Going Private through LBOs: Empirical Evidence from European markets

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ABSTRACT

This thesis examines public-to-private leveraged buyouts (LBOs) in Europe that occurred between 1998 and 2011. Using a sample of 127 companies that went private through LBO, we investigate both the value gains generated to the pre-buyout shareholders of target companies and the sources of these variations in the stock performance. The results of the cross-sectional regression analysis support the agency cost and information asymmetry theories, as companies with high free cash flow or companies that have been undervalued by the market tend to reap strong abnormal returns. In addition, using a sample of 72 buyout firms with sufficient financial data and a matched-control sample of peer groups, we examine, through logistic regression methodology, the determinants that affect the likelihood of public-to-private buyout transactions. The findings are consistent with the free cash flow theory, as mature companies with excess cash seem to be more likely candidates for such deals.

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CHAPTER 1

1.1 INTRODUCTION

Public-to-private buyouts became a prominent acquisition type during the 1980s' merger wave. In this period, whole businesses or divisions of corporations with poor operating performance were taken private by specialized investment firms, referred as private equity firms. Such acquisitions were financed using relatively large amount of debt with the remaining consideration funded through equity (Povaly, 2010). This groundbreaking financing mix gave rise to leveraged buyouts (LBOs thereafter) which in many cases proved to be the source of superior value creation and contributed to the growth of private equity market in the last decades. Following the acquisition of the buyout firm, public shareholders are bought out and the company is subsequently delisted from the stock exchange. The private equity firm which provides the majority of equity capital supervises the buyout process and monitors the company following the LBO (Rosenbaum and Pearl, 2010).

The current thesis investigates a sample of public-to-private LBOs that took place in Western Europe between 1998 and 2011. The main purpose of the study is to examine the wealth effects of the leveraged buyout announcements and identify the characteristics of the buyout targets that favor such transactions. The research questions that the present study attempts to explore are the following:

1. What is the generated return of the public-to-private LBOs in Western Europe for the pre-buyout shareholders and what are the different sources of these gains?
2. What are the determinants of public-to-private LBOs in Western Europe?

To provide an unequivocal answer to these questions, we employ a sample 127 European LBOs by employing the classical event study methodology. We also deploy equality testing and regression analysis in order to uncover the major characteristics of LBO targets that may affect the possibility of

occurrence of LBOs. For this purpose, we form a matched-sized control sample of public firms which meet specified criteria.

The majority of studies on public-to-private LBO activity refer to U.S. market, especially in the first wave of LBOs which ended in the end of 80s. However, during the last twenty years the private equity market has developed in a global manner and the nature of transactions has changed to some extent. Recent LBO activity in Europe is an academic topic that requires further investigation. Empirical research on European deals comes from a few studies in which many cases led to controversial results. This study, therefore, aims at contributing to the existing literature by providing evidence from a market that is relatively under-researched. Moreover, the current study extends recent studies on the topic by including LBO deals that took place during the period of financial crisis. Although, deals after 2008 are few in the whole sample, the results of this study are expected to incorporate the latest trends in the buyout market following the structural changes caused by financial crisis.

This thesis is organized as follows. Chapter 1 is completed after a brief documenting on the evolution of the buyout market over time. Chapter 2 reviews the academic works related to the research area and sets the theoretical framework of the analysis. Chapter 3 describes the data selection process and the methodology employed for the purpose of the data analysis. Chapter 4 reports the empirical results with regard to previous studies. Finally, Chapter 5 presents the conclusions of the thesis.

1.2 THE EVOLUTION OF THE BUYOUT MARKET

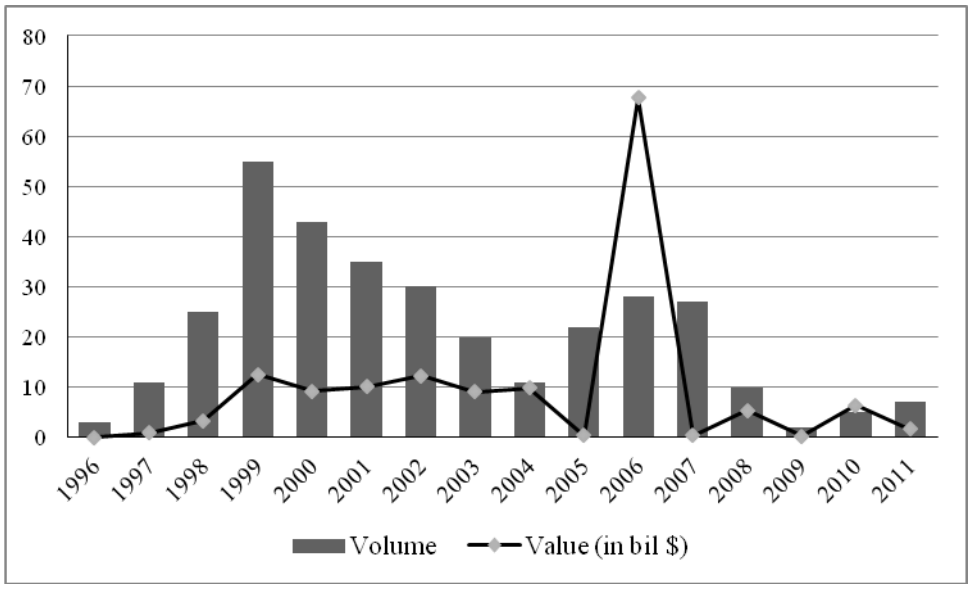
LBOs first emerged as an important phenomenon in late of 1980s in the U.S. market. However, the continental Europe did not catch on, although it was also experiencing a merger boom, as well. Differences in the legal and tax environment have been documented as the main obstacles posed to investors (Povaly, 2010). During the same period, only the UK experienced an explosive growth in the management buyouts (MBOs) in which the acquiring firm consists mostly of the buyout firm's management. The U.S. buyout market reached its peak in 1989 after which it slowed down due to several bankruptcies caused by over-leveraging of acquired firms (Povaly, 2010). After mid 1990s, however, LBO market recovered and experienced global growth following the technology boom of the same period. European transactions increased significantly in terms of volume and value till the end of the decade. Private equity activity declined during 2001-2002 due to the technology stock market crisis; nevertheless, by the end of 2003 it experienced further growth. The harmonization of national corporate and tax laws across European Union benefited private equity firms in fund raising and managing their investments. The favourable market conditions that prevailed this period allowed more risky investments to larger firms and with more aggressive financing structures. This growth, however, was irretrievably ceased after the crisis that burst in debt markets in 2008 (Scholes and Wright, 2009). As outlined by Kaplan and Strömberg (2008), LBO evolution patterns exhibit cyclicality which is associated with the activity in the leverage loan market.

The UK is regarded as the most well-established buyout market in Europe (Povaly, 2010). The growth in the European activity observed in 2003 – 2007 stems to large extent from continental Europe. As for the public-to-private LBOs, however, the UK market has performed significantly better than the other European countries. Almost 70% of the whole transactions completed in Western Europe during the last 15 years took place in the UK. Among the rest countries, France has the more intense activity followed by Sweden, Netherlands, Germany and Ireland.

Figure 1 presents the public-to-private buyouts completed in Western Europe during the last 15 years in terms of volume and value. The LBO activity

is observed to follow cyclical pattern and to be concentrated around 1999 and 2006. Although years surrounding 1999 seem to be of the more intense activity, in terms of values, 2006 is by far the more important, due to the large-sized buyouts that took place in the same period. It should be pointed also the unprecedented drop in the buyout activity after the debt market crisis in 2008 which made leverage scarce and costly. Moreover, latest figures show that European buyout market has not yet managed to recover from this market malaise.

