Shareholder wealth gains in European public-to-private transactions

Evidence from the third LBO wave

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Abstract

This study examines the wealth gains to pre-transaction shareholders in European public-to-private (PTP) transactions during the third leveraged buyout wave. The sample consists of 153 PTP transactions announced between 2003 and 2007. On average, the shareholders received a premium of 40% over the pre-rumor price and 10 to 20% over the pre-announcement price. The average share price reaction on the rumor and announcement date amounted to approximately 16% and reached up to 30% when measured over longer periods. Evidence is found that higher wealth gains are realized for low leveraged firms and firms which have experienced a significant share price decline prior to the PTP announcement. These findings suggest that financial engineering and financial arbitrage are main sources of wealth creation in PTP transactions. No evidence is found in favor of other sources of wealth creation, such as the mitigation of agency costs and the reduction of transaction costs. Furthermore, this study is the first to examine whether knowledge transfers are a source of PTP wealth gains and whether collusion depresses PTP wealth gains in Europe. While no evidence is found that wealth is created by the transfer of informational resources from the private equity investor to the portfolio company, weak evidence is found that private equity investors team up in order to depress bid prices.

JEL codes: G14, G32, G34

Keywords: LBO, going private, event study, public to private, delisting, private equity

PREFACE

First and foremost, this research paper is a scientific study. Its main goal is to make a contribution to the academic research in its field. However, I believe that this paper is also of interest to people from 'the industry' because it addresses a range of current real-world issues. It will therefore provide interesting food for thought to a wide range of people outside the academic world, including among others private equity practitioners, financial advisors on merger and acquisitions, institutional investors and the management teams of companies contemplating buyouts.

I would like to thank prof. dr. Robert van der Meer for his patient supervision and advice. He helped me maintain an academic perspective and challenged me by asking the right questions. In addition, I would like to thank the Private Equity Advisory team of ABN AMRO. During my internship and extended stay, they introduced me to the private equity industry. They helped me gain a practical perspective and ensured that my research addressed real-world issues. Last but not least I would like to thank my family, friends and girlfriend for their continued support.

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1. INTRODUCTION

Leveraged buy-outs (LBOs) became famous during the late 1980s, when LBO activity in the US reached its peak. The largest and most renowned buy-out of this period was the acquisition of RJR-Nabisco by the private equity firm Kohlberg, Kravis & Roberts (KKR) in 1989 for $25 billion. Up till today, this transaction ranks among the top 5 largest buyouts ever completed worldwide. Since the buy-out boom in the 1980s large buy-outs have not been restricted to the US alone. The buyout markets in both the UK and continental Europe have experienced substantial growth over the last 25 years. Most recently the European buy-out market experienced its third wave, following the buyout waves during the latter halves of the 1980s and 1990s. Especially this third wave, which lasted from 2003 to 2007, is of interest as the largest European buy-outs all occurred during this wave. The largest European LBOs were Alliance Boots (UK, 2007) at EUR 16.5 billion, TDC (Denmark, 2005) at EUR 13.3 billion and VNU (the Netherlands, 2005) at EUR 8.7 billion[1]. As leveraged buyout activity grew and individual transactions increased in size over the past two decades, leveraged buyouts have become an integral part of European financial markets. Research is required to provide a thorough understanding of the nature and consequences of these transactions.

Loos (2005) defines a leveraged buyout as "*a transaction in which a group of private investors, typically including management, purchases a significant and controlling equity stake in a public or non-public corporation or a corporate division, using significant debt financing, which it raises by borrowing against the assets and/or cash flows of the target firm taken private*". A target company may thus be listed, privately owned or a division of another company. The LBO of a public company is also known as a public-to-private (PTP) transaction.

This study will examine the wealth effects of PTP transactions that occurred during the third European LBO wave. This research will be conducted in three main steps. At first, I will research the existing literature on public-to-private transactions and LBO transactions in general in order to formulate theoretical predictions about sources of value creation in public-to-private transactions. The second step will amount to quantifying the wealth gains (abnormal returns) to pre-transaction shareholders following the announcements of public-to-private transactions during the third European LBO wave. Having done this, I will try to use the theoretical predictions about different sources of value creation identified in step 1 to explain the abnormal returns identified in step 2. The ultimate goal is to identify which factors explain the wealth gains in public-to-private transactions. Hopefully, this will shed light on what drove value creation in European public-to-private transactions during the third LBO wave. More formally, the above mentioned steps can be formulated in the following main research questions:

[1] Deal values are taken from Bureau van Dijk's Zephyr Database

1. What were the wealth gains to pre-transaction shareholders in public-to-private transactions during the third European LBO wave (2003-2007)?
2. What were the different sources of the wealth gains to the pre-transaction shareholders in public-to-private transactions during the third European LBO wave (2003-2007)?

This paper will attempt to contribute to existing literature in several ways. Up to now, most of the research on public-to-private transactions refers to the US. Only limited research has been published on the sources of abnormal returns to pre-PTP shareholders in a pan-European context. In addition, the existing empirical research on European PTP transactions provides mixed evidence. This paper tries to contribute to the existing literature by increasing our understanding of European PTPs. Differences in the capital market structures, tax laws and shareholder protection standards between the US and Europe may account for potential differences in abnormal returns following PTP announcements in the two regions.

The second contribution of this paper is that it will examine a very recent dataset. An extensive body of research focuses on the 1980s and early 1990s during which years the US LBO market peaked. In addition, some research has already been conducted on the second LBO wave in Europe. To my knowledge however, this paper is the first to exclusively examine the latest European LBO wave. Conclusions from prior research on European PTP transactions cannot simply be generalized to the most recent wave as the LBO market is in continuous development. Innovation by financial market participants has led to the application of increasingly sophisticated financial instruments and techniques in LBO deals. This evolution of the LBO market is evidenced by the mere fact that during the third wave Europe experienced PTP transactions of unprecedented and previously unimaginable size, including the Alliance Boots transaction. As mega-buyout-deals came to Europe, the LBO market appears to have structurally changed. This paper will shed some light on these structural changes by analyzing the sources of wealth gains during the last European LBO wave.

Thirdly, this paper will provide a contribution to the existing literature by extending the research on sources of shareholder wealth gains in PTP transactions to include the role of the private equity investor. Up till today, only characteristics of the target firm were examined in order to explain the abnormal returns to shareholders in PTP transactions. This paper will examine whether the involvement and experience of private equity investors executing PTP transactions impact shareholder wealth gains. In this context, value gains will be explained from a resource based view of the firm and relate to the transfer of informational resources from the private equity investor to the portfolio company. To my knowledge, this approach has not yet been employed in explaining PTP wealth gains.

Lastly, I will be the first to examine the influence of collusion through investment syndicates on the shareholder wealth gains following PTP announcements in Europe. Only recently researchers

have started to examine the impact of club deals on target shareholder returns in the US. To my knowledge however, no such research has been conducted with respect to European PTP transactions.

The remainder of this paper is organized as follows. Section 2 describes the major developments in the European LBO market. In addition, an overview of the most important empirical and theoretical literature is provided and the research hypotheses are formulated. Section 3 describes the sample construction and the major data sources. Moreover, various descriptive statistics will be presented. Section 4 discusses the methodology employed in this research. Section 5 reports the results and relates the results to prior literature. Section 6 presents the conclusions.

2. THEORY, EMPIRICS AND TRENDS

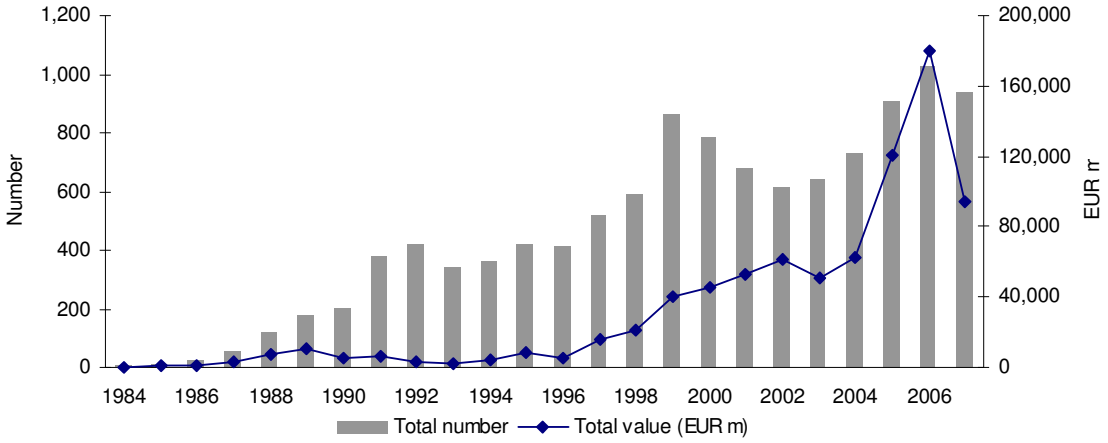
2.1 Evolution of the leveraged buy-out market

Leveraged buyout activity is of a very cyclical nature. Smit and Van den Berg (2006) note that buyout markets experience cycles with remarkable periods of private investment and wealth creation, followed by controversy and entrenchments. Over time three distinct waves of leveraged buyouts can be identified as is clearly shown in Figure 1. Prior studies have acknowledged the existence of these three distinct buyout waves as well (among others Smit and Van den Berg, 2007; Renneboog, Scholes, Simons and Wright, 2006). It is notable that each of these waves occurred almost simultaneously in both Europe and the US. The first large buyout wave occurred in the 1980s. This wave was a reaction to the large scale conglomeration trend of US companies in the 1960s and 1970s (Smit, 2004). As over time the large conglomerates turned out to suffer from all sort of inefficiencies, a *de*-conglomeration wave followed. A market for corporate control developed, which led to many hostile takeovers. Private equity investors took the lead and acquired non-core assets from the inefficient conglomerates. Following the acquisitions, the private equity investors restructured the divisions by improving corporate governance regulations and boosting managerial incentives (Martynova and Renneboog 2005, 2006). This first buyout wave was further enhanced by the emergence of the junk bond market, which allowed for very cheap financing of acquisitions. Europe experienced a buyout wave similar to the one initiated in the US. At the start of the 1990s the buyout wave came to a sudden halt as many private equity investors flooded the market, all looking for a "quick win". They were attracted by the high returns earned by private equity investors during the prior years. However, due to high competition returns evaporated and buyout activity slowed down (Gompers and Lerner, 1999). It became clear that many of the previously executed leveraged buyouts had taken on too much debt and as a consequence these companies were facing difficulties servicing their debt.

The second buyout wave started at the end of the 1990s. Smit (2004) notes that during this period the value creation focus of private equity firms shifted from restructuring inefficient conglomerates to supporting growth. The investors were able to bring substantial additional knowledge into the firm, while acting as advisors on strategic issues, human resources, financing and legal issues. In addition, private equity investors recruited outside advisers with industry expertise into the target firms and leveraged their network of relations for the benefit of the target firms. While during the first wave many leveraged buyouts were initiated by incumbent management, the second wave experienced a rise of investor-led buyouts. This rise in institutional buyouts was driven by the focus on value creation through strategic involvement of the private equity investor. In addition, this period experienced an emergence of buyouts of family owned firms. Renneboog, Scholes, Simons and Wright (2006) argue that founding owners were driven in these buyouts by motives such as wealth

Figure 1

Total number and deal value of completed buyout transactions of European targets (data source: Thomson Banker One)



diversification and succession issues. The second wave faded after 2001 as worldwide economies stagnated and stock markets experienced significant declines.

The third buyout wave started after 2003 and was fuelled by economic recovery and low interest rates. Strong recovery of global stock markets offered private equity investors good exit opportunities leading to a large number of exits through IPOs. In addition, purchasing companies in buyout transactions from other private equity investors (also known as secondary buyouts) became increasingly popular (Cumming, Siegel and Wright, 2007). The maturing European buyout market and increased competitive pressure among investors forced private equity investors to consider alternative sources of transactions including the previously disregarded secondary buyouts. Besides the increased popularity of exits through IPOs and secondary buyouts, it is notable that US private equity funds started to play a major role in the European buyout market. The US funds saw opportunities in the relatively less mature European buyout market as their home market became increasingly competitive. In September 2005, David Rubenstein (co-founder of the Carlyle Group) clearly highlighted this point by stating: "*Europe is more attractive than the U.S. and Asia, where there are fewer opportunities for restructuring*". [2] Furthermore, another key characteristic of the third European buyout wave was the emergence of "mega" buyout deals. Several factors contributed to this phenomenon. First of all, there was the enormous liquidity in the private equity market. Many private equity investors raised record amounts of funds during the third wave. The availability of funds made large buyouts possible. Pressure on private equity investors to generate superior returns on their funds pushed them to invest large amounts of funds in single transactions rather than holding onto "low-return" cash balances. A second factor that contributed to the pursuit of multi-billion euro transactions was the development of more sophisticated deal making skills and financing techniques including the increased use of

[2] International Herald Tribune, Online Version, September 29, 2005

mezzanine financing. Thirdly, the execution of large transactions was facilitated by the sharing of risks through the formation of consortia. As a consequence, the third wave saw a notable rise in club deals, in which private equity investors teamed up in order to purchase companies. Although in 2006 private equity activity was booming and larger companies than ever before were bought out, insiders feared the day that it would abruptly end. On two different occasions David Rubenstein expressed this fear. In January 2006, he stated: "*This has been a golden age for our industry, but nothing continues to be golden forever*".[3] One month later, he emphasized this concern more explicitly: "*Right now we're operating as if the music's not going to stop playing and the music is going to stop. I am more concerned about this than any other issue*".[4] These concerns proved to be right as at the end of 2007 the buyout market collapsed. This collapse can largely be attributed to the credit crunch, which significantly increased the cost of borrowing. As leveraged loan activity came to an abrupt stop, private equity firms were unable to secure financing for their transactions. As the consequences of the credit crunch unveiled themselves, many previously announced buyouts were cancelled.

Taking a more specific look at the PTP market, it can be noted that PTP activity has largely moved in line with buyout activity as can be seen in Figure 2. The same cyclicality applies and the waves of PTP activity closely follow the three buyout waves. However, an interesting remark can be made. While buyout activity reached its all-time peak during the third wave in terms of both numbers and deal value, PTP activity reached its peak only in terms of deal value. The actual number of completed PTP deals during the third wave was substantially lower compared to the second wave. This clearly illustrates the emergence of the "mega" buyout deals. While the number of deals decreased, total deal value in 2006 was over 4 times higher compared to total deal value in the peak year of the second wave. Private equity investors started to invest larger amounts of capital in fewer transactions.

Figure 3 compares the development of the number of completed PTP transactions in Europe with PTP development in the US. The figure clearly shows the first buyout wave to be predominantly a US phenomenon. In Europe, the first PTP wave followed a few years after the start of the first US wave. In addition, the first European wave reached its peak somewhat later as well. These findings suggest that the European PTP market lags the US market. As a result, US PTP activity might have predictive capabilities in forecasting European PTP activity. However, a closer look at the second and third wave indicates that this time lag seems to have largely disappeared. While the first European PTP wave lagged the first US wave, later waves coincide. As financial markets have become increasingly integrated over time, the US and European PTP markets appear to have converged. Differences between the two geographies do exist. In terms of number of deals completed, the first US wave was

[3] International Herald Tribune, Online Version, January 27, 2006
[4] Reuters, February 22, 2006

unmatched by later waves in the US. In Europe however, the number of PTP deals reached its peak during the second wave.

Figure 2

Total number and deal value of completed public to private transactions of European targets (data source: Thomson Banker One)

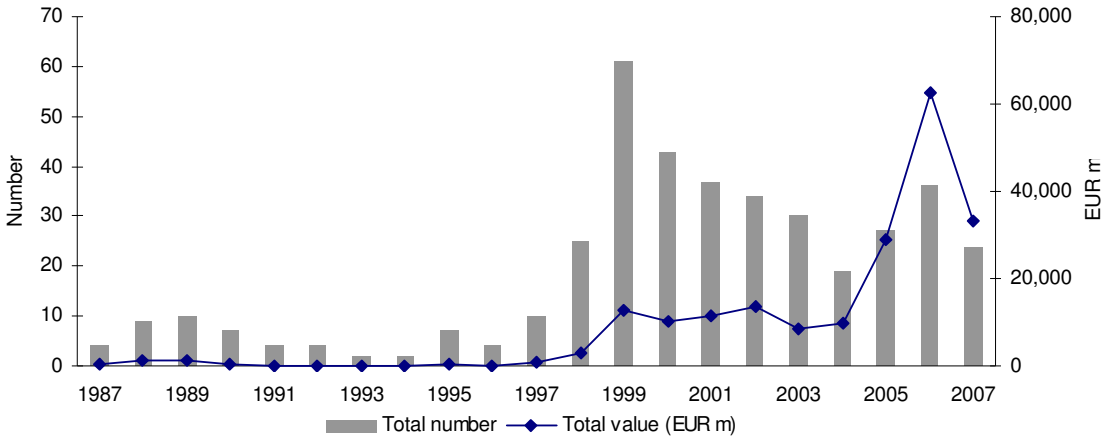
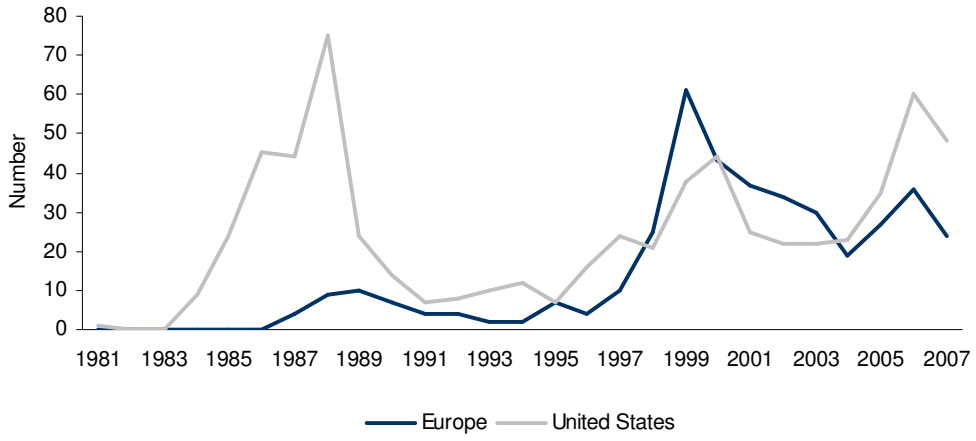


Figure 3

Total number of completed public to private transactions of European targets versus US targets (data source: Thomson Banker One)



The main question remains: "What will the future of the buyout market bring us?". In the short term, the cost of borrowing is expected to remain high. Covenants have become more stringent reducing the flexibility of private equity firms. As private equity firms are unable to secure financing for large transactions, the focus is expected to shift towards the middle-market. Large private equity investors that were previously responsible for multi billion euro buyouts will in the future focus on smaller transactions, which can be financed more easily. As a result, a rise in middle-market buyouts is

expected. In addition, it is expected that private equity investors will have to become more creative. This may coincide with a rise in popularity of non-leveraged transactions. Instead of traditional buyouts, the focus may shift to minority investments, acquisition financing or teaming up with strategic buyers in new transactions (Knowledge@Wharton, University of Pennsylvania, May 06, 2008). Moreover, as economic growth is slowing, more opportunities will abound in restructuring and investing in distressed assets. A potential threat to traditional private equity firms may come from the increased competition from alternative investment sources. These alternative investment sources include hedge funds moving into less liquid markets, family offices and wealthy entrepreneurs (Renneboog, Scholes, Simons and Wright, 2006). Besides, recently there has been an emergence of sovereign wealth funds investing directly in companies. With investments in among others Citigroup, Morgan Stanley, Merill Lynch and UBS, these funds have mainly focused on investing in the financial sector. However, in the future they may expand their focus to include other sectors. In addition, as public controversy over these sovereign wealth funds will diminish over time, these funds may take a more active role and acquire controlling stakes. It should be noted though that the emergence of sovereign wealth funds may also offer opportunities to private equity investors as they can pursue investment opportunities together through joint ventures. In addition to new transaction structures and market participants the future of the buyout market is expected to be characterized by a focus on new geographies. Investors are likely to turn their attention towards emerging markets including Asia and Eastern Europe. Despite the hard times the private equity industry is currently facing, experts remain optimistic about the future. In May 2008 David Rubenstein stated: *"But once this period is over, once the debt on the books of the banks is sold and new lending starts, I think you'll see the private equity industry coming back in what I call the Platinum Age -- better than it's ever been before. … I do think that the private equity industry has a great future and that the greatest period for private equity is probably ahead of us."*[5]

2.2 Empirical research

To gain control over a company investors usually pay a large premium over the target company's going-concern market value. This premium is defined as the difference between the bid price paid by the private equity investor and the stock price of the company before the announcement of the PTP. Alternatively, shareholder wealth effects can be measured by calculating the abnormal returns of a company's stock on the days surrounding the PTP announcement. These risk-adjusted share price reactions provide a measure of the expected wealth gains to the pre-transaction shareholders.

