instruments); this problem is unlikely to be severe in the present results.

serve as instruments. In fact, although relaxing the assumption of exogeneity for the performance regressors (and their instruments) did improve the model in terms of the diagnostic tests (see the Hansen test and the Difference in Hansen test under Column (e) of Table 7.2), there was no qualitative change the results. The SOA for extremely overleveraged firms under exogeneity assumption is 30% (see Column (d)), compared with 31% when we assume the performance variables to be endogenous (see Column (e)), implying that any potential problems with the instruments do not materially alter the key conclusions.

Table 7.2

The speeds of adjustment for firms with different levels of leverage deviation

	(a) Underlev	(b) Normlev1	(c) Normlev2	(d) Overlev	(e) OverlevEndo
Market leverage t-1	**0.740**[a]	**0.760**[a]	**0.748**[a]	**0.699**[a]	**0.695**[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Non-debt tax shelter	-0.014[c]	-0.020[b]	-0.019[b]	-0.027[a]	0.000
	(0.078)	*(0.021)*	*(0.044)*	*(0.006)*	*(0.998)*
Growth opportunities	-0.017[a]	-0.014[a]	-0.011[a]	-0.024[a]	-0.018[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Firm size	0.008[a]	0.008[a]	0.006[a]	0.008[a]	-0.003
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.595)*
Profitability	-0.124[a]	-0.121[a]	-0.107[a]	-0.127[a]	0.181
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.286)*
Asset tangibility	0.040[a]	0.050[a]	0.073[a]	0.097[a]	0.063[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.014)*
Altman Z-score	0.006[a]	0.004[a]	0.001	0.003[b]	0.001
	(0.000)	*(0.013)*	*(0.487)*	*(0.017)*	*(0.741)*
R&D expense ratio	-0.051	-0.038	-0.018	0.065[b]	0.258[b]
	(0.132)	*(0.115)*	*(0.211)*	*(0.054)*	*(0.020)*
Missing R&D dummy	-0.002	0.003	0.007[b]	0.003	0.013[c]
	(0.463)	*(0.289)*	*(0.037)*	*(0.420)*	*(0.085)*
Stock return	-0.590[a]	-0.395[a]	-0.613[a]	-0.839[a]	-0.566
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.325)*
SOA $(1 - Leverage_{t-1})$	**0.26**	**0.24**	**0.25**	**0.30**	**0.31**
No. of Observations	8,718	9,034	8,879	8,054	8,054
No. of firms	2,511	2,582	2,580	2,439	2,439
F-stat.	159.21	230.16	304.03	196.29	112.34
Prob. > F	0.000	0.000	0.000	0.000	0.000
No. of instruments	41	41	41	41	45

AB AR(1) test (Pr > z)	0.000	0.000	0.000	0.000	0.000
AB AR(2) test (Pr > z)	0.230	0.977	0.795	0.653	0.363
Sargan test for OI res.	0.030	0.024	0.511	0.000	0.020
Hansen test for OI res.	0.580	0.448	0.918	0.005	0.171
Diff. in Hansen test					
Excluding group	0.776	0.363	0.794	0.005	0.426
Difference	0.251	0.493	0.833	0.158	0.106

The table presents regression results of the partial adjustment model in Eq. (7.4) estimated for four subsamples – extremely underleveraged firms (Underlev), moderately underleveraged firms (Normlev1), moderately overleveraged firms (Normlev2), and extremely overleveraged firms (Overlev). In all models, the two-stage system GMM estimation technique is employed. The results of the models presented in Columns (a) to (d) assume all explanatory variables, except the lag of market leverage, are exogenous. However, the results of the model reported under (e) treat the lag of market leverage, profitability, and stock return as endogenous; hence, the Overlev subsample in Column (d) is referred to as OverlevEndo under Column (e). Variable definitions are in the list of definitions of key variables and terminologies on pages 15-22. The p-values are reported in *italics* and *parentheses* under the corresponding coefficients and robust standard errors are always selected. All models include 10 year dummies, 13 industry dummies and an intercept which are not reported to conserve space. F-stats. test the joint significance of the estimated coefficients under the null of no relations. AB AR (1) and AB AR (2) are the Arellano and Bond first- and second-order serial correlation tests under the null of no serial correlation. Sargan and Hansen tests are a test of overidentifying restrictions under the null of instrument validity. Difference in Hansen test is a test of exogeneity of instruments subsets under the null of exogeneity of instruments. a, b, and c represent statistical significance at 1%, 5%, and 10%, respectively.

A key implication of these results is that the speed at which firms move towards their target leverage ratios may vary from sample to sample depending on the average leverage deviation (or average leverage levels) in a particular sample. Where the sample is dominated by underleveraged and normleveraged firms, SOA may be slow, whereas a fast SOA estimates will be observed when the sample is dominated by overleveraged firms. This might perhaps partly explain the disagreements on the SOAs documented in the target leverage literature (see e.g. Flannery and Rangan, 2006; Fama and French, 2002; Antoniou et al., 2008).

For example, the estimated SOA documented by Antoniou et al. (2008) for their sample of UK firms is 32%, which is closest to our SOA estimate for extremely overleveraged firms (especially when the exogeneity assumption is relaxed, 31%) but far from our SOA estimate for moderately underleveraged firms, 24%. It is possible that Antoniou et al.'s sample was dominated by overleveraged firms which unduly influenced their high SOA estimate. This conjecture seems more credible when one considers the similarity in their reported summary statistic on market leverage (0.32), compared with the long-term market leverage for overleveraged firms in this study (0.34).

Overall, these results indicate that firms do adjust their leverage ratios towards target levels over time. They, however, do not exhibit the same adjustment behaviour (Xu, 2007). To be specific, the SOA is asymmetric for firms with varying degrees of deviations from their leverage targets. SOA is fastest among firms with extreme leverage deviations (extremely overleveraged and extremely underleveraged firms), implying higher deviation cost for these firms (Fischer et al., 1989). In contrast, SOA is slowest for firms with moderate levels of leverage deviations (i.e. moderately overleveraged and moderately underleveraged firms), suggesting a relatively lower deviation costs for these firms (Leary and Roberts, 2005). This is consistent with Hypothesis H7. Also, the findings are consistent with the predictions of Fischer et al. (1989) and are largely in line with the empirical findings in the US studies by Xu (2007) and Byoun (2008).

Before closing the discussion of the results on the partial adjustment model, we briefly look at the results on the other explanatory variables. With the exception of bankruptcy risk

(Altman Z-score), all the other regressors have the expected signs. Non-debt tax shelter, growth opportunities, profitability, R&D expense and stock return are inversely related to leverage ratio. These are consistent with estimates in studies such as Lemmon et al. (2008), Uysal (2011), and Antoniou et al. (2008). The other variables, firm size and asset tangibility are (as expected) positive and significant. Similar findings are reported by Rajan and Zingales (1995) and Flannery and Rangan (2006).

7.4.2 Tests based on evolution of leverage deviation and financing patterns

In an attempt to provide further evidence in support of the DoD hypothesis, we present the evolution of leverage deviation, the net debt issues and the net equity issues of our sample firms over the 5 years starting from the reference year (i.e. from year *t* to year *t*+4).

a. *Evolution of leverage deviation*

In Table 7.3, we present results on the annual percentage change in leverage deviation over the period *t* to *t*+4. [68] The annual percentage change in leverage deviation gives an indication of the extent of alternations that corporate managers make to the capital structures of their firms each year. Therefore, following Harford et al. (2009), we interpret this statistic (the annual percentage change) to mean the speed of leverage adjustment (SOA). According to this SOA estimate, the annual rate of change in corporate leverage ratios is higher in firms with extreme leverage deviations (i.e. extremely underleveraged and overleveraged firms) than in firms with moderate leverage deviations (i.e. moderately underleveraged and overleveraged firms). In particular, SOA is 20% among extremely underleveraged and extremely overleveraged firms, while it is only 17% for moderately underleveraged and moderately overleveraged firms (see Table 7.3 below).

[68] The SOA is calculated as the annual percentage change in leverage deviation from year *t* to year *t*+4 using the following formula: $SOA = \left(\frac{(D_{t+4} - D_t)/D_t}{5years} \right) * 100$. The results tend to be negative, indicating declines in leverage deviation but we ignore the negative sign in our interpretations. Our focus is on the aggression with which managers of firms in the different subsamples respond to the deviations in their leverage. A limitation of this SOA is that it does not give a precise indication of elimination of leverage deviation because by year *t*+4, firms had not completely removed all deviations in their leverage. Complete elimination of deviations would require a mean leverage deviation of 0.000, but none of mean leverage deviation values in year *t*+4 meet this requirement.

These results suggest that because the cost of staying off-target is higher for firms with extreme deviations from their targets than for firms with moderate deviations (Fischer et al., 1989), managers of extremely overleveraged and extremely underleveraged firms show more aggression in dealing with their leverage deviations, compared to their counterparts in firms with moderate leverage deviations. These findings are consistent with Hypothesis H7 and the conclusions of the partial adjustment model.

Table 7.3

The evolution of leverage deviations for different firms

The table presents the evolution of leverage deviation for extremely underleveraged firms (Q1), moderately underleveraged firms (Q2), moderately overleveraged firms (Q3), and extremely overleveraged firms (Q4). The number of observations in each year is reported in *italics* and *parentheses*. SOA are computed as annual percentage change from year *t* to year *t*+4. Variable definitions are contained in the list of definitions of key variables and terminologies on pages 15-22. a, b, and c superscripts represent significance at 1%, 5%, and 10%, respectively, for two sample mean comparison tests.

Subsamples / Years	***t***	***t*+1**	***t*+2**	***t*+3**	***t*+4**	**SOA (%)**
Extremely underleveraged firms (Q1)	-0.116	0.003[a]	-0.001	-0.006	0.001[c]	20
	(2802)	*(2500)*	*(2285)*	*(2093)*	*(1894)*	
Moderately underleveraged firms(Q2)	-0.034	-0.006[a]	-0.006	-0.007	-0.005	17
	(2801)	*(2586)*	*(2362)*	*(2155)*	*(1988)*	
Moderately overleveraged firms (Q3)	0.012	0.003[a]	0.003	0.002	0.002	17
	(2801)	*(2567)*	*(2324)*	*(2121)*	*(1936)*	
Extremely overleveraged firms (Q4)	0.138	-0.000[a]	0.004	0.013[b]	0.002	20
	(2802)	*(2434)*	*(2128)*	*(1887)*	*(1706)*	

a. Average yearly net debt issues

In order to understand the specific financing mechanisms by which the sample firms (especially, the extreme overleveraged and underleveraged firms) eliminate the deviations in their leverage, we study the net debt issues of firms following the reference year, *t*. For firms to move their leverage ratios towards their leverage targets (i.e. eliminate deviations), we expect underleveraged firms to increase their debt issues while overleveraged firms reduce their debt issues.

Table 7.4 appears to confirm our expectations. For instance, just a year after spotting deviations from leverage target (in year *t*+1), whilst extremely underleveraged firms significantly increase their debt issues, the net debt issues significantly reduces for extremely overleveraged firms. In fact, in year *t*+1, extremely overleveraged firms paid off more of their debts than they borrowed (i.e. net debt issues of -0.005). Similarly, when averaged over the observation period (from years *t*+1 to *t*+4),[69] the highest net debt issuers are the underleveraged firms (0.036 and 0.034), while the lowest net debt issuers are the overleveraged firms (0.029 and 0.003), implying that underleveraged (overleveraged) firms attempt to remedy the anomaly by issuing more (less) debt in subsequent years. Another plausible interpretation to these finding is that being overleveraging in year *t* limits the borrowing ability of firms in the subsequent years (Hovakimian et al., 2001; Harford et al., 2009).

[69] The averages for net debt issues and net equity issues across the years are based on years *t*+1 to *t*+4 (and not from years *t* to *t*+4) because the security issues (perhaps unusual issues) made in year *t* might have caused the deviations from leverage targets. More so, the objective of the analysis is to find out how firms respond to existing deviations from their leverage targets. Fortunately, the conclusions are unchanged when averages are based on years *t*+1 to *t*+5.

Table 7.4

Average net debt issues for firms with different leverage deviations

The table presents net debt issues for extremely underleveraged firms (Q1), moderately underleveraged firms (Q2), moderately overleveraged firms (Q3), and extremely overleveraged firms (Q4). The number of observations in each year is reported in *italics* and *parentheses*. Variable definitions are contained in the list of definitions of key variables and terminologies on pages 15-22. a, b, and c superscripts represent significance at 1%, 5%, and 10%, respectively, for a two sample mean comparison tests.

Subsamples / Years	***t***	***t*+1**	***t*+2**	***t*+3**	***t*+4**	**Average**
Extremely underleveraged firms (Q1)	-0.060	0.044[a]	0.041	0.028[a]	0.030	0.036
	(2802)	*(2551)*	*(2335)*	*(2137)*	*(1942)*	
Moderately underleveraged firms (Q2)	0.000	0.043[a]	0.039	0.033	0.022[a]	0.034
	(2801)	*(2617)*	*(2404)*	*(2194)*	*(2032)*	
Moderately overleveraged firms (Q3)	0.040	0.038	0.039	0.023[a]	0.017	0.029
	(2801)	*(2604)*	*(2369)*	*(2166)*	*(1967)*	
Extremely overleveraged firms (Q4)	0.143	-0.005[a]	0.000	0.010[b]	0.006	0.003
	(2802)	*(2474)*	*(2182)*	*(1952)*	*(1765)*	

b. Average yearly net equity issues

Another financing mechanism by which firms (particularly overleveraged firms) can rebalance their capital structures is by issuing equity. Equity financing reduces the proportion of debt in a firm's capital structure, thus, reducing corporate leverage ratios. We therefore expect equity issues to be heavy among overleveraged firms. As shown in Table 7.5, on average, equity issues appear to be higher among overleveraged firms (0.081 and 0.062) than among underleveraged firms (0.055 and 0.051). This is consistent with the view that overleveraged firms tend to rebalance their capital structure by issuing more equity (Uysal, 2011).