Figure 1: Public-to-private LBOs in Western Europe (1996-2011)



Source: Thomson One

CHAPTER 2

2.1 LITERATURE REVIEW

The following section reviews the pertinent literature for LBO transactions. The first part discusses the findings of previous studies on sources of shareholder wealth gains surrounding LBO announcements. In the second part, it is briefly presented the characteristics outlined by literature as potential determinants of LBO firms.

2.1.1 Shareholder wealth gains in reaction to LBOs

The significant development of public-to-private activity in the U.S. during 80s motivated academics to study the driving forces of the gains accrued to pre-buyout shareholders from going private transactions. Various studies in the U.S. market found empirical evidence of positive excess returns on the buyout announcements. However, few of these studies agreed on the sources of these gains.

De Angelo et al. (1984) suggested that abnormal returns generated to shareholders surrounding the announcement period can be mainly attributed to the ownership structure changes that take place in going private transactions and are assumed to enhance organizational efficiency. Grammatikos and Swary (1986), on the other hand, stated that stock price movements imply uncertainty about the success of the buyout and empirically proved that firms with less volatile history of stock movements experience even more positive stock price reactions. Studies on the U.S. buyout activity of the same period tested various potential drivers of these gains following the framework of similar reports for different MandA deals. These studies suggested that positive excess returns represent a sharing of post-buyout gains and thus, investigated their drivers among the saving of public listing costs or wealth transfers from employees and debtholders (Torabzadeh and Bertin, 1987).

Lehn and Poulsen (1989), who investigated public-to-private activity of 1980-1987, were the first who attempted to relate abnormal returns with the free cash flow theory according to which companies with free cash flows suffer from conflicts of interests between managers and shareholders concerning the

distribution of excess cash (Jensen, 1986). The results of their analysis supported Jensen's theory indicating significant positive relationship between the free cash flow and the magnitude of pre-buyout shareholders' returns.

Carow and Roden (1997) analysed public-to-private LBOs of the first wave (1981-1990) and documented statistically significant positive excess returns to pre-buyout stockholders. They investigated for the sources of these gains among the characteristics outlined by Opler and Titman (1991 and 1993) as factors affecting the probability of going private through LBO. The chosen set of variables combined assumptions of the free cash flow theory with firm or deal specific characteristics, such as deal pricing, stock volatility and changes in leverage and corporate governance structure. Their results indicated that companies with excess cash flow that have been undervalued by the market demonstrate higher abnormal returns. In addition, these returns have been proved to be greater, the lower the volatility in the historic stock performance of the buyout companies.

After mid 1990s, buyout market experienced new development, not only in the U.S. but in Europe as well, especially in the UK. Following this development, analysts investigated the reasoning of stock price increases surrounding the announcements of this new wave of LBOs. These studies have been based upon previous analyses in the U.S. market, however, they are assumed to have accounted for the distinctive features of European market as well. As highlighted by Cumming et al. (2007), the recent buyout activity sustained the return patterns reported in studies of the first wave of buyouts.

Andres et al. (2005) investigated the market reaction to public-to-private announcements that took place in Europe from 1996 to 2002. Employing the event study analysis, they empirically proved that these announcements yield considerable abnormal returns to shareholders. The parameters employed for identifying these returns included variables such as the shareholders' monitoring over management actions, the undervaluation of the companies due to information asymmetries, differences in the legal environment, wealth transfers from employees and tax benefits. The most important finding of the cross sectional regression analysis was the positive significant relationship between monitoring and abnormal returns, supporting the argument that the mitigation of agency costs causes abnormal returns. From the rest of variables

examined the only significant relationship identified was the market inefficiency parameter according to which undervalued companies proved to demonstrate higher excess returns.

Andres et al. (2007) examined shareholder wealth effects in a sample of European public-to-private LBOs that took place between 1997 and 2005 and found significant positive abnormal returns to the firm's shareholders on the LBOs announcement day. Moreover, the authors investigated the determinants of abnormal returns looking at corporate governance characteristics, agency conflicts in the buyout firms and historic stock price performance in relation to market inefficiencies. Cross sectional regression results supported the main hypothesis of the study that corporate governance issues have impact on shareholders' wealth gains. Poor minority equity protection was found to have explanatory power as well. Concerning agency theory, the results showed that companies with more scattered shareholdings and less intense monitoring experience higher returns. Finally, the analysis identified that information asymmetries and market inadequate valuation of LBO companies have increasing effect on stock price reaction. In contrast with previous studies however, this study found no significant relationship between free cash flow and the excess returns observed in LBOs.

Sudarsanam et al. (2007) examined UK going-private buyouts of 1997-2005 and reported significant abnormal returns in line with previous studies. The most important finding of their analysis is that these abnormal returns have been proportional to firm's default risk. That is, the higher the default risk, the stronger the market reaction. Moreover, the findings of the study showed post-announcement wealth gains for companies with larger free cash flow and low growth rates which were more undervalued by the market.

2.1.2 Typical characteristics of LBO targets

Various studies aimed at identifying typical characteristics among buyout targets that determine the likelihood of a LBO. This section summarizes the major characteristics examined to affect the possibility of a LBO deal.

1. *High Free Cash Flow*

According to the free cash flow theory (Jensen, 1986) companies with high cash flow suffer from agency costs stemming from the conflicting interests between managers and shareholders over the distribution of excess cash. Managers with large free cash flows at their discretion have incentives to waste organizational resources on negative net present value projects, rather than pay out the excess cash to shareholders through dividends or share repurchase schemes (Le Nadant and Perdreau, 2006). Lehn and Poulsen (1989) found a significant relationship between the undistributed cash flow and the going-private activity. With regard to this finding, Opler and Titman (1991 and 1993) documented significant differences in the characteristics that proxy the free cash flow between LBO targets and their peers. Recent studies, however, have not fully supported this theory. According to Nikoskelainen's (2006) analysis on European LBOs during 1997-2003, LBO activity has not been driven by high cash flow. Similar results were produced by Sudarsanam et al. (2007) for their UK sample of LBOs.

2. *Low Growth*

Another characteristic that has been identified as a driver of LBOs is the low growth rates performed by LBO candidates. Low growth rates relate to the free cash flow theory and indicate management inefficiency in recognizing and exploiting growth opportunities (Rosenbaum and Pearl, 2009). Opler and Titman (1991 and 1993) found significant negative relationship between the growth perspectives of firms and going private likelihood. Similarly, Nikoskelainen (2006) highlighted that the likelihood for LBO as outlined by the recent buyout activity in Europe depends on the medium term growth of the target companies.

3. Low Capital Requirements

Low capex requirements are regarded to enhance a company's cash flow generation (Rosenbaum and Pearl, 2009). Consequently, this characteristic is closely related to free cash flow theory, too. Great amounts of undistributed cash flow over which agency conflicts emerge, are mainly observed in mature businesses with low capital investment needs. Thus, capital expenditures can be used as an indicator of the operating age of the company. Maturity is also associated with the growth prospects of firms discussed above. Consistent with this theoretical framework, Nikoskelainen (2006) empirically found that mature companies are more likely to go private through LBOs.

4. Leverage and cash flow volatility

A lot of discussion has been spent about the involvement of high debt levels in LBO transactions. Kaplan (1989) studied the post-buyout performance of buyouts and outlined that high leverage is an important source of wealth, due to the significant tax benefits. Lehn and Poulsen (1989) documented that tax incentives arising from tax deductible interest expenses on debt affect positively the probability of a firm to go private. However, subsequent studies identified that the majority of LBO firms tend to use more debt than the amount needed to maximize tax advantages. Opler and Titman (1991) highlighted that apart from tax considerations, leverage can also reduce agency costs by inducing management incentives to align with those of investors. However, as stated by Sudarsanam et al (2007), additional leverage requires debt capacity and the more this debt capacity the greater the probability for LBO. Opler and Titman (1993) identified also that firms with volatile cash flows may be not suited for high leverage since they are more likely to experience costly defaults. On the other hand, Nikoskelainen's (2006) study on a sample of European transactions indicated that firms with more volatile cash flows were strong LBO candidates and attributed this volatility to the relevant information asymmetry.