Much research has been conducted in order to examine the magnitude and sources of shareholder gains in PTP transactions. Of this research body, the largest part focuses on PTP transactions in the US during the 1980s LBO wave. The first ones to examine shareholder gains in

[5] Knowledge@Wharton, University of Pennsylvania, May 6, 2008

PTP transaction were DeAngelo, DeAngelo and Rice (1984). Research on a sample of 72 PTP announcements of US firms during the period 1973-80 indicated that public stockholders gained 22.3% in wealth during the two days surrounding the proposal. Furthermore, stockholder wealth decreased by 8.8% on average after withdrawal of the PTP proposal. After the research of DeAngelo, DeAngelo and Rice (1984) a large number of other studies found significant positive abnormal returns following PTP announcements in the US and confirmed their results. A study by Renneboog, Scholes, Simons and Wright (2006) provides an overview of evidence from different US studies on PTP transactions indicating an average premium in the range of 32.9% to 56.3%. Furthermore, depending on the length of the event window surrounding the PTP announcement, abnormal returns in these US PTP transactions varied between 13% and 28%.

In contrast to PTP transactions in the US, little research exists on shareholder wealth gains in European PTP transactions. Betzer (2004) examined premiums paid in European PTP transactions. The data set comprises 73 LBOs from 1996 to 2002. A multivariate regression explores the relationship between a set of variables and premiums paid. Betzer's findings indicate that acquirers look for target firms that experienced a poorly performing share price and firms that have a scattered shareholding structure. Furthermore, evidence is presented that contested bidding leads to higher bid prices. Contrary to predictions by La Porta, Lopez-de-Silanes, Shleifer and Vishny (2002), premiums in the UK where common law applies are significantly higher than in Continental Europe where civil law prevails. The average premium for the total European sample is 36.2% with an UK average of 44% as opposed to a Continental European average of 18.2%.

Andres, Betzer and Hoffmann (2004) examined 99 European PTP transactions between 1996 and 2002. The magnitude and sources of value creation to pre-transaction shareholders were investigated. They found positive and significant abnormal returns of about 13.8% on the PTP announcement day and 21.9% over the period [-15 to +15]. Support is found that a high pre-transaction free float, a badly performing stock price in the two years before the buyout and undervaluation compared to an industry peer group are factors which lead to higher abnormal returns for pre-transaction shareholders. As Andres, Betzer and Hoffmann (2004) examined PTP transactions covering the same period and geographies as the sample of Betzer (2004), it is not surprising that their studies provide similar results.

Weir, Laing and Wright (2005) investigated the factors that influence a company's decision to change its status from a public one to a private one. They found an average premium paid of 44.9% for a sample of 95 PTP transactions that took place in the UK during 1998 to 2002. However the paper did not investigate the different sources of value gains to shareholders. Further analysis did indicate that firms that go private have higher CEO ownership, higher institutional ownership and more duality with respect to their board structures compared to firms that stay public.

Renneboog, Simons and Wright (2007) examined the magnitude and sources of expected shareholder gains in 177 PTP transactions in the UK during the second LBO wave from 1997 to 2003. They found an average premium of 41.0% and a share price reaction to the PTP announcement of 29.3% over a [-40 to +40] period. The results show that increased interest tax shields, incentive realignment and undervaluation of the target firm as evidenced by bad stock performance appear to be the main sources of shareholder wealth creation.

Andres, Betzer and Weir (2007) examined shareholder wealth effects in a sample of 115 European PTP transactions during the period 1997 to 2005. The research found positive abnormal returns of 11.9% on the day of the announcement and 24.2% during a [-30 to +30] period. On a firm level, the abnormal returns are positively related to the extent of free float. In addition, abnormal returns are higher for companies that experienced a significant decline in share price and for those which are undervalued compared to a peer group. On a macro level, abnormal returns are found to be larger in countries with poor shareholder protection as measured by the ADR index.

Sudarsanam, Wright and Huang (2007) contributed to the existing literature by examining the impact of bankruptcy risk on the going private decision. In addition, value gains to pre-transaction shareholders were examined. They analyzed an extensive sample of 236 firms going private in the UK during the period 1997 to 2005 and a control group. The methodology of this study differs from prior studies on European PTP transactions as it introduces the Fama-French 3 factor event study approach in determining the abnormal returns around the announcement period. The results indicate that going private firms have higher default probability, lower stock market valuation, poorer operating performance, larger pre-transaction management holdings and weak corporate governance. In addition, these companies appear to be small in size, to suffer stock market neglect and to be undervalued. Abnormal returns of 15% are recorded for a 7 day period surrounding the PTP announcement. Higher value gains are achieved for firms with higher operating cash flow and those which are more undervalued by the market.

The average premium in a European PTP varies between 36% and 45% as indicated in Table 1. Abnormal returns in the two days surrounding the announcement are approximately 16% for the European studies. For different event windows the gains vary in the range of 12% and 29%.These results are in line with the US findings on PTP transactions cited above and are comparable to target shareholders returns in European takeovers in general (Campa and Hernando, 2004).

Previous studies provide evidence of large abnormal returns following the announcements of PTP transactions in Europe. These findings suggest the following hypothesis:

H1: The wealth effect hypothesis

"Announcements of PTP transactions during the third European LBO wave generated wealth gains to the pre-transaction shareholders"

Table 1

Literature on shareholder wealth effects in European public-to-private transactions

Author(s)	Region	Sample period	N	Premium	Event window (days)	CAAR	Additional results
Betzer (2004)	Europe	1996-02	73	36.1%	na	na	Bad stock performance, scattered shareholding and competitive bidding are associated with higher premia paid
Andes, Betzer and Hoffmann (2004)	Europe	1996-02	99	na	-1, 0 -15, 0 -15, 15	14.80% 19.37% 21.89%	Bad stock performance, scattered shareholding and undervaluation compared to an industry peer group are associated with higher abnormal returns
Weir, Laing and Wright (2005)	UK	1998-00	95	44.9%	na	na	Firms that go private have higher CEO ownership, higher institutional ownership and more duality with respect to their board structure
Renneboog, Simons and Wright (2007)	UK	1997-03	177	41.0%	-1,0 -5, 5 -40, 40	22.68% 25.53% 29.28%	Undervaluation of the target firm (bad stock performance), increased interest tax shields, stronger monitoring and incentive realignment appear to be the main sources of shareholder wealth creation
Andres, Betzer and Weir (2007)	Europe	1997-05	115	na	-1, 0 -15, 0 -15, 15	12.78% 17.30% 19.07%	High free float, low shareholder protection, bad stock performance and undervaluation compared to a peer group are associated with higher abnormal returns
Sudarsanam, Wright and Huang (2007)	UK	1997-05	236	na	-1, 0 -4,2 -10, 10	11.74% 15.00% 18.00%	Higher abnormal returns are reported for firms with larger free cash flow and lower market-to-book ratio

2.3 Theoretical sources of value gains

2.3.1 Introduction

As the empirical research in section 2.2 indicates, investors are willing to pay large premiums in order to acquire companies in PTP transactions. But how can investors afford to pay premiums of around 40% over a going-concern market value? Traditionally large takeover premiums have been justified by referring to the future benefits of revenue synergies and cost savings resulting from the combination of two companies. This might be true for strategic investors, but this is certainly not the case for private equity investors who take a company private and then hold it as an independent entity. As private equity investors manage their portfolio companies independently of each other, leveraged buyouts can be regarded as "unrelated" acquisitions. Where does the value creation in these "unrelated" acquisitions come from if no synergetic benefits can be realized? In order to answer this question I will first take a closer look at what determines the value of a firm in a PTP transaction.

A widely accepted method for calculating the value of a firm is discounting the expected free cash flows of a firm at the appropriate cost of capital. The Discounted Cash Flow (DCF) method calculates how much a firm is worth by discounting expected free cash flows at the weighted-average cost of capital. The application of this technique in valuing projects and firms has become widespread since the 1960s (Parker, 1968). However, the DCF method is not very practical in calculating the value of a firm in a PTP transaction. One of the key characteristics of a PTP transaction is the increase in leverage associated with the buyout. As a capital structure that changes over time entails a changing weighted-average cost of capital, DCF methods require a constant adjustment of the discount rate. A variation on the DCF approach is the Adjusted Present Value (APV) method. This method of calculating firm value is especially useful for PTP transactions as, in contrast to the DCF approach, it does not rely on the assumption of a constant (target) capital structure. It explicitly accounts for a changing capital structure over time by calculating the present value of the tax shields associated with debt financing independently of the all-equity value of the firm. The APV method was introduced by Myers (1974). The APV formula for calculating the value of a firm is given by:

$$APV = \sum_{t=0}^{T} \frac{FCF_t}{(1+r_u)} + \sum_{t=0}^{T} \frac{Taxshield_t}{(1+r_{tx})} \tag{2.1}$$

Where FCF_t is the free cash flow of the firm in year t, r_u is the unlevered cost of equity, $Taxshield_t$ is the interest tax shield in year t and r_{tx} is the cost of the tax shield. Myers (1974) defines the $Taxshield_t$ in year t as:

$$Taxshield_t = M_t * D_t * r_d \quad (2.2)$$

Where M_t is the marginal tax rate of the firm in year t, D_t is the value of debt in year t and r_d is the cost of debt. $D_t * r_d$ proxies for the interest payment of the firm in year t. As interest is tax deductible, for a leveraged firm its all-equity free cash flow is increased with the amount of the tax shield.

In a PTP transaction the buyer is able to bid well over the going concern market value of the firm, because the buyer is able to influence expectations about the independent variables of the APV formula (2.1) hence creating value. While some sources of value creation in PTP transactions have a direct effect on future free cash flow or tax shields, other sources are less straightforwardly quantifiable and may be interdependent with other value drivers (Loos, 2005). However, eventually all sources of value creation in PTP transactions can be traced down to changes in the independent variables of the APV formula. For a change in independent variables of the APV formula to classify as a source of wealth creation in PTP transactions, it should be unique to PTP transactions. If the wealth gain can also be easily obtained by management in the absence of a PTP transaction the wealth gain might already be priced into the going-concern market value of the firm and the PTP will not create additional value. Wealth is created only if the action is either impossible or very unlikely to occur in the absence of a PTP transaction.

In the existing body of literature on leveraged buy-outs several sources of wealth creation that are unique to PTP transactions have been identified. These complementing sources of wealth creation concern: tax benefits, agency costs, transaction costs and financial arbitrage. In addition, I have constructed a theoretical prediction concerning an additional source of PTP value creation based on the resource based view of the firm. This section will provide theoretical background on the different sources of PTP wealth gains.

2.3.2 Tax benefits

Miller and Modigliani (1958) argue that in a perfect world with no taxes the capital structure of a firm does not affect its value. In their original model (Miller and Modigliani, 1958) and its extension (Miller and Modigliani, 1963) they do however recognize the value advantages of debt financing in a world with taxes due to the tax deductible nature of interest payments. As PTP transactions typically are accompanied by a substantial increase in leverage, the increase in debt-related tax shields are considered to be an important source of value creation in these transactions (Lowenstein 1985). The value effects resulting from the potential to increase a firm's leverage justifies a higher bid price. As a

consequence, wealth is transferred from the tax receiving public authorities to the pre-transaction shareholders (Andres, Betzer and Hoffmann, 2004).

Under the tax benefits hypothesis, firms with high pre-transaction tax bills benefit from going private due to the fact that the future tax shields associated with the considerable increase in leverage increase the value of the firm. In addition, it can be argued that the scope for additional debt related tax shields depends on the target's pre-transaction debt capacity. The lower the level of pre-PTP debt, the higher is the firm's debt capacity and potential for value creation.

H2: The tax benefits hypothesis

"The wealth gains associated with PTP announcements are positively related to high tax levels and low leverage levels of the pre-transaction firms"

Empirical results of several studies of the US market have provided support for the tax benefit hypothesis (e.g. Lehn and Poulsen, 1989; Kieschnick, 1998; Kaplan, 1989). Interestingly, while several European studies examined potential tax benefits in PTP transactions as well, most did not find evidence supporting the tax benefits hypothesis (Betzer, 2004; Andres, Betzer and Hoffmann, 2004; Sudarsanam, Wright and Huang, 2007). Only Renneboog, Simons and Wright (2007) provided some support for the tax benefits hypothesis as they found evidence that unused debt capacity was related to higher abnormal returns for UK PTP transactions. The lack of evidence for tax benefits in European PTP transactions contrasts the strong evidence found in US studies. This is a remarkable finding as the other sources of value creation in US and European PTP transactions show strong similarities. Differences between these US and European results may stem from differences in the tax regimes companies are subject to. Both Dicker (1990) and Weir, Laing and Wright (2005) indicate that the tax advantages of debt financing are smaller for UK firms than for US firms. One remark has to be made with respect to unused debt capacity. A relationship between low debt and high abnormal returns following a PTP announcement may not necessarily reflect value creation from increased tax shields in the future. Private equity firms use a high amount of debt financing not only to create tax shields but also to discipline management. Value gains stemming from a large pre-transaction unused debt capacity may just as well refer to the increased potential to discipline management in the future.

2.3.3 Agency Costs

One of the most often mentioned sources of wealth creation in leveraged buy-outs refers to the mitigation of agency costs. Agency costs result from the separation of ownership and control. More specific, an agency problem exists when the goals of an agent (company management) are not in line with the goals of a principal (company shareholders). In such a case, company management may pursue private benefits at the expense of the shareholders. This conflict of interest and the general

inability of shareholders to directly monitor managers, necessitate that control/monitoring mechanisms need to be installed to protect shareholders (Fama and Jensen, 1983; Jensen and Meckling, 1976).
The agency cost based sources of wealth creation in PTP transactions relate to free cash flow, incentive realignment, monitoring and shareholder protection standards.

Free cash flow

Jensen (1986) defines free cash flow as the cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital. Jensen's free cash flow theory states that conflicts of interest between shareholders and managers motivate managers to waste cash. Instead of distributing cash to shareholders, managers tend to invest free cash flows at a rate below the cost of capital or spend it on organization inefficiencies. Managers are driven in these actions by motivations such as empire building. They have incentives to grow the firm beyond its optimal size as this enlarges the managers' power by increasing the resources under their control. Jensen (1986) states that these conflicts of interests are especially severe when the organization generates substantial free cash flow.

PTP transactions can serve as a method of mitigating the agency costs related to free cash flow. The substantial amount of debt associated with PTP transactions disciplines management as it commits management to paying high interest payments in the future. As a consequence, debt financing reduces future free cash flow and the thus the potential to waste cash flows. As the conflicts of interest are more severe for firms with substantial free cash flow, the potential to reduce these agency costs is higher for these high cash flow firms.

H3: The free cash flow hypothesis

"The wealth gains associated with PTP announcements are positively related to the levels of free cash flow of the pre-transaction firms"

The US evidence regarding the role of free cash flow in PTP transactions is mixed. Lehn and Poulsen (1989) were the first to examine the free cash flow hypothesis by examining PTP transactions in the US. They found that the likelihood to go private was directly related to undistributed cash flow. Later this finding was supported by Opler and Titman (1993). In addition, Lehn and Poulsen (1989) found premiums to be positively related to undistributed cash flow. Other US studies however reported evidence that was inconsistent with the free cash flow hypothesis (Halpern, Kieschnick and Rotenberg, 1999; Kieschnick, 1998; Servaes, 1994). The European evidence is mixed as well. Many studies examined the influence of free cash flow, but did not find a significant relation with abnormal returns (Andres, Betzer and Hoffmann, 2004; Andres, Betzer and Weir, 2007; Renneboog, Simons, Wright,

2007). In contrast, Sudarsanam, Wright and Huang (2007) did find evidence that firms with larger operating cash flow generated higher shareholder gains following PTP announcements in the UK.

Incentive realignment

Managerial ownership can be seen as an important corporate governance mechanism as it can be used to align the incentives of management with those of the shareholders. As a consequence, conflicts of interest and hence agency costs are reduced. Various studies have shown that managerial ownership has a significant positive influence on firm performance (Morck, Shleifer and Vishny, 1988; Mehran, 1995). In PTP transactions a major source of value creation is believed to come from the realignment of managers' incentives with those of the shareholders. The incentive realignment hypothesis states that low managerial equity ownership provides scope for additional incentive realignment which results in higher managerial effort to maximize firm value. In addition, as managerial ownership can be seen as a substitute of other corporate governance mechanisms, lower monitoring and contract costs after the going private may provide additional sources of value gains. These findings suggest a negative relation between pre-transaction managerial ownership and PTP wealth gains. However, Morck, Shleifer and Vishny (1988) propose the "entrenchment hypothesis" that suggests that managers with effective control pursue self indulging and non-value maximizing activities which reduce firm value. With effective control managers become immune to disciplining mechanisms such as the market for corporate control. A PTP can alleviate these agency costs, resulting in high wealth gains for firms with high pre-transaction managerial ownership levels. In conclusion, it is therefore expected that the negative relation between managerial ownership and P2P wealth gains reverses at high ownership levels (+25%). Evidence for this non-linear relation is found by among others Chen, Hexter and Hu (1993).

H4: The incentive realignment hypothesis

"The wealth gains associated with PTP announcements are negatively related to managerial equity ownership in the pre-transaction firm for low levels of managerial ownership (<25%) and positively related to managerial equity ownership for high levels of managerial ownership (>25%)"

Weir, Laing and Wright (2005) and Sudarsanam, Wright and Huang (2007) found that firms going private have higher CEO ownership than control firms. Renneboog, Simons and Wright (2007) provide support for the incentive realignment hypothesis by finding that lower pre-transaction managerial ownership is associated with both higher abnormal returns and higher premiums. In contrast, Andres, Betzer and Weir (2007) and Sudarsanam, Wright and Huang (2007) fail to find a significant relationship between managerial ownership and abnormal returns.

Monitoring

Besides by realigning incentives, agency costs can be reduced by monitoring. In the case of public companies, however, the free rider problem arises which prevents effective monitoring. The free rider problem with respect to monitoring is described by Grossman and Hart (1980). In a public corporation with a scattered shareholders base, individual shareholders do not have a large enough incentive to invest in monitoring company management. Since company management serves the "public good", the social benefits from monitoring management's activities outweigh the private benefits to any individual. As a result each individual attempts to be a free-rider and thus underinvests in monitoring activities. The organizational changes associated with a PTP will mitigate the free-rider problem. Following a PTP, the private equity investor gets a strong incentive to act as an "active investor" (Jensen, 1989) as ownership in the firm becomes highly concentrated. After a PTP, the private equity firm fully benefits from its monitoring activities as the "public good" has become the "private equity's good". As a consequence, the incentive for free-riding on the monitoring efforts of others disappears. Overall, the greater ownership concentration associated with a PTP encourages closer monitoring and leads to a more active representation in the board of directors (DeAngelo, DeAngelo and Rice, 1984). The monitoring hypothesis thus states that in the presence of weak ownership concentration prior to the transaction, larger wealth gains from increased monitoring can be realized in going private.

H5: The monitoring hypothesis

"The wealth gains associated with PTP announcements are positively related to the amount of free float of the pre-transaction firms"

Few US studies have examined the effect of increased shareholder monitoring on abnormal returns following PTP transactions. In contrast, a large number of European studies analyzed this potential source of wealth gains. Weir, Laing and Wright (2005) found that firms going private tend to have higher institutional ownership than firms staying public. Betzer (2004) found that a scattered shareholder structure is associated with higher premiums paid. More evidence in favor of the monitoring hypothesis is provided by Andres, Betzer and Hoffmann (2004), Renneboog, Simons and Wright (2007) and Andres, Betzer and Weir (2007) who all report a positive relationship between abnormal returns and free float.