Collectively, the results so far suggest that firms place importance on getting their leverage ratios close to their targets levels. When firms find themselves to have drifted away from their target leverage ratios, they take steps to rebalance towards target levels. The financing patterns of firms subsequent to the reference year, *t* (see Tables 7.4 and 7.5) throw more light on the presence of leverage adjustments towards target levels by showing that overleveraged (underleveraged) firms tend to issue less (more) debt and more (less) equity in subsequent periods. In addition, the findings reported in Table 7.3 indicate that the firms with extreme leverage deviations appear to have higher SOAs compared with those firms with moderate leverage deviations. These findings are broadly consistent with hypothesis H7 and the results based on the partial adjustment model.

Although these results tell us of the existence of asymmetric leverage adjustment behaviour for firms with different levels of leverage deviation, they fail to directly give us an indication of the possible reasons why some firms (e.g. extremely overleveraged firms) may give more consideration to their target leverage ratios (than others) and aggressively attempt to eliminate deviations in their leverage. The next section explores one possible reason (i.e. the fear of M&A constraints) why overleveraged firms may be more aggressive in rebalancing their capital structures.

Table 7.5

Average net equity issues for firms with different leverage deviations

The table presents net equity issues for extremely underleveraged firms (Q1), moderately underleveraged firms (Q2), moderately overleveraged firms (Q3), and extremely overleveraged firms (Q4). The number of observations in each year is reported in *italics* and *parentheses*. Variable definitions are contained in the list of definitions of key variables and terminologies on pages 15-22. a, b, and c superscripts represent significance at 1%, 5%, and 10%, respectively, for a two sample mean comparison tests.

Subsamples / Years	***t***	***t*+1**	***t*+2**	***t*+3**	***t*+4**	**Average**
Extremely underleveraged firms (Q1)	0.073	0.070	0.044[a]	0.040	0.049	0.051
	(2789)	*(2537)*	*(2326)*	*(2121)*	*(1927)*	
Moderately underleveraged firms (Q2)	0.059	0.065	0.066	0.052	0.040	0.055
	(2796)	*(2600)*	*(2387)*	*(2184)*	*(2019)*	
Moderately overleveraged firms (Q3)	0.120	0.106	0.098	0.055[a]	0.066	0.081
	(2798)	*(2587)*	*(2348)*	*(2150)*	*(1954)*	
Extremely overleveraged firms (Q4)	0.107	0.080[b]	0.054[a]	0.058	0.056	0.062
	(2797)	*(2457)*	*(2168)*	*(1936)*	*(1745)*	

7.5 The empirical tests of the anticipation of acquisition (AoA) hypothesis

The final empirical analysis of this study links the capital structure rebalancing behaviour of firms to corporate M&A activities. From the results in Chapters 5 and 6, leverage deviation appears costly to firms that may want to undertake acquisitions. Therefore, we expect that when firms anticipate acquisitions, they take more aggressive steps to deal with deviations in their leverage ratios. Specifically, this section presents the empirical test of Hypothesis H8 which postulates that firms that undertake M&As eliminate their leverage deviations ahead of these deals. Therefore, the speed of adjustment (i.e. leverage adjustments) is expected to be higher among firms that expect to undertake acquisitions in the immediate future, relative to firms that do not anticipate acquisitions in the immediate future. As was done in section 7.4, we first test the AoA hypothesis by utilising the partial adjustment model, and then later examine the financing patterns of the relevant subsamples over a specified period of time.

7.5.1 The partial adjustment model tests

The empirical approach adopted to examine the AoA hypothesis is very similar to that of the DoD hypothesis. The main difference relates to the subsamples involved – expectants and non-expectants. We use the term expectant (and non-expectant) firms to represent those firms that (do not) expect to undertake acquisitions in the immediate future. Before presenting the empirical findings, we first discuss some important matters relating to how the base sample is classified into the expectant and non-expectant subsamples.

a. The sample classification

As pointed out earlier, the AoA hypothesis assesses whether the prospects of undertaking acquisitions in the immediate future (defined as 5 years after the reference year, *t*+5) gives additional incentives for firms (particularly extremely overleveraged firms) to adjust their leverage ratios towards target levels. The major empirical challenge in this test is the identification of firms that expect to undertake acquisitions in future (i.e. in year *t*+5) ("expectants", henceforth) and those with no such expectations ("non-expectants", hereafter).

Unfortunately, strict classification of firms as expectants and non-expectants seems impracticable because it requires observing the intentions and expectations of corporate managers *ex*-ante. To overcome this challenge, we attempt to proxy a firm's plans to acquire (or not acquire) in the future with its actual acquisitions (or otherwise) observed *ex*-post. Specifically, all firms in the reference year (year *t*) that are observed to have made acquisitions in 5 years' time (i.e. in year *t*+5) are considered to be expectants in year *t*. We expect that these firms make preparations for the acquisitions (e.g. eliminate their leverage deviations) in the pre-acquisition years (i.e. *t*+1 to *t*+4). We thus attempt to estimate the speeds of adjustments of these firms over the 4-year pre-acquisition period.

An important empirical consideration is how to isolate the influence of anticipation of acquisition on expectants' pre-acquisition leverage adjustments from the effect of other factors that could cause significant leverage changes during the pre-acquisition period (i.e. *t*+1 to *t*+4). In the light of the empirical evidence that corporate leverage significantly increases following acquisitions (see Ghosh and Jain, 2000; Harford et al., 2009), it was decided to define expectant firms to exclude firms that made any acquisitions during our pre-acquisition period (i.e. years *t*+1 and *t*+4). Without imposing such restrictions, it may be inaccurate to describe leverage adjustments of expectants in the pre-acquisition years (*t*+1 to *t*+4) to be solely due to their anticipation of the acquisitions made in year *t*+5. Consequently, unless otherwise specified, we define expectants as firms in year *t* that made their *first* observed acquisitions in year *t*+5.

To be able to capture the influence of a firm's future acquisition plans on its pre-acquisition leverage adjustment behaviour, it is important to benchmark the speed of adjustment and the financing choices of expectants against a control sample of firms (i.e. non-expectants). Naturally, non-expectants should be defined as firms in year *t* that have no observed acquisitions during the years *t*+1 to *t*+5 (Def.1 or Non-exp1, henceforth). However, further restriction is imposed on non-expectants. They are also precluded from having any observed M&A activities in the 5 years preceding the reference period, year *t* (i.e. from years *t*-5 to *t*-1).

This additional condition ensures that any observed leverage adjustments in years *t*+1 to *t*+5 (i.e. post-reference years) for the subsample of non-expectants is not unduly influenced by their past M&A activities. This restriction is imposed in the light of the empirical evidence that M&A activities induce significant changes in financial leverage (Bruner, 1988; Ghosh and Jain, 2000; and Harford et al., 2009). Without accounting for this effect, the "true" difference, if any, between the speeds of adjustment for expectants and non-expectants which emanates from the anticipation of acquisition could be severely biased.

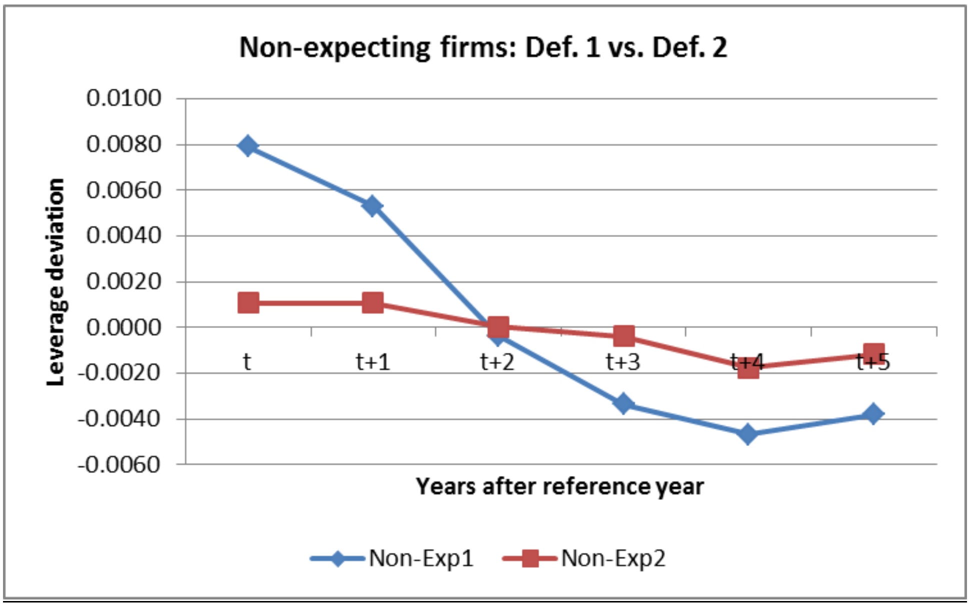
In view of these considerations, the principal definition of non-expectants is firms that undertake no acquisitions in the 11-year period around the reference year, *t* (i.e. from *t*-5 to *t*+5). For comparison purposes, this definition is referred to as Def.2 or Non-exp2. Imposing these restrictions on our subsamples of expectants and non-expectants (based on Def.2) leaves us with 298 and 2,731 firm-year observations, respectively.[70]

Figure 7.1 illustrates the effect and relevance of precluding non-expectants from making acquisitions in the pre-reference periods by plotting the leverage deviations of the non-expectant subsample over the period *t* to *t*+5. The graph shows the behaviour of the leverage deviation variable under the two definitions of non-expectants (Def.1 and Def.2). As can be seen in the graph (see Figure 7.1 below), under Def.1 (Non-Exp1) where non-expectants are permitted to have pre-reference period (years *t*-5 to *t*-1) acquisitions but are not allowed to have acquisitions in the post-reference period (years *t*+1 to *t*+5), huge variations are observed in their leverage deviations during the post-reference years (especially prior to year *t*+2). This suggests substantial alterations to the leverage ratios of the non-expectants possibly in response to recent acquisitions made in the pre-reference period. As argued earlier, these variations could unduly influence the speed of adjustment (SOA) for non-expectants, leading to bias in the estimate of the leverage adjustments attributable to acquisition anticipation.

[70] The limited number of expectants did not permit us to sub-divide this sample into those that were expecting to undertake diversifying vs. non-diversifying acquisitions. We hope later studies pursue this further.

Figure 7.1

The evolution of leverage deviation for non-expectants based on Def. 1 (Non-Exp1) and Def. 2 (Non-Exp2). Def. 1 demands that non-expectants make no acquisitions in all the 5 years following the reference year (from years *t*+1 to *t*+5). Firms are allowed to make acquisitions in the pre-reference periods (i.e. from *t*-5 to *t*-1). Def. 2 (Non-Exp2) requires firms to have no acquisitions in all the 10 years around the reference year as well as in the reference year itself (from years *t*-5 to *t*+5).



However, under Def.2 (Non-Exp2), when non-expectants are precluded from making acquisitions over the 11-year period (years *t*-5 to *t*+5) around the reference year, the variations in leverage deviations become relatively small over the post-reference period. This increases the likelihood that the SOA estimates for non-expectants reflect changes in their leverage ratios not due to any past or future acquisitions, thus, making them better benchmarks against which to measure the leverage adjustment behaviour of expectants.

It is important to point out that the concerns expressed about bias in relation to the pre-reference period could be applicable to expectants as well. In other words, expectants that made acquisitions in the pre-reference period could be making radical alterations in their leverage ratios during the post-reference period with the objective to reverse the leverage effect of previous acquisitions. Despite this concern, the pre-reference period restriction is not imposed on expectants for two reasons.

The first reason relates to sample size. Like many estimators, the generalised method of moments (GMM) estimator of the partial adjustment model is less robust when the sample size is small (Roodman, 2006, p.13). Therefore, preference is given to the definition of expectants that allows for more firms to be studied. In fact, defining expectants as firms making their first observable acquisitions in year *t*+5 *and* with no acquisitions during the years *t*-5 to *t*+4 (as in Def.2) drastically reduces the expectant sample to 112 firms. In contrast, the expectant sample is relatively larger, 298 firms, when the condition of no pre-reference year acquisitions is dropped (Def.1). Thus, we choose Def.1 over Def.2 for expectants. The second practical reason for not opting for Def.2 for expectant firms is to prevent a situation where the conclusions drawn from the study's findings do not reflect the financing behaviour of "typical" acquirers. If within an 11-year period (i.e. from *t*-5 to *t*+5), a firm makes only a single acquisition (in year *t*+5), then it is likely that such a firm may be inactive in the market for corporate control. Consequently, such firms may not represent acquiring firms.