The collateral value of assets has been regarded as an important factor in determining LBO likelihood. According to the study of Brinkhuis and De Maeseneire (2009) on the financial structure of recent European LBOs, the

collateral value of the firm's asset drives the relevant cost of debt and thus determines to a great extent the LBO probability.

5. *Information asymmetry and undervaluation by market*

Informational asymmetry arises when outside investors and managers have different information about the firm's future operating performance (Palepu, 1990). Such asymmetry between managers and shareholders is assumed to enhance agency costs and has triggered analysts to study the way it may induce companies to go private. In addition, informational asymmetry relates to market undervaluation since all available information does not reach all the market participants at the same time. Opler and Titman (1991 and 1993) stated that informational asymmetry increases agency conflicts and also the chances of undervaluation of a firm since not all information is available to investors. They found significant relationship between LBO likelihood and undervaluation effects especially when informational asymmetry is combined with high free cash flow. Sudarsanam et al. (2007) did not identified market mispricing as a significant determinant of LBO likelihood.

6. *Corporate governance and managerial holding*

The equity ownership held by managers has attracted much attention by all the studies investigating the LBO targets characteristics. Opler and Titman (1991) reported that poorly monitored management can be a motivation behind LBO choice. LBO transaction can be a chance for managers to increase their stake in the company and, thus an incentive to try harder for the maximization of firm's value. Sudarsanam et al. (2007), however, stated that the relationship between the managerial ownership and the probability of public-to-private buyout is not straightforward. They underlined that very high managerial holdings may produce managerial entrenchment. Managers with large ownership stakes may be more likely to go private to realize immediate gains in the form of takeover premiums and private benefits of control. Therefore, higher managerial ownership might imply greater probability for LBO. The results of their study supported this hypothesis and suggested that the likelihood of going private is related to the marginal increase in the managerial shareholding as well.

CHAPTER 3

3.1 SAMPLE SELECTION

Among the challenges faced during this study was the appropriate sample construction in order to empirically test both the stock price reactions to LBO announcements and the characteristics of LBO firms. Using the Thomson One database, there have been identified completed public-to-private buyouts announced between 1998 and 2011, for which both the target and the acquirer originate from the Western Europe. Transactions with values less than 100 mil $ were eliminated from the sample. Small sized transactions are often driven by exceptional characteristics or urging circumstances (Nikoskelainen, 2006) which could distort the analysis of this study.

The entire capital of the companies included in the sample has been bought via a tender offer and the companies have been subsequently delisted from the stock exchange. Transactions which have not led to a 100% ownership by the acquirer were excluded from the sample in order to eliminate effects caused by differences in the legal treatment of minority shareholders among European countries. The final sample was selected after eliminating buyouts for which sufficient stock data of the acquired firms were not available. This gives a final sample of 127 transactions for which the announcement effects on pre-buyout stockholders' wealth can be investigated. This final sample is assumed to be representative since it excludes only a small fraction of the transactions that did not meet the prescribed criteria. Stock prices and financial statement accounts of the buyout firms have been collected from Bloomberg.

Details about the distribution of the selected sample across the examined period or across different countries and sectors are provided in Table 1. We can see that the sample is most heavily concentrated in the period 1999-2001 and 2006-2007 when there is a substantial increase in the number and value of LBOs. Such growth reflects the increased importance and diffusion of public-to-private deals which is strongly related to more favourable capital market conditions (Kaplan and Stromberg, 2008). LBO market activity seems to unprecedentedly slow down after the turmoil in debt markets in 2008.

Concerning the geographic distribution, the LBO sample is dominated by deals in the UK, which is assumed to be the most developed buyout market in Europe (Povaly, 2010). The rest of the LBO deals are dispersed across European countries, with more intense buyout activity to be observed in Ireland and Sweden, which is supposed to have the world's third highest private equity investments as a percentage of GDP (Bergström et al., 2007). In the other European countries, LBO market seems to be less active in terms of public-to-private transactions.

Regarding the distribution of the sample across industries, we observe a sample concentration on specific sectors such as industrials, consumer staples, retail and media. As pointed out by Strömberg (2007) the changing nature in the private equity market is reflected to the increase of LBOs in high growth sectors following the mid 1990s.

Table 1: LBOs' number, average transaction value, median transaction value and sum of transaction values by year (Panel A), by country (Panel B) and by industry (Panel C)

Panel A

LBO Year	Number of LBOs	Average Transaction Value (mil $)	Median Transaction Value (mil $)	Sum of Transaction Values (mil $)
1998	5	484.98	315.03	2,424.92
1999	25	434.75	212.16	10,868.63
2000	14	521.28	444.70	7,297.88
2001	15	616.17	431.82	8,736.01
2002	7	1,215.12	727.43	8,505.87
2003	7	948.42	782.49	6,638.91
2004	6	1,099.91	832.22	6,599.49
2005	8	2,071.93	1,221.46	16,575.40
2006	20	3,270.25	696.32	65,405.08
2007	13	3,648.20	1,425.77	47,426.60
2008	3	1,609.55	601.76	4,828.65
2009	1	245.41	245.41	245.41
2010	2	3,003.17	3,003.17	6,006.33
2011	1	99.64	99.64	99.64
Total 1998 - 2011	127	1,509.12	517.62	191,658.83

Panel B

LBO Country	Number of LBOs	Average Transaction Value (mil $)	Median Transaction Value (mil $)	Sum of Transaction Values (mil $)
UK	89	1,608.73	517.62	143,177.34
Ireland	8	1,324.77	425.05	10,598.14
Sweden	8	1,336.85	641.35	10,694.83
France	3	512.77	388.41	1,538.32
Denmark	3	2,063.71	866.17	6,191.12
Netherlands	3	358.04	188.53	1,074.11
Germany	2	360.15	360.15	720.30
Italy	2	389.86	389.86	779.71
Spain	2	3,475.83	3,475.83	6,951.66
Norway	2	770.29	770.29	1,540.58
Jersey	1	786.51	786.51	786.51
Austria	1	118.69	118.69	118.69
Luxembourg	1	211.86	211.86	211.86
Iceland	1	6,389.37	6,389.37	6,389.37
Finland	1	886.28	886.28	886.28
Total 1998 - 2011	127	1,509.12	517.62	191,658.83

Panel C

LBO Industry	Number of LBOs	Average Transaction Value (mil $)	Median Transaction Value (mil $)	Sum of Transaction Values (mil $)
Industrials	24	2,079.48	432.01	49,907.62
Consumer Staples	16	528.84	263.47	8,461.46
Retail	14	2,404.04	853.43	33,656.55
Media/Entertainment	12	884.02	332.81	10,608.25
Real Estate	11	772.37	727.43	8,496.03
Energy and Power	10	2,423.47	1,203.67	24,234.72
Consumer Products	9	1,604.93	517.62	14,444.41
Materials	9	1,092.94	936.31	9,836.49
Healthcare	7	2,580.90	2,936.21	18,066.32
Financials	7	1,046.36	1,062.73	7,324.51
High Technology	7	557.20	371.64	3,900.38
Telecommunications	1	2,722.10	2,722.10	2,722.10
Total	127	1,509.12	517.62	191,658.83

In most public-to-private buyouts, the firms acquired are delisted soon after the buyout proposal release. The following table presents statistics on the time that elapse between the deal announcement and the subsequent delisting of the company. Table 2 shows that it usually takes one to two months for the actively

traded public companies to be delisted after the intention of going private through LBOs. In some cases delisting occurs in less than two months after the LBO announcement, whereas 10% of the companies are delisted after more than six months following the event.