Shareholder protection

La Porta, Lopez-de-Silanes, Shleifer and Vishny (2002) state that when shareholder rights are better protected by law, investors are more willing to finance firms and financial markets in general are more valuable. Investors recognize that, with better legal protection, misuse of company profits by management is limited. By limiting expropriation, the law justifies higher valuation of securities. The

findings of La Porta, Lopez-de-Silanes, Shleifer and Vishny (2002) support their theory by showing that better shareholder protection is empirically associated with higher valuation of corporate assets. In addition, La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998) already found that countries with Common Law systems provide better investor protection than Civil Law countries. A PTP announcement should therefore result in higher abnormal returns in Civil Law countries (Continental Europe) compared to Common Law countries (UK). After the going private the need for legal protection of minority shareholders disappears. The private equity firm acts as an "active investor" who is able to guard itself against expropriation by management. As the scope for improvement in protection is largest in Civil Law countries, companies in Continental Europe should benefit most from a PTP announcement.

H6: The shareholder protection hypothesis
"The wealth gains associated with PTP announcements are higher in Civil Law countries compared to Common Law countries"

Contrary to expectations, Betzer (2004) found premiums in the UK to be higher than in Continental Europe. Andres, Betzer and Hoffmann (2004) and Andres, Betzer and Weir (2007) do not find a significant difference in abnormal returns between UK and Continental Europe.

2.3.4 Transaction Costs

Pagano, Panetta and Zingales (1998) note that maintaining a stock exchange listing entails both direct and indirect costs. Direct costs include the yearly stock exchange fees and yearly expenses on among others auditing, certification and dissemination of accounting information. The fixed costs associated with maintaining a listing are quite substantial as evidenced by the fact that smaller companies are less likely to go public (Ritter 1987). In addition, several indirect costs exist such as the costs associated with the loss of confidentiality. These costs occur as disclosure rules of stock exchanges oblige firms to unveil information which may result in the loss of competitive advantages. Other indirect costs include the opportunity costs associated with management time and effort spent on maintaining investor relations. As both the direct and indirect listing costs disappear after a company has gone private, the potential to save transaction costs is expected to be a source of wealth gains in PTP transactions. Direct costs of a listing depend on the stock exchange the company is listed on. For example, a main difference between the Alternative Investment Market (AIM) and the Official List market of the London Stock Exchange concerns the regulatory regimes. Renneboog, Simons and Wright (2007) state that large firms pay only half the direct costs when listed on the AIM compared to being listed on the Official List market. Indirect costs too are expected to be lower due to the lower listing and disclosure requirements of the AIM.

H7: The transaction costs hypothesis

"The wealth gains associated with PTP announcements are positively related to the cost savings from eliminating listing costs"

Travlos and Cornett (1993) examined the relationship between listing costs and subsequent abnormal returns following PTP announcements in the US. However, they did not find support for the hypothesis. In contrast, Renneboog, Simons and Wright (2007) found that higher listing costs were associated with higher value gains in PTP transactions in the UK.

2.3.5 Financial Arbitrage

A PTP may be driven by management's perception that the securities of a firm are undervalued by the market. In such a case, management believes that the prevalent trading price of the firm's shares does not justify the intrinsic value of the firm. As a consequence managers need to deal with the conflicts arising from the undervaluation of the firm. One of these conflicts is the increase in likelihood of a hostile takeover. As a consequence, dissatisfied managers may choose to take a company private in order to prevent a hostile take-over in the future or resolve other conflicts stemming from company undervaluation. Alternatively, a PTP may be initiated by a private equity firm, which actively scans the market for undervalued companies. Potential reasons that explain why companies trade at a discount relative to their intrinsic value include market inefficiencies (e.g. lack of transparency, illiquidity or stock market neglect), agency costs and explanations from a behavioral finance context. When an undervalued firm is then taken private, the value gains stem from the elimination of the underlying reasons for the discount. Berg and Gottschalg (2005) note that financial arbitrage may be based on changes in market valuation through time (in practice known as 'multiple riding'), on superior market information, on superior deal making capabilities and on private information about the portfolio company. With respect to this last factor, value gains may also result from management exploiting insider information. It can be beneficial for management to deliberately depress the value of a firm in light of a future buy-out by misrepresenting future cash flows (Lowenstein, 1985; DeAngelo 1986). As management acts as a buyer in the going private, management directly benefits from a depressed value by paying a lower price for the firm.

The financial arbitrage hypothesis states that as a company trades at a higher discount relative to its intrinsic value, investors are able to pay a higher premium and the PTP will thus generate larger abnormal returns. Undervaluation can be measured by looking at intertemporal undervaluation or cross-sectional undervaluation. Intertemporal undervaluation can be measured by looking at the share price decline over a certain time period, while cross-sectional undervaluation can be measured by looking at the value of a firm at a certain point in time versus the value of a peer group. I will look at

intertemporal undervaluation, because of the subjectivity and practical difficulties in constructing individual company peer groups.

H8: The financial arbitrage hypothesis
"The wealth gains associated with PTP announcements are positively related to the pre-transaction undervaluation of the stock price"

In the US Travlos and Cornett (1993) examined the impact of a company's PE ratio relative to an industry peer group on shareholder wealth gains in PTP transactions. Their results showed that undervaluation compared to an industry peer group was associated with higher abnormal returns. However, without showing evidence they attributed the pre-transaction undervaluation to agency problems and attributed the wealth gains to the mitigation of these agency costs. European studies have found strong evidence for the financial arbitrage hypothesis. Betzer (2004), Andres, Betzer and Hoffmann (2004) and Andres, Betzer and Weir (2007) found higher shareholder wealth gains for firms which experienced significant declines in share price. In addition, Renneboog, Simons and Wright (2007) found share price decline to be associated with higher wealth gains in Management Buyouts and Institutional Buyouts but not in Management Buy-Ins. This finding suggests that management, due to information asymmetries, plays a crucial role in identifying undervaluation. Besides evidence of PTP wealth effects associated with intertemporal undervaluation, European studies have also provided evidence of wealth effects associated with cross-sectional undervaluation (Andres, Betzer and Hoffmann, 2004; Andres, Betzer and Weir, 2007; Sudarsanam, Wright and Huang, 2007). In contrast, Betzer (2004) did not find higher premiums paid for companies with a low P/E ratio compared to an industry peer group.

2.3.6 Informational resources

The existing literature on PTP transactions has focused on characteristics of the going private firm in determining the sources of shareholder wealth gains. So far it has been neglected to examine how the characteristics of the private equity firm executing the PTP transaction affect shareholder wealth gains. The private equity firms have been considered to be a homogenous group. The value of a firm going private has thus been considered to be the same to any private equity firm. I believe this is an unrealistic representation of real PTP transactions as private equity firms are indeed a heterogeneous group and an individual firm may be worth more to one private equity investor than to another. The premium paid by a private equity investor depends on the value of the target company *to the private equity firm* and thus depends on not only characteristics of the target company but on characteristics of the private equity investor itself as well.

The resource based view of the firm (Penrose 1959, Teece 1982, Wernerfelt 1984, Rumelt 1984) emphasizes that each firm is characterized by its own collection of resources and capabilities. According to this view, value is created by a firm through exploitation of scarce firm-specific resources and capabilities. The firm's resources are those tangible and intangible assets that add to the strengths and weaknesses of the firm. Capability in turn refers to the capacity for a set of resources to perform a given task or activity. Value creation in a PTP transaction should result from the increase in profitability of the firm's resource bundle as a stand-alone business as there are no horizontal synergies through resource sharing among portfolio companies of a private equity investor (Loos, 2005). Instead of horizontal resource sharing among portfolio companies, there should be a vertical exchange of resources between the private equity investor and the individual portfolio company. Following the acquisition of a company by a private equity investor, one method for the investor to increase the value of the firm is by enhancing the firm's capabilities and by providing it with access to additional informational resources consisting of enhanced strategic advice, industry expertise and an extensive network of relations (Berg and Gottschalg, 2005). These specific resources are scarce, hard to imitate and relevant to the establishment of a competitive advantage. By leveraging these informational resources, the target firm will be able to generate excess sustainable profits in the future and thus create value. For example, Berg and Gottschalg (2005) note that buyouts can create value beyond the increase in operational performance. Value is created by redefining major strategic variables and increasing the strategic distinctiveness of the company by for example refocusing the company on its core activities or executing a buy-and-build strategy. The strategic advice and involvement of a private equity investor is essential in this process of increasing the strategic distinctiveness of a firm. The 'cross-utilization' of managerial talent between the private equity investor and the portfolio company represents a source of value creation that would otherwise not have been readily available (Hite and Vetsuypens, 1989).

Developing the strategic advisory skills set is one of the main sources of establishing a competitive advantage for a private equity investor. Developing an extensive knowledge base allows a private equity investor to differentiate itself from rival firms. While many of the previously discussed sources of PTP wealth creation were readily available to all target firms, this source highly depends on the specific private equity investor involved. As buyout markets have developed over time and have become increasingly competitive, the need for private equity investors to build a competitive advantage and to develop strategic advisory skills has increased. Therefore, it is expected that during the third wave the transfer of knowledge from a private equity firm to a portfolio company has become an increasingly important source of wealth creation.

The knowledge transfer between a private equity investor and a portfolio company is difficult to observe, but it is clear that the knowledge transfer and its benefits are absent in PTP transactions without private equity involvement. The private equity involvement hypothesis states that buyouts

which are backed by private equity generate higher abnormal returns than pure management buyouts without private equity involvement.

H9: The private equity involvement hypothesis
"The wealth gains associated with PTP announcements are higher for transactions with private equity involvement compared to transactions without private equity involvement"

In PTP transactions value is created as a result of access to increased informational resources and improved strategic decision making by the target firm following the buyout. A private equity firm enhances the value of a target firm through the expertise and reputation acquired by the private equity firm in previous transactions. Private equity firms that have been involved in many PTP transactions have developed an extensive network of relations and sophisticated strategic advisory skills. It can therefore be argued that these experienced private equity firms can afford to pay a higher premium in a PTP transaction compared to less experienced private equity firms as a result of their more advanced capacity to enhance the informational resources of the firm and thus of their increased potential to create value. This suggests that private equity firms differ in "quality". The large knowledge base of "high quality" private equity investors allows them to transfer more knowledge to new portfolio companies. In addition to the higher premium paid, the market may expect a bid by a highly reputable private equity firm, which has executed many transactions in the past, to be more credible and to have a higher probability of transacting. The higher transaction probability and higher bid price are expected to be associated with higher abnormal returns following the PTP announcement.

H10: The private equity experience hypothesis
"The wealth gains associated with PTP announcements are higher for experienced private equity firms acquiring target companies compared to inexperienced private equity firms acquiring target companies"

Berg and Gottschalg (2005) note that the mentoring effect of private equity investors on portfolio companies has been a neglected research topic. To my knowledge, no prior research exists that examines the effect of either private equity involvement or the level of experience of private equity firms on value gains in PTP transactions. However, research has been conducted into the role of a private equity firm's reputation. For example, prior research examined the effect of private equity reputation on the financial performance of a LBO exiting through an IPO. Results by Jelic, Saadouni and Wright (2005) indicate that IPOs of UK based MBOs backed by more reputable private equity firms perform better over the long-run than those backed by less reputable ones. In addition, with respect to LBO transactions in general, Loos (2005) found several variables relating to acquisition

experience of private equity firms to be associated with higher buyout performance as measured by the Internal Rate of Return (IRR).

Based on different theoretical frameworks and the existing literature on PTP transactions in Europe, nine hypotheses (H2 to H10) concerning potential sources of value creation have been constructed. A summary of these hypotheses and the empirical evidence supporting these hypotheses has been provided in Table 2. The table clearly illustrates the lack of empirical research on informational resources as a source of PTP value gains. This study will be the first to empirically examine this subject and will thereby fill the research gap.

Table 2
Evidence of sources of PTP value gains in prior European studies

	Betzer 2004	Andres, Betzer, Hoffmann 2004	Renneboog, Simons, Wright 2007	Andres, Betzer, Weir 2007	Sudarsanam, Wright, Huang 2007
Tax benefits					
H2: Tax Benefits	×	×	✓	-	×
Agency Costs					
H3: Free Cash Flow	-	×	×	×	✓
H4: Incentive realignment	-	×	✓	×	×
H5: Monitoring	✓	✓	✓	✓	-
H6: Shareholder protection	×	×	-	×	-
Transaction Costs					
H7: Transaction Costs	-	-	✓	-	-
Financial Arbitrage					
H8: Financial arbitrage	✓	✓	✓	✓	✓
Informational Resources					
H9: Private equity involvement	-	-	-	-	-
H10 Private equity experience	-	-	-	-	-

"✓" indicates that the study by the author(s), mentioned in the top row of the column, found evidence in support of the hypothesis. "×" indicates that the hypothesis was tested but no evidence was found. "-" indicates that the hypothesis was not tested.

2.4 The impact of collusion

In addition to examining the sources of value creation in PTP transactions, special interest will be paid to the impact of collusion on value creation in PTPs. Cumming, Siegel and Wright (2007) note that in recent years club deals, which were very popular in the 1980s, have experienced a resurgence. As these club deals became increasingly popular during the third LBO wave, research on the effects of these club deals seems called for. Today, an increasing number of private equity firms form syndicates, which bid for very large buyouts that would have been too risky to fund on their own. It can be argued

that higher premiums can be paid in these club deals because of the increased collection of expertise and financial power of these buyer clubs (Loos, 2005). However, two main negative wealth effects to pre-transaction shareholders can be identified as well. First of all, club deals are expected to face high costs associated with additional communication needs and consensus building among the partners. Secondly, an interesting dimension of these club deals relates to their impact on competition and thus on the price paid in leveraged buyout deals. Club deals have been subject to criticism as they are believed to offer room for collusion. Meuleman and Wright (2007) note that recently US antitrust authorities have started to investigate some of these club deals, because of suspected collusion by major private equity firms. The collusion in club deals would consist of rival private equity firms agreeing not to bid for a target company in order to depress the bid price; in return they would receive an equity stake after completion of the deal by another private equity firm. Collusion between private equity firms is expected to lead to lower prices being paid in PTP transactions and smaller wealth gains to pre-transaction shareholders. This effect is expected to be the dominant wealth effect.

H11: The collusion hypothesis

"The wealth gains associated with PTP announcements are lower for investment syndicates acquiring target companies compared to single private equity firms acquiring target companies"

Intuitively this hypothesis seems to be contradicting the private equity involvement hypothesis, which states that private equity involvement leads to higher abnormal returns compared to transactions without private equity involvement. However, both hypotheses do not need to be substitutes as there may be several forces interacting at the same time providing both upwards and downwards pressure on the price paid in a going private transaction. There might well be a non-linear relationship between the number of private equity investors involved in a transaction and the abnormal returns. In such a case, the involvement of one private equity investor in a PTP transaction would lead to higher abnormal returns as proposed by the private equity involvement hypothesis. However, as soon as multiple private equity investors are involved in one transaction the effect is unclear as the private equity involvement hypothesis and the collusion hypothesis predict opposite effects.

Although much research has been conducted on different aspects of syndications, little research exists on the influence of club deals on wealth gains in PTP transactions. Only very recently researchers have started to investigate this topic. Officer, Ozbas and Sensoy (2008) examined 198 US private equity deals of which 59 were club deals. These transactions occurred between January 1984 and September 2007. They found that target shareholders gained less than 10% in club deals compared to sole-sponsor leveraged buyouts. Interestingly, they found the discount to be concentrated in club deals announced prior to 2006, the year in which the media turned their attention to the practice of club deals and the US government started to investigate these deals. In addition, Boone and Mulherin

(2008) examined 870 takeovers of US publicly traded firms in the 2003 to 2007 period. In contrast to the findings of Officer, Ozbas and Sensoy (2008) they however did not find target abnormal returns to be lower in club deals compared to sole sponsor transactions. The only European study to examine clubs deals did not measure PTP wealth gains but focused on the effect of the presence of co-investors on the IRR of LBO investments. Loos (2005) examined a sample of 274 realized European LBOs and found IRRs to be higher for club deals compared to the total sample of LBOs. This finding is in line with the collusion hypothesis as low bid prices being paid to pre-transaction shareholders lead to higher IRRs. However, as mentioned, Loos (2005) did not measure the wealth effects to pre-PTP shareholders in particular. In the existing body of European literature a research gap exists as the effect of collusion on PTP value gains has not yet been researched. This study will contribute to the existing body of research by being the first to examine this relation.

3. DATA

3.1 Sample selection and data sources

The final sample consists of a total of 153 public to private transactions of European target companies announced between 2003 and 2007. These transactions were identified by searching Bureau Van Dijk's Zephyr Database. Furthermore, the Mergermarket database was searched in order to identify additional transactions that were not covered in the Zephyr Database. For a transaction to be included in the sample it had to concern the acquisition of a European listed company which was formally announced (and subsequently not withdrawn) between January 1, 2003 and December 31, 2007. In addition, the transaction had to satisfy the following criteria:

(1) The transaction was a buyout led by management and/or one or more private equity investors as opposed to an acquisition by a strategic investor;
(2) The public offer resulted in a 100% final stake owned by the acquirer with the transaction resulting in a going private of the firm;
(3) The transaction involved a public bid for a majority stake of the target firm (>50%) in order to ensure a definite shift in hierarchical power from the divestor to the bidder;
(4) The target company did not experience financial distress immediately prior to the PTP transaction;
(5) The Datastream total return index had to be available for the full event window and at least 100 days of the estimation period

The sample size of 153 transactions is on the high end of the range of sample sizes used in similar European studies (Table 1). Detailed information about the construction of the sample is presented in Table 1 of the Appendix. Although the sample does not cover the total population of European PTP transactions during the specified time period (nor did it have the intention to do so), the sample is believed to be highly representative of the total population. A number of factors support this belief. First of all, as PTP transactions concern the acquisitions of public companies, financial data about the transactions and target companies involved is readily available. Therefore, only a handful of transactions were omitted from the sample because of data unavailability. Secondly, PTP transactions are high profile transactions which receive extensive media coverage. Therefore, information on PTP transactions is expected to be well documented in all M&A databases. Lastly, the use of two M&A databases in constructing the sample ensured data triangulation. It is therefore expected that choosing other M&A databases would not have substantially changed the size or composition of the sample.

In order to collect the required research information different sources were used. Deal characteristics such as deal values, bid details and announcement dates in addition with certain acquirer and target characteristics were gathered from Bureau Van Dijk's Zephyr Database. Information gaps were filled, data was verified and inconsistencies were eliminated by searching the Mergermarket database. Stock price information, daily total return indices and market interest rates were collected via a Thomson Datastream terminal. This database was also used to download information on the market index. Thomson Worldscope Fundamentals was the primary source for accounting data and target company information. In order to access the Thomson Worldscope data the Thomson ONE Banker portal was used. Accounting data was complemented with data from Bureau van Dijk's Amadeus Database if needed. Where both databases contained incomplete information, annual reports were consulted.

3.2 Description of major sources

Central to my research are a selected number of databases. A huge heterogeneity exists among the total collection of financial databases available. Table 2 in the Appendix provides a summary overview of major financial databases and the key advantages of each database. The selection of a particular database can have a large impact on the results of one's study. In order to highlight this issue, this section will provide some background on the major databases used in this research. In addition, I will describe a number of considerations in selecting databases and arguments for choosing the databases used. For comparison purposes, table 3 in the Appendix provides an overview of the data sources which were used in similar empirical studies in the past.

M&A information

Bureau Van Dijk's Zephyr Database

Zephyr is the primary M&A database used in this research. The database is an information solution containing M&A, IPO and venture capital deals with links to detailed financial company information. Zephyr is a very extensive database containing information on almost 600,000 transactions, while up to 100,000 transactions are added each year. Several other M&A databases exist including Mergermarket, Mergerstat and SDC Platinum. One of the advantages of the Zephyr database is that it does not have a minimum deal value while some of the other databases do. Another advantage is the large and detailed amount of company information, because the database is interlinked with other databases of Bureau Van Dijk. In addition, Zephyr has over 100 detailed search criteria, which greatly facilitates the creation of a proper sample.

Mergermarket

My sample is the key to my results and findings. As the reliability of my findings is increased with a larger sample size, I have decided to search for additional transactions in the Mergermarket database.

This process also included verifying the data from the Zephyr Database which further enhances the reliability of my results. The Mergermarket database includes European, American and Asia Pacific deals. It covers all European deals larger than EUR 5m since 1998. The Mergermarket database has not been widely employed in academic research making it a good complement to the Zephyr database.

Time series

Thomson Datastream

Thomson Datastream is a financial statistical database which contains over 100 million time series and information on securities and indicators for over 175 countries in 60 markets. This database has been used to download time series information as it is unparalleled in scope. While other databases such as Bloomberg also provide historical time series of daily stock prices, they do not provide time series of securities' total return indices. Datastream has been widely employed as the primary source of time series data as evidenced by Table 3 in the Appendix.