However, these two reasons do not in any way resolve any potential bias that could arise from leverage adjustments in response to the past acquisitions of expectants. Therefore, the findings of the study are later tested using Def.2 during the robustness testing in Section 7.6.

b. The empirical findings

After constructing the expectant and non-expectant subsamples, the second stage of the test for the AoA hypothesis is to estimate and analyse the speeds of adjustment (SOA) for these two main subsamples. The difference between the two SOA estimates gives an indication of leverage adjustments due to the anticipation of acquisition. To permit a closer inquiry, the analysis is also carried out for the subsamples of extremely overleveraged expectants, extremely overleveraged non-expectants, extremely underleveraged expectants, and extremely underleveraged non-expectants. The results are presented in Table 7.6.

All the results are based on the partial adjustment model (PAM) specified in Eq. (7.4). Prior to discussing the results, it is important to point out that, as in the DoD hypothesis tests, the PAM estimations are based on a 5-year panel data for firms for the period t to t+4 (i.e. 4 years before the acquisition). Firms' data in the acquisition year (year t+5) are ignored in the estimation of the SOA. With this design, we hope to capture those adjustments in leverage that take place for expectants prior to making their acquisitions.

The regression results reported in Columns (a) to (f) of Table 7.6 are generally consistent with the dynamic trade-off theory, in that, the speeds of adjustment (SOAs) seem to be significant, ranging from 20% to 47%. This suggests that firms in our subsamples of expectant and non-expectant quickly close up the gaps between their actual and target leverage ratios. On the specific issue of whether plans of acquisitions motivate expectants to move their leverage ratios faster towards target levels than is done by non-expectants, the results provide some evidence in favour of the AoA hypothesis (Hypothesis H8).

In fact, in all cases, the expectants revert towards their target leverage ratios at a much faster pace than is the case for their non-expectant peers. For example, the results reported under

Columns (a) and (b) indicate that the average SOAs for expectants and non-expectants are 31% and 23%, respectively. The difference of 8% could be partly attributable to the desire by expectant firms to return their leverage ratios to a level that allows them to further access the debt market in future. For firms not expecting to make acquisitions in the near future, they could afford to be sluggish in moving their leverage ratios towards target levels since they are unlikely to be seeking debt capital any time soon.

A much faster adjustment rate is exhibited by the firms that are more likely to be denied debt capital, i.e. the extremely overleveraged expectants (OvExp). Overleveraged firms that expect to make acquisitions in the future are the fastest among all the subsamples to rebalance their capital structures in the direction of target leverage ratios. They have an estimated SOA of 47% per annum, implying that they eliminate almost all the positive leverage deviations within 2 years. By any standard, SOA of 47% is an extremely high rate of leverage adjustments; even higher than the estimate of 36% (based on entire sample) documented by Flannery and Rangan (2006) whose fixed-effect (FE) estimation technique is suspected to have inflated the SOA.

The extreme rate of leverage adjustment shown by overleveraged expectants is additional evidence on the constraints that overleveraging can pose to corporate acquisitions. This finding is economically significant since it suggests that when firms are far above their leverage targets and plan to undertake acquisitions within 5 years, they tend to eliminate nearly all their leverage deviations around 2 years before the actual acquisition takes place.

Table 7.6

Speed of adjustment for firms anticipating acquisitions and those not anticipating acquisitions.

	(a) Exp	(b) N-exp	(c) OvExp	(d) OvN-exp	(e) UnExp	(f) UnN-exp	(g) UnN-expLag3
Market leverage *t*-1	**0.691[a]**	**0.773[a]**	**0.532[a]**	**0.693[a]**	**0.597[a]**	**0.798[a]**	**0.939[a]**
	(0.000)	*(0.000)*	*(0.002)*	*(0.000)*	*(0.003)*	*(0.000)*	*(0.000)*
Non-debt tax shelter	-0.018	-0.011	-0.417	-0.044[a]	-0.027	0.000	-0.014
	(0.417)	*(0.157)*	*(0.544)*	*(0.001)*	*(0.809)*	*(0.976)*	*(0.333)*
Growth opportunities	-0.019[a]	-0.011[a]	-0.140	-0.018[a]	-0.009	-0.015[a]	-0.015[a]
	(0.000)	*(0.000)*	*(0.160)*	*(0.000)*	*(0.189)*	*(0.000)*	*(0.001)*
Firm size	0.009[a]	0.008[a]	0.012	0.008[a]	0.005	0.009[a]	0.008[a]
	(0.002)	*(0.000)*	*(0.420)*	*(0.001)*	*(0.547)*	*(0.001)*	*(0.001)*
Profitability	-0.163[a]	-0.100[a]	-0.406[c]	-0.097[a]	-0.085	-0.124[a]	-0.137[a]
	(0.000)	*(0.000)*	*(0.062)*	*(0.001)*	*(0.263)*	*(0.000)*	*(0.000)*
Asset tangibility	0.077[a]	0.061[a]	-0.058	0.136[a]	0.035	0.010	0.005
	(0.005)	*(0.000)*	*(0.600)*	*(0.000)*	*(0.676)*	*(0.534)*	*(0.722)*
Altman Z-score	-0.001	0.004[a]	0.027	0.004[b]	-0.006	0.007[b]	0.008[b]
	(0.784)	*(0.002)*	*(0.322)*	*(0.054)*	*(0.425)*	*(0.026)*	*(0.015)*
R&D expense ratio	0.033	-0.006	-2.268	0.086[b]	-0.275[c]	-0.010	0.003
	(0.713)	*(0.701)*	*(0.538)*	*(0.042)*	*(0.067)*	*(0.852)*	*(0.965)*
Missing R&D dummy	0.008	0.003	-0.056	0.007	0.011	-0.003	-0.007
	(0.408)	*(0.451)*	*(0.499)*	*(0.435)*	*(0.750)*	*(0.723)*	*(0.360)*
Stock return	-0.298[a]	-0.540[a]	-0.027	-0.795[a]	-0.358[b]	-0.474[a]	-0.475[a]
	(0.013)	*(0.000)*	*(0.962)*	*(0.000)*	*(0.021)*	*(0.000)*	*(0.000)*
SOA $(1 - Leverage_{t-1})$	**0.31**	**0.23**	**0.47**	**0.31**	**0.40**	**0.20**	**0.06**
No. of observations	1,140	7,652	273	1,845	292	1,863	1,863
No. of firms	294	2,355	73	589	75	576	576
F-stat.	31.37	231.38	46.59	86.04	58.31	40.00	41.10
Prob. > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000

No. of instruments	41	41	40	41	40	41	37
AB AR(1) test (Pr > z)	0.000	0.000	0.000	0.000	0.063	0.000	0.000
AB AR(2) test (Pr > z)	0.948	0.196	0.867	0.354	0.330	0.083	0.099
Sargan test for OI res.	0.002	0.154	0.002	0.445	0.000	0.006	0.822
Hansen test for OI res.	0.284	0.753	0.292	0.806	0.487	0.524	0.909
Diff. in Hansen test							
Excluding group	0.311	0.722	0.373	0.606	0.294	0.755	0.726
Difference	0.284	0.535	0.234	0.822	0.719	0.214	0.834

The table presents regression results of the partial adjustment model in Eq. (7.4) estimated for six subsamples – all expectants (Exp), all non-expectants (N-exp), overleveraged expectants (OvExp), overleveraged non-expectants (OvN-exp), underleveraged expectants (UnExp), and underleveraged non-expectants (UnN-exp). In all models, the two-stage system GMM estimation technique is employed. All the results of the models presented assume all explanatory variables, except the lag of market leverage, are exogenous. By way of default, in selecting instruments for the lagged dependent variable (market leverage), STATA chooses lags of 2 and deeper. All the results reported under Columns (a)-(f) follow this approach. However, for the results in the model under (g), STATA is specifically instructed to restrict the choice of instruments for the lag of market leverage to lags of 3 and deeper, thus, the header is called UnN-expLag3 to reflects the results. Such a restriction is not made for the other models. Expectants are firms anticipating acquisitions in the future. Non-expectants are those not anticipating acquisitions in future. Other variable definitions are in the list of definitions of key variables and terminologies on pages 15-22. The p-values are reported in *italics* and *parentheses* under the corresponding coefficients and robust standard errors are reported. All models include 10 year dummies, 13 industry dummies and an intercept which are not reported to conserve space. F-stats test the joint significance of the estimated coefficients under the null of no relations. AB AR (1) and AB AR (2) are the Arellano and Bond first- and second-order serial correlation tests respectively under the null of no serial correlation. Sargan and Hansen tests are a test of overidentifying restrictions under the null of instrument validity. Difference in Hansen test is a test of exogeneity of instruments subsets under the null of exogeneity of instruments.

The role of acquisition anticipation becomes much clearer when we compare the SOA for extremely overleveraged expectants with that of extremely overleveraged non-expectants. As reported, overleveraged non-expectants eliminate their leverage deviations at a relatively slower pace (31%). The fact that overleveraged non-expectants are 16% slower than overleveraged expectants in making adjustments to their leverage ratios again indicates that the absence of immediate acquisition plans gives non-expectants some leeway in moving towards their leverage targets. It is noteworthy that overleveraged non-expectants still rebalance their capital structures at a faster pace (31%) than underleveraged non-expectants (20%), confirming the earlier general findings about overleveraged and underleveraged firms.

We turn attention to Columns (e) and (f) of Table 7.6 to discuss the results for underleveraged firms. In fact, the main conclusion that anticipating acquisitions is associated with faster speed of adjustment does not change. Specifically, underleveraged expectants adjust their leverage ratios twice as fast as underleveraged non-expectants (40% vs. 20%). This finding, on the surface, appears to be inconsistent with the view that expectants do prefer to store up borrowing capacity in the pre-merger years and therefore move more towards negative deviations than towards target levels (DeAngelo et al., 2011). However, it must be noted that it is possible for extreme negative deviations from targets to be indicative of borrowing difficulties (as pointed out in Chapter 3), therefore, such firms may wish to correct those extreme deviations by issuing some debt instruments ahead of undertaking acquisitions.[71] It is also possible that underleveraged expectants bring forward their borrowings for their planned acquisitions. In other words, underleveraged expectants with borrowing capacity may not have to wait till the year of acquisition (year *t*+5) before issuing bonds to finance their acquisitions. They could view the planned acquisitions as an opportunity to close the gap between their actual and target leverage ratios by borrowing in the present. The latter explanation becomes more plausible when current borrowing conditions are favourable or when firms foresee worse borrowing conditions in future.

[71] This could be viewed as being similar to an individual borrower who expects to take up a mortgage in the immediate future but currently has no credit history (i.e. being extremely underleveraged). The fear of being refused credit in future could make him/her take up some personal borrowings in the present with the view to building up some credit history.

Furthermore, it is interesting to observe the slowest SOA (20% or 6%) among underleveraged non-expectants. This is further evidence to imply that underleveraged firms may face lower deviation cost, particularly when they are not likely to undertake major investments in the near future.

The reported diagnostic statistics are generally satisfactory. The explanatory variables are jointly significant in explaining the leverage model, as indicated by the F-statistics. Also, the tests for instrument validity (especially Hansen tests) are generally reassuring. Except the results under Column (f), the Arellano and Bond tests suggest the absence of second-order correlation in the residuals. This assumption is crucial for GMM to estimate valid parameters. Therefore, the failure of this assumption in the model for underleveraged non-expectants called for making alterations in the model specification.

The presence of a second-order serial correlation could be due to correlation between the differenced disturbances ($\Delta u_{it}(i.e., u_{it} - u_{it-1})$) and the second lag of leverage ($Leverage_{it-2}$) used as an instrument. Therefore, we re-specify the model for underleveraged non-expectants and restrict the instruments to the third lag of leverage and deeper $(Leverage_{it-3}, Leverage_{it-4} .....)$. The results of this re-specified model is reported under Column (g), and though the estimated SOA for underleveraged non-expectants reduce drastically to 6%, the overall conclusion remains unaffected.

Lastly, most of the explanatory variables in the leverage model are significant and have the expected signs. For example, the one-period lag of leverage, firm size and asset tangibility are generally positive and significant. Likewise, growth opportunities, profitability and stock return are largely negative and significant.

Overall, these findings support the AoA hypothesis (Hypothesis H8). They imply that the fear of possible M&A constraints incentivises firms with extreme leverage deviations that anticipate acquisitions (especially overleveraged expectants) to return their leverage ratios to target levels much faster than other firms. Nonetheless, the specific financing mechanisms through which firms achieve this rebalancing seem unclear from the current analysis based on the partial adjustment model. As a result, the next subsection examines the changes in leverage deviations, and the debt and equity financing of the various subsamples from the reference year (year *t*) through to the acquisition year (year *t*+5).

7.5.2 Tests based on changes in leverage deviation and financing patterns

We provide further evidence in support of the AoA hypothesis by focusing on how the yearly financing activities of the subsamples of expectants and non-expectants might differ from each other. We first provide graphical evidence before proceeding to consider the average annual leverage deviations, net debt issues, and net equity issues of the subsamples.

a. The graphical evidence

The main finding contained in this subsection (and section) seem to be well summed up in Figure 7.2 below, which plots the leverage deviation variable over the reference year, *t*, through to the acquisition year, *t*+5. In Figure 7.2, leverage deviation for both expectants and non-expectants in year *t* are close to zero because they both contain underleveraged and overleveraged firms which neutralise the effect of negative and positive deviations.[72]

Figure 7.2 also reveals a clear difference in the financing patterns (which changes leverage deviation) of expectants and non-expectants. First, while non-expectants maintain a fairly stable leverage ratio, which is centred closely around their leverage targets, expectants show considerable efforts in reducing their leverage levels. It could be argued that expectants try to maintain some spare debt capacity to support their anticipated acquisitions. Such a downward trend in leverage deviation shown by expectants is consistent with the view that acquiring firms tend to be underleveraged in the pre-acquisition years (see Ghosh and Jain, 2000; Harford et al., 2009).