Table 2: Days after public-to-private deal announcement till the delisting of the buyout company

Days from deal announcement to delisting	LBO firms of the sample
≤ 60	17
61 – 120	79
121 – 180	18
> 180	13
Mean	109
Median	86
Minimum	14
Max	766

Another issue of the buyout market which has attracted much of the academic interest is related to the longevity of LBOs. LBOs are primarily sponsored by private equity funds of limited life and short investment horizon. According to previous studies, private equity funds, on average, exit their investments after a period of 3 – 7 years (Strömberg, 2007). The most common outcomes of such investments are the sale of the firm to a strategic buyer other than the private equity firm, the trade-sale to another private equity-backed firm (Secondary buyout) or even the reverting of the buyout firm to a public status through an IPO. However, it is common for buyout firms to remain for long period under a private ownership scheme, whereas a proportion of these firms result in financial distress (Povaly, 2010).

The ultimate outcome of the sample of LBOs is provided in Table 3. To detect the outcome of these transactions, we firstly investigated whether LBO firms are involved in a subsequent MandA transaction. Then, we check for possible re-listings. Table 3 displays that the majority of buyout firms remain in private ownership. Given the up-to-date dataset used, it is not surprising that

more than 40% of the LBOs have not yet exited. Concerning the outcome, the most common exit route seems to be the trade sale to strategic buyers, followed by re-listings through IPOs and secondary buyouts. Strömberg (2007) pointed out the significant drop in the IPO exits compared to the past deals and attributed this drop to the toughening of the capital market conditions which affected IPO markets. Another important issue of the exit behavior is the relatively modest rates of firms led to financial distress taking into consideration the significant debt levels involved in such transactions. Less than 10% of the firms included in the sample went bankrupt, either in the form of debt restructuring, or of insolvency proceedings.

Table 3: Outcome of LBO investments and average holding period

Type of outcome	LBO firms of the sample	Average holding period (years)
Strategic Sale	25 *(19.69%)*	5.48
IPO	14 *(11.02%)*	4.14
Secondary Buyout	10 *(7.87%)*	3.90
Still Private	55 *(43.31%)*	-
Financial Distress	11 *(8.66%)*	-
Merged	6 *(4.72%)*	-
Unknown	6 *(4.72%)*	-

Note: The statistics presented are obtained in the second half of 2012

The research on the relationship between firm characteristics and the likelihood of LBO is limited. The main reasons are the limited pre-buyout financial data for a period of up-to-three years before the announcement and the difficulty in forming a control sample of peer companies with sufficient data for the same date range. These data constraints led to the formation of a sub-sample of 72

transactions. For the LBO likelihood analysis, for each buyout firm a peer group of five companies is assigned. Each peer group consists of five firms that were selected after meeting certain criteria: Firstly, the selected competitors should be public companies of the same industry. In order to identify the industry of LBO firms and their peers, 4-digit SIC codes were employed. Apart from matching industry codes, the selected peers should have the same size with sample firms. For this purpose, companies with revenues of more than 100% or less than 50% of the sample buyout firm were excluded from the initial peer candidates' sample. In case that more than five companies meeting these criteria, the final group was constructed by preferably selecting companies of the same country or of more similar size. This procedure led to the sample of 72 matching peer groups which in most cases consist of different European countries. Table 4 presents the distribution of this sub-sample. There are no significant variations across years, countries and sectors compared to the whole sample, with the exception of some countries that are not included in this sub-sample.

Table 4: Distribution of sub-sample used in analysis of LBO likelihood determinants by year (Panel A), by country (Panel B) and by industry (Panel C)

Panel A		**Panel B**		**Panel C**	
LBO Year	Number of LBOs	Target Country	Number of LBOs	Target Industry	Number of LBO firms
1998	1	UK	51	Industrials	15
1999	13	Ireland	5	Consumer Staples	9
2000	9	Sweden	3	Retail	10
2001	8	France	0	Media /Entertainment	6
2002	5	Denmark	1	Real Estate	8
2003	6	Netherlands	3	Energy and Power	7
2004	4	Germany	2	Consumer Products	4
2005	5	Italy	2	Materials	3
2006	8	Spain	1	Healthcare	4
2007	8	Norway	1	Financials	0
2008	3	Jersey	1	High Technology	5
2009	1	Austria	0	Telecommunications	1
2010	1	Luxembourg	0		
2011	0	Iceland	1		
		Finland	1		
Total	72	Total	72	Total	72

3.2 METHODOLOGY

This section describes the methodology and techniques applied for the investigation of the European LBOs.

3.2.1 Estimation of abnormal returns

In order to capture possible wealth effects that public-to-private LBOs generate the classical event study analysis is employed. Excess returns are computed utilizing 250 days prior to the event of the LBO announcement and ends up 10 days after. The event window for calculating excess returns consists of 21 days, that is, from day t=-10 to t=+10 around the event day (day 0), whereas the estimation period used for the calculation of the model parameters is defined as [-250, -10]. We calculate abnormal returns around the event window using the market model and the market-adjusted model (Brown and Warner, 1985).

Specifically, abnormal returns AR_{it} of each company are computed as the difference between the realized return R_{it} and the normally expected return $E(R_{it})$ as following:

$$AR_{it} = R_{it} - E(R_{it}) \quad (1)$$

Stock returns are calculated as continuously compounded returns by the following formula:

$$R_{it} = \ln \frac{P_t}{P_{t-1}} \quad (2)$$

where P_t and P_{t-1} are the daily closing stock prices at day t and t-1.

Market model returns for each security i in time t is given by:

$$R_{it} = a_i + \beta_i R_{Mt} \quad (3)$$

where the R_M is the market return. The parameters a_i and β_i are estimated on the estimation period by regressing the security returns on the market returns.

The market-adjusted model, on the other hand, assumes that the ex ante return on a security is constant across securities and can differ across time. Consequently, the expected return on a security i in time t is defined as:

$$E(R_{it}) = E(R_{Mt}) \quad (4)$$

This study uses both these two different excess returns models in order to strengthen the robustness of the results.

Average abnormal returns and cumulative abnormal returns are also calculated in the event window. The average abnormal return on day t in the event window across a sample of N securities is computed as follows:

$$AAR_{it} = \frac{1}{N} \sum_{i=1}^{N} AR_{i,t} \quad (5)$$

The cumulative abnormal returns (CAR) for a period of time are calculated as the sum of the daily excess returns.

$$CAR_{iT} = \sum_{t=1}^{T} AR_{i,t} \quad (6)$$

In order to examine whether public-to-private announcements have significant wealth effects, average abnormal and cumulative abnormal returns need to be statistically different from zero. The statistical significance is tested using the t-test. We also use cross-sectional regression analysis in order to detect the factors that explain stock price abnormality during the period surrounding the LBO announcement day. The parameters used in regression analysis are selected in line with the findings of prior studies and include variables that represent the cash flow profile and the growth prospects of the company combined with market mispricing indicators.

As it has been previously mentioned, the increased use of debt proxy for the elimination of agency costs caused by the divergent interests of asymmetrically informed managers and shareholders (Jensen, 1986). According to Opler and Titman (1991 and 1993), the agency conflict of interests over the distribution of cash surplus can be mitigated through LBOs, since the substantial debt servicing costs reduces the amount of free cash. Previous

studies such as that of Lehn and Poulsen (1989) and Carow and Roden (1997) identified free cash flow variables to be positively related to the wealth gains. Following these studies, we use the free cash flow-to-total assets ratio as an additional independent variable for examining the drivers of abnormal returns to pre-buyout shareholders.