Accounting data

Thomson Worldscope

Thomson Worldscope is the primary source used to collect accounting data. It is an extensive financial data source which includes up to 20 years of historical data on 31,000 active and 9,000 inactive companies with over 1,500 data elements on each company record. One of the main advantages of Thomson Worldscope over other sources is the high amount of data elements per annual record. While Thomson Datastream is a superb information source for time series data, Thomson Worldscope is especially well suited as a source of static data (annual and quarterly financial data).

Bureau Van Dijk's Amadeus Database

Amadeus is a pan-European database containing information on 11 million public and private companies. It incorporates data from over 30 specialist regional information providers. My version allowed me to access the top 250.000 companies. The database covers an extensive amount of companies. However, the number of records per company is limited. This database has therefore been used to complement the Thomson Worldscope database. When inconsistencies arose, annual reports were consulted.

3.3 Descriptive statistics

Table 3 shows the development of the number and value of the total sample of 153 PTP transactions. From 2003 to 2004 the number of deals dropped followed by a steady climb up till 2006. 2007 shows

a decline compared to the 39 transactions in 2006. The figures on average transaction value show a more consistent pattern. The table clearly shows that the average deal size increased over time. In line with the increase in average deal size is the increase in total transaction value reaching a peak of EUR 43 bn in 2007. This peak is almost 4 times the total transaction value in 2003.

Table 3

Number, average transaction value and sum of transaction values per year

Year	Number of transactions	Average transaction value (EUR m)	Sum of transaction values (EUR m)
2003	40	286	11,435
2004	20	628	12,561
2005	23	1,194	27,468
2006	39	1,022	39,847
2007	31	1,402	43,447
2003-2007	153	881	134,758

Table 4 provides an overview of PTP activity per sector. The industry classification is based on primary Standard Industrial Classification (SIC) codes, which were developed by the US government. These codes have been assigned to both US and non-US companies. While a company can have multiple SIC codes, its primary SIC code represents the business segment which provides the most revenue. If no sales breakdown is available, SIC codes are assigned according to the best judgment of Worldscope. 10 different SIC divisions can be identified. As Table 4 shows, PTP activity covers the wider industry spectrum. Only 2 SIC divisions did not experience a PTP transaction: Agriculture, Forestry and Fishing, and Public Administration. Together the Services and Manufacturing sectors accounted for over half of the total number of PTP transactions. However, many of the PTP transactions in the Services sector concern companies of relatively small size. In terms of total deal value, the Transportation, Communications and Public Utilities sector was the most important sector.

Table 4

Number, average transaction value and sum of transaction values per sector

Sector	Number of transactions	Average transaction value (EUR m)	Sum of transaction values (EUR m)
Services	47	394	18,528
Manufacturing	35	1,141	39,918
Retail Trade	27	617	16,671
Transportation, Communications, Public Utilities	15	2,727	40,899
Finance, Insurance, And Real Estate	14	491	6,874
Construction	8	850	6,797
Wholesale Trade	6	429	2,571
Mining	1	2,500	2,500

Table 5 shows the importance of the UK PTP market. PTP transactions of UK companies account for over two third of the total sample. Compared to the UK market the continental European market is considered to be less mature. Still, the continental European market is not a homogenous market. Interesting differences can be identified between the individual countries. The Dutch PTP market is the most developed one. Notable is the large average deal size in the Danish PTP market. The EUR 13.3bn buyout of TDC explains part of this high figure. The average transaction value, excluding the TDC buyout, drops to EUR 937m which is more in line with the other countries.

Table 5

Number, average transaction value and sum of transaction values per country

Country	Number of transactions	Average transaction value (EUR m)	Sum of transaction values (EUR m)
United Kingdom	107	743	79,522
Netherlands	12	1,300	15,604
Germany	7	600	4,199
Ireland	7	467	3,267
Sweden	6	1,039	6,236
Denmark	5	3,412	17,061
Spain	4	1,476	5,904
France	4	557	2,229
Belgium	1	737	737

Tables 6 and 7 provide an overview of some key characteristics of the sample. It is interesting to see that over the 500 trading days prior to the PTP announcements the companies on average experienced a price decline relative to the market. Furthermore, Table 7 shows that 15.7% of the transactions did not include support of private equity investors and 20.3% included support of more than one private equity investor. This implies that the bulk of the transactions (64%) were executed by single private equity investors.

Table 6

Key sample characteristics: continuous variables

		Mean	Median	St. dev.	Min	Max
Taxes	Taxes (% of sales)	0.0198	0.0210	0.0597	-0.4785	0.1606
Leverage	Debt to equity (%)	0.3381	0.1876	0.8110	-1.3534	7.7429
Free Cash Flow	Free cash flow (% of sales)	0.0395	0.0769	0.2393	-1.0000	0.5322
Management Stake	Management stake (% of total shares)	0.1206	0.0460	0.1544	0.0000	0.6295
Free Float	Shareholdings <5% (% of total shares)	0.5660	0.5652	0.2148	0.1185	0.9987
Share Performance	2 yr market-adjusted average performance	0.9850	0.9796	0.3228	0.0835	2.0393

The *Taxes* are taken from the last annual income statement and divided by the same fiscal year's sales. *Leverage* is total debt divided by the market capitalization at last fiscal year end. *Free Cash Flow* is EBITDA minus taxes, interest and dividends. This figure is divided by last fiscal year's sales and trimmed at -100%. *Management Stake* is the percentage of shares owned by management. The *Free Float* is calculated by deducting all interests of over 5% of total outstanding share capital. *Share Performance* is measured by dividing the closing market price 30 days prior to the first PTP rumor/announcement by the average price measured over 500 trading days counting backwards from the 30 days prior to the first announcement. This ratio is divided by the equivalent ratio of the Dow Jones STOXX 600 index in order to exclude market movements.

Table 7

Key sample characteristics: binary variables

	Number	% of sample
Target characterstics		
Management stake > 25%	32	20.9
Common law home country	114	74.5
AIM listed	38	24.8
Deal characteristics		
Pure management buyout	24	15.7
Acquiror = top 20 private equity firm	41	26.8
Club deal	31	20.3
Contested bid	9	5.9
Improved bid	23	15.0

A deal is characterized as a *Pure management buyout* if no private equity investor was involved in the PTP transaction. *Acquiror = top 20 private equity firm* refers to the 2008 ranking of private equity firms as published by Private Equity International magazine. This ranking is based on the total amount of funds raised over the period January 1, 2003 to April 15, 2008. A *Club deal* is a transaction in which more than one private equity investor acquires the company. A *Contested bid* is a transaction in which there was more than 1 bidder. *Improved bid* refers to a transaction in which the successful bid was preceded by at least one unsuccessful bid by the same acquirer.

4. METHODOLOGY

4.1 Discussion of alternative methods

As previously mentioned, wealth effects in PTP transactions are most commonly measured by calculating either the premiums paid in such transactions or the abnormal returns following the PTP announcements. This analysis of abnormal returns is more commonly referred to as an event study. The premium analysis looks at the final offer price paid for the company's stock, while an event study measures the expected wealth gains to pre-transaction shareholders. The event study thereby takes into account not only the offer price, but also uncertainty factors such as the bid's probability of success, the probability of the bid being raised and the probability of another party offering a higher bid. Both methods can be used in order to test this study's main hypothesis H1. Each of the two methods has its own advantages.

An advantage of premiums over abnormal returns is that they capture the total wealth gains over the whole period from the first announcement of takeover interest to the delisting of a company's stock. Any wealth effect associated with an information release within this period will be accounted for. A major disadvantage is that it will therefore not only capture PTP wealth effects but also any wealth effects not associated with the PTP transaction which occurred during this period. In contrast, an event study concentrates its abnormal return analysis on just a few days surrounding the PTP announcement. Hereby, the effect of noise is reduced. Moreover, another main advantage of the event study method is that it explicitly accounts for market movements.

In conclusion, the premium analysis of especially those PTP transactions, which experienced a large time interval between the first announcement of takeover interest and the final delisting, will be biased by a high level of noise and by the fact that market movements are excluded. This study will therefore primarily focus on the event study methodology in measuring PTP wealth effects. However, a premium analysis will be conducted as well since the power of econometric tests in PTP research can be increased by simultaneously employing both methods (Renneboog, Simons and Wright, 2007).

4.2 Premium analysis

Wealth gains in PTP transactions can be quantified by analyzing the premiums paid to the pre-PTP shareholders. The premium is measured as the relative difference between the final offer price paid and the initial pre-takeover price. By comparing the pre-takeover price to the final offer price, changes in offer prices due to new information, competing bids and other factors are incorporated. The final offer price is a "hard" price quoted in the offer document of the acquirer. In contrast, one of the main difficulties of a premium analysis concerns the subjectivity in pinpointing the pre-takeover price. Information leakage, trading on rumors and insider trading may all drive stock prices upwards prior to

the takeover announcement. Therefore, typically studies have defined the pre-takeover price as the price somewhere between 1 to 40 days prior to the first takeover announcement (Betzer, 2004; Weir, Laing and Wright, 2005; Renneboog, Simons, Wright, 2007). This period preceding the first announcement is referred to as the anticipation window.

The premium for firm *i* with an anticipation window of *aw* days is defined as:

$$PR_{i,aw} = \frac{(OP_i - P_{i,aw})}{P_{i,aw}} \tag{4.1}$$

Where OP_i is the final offer price for stock *i* and P_{iaw} is the price of stock *i* on *aw* days prior to the first announcement of takeover interest. The mean premium across a sample of *N* securities is given by:

$$APR_{aw} = \frac{1}{N}\sum_{i=1}^{N} PR_{i,aw} \tag{4.2}$$

The null hypothesis that the mean premium with an anticipation window of *aw* days equals zero is tested by the following tests statistic:

$$\theta_{APR,aw} = \frac{APR_{aw}}{(\text{var}(APR_{aw}) * N)^{1/2}} \tag{4.3}$$

$$\text{Where } \text{var}(APR) = \frac{1}{N-1}\sum_{i=1}^{N}\left(PR_{i,aw} - APR_{aw}\right)^2$$

4.3 Event study

4.3.1 Introduction

Besides the premium analysis, an event study methodology is used in order to examine the effect of a PTP transaction on shareholders' wealth. The Efficient Market Hypothesis (Fama, 1970) states that security prices at any time "fully reflect" all available information. If value-related information reaches the market, the event study methodology predicts that market forces will immediately adjust the stock price to incorporate the new information. As a consequence, the return of a stock will deviate from its normal return to reflect the value-content of the event. More formally, any information about expected changes in the independent variables of formula (2.1) will be instantly priced into stock price. In studies on PTP value gains, the event relates to the communication of a PTP transaction to the market. Most empirical studies on value gains in PTP transactions looked at the share price reaction in

response to the official announcement of the going private transaction (e.g. Andres, Betzer and Hoffmann, 2004; Andres, Betzer and Weir, 2007; Sudarsanam, Wright and Huang, 2007). However, Renneboog, Simons and Wright (2007) argue that this announcement date is not necessarily the correct event date, because often information on a PTP transaction reaches the market in several stages. Two main stages can be identified. At stage 1 a rumor or announcement of takeover interest in the target company reaches the market. As a consequence the share price of the target company reacts to this information. At stage 2 the target company or the acquirer releases the first official announcement that communicates the PTP proposal. As a consequence the new information is incorporated in the share price. This second share price reaction can be regarded as a correction to the reaction in the first stage. The correct share price reaction to a PTP announcement should therefore be the cumulative reaction in stage 1 and stage 2. In this study, we will therefore calculate the abnormal returns over both stage 1 and stage 2 and then look at the combined abnormal returns. Therefore two event dates are identified for each transaction, namely one for each stage. This is in line with the study on UK PTP transactions by Renneboog, Simons and Wright (2007).

In order to account for information leakage and rumors, the share price reaction will be analyzed over a wider time frame than just the event dates. The event window in this study ranges from t= +30 to t= -30 relative to the announcement days of stage 1 and stage 2. Initially over a total of 122 days the abnormal returns will be calculated, but by combining the effects of stage 1 and stage 2 eventually 61 abnormal return days will be analyzed. In the case of overlapping event windows, only the event window of stage 1 will be analyzed (including the overlap with stage 2). The event window specification of [+30, -30] is in line with prior empirical research by Andres, Betzer and Hoffmann (2004) and Andres, Betzer and Weir (2007). For comparison purposes other event window specifications within the [-30, +30] period will be analyzed as well.

4.3.2 Abnormal return estimation

The abnormal returns of each company are computed as the difference between the observed return and the normal return.

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \tag{4.4}$$

Where AR_{it}, R_{it} and $E(R_{it})$ respectively indicate the abnormal, observed and normal returns for firm *i* on day *t*. The observed returns are calculated by the following formula:

$$R_{i,t} = \frac{(I_{i,t} - I_{i,t-1})}{I_{i,t-1}} \tag{4.5}$$

Where I_{it} equals the total return index of stock i on day t from Thomson Datastream. The normal return is defined as that expected if the event did not take place. In order to determine the normal returns of a stock, a normal performance model will be specified. In this study three different normal performance models will be used in order to ensure robustness of the final results in case of misspecification of the normal performance model.

(1) the Market Adjusted Model
(2) the Market and Risk Adjusted Model
(3) the GARCH corrected Market and Risk Adjusted Model

Formally, the Market Adjusted Model is specified as:

$$R_{i,t} = R_{m,t} + \varepsilon_{i,t} \tag{4.6}$$

$$E(R_{i,t}) = R_{m,t} \tag{4.7}$$

Where R_{it} and $E(R_{it})$ respectively equal the observed and the normal stock return of firm i on day t and where R_{mt} equals the return on the market portfolio on day t. ε_{it} is the error term of firm I on day t. The broad European Dow Jones STOXX 600 index will be used to proxy for the market portfolio. The Dow Jones STOXX 600 index represents large, mid and small capitalization companies across 18 countries of the European region. This market index is also employed in similar pan-European studies by Andres, Betzer and Hoffmann (2004) and Andres, Betzer and Weir (2007).

The Market and Risk Adjusted Model is given by:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \tag{4.8}$$

$$\text{Where } E(\varepsilon_{i,t}) = 0 \ ; \text{var}(\varepsilon_{i,t}) = \sigma_i^2$$

$$E(R_{i,t}) = \hat{\alpha}_i + \hat{\beta}_i R_{m,t} \tag{4.9}$$

The variables are as defined for the market model. The coefficients $\hat{\alpha}_i$ and $\hat{\beta}_i$ are Ordinary Least Squares estimates of the intercept and slope parameters for firm i. These parameters are calculated with the estimation period being t = -280 to t = -31 relative to the first announcement day (stage 1). This estimation period specification is in line with comparable empirical research by Andres, Betzer and Hoffmann (2004) and Andres, Betzer and Weir (2007).

For the third method of estimating the normal performance model an adjustment will be made to the original Market and Risk Adjusted Model as presented in equation (4.8) in order to improve efficiency of the estimators. Many researchers (among others Akgiray 1989) have shown that time series of daily stock returns exhibit significant levels of time dependence. As a result, error terms are not likely to have a constant variance as is assumed by equation (4.8). Furthermore, evidence by Akgiray (1989) and Corhay and Tourani Rad (1994) shows that not correcting for the presence of time dependence leads to inefficient parameter estimates and inconsistent test statistics. In this study a GARCH (1,1) model is employed to describe the characteristics of stock return series in order to allow for non-linear intertemporal dependence in the error terms. Corhay and Tourani Rad (1996) suggest the use of a GARCH (1,1) model as it has proven to show a better fit with stock returns and a higher forecast accuracy than GARCH (p,q) models with p+q $\geq$ 3 do. Accounting for conditionally heteroscedastic error terms, leads to the GARCH corrected Market and Risk Adjusted Model:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \tag{4.10}$$

Where $E(\varepsilon_{i,t}) = 0$; $\text{var}(\varepsilon_{i,t}) = \sigma^2_{i.t} = \alpha_{o,i} + \alpha_{1,i}\varepsilon^2_{i,t-1} + \alpha_{2,i}\sigma^2_{i,t-1}$

$$E(R_{i,t}) = \hat{\alpha}_i + \hat{\beta}_i R_{m,t} \tag{4.11}$$

Where the variables (except the parameter estimates) are as defined for both the market model and the market and risk adjusted model. $\hat{\alpha}_i$ and $\hat{\beta}_i$ are parameter estimates for firm *i* based on the maximum likelihood technique over the estimation period.

4.3.3 Abnormal return aggregation

The average abnormal return on day τ in event window τ_1 to τ_2 ($\tau_1 < \tau < \tau_2$) across a sample of N securities is equal to:

$$AAR_\tau = \frac{1}{N}\sum_{i=1}^{N} AR_{i,\tau} \tag{4.12}$$

The cumulative abnormal return for an individual security *i* for event window τ_1 to τ_2 is computed as follows, for $i = 1, \ldots, N$:

$$CAR_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{i,\tau} \tag{4.13}$$

The cumulative abnormal return for an individual security *i* over both stage 1 and stage 2 is computed as follows, for *i* = 1, … , *N*:

$$CAR_i^{1+2}(\tau_1^1,\tau_2^1;\tau_1^2\tau_2^2)=\begin{cases}CAR_i^1(\tau_1^1,\tau_2^1)+CAR_i^2(\tau_1^2,\tau_2^2)\ if\ \tau_1^2>\tau_2^1\\ CAR_i^1(\tau_1^1,\tau_2^1)\ if\ otherwise\end{cases} \quad (4.14)$$

$CAR_i^1(\tau_1^1,\tau_2^1)$ and $CAR_i^2(\tau_1^2,\tau_2^2)$ are the cumulative abnormal returns for stage 1 and stage 2 separately. The length of the stage 1 event window is equal to the length of the stage 2 event window: $\tau_1^1-\tau_2^1=\tau_1^2-\tau_2^2=w$ days

The cumulative average abnormal return for the *w* day event window $(\tau_1^1,\tau_2^1;\tau_1^2,\tau_2^2)$ for the total sample *N* is the average of the included cumulative abnormal returns:

$$CAAR^{1+2}(\tau_1^1,\tau_2^1;\tau_1^2,\tau_2^2)=\frac{1}{N}\sum_{i=1}^{N}CAR_i^{1+2}(\tau_1^1,\tau_2^1;\tau_1^2,\tau_2^2) \quad (4.15)$$

After the calculation of the cumulative average abnormal returns, their statistical significance will be tested using both a t-test and the Corrado non-parametric test.

4.3.4 Calculation of test statistics

Parametric test

In order to examine whether PTP announcements are accompanied by wealth effects, abnormal returns need to be statistically different from zero. The following test statistic is used to test the average abnormal return on day τ in event window τ_1 to τ_2:

$$\theta_{AAR\tau}=\frac{AAR_\tau}{\mathrm{var}(AAR)^{1/2}}\ \sim N(0,1) \quad (4.16)$$

Where $\mathrm{var}(AAR)=\frac{1}{x-1}\sum_{t=-280}^{-31}\left(AAR_t-average(AAR_t)\right)^2$; $average(AAR_t)=\frac{1}{x}\sum_{t=-280}^{-31}AAR_t$

x equals the amount of observations in the estimation period (= max 250 days). This test statistic is widely used in event studies and uses a time series of average abnormal returns, thereby taking into

account any cross-sectional dependence in the security specific abnormal returns (Brown and Warner, 1985). If the average abnormal returns are independent, identically distributed and normal, the test statistic is distributed Student-t under the null hypothesis. Evidence by Brown and Warner (1985) indicates that both daily returns and daily abnormal returns are fat-tailed relative to a normal distribution. However, the same authors note that the distribution of the average abnormal returns converges to normality as the number of securities increases. They conclude that as a result the non-normality of daily returns has no obvious impact on event study methodologies. An analysis of the distribution of average abnormal returns in this study as presented in Table 4 of the Appendix does not provide evidence for non-normality. The null hypothesis of a normal distribution cannot be rejected by the Jarque-Bera test statistic which is highly insignificant. The use of a parametric test statistic therefore seems to be grounded.

The test statistic for the cumulative average abnormal returns over the event window τ_1 to τ_2 (whether based on stage 1, stage 2 or the combined effect of stage 1 + 2) is:

$$\theta_{CAAR(\tau 1,\tau 2)} = \frac{CAAR(\tau_1,\tau_2)}{(\mathrm{var}(AAR)*w)^{1/2}} \quad \sim N(0,1) \tag{4.17}$$

Where *var(AAR)* is as defined by equation (4.16) and *w* refers to the amount of days in the event window.