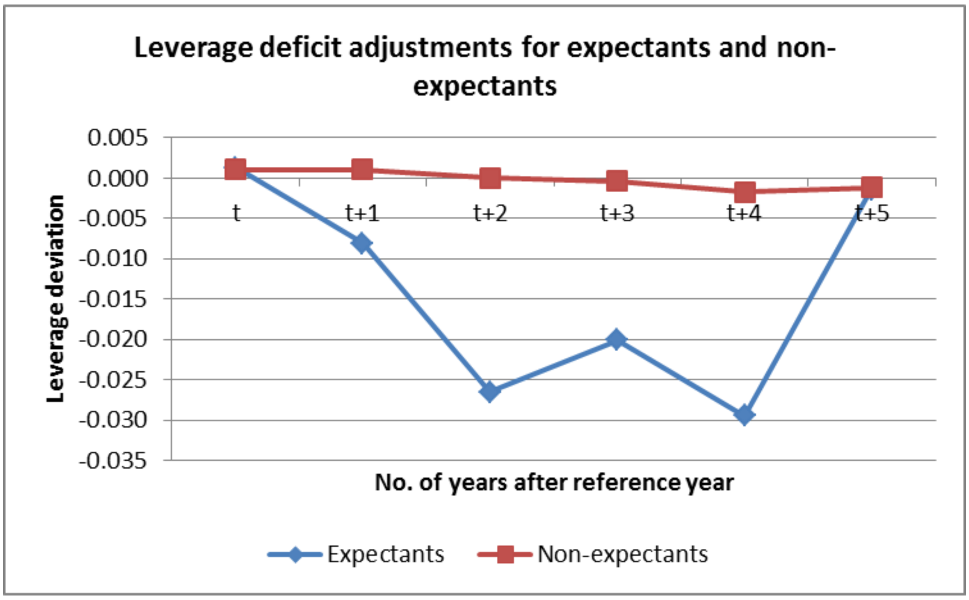
[72] The graph for overleveraged (underleveraged) firms shows a sharp drop (rise) in leverage deviation from a high positive (negative) value in year *t* to a close-to-zero value in year *t*+1. These diagrams are available upon request.

In fact, in all the pre-acquisition years (especially *t*+1 to *t*+4), expectants are substantially underleveraged (i.e. negative leverage deviations), while non-expectants are close to the target leverage ratio (i.e. mean leverage deviations close to zero). However, in the acquisition year, *t*+5, there is a huge increase in the leverage ratio of expectants which brings them close to the leverage levels maintained by non-expectants. This suggests that, in the acquisition year, expectants (who become acquirers) make use of the debt capacity that they store in the pre-merger years by raising substantial debt capital for their acquisitions.

A second inference that may be drawn from the chart is that although expectants may make substantial changes in their pre-acquisition leverage ratios, these changes may not necessarily be moving the expectant firms towards their target leverage, as suggested by DeAngelo et al. (2011). Rather, the pre-acquisition leverage changes may be targeted towards leverage levels that allow the firm to maintain good future borrowing (i.e. unused debt) capacity. However, it is possible for the downward swing in the leverage deviation of expectants to be unduly driven by the pre-acquisition financing activities of overleveraged expectants. A careful analysis of the results presented in Tables 7.7, 7.8, and 7.9 seems to suggest that. These tables also confirm (in numbers) most of the conclusions drawn from inspection of the chart (in Figure 7.2).

Figure 7.2

Evolution of leverage deviation for firms anticipating acquisitions in year *t*+5 (expectants), and those expecting no such acquisitions in year *t*+5 (non-expectants). Year *t* is the reference year and year *t*+5 is the acquisition year. Thus, years *t* to *t*+4 are pre-acquisition years.



b. Evolution of leverage deviation

We see from Table 7.7 that 3 years prior to acquisitions (in year *t*+2), acquiring firms (expectants) begin the process of storing up borrowing capacity by reducing their leverage deviation by 1.9 percentage points (from -0.008 to -0.027).[73] This reduction in leverage deviation is statistically significant at the 5% level. In all the remaining years ahead of acquisitions (years *t*+3 and *t*+4), expectants continue to ensure that they are at least 2 percentage points below their target leverage ratios. As pointed out earlier, in the year of acquisition (year *t*+5), expectants seem to make use of their unused debt capacity accumulated over the pre-acquisition years by increasing their leverage deviation by 2.8 percentage points (from -0.029 to -0.001) presumably to finance the acquisition deals.

Unlike expectant firms, non-expectant firms which serve as a benchmark (control) sample, do not exhibit any significant changes in their leverage deviation in all the years under review. It will therefore be reasonable to attribute the declines in leverage deviation (in the pre-merger years) displayed by expectant firms to be at least partly due to the anticipation of acquisitions.

Also, in an attempt to summarise the pre-acquisition changes in leverage deviation in a single statistic, we compute the annual percentage rate of change between years *t* and *t*+4 (i.e. the proxy for SOA prior to acquisition). This statistic indicates that expectants make about 9 times more adjustments to their pre-acquisition leverage ratios than is the case for their non-expectant counterparts (472% vs. 53%). When we segregate the expectant and non-expectant subsamples into overleveraged and underleveraged, we find extremely overleveraged expectants to have a faster SOA (of 29%) than extremely overleveraged non-expectants (18%). In fact, over the observation periods, overleveraged expectants make two significant reductions in their leverage deviations (in years *t*+1 and *t*+4), whereas the only significant decline in leverage deviation for overleveraged non-expectants is observed in year *t*+1. In the acquisition year, however, overleveraged expectants significantly increase their leverage ratios, whiles no such increases are observed for overleveraged non-expectants.

[73] Unless otherwise stated, all the percentage changes reported in this section are in absolute (not relative) terms.

Table 7.7

Average yearly leverage deviations of firms anticipating acquisitions (expectants) and those not anticipating acquisitions (non-expectants)

The table presents the mean yearly leverage deviations for all expectants, all non-expectants, overleveraged expectants, overleveraged non-expectants, underleveraged expectants, and underleveraged non-expectants. The number of observations in each year is reported in *italics* and *parentheses*. SOAs are computed as annual percentage change from years *t* to *t*+4. Variable definitions are contained in the list of definitions of key variables and terminologies on pages 15-22. a, b, and c superscripts represent significance at 1%, 5%, and 10%, respectively, for a two sample mean comparison tests.

Subsamples / Years	***t***	***t*+1**	***t*+2**	***t*+3**	***t*+4**	***t*+5**	**SOA (%)**
Expectants	0.001	-0.008	-0.027[b]	-0.020	-0.029	-0.001[a]	472
	(298)	*(290)*	*(288)*	*(286)*	*(283)*	*(278)*	
Non-expectants	0.001	0.001	0.000	0.000	-0.002	-0.001	53
	(2731)	*(2359)*	*(2053)*	*(1795)*	*(1569)*	*(1361)*	
Overleveraged expectants	0.148	-0.014[a]	-0.019	-0.002	-0.064[b]	0.005[a]	29
	(75)	*(69)*	*(68)*	*(69)*	*(69)*	*(67)*	
Overleveraged non-expectants	0.138	0.013[a]	0.012	0.020	0.014	0.007	18
	(709)	*(588)*	*(500)*	*(421)*	*(369)*	*(311)*	
Underleveraged expectants	-0.129	-0.008[a]	-0.036[c]	-0.036	-0.020	0.015[b]	17
	(77)	*(75)*	*(75)*	*(73)*	*(72)*	*(71)*	
Underleveraged non-expectants	-0.115	-0.001[a]	-0.005	-0.003	-0.002	0.002	20
	(676)	*(576)*	*(498)*	*(443)*	*(375)*	*(323)*	

For underleveraged expectants, the rate of change in their pre-acquisition leverage deviation is 3 percentage points lower than their non-expectant counterparts (17% vs. 20%). However, in the acquisition year (year *t*+5), underleveraged expectants significantly increase their financial leverage. This implies that underleveraged expectants do not rush to lever up and eliminate the deviations in their leverage ratios but rather they use acquisitions as a vehicle to move towards their leverage targets (Harford et al., 2009).

c. *Average yearly net debt issues*

Table 7.8 shows the pattern of net debt issues for the subsample of expectants and non-expectants during the observation period, years *t* to *t*+5. In general, it confirms the downward trends observed in the leverage deviation for expectant firms. In all the pre-merger years (except year *t*), expectants are negative net debt issuers, implying that expectant firms rebalance their capital structures by choosing to pay down on their debt.

Such a financing arrangement ultimately reduces their leverage ratios (and positive leverage deviations, as shown in Table 7.7 above), thereby freeing up borrowing capacity for future investments. Actually, in the acquisition year (year *t*+5), expectants substantially increase their debt issues from -0.007 in year *t*+4 to 0.061 in year *t*+5, an increase of about 6.8 percentage points (significant at 1%). This is further evidence that expectants reduce their pre-acquisition leverage ratios in an attempt to store up borrowing ability for their planned acquisitions.

Table 7.8

Average yearly net debt issues of firms anticipating acquisitions (expectants) and those not anticipating acquisitions (non-expectants).

The table presents the average yearly net debt issues for all expectants, all non-expectants, overleveraged expectants, overleveraged non-expectants, underleveraged expectants, and underleveraged non-expectants. Averages for net debt issues are based on values for years pre-acquisition values (i.e. *t*+1, *t*+2, *t*+3, and *t*+4). The number of observations in each year is reported in *italics* and *parentheses*. Variable definitions are contained in the list of definitions of key variables and terminologies on pages 15-22. a, b, and c superscripts represent significance at 1%, 5%, and 10%, respectively, for a two sample mean comparison tests.

Subsamples / Years	***t***	***t*+1**	***t*+2**	***t*+3**	***t*+4**	***t*+5**	**Average**
Expectants	0.023	-0.005[a]	-0.012	-0.015	-0.007	0.061[a]	-0.010
	(298)	*(293)*	*(292)*	*(293)*	*(294)*	*(286)*	
Non-expectants	0.023	0.024	0.021	0.015	0.014	0.013	0.018
	(2731)	*(2411)*	*(2113)*	*(1862)*	*(1642)*	*(1436)*	
Overleveraged expectants	0.119	-0.056[a]	-0.023	-0.025	-0.034	0.086[a]	-0.035
	(75)	*(72)*	*(71)*	*(72)*	*(73)*	*(71)*	
Overleveraged non-expectants	0.116	0.001[a]	-0.001	0.013	0.015	0.002	0.007
	(709)	*(603)*	*(516)*	*(439)*	*(385)*	*(328)*	
Underleveraged expectants	-0.061	0.009[a]	-0.007	-0.012	0.017[c]	0.090[a]	0.002
	(77)	*(75)*	*(75)*	*(75)*	*(75)*	*(73)*	
Underleveraged non-expectants	-0.057	0.034[a]	0.033	0.026	0.015	0.033[b]	0.027
	(676)	*(591)*	*(515)*	*(459)*	*(396)*	*(345)*	

d. Average yearly net equity issues

The final results on the AoA hypothesis are presented in Table 7.9. It is interesting to observe that it is expectant firms, and overleveraged firms in particular that witness significant changes (specifically increases) in net equity issues. First, while non-expectants make no significant changes in their equity issues over the observation period (except in one case where there was a significant reduction), there are significant increases in equity issues in year *t*+5 (the acquisition year) for expectants. This suggests that at least some expectants (acquirers) may be forced to issue equity capital to finance their acquisitions. Further analysis reveals that these acquirers (equity issuing expectants) are overleveraged firms. Specifically, overleveraged expectants increase their equity issues by about 16.1 percentage points (from 0.014 to 0.175) in the acquisition year, *t*+5. This is likely to represent those overleveraged firms that are denied debt capital due to their excessive debt levels but go ahead to undertake acquisitions by financing via equity issues.

Since underleveraged expectants do not experience any such significant increases in equity issues, this is additional evidence in support of the view that overleveraging may hinder firms from raising further debt capital but force them to issue expensive equity (Harford et al., 2009; Uysal, 2011). Again, it is important to highlight that net equity issues made by overleveraged expectants is over 7 times higher than that of underleveraged expectants (0.057 vs. 0.008), implying some frantic efforts on the part of overleveraged expectants to remedy the deviations in the leverage. However, compared with overleveraged non-expectants, overleveraged expectants issue less equity. This latter finding seems inconsistent with the results of Uysal (2011) who suggest that among overleveraged firms, those that are more likely to make acquisitions tend to issue more equity.

Table 7.9

Average yearly net equity issues of firms anticipating acquisitions (expectants) and those not anticipating acquisitions (non-expectants).

The table presents the average yearly net equity issues for all expectants, all non-expectants, overleveraged expectants, overleveraged non-expectants, underleveraged expectants, and underleveraged non-expectants. Averages for net equity issues are based on values for years pre-acquisition values (i.e. *t*+1, *t*+2, *t*+3, and *t*+4). The number of observations in each year is reported in *italics* and *parentheses.* Variable definitions are contained in the list of definitions of key variables and terminologies on pages 15-22. a, b, and c superscripts represent significance at 1%, 5%, and 10%, respectively, for a two sample mean comparison tests.