In the presence of information asymmetry, the market value of a company might not reflect all available information and, therefore company's security might be mispriced. Previous studies indicate that companies that have been undervalued by the market experienced significant positive returns following LBO announcements (Andres et al., 2005 and 2007). Opler and Titman (1993) and Carow and Roden (1997) utilized Tobin's q ratio in their analysis to capture the mispricing of companies by the market. Tobin's q ratio is defined as the ratio of book value of debt plus the market value of equity divided by the book value of assets. When the value of the ratio is less than 1 the company is assumed to be undervalued by the market. Opler and Titman (1993) and Carow and Roden (1997) found a significant negative Tobin's q coefficient implying that the more undervalued the firms the higher gains to stockholders.

Except for market mispricing Tobin's q ratio is also used as a proxy for growth opportunities. To the extent that the market value exceeds the replacement cost of its assets indicates the company's growth prospects. According to Opler and Titman, (1993) and Carow and Roden (1997) low growth businesses are more attractive investments for private equity firms. They empirically proved that positive announcement effects of LBOs are even higher for low growth firms. Consequently, the current study incorporates Tobin's q ratio as another control variable.

The size effect on abnormal returns is also examined. This variable is closely related to the information asymmetry discussed above, in the sense that small firms are expected to convey less information to market participants since they usually attract less public interest and are less adequately covered by financial press (Andres et al., 2005). Small firms are more likely to exhibit information asymmetries. The natural logarithm of total assets in the end of the last fiscal year prior to the LBO announcement is used and is expected to be negatively correlated with the dependent variable.

Another variable that has been tested as a source of excess return is the risk of the firm. It is alleged that low risk firms can bear more leverage. Grammatikos and Swary (1986) and Carow and Roden (1997) examined the influence of risk measured by the standard deviation of stock returns prior to the event window. Their results showed a significant negative coefficient for this variable.

Finally, year dummies are also used in the cross-sectional regression analysis to capture any time effect on the sources of abnormal returns.

A limitation of this study is that it does not account for qualitative variables related to the corporate governance regime or other deal related characteristics. In contrast with previous studies which related abnormal returns with variables such as management's equity stake, legal protection or the case of multiple bids, this investigation is limited to the financial elements of the leveraged buyout firms.

3.2.2 Assessing the determinants of LBO likelihood

Concerning the likelihood of going private through LBO, we use operating characteristics of buyout targets that differ from comparable public companies. Mature companies with low growth are typical LBO candidates for several reasons. Low growth may be indicative of unexplored growth opportunities and the recurring and predictable performance of such mature companies make them more attractive investments for private equity firms taking into consideration the low risk that allows for high leverage (Rosenbaum and Pearl, 2009). Growth variables have been examined in the majority of previous studies and in many cases were concluded to be significant (Opler and Titman, 1993; Nikoskelainen, 2006). Regarding the age of the buyout company, mature companies are expected to have limited capital investment needs. Therefore, the variable selected to represent the maturity of the selected companies is the capital expenditure ratio which is defined as the ratio of capital expenditures to total assets.

The free cash flow variable is also tested for LBO targets in comparison with their peer groups. As it has already been outlined, high free cash flow is related to agency conflicts between managers and stockholders over the

distribution of excess cash. On the other hand, LBO candidates should have the ability to generate strong and predictable cash flow given the highly leveraged capital structure. Cash flow for buyout firms and their peers is measured with EBITDA margin, since EBITDA is regarded to be the most suitable cash flow measure to indicate the ability of a firm to service its debt. According to Jensen (1986), agency problems may have increasing effect on the volatility of cash flows generated by the firms' operations. Opler and Titman (1991) examined cash flow volatility as indicator of LBO likelihood. They stated that firms with volatile cash flows are less attractive options for private equity market concerning the greater probability of default on their debt obligations. Nikoskelainen (2006) on the other hand, provided evidence that high volatility in cash flows relates to information asymmetry and enhances the probability of LBOs. Similarly to his methodology, cash flow volatility is measured in this study by the standard deviation of the EBITDA margin the last three fiscal years prior to announcement.

Another important characteristic that an ideal LBO candidate should have is operating efficiency enhancement opportunities (Rosenbaum and Pearl, 2009). There has been a lot of analysis discussing the long term impact of LBOs on the performance of acquired firms. Concerning, however, the pre buyout operating characteristics of these companies, previous researchers have not identified certain common traits among LBO candidates. Opler and Titman (1991 and 1993) introduced cost variables such as R & D expenditures and other operating expenses to identify their relationship with the likelihood of LBO. Nikoskelainen (2006), on the other hand, did not separately examined cost variables, but introduced certain efficiency measures which are affected by the cost structure of the firms. Following his methodology, the current study assesses the effect of the return on assets ratio on the LBO likelihood.

The ability of the LBO candidate to bear the high debt levels required in such transactions is related to the pre buyout leverage levels as outlined in the studies of Opler and Titman (1991 and 1993) and Nikoskelainen (2006). Except for the cost of capital improvements, gearing enhances the chances that growth opportunities can be exploited. The present study accounts for gearing by using the interest bearing debt-to-shareholder's equity ratio as another control variable.

Much academic interest has been focused on the size of firms going private through LBO. The potential for leveraging is alleged to be greater for firms with strong asset base. A strong asset base pledged as collateral against a loan benefits lenders by increasing the likelihood of principal recovery in case of liquidation (Rosenbaum and Pearl, 2009). On the other hand, a firm with little asset base can be still an attractive LBO target provided that it generates sufficient cash flow. Studies in the demography of private equity market indicate that midmarket buyouts are more common than large transactions (Strömberg, 2007). This tendency is mainly attributed to the fact that uncontrollable large asset base incurs significant capital expenditures and, therefore, signify high barriers to entry for the target market. Taking into consideration the controversial effects of the firm's size to the chances of LBO, size variable is not included in our analysis.

Variations in the long-term operating performance between LBO targets and peer groups are tested using the two-tailed test for differences in means and the Mann-Wilcoxon-Whitney test for differences in medians. The explanatory power of the selected variables is then identified through a logistic regression analysis. The aim is to measure the likelihood for LBO as a function of operational characteristics.

Table 5 summarizes the set of variable used in defining the LBO likelihood and reports the expected signs according to previous studies. Table 6 presents descriptive statistics for the sub-sample of the 72 public-to-private transactions and for the corresponding sample of the 72 peer groups. The relevant figures provide evidence that buyout firms have lower capital expenditures than their peers and generate higher cash flows. The variations in the values between the two samples and statistical inferences arising from these differences are discussed in detail in the following section.

As discussed previously, a limitation of this study is that it assesses the probability of LBO transactions only in relation to financial ratios ignoring the potential impact of qualitative variables related to the corporate governance area. Such variables were excluded due to the difficulty in retrieving sufficient data for our analysis.