Non-parametric test

The parametric tests as previously described are based on strong assumptions concerning the distribution of the average abnormal returns. Although my analysis of the average abnormal returns did not find any evidence of non-normality, the robustness of this study's results can be further enhanced by applying a non-parametric test. A non-parametric test is free of specific assumptions about the distribution of the underlying returns. I will apply the non-parametric test as proposed by Corrado (1989). Unlike other non-parametric tests (i.e. the sign test and signed rank test), this rank test does not require symmetry in cross-sectional abnormal return distributions for correct specification. In addition, evidence by Corrado (1989) shows that the rank test is resistant to misspecification caused by an event-date abnormal return variance increase. The Corrado test statistic for the average abnormal return on day τ is:

$$\theta_{COR\tau} = \frac{1}{N}\sum_{i=1}^{N}\frac{K_{it} - \frac{(L+1)}{2}}{s(K)} \tag{4.18}$$

$$\text{Where } s(K) = \sqrt{\frac{1}{L}\sum_{t=-280}^{+30}\left(\frac{1}{N}\sum_{i=1}^{N}\left(K_{it} - \frac{(L+1)}{2}\right)\right)^2} \tag{4.19}$$

L is the number of observations in the combined estimation period and event window. K_{it} is the rank of the abnormal return of security *i* on day *t* in security *i*'s time series of abnormal returns over its estimation period and event window. The other variables are as defined before. The rank test transforms the distribution of abnormal returns in a uniform distribution regardless of any asymmetry of the original distribution. Under the null hypothesis, the asymptotic null distribution of the rank test statistic approaches the Student-t distribution (MacKinlay, 1997).

4.4 Cross-sectional analysis

Berg and Gottschalg (2005) describe the complex process through which different factors interact to generate value in buyouts. In their study, they express the need for empirical studies that consider multiple sources of value creation simultaneously through multivariate analyses. This study will meet their request. Using an Ordinary Least Squares (OLS) regression the hypotheses H2 to H11 will be tested simultaneously. In this regression, the dependent variable will be the cumulative abnormal return for a company *i* over the event window τ_1 to τ_2 ($CAR_i^{1+2}(\tau_1, \tau_2)$). Twelve different independent variables have been constructed in order to test the hypotheses H2 to H11. For each variable a prediction has been made concerning the sign of the coefficient. An analysis of the estimated coefficients of these variables will provide information on whether to accept the different hypotheses. The variables used to test hypotheses H2 to H8 are based on similar measures used in prior empirical studies. Special interest will go out to the variables used to test hypotheses H9 to H11 as these have not been used in prior research and have been newly constructed based on theory. In addition to the twelve independent variables, several control variables have been added in order to control for external effects. A distinction can thus be made between three categories: *Independent Variables – Old*, *Independent Variables – New* and *Control Variables.*

The regression equation is:

$$\begin{aligned} &CAR_i^{1+2}(\tau_1, \tau_2) = \\ &c_0 + c_1 taxes_i + c_2 leverage_i + c_3 FCF_i + c_4 stake_i + c_5 stake25_i + c_6 freefloat_i + \\ &c_7 law_i + c_8 listing_i + c_9 price_i + c_{10} involvement_i + c_{11} transactions_i + c_{12} collusion_i + \\ &c_{13} improved_i + c_{14} contested_i + c_{15} \text{int}erest_i + yeardummies + \varepsilon_i \end{aligned} \tag{4.20}$$

Independent Variables – Old (based on prior studies)

taxes – The taxes in the last fiscal year prior to the PTP announcement deflated by sales. Taxes are taken from the company's income statement.

leverage – The ratio of debt over equity. Debt is defined as both short- and long-term debt from the last fiscal year end prior to the formal PTP announcement. Equity is measured as the market capitalization of the common shares outstanding at last fiscal year end.

FCF – Operating income before amortization and depreciation minus taxes, interest expenses and dividends in the last fiscal year prior to the PTP announcement. The free cash flow figure is then deflated by sales. This definition of free cash flow has been used by Lehn and Poulsen (1989) and has since been used by numerous other studies examining PTP wealth gains.

stake – The percentage of common shares held by management as reported in the last annual report prior to the PTP announcement.

stake25 – A dummy variable equal to "1" if managerial ownership accounts for more than 25% of total shares

freefloat – The free float as measured by subtracting all shareholdings of investors with an interest of over 5% of the common shares from the total share capital. These shareholdings are based on the shareholdings as published in the last annual report prior to the PTP announcement

law – Dummy variable equal to "1" if the target company is based in the UK or Ireland, where the law system is based on common law; "0" if the target company is based in continental Europe, where the law system is based on civil law.

listing – Dummy variable equal to "1" if the target company is listed on the AIM (Alternative Investment Market); "0" of the target company is listed on another stock exchange than the AIM

price – The market-adjusted share performance during the two years prior to the PTP announcement. The share performance is measured by dividing the closing market 30 trading days prior to the PTP announcement by the average price over 500 trading days counting backwards from 30 days prior to the PTP announcement. The figure is divided by the equivalent ratio of the Dow Jones Stoxx 600 to account for market movements. This measure of market-adjusted share performance is based on

similar measures used in previous studies by Betzer (2004), Andres, Betzer and Hoffmann (2004) and Andres, Betzer and Weir (2007). It should be noted that, although consistent with prior studies, the choice to analyze 500 trading days is somewhat arbitrary. There is no evidence that suggests that an analysis of the share price development over for example 300 or 600 days is less meaningful. In order to reduce the effect caused by the choice of period, the pre-transaction share price is compared against an average over 500 trading days instead against the share price at a single point in time (t = -530).

Independent Variables – New (self constructed)

involvement – Dummy variable equal to "1" if no private equity investor is involved in the transaction; "0" if one or more private equity investors are involved in the transaction

transactions – Dummy variable equal to "1" if at least one "prominent" private equity investor is involved in the transaction; "0" if no "prominent" private equity investor is involved in the transaction. "Prominent" private equity investors are those which are highly experienced and reputable. In order to proxy for transaction experience and reputation of private equity investors, we look at the amount of private equity direct-investment capital raised by each firm over the past 5 years. Private Equity International (PEI) magazine provides a ranking of the 50 largest private equity firms based on this measure. The 2008 ranking is based on the funds raised by private equity investors between January 2003 and April 2008. This period almost perfectly suits our sample period. We define a "prominent" private equity investor as one that belongs to the top 20 of the PIE 2008 ranking. These firms raised capital in excess of USD 14 billion each in the past five years. I am not the first to use the PIE ranking for the purpose of scientific research, as Officer, Ozbas and Sensoy (2008) used this ranking in order to identify "prominent" private equity firms as well

collusion – Dummy variable equal to "1" if at least two private equity investors are involved in the transaction; "0" if one or no private equity investor is involved in the transaction

Control variables

In addition to the independent variables several control variables will be included. If the successful bid is a raised bid following one or more prior attempts by the same bidder, the bidder is more likely to overpay. *"Improved"* is a dummy variable that equals "1" if the successful bid is a raised bid and "0" if otherwise. Bidder competition is likely to push up the price and the abnormal returns in a PTP. Therefore, a dummy variable "*contested"* will be included which equals "1" if the PTP bid is a reaction to a previous bid by another party and "0" if otherwise. Evidence for higher abnormal returns

in a contested bid is presented by Renneboog, Simons and Wright (2007). In order to proxy for the "ease" of getting financing, the 1 year UK London Interbank Offer Rate (LIBOR rate) is included as variable "*Interest"*. When interest rates are low private equity firms are expected to be able to borrow at low costs, facilitating the payment of large premiums and resulting in high PTP value gains to the pre-transaction shareholders. Banks typically state interest rates on leveraged loans as a spread over LIBOR, highlighting the importance of LIBOR as a key benchmark rate. Furthermore, year dummies are included which are based on the formal announcement dates of the transactions.

The estimated regression coefficients of equation (4.20) will be tested using their White's Heteroskedasticity Consistent Standard Errors (HSCE). In the presence of heteroskedasticity standard OLS regression provides consistent coefficient estimates, but the usual OLS standard errors will be incorrect. The HSCEs provide a solution to this problem by correctly estimating the coefficient standard errors in the presence of heteroskedasticity of unknown form without requiring alteration of the coefficient values. If heteroskedasticty is not present, the HSCEs will still be efficient estimates and can be used for inference.

Table 8 provides a summary of the hypotheses, the measures for testing these hypotheses the primary data sources and the expected signs of the coefficients. The expected signs of the coefficients are derived from the theories described in section 2.3 and 2.4.

Table 8

Summary of hypotheses, variables, primary data sources and expected signs of coefficients

Hypothesis	Variable	Measure	Primary data source	Expected sign
H2: Tax Benefits	*taxes*	Taxes (as % of sales)	Worldscope	+
	leverage	Debt to equity ratio	Worldscope	-
H3: Free Cash Flow	*FCF*	Free Cash Flow (as % of sales)	Worldscope	+
H4: Incentive realignment	*stake*	Managerial ownership (%)	Worldscope	-
	stake25	Managerial ownership > 25% (1=yes)	Worldscope	+
H5: Monitoring	*freefloat*	Free float (%)	Worldscope	+
H6: Shareholder protection	*law*	United Kingdom (1=yes)	Zephyr	-
H7: Transaction Costs	*listing*	AIM listing (1=yes)	Zephyr	-
H8: Financial arbitrage	*price*	Market-adjusted share performance	Datastream	-
H9: Private equity involvement	*involvement*	Pure management buyout (1=yes)	Zephyr	-
H10: Private equity experience	*transactions*	Top 20 private equity firm (1=yes)	PIE	+
H11: Collusion	*collusion*	Club deal (1=yes)	Zephyr	-
Control variables	*improved*	Raised bid (1=yes)	Zephyr	+
	contested	Multiple bidders (1=yes)	Zephyr	+
	interest	1 year UK LIBOR rate	Datastream	-
	yeardummies	Year of formal announcement	Zephyr	na

5. EMPIRICAL RESULTS

5.1 Results of the premium analysis

From table 9 it can be observed that the mean premium in European PTP transactions during the third LBO wave amounted to approximately 40% when calculated over the share price prior to the first rumor of takeover interest (stage 1). In these cases, the premiums are measured over a period comprising of the anticipation window, stage 1, stage 2 and the period in between the two stages. Comparing the mean premium with the median premium, which is only approximately 30%, suggests that a few very large premiums heavily influence the overall mean. Excluding these premiums would significantly lower the mean of the premiums paid in PTP transactions. Furthermore, when calculating the premiums over the share price prior to stage 2 (the formal announcement) instead of prior to stage 1, the mean premiums for different anticipation windows drop to a range of 10 to 20%. Again, the median premiums are lower than the means indicating that the sample includes a few very high premiums.

Table 9

Premiums by anticipation window of the total sample of PTP transactions (N =153)

Anticipation window	Premium over stage 1 price			Premium over stage 2 price		
	Mean	t-value	Median	Mean	t-value	Median
1 day	34.3%	7.41 **	24.3%	9.5%	7.68 **	5.8%
10 days	40.4%	7.51 **	30.9%	12.6%	9.75 **	7.8%
20 days	41.1%	7.75 **	30.2%	14.9%	10.74 **	11.1%
30 days	40.3%	7.34 **	30.2%	18.4%	11.79 **	13.5%
40 days	39.8%	7.05 **	29.6%	22.5%	12.16 **	16.6%

* and ** indicate statistical significance at the 5% and 1% level respectively (two-tailed test)

5.2 Results of the event study

Table 10 presents the daily average abnormal returns (AAR) based on the GARCH corrected Market and Risk Adjusted Model. I will focus on this model as it is the only model to explicitly account for time dependence of daily stock return series. For each event, two stages and two corresponding event dates are identified. For stage 1, $t = 0$ represents the very first rumor or announcement of a transaction. For stage 2, $t = 0$ represents the formal announcement of a public to private proposal. For both stages, the table reports the abnormal returns for each day t of event window -30 to +30 relative to day $t = 0$. For 25 events, the event date of stage 1 is the same day as the event date of stage 2. In these cases, no rumor or announcement preceded the formal PTP announcement and the formal announcement thus is the very first announcement.

Table 10

Daily average abnormal returns (AAR) based on the GARCH corrected Market and Risk Adjusted Model

	Stage 1 (N=153)			Stage 2 (N=153)		
Relative day	AAR	T- value	Corrado test statistic	AAR	T- value	Corrado test statistic
-30	0.01%	0.06	-1.20	0.82%	4.23 **	0.16
-29	0.19%	0.97	0.39	0.30%	1.53	0.72
-28	-0.49%	-2.50 *	-1.66	0.15%	0.78	0.51
-27	0.25%	1.29	0.31	0.69%	3.57 **	1.19
-26	-0.34%	-1.74	-0.95	0.20%	1.04	-0.77
-25	-0.09%	-0.44	-0.27	0.58%	2.97 **	1.23
-24	0.10%	0.51	0.33	0.51%	2.63 **	0.37
-23	0.07%	0.35	-0.13	0.45%	2.33 *	1.27
-22	0.00%	-0.02	-0.38	0.40%	2.08 *	-0.29
-21	0.14%	0.73	-0.14	0.71%	3.66 **	-0.13
-20	-0.16%	-0.82	-0.46	-0.07%	-0.39	-0.63
-19	-0.08%	-0.43	-0.28	0.14%	0.74	1.11
-18	-0.10%	-0.53	0.01	0.31%	1.62	2.08 *
-17	-0.03%	-0.14	-0.50	0.30%	1.55	-0.57
-16	-0.08%	-0.39	-1.01	0.26%	1.33	0.74
-15	0.00%	-0.01	-0.41	0.28%	1.44	1.04
-14	0.25%	1.29	0.40	-0.16%	-0.81	-1.12
-13	0.06%	0.29	0.00	0.35%	1.83	0.60
-12	-0.02%	-0.11	-1.41	0.12%	0.60	-1.16
-11	0.18%	0.95	0.41	-0.03%	-0.16	0.77
-10	0.20%	1.01	-0.20	0.83%	4.28 **	1.43
-9	0.38%	1.97 *	0.62	0.09%	0.44	0.16
-8	-0.15%	-0.76	-0.33	0.55%	2.82 **	1.11
-7	-0.04%	-0.20	-0.66	0.27%	1.38	0.09
-6	0.46%	2.39 *	1.21	0.11%	0.56	-0.33
-5	0.42%	2.14 *	0.91	0.14%	0.74	-0.32
-4	0.56%	2.91 **	2.13 *	0.58%	3.01 **	2.18 *
-3	0.32%	1.66	1.43	-0.10%	-0.50	0.04
-2	0.15%	0.78	1.65	0.59%	3.04 **	1.27
-1	2.06%	10.60 **	4.80 **	1.19%	6.15 **	3.04 **
0	11.84%	61.02 **	11.08 **	6.32%	32.58 **	9.15 **
1	2.10%	10.84 **	2.68 **	1.52%	7.82 **	1.77
2	0.24%	1.25	0.76	0.05%	0.25	0.19
3	0.04%	0.23	-0.54	0.10%	0.52	-0.19
4	0.14%	0.71	0.18	0.05%	0.24	0.43
5	0.28%	1.42	0.56	0.06%	0.32	-0.04
6	-0.17%	-0.89	-1.41	-0.02%	-0.10	-0.98
7	-0.10%	-0.51	-0.50	0.26%	1.36	1.03
8	0.21%	1.10	0.69	-0.02%	-0.10	0.20
9	0.21%	1.08	0.83	0.01%	0.03	-0.31
10	0.62%	3.17 **	0.32	0.13%	0.69	0.79
11	0.05%	0.24	-0.51	0.05%	0.24	-0.55
12	0.06%	0.29	0.13	0.14%	0.70	0.29
13	0.03%	0.17	-0.30	0.01%	0.04	0.19
14	0.05%	0.26	0.30	0.01%	0.07	-0.24
15	0.24%	1.24	1.57	0.20%	1.05	1.38
16	0.01%	0.05	-0.45	0.02%	0.08	-0.03
17	-0.12%	-0.60	-0.58	0.08%	0.40	-0.20
18	0.01%	0.07	-1.17	-0.03%	-0.17	-0.26
19	0.28%	1.47	0.97	0.10%	0.50	0.92
20	0.39%	1.99 *	0.77	0.06%	0.29	-0.01
21	0.14%	0.75	-0.68	0.12%	0.62	0.36
22	0.20%	1.05	1.15	0.04%	0.23	0.72
23	-0.03%	-0.16	-0.58	0.08%	0.40	0.23
24	-0.18%	-0.94	-0.97	-0.16%	-0.82	-0.28
25	0.05%	0.27	-0.48	0.08%	0.42	-0.43
26	0.34%	1.74	1.60	0.14%	0.70	1.00
27	0.00%	-0.01	-0.30	0.01%	0.03	-0.60
28	0.09%	0.44	0.11	0.13%	0.67	0.55
29	0.24%	1.23	0.32	-0.09%	-0.46	0.28
30	0.46%	2.38 *	0.72	0.02%	0.10	-0.02

* and ** indicate statistical significance at the 5% and 1% level respectively (two-tailed test)

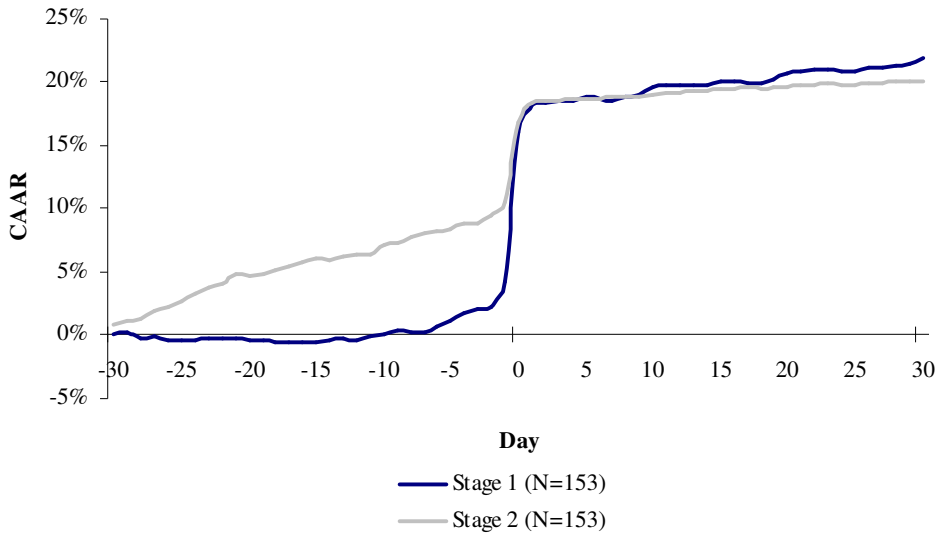
The table clearly shows that PTP announcements generate substantial abnormal returns. On the event date of stage 1 an average abnormal return of 11.8% is earned, while on the event date of stage 2 the average abnormal return amounts to 6.3%. Most prior studies on PTP value gains measured abnormal returns following the official announcement date (stage 2). As indicated by the table this method will largely underestimate true value gains as the largest share of abnormal returns are generated following the very first announcement or rumor (stage 1). In addition, for both stages the table shows significant positive abnormal returns for the two days surrounding the event date. Potential explanations for these abnormal returns include trading on rumors and information leakage (t = -1), slow market reaction (t = 1) and errors made in pinpointing the exact event date (t = -1 and t = 1). Furthermore, the timing of the information release can also explain part of the abnormal returns. As information reaches the market after closing of the stock market, the day after the announcement day will be the correct event date. The abnormal returns on and surrounding the event date are significant at the 0.01 level (t-test). Besides, these abnormal returns (except Stage 2, t = 1) also have highly significant Corrado test statistics indicating high robustness over wrong assumptions about the underlying distribution.

In addition to the high abnormal returns on and surrounding the event date, Table 10 shows significant abnormal returns on other days as well. All except one are positive. Especially notable is the large amount of significant positive abnormal returns preceding the Stage 2 event date. Two possible explanations for this phenomenon can be identified. First of all, the run-up can be due to information leakage. Secondly, it is possible that there is an overlap of the event window of Stage 1 with the event window of Stage 2. This implies that previous announcement effects influence the abnormal returns of the Stage 2 event window leading to high abnormal returns prior to the official announcement. Moreover, the absence of many significant positive abnormal returns following the event dates of Stage 1 and Stage 2 suggests that the wealth gains are fully incorporated within a few days of the announcement. This is consistent with semi-strong market efficiency as defined by Fama (1970, 1991).