Subsamples / Years	***t***	***t*+1**	***t*+2**	***t*+3**	***t*+4**	***t*+5**	**Average**
Expectants	0.062	0.048	0.024	0.057	0.046	0.106^{c}	0.044
	(298)	*(292)*	*(291)*	*(293)*	*(294)*	*(282)*	
Non-expectants	0.102	0.096	0.081	0.065	0.082	0.067	0.081
	(2725)	*(2390)*	*(2096)*	*(1845)*	*(1621)*	*(1397)*	
Overleveraged expectants	0.059	0.104	0.005^{c}	0.106^{c}	0.014	0.175^{b}	0.057
	(75)	*(72)*	*(71)*	*(72)*	*(73)*	*(69)*	
Overleveraged non-expectants	0.100	0.117	0.071^{c}	0.068	0.081	0.083	0.084
	(709)	*(597)*	*(512)*	*(437)*	*(377)*	*(320)*	
Underleveraged expectants	0.038	-0.012	-0.023	0.006	0.060	0.103	0.008
	(77)	*(75)*	*(75)*	*(75)*	*(75)*	*(71)*	
Underleveraged non-expectants	0.078	0.060	0.057	0.039	0.052	0.071	0.052
	(672)	*(588)*	*(510)*	*(454)*	*(390)*	*(338)*	

Taken together, the results in this section suggest that firms expecting to undertake acquisitions in the near future (expectants) and those without any such expectations (non-expectants) show a clear difference in their financing behaviours in the periods prior to the acquisitions. It appears the fear of being denied debt capital for planned M&A activities makes expectant firms, particularly the overleveraged ones, take conscious aggressive actions to reduce their debt ratios and move their capital structures towards target debt ratios. Expectants, especially the overleveraged ones, achieve their leverage alterations by paying off existing debt and raising relatively more equity capital. In sum, the findings suggest that planned acquisitions provide additional incentives for overleveraged firms to revert their capital structures in the direction of target levels.

7.6 Robustness testing

To examine the robustness of the findings to alternative measure of leverage and definitions of expectants and non-expectants, we undertake additional analyses in this section. We also consider whether our assumption that the explanatory variables in Eq. (7.4) are exogenous affects the conclusions drawn in this chapter. All these tests are based on the partial adjustment model (PAM) specified in Eq. (7.4).

7.6.1 Tests based on book leverage ratios

Tables 7.10 present results based on book leverage definition of leverage. Column (a) contains results for the full sample, while Columns (b) to (e) have results for the degree of deviation (DoD) hypothesis. Finally, the results for tests of the anticipation of acquisition (AoA) hypothesis are reported under Columns (f) and (g). As we can see, the speeds of adjustment (SOAs) based on the book leverage measures are generally higher than those reported under the market leverage definition in the main analyses. Nonetheless, the results are consistent with the existence of dynamism in capital structure decisions since the coefficients on the one-period lag of leverage is positive and significant and lies between 0 and 1 in all cases.

In Columns (b) to (e), the book leverage results are consistent with the DoD hypothesis. To be more specific, the SOAs are fastest among firms with extreme leverage deviations (61% and 56% for overleveraged firms and underleveraged firms, respectively).[74] The SOAs for moderately underleveraged and moderately overleveraged firms are however relatively modest (53% and 38%).

When we consider the AoA hypothesis, the book leverage results under Columns (f) and (g) are inconsistent with our predictions (Hypothesis H8) and with the market leverage results. Specifically, the book leverage results suggest that expectants adjust towards their target leverage at a slower pace compared with non-expectants (43% vs. 53%). As mentioned in Chapter 4, the book leverage results should be interpreted with caution, especially when they are in conflict with the findings of a relatively "objective" market value variable. This is because it is suggested that managers of acquiring firms tend to manipulate their accounting information in an attempt to either paint a "rosy" picture or conceal "ugly" facts (see Erickson and Wang, 1999).

[74] The diagnostic statistics for underleveraged (Column (b)) and normleveraged1 (Column (c)) firms suggest that the instruments may be invalid. When a third lag of the dependent variable is specified, the statistics indicate more assuring results. With this specification, underleveraged and normleveraged 1 firms have SOAs of 38% and 31% respectively, leaving the results qualitatively unchanged.

Table 7.10

Book leverage estimates of SOA under the 2-stage system GMM

	(a)	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**
Variables	**All**	**Under**	**Norm1**	**Norm2**	**Over**	**Exp**	**Non-Exp**
Book leverage $_{t-1}$	**0.445[a]**	**0.436[a]**	**0.466[a]**	**0.617[a]**	**0.389[a]**	**0.574[a]**	**0.472[a]**
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.001)*	*(0.000)*
Non-debt tax shelter	0.030[c]	0.033	-0.025	0.025	0.034	0.114	0.003
	(0.061)	*(0.195)*	*(0.427)*	*(0.509)*	*(0.269)*	*(0.259)*	*(0.918)*
Growth opportunities	-0.003	-0.007	0.007	0.002	-0.021[a]	0.003	-0.009[b]
	(0.232)	*(0.190)*	*(0.109)*	*(0.663)*	*(0.001)*	*(0.853)*	*(0.042)*
Firm size	0.027[a]	0.026[a]	0.031[a]	0.021[a]	0.021[a]	0.029[b]	0.024[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.050)*	*(0.000)*
Profitability	-0.180[a]	-0.165[a]	-0.235[a]	-0.181[a]	-0.171[a]	-0.303[b]	-0.221[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.016)*	*(0.000)*
Asset tangibility	0.073[a]	0.040[b]	0.098[a]	0.087[a]	0.069[b]	0.005	0.075[a]
	(0.000)	*(0.042)*	*(0.000)*	*(0.001)*	*(0.020)*	*(0.947)*	*(0.010)*
Altman Z-score	0.000	-0.001	-0.002	0.002	-0.002	-0.013	0.002
	(0.919)	*(0.799)*	*(0.505)*	*(0.423)*	*(0.617)*	*(0.172)*	*(0.635)*
R&D expense ratio	-0.122[b]	-0.228	-0.154	-0.074	-0.227[c]	-0.892[b]	-0.118[c]
	(0.021)	*(0.163)*	*(0.178)*	*(0.305)*	*(0.083)*	*(0.035)*	*(0.096)*
Missing R&D dummy	0.006	-0.004	0.001	0.002	0.007	-0.041	0.002
	(0.201)	*(0.650)*	*(0.882)*	*(0.821)*	*(0.595)*	*(0.320)*	*(0.812)*
Stock return	-0.118[b]	-0.157	0.012	-0.141	-0.148	0.009	-0.049
	(0.019)	*(0.134)*	*(0.875)*	*(0.096)*	*(0.194)*	*(0.972)*	*(0.608)*
SOA (1-Leverage $_{t-1}$)	**0.55**	**0.56**	**0.53**	**0.38**	**0.61**	**0.43**	**0.53**
No. of observations	34,700	8,719	9,037	8,885	8,059	1,140	7,654
No. of firms	10,113	2,511	2,582	2,580	2,440	294	2,356
F-stat.	103.68	32.15	68.54	73.28	14.29	10.76	36.82
Prob. > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000

No. of instruments	41	41	41	41	41	41	41
AB AR(1) test (Pr > z)	0.000	0.000	0.000	0.000	0.000	0.003	0.000
AB AR(2) test (Pr > z)	0.224	0.045	0.117	0.656	0.644	0.833	0.544
Sargan test for OI res.	0.000	0.000	0.000	0.000	0.003	0.000	0.000
Hansen test for OI res.	0.362	0.187	0.011	0.112	0.856	0.151	0.57
Diff. in Hansen test							
Excluding group	0.594	0.619	0.849	0.145	0.723	0.040	0.526
Difference	0.166	0.052	0.000	0.187	0.762	0.942	0.470

The table presents regression results of the partial adjustment model in Eq. (7.4) estimated for all firms (All), extremely underleveraged firms (Under), moderately underleveraged firms (Norm1), moderately overleveraged firms (Norm2), extremely overleveraged firms (Over), expectant firms (Exp), and non-expectant firms (Non-Exp). The results of all models presented assume that all explanatory variables (except the lag of market leverage) are exogenous. Exp are firms in year *t* which make no acquisitions in years *t*+1 to *t*+4 but make an acquisition in year *t*+5. Non-Exp are firms in year *t* which make no acquisitions in years *t*-5 to *t*+5. Other variable definitions are in the list of definitions of key variables and terminologies on pages 15-22. The p-values are reported in *italics* and *parentheses* under the corresponding coefficient and robust standard errors are reported. All models include 10 year dummies and 13 industry dummies and an intercept which are not reported to conserve space. F-stats test the joint significance of the estimated coefficients under the null of no relations. AB AR (1) and AB AR (2) are the Arellano and Bond first- and second-order serial correlation tests under the null of no serial correlation. Sargan and Hansen tests are a test of overidentifying restrictions under the null of instrument validity. Difference in Hansen test is a test of exogeneity of instruments subsets under the null of exogeneity of instruments. a, b, and c superscripts represent significance at 1%, 5%, and 10%, respectively, for a two sample mean comparison tests.

7.6.2 Alternative definitions of expectants and non-expectants

In this subsection, we examine whether our conclusion on the anticipation of acquisitions (AoA) hypothesis (based on the market leverage ratios) are sensitive to our chosen definitions of expectants and non-expectants. The results presented in Table 7.11 suggest that the findings and conclusions drawn on the AoA hypothesis are robust to alternative definitions.

First, we consider definitions "Expectants 1" (Exp.1) and "Non-expectants 1" (Non-Exp.1) which ensure that leverage changes relating to past M&A activities of firms (i.e. acquisitions made in the pre-reference years, *t*-n), do not confound the results.[75] Therefore, Exp.1 are firms that make no acquisitions from years *t*-5 to *t*+4 (i.e. years *t*-5, *t*-4, *t*-3, *t*-2, *t*-1, *t*, *t*+1, *t*+2, *t*+3, and *t*+4), but only made acquisitions in year *t*+5. Similarly, Non-Exp.1 are firms which make no acquisitions from years *t*-5 to *t*+5.[76] The results based on these definitions are supportive of the AoA hypothesis because Exp.1 have faster speed of adjustment (32% vs. 23%) than Non-Exp.1 (see Columns (a) and (b) of Table 7.11).

In Columns (c) and (d) of Table 7.11, we show results based on a modified definition of expectants and non-expectants. We define "Expectants 2" (Exp.2) as firms in year *t* that make no acquisitions in years *t*+1 to *t*+4, but only make acquisitions in year *t*+5. On the other hand, "Non-expectants 2" (Non-Exp.2) are firms in year *t* that make no acquisitions in years *t*+1 to *t*+5. It must be noted that under these definitions (Exp.2 and Non-Exp.2), it is possible for these firms to have made acquisitions in years *t*-5 to *t* (i.e. the pre-reference year). These definitions increase the sample size but could lead to results confounded by the effects of pre-reference year acquisitions.

[75] It must be noted that the objective of the analyses is to examine the effect of an anticipated acquisition in year *t*+5 on the leverage changes (adjustments) made by firms between years *t* and *t*+4.
[76] It is possible for expectants and non-expectants to have made acquisitions in year *t*+6 and beyond but those periods are beyond the study's cut-off point. More so, we did not have data to allow us to make such observations.

Table 7.11

Market leverage estimates of SOA under alternative definitions of expectant and non-expectant firms

	(a)	(b)	(c)	(d)
Variables	**Exp.1**	**Non-Exp.1**	**Exp.2**	**Non-Exp.2**
Book leverage t-1	**0.679**[a]	**0.773**[a]	**0.691**[a]	**0.765**[a]
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*
Non-debt tax shelter	-0.267	-0.011	-0.018	-0.007
	(0.312)	*(0.157)*	*(0.417)*	*(0.314)*
Growth opportunities	-0.026	-0.011[a]	-0.019[a]	-0.012[a]
	(0.148)	*(0.000)*	*(0.000)*	*(0.000)*
Firm size	0.035	0.008[a]	0.009[a]	0.007[a]
	(0.352)	*(0.000)*	*(0.002)*	*(0.000)*
Profitability	-0.235[b]	-0.100[a]	-0.163[a]	-0.091[a]
	(0.030)	*(0.000)*	*(0.000)*	*(0.000)*
Asset tangibility	0.193	0.061[a]	0.077[a]	0.063[a]
	(0.315)	*(0.000)*	*(0.005)*	*(0.000)*
Altman Z-score	0.001	0.004[a]	-0.001	0.001
	(0.922)	*(0.002)*	*(0.784)*	*(0.118)*
R&D expense ratio	-1.060	-0.006	0.033	-0.012
	(0.430)	*(0.701)*	*(0.713)*	*(0.336)*
Missing R&D dummy	0.059	0.003	0.008	-0.001
	(0.498)	*(0.451)*	*(0.408)*	*(0.777)*
Stock return	0.145	-0.540[a]	-0.298[a]	-0.632[a]
	(0.691)	*(0.000)*	*(0.013)*	*(0.000)*
SOA (1-Leverage $_{t-1}$)	**0.32**	**0.23**	**0.31**	**0.23**
No. of Observations	414	7,652	1,140	13,742
No. of firms	110	2,355	294	4,377
F-stat.	142.68	231.38	31.37	334.07

Prob. > F	0.000	0.000	0.000	0.000
No. of instruments	41	41	41	41
AB AR(1) test (Pr > z)	0.003	0.000	0.000	0.000
AB AR(2) test (Pr > z)	0.199	0.196	0.948	0.369
Sargan test for OI res.	0.018	0.154	0.002	0.113
Hansen test for OI res.	0.833	0.753	0.284	0.710
Diff. in Hansen test				
Excluding group	0.679	0.722	0.311	0.418
Difference	0.773	0.535	0.284	0.929

The table presents regression results of the partial adjustment model in Eq. (7.4) estimated for expectants and non-expectants under two alternative definitions. The results of all models presented assume that all explanatory variables (except the lag of market leverage) are exogenous. Exp.1 are firms which make no acquisitions in years *t*-5 to *t*+4 but make an acquisition in year 5. Non-Exp.1 are firms in year *t* which make no acquisitions in years *t*-5 to *t*+5. Exp.2 are firms in year *t* which make no acquisitions in years *t*+1 to *t*+4 but make an acquisition in year *t*+5. Non-Exp.2 are firms in year *t* which make no acquisitions in years *t*+1 to *t*+5. Other variable definitions are in the list of definitions of key variables and terminologies on pages 15-22. The p-values are reported in *italics* and *parentheses* under the corresponding coefficient and robust standard errors are reported. All models include 10 year dummies and 13 industry dummies and an intercept which are not reported to conserve space. F-stats test the joint significance of the estimated coefficients under the null of no relations. AB AR (1) and AB AR (2) are the Arellano and Bond first- and second-order serial correlation tests under the null of no serial correlation. Sargan and Hansen tests are a test of overidentifying restrictions under the null of instrument validity. Difference in Hansen test is a test of exogeneity of instruments subsets under the null of exogeneity of instruments. a, b, and c superscripts represent significance at 1%, 5%, and 10%, respectively, for a two sample mean comparison tests.