Table 5: Independent variables description and predicted signs

Variable Name	Variable Code	Description	Predicted Sign(s)
Growth	REVGR_1_0	Revenues growth at the end of the last fiscal year prior to announcement	-
Maturity	CAPEXPR	Capital expenditures ratio defined as capital expenditures divided by total assets at the end of last fiscal year prior to announcement	-
Cash flow generation	EBITDAM_0	EBITDA margin defined as the ratio of EBITDA divided by revenues at the end of the last fiscal year prior to announcement	+
Cash flow volatility	EBITDAVOL	Standard deviation of last 3 fiscal years prior to announcement of EBITDA margin	+/-
Operating efficiency	ROA	Ratio of EBIT (Earnings before interest and taxes) divided by total assets in the last fiscal year prior to announcement	+/-
Leverage	D_E	Debt-to-equity ratio defined as total debt divided by total shareholder's equity in the last fiscal year prior to announcement	-

Table 6: Descriptive statistics of LBOs sub-sample and peer groups

Panel A: LBO targets (N=72)						
Variable Name	Code	Mean	Median	Standard Deviation	Maximum	Minimum
Growth	REVGR_1_0	0.158	0.091	0.285	1.429	-0.299
Maturity	CAPEXPR	0.036	0.035	0.105	0.436	-0.323
Cash flow generation	EBITDAM_0	0.205	0.145	0.173	0.837	0.006
Cash flow volatility	EBITDAVOL	0.023	0.013	0.024	0.119	0.001
Operating efficiency	ROA	0.099	0.092	0.069	0.381	-0.104
Leverage	D_E	0.938	0.534	2.561	21.621	-1.141

Panel B: Peer groups of LBO targets (N=72)						
Variable Name	Code	Mean	Median	Standard Deviation	Maximum	Minimum
Growth	REVGR_1_0	0.179	0.147	0.177	0.985	-0.110
Maturity	CAPEXPR	0.068	0.055	0.070	0.229	-0.103
Cash flow generation	EBITDAM_0	0.176	0.146	0.094	0.505	0.044
Cash flow volatility	EBITDAVOL	0.032	0.017	0.042	0.287	0.004
Operating efficiency	ROA	0.092	0.094	0.048	0.194	-0.054
Leverage	D_E	0.682	0.632	0.980	3.800	-4.607

CHAPTER 4

4.1 DATA ANALYSIS AND EMPIRICAL RESULTS

4.1.1 Event Study Analysis results

Table 7 summarizes the results of the event study analysis. The table reports the average abnormal daily returns for each day of the event period (Panel A) and the cumulative average abnormal returns for various event windows around the event of LBO announcement (Panel B).

Table 7: Daily average abnormal returns and cumulative average abnormal returns based on the market model and the market-adjusted model

Panel A: Average abnormal returns in reaction to public-to-private LBOs announcements				
	Market model		Market-adjusted model	
Day relative to event	AAR %	T-Student	AAR %	T-Student
-10	0.215%	0.83	0.189%	0.72
-9	0.586%	0.37	0.500%	0.31
-8	0.028%	0.18	-0.031%	-0.19
-7	0.191%	0.95	0.225%	1.04
-6	0.169%	0.11	0.130%	0.08
-5	0.501%	2.31**	0.441%	1.91*
-4	0.722%	2.30**	0.772%	2.44**
-3	0.348%	1.45	0.297%	1.14
-2	0.537%	2.09**	0.676%	2.66***
-1	1.383%	3.30***	1.513%	3.72***
0	7.091%	9.42***	7.116%	9.45***
1	1.011%	2.60***	1.152%	2.92***
2	0.058%	0.28	0.099%	0.44
3	0.154%	0.94	0.274%	1.51
4	0.061%	0.24	0.047%	0.18
5	0.178%	2.10**	0.280%	2.26**
6	0.016%	0.24	0.081%	0.68
7	0.003%	0.03	0.077%	0.47
8	0.032%	0.23	0.072%	0.43
9	0.020%	0.21	0.135%	0.97
10	-0.022%	-0.30	0.076%	0.74

***significant at 1% level, **significant at 5% level, *significant at 10% level (two-tailed test)

Note: Column 1 lists the days of the event period relative to announcement day (t=0). Columns 2 and 4 present the daily average abnormal returns (AARs) of each day based on market model and market-adjusted model respectively. Columns 3 and 5 contain the corresponding test statistics which indicate whether the null hypothesis of zero abnormal return can be rejected or not.

Panel B: Cumulative Average Abnormal returns in reaction to public-to-private LBOs announcements

	Market Model		Market-adjusted model	
Event Window	CARs %	t-statistic	CARs %	t-statistic
CAR (-10 -1)	4.679%	0.97	4.712%	0.98
CAR (+1 +10)	1.511%	0.31	2.293%	0.47
CAR (-1 0)	8.475%	3.93***	8.629%	4.00***
CAR (-1 +1)	9.486%	3.59***	9.781%	3.89***

***significant at 1% level, **significant at 5% level, *significant at 10% level (two-tailed test)

Note: Column 1 contains different event windows relative to announcement day (t=0). Columns 2 and 4 present the cumulative average abnormal returns (AARs) of each window based on market model and market-adjusted model respectively. Columns 3 and 5 contain the corresponding test statistics which indicate whether the null hypothesis of zero abnormal return can be rejected or not.

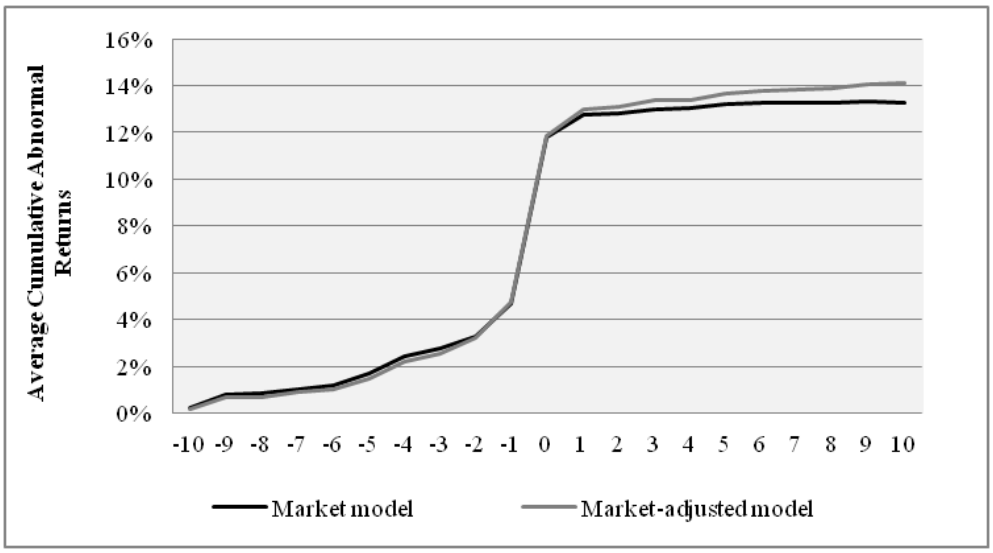
The results show that LBO announcements cause significant positive excess returns to pre-buyout shareholders. On the announcement day (t=0), the average abnormal return is 7.10% and statistically significant for both models. On the days surrounding the release of the buyout [-1, +1] shareholders experience significant wealth gains. Since it was not possible to identify the actual time of the LBO announcement, we use three days (-1, +1) as event period. Except for the short period around the event, the results show significant positive excess returns for other days prior to announcement, as in days t=-2, t=-4, t=-5. A possible explanation of this phenomenon might be rumors or information leakages concerning the deal or even other firm relevant events that affect positively the stock performance. Significant abnormal returns prior to the actual announcement day have been also found by Andres et al (2007) who attributed this phenomenon to leakage of information. In addition, taking into consideration the dramatic increase in the excess returns taking place on days 0 and +1, it can be concluded that the information on buyout transaction is decoded by the majority of market participants only after the LBO announcement.

Another interesting finding is the significant positive excess returns on t=+5. One possible explanation might be a sluggish analyst's opinions and predictions concerning the success and viability of the announced takeover. However, it is impossible to distinguish whether these effects are attributed to analysts' opinions or other company news. The results are supported by both

methods applied for the calculation of abnormal returns, with a little variation on the significance levels in some cases (t=-5 and t=-2).

As shown by Figure 2 the average cumulative abnormal returns are similar for both models used. Moreover, Panel B of Table 7 indicates that the two models display similar levels of significance. When alternative event widows are examined, the results for both models indicate that in short periods around the event [-1, 0] and [-1, +1] the cumulative average abnormal returns are 8.50% and 9.50%, respectively and highly significant.