The cumulative average abnormal returns (CAARs) based on the GARCH corrected Market and Risk Adjusted Model are plotted in Figure 4. This graph clearly shows the pre-event date run-up during Stage 2. However, it is also clear from the graph that for both stages the major wealth effects are concentrated on the event date and the two days surrounding this date.

Figure 4

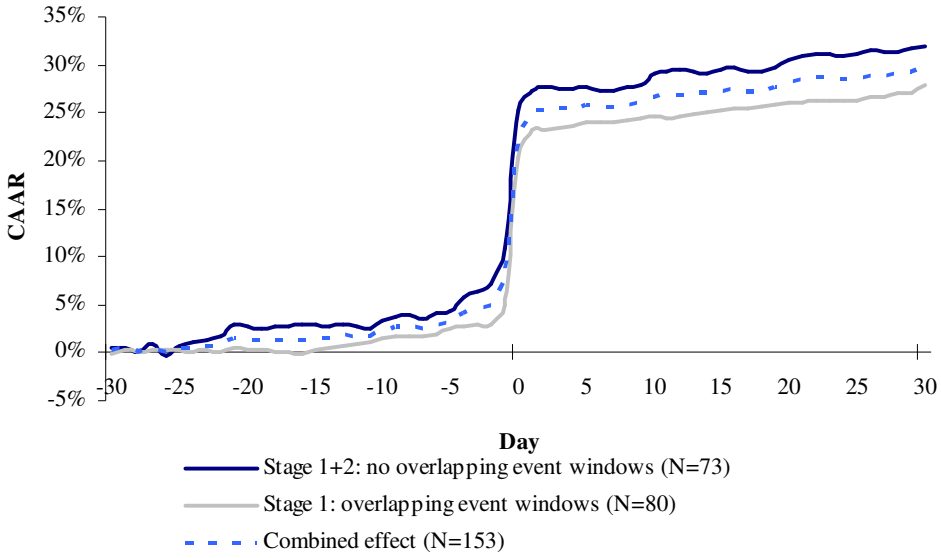
Cumulative abnormal returns for Stage 1 and Stage 2 separately, based on the GARCH corrected Market and Risk Adjusted Model



The wealth gain to be analyzed is the overall wealth effect of both Stage 1 and Stage 2. However in order to calculate the cumulative wealth effect, I cannot simply add the CAARs of Stage 1 and Stage 2. This is due to the fact that for some events the Stage 1 event date is equal to the Stage 2 event date. Simply adding the CAARs would double count the underlying wealth effect of these events. Besides, for other events the event windows of Stage 1 and Stage 2 partly overlap leading to a further overestimation of the overall effect. To overcome these problems, we correct for overlapping event windows as explained in more detail in the Methodology section. The combined effect is shown in Figure 5. By excluding overlapping event windows I am able to greatly reduce the pre- event date run up. The CAARs of Stage 1 and Stage 2 have been summed provided that there was no overlap in event windows. In 80 cases the event windows of Stage 1 and Stage 2 did experience an overlap. Figure 5 shows that the CAAR over the -30 to +30 window of Stage 1 and Stage 2 combined (with no overlapping event windows) is higher than the CAAR of Stage 1 (with overlapping event windows). It appears that this is partly due to a higher pre-event date share price run-up of the events with no overlapping event windows. Part of this effect can also be explained as, in the case of overlapping event windows, the Stage 1 CAARs do not cover the full Stage 2 effect. As a result a downward bias in CAARs will arise in the case of overlapping event windows. This bias is expected to become less as shorter event windows are chosen and fewer events experience overlapping windows. The combined effect in Figure 5 shows the CAARs for the total sample and combines the two sub samples. The graph indicates that the largest share of abnormal returns is generated during the -5 to +5 window.

Figure 5

Cumulative abnormal returns for the combined effect of Stage 1 and Stage 2, based on the GARCH corrected Market and Risk Adjusted Model



Therefore, I will focus on the [-5, +5] and [-1, +1] windows in the cross-sectional analysis of the abnormal returns.

Figure 6 plots the CAARs of the combined effect of Stage 1 and Stage 2 for the alternative models of calculating abnormal returns. The Market and Risk Adjusted Model and the GARCH corrected Market and Risk Adjusted Model show a run-up before and after the event date. However, the Market Adjusted Model, which does not account for a stock's risk relative to the market, does not show this run-up. Overall, the graph shows similar patterns for the three individual models. The tables reporting the underlying average abnormal returns based on the Market Adjusted Model and the Market and Risk Adjusted Model are both provided in the Appendix in Tables 5 and 6 respectively. These models show comparable abnormal returns. This implies that my findings are robust against misspecification of the normal performance model.

Figure 6

Cumulative abnormal returns for Stage 1 and Stage 2 combined, based on different models

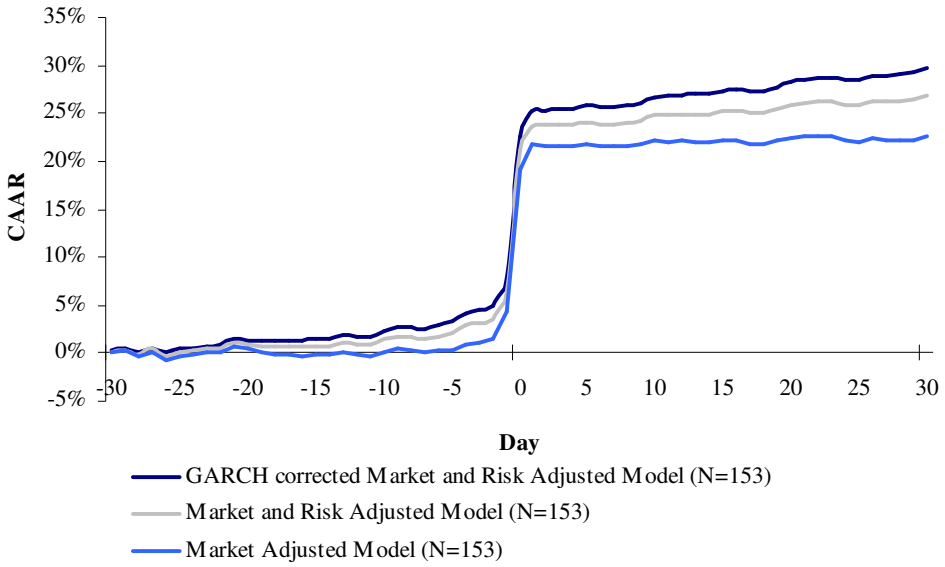


Table 11 provides a summary of the Stage 1 and Stage 2 combined CAARs based on different models and different event window specifications. The combined average abnormal return on the event dates of Stage 1 and Stage 2 amounts to around 16.3% and is robust over the different models. Over the window [-1, +1] the CAAR varies between 21.7% and 21.9% depending on the underlying model. Over the total window [-30, +30] the cumulative abnormal return is 22.6% for the Market Model, 26.9% for the Market and Risk Adjusted Model and 29.8% for the GARCH corrected Market and Risk Adjusted Model.

Table 11

Cumulative abnormal returns for Stage 1 and Stage 2 combined, based on different models and different event window specifications (N =153)

		Market Model		Market and Risk Adjusted Model		GARCH corrected Market and Risk Adjusted Model	
Window	Overlap	CAAR	t-value	CAAR	t-value	CAAR	t-value
Day 0	25	16.3%	77.5 **	16.3%	83.7 **	16.4%	84.3 **
[-1,0]	28	19.1%	64.0 **	19.0%	69.2 **	19.1%	69.8 **
[-1,+1]	29	21.8%	59.8 **	21.7%	64.4 **	21.9%	65.0 **
[-5,+5]	35	23.3%	33.3 **	24.0%	37.2 **	24.7%	38.3 **
[-15,+15]	57	24.0%	20.5 **	26.0%	24.0 **	27.4%	25.4 **
[-30,+30]	80	22.6%	13.7 **	26.9%	17.7 **	29.8%	19.7 **

* and ** indicate statistical significance at the 5% and 1% level respectively (two-tailed test)

In conclusion, European PTP announcements during the third wave generated high and significant abnormal returns to the pre-transaction shareholders. Wealth gains totaled 16% on average on the announcement day(s) and reached up to 30% when measured over longer event windows. Based on this evidence and the evidence provided by the premium analysis, strong evidence is found in support of the first hypothesis.

5.3 Results of cross-sectional analysis

5.3.1 Main regression results

Table 12 provides the results of the cross-sectional regression of the cumulative abnormal returns (CARs) based on the GARCH corrected Market and Risk Adjusted Model for the total sample of 153 companies. The estimated regression refers to formula (4.20) and tests the hypotheses H2 to H11, which are described in Section 2.3 and 2.4. Initially, four variations of the regression design are employed in order to ensure robustness of the results. Model 1 shows the regression with the CARs over event window [-1, +1] as the dependent variable. In model 2 the CARs over event window [-5, +5] are employed as dependent variable. Model 3 and model 4 are both restricted versions of model 1 and model 2 respectively. In these restricted models, the insignificant independent variables of model 1 and model 2 as well as the year dummies have been omitted.

The coefficient of determination (R^2) is 31.1% and 35.9% for Models 1 and 2 respectively and 24.7% and 27.6% for the restricted models 3 and 4. The higher R^2 for the unrestricted models is a result of inflation of R^2 that arises from adding additional independent variables to the regression. The Adjusted R^2 takes this phenomenon into account and adjusts for the number of independent variables in the model. The Adjusted R^2 figures of the restricted models are very close to the Adjusted R^2 figures of the unrestricted models. For the four models the Adjusted R^2 ranges between 21.3% and 26.7%. In order to tell how well the models fit the data, I will take a look at similar cross-sectional regressions in prior studies. The Adjusted R^2 of Sudarsanam, Wright and Huang (2007) was a mere 7%. The R^2 figures of Andres, Betzer and Hoffmann (2004) ranged between 23.5% and 31.1%. The R^2 of Renneboog, Simons and Wright (2007) varied between 41.9% and 35.2%, while the Adjusted R^2 ranged from 29.5% and 23.4%. Andres, Betzer and Weir (2007) reported R^2 figures varying between 37% and 18%. My R^2 figures seem to be in the range of those found in similar prior studies. Overall, we may conclude that models 1 to 4 are quite successful in explaining the variance in abnormal returns. This conclusion is further supported by the fact that the F-statistics of all four models are significant at 1% level providing strong evidence that at least one of the regression coefficients is different from zero. In addition, a redundant variable test is used to test whether the insignificant coefficients of models 1 and 2 are all equal to zero. The results are reported in Table 7 of the Appendix. The

Table 12
Estimated coefficients of the CAR regression based on the GARCH corrected Market and Risk Adjusted Model

		Model 1		Model 2		Model 3		Model 4	
		Dep. Var. = CAR [-1,+1] Unrestricted		Dep. Var. = CAR [-5,+5] Unrestricted		Dep. Var. = CAR [-1,+1] Restricted		Dep. Var. = CAR [-5,+5] Restricted	
Variable	Exp. sign	Coef.	T-value	Coef.	T-value	Coef.	T-value	Coef.	T-value
Constant		0.771	2.130 *	0.850	2.156 *	0.566	7.569 **	0.677	7.309 **
Taxes	+	0.175	0.647	0.362	1.029				
Leverage	-	-0.087	-2.438 *	-0.121	-2.390 *	-0.082	-2.566 *	-0.116	-2.375 *
FCF	+	0.017	0.195	0.011	0.094				
Stake	-	-0.379	-1.947	-0.325	-1.408				
Stake25	+	0.061	0.951	0.033	0.407				
Freefloat	+	-0.188	-2.452 *	-0.232	-2.661 **	-0.114	-1.835	-0.142	-1.969
Law	-	0.034	0.940	0.067	1.717				
Listing	-	0.006	0.137	-0.021	-0.439				
Price	-	-0.267	-3.988 **	-0.325	-4.253 **	-0.259	-4.505 **	-0.315	-4.453 **
Involvement	-	0.013	0.248	0.007	0.114				
Transactions	+	-0.001	-0.028	-0.018	-0.481				
Collusion	-	-0.027	-0.664	-0.035	-0.777				
Control									
Improved	+	0.023	0.620	0.074	1.623				
Contested	+	0.080	1.135	0.106	1.197				
Interest	-	-1.883	-0.380	-1.326	-0.242				
Year dummies		yes		yes		no		no	
N		153		153		153		153	
R2		0.311		0.359		0.247		0.276	
Adjusted R2		0.213		0.267		0.232		0.262	
F-Statistic		3.167		3.916		16.267		18.968	
Prob. (F-stat)		0.000		0.000		0.000		0.000	

* and ** indicate statistical significance at the 5% and 1% level respectively (two-tailed test)

insignificant test statistics indicate that the null hypothesis that the omitted variables are redundant cannot be rejected in the models. This finding justifies the use of the restricted models 3 and 4. Moreover, Table 8 of the Appendix shows that there is no evidence of multicollinearity between the independent variables. All correlation figures (except the correlation between Stake and Stake25) are below 0.53. Overall, it can be concluded that the explanatory power of the models is high and that multicollinearity is absent. These findings justify further analysis of the coefficients of the independent variables. Analyzing the sign of a coefficient will provide some indication of a possible relation between the relevant independent variable and the cumulative abnormal returns. Hard evidence is found when a coefficient is statistically significant at at least the 5% level.

The tax benefits hypothesis (H2) states that firms with high tax bills and low levels of leverage generate higher value gains in PTP transactions. Table 12 shows positive but insignificant coefficients for the tax coefficients. The regression analysis does, however, provide strong evidence that low leverage is associated with high value gains. In all four models, the coefficients of the variable *Leverage* are negative and significant at the 5% level. Evidence is found that high premiums can be paid for low leverage firms because of the benefits of increased tax shields associated with an increase in leverage. Overall, the results provide evidence in favor of the tax benefits hypothesis.

It should be noted that part of the value gain from increasing leverage may also result from the mitigations of agency costs. The high debt capacity of low leverage firms allows the acquirer to discipline management by committing management to the payment of fixed interest payments in the future. Increasing leverage will reduce managerial discretion and will thereby improve management's investment decisions. The Free Cash Flow hypothesis (H3) tests this hypothesis. Especially firms with large free cash flows are expected to benefit from PTP transactions as the conflicts of interest will be most severe at these firms. In both models 1 and 2, the coefficients of the variable *FCF* have the expected signs. However, in both cases the coefficients are not statistically significant at the 5% level. Therefore, benefits from reduced managerial discretion do not appear to be a major source of value gains in PTP transactions.

Several other hypotheses relate to the mitigation of agency costs as well, namely H4 to H6. The results, however, do not provide strong evidence in favor of the incentive realignment hypothesis (H4) and shareholder protection hypothesis (H6) as evidenced by insignificant coefficients of the variables *Stake, Stake25* and *Law*. It should be noted though that, in both models 1 and 2, the coefficients of *Stake* and *Stake25* do have the expected signs providing some indication of the benefits from incentive realignment. Moreover, the coefficient of the variable *Freefloat* is significant at the 5% level in models 1 and 2. Interestingly, while a positive sign of the coefficient was predicted, the actual sign is negative. Contrary to my expectations, a larger free float is associated with smaller value gains in PTP transactions. Therefore, value gains in PTP transactions do not appear to result from closer monitoring of management as predicted by the monitoring hypothesis (H5). The evidence for a

negative relation between free float and abnormal returns, however, is weak. In the unrestricted models the coefficients still have negative signs but are no longer significant. Two potential explanations for the negative relation between abnormal returns and free float can be identified. First of all, it may be due to the fact that companies with a small free float are subject to higher illiquidity of the shares. These shares may be systematically undervalued by the market due to a lack of active trading. The illiquidity is priced into the share price and as a result these shares trade at a discount. A PTP will lead to cancellation of these market inefficiencies and lead to higher value gains for companies with a small free float. Secondly, it can be argued that free float shareholders require a discount when a substantial part of the shares are being held by large block holders. The smaller the free float, the larger the threat of expropriation of company resources by the large block holders at the expense of the free float shareholders. After a PTP transaction there are no more free float shareholders and the discount is eliminated. Overall, it can be concluded that weak evidence is found in favor of a negative relation between free float and abnormal returns. These abnormal returns are likely to result from the elimination of inefficiencies associated with a small free float.

The analysis in Table 12 shows that no evidence is found in support of the transaction costs hypothesis (H7) as evidenced by the insignificant coefficients of the variable *Listing*. Savings of direct and indirect listing costs do not appear to be a major source of wealth gains in PTP transactions.

Furthermore, as predicted, the *Price* variable has a negative coefficient. In addition, this coefficient is highly significant (at the 1% level) in all four models. Higher premiums are being paid in PTP transactions of companies which experienced a high market-adjusted share price decline (relative to the average share price over the 500 trading days prior to the PTP announcement). As the share price decline is a proxy for intertemporal undervaluation, this finding provides strong support for the financial arbitrage hypothesis (H8). PTP transactions are executed with the goal of eliminating the undervaluation of a company's stock and larger premiums are thus being paid for companies which are undervalued over time. Although the elimination of a stock's undervaluation is found to be a major source of PTP wealth gains, it is not clear what causes the undervaluation. Potential underlying causes of the intertemporal undervaluation are market inefficiencies (e.g. lack of transparency, illiquidity or stock market neglect), agency costs and explanations from a behavioral finance context. Moreover, the undervaluation can be the result of somewhat harder factors as well, such as mismanagement and bad capital investment decisions which are expected to continue into the future.

Contrary to my expectations, the regression results show positive coefficients for the *Involvement* variable and negative coefficients for the *Transactions* variable. However, no hard evidence in favor of these relations is found as the coefficients are insignificant. Overall, the involvement of a private equity investor in a PTP transaction does not appear to lead to higher abnormal returns (H9), nor does the experience of the involved private equity investor(s) create additional value (H10). It can therefore be concluded that the transfer of informational resources from

private equity investors to target firms does not appear to be a major source of value gains in PTP transactions.

In both models 1 and 2, the coefficients of the variable *Collusion* have the expected sign. However, in both models the coefficients are insignificant at the 5% level. Therefore, no strong evidence is found of club deals being formed with the goal of reducing competition and lowering the purchase price. Based on models 1 and 2, we do not accept the collusion hypothesis (H11).

Finally, while the coefficients of the control variables *Improved, Contested* and *Interest* all have the expected signs, none is significant. No strong evidence is found that bidder competition, an improved bid or low interest rates enhance value gains to pre-transaction shareholders in PTP transactions.

Table 13 provides a summary overview that links the regression results with the hypotheses H2 to H11.

Table 13

Overview of hypotheses and estimated coefficients signs of the CAR regression based on the GARCH corrected Market and Risk Adjusted Model

Hypothesis	Variable	Expected sign	Model 1	Model 2	Model 3	Model 4
H2: Tax Benefits	*taxes*	+	+	+		
	leverage	-	- *	- *	- *	- *
H3: Free Cash Flow	*FCF*	+	+	+		
H4: Incentive realignment	*stake*	-	-	-		
	stake25	+	+	+		
H5: Monitoring	*freefloat*	+	- *	- **	-	-
H6: Shareholder protection	*law*	-	+	+		
H7: Transaction Costs	*listing*	-	+	-		
H8: Financial arbitrage	*price*	-	- **	- **	- **	- **
H9: Private equity involvement	*involvement*	-	+	+		
H10: Private equity experience	*transactions*	+	-	-		
H11: Collusion	*collusion*	-	-	-		
Control variables	*improved*	+	+	+		
	contested	+	+	+		
	interest	-	-	-		
	yeardummies	na	na	na		

* and ** indicate statistical significance at the 5% and 1% level respectively (two-tailed test). *Green* indicates that the estimated coefficient sign of the model corresponds with the expected sign based on the relevant hypothesis. *Red* indicates that the sign of the estimated coefficient is inconsistent with the expected sign based on the relevant hypothesis.

5.3.2 Additional regressions & robustness checks

In order to ensure robustness of the results, models 1 to 4 have also been tested with as dependent variable the CARs as calculated under the Market Adjusted Model and the Market and Risk Adjusted Model. The results of these regression analyses are shown in the Appendix in Tables 9 and 10 respectively. The results are very similar to the original results under the GARCH corrected Market and Risk Adjusted Model as reported in Table 12. It can therefore be concluded that the regression results are robust against misspecification of the normal performance model.

Furthermore, additional regressions were run using premiums instead of abnormal returns as the dependent variable. As premiums are a common alternative for measuring PTP wealth gains, these premium regressions will provide additional information on sources of PTP wealth gains. The regressions will complement the CAR regressions and simultaneously serve as a robustness check.