Fortunately, the results do not suggest any serious problems in employing these definitions. The results under Columns (c) and (d) are very similar to the ones reported earlier (in Columns (a) and (b)). In fact, the conclusion that firms anticipating acquisitions rebalance their capital structures at a faster rate remains unchanged.

7.6.3 Relaxing the exogeneity assumption

Finally, Table 7.12 reports results based on the original model[77] assuming that all explanatory variables are non-exogenous (i.e. regressors are assumed to be either predetermined or endogenous). Broadly, relaxing the exogeneity assumption leaves the findings and the key conclusions qualitatively unchanged. As indicated by Table 7.12, overleveraged firms are the fastest to move towards target leverage levels, which is still supportive of the DoD hypothesis (see Columns (b) to (e)). Similarly, expectant firms adjust more quickly towards leverage targets than non-expectants (32% vs. 26%) as predicted by the AoA hypothesis. These results imply that the assumptions made about the model's explanatory variable are irrelevant to the overall conclusions drawn.[78]

In summary, the findings on the SOA and the extent of deviations (DoD hypothesis) are generally robust to book leverage measures. Similarly, the findings on the SOA and the anticipation of acquisitions (AoA hypothesis) are robust to alternative definitions of expectant and non-expectant firms. Further, the conclusions on the DoD and AoA hypotheses are unaffected by the assumptions made about the regressors. However, the results on the AoA hypothesis appear to be sensitive to the leverage measure employed.

[77] We use the term original model to refer to the partial adjustment model specified in Eq. (7.4) used in the main empirical analysis. It has market leverage as the dependent variable and assumes exogeneity of all explanatory variables (except lag of market leverage). The original model for the AoA tests is based on definitions of expectants and non-expectants that are used in the main analyses.

[78] The main analyses are not based on the assumption of endogenous explanatory variables because most of the models under the endogeneity assumption show signs of invalid instruments, as indicated by the rejection of the null in the Sargan/Hansen tests.

Table 7.12

Speed of adjustment for models assuming non-exogenous regressors

	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Variables	**All**	**Under**	**Norm1**	**Norm2**	**Over**	**Exp**	**Non-Exp**
Book leverage t-1	**0.697[a]**	**0.730[a]**	**0.734[a]**	**0.766[a]**	**0.652[a]**	**0.682[a]**	**0.744[a]**
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Non-debt tax shelter	-0.042[b]	-0.086[b]	0.002	-0.076[a]	-0.060[c]	-0.085	0.002
	(0.035)	*(0.017)*	*(0.942)*	*(0.007)*	*(0.077)*	*(0.144)*	*(0.940)*
Growth opportunities	-0.008[a]	-0.017[a]	-0.008[b]	-0.008[b]	-0.021[b]	-0.017[b]	-0.003
	(0.006)	*(0.003)*	*(0.029)*	*(0.023)*	*(0.016)*	*(0.054)*	*(0.362)*
Firm size	0.038[a]	0.029[a]	0.034[a]	0.003	0.049[a]	-0.003	0.040[a]
	(0.000)	*(0.002)*	*(0.000)*	*(0.665)*	*(0.002)*	*(0.810)*	*(0.000)*
Profitability	-0.206[a]	-0.184[a]	-0.120[a]	-0.151[a]	-0.144[b]	-0.081	-0.152[a]
	(0.000)	*(0.000)*	*(0.006)*	*(0.000)*	*(0.052)*	*(0.225)*	*(0.000)*
Asset tangibility	0.100[a]	0.027	0.068	0.081	0.126[c]	0.079	0.051
	(0.000)	*(0.611)*	*(0.121)*	*(0.106)*	*(0.059)*	*(0.343)*	*(0.374)*
Altman Z-score	0.009	0.003	0.008	0.005	-0.003	0.003	-0.009
	(0.285)	*(0.752)*	*(0.353)*	*(0.682)*	*(0.776)*	*(0.813)*	*(0.250)*
R&D expense ratio	0.004	0.255	0.095	-0.068	0.185	0.174	-0.032
	(0.949)	*(0.191)*	*(0.277)*	*(0.156)*	*(0.152)*	*(0.357)*	*(0.565)*
Missing R&D dummy	0.001	0.006	-0.011	0.033	0.021	0.018	0.056[b]
	(0.962)	*(0.785)*	*(0.578)*	*(0.165)*	*(0.511)*	*(0.735)*	*(0.037)*
Stock return	-0.886[a]	-0.689[a]	-0.270[b]	-0.730[a]	-1.113[a]	-0.238	-0.373[b]
	(0.000)	*(0.001)*	*(0.028)*	*(0.000)*	*(0.001)*	*(0.239)*	*(0.053)*
SOA (1-Leverage $_{t-1}$)	**0.30**	**0.27**	**0.27**	**0.23**	**0.35**	**0.32**	**0.26**
No. of Observation.	34,685	8,718	9,034	8,879	8,054	1,140	7,652
No. of firms	10,112	2,511	2,582	2,580	2,439	294	2,355
F-stat.	269.65	64.3	64.8	157.93	62.74	21.78	79.20
Prob. > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000

No. of instruments	113	113	113	113	113	113	113
AB AR(1) test (Pr > z)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AB AR(2) test (Pr > z)	0.578	0.134	0.823	0.59	0.952	0.944	0.383
Sargan test for OI res.	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen test for OI res.	0.000	0.000	0.000	0.000	0.000	0.147	0.000
Diff. in Hansen test (GMM)							
Excluding group	0.000	0.014	0.013	0.000	0.000	0.355	0.028
Difference	0.000	0.000	0.000	0.000	0.000	0.102	0.000
Diff. in Hansen test (IV)							
Excluding group	0.000	0.000	0.000	0.000	0.000	0.147	0.000
Difference	0.000	0.000	0.032	0.000	0.000	0.348	0.053

The table presents regression results of the partial adjustment model in Eq. (7.4) estimated for seven subsamples – all firms (All), extremely underleveraged firms (Under), moderately underleveraged firms (Norm1), moderately overleveraged firms (Norm2), extremely overleveraged firms (Over), expectants (Exp), and non-expectants (Non-Exp), In all models, the two-stage system GMM estimation technique is employed. All models assume that all explanatory variables (except industry and year dummies) are either exogenous or predetermined (non-exogenous). Variable definitions are in list of definitions of key variables and terminologies on pages 15-22. The p-values are reported in *italics* and *parentheses* under the corresponding coefficient and robust standard errors are selected. All models include 10 year dummies, 13 industry dummies and an intercept which are not reported to conserve space. F-stats test the joint significance of the estimated coefficients under the null of no relations. AB AR (1) and AB AR (2) are the Arellano and Bond first- and second-order serial correlation tests under the null of no serial correlation. Sargan and Hansen tests are a test of overidentifying restrictions under the null of instrument validity. Difference in Hansen test (GMM) is a test of exogeneity of instruments subsets used for the endogenous variables. Difference in Hansen test (IV) is a test of exogeneity of instruments subsets used for the exogenous variables. They are under the null of exogeneity of instruments. a, b, and c superscripts represent significance at 1%, 5%, and 10%, respectively, for a two sample mean comparison tests.

7.7 Conclusion and implications

This chapter investigates how corporate leverage adjustments are influenced by: (1) the extent of discrepancy between firms' actual leverage ratios and their target leverage ratios; and (2) the anticipation of acquisitions. We find that firms with substantial deviations from their target leverage (extreme deviants) tend to exhibit different adjustment behaviours from those firms that are fairly close to their leverage targets (moderate deviants). In general, extreme deviants, particularly overleveraged firms, take more drastic and aggressive steps to move their leverage ratios towards target levels, implying that extreme deviations from target leverage may be very costly to firms (Uysal, 2011).

We also find that capital structure rebalancing by overleveraged firms is usually undertaken by issuing relatively more equity and less debt. For underleveraged firms, they tend to adjust their leverage towards target levels by issuing relatively more debt and less equity. Given the presence of higher transaction costs (see Lee et al., 1996) in issuing equity capital, it is interesting to find overleveraged firms being prepared to incur these costs in order to return their leverage back to target levels. It suggests that, to these overleveraged firms, the cost of being overleveraged (in the form of constrained M&A activities) is greater than the transaction costs of issuing equity capital.

Collectively, these findings support the existence and relevance of leverage targets as suggested by the trade-off theory. It also supports the view that due to the transaction cost associated with leverage adjustments, small deviations from leverage targets may not be immediately (quickly) eliminated by firms (Fischer et al., 1989), leading to asymmetry in the speeds of adjustment for firms with extreme deviations and those with moderate deviations.

Another key aspect of this chapter is that it increases our understanding of the link between future investment plans and leverage adjustments of firms prior to planned investments. We find that the desire to make acquisitions in the near future serves as an incentive for firms (especially overleveraged firms) to return their leverage ratios to target levels. This fits perfectly with the findings in the previous empirical chapters (i.e. overleveraged firms are less likely to make acquisitions).

An important implication of the finding on the link between acquisition plans and capital structure rebalancing is that by observing the capital structure rebalancing behaviour of firms, it may be possible to predict their future acquisition decisions. In other words, when firms (particularly overleveraged firms) are actively working to return their leverage ratios to target levels, it may actually be part of its preparations to launch an acquisition.

In sum, the findings in this chapter contribute to our understanding of corporate leverage adjustments by showing that capital structure rebalancing is not symmetric for all firms but varies on two fronts; first, the degree of current deviations from target; and second, the anticipation or otherwise of acquisitions in the near future.

Theoretically, the results contained in the present chapter increase our understanding of the capital structure theory. Like the results reported in Chapter 5, these results generally support the existence and relevance of the target leverage ratio (and the trade-off theory). It however suggests that the degree of importance to managers (and the extent of support for the trade-off theory) differs depending on the type of firm. In particular, the target leverage ratio may be more important to managers of overleveraged firms and to managers of firms anticipating acquisitions in the immediate future. In other words, for the fear of facing future investment constraints, managers of overleveraged firms and acquiring firms undertake frantic efforts to move close to the "optimal" debt ratio. Thus, the chapter's findings support the trade-off theory of capital structure. Also, the chapter's findings are consistent with the inefficient management theory of M&As because expectants (who later become acquirers) take steps that make them appear to be efficient (optimal) to investors.

Chapter 8

Summary and Conclusions

8.1 Introduction

This study has three broad objectives. First, it aims to re-examine the association between firms' deviations from their leverage targets (i.e. leverage deviation) and the probability of undertaking acquisitions using a sample of UK firms. To the best of our knowledge, the relationship between leverage deviation and acquisition probability was first investigated by Uysal (2011) who without advancing any justifications restricts his sample to US *domestic* acquisitions. Unlike this prior study, our study examines both domestic and *cross-border* acquisitions. Given the increasing significance of cross-border acquisitions in recent years and the substantial amounts of corporate resources needed to execute these deals, it is argued (in Chapters 1 and 3) that an important gap exists in this relatively new literature.

It is also argued in Chapter 5 that the empirical design used in Uysal (2011) which relates the leverage deviations of firms in a given year to their acquisition activities occurring within a 17-year period is likely to *understate* the link between leverage deviation and acquisition probability. This is because firms have the option to remove deviations in their leverage ratios over time and the longer the gap between leverage deviation and the acquisition activity, the easier it is for firms to undo deviations in their leverage ratios and neutralise the negative leverage deviation effect. More so, Uysal (2011) excludes cross-border acquisitions and this is also likely to *understate* the link between leverage deviation and acquisition probability. Therefore, the framework used in the present study incorporates the possibility of pre-acquisition leverage adjustments by prospective acquirers and also analyses cross-border acquisitions.

Second, the study aims to examine the influence of corporate diversification on the link between leverage deviation and the acquisition probability. We argue that, if, in making lending decisions, investors incorporate the risks and return implications of the borrowing firms' planned investments, then acquisitions undertaken by a firm could influence its *ex-ante* debt financing constraint. We also explore whether the *acquiring firm's pre-acquisition level of diversification* influences the link between leverage deviation and the acquisition probability.