Figure 2: Average cumulative abnormal returns during the event period based on the market model and the market-adjusted model



4.1.2 Cross-sectional analysis on sources of shareholders' wealth gains

We attempt to find out the determinants of the LBO wealth effects by using cross-sectional regression analysis. Specifically, we employ the following OLS regression where the dependent variable is the CAR of three days [-1, +1].

$$CAR_i = c + \beta_1 (\text{FCF ratio}) + \beta_2 (\text{Tobin's q ratio}) + \beta_3 (\text{risk}) + \beta_4 (\text{size}) + \text{year dummies} + e_i$$

The independent variables are checked for existence of multicollinearity. The results indicate no significant correlations between the regressors. Consequently the whole variable set is simultaneously applied on the regression.

The results of the cross-sectional regression are presented in Table 8.

Table 8: Coefficients and t-statistics of the CAR [-1, +1] regression

Variable	Predicted sign	Market model	Market-adjusted model
Intercept		0.240 (1.78)*	0.221 (1.63)
FCF ratio	+	0.028 (2.07)**	0.030 (2.27)**
Tobin's q ratio	-	-0.048 (-2.50)**	-0.048 (-2.56)***
Variance of returns	-	-0.008 (-0.36)	-0.006 (-0.28)
Size	-	-0.008 (-0.75)	-0.006 (-0.81)
Year Dummies		yes	yes
N		127	127
R^2		0.24	0.22
F –statistic		1.67	1.55
Probability (F-statistic)		(0.06)	(0.09)

***significant at 1% level, **significant at 5% level, *significant at 10% level

Note: Two OLS regressions of the CAR [-1, +1] are performed using a multivariate regression to explain the sources of abnormal returns. Columns 3 and 4 present the results based on market model and market-adjusted model.

The results show that FCF ratio has a positive and significant coefficient at the 95% confidence level for both models, indicating that the theory concerning the mitigation of agency costs through LBOs is empirically confirmed. In addition, Tobin's q ratio has significant negative influence on the abnormal returns during the LBO announcement. As discussed in the previous section, Tobin's q ratio represents two different characteristics. On the one hand, this ratio is related with the market valuation of the company. Consequently, the results support the hypothesis that information asymmetry implies

undervaluation by the market for companies and leads to higher returns following the LBO deal. On the other hand, Tobin's q ratio reflects the growth prospects of firms. Therefore, the significant negative coefficient suggests that positive announcement effects are even greater for low growth firms.

Concerning the explanatory power of the risk of the firm, although the coefficient has the predicted sign, we cannot support the existence of a significant relationship between returns' volatility and abnormal returns. Similarly, the hypothesis that there may be size effects on the magnitude of information asymmetry and consequently on the stock price reaction cannot be supported, since the relevant t-statistic is insignificant.

As for the goodness of fit statistics, the values of R^2 are similar to that of previous studies. According to R^2 the models do not fit the data adequately. Finally, the regression residuals have been tested for heteroskedasticity. The results suggest there is not existence of such violation that could set in doubt the validity of the model used.

4.1.3 Equality testing on LBO firms and control sample

The objective of the empirical process applied in this section is to determine the factors that affect the probability of going private through LBO. To identify typical operating characteristics among the buyout targets, the mean and median values of the previously discussed variables have been reported for both LBO firms and peer groups. Two-tailed test and Wilcoxon-Mann-Whitney tests are applied to test for significant differences in mean and median values, respectively.

In some cases the two tests show different significance levels for the variables. Median is assumed to be better suited for skewed distributions, whereas mean is largely influenced by outliers and suits better for normal distributions (Brooks, 2008). Therefore, median is assumed to provide more robust evidence for rejecting the null hypothesis of no differences in the variables examined for buyout firms and their peers prior to the deal announcement.

Table 9 lists and compares the mean and median values of the above variables for the LBO sample and peer groups. Test results indicate that there

are significant differences in the means and medians in cash flow volatility and maturity metrics, whereas growth and leverage measures have statistically significant medians. These results agree with the assumptions discussed in previous sections according to which LBO targets are usually mature businesses with low capex requirements. In addition, they are mostly firms with less volatile cash flows that provide much security from a debt provider's perspective concerning the debt servicing. On the other hand, firms that are of more chances to go private through LBOs are assumed to be performing lower growth rates compared to each peers, an assumption that is supported by the significant difference in the median values of growth variable. Less powerful in terms of statistical significance, is the difference in leverage medians that supports the hypothesis that LBO targets should have lower leverage rates to bear the additional debt burdens required for such transactions.

Concerning the results related to the free cash flow hypothesis, differences in EBITDA margin – the free cash flow metric – are not significant and the difference in medians is negative. This finding is in contrast with the theory according to which the major motivation of LBOs is the mitigation of agency costs related to high free cash flow. Concerning ROA, the results do not support any hypothesis about operating efficiency in determining LBO likelihood.

Table 9: Mean and Median values of variables for LBO targets and peer groups and corresponding p-values

Panel A: Revenues growth of last fiscal year prior to the buyout announcement for LBO firms and peer groups

	LBO Firms	Peer Group	Significance tests	
Mean	0.1579	0.1787	Difference in means Two-tailed test p-value	-0,0208 0.6001
Median	0.0906	0.1468	Difference in medians Wilcoxon/Mann-Whitney p-value	-0.0562 0.0402**

***significant at 1% level, **significant at 5% level, *significant at 10% level

Panel B: EBITDA margin of last fiscal year prior to the buyout announcement for LBO firms and peer groups

	LBO Firms	Peer Group	Significance tests	
Mean	0.2052	0.1765	Difference in means Two-tailed test p-value	0.0287 0.2172
Median	0.1451	0.1457	Difference in medians Wilcoxon/Mann-Whitney p-value	-0.006 0.9506

***significant at 1% level, **significant at 5% level, *significant at 10% level

Panel C: Standard deviation of EBITDA margin 3 fiscal years prior to the buyout announcement for LBO firms and peer groups

	LBO Firms	Peer Group	Significance tests	
Mean	0.0229	0.0324	Difference in means Two-tailed test p-value	-0.0095 0.0960*
Median	0.0128	0.0170	Difference in medians Wilcoxon/Mann-Whitney p-value	-0.0042 0.0340**

***significant at 1% level, **significant at 5% level, *significant at 10% level

Panel D: Capital expenditures to total assets of last fiscal year prior to the buyout announcement for LBO firms and peer groups

	LBO Firms	Peer Group	Significance tests	
Mean	0.0364	0.0680	Difference in means Two-tailed test p-value	-0.0316 0.0351**
Median	0.0349	0.0550	Difference in medians Wilcoxon/Mann-Whitney p-value	-0.0201 0.0156**

***significant at 1% level, **significant at 5% level, *significant at 10% level

Panel E: ROA of last year before buyout for LBO firms and peer groups

	LBO Firms	Peer Group	Significance tests	
Mean	0.0995	0.0915	Difference in means	0.0080
			Two-tailed test p-value	0.4259
Median	0.0918	0.0940	Difference in medians	-0.0022
			Wilcoxon/Mann-Whitney p-value	0.8746

***significant at 1% level, **significant at 5% level, *significant at 10% level

Panel F: Debt-to-equity ratio of last year before the buyout period for LBO firms and peer groups

	LBO Firms	Peer Group	Significance tests	
Mean	0.9378	0.6821	Difference in means	0.2557
			Two-tailed test p-value	0.4301
Median	0.5337	0.6323	Difference in medians	-0.0986
			Wilcoxon/Mann-Whitney p-value	0.0771*

***significant at 1% level, **significant at 5% level, *significant at 10% level

4.1.4 Logit Regression Results

To determine the firm characteristics that explain the likelihood of LBOs, we use a logistic regression whose dependent variable is a binary that takes the value 1 for firms that went through LBO and 0 for peer groups. Independent variables have been found not to be correlated and are simultaneously included in the model applied. Table 10 presents the results.