First of all, a set of regressions was run using the premiums over stage 1. In line with prior research by Renneboog, Simons and Wright (2007), the premiums with anticipation windows of respectively 20 and 40 days were used. The results of the regression analyses of model 5 (with an anticipation window of 20 days prior to stage 1) and model 6 (with an anticipation window of 40 days prior to stage 1) are presented in Table 11 of the Appendix. The Adjusted R^2 figures are 9.9% and 8.5% for model 5 and model 6 respectively. Furthermore, none of the coefficients, except the one for the control variable *Improved,* is significant at the 5% level. These findings indicate that models 5 and 6 are not successful in explaining the variance in premiums. It can be argued that the low explanatory power of the models is due to the fact that the time interval between the first rumor of takeover interest (stage 1) and the delisting is too large. As a result, noise and market movements influence premiums too much, obstructing the proper measurement of PTP wealth gains.

Moreover, a second set of regressions was run using the premiums over stage 2 instead of over stage 1. As the time interval between the formal announcement (stage 2) and the delisting is much smaller than the time interval between the first rumor of takeover interest (stage 1) and the delisting, the noise effects will be reduced. The regression results of model 7 (with an anticipation window of 20 days prior to stage 2) and model 8 (with an anticipation window of 40 days prior to stage 2) are presented in Table 12 of the Appendix. This table also presents the regression results of the restricted versions of model 7 and model 8, namely model 9 and model 10 respectively. The use of these restricted versions is justified by the results of the redundant variable tests, as presented in Table 13 of the Appendix. The Adjusted R^2 figures of models 7 to 10 are substantially lower that the Adjusted R^2 figures of the original CAR regressions. Interestingly, the models 7 and 9 (with anticipation windows of 20 days) do a better job at explaining the variance in premiums than do models 8 and 10 (with anticipation windows of 40 days).

The analysis of the regression coefficients of models 7 to 10 provides results that are very similar to the original results based on the CAR regression enhancing the robustness of the original results. In all four models, the coefficients of the variables *Leverage* and *Price* are significant at either the 5% or 1% level. These regression analyses therefore provide further evidence in support of the tax benefits hypothesis (H2) and the financial arbitrage hypothesis (H8). An interesting difference between the CAR regressions and the premium regressions relates to the coefficient of the variable *Freefloat.* While a statistically significant negative relation was found between free float and abnormal returns in the unrestricted models 1 and 2, no such evidence is found in models 7 to 10. Furthermore, the premium analysis presents another interesting finding as the coefficient of the variable *Collusion* is statistically significant at the 5% level in both model 7 and its restricted counterpart, model 9. This finding provides evidence in support of the collusion hypothesis (H11). However, as the other regression models do not find this coefficient to be statistically significant, only weak evidence is found of private equity clubs paying lower premiums in PTP transactions compared to individual private equity investors.

A summary overview linking the hypotheses (H2 to H11) with the regression results of all unrestricted premium and CAR models is presented in Table 14. Several conclusions can be drawn based on the coefficients which are statistically significant at at least the 5% level. In summary, the regression analyses provide strong evidence in support of the tax benefits hypothesis (H2) and the financial arbitrage hypothesis (H8). With respect to these two hypotheses, the different models provide highly consistent evidence. It can be concluded that high premiums are paid for companies which are undervalued over time and which have low debt-to-equity ratios. Furthermore, weak evidence is found in favor of a negative relation between free float and wealth gains. Finally, weak evidence is also presented in favor of the collusion hypothesis (H11) suggesting that private equity investors team up in order to depress bid prices. The evidence supporting the two latter findings is somewhat weak as the evidence is inconsistent over the different models as illustrated by Table 14.

5.4 Discussion of results

This research shows that during the third European LBO wave the average premium paid to pre-PTP shareholders amounted to around 40% over the pre-rumor price and 10 to 20% over the pre-announcement price. This is in line with average premiums measured in prior European studies, which varied between 36 and 45% as indicated in Table 1. Furthermore, this study measured average abnormal returns of 16.4% on the announcement day(s) of a PTP transaction. Over the interval consisting of the announcement day(s) and the two days surrounding the announcement day(s) average abnormal returns amounted to 21.9%. When measured over longer event windows wealth gains of up

Table 14
Overview of hypotheses and estimated coefficients signs of the unrestricted regressions

			Dep. Var. = CAR						Dep. Var. = Premium			
			Market Adjusted		Market and Risk Adjusted		GARCH corrected Market and Risk		Stage 1		Stage 2	
Hyp.	Variable	Expected sign	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 5	Model 6	Model 7	Model 8
H2	*taxes*	+	+	+	+	+	+	+	+	+	+	+
	leverage	-	-*	-**	- *	- *	- *	- *	-	-	- **	- *
H3	*FCF*	+	+	+	+	+	+	+	+	-	-	-
H4	*stake*	-	-	-	-	-	-	-	+	+	-	-
	stake25	+	+	+	+	+	+	+	-	-	+	+
H5	*freefloat*	+	-*	-**	- *	- *	- *	- **	+	+	-	+
H6	*law*	-	+	+	+	+	+	+	+	+	-	-
H7	*listing*	-	+	-	+	-	+	-	+	+	+	+
H8	*price*	-	-**	-**	- **	- **	- **	- **	-	-	- *	- *
H9	*involvement*	-	+	-	+	+	+	+	-	-	+	+
H10	*transactions*	+	-	-	-	-	-	-	-	-	-	-
H11	*collusion*	-	-	-	-	-	-	-	+	+	- *	-
Control	*improved*	+	+	+	+	+	+	+	+*	+	-	+
	contested	+	+	+	+	+	+	+	+	+	+	+
	interest	-	-	+	-	-	-	-	+	+	-	+
	yeardummies	na	na	na	na	na	na	na	na	na	na	na

* and ** indicate statistical significance at the 5% and 1% level respectively (two-tailed test). *Green* indicates that the estimated coefficient sign of the model corresponds with the expected sign based on the relevant hypothesis. *Red* indicates that the sign of the estimated coefficient is inconsistent with the expected sign based on the relevant hypothesis.

to 29.8% were realized. These abnormal returns are also in line with the findings of other European studies of which an overview is provided in Table 1. It should be noted that my methodology most closely resembles the methodology as employed by Renneboog, Simons and Wright (2007) and that therefore it is especially purposeful to compare my results with theirs. It appears that wealth gains realized in PTP transactions during the third European LBO wave were of the same size as wealth gains realized during the second wave. Furthermore, these wealth gains appear not to be very different from the returns earned in US PTP transactions, which varied between 13% and 28% (Renneboog, Scholes, Simons and Wright, 2006), or in takeovers in general.

Findings concerning the different sources of value creation were based on the cross-sectional regression analyses. Comparing these findings to the literature on European PTP transactions generates interesting insights, especially as most of the prior findings refer to the second LBO wave. An overview of prior studies and their hypotheses is found in Table 2. First, it is noteworthy that the majority of prior studies did not find evidence in favor of the tax benefits hypothesis (Betzer, 2004; Andres, Betzer and Hoffmann, 2004; Sudarsanam, Wright and Huang, 2007). However, my results are very similar to those of Renneboog, Simons and Wright (2007) who did not find the coefficient of taxes to be significant, but did find evidence of a relation between value gains in PTP transactions and low pre-transaction leverage. Secondly, in contrast to the mixed evidence on tax gains in European PTP transactions stands the highly unambiguous evidence in support of the financial arbitrage hypothesis. Betzer (2004), Andres, Betzer and Hoffmann (2004), Andres, Betzer and Weir (2007) and Renneboog, Simons and Wright (2007) all found evidence of a relation between bad stock performance and high wealth gains. My results contribute to this pool of evidence. The elimination of intertemporal undervaluation appears to be one of the main sources of wealth gains in European PTP transactions. The third and probably most controversial finding of my study is the evidence of a negative relation between free float and abnormal returns. Betzer (2004), Andres, Betzer and Hoffmann (2004), Andres, Betzer and Weir (2007) and Renneboog, Simons and Wright (2007) all reported a positive relation between free float and wealth gains and thus confirmed the monitoring hypothesis. Future research must indicate whether my finding is unique to my sample or that it can be ascribed to changing fundamentals in the PTP environment. Fourthly, this study found weak evidence that collusion between private equity investors depresses bid prices. So far no prior European research has examined this relation, making this insight new and especially relevant. Furthermore, this study did not find evidence that wealth is created in PTP transactions through the elimination of agency costs. No support is found in favor of the Free Cash Flow hypothesis, the incentive realignment hypothesis and the shareholder protection hypothesis. As indicated in Table 2 most studies found these hypotheses to be irrelevant as well, although occasionally evidence supporting one of these hypotheses was found. In addition, this research does not support the transaction cost hypothesis. Renneboog, Simons and Wright (2007) were the only ones to test this hypothesis. They did find evidence

suggesting that the elimination of listing costs was a source of PTP value gains. Finally, another main contribution of this paper was to examine whether knowledge transfers are a source of PTP wealth creation. In doing so, I was the first to test the private equity involvement and the private equity experience hypotheses. However, no evidence in favor of these hypotheses was found. The knowledge transfer of private equity investors to the target firms does not appear to be a main source of wealth creation. Value gains appear to be more dependent on hard factors such as tax shields and the elimination of undervaluation.

Putting my findings in a broader context and comparing them to the findings of US studies, will shed some light on differences in the US and European PTP markets. Overall, prior studies indicate that the US and European PTP markets are quite similar in terms of sources of PTP wealth gains. However, differences do exist. One of the main differences between US and European studies relates to the evidence concerning the Free Cash Flow hypothesis. My findings and most other European studies do not find evidence in favor of this hypothesis. This contrasts the US evidence which is more mixed. Another major difference between most European and US studies concerns the tax benefits hypothesis. While most prior European studies did not find evidence in favor or this hypothesis, most US studies did. My study indicates that tax benefits of PTP transactions are not solely a US phenomenon as evidence is found that indicates that a high pre-transaction debt capacity is related to high PTP wealth gains. This finding suggests that the US and European PTP market are more similar than previously assumed. A mixed picture emerges when looking at the effect of club deals on PTP wealth gains in the US. Officer, Ozbas and Sensoy (2008) find evidence in support of the collusion hypothesis, while Boone and Mulherin (2008) do not find lower value gains in club deals. My results present weak evidence in favor of a negative effect of club deals on PTP wealth gains. This is consistent with the results of Officer, Ozbas and Sensoy (2008). Overall, it can be concluded that the PTP market appears to be quite uniform through time and over different geographies.

6. CONCLUSIONS

6.1 Summary of key findings

The third European LBO wave was unique as total deal value reached all-time highs and Europe experienced the emergence of mega buyout deals. These mega buyout deals became possible as large amounts of funds were readily available, financing techniques became increasingly sophisticated and club deals saw an increase in popularity. In addition, the third wave saw US private equity funds playing an increasingly important role in the European LBO market.

In order to provide a better understanding of the third European LBO wave, this paper analyzes the wealth gains to pre-transaction shareholders during this wave that started in 2003 and ended in 2007. Goal of this paper was to both quantify the wealth gains and identify the sources of those wealth gains. A total sample of 153 PTP transactions of European companies was investigated. Average premiums of 40% were paid over the pre-rumor price and 10 to 20% over the pre-announcement price. On average the share price increased by 16% on announcement of a PTP transaction. When measured over a longer time horizon [-30, +30], PTP transactions generated wealth gains of up to 30%. These findings are consistent with both the premiums and abnormal returns found in studies of prior European LBO waves and studies of the US market.

The study proceeds by identifying the sources of these PTP wealth gains. In addition to examining 'known' sources of PTP wealth gains, newly formulated hypotheses concerning PTP wealth creation through the transfer of informational resources were tested as well. In addition, this study is the first to examine the impact of collusion on PTP wealth gains in Europe. In summary, four key findings can be identified. First of all, strong evidence is found that a low pre-transaction leverage is associated with high abnormal returns. This finding indicates that tax benefits appear to be a main source of PTP wealth creation and that value is created through financial engineering. The lower the level of pre-transaction leverage, the higher is the firm's debt capacity and scope for value creation by additional debt related tax shields. Practical implications can be drawn from this finding. Highly leveraged firms seem to be less attractive for PTP transactions as the realized wealth gains depend on the debt capacity of the firm. It therefore seems reasonable to argue that one method for management to defend against a hostile takeover by a private equity firm consists of increasing leverage. Increasing leverage would put pressure on the wealth gains to be realized by the buyout firm and could potentially deter the bidder altogether. Secondly, strong evidence is found that poor stock performance is associated with high PTP value gains. The elimination of intertemporal undervaluation appears to be a second main source of PTP wealth creation. Thirdly, weak evidence is found that suggests that larger premiums are being paid for companies in which ownership is closely held. This finding contradicts findings from prior European studies which indicated that scattered shareholdings were associated with larger PTP value gains as a result of increased monitoring following the PTP. A potential

explanation for high PTP wealth gains of companies with small free floats relates to the elimination of illiquidity discounts. Fourthly, weak evidence is found that club deals by private equity investors are associated with lower wealth gains compared to other PTP transactions. This finding suggests that collusion between private equity investors depresses bid prices.

Moreover, this study did not find evidence in favor of other sources of PTP wealth creation. In contrast to common belief, no evidence was found that the mitigation of agency costs provides PTP wealth gains. Nor did I find evidence of value gains associated with the elimination of transaction costs. Furthermore, the results do not indicate that the involvement of private equity investors and the experience of those investors positively influence PTP wealth gains. The added-value of private equity investors in terms of mentoring and advising therefore appears to be limited.

In conclusion, during the third European LBO wave high premiums were paid for low leveraged and intertemporally undervalued firms. This finding is largely consistent with the existing literature on PTP value gains. Although the European buyout market has developed over time and larger buyouts than ever before were executed, value creation during the third wave rested on traditional factors which were also responsible for explaining wealth gains in prior waves. New and more subtle sources of wealth creation such as knowledge transfers between the investor and portfolio company appear not to play a major role. The results are summarized in Table 15.

6.2 Suggestions for future research

This study is the first to examine wealth gains during the third European LBO wave. While most studies answer questions, they usually raise new questions as well. With respect to this, this research is no exception. The research of this study can be extended in several ways. Eight potential extensions of this research will be discussed. First of all, my findings indicate a negative relation between free float and shareholder wealth gains. As this finding contradicts the findings of prior studies, an interesting future research topic would be to further analyze the nature of this relation. Future research will have to prove whether this negative relation holds for other samples as well. Secondly, while this study indicates that the elimination of intertemporal undervaluation is a source of PTP wealth creation, it remains unclear what causes the stocks to be undervalued. It would be interesting to examine whether common factors cause these stocks to be undervalued and if so which factors. Thirdly, weak evidence is presented suggesting that private equity investors collude in order to depress bid prices. As this study is the first to research this subject in a European context, there is scope for additional research. A follow-up study could examine the impact of club deals on PTP wealth gains in Europe in more detail. Fourthly, although my study did not find evidence of value creation by knowledge transfers between a private equity investor and its portfolio companies, knowledge transfers remain an interesting research topic for future PTP studies. Fifthly, Sudarsanam, Wright and Huang (2007) find that many factors influencing the going private decision do not impact PTP value gains. Therefore both the motives for

Table 15
Summary of findings

Hypothesis		Test Result / Key Finding	Evidence
H1:	Wealth effect	High abnormal returns and premiums found in line with prior PTP studies	**Strong evidence in favor of H1**
H2:	Tax Benefits	Wealth gains are higher for low-leveraged firms. No evidence of relation with tax levels	**Strong evidence in favor of H2**
H3:	Free Cash Flow	No evidence in favor of higher wealth gains for firms with high levels of free cash flow	No evidence
H4:	Incentive realignment	No evidence in favor of a relation between managerial ownership and wealth gains	No evidence
H5:	Monitoring	Contrary to expectations, weak evidence is found in favor of a negative relation between free float and wealth gains	**Weak evidence against H5**
H6:	Shareholder protection	No evidence in favor of higher wealth gains in Continental Europe	No evidence
H7:	Transaction Costs	No evidence in favor of lower wealth gains for AIM listed companies	No evidence
H8:	Financial arbitrage	Wealth gains are higher for firms wich experienced a bad stock performance	**Strong evidence in favor of H8**
H9:	Private equity involvement	No evidence in favor of higher wealth gains with involvement of private equity investors	No evidence
H10:	Private equity experience	No evidence in favor of higher wealth gains for experienced private equity investors	No evidence
H11:	Collusion	Weak evidence of lower wealth gains for private equity clubs	**Weak evidence in favor of H11**

going private and how these transactions create value should be researched. A follow-up study researching the determinants of the decision to go private during the third LBO wave seems called for. Sixthly, as this study measures wealth gains from the perspective of pre-transactions shareholders, wealth gains refer to the expected wealth gains to be realized by the acquirer. It would be interesting to examine what the actual realized wealth gains are and how these relate to the expected wealth gains. However, such wealth gains can only be measured after private equity investors have exited their investments. As a typical private equity firm holds on to a portfolio company for around four years (Peacock and Cooper, 2000), many portfolio companies have not yet been exited and thus the full wealth gains for these companies have not yet been realized. Moreover, in contrast to public companies private companies do not disclose much financial information, which will obstruct a proper analysis of these wealth gains. Seventhly, there is ample scope for additional research on cross-country differences between PTP markets. Although this study did not find abnormal returns in continental Europe to be significantly different than in the UK, it would be interesting to further research the differences among the individual European PTP markets. Differences in among others the development stages of the LBO markets and tax regimes could account for differences in PTP value

gains. Eighthly and finally, more research is required in order to provide a better understanding of the emergence of PTP waves. Although this study found the latest two European PTP waves to coincide with the latest US PTP waves, the first US PTP wave was found to precede the first European wave. Therefore, it could be interesting to examine whether mature PTP markets have a predictive capability on forecasting PTP activity in less mature PTP markets. Such an analysis could for example focus on predicting PTP activity in emerging markets, such as the Central and Eastern European countries.