Third, this study investigates the role played by the extent of firms' leverage deviation and their anticipation of acquisitions in corporate capital structure rebalancing behaviour. It is posited that the speed of adjustment towards the target leverage ratio may also be asymmetric across firms with different levels of leverage deviation and with different acquisition expectations.

The remaining parts of this concluding chapter summarise key issues of the thesis, draw broad inferences from the main findings, and point to some interesting but unresolved issues that are worthy of further inquiry.

8.2 Summary of preceding chapters

This section presents a summary of the main findings and conclusions of Chapters 2 to 7. Chapter 2 presents a comprehensive review of the principal motivations for M&As. The key motives for M&As stem from synergy, agency, and hubris. The empirical evidence on the motives for M&As is also reviewed. The evidence suggests that although majority of M&As in the US, the UK, and Europe are linked to managers' pursuit of efficiency in an attempt to maximise shareholders' wealth (i.e. the synergy motive), there is also ample evidence in the sample for M&As driven by the other two motives (i.e. agency and hubris). The chapter also comprehensively reviews some of the factors that influence acquirers' announcement shareholders' wealth effect. It concludes that:

1) cash/debt-financed acquisitions tend to create gains for acquirers' shareholders, while equity-financed acquisitions often result in losses for acquirers' shareholders;
2) diversifying acquisitions and agency-motivated acquisitions typically underperformed other types of acquisitions.

Finally, this chapter reviews the literature on how M&As affect bondholders' wealth. It appears leverage-increasing M&As tend to increase the risks of financial distress, and are thus detrimental to the interest of bondholders. However, risk-reducing acquisitions tend to be beneficial to bondholders.

The objective of Chapter 3 is to briefly review the dominant theories of capital structure with special emphasis on the trade-off theory and utilise the implications of these theories to establish the link between leverage deviation and corporate acquisition probability. From the perspective of the trade-off theory, deviations from the target (optimal) leverage ratio could be viewed by investors as a suboptimal corporate action which could make these investors less willing to supply capital to firms with extreme leverage deviations. Moreover, firms that maintain leverage ratios that are far above the target leverage ratio (i.e. overleveraged firms) may be associated with higher bankruptcy probability which may make lenders extremely cautious in advancing credit to them. The empirical evidence suggests that high-leveraged firms and above-target leveraged (overleveraged) firms tend to have low debt (borrowing) capacity, and thus, face debt financing constraint. Furthermore, the chapter reviews the key studies that are related to the present study and highlights the various ways in which the present study differs from them. Lastly, this chapter develops the central hypotheses (i.e. Hypotheses H1a and H1b) which relate leverage deviation to the acquisition probability.

Chapter 4 presents the general framework used in the empirical work in the subsequent chapters (Chapters 5, 6, and 7). A detailed description of the data collection process (for both firms and M&A samples) is presented and summary statistics on the main subsamples are also discussed. The statistics suggest that relative to the other subsamples, extremely overleveraged firms are more likely to face debt financing constraints (consistent with Hypothesis H1). Also, the analysis of the M&A sample reveals that related (within-industry) and cross-border acquisitions are generally larger and more likely to require external (debt) financing. Finally, the chapter presents the definitions and construction of the two key variables of the study – financial leverage and leverage deviation.

Chapter 5 is the first empirical chapter. Thus, it presents a detailed analysis and discussion of the association between leverage deviation and acquisition probability. First, it builds on the review conducted in Chapters 2 and 3 and formulates hypotheses H1a, H1b, H2a, H2b, and H3 (see Appendix 1). Second, the chapter describes the main method used in investigating the leverage deviation effect on the acquisition probability. Also, it discusses the construction of the main subsamples, the empirical model (i.e. the acquisition probability model), and the preferred estimation method (the probit regression). Third, the empirical tests of the hypotheses (Hypotheses H1, H2, and H3) are conducted and the findings presented and discussed. The evidence suggests that leverage deviation (and overleveraging) is associated with a 12.7% (5.1%) significantly lower acquisition probability. In comparison with the prior study that reported a leverage deviation (overleveraging) effect of 5.2% (0.9%), the chapter's results suggest that either Uysal's (2011) empirical framework underestimated the leverage deviation effect or the effect is stronger among UK firms, in relation to US firms. The chapter's results also indicate that underleveraging (an aspect of leverage deviation) is not associated with a significantly reduced acquisition probability, which implies that the deviation costs associated with underleveraging may be less than that of extreme overleveraging. Finally, the chapter discusses and shows that the leverage deviation effect may be limited to only cash/debt-financed acquisitions, implying that leverage deviation is likely to be related to the acquisition probability via debt financing constraint.

Chapter 6 examines the role of corporate diversification within the context of the link between leverage deviation and the acquisition probability. In this regard, we explore the influence of diversification from two main perspectives:

1) the diversification characteristic of the proposed acquisition deal (i.e. diversifying vs. related deals; and domestic vs. cross-border deals), and
2) the acquirers' pre-acquisition level of diversification (i.e. diversified vs. focused firms).

The chapter develops the relevant hypotheses (Hypotheses H4, H5, and H6) and presents as well as discusses the empirical tests of the hypotheses. We report that, the negative leverage deviation (overleveraging) effect is weaker in diversifying acquisition deals (relative to related acquisitions), which tend to be smaller (in terms of transaction value) and risk-reducing. Also, the evidence suggests a stronger negative overleveraging and underleveraging effect in cross-border acquisitions than in domestic acquisitions. We conclude that since cross-border deals are, on average, larger than domestic deals, and also tend to involve additional foreign exchange and political risks, the results are consistent with the view that large cross-border acquisitions may be agency-motivated and may result in greater risks for the combined firm. Lastly, the chapter shows that the leverage deviation effect is more pronounced among diversified (multi-segment) acquirers than among focused (single-segment) acquirers. This implies that investors are less likely to lend to diversified overleveraged firms that intend to undertake acquisitions, probably because they perceive such acquisitions to be motivated by managers pursuing firm growth maximization objectives.

Finally, Chapter 7 conducts further inquiry into whether the concept of target leverage ratio is important for managers, particularly for those managers who deviate substantially from their target leverage and plan to undertake acquisitions in the immediate future. This inquiry is performed through the partial adjustment model which estimates the speed of adjustment (SOA). The chapter outlines the method used for the empirical analysis and also develops the relevant hypotheses (Hypotheses H7 and H8) before undertaking the empirical tests and presenting and discussing the results. The results indicate that, the SOA is fastest among extremely overleveraged firms, suggesting that managers of extremely overleveraged firms do recognise the costs (and risks) of deviating from their leverage targets, and thus, take aggressive steps in rebalancing their capital structures. We also find that, even among extremely overleveraged and extremely underleveraged firms, the SOAs towards the target leverage ratio were fastest when the firms were anticipating acquisitions in the immediate future. We conclude that in making capital structure decisions, firms do incorporate their future acquisition plans. It is, however, important to point out that these measures of SOAs are point estimates and do not test the statistical differences between the SOA estimates for the various subsamples. Thus, these findings and the conclusions drawn therefrom should be interpreted with this point in mind.

8.3 Key conclusions, discussions, and practical and theoretical implications

The study draws five major conclusions from its findings. These conclusions and their practical and theoretical implications are briefly discussed in the following subsections.

8.3.1 Importance of target leverage ratio

First and foremost, the target leverage ratio appears to be very important and useful in managerial decisions, since it influences major corporate events such as M&As and capital structure decisions. Two of our key findings support this conclusion. First, we show that firms that substantially deviate from their *target leverage ratios* have a lower probability of undertaking acquisitions. This implies that the target leverage ratio could influence firms' level of investment, and subsequently their shareholders' return. Second, we show that firms that plan to undertake acquisitions tend to take aggressive steps to return their leverage ratios close to their target levels. In fact, our conclusion regarding the importance of target leverage ratios in managerial decisions appears to be consistent with the finding that over 81% of chief financial officers claim to have target leverage ratios (see Graham and Harvey, 2001). In addition, the study shows that it is not sufficient for corporations to have target leverage ratios but they need to closely monitor their actual leverage ratios against these targets, since extreme deviations from them (i.e. the target leverage ratios) could prove costly in terms of forgoing some net present value investments.

Furthermore, these findings have implications on the theories of capital structure and M&As. For the capital structure theory, since our results suggest ***the relevance of the target leverage ratio to managerial decisions,*** our study provides support to the trade-off theory. This is because the pecking order theory disputes the existence and/or relevance of the target leverage ratio and suggests that the financing choices of managers are *purely* a matter of preference of one financing source (debt) to another (equity) (see e.g. Myers, 2001). However, from our study, it seems plausible to expect a manager of a firm who has preference for external debt capital to choose external equity capital (instead of debt) if using debt capital would make the firm exceed its target leverage ratio (i.e. overleveraged). This is particularly so when the firm expects to undertake acquisitions in the near future, in order that its planned acquisitions are not constrained. In brief, our key results imply that the trade-off theory (via the current/past deviations from corporate target leverage ratio) offers one potential reason why firms may not always follow the standard pecking order of internal funds, external debt, and external equity. When a firm is almost overleveraged and expects to undertake acquisitions, its managers may not follow the standard pecking order in their financing choices.

Finally, our conclusion that the target leverage ratio is important for managerial decisions adds to our understanding of the theories of M&As. It seems firms are more (less) likely to undertake M&As when they are close to (far away from) their target leverage ratios. In general, our findings seem to provide evidence in support of the inefficient management hypothesis/theory, but against the unused debt capacity hypothesis/theory of M&As reviewed in Chapter 2. This is because while we fail to find support for the view that extremely underleveraged firms (i.e. those with more unused debt capacity) are more likely to undertake M&As, we find that moderately under/overleveraged firms (i.e. those close to their target leverage ratios) are frequent acquirers. Since the trade-off theory implies that managers of firms that are close to (far away from) their target leverage ratios are efficient (inefficient), we view our findings to be more related to the inefficient management theory of M&As. In other words, firms that manage their capital structures efficiently/optimally tend to be successful in their acquisition attempts, and hence are more likely to become acquirers.

8.3.2 Higher overleverage effect

Another important conclusion that can be drawn from the present study is that overleveraging (i.e. maintaining above-target leverage) and underleveraging (i.e. having below-target leverage) may not have the same effect on a firm's acquisition probability. Specifically, while the effect of overleverage is negative and significant, underleverage has an insignificant effect on the probability that a firm makes an acquisition. This suggests that overleveraged firms may be required to pay higher price on the capital market if they need external funds to support their planned investment; a price which appears to be so high to put off some planned acquisitions. On the contrary, underleveraged firms do not seem to experience any serious debt financing constraints. In fact, underleveraged firms appear to be able to have almost equal access for funds to finance their acquisitions as do firms that are very close to their leverage targets. Overall, we conclude along the lines of the findings of van Binsbergen et al.

(2010) that *"the cost of being overleveraged is asymmetrically higher than the cost of being underleveraged"*.

In fact, our conclusion of higher overleveraged effect implies that managers of overleveraged firms will give more regard to their target leverage ratios, compared to their counterparts managing underleveraged firms. Thus, theoretically, our study suggests that the trade-off theory of capital structure and the inefficient management theory of M&As may better explain the managerial/corporate actions of firms that are heavily reliant on debt financing than those that do not make any significant use of debt in financing their investments.

8.3.3 Higher overleverage effect for diversified firms

The study's results also allow us to conclude that overleveraging tends to deplete the financial flexibility associated with pursuing a corporate diversification strategy. It seems the view that diversified firms have greater debt capacity (Lewellen, 1971) and larger internal capital markets (Stein, 1997) is restricted to only diversified firms that are either close to or below their leverage targets. This conclusion stems from the study's finding that diversified firms that are overleveraged are beset with significant constraints on their acquisition activities. Such constraints may be indicative of their inability to access external (debt) financing and the non-existence of alternative financing sources (e.g. internal cash reserves). It is not surprising for overleveraged firms (whether diversified or focused) to have their internal funding pool depleted, since Stulz (1990) and Jensen (1986) both suggest that the regular interest payments associated with debt capital forces firms to pay out cash. Therefore, it is very possible that overleveraged diversified firms may have depleted their internal cash pool. In terms of their higher debt capacity, it seems quite obvious (from the review undertaken in Chapter 3) that being overleveraged implies usage of all debt capacities; thus, overleveraging erodes all the financing advantages associated with being a diversified firm.

Since the negative overleverage effect was less severe and sometimes negligible in the case of focused firms, one of the plausible inferences that can be drawn is that investors view proposed acquisitions by overleveraged diversified firms with more suspicion and are therefore less willing to finance such deals. Investors appear to see such deals as being motivated by management's desire to grow the size of the firm rather than enhance firm value (Jensen, 1986), because diversified firms are already generally larger than focused firms, thus, any further acquisitions could be seen to be prone to overinvestment (i.e. investment inefficiency).

The study's finding of reduced acquisition probability for overleveraged diversified firms appears to be consistent with Singhal and Zhu (2011) who report that although diversified firms generally invest significantly more than focused firms, their subsample of diversified firms with greater leverage have significantly lower investment than the subsample of focused firms with more leverage. Thus, Singhal and Zhu's (2011) finding implies that higher levels of leverage are associated with greater investment constraints in diversified firms.