Table 10: Logistic Regression Analysis of LBO likelihood

Variable	z-statistic (p-values)
REVGRTH_1_0	0.5489 (0.5196)
EBITBAM_0	3.6669 (0.0069)***
EBITDAVOL	-14.7804 (0.0368)**
CAPEXPR	-5.0078 (0.0503)**
ROA	1.9272 (0.5470)
D_E	0.03263 (0.6501)
C	-0.2792 (0.5669)
N	144
McFadden R^2	0.067

***significant at 1% level, **significant at 5% level, *significant at 10% level

Note: The dependent variable is an LBO dummy that equals 1 if the company is an LBO target and O otherwise. Probability value associated with the z-statistic that a coefficient is statistically different from zero is given in parentheses. Standard error estimates are robust to heteroskedasticity (Huber/White).

The results show that EBITDA margin, EBITDA volatility and capital expenditures ratio have the predicted sign and are statistically significant. In other words, a firm is more likely to go through a public-to-private transaction the greater its free cash flow of the firm, the less volatile its cash flow profile or the less its capital requirements. The other variables of the model do not display significant values.

Table 11: Marginal effects after logit

Variables	dx/dy	Standard Error	Z	P>|z|
REVGR_1_0	0.137	0.211	0.65	0.516
EBITBAM_0	0.842	0.398	2.12	0.034
EBITDAVOL	-3.695	200.773	-1.84	0.066
CAPEXPR	-1.252	0.575	-2.18	0.030
ROA	0.482	0.805	0.6	0.549
D_E	0.008	0.028	0.3	0.768

Table 11 contains the marginal effects whose values can be intuitively interpreted in terms of how incremental changes in the independent variables can affect the probability of LBO. An increase in the EBITDA margin by one unit will increase the likelihood of LBO by 0.842 %. Similarly, an increase by one unit in the standard deviation of last 3 years EBITDA will reduce the probability of LBO by 3.695 %, indicating that the volatility of cash flows generated by the LBO target is an important factor in determining LBO likelihood. Similarly, an increase by one unit in the capital expenditure ratio, whose value is supposed to be lower for more mature businesses, the probability of the firm to go private through LBO falls by 1.252 %.

The other factors examined are not significant and their explanatory power is weaker and less robust. Moreover, the coefficients of the growth and leverage variables are different from the expected ones. Therefore, according to the results an increase in the growth rate or in the debt-to-equity ratio by one unit will result in probability enhancement by 0.137% and 0.008%, respectively

Theory suggests, however, that low growth and low leverage companies are more likely to go through LBOs. Regarding ROA, the marginal effect sign and magnitude suggests that when other factors remain equal, an increase by one unit in the ratio leads to the likelihood of LBO rising by 0.482%.

CHAPTER 5

5.1 CONCLUSIONS

This study analyzed the recent wave of public-to-private buyouts in Europe. Although much research has been done on such transactions taking place in the U.S. especially in the 1980s, there is limited evidence on European LBO activity, including both the boom of late 1990s and the collapse after the debt market crisis in 2008. The purpose of this analysis was to quantify the shareholder wealth gains surrounding the announcement of the deal and also identify the sources of these gains. Moreover, the LBO firms of the sample were investigated in terms of potential characteristics that indicate likelihood for a public company to go private through LBO.

A total sample of 127 transactions that took place between 1998 and 2011 has been investigated. Empirical findings show that pre-buyout shareholders gained almost 7.10% significant abnormal returns on the announcement day and cumulative abnormal returns of about 9.50% over a three-day period surrounding this event. Moreover, empirical results showed that firms with low growth rates and are historically undervalued by the market experience high abnormal returns. The findings also indicate that high amount of undistributed cash flow is associated with the wealth gains supporting the hypothesis that the mitigation of agency costs generates significant returns. However, we do not find significance for other sources of positive excess returns, such as the risk or the size of the firms that other studies identified to have explanatory power.

The thesis proceeds by examining the buyout firms for typical operating characteristics that affect the likelihood for LBO. For 72 companies with available pre-buyout data there have been assigned peer groups of public companies. The two sub-samples were then compared in terms of key characteristics that theory suggests as important determinants of LBO likelihood. Empirical evidence highlighted differences in many performance indicators between the two sub-samples. In addition, logistic regression analysis showed that the likelihood for company to go private through LBO instead of remaining public is linked to the maturity of the company and to the amount and stability of cash flow generated by its operations. Empirical results

supported Jensen's free cash flow theory according to which the agency conflicts between managers and shareholders over the distribution of free cash flow are the main driver for LBO activity. Consequently, mature businesses with established cash flow generation and low capital expenditures were found more likely LBO targets. On the contrary, no evidence has been found in favour of other factors that have been proved significant by prior literature. The growth rates, the pre-buyout leverage and the operating profitability were not found to be associated with the companies' decision to go private through LBO.

The above results are consistent to a great extent with the free cash flow hypothesis similarly to prior studies. No matter the changes in the capital market conditions among years, agency theory is supported by the current study. Overall, private equity market appears to be quite uniform across time and geographic areas.

Concluding, this study has provided new insights into the private equity industry which could be useful for market participants interested in such investment opportunities. From the perspective of public investors who have invested in the companies which go private through LBOs, the results provide additional evidence on the magnitude and the sources of the abnormal returns expected following LBOs announcements. On the other hand, from the perspective of private equity professionals, this thesis has illustrated the major characteristics which favour LBO transactions and thus can indicate potential LBO candidates.

At this point, it could be useful to highlight some interested issues raised by the analysis applied in this thesis. Taking into consideration that this study does not account for the potential success or failure of the deals investigated, a research on the determinants of LBO success could be performed. In addition, the number of deals that took place after the financial crisis was relative small. A sub-sample of post-crisis transactions would be inconclusive and thus unsuitable for statistical inferences. Changes of private equity transactions following the toughening of market conditions could be an interesting topic in the future.

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APPENDICES

Appendix 1: Correlation matrix for the independent variables of the OLS regression

Variables	FCF ratio	Tobin's q ratio	Variance of returns	Size
FCF ratio	1			
Tobin's q ratio	0.22	1		
Variance of returns	0.06	-0.02	1	
Size	0.28	0.07	0.04	1

Appendix 2: Tests on OLS regression residuals (Market model)

Test for heteroskedasticity (White)		Test for autocorrelation (Breusch - Godfrey)		Test for normality (Jarque – Bera)	
Ho: The variance is constant across residuals		Ho: Residuals are of zero autocorrelation		Ho: Residuals are normally distributed	
F-statistic	0.71	F-statistic	0.29	Jarque-Bera	131.55
Probability	0.78	Probability	0.92	Probability	0.00

Appendix 3: Tests on OLS regression residuals (Market – adjusted model)

Test for heteroskedasticity (White)		Test for autocorrelation (Breusch - Godfrey)		Test for normality (Jarque – Bera)	
Ho: The variance is constant across residuals		Ho: Residuals are of zero autocorrelation		Ho: Residuals are normally distributed	
F-statistic	0.76	F-statistic	0.40	Jarque-Bera	150.40
Probability	0.74	Probability	0.85	Probability	0.00

Appendix 4: Correlation matrix for the independent variables of the Logit regression

Variables	REVGR_1_0	EBITBAM_0	EBITDAVOL	CAPEXPR	ROA	D_E
REVGR_1_0	1					
EBITBAM_0	0.07	1				
EBITDAVOL	0.22	0.35	1			
CAPEXPR	0.32	0.11	0.08	1		
ROA	-0.09	-0.13	-0.20	0.01	1	
D_E	0.02	0.06	-0.09	-0.01	0.10	1