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APPENDIX

Table 1

Sample construction

Step	Selection criterion	Number
	Acquisitions of European listed companies between 2003-07	66,312
1.	Buyout led by management or private equity investor(s)	344
2.	Final stake : 100%	234
3.	Purchase of majority stake	167
4.	No financially distressed target company	160
5.	Datastream total return index available	153

Table 2

Overview of major financial databases

Database	Contents	Key advantages
M&A information		
Zephyr *Bureau van Dijk*	- Information on M&A, IPO and venture capital deals - 600,000 transactions (up to 100,000 added each year) - 5 years of global coverage and US and European deals going back to 1997	- No minimum deal size - Userfriendly interface with 100 search criteria - Detailed financial information on companies - Linked with other Bureau van Dijk products
Mergermarket *Mergermarket*	- Information on M&A deals - 100,000 transactions - European coverage since 1998, American coverage since 2001 and Asia-Pacific coverage since 2003	- Extensive background information - Business perspective (instead of academic)
One Banker Deals *Thomson*	- Information on M&A and corporate deals - 400,000 M&A transactions - Global coverage from 1977	- Linked with other Thomson products / all-in-one solution - Strong historical coverage
Mergerstat *Factset*	- Information on M&A deals - 300,000 M&A transactions - US coverage since 1992, global coverage from 2000	- Extensive background information
SDC Platinum *Thomson*	- Information on M&A deals and new issues - 672,000 M&A transactions - Global coverage from 1979	- Comprehensive deal data source - Strong historical coverage
Time series & Accounting data		
Datastream *Thomson*	- Historical information on over 2 million financial instruments, securities and indicators for over 175 countries in 60 markets	- Coverage of over 100,000 indices - Total return time series for both stocks and bonds
Bloomberg *Bloomberg*	- Real-time and historical information on 5 million bonds, equities, commodities, currencies and funds	- Extensive real-time data
Accounting data		
Worldscope *Thomson*	- Worldscope includes up to 20 years of historical data on more than 50,000 public and private companies - Up to 1,500 data elements on each company record - 70 countries	- Large amount of data elements per company record, including pre-calculated ratios - Represents 95% of the world's market value - Standardized
Extel *Thomson*	- As reported financial data on more than 14,600 active and 1,500 inactive companies since 1985 - Over 1,200 data elements on each company record - 55 countries	
Compustat *Standard & Poor's*	- Financial data on more than 10,500 active and 11,000 inactive companies since 1981 - 615 data elements on each company record - Only US	- Standardized
Amadeus *Bureau van Dijk*	- Financial data on 11 million companies - 100 data elements on each company record - 41 European countries	- Unparalleled coverage - Standardized

Table 3

Overview of databases used in prior studies on European PTP wealth gains

	Betzer 2004	Andres, Betzer, Hoffmann 2004	Renneboog, Simons, Wright 2007	Andres, Betzer, Weir 2007	Sudarsanam, Wright, Huang 2007	**This study** **2008**
M&A transaction information	-Reuters -Bloomberg -Wall Street Journal	-Reuters -Bloomberg -Wall Street Journal	-CMBOR database* -Mergerstat -Thomson Mergers -Thomson SDC -Financial Times -Regulatory News Wire	-Reuters -Bloomberg -Wall Street Journal	-Thomson SDC -CMBOR database*	-Zephyr -Mergermarket
Times series	-Datastream -Bloomberg	-Datastream -Bloomberg	-Datastream	-Datastream -Bloomberg	-Datastream	-Datastream
Accounting data	-Datastream -Bloomberg	-Datastream -Bloomberg	-Extel (Thomson) -Worldscope -Annual reports	-Datastream -Bloomberg	-Datastream	-Worldscope -Amadeus -Annual reports

* CMBOR = Centre for Management Buyout Research, Nottingham University Business school

Table 4

Descriptive statistics of the average abnormal returns of the estimation period [-280,-31] based on different models

	Market Adjusted Model	Market and Risk Adjusted Model	GARCH corrected Market and Risk Adjusted Model
Mean	-7.0E-05	1.9E-07	0.0003
Median	-0.0002	0.0002	0.0005
Max.	0.0064	0.0063	0.0064
Min.	-0.0064	-0.0061	-0.0057
Std. Dev.	0.0021	0.0019	0.0019
Skewness	0.0015	-0.1488	-0.1790
Kurtosis	3.0168	3.1683	3.1199
Jarque-Bera	0.0030	1.2177	1.4844
Probability	0.9985	0.5440	0.4761
Observations	250	250	250

Table 5

Daily average abnormal returns (AAR) based on the Market Adjusted Model

	Stage 1 (N=153)			Stage 2 (N=153)		
Relative day	AAR	T- value	Corrado test statistic	AAR	T- value	Corrado test statistic
-30	-0.08%	-0.40	-1.41	0.75%	3.55 **	0.50
-29	0.16%	0.76	0.77	0.24%	1.12	0.42
-28	-0.64%	-3.04 **	-2.09 *	0.06%	0.26	-0.18
-27	0.22%	1.05	0.46	0.68%	3.21 **	0.96
-26	-0.39%	-1.85	-0.72	0.03%	0.15	-1.12
-25	-0.19%	-0.90	-0.39	0.45%	2.14 *	0.05
-24	0.22%	1.03	0.89	0.50%	2.37 *	0.64
-23	0.05%	0.22	-0.33	0.36%	1.69	0.58
-22	0.00%	-0.02	0.33	0.37%	1.73	0.08
-21	0.10%	0.47	-0.03	0.56%	2.67 **	-0.71
-20	-0.17%	-0.79	-0.19	-0.10%	-0.49	-0.44
-19	-0.29%	-1.38	-0.37	0.05%	0.22	0.42
-18	-0.21%	-0.98	-0.39	0.22%	1.04	1.11
-17	-0.12%	-0.57	-0.58	0.25%	1.16	-0.26
-16	-0.12%	-0.57	-0.73	0.23%	1.08	0.40
-15	-0.05%	-0.23	-0.33	0.14%	0.67	1.03
-14	0.15%	0.70	0.13	-0.32%	-1.54	-1.43
-13	-0.01%	-0.06	0.26	0.32%	1.52	0.86
-12	-0.04%	-0.21	-0.81	0.00%	0.00	-1.17
-11	0.10%	0.47	0.10	0.01%	0.06	0.99
-10	0.02%	0.11	-0.64	0.79%	3.73 **	0.82
-9	0.30%	1.43	0.69	0.11%	0.54	0.91
-8	-0.26%	-1.22	-0.99	0.54%	2.54 *	1.04
-7	-0.10%	-0.47	-0.57	0.29%	1.37	0.27
-6	0.33%	1.56	0.74	-0.08%	-0.39	-1.31
-5	0.21%	0.97	0.35	-0.02%	-0.12	-0.88
-4	0.41%	1.93	1.16	0.43%	2.05 *	1.07
-3	0.31%	1.48	1.17	-0.21%	-1.01	-0.73
-2	0.12%	0.55	2.07 *	0.47%	2.22 *	0.71
-1	2.07%	9.80 **	4.21 **	1.09%	5.19 **	2.07 *
0	11.83%	56.13 **	11.18 **	6.26%	29.68 **	8.92 **
1	2.26%	10.70 **	2.60 **	1.43%	6.77 **	1.54
2	0.15%	0.72	0.25	-0.05%	-0.22	-0.49
3	-0.01%	-0.07	-0.45	-0.03%	-0.16	-0.44
4	0.02%	0.08	-0.15	-0.03%	-0.14	-0.03
5	0.32%	1.50	0.50	0.00%	0.01	-0.10
6	-0.14%	-0.66	-0.34	-0.11%	-0.52	-1.05
7	-0.10%	-0.47	-0.29	0.18%	0.85	0.44
8	0.16%	0.77	-0.04	-0.18%	-0.88	-1.02
9	0.18%	0.84	0.70	-0.17%	-0.81	-1.03
10	0.45%	2.12 *	-0.12	0.10%	0.46	0.08
11	-0.16%	-0.77	-0.92	-0.13%	-0.61	-1.58
12	0.07%	0.31	0.50	0.07%	0.35	0.45
13	-0.09%	-0.42	-0.72	0.04%	0.17	0.56
14	0.03%	0.12	0.48	0.02%	0.08	0.34
15	0.08%	0.39	0.42	0.19%	0.91	1.20
16	-0.01%	-0.06	-0.24	-0.05%	-0.23	0.04
17	-0.37%	-1.74	-1.61	-0.08%	-0.40	-1.22
18	-0.01%	-0.04	-0.70	-0.14%	-0.68	-0.78
19	0.27%	1.26	0.65	0.11%	0.51	1.07
20	0.24%	1.15	0.03	-0.08%	-0.39	-0.60
21	0.02%	0.09	-0.64	0.12%	0.55	0.78
22	0.10%	0.48	0.48	-0.04%	-0.18	0.21
23	-0.12%	-0.56	-0.49	0.01%	0.07	0.03
24	-0.22%	-1.06	-0.83	-0.22%	-1.05	-0.63
25	-0.11%	-0.51	-0.87	0.01%	0.04	-0.27
26	0.23%	1.09	0.76	0.07%	0.34	0.69
27	-0.13%	-0.63	-0.39	-0.08%	-0.37	-0.46
28	-0.05%	-0.23	-0.63	0.01%	0.07	-0.10
29	0.07%	0.32	-0.41	-0.27%	-1.28	-0.91
30	0.48%	2.29 *	1.20	0.02%	0.08	0.30

* and ** indicate statistical significance at the 5% and 1% level respectively (two-tailed test)

Table 6

Daily average abnormal returns (AAR) based on the Market and Risk Adjusted Model

	Stage 1 (N=153)			Stage 2 (N=153)		
Relative day	AAR	T- value	Corrado test statistic	AAR	T- value	Corrado test statistic
-30	-0.01%	-0.07	-0.94	0.79%	4.04 **	0.58
-29	0.16%	0.81	0.44	0.27%	1.39	0.61
-28	-0.53%	-2.70 **	-1.66	0.12%	0.62	0.46
-27	0.24%	1.22	0.47	0.65%	3.33 **	0.76
-26	-0.36%	-1.85	-0.73	0.18%	0.91	-0.64
-25	-0.13%	-0.67	-0.27	0.55%	2.81 **	0.88
-24	0.07%	0.37	0.17	0.48%	2.47 *	0.36
-23	0.04%	0.21	0.10	0.42%	2.14 *	1.18
-22	-0.03%	-0.15	-0.45	0.37%	1.92	-0.04
-21	0.11%	0.56	0.20	0.68%	3.50 **	0.02
-20	-0.18%	-0.93	-0.42	-0.10%	-0.52	-0.57
-19	-0.12%	-0.60	-0.11	0.11%	0.58	1.30
-18	-0.16%	-0.80	-0.29	0.29%	1.49	1.89
-17	-0.06%	-0.29	-0.10	0.26%	1.36	-0.17
-16	-0.13%	-0.66	-1.57	0.23%	1.17	0.15
-15	-0.04%	-0.20	-0.27	0.26%	1.33	1.35
-14	0.21%	1.06	0.47	-0.19%	-0.97	-0.90
-13	0.03%	0.18	0.19	0.33%	1.72	1.02
-12	-0.05%	-0.25	-0.79	0.09%	0.44	-0.53
-11	0.16%	0.84	0.13	-0.06%	-0.31	0.18
-10	0.17%	0.87	0.34	0.81%	4.15 **	2.00 *
-9	0.36%	1.84	0.94	0.07%	0.35	0.59
-8	-0.18%	-0.94	-0.23	0.51%	2.63 **	0.87
-7	-0.07%	-0.35	-0.76	0.24%	1.24	-0.01
-6	0.41%	2.10 *	1.15	0.06%	0.30	-0.81
-5	0.38%	1.93	0.47	0.11%	0.56	-0.69
-4	0.51%	2.65 **	1.69	0.55%	2.83 **	1.84
-3	0.30%	1.55	1.46	-0.12%	-0.63	-0.23
-2	0.11%	0.56	1.87	0.56%	2.86 **	1.46
-1	2.04%	10.47 **	4.99 **	1.16%	5.99 **	3.28 **
0	11.81%	60.69 **	10.98 **	6.28%	32.29 **	8.89 **
1	2.08%	10.67 **	2.51 *	1.49%	7.67 **	1.91
2	0.22%	1.11	0.78	0.01%	0.07	0.53
3	0.00%	0.02	-0.57	0.06%	0.32	-0.19
4	0.11%	0.55	-0.03	0.01%	0.06	0.07
5	0.24%	1.22	0.48	0.03%	0.17	-0.02
6	-0.18%	-0.92	-0.92	-0.05%	-0.26	-0.71
7	-0.14%	-0.71	-0.69	0.23%	1.17	0.84
8	0.18%	0.90	0.47	-0.05%	-0.25	0.12
9	0.19%	0.98	0.72	-0.03%	-0.13	-0.55
10	0.58%	3.00 **	0.32	0.12%	0.60	0.82
11	0.00%	0.00	-0.66	0.01%	0.04	-0.73
12	0.04%	0.22	0.74	0.12%	0.64	1.10
13	0.00%	-0.02	-0.46	-0.02%	-0.11	0.10
14	0.03%	0.14	0.53	-0.01%	-0.06	0.30
15	0.20%	1.04	1.33	0.18%	0.92	1.18
16	-0.02%	-0.11	-0.06	-0.02%	-0.12	0.16
17	-0.16%	-0.84	-0.88	0.04%	0.21	-0.50
18	-0.02%	-0.09	-1.37	-0.06%	-0.32	-0.56
19	0.26%	1.31	1.15	0.08%	0.39	1.03
20	0.35%	1.81	0.61	0.03%	0.13	0.13
21	0.14%	0.70	-0.30	0.10%	0.54	0.53
22	0.16%	0.84	0.52	0.01%	0.05	0.21
23	-0.06%	-0.32	-0.36	0.04%	0.19	0.07
24	-0.21%	-1.09	-0.83	-0.19%	-0.95	0.08
25	0.02%	0.10	0.02	0.04%	0.23	0.00
26	0.30%	1.56	1.32	0.10%	0.52	0.99
27	-0.03%	-0.15	-0.20	-0.01%	-0.07	-0.11
28	0.03%	0.17	-0.14	0.10%	0.52	0.32
29	0.20%	1.04	0.13	-0.12%	-0.64	0.30
30	0.43%	2.23 *	0.90	0.00%	0.00	-0.26

* and ** indicate statistical significance at the 5% and 1% level respectively (two-tailed test)

Table 7

Redundant variables tests of the variables: *Taxes, FCF, Stake, Stake25, Law, Listing, Involvement, Transactions, Collusion, Improved, Contested, Interest* and *Year dummies*

	GARCH corrected Market and Risk Adjusted Model		Market Adjusted Model		Market and Risk Adjusted Model	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
F-statistic	0.782	1.068	0.795	1.084	0.800	1.180
Probability	0.704	0.392	0.689	0.376	0.683	0.292
Log likelihood ratio	13.751	18.492	13.977	18.762	14.064	20.313
Probability	0.617	0.296	0.600	0.281	0.594	0.206

Table 8

Correlation table

N=153	Collusion	Contested	FCF	Freefloat	Improved	Interest	Involvement
Collusion	1.00	0.15	0.11	0.25	0.06	-0.03	-0.22
Contested	0.15	1.00	-0.05	0.13	0.13	-0.04	-0.11
FCF	0.11	-0.05	1.00	0.11	-0.02	0.16	-0.13
Freefloat	0.25	0.13	0.11	1.00	0.13	0.16	-0.20
Improved	0.06	0.13	-0.02	0.13	1.00	0.10	-0.08
Interest	-0.03	-0.04	0.16	0.16	0.10	1.00	-0.29
Involvement	-0.22	-0.11	-0.13	-0.20	-0.08	-0.29	1.00
Law	-0.15	0.02	-0.13	-0.06	-0.09	-0.12	0.21
Leverage	0.00	0.07	-0.03	-0.06	0.04	0.06	-0.22
Listing	-0.18	-0.02	-0.03	-0.27	-0.16	-0.02	0.13
Price	0.03	-0.05	0.32	0.05	0.08	-0.10	0.04
Stake	-0.17	-0.13	-0.13	-0.45	-0.16	-0.20	0.41
Stake25	-0.10	-0.13	-0.16	-0.34	-0.17	-0.17	0.35
Taxes	0.20	0.07	0.52	-0.02	-0.04	-0.07	-0.02
Transactions	0.28	-0.09	0.11	0.30	0.12	0.09	-0.26

N=153	Leverage	Listing	Price	Stake	Stake25	Taxes	Transactions
Collusion	0.00	-0.18	0.03	-0.17	-0.10	0.20	0.28
Contested	0.07	-0.02	-0.05	-0.13	-0.13	0.07	-0.09
FCF	-0.03	-0.03	0.32	-0.13	-0.16	0.52	0.11
Freefloat	-0.06	-0.27	0.05	-0.45	-0.34	-0.02	0.30
Improved	0.04	-0.16	0.08	-0.16	-0.17	-0.04	0.12
Interest	0.06	-0.02	-0.10	-0.20	-0.17	-0.07	0.09
Involvement	-0.22	0.13	0.04	0.41	0.35	-0.02	-0.26
Law	0.05	0.34	-0.20	0.20	0.12	-0.09	-0.12
Leverage	1.00	0.03	-0.20	-0.14	-0.08	-0.02	0.02
Listing	0.03	1.00	-0.24	0.38	0.23	-0.02	-0.14
Price	-0.20	-0.24	1.00	-0.16	-0.18	0.12	0.09
Stake	-0.14	0.38	-0.16	1.00	0.86	0.06	-0.26
Stake25	-0.08	0.23	-0.18	0.86	1.00	0.10	-0.20
Taxes	-0.02	-0.02	0.12	0.06	0.10	1.00	0.00
Transactions	0.02	-0.14	0.09	-0.26	-0.20	0.00	1.00

Table 9

Estimated coefficients of the CAR regression based on the Market Adjusted Model

		Model 1		Model 2		Model 3		Model 4	
		Dep. Var. = CAR [-1,+1] Unrestricted		Dep. Var. = CAR [-5,+5] Unrestricted		Dep. Var. = CAR [-1,+1] Restricted		Dep. Var. = CAR [-5,+5] Restricted	
Variable	Exp. sign	Coef.	T-value	Coef.	T-value	Coef.	T-value	Coef.	T-value
Constant		0.671	1.879	0.682	1.791	0.554	7.471 **	0.582	6.286 **
Taxes	+	0.170	0.636	0.316	0.927				
Leverage	-	-0.090	-2.599 *	-0.129	-2.793 **	-0.086	-2.758 **	-0.121	-2.736 **
FCF	+	0.013	0.156	0.033	0.297				
Stake	-	-0.367	-1.861	-0.359	-1.569				
Stake25	+	0.060	0.947	0.045	0.535				
Freefloat	+	-0.176	-2.286 *	-0.241	-2.675 **	-0.112	-1.794	-0.140	-1.942
Law	-	0.040	1.139	0.074	1.908				
Listing	-	0.010	0.236	-0.028	-0.573				
Price	-	-0.250	-3.741 **	-0.246	-3.151 **	-0.247	-4.293 **	-0.232	-3.207 **
Involvement	-	0.003	0.053	-0.001	-0.020				
Transactions	+	-0.006	-0.197	-0.021	-0.531				
Collusion	-	-0.026	-0.635	-0.043	-0.906				
Control									
Improved	+	0.023	0.610	0.075	1.595				
Contested	+	0.068	0.947	0.103	1.192				
Interest	-	-0.661	-0.135	0.172	0.032				
Year dummies		yes		yes		no		no	
N		153		153		153		153	
R2		0.310		0.331		0.244		0.236	
Adjusted R2		0.212		0.235		0.229		0.220	
F-Statistic		3.148		3.458		16.012		15.308	
Prob. (F-stat)		0.000		0.000		0.000		0.000	

* and ** indicate statistical significance at the 5% and 1% level respectively (two-tailed test)

Table 10
Estimated coefficients of the CAR regression based on the Market and Risk Adjusted Model

		Model 1		Model 2		Model 3		Model 4	
		Dep. Var. = CAR [-1,+1] Unrestricted		Dep. Var. = CAR [-5,+5] Unrestricted		Dep. Var. = CAR [-1,+1] Restricted		Dep. Var. = CAR [-5,+5] Restricted	
Variable	Exp. sign	Coef.	T-value	Coef.	T-value	Coef.	T-value	Coef.	T-value
Constant		0.793	2.193 *	0.938	2.384 *	0.568	7.550 **	0.68	7.29 **
Taxes	+	0.173	0.640	0.348	0.977				
Leverage	-	-0.085	-2.475 *	-0.116	-2.478 *	-0.081	-2.628 **	0.11-	2.51- *
FCF	+	0.022	0.249	0.033	0.291				
Stake	-	-0.377	-1.937	-0.321	-1.404				
Stake25	+	0.060	0.916	0.027	0.319				
Freefloat	+	-0.186	-2.402 *	-0.232	-2.574 *	-0.111	-1.790	0.14-	1.89-
Law	-	0.034	0.951	0.067	1.687				
Listing	-	0.004	0.105	-0.028	-0.588				
Price	-	-0.274	-4.070 **	-0.349	-4.433 **	-0.265	-4.579 **	0.33-	4.62- **
Involvement	-	0.011	0.216	0.004	0.070				
Transactions	+	-0.001	-0.015	-0.018	-0.446				
Collusion	-	-0.028	-0.694	-0.042	-0.874				
Control									
Improved	+	0.022	0.599	0.072	1.579				
Contested	+	0.077	1.092	0.094	1.072				
Interest	-	-2.175	-0.440	-2.402	-0.437				
Year dummies		yes		yes		no		no	
N		153		153		153		153	
R2		0.314		0.359		0.249		0.276	
Adjusted R2		0.216		0.268		0.234		0.261	
F-Statistic		3.208		3.925		16.437		18.903	
Prob. (F-stat)		0.000		0.000		0.000		0.000	

* and ** indicate statistical significance at the 5% and 1% level respectively (two-tailed test)

Table 11
Estimated coefficients of the regression of the premiums over stage 1

		Model 5		Model 6	
		Dep. Var. = Premium 20 days - Stage 1 Unrestricted		Dep. Var. = Premium 40 days - Stage 1 Unrestricted	
Variable	Exp. sign	Coef.	T-value	Coef.	T-value
Constant		-0.465	-0.391	-1.118	-0.847
Taxes	+	0.591	1.057	0.628	1.050
Leverage	-	-0.083	-0.858	-0.078	-0.816
FCF	+	0.049	0.216	-0.075	-0.317
Stake	-	0.077	0.111	0.179	0.258
Stake25	+	-0.119	-0.460	-0.210	-0.772
Freefloat	+	0.137	0.569	0.100	0.413
Law	-	0.164	1.877	0.148	1.577
Listing	-	0.152	0.775	0.238	1.144
Price	-	-0.173	-0.769	-0.020	-0.089
Involvement	-	-0.093	-0.752	-0.068	-0.495
Transactions