A major implication of the results on the capital structure theory is that ***the importance managers of acquiring firms place on the target leverage ratio (and the trade-off theory) may depend, to some extent, on the organisational form of the acquirers.*** In particular, acquirers with diversified pre-acquisition organisational structure (i.e. diversified acquirers) would pay more attention to their target leverage ratios since they tend to face greater debt financing constraint. Since the target leverage ratio is considered to be important under the trade-off theory of capital structure, it could be concluded that the trade-off theory may find more support in an environment of diversified acquirers. On the contrary, the trade-off theory may be rejected in favour of the pecking order theory in an environment of focused (single-segment) acquirers.

Finally, the study's results throw more light on the theories of M&As. To the extent that the acquirers' size serves as a proxy for value-destroying acquirers (Moeller et al., 2004), our conclusion in this subsection is supportive of the agency theory of M&As. It seems investors fail to support managers of diversified firms possibly because they (investors) suspects them (managers) to grow the size of the firm beyond optimal levels (Jensen, 1986).

8.3.4 Lower overleverage effect for risk-reducing acquisition deals

Another implication of the study's results is that the perceived risks associated with the proposed investments of risky (overleveraged) firms tend to influence their *ex-ante* ability to obtain financing for them. In particular, we showed that overleveraged firms are more likely to obtain financing to support their acquisitions if they pursue less risky acquisition deals (i.e. domestic and diversifying deals) than when they pursue more risky acquisitions such as related and cross-border deals. These findings are consistent with the notion that diversifying acquisitions could be risk-reducing (Lewellen, 1971), and foreign corporate activities could be risk-increasing (Bartov et al., 1996). Overall, it may be concluded that, by choosing some types of target firms, managers of overleveraged acquiring firms may be able to mitigate the debt financing constraint faced by their firms.

Further, a key implication of the results on the capital structure theory is that ***the importance managers of acquiring firms place on the target leverage ratio (and the trade-off theory) may depend, to some extent, on the type of target firm they pursue.*** Specifically, acquirers undertaking related (within-industry) acquisitions (i.e. related acquirers) may give more consideration to their target leverage ratios since they tend to face greater debt financing constraint. As pointed out earlier, since the target leverage ratio is seen to be important under the trade-off theory of capital structure, it seems the trade-off theory may find more support in a sample of related acquirers. In contrast, the trade-off theory may be rejected in favour of the pecking order theory in a sample of diversifying (cross-industry).

Also, the results of the study add to our understanding of the theories of M&As. If the size of the acquisition transaction proxies for acquisitions that destroy shareholders' wealth (Moeller et al., 2004), then, the study's results seem to provide evidence in favour of the agency theory of M&As. It seems investors fail to support managers of related acquirers (via denying them financing) because they (investors) probably view them (managers) as selectively choosing target firms that enhance the dependence of the combined firm on the specialised skills of the incumbent managers (Shleifer and Vishney, 1989). Thus, the agency theory of M&As is likely to find more support in related (within-industry) acquisitions, compared to diversifying (cross-industry) acquisitions.

8.3.5 Asymmetric speed of adjustment

Finally, the thesis concludes that capital structure rebalancing behaviour of firms is influenced by the extent to which firms deviate from their leverage targets, implying that estimating the speed of adjustment for firms without regard to their deviation levels could lead to biased estimates and wrongful rejections of the trade-off theory of capital structure. In other words, tests of the trade-off theory based on the speed of adjustment approach may find more (less) support in a sample dominated by firms that have, in the past, deviated substantially (marginally) from their target leverage ratios. Another interesting implication of this result is that the presence of adjustment costs makes firms with marginal deviations from their target leverage adjust more slowly (or less frequently) towards their leverage targets, implying that slow adjustments do not necessarily undermine the existence and importance of leverage targets and the trade-off theory. Instead, slow adjustments may simply suggest that adjustment cost (deviation cost) is high (low) for firms with moderate leverage deviations and this makes them to absorb the deviation cost internally rather than resort to the external capital markets and incur the cost of issuing new securities. These conclusions are consistent with those reached by Byoun (2008) who report faster adjustment rates when the extent of deviation from target is controlled for than when it is ignored.

Also, the desire of firms to quickly return their leverage ratios to target levels is influenced by their acquisition plans. This is further evidence in support of the earlier finding that deviations from target leverage ratios do influence corporate acquisition probability. Specifically, the study shows that firms with extreme leverage deviations (both overleverage and underleverage) are faster in eliminating the deviations from their leverage targets when they anticipate acquisitions in the near future than when they have no immediate acquisition plans. This suggests that investment opportunities do influence the capital structure rebalancing decisions of firms (DeAngelo, DeAngelo, and Whited, 2011). The implication is that overleveraged firms with profitable investment opportunities (i.e. anticipating acquisitions) may seek to return to target leverage levels by either issuing more equity or paying down on their existing debts. The latter option is more likely when overleveraged firms have excess internal funds (financial surplus) (Byoun, 2008).

For underleveraged firms with growth opportunities (i.e. anticipating acquisitions), the evidence presented in this study suggests that they are also quick to close the gap between their actual leverage ratios and their leverage targets. This is consistent with the findings of Byoun (2008) but inconsistent with the predictions of DeAngelo et al. (2011). Byoun (2008) reports that underleveraged firms that require external financing to support their planned investments do aggressively move towards their leverage targets, while DeAngelo et al. (2011) suggest that underleveraged firms with growth opportunities may not be quick to lever up. The evidence deduced by the present study suggests that acquisition prospects (growth opportunities) present incentives, rather than disincentive, for underleveraged firms to return their leverage ratios to target levels.

Overall, these results and the conclusions drawn therefrom are consistent with the key conclusions reached under subsection 8.3.1. That is, staying close to the target leverage ratio is an important matter for managers, particularly for managers of overleveraged firms and acquiring firms. In other words, for the fear of facing future investment constraints, managers of overleveraged firms and acquiring firms engage in frantic efforts to move close to the "optimal" debt ratio. Thus, the study's findings support the trade-off theory of capital structure and the inefficient management theory of M&As.

8.4 Limitations of the study and suggestions for future research

Despite the contributions made by the present study, it is limited in three major ways. First, the focus and scope of the study limit its findings and conclusions to only UK public companies, implying that any interpretation of the results outside the context of UK public firms needs to be done with extreme caution. Second, the study implicitly assumes that the constrained investments (acquisitions) resulting from overleveraging is costly to shareholders. This assumption might not be plausible, since investment constraint could be beneficial to shareholders of firms that are prone to the overinvestment problem. It will be very insightful to know whether investment constraint due to overleveraging is ultimately costly or beneficial to shareholders. However, the present study falls short of being able to resolve that matter. Finally, the study may be limited by the proxy variables used in the analyses, since proxy variables are generally imperfect measures of constructs. Therefore, the proxy variables may deviate from the "true" values of the variables of interest. For example, it has been stated in Chapter 4 that the key variable of the study – leverage deviation – is dependent on the target leverage ratio, which is unobservable and therefore needs to be estimated. The estimated target leverage ratio may not necessary coincide with the "true" value of the target leverage ratio, and variances between the actual and estimated target leverage ratio could bias the findings and conclusions of the study. Consequently, the findings and conclusions of this study should be interpreted with this fact in mind.

In the light of the above-stated limitations and some other matters which we belief have the potential to enhance our understanding in this field of research, but that remain unsettled, we propose the following six issues for future research:

1) Overleveraging has been found to reduce the probability of firms undertaking *cash* acquisitions, but not equity acquisitions. However, cash acquisitions are defined by Thomson ONE's database to include acquisitions funded from either internal corporate funds or new borrowing (debt). Whether the overleverage effect on cash acquisitions is due to reduced debt financing or reduced internal funding is not sufficiently clear, and later studies can explore this matter further.
2) The present study suggests that overleveraged firms anticipating acquisitions do rebalance their capital structures more quickly, possibly, to enable them access debt financing for their planned acquisitions. But Harford et al. (2009) show that overleveraged firms are less (more) likely to make debt (equity)-financed acquisitions. It will, thus, be interesting to examine whether the capital structure rebalancing activities of overleveraged prospective bidders (in the pre-merger years) increase their chances of undertaking debt-financed acquisitions.
3) It is also possible for the capital structure rebalancing behaviour of acquiring firms in the pre-acquisition period to differ depending on the risks of the anticipated acquisition (i.e. diversifying vs. related deals, and domestic vs. cross-border deals) and also vary between diversified and focused firms, since the effect of overleveraging on acquisition probability varies along those lines (as discussed in Chapter 6). Data and time constraints did not permit these lines of inquiry to be researched by the present study.

4) Prior studies as well as the present study limit their sample to public firms, implying that an important gap exists in our knowledge of how the major conclusions about the linkage between financial leverage and corporate M&As apply to private firms. Given that private firms generally have limited access to the external capital market but also tend to have higher leverage ratios (Brav, 2009), it will be interesting to find out how deviations from the leverage targets of private (unlisted) firms affect their acquisition activities.
5) Although extreme overleveraging appears to constrain investments (acquisitions), its ultimate effect on firm value is not clear. Ultimately, the overleverage effect on firm value will depend on whether the acquisitions forgone (due to the debt financing constraint) are positive or negative net present value projects, but no known empirical study has yet considered this matter within the context of the overleverage effect on acquisitions. Such a study could help determine whether the constraints that overleveraging imposes on corporate M&A activities ultimately ends up in costs or benefits to shareholders. If overleveraging curbs (creates) overinvestments (underinvestments), then it could be beneficial (costly) to shareholders, but as it stands, it is quite unclear.
6) Finally, since capital structure decisions tend to vary across countries (Rajan and Zingales, 1995) and between bank-based economies and market-based economies (Antoniou et al., 2008), it may be interesting to investigate whether the impact of overleveraging (on acquisition probability) may stronger in some economies than in other economies. It may also be interesting to undertake similar studies for firms in developing countries with less developed equity/financial markets.

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Appendix 1

List of Hypotheses

No.	Hypotheses	Details	Basis	Tested in:
1	H1a	The probability of undertaking acquisitions decreases with leverage deviation, all else equal	Management inefficiency - Managers who deviate from the target leverage deviation may be regarded as inefficient and thus unable to command support from investors for their M&A activities.	Chapter 5
2	H1b	The probability of undertaking acquisitions decreases more with overleveraging compared to underleveraging, all else equal.	M&As tend to increase leverage and managers aim to stay close to their leverage targets. Managers of overleveraged (underleveraged) firms may be discouraged from undertaking (encouraged to undertake) acquisitions. Also, overleveraged firms may be viewed by investors as risky and lacking debt capacity, and thus, they are likely to face debt financing constraints.	Chapter 5
3	H2a	The probability of undertaking cash/debt-financing acquisitions decreases with leverage deviation, all else equal.	Overleveraging is associated with debt financing constraint but not necessarily equity financing constraint. Overleveraging also reduces internal cash flows via the cash outflows towards debt interest payments and debt principal repayments.	Chapter 5
4	H2b	The probability of undertaking cash/debt-financing acquisitions decreases more with	Same basis as in H1b above.	Chapter 5

		overleveraging compared to underleveraging, all else equal.		
5	H3	The probability of undertaking equity-financing acquisitions does not decrease with leverage deviation, all else equal.	Overleveraging seems to constrain firms from issuing new debt and from piling up internal cash flows, but does not seem to substantially affect equity issues.	Chapter 5
6	H4	The association between leverage deviation (overleveraging) and the probability of undertaking acquisitions is less pronounced in diversifying M&A deals than in related M&A deals	Diversifying acquisitions are associated with risk reduction which reduces the debt financing constraint faced by overleveraged acquirers. Related acquisitions may be associated with agency problems because "specialist" managers may want to link the continued existence of the merged firm to their specialised skills and knowledge. Such managers are more likely to buy targets from their own industries and consequently increase the assets under their control. Therefore, lenders may be more (less) willing to fund diversifying (related) acquisitions.	Chapter 6
7	H5	The association between leverage deviation (overleverage) and the probability of undertaking acquisitions is more pronounced in cross-border acquisitions than in domestic	Cross-border acquisitions are associated with additional risks (e.g. foreign exchange and political risks) which could make firms more risky and less attractive to lenders. Moreover, cross-border acquisitions tend to be associated with greater agency problems since shareholders tend to make more losses	Chapter 6

		acquisitions.	in cross-border M&As while at the same time managers gain more in cross-border M&As. Thus, cross-border M&As may be less attractive to lenders.	
8	H6	The leverage deviation effect is more pronounced for diversified acquirers than for focused acquirers.	Diversified firms face greater agency cost because their managers may lack discipline from the external capital markets. This is because diversified firms tend to have more internal cash flows relative to focused firms. Due to the lack of market discipline, diversified firms may be perceived by lenders to be susceptible to the overinvestment problem. Also, diversified firms tend to be larger than focused firms and since larger acquirers generally engage in value-destroying acquisitions, investors may view the M&A activities of diversified firms to be value-destroying. Consequently, the debt financing constraint associated with acquisition probability may be higher for overleveraged diversified acquirers compared to overleveraged focused acquirers.	Chapter 6
9	H7	Firms with extreme leverage deviations will be faster in rebalancing their capital structures, relative to firms with moderate leverage	The cost of extremely deviating from a firm's target leverage ratio appears to be greater than the cost of have marginal deviations from leverage targets. Thus, managers should aggressively act to eliminate extreme leverage deviations.	Chapter 7

		deviations.		
10	H8	The speed of adjustment will be higher for firms that are anticipating acquisitions in the immediate future than for firms with no acquisition expectations in the near future.	Since leverage deviation appears to be costly by constraining corporate M&A activities, rationale managers may aggressively try to eliminate their leverage deviations when they expect to undertake acquisitions in the immediate future.	Chapter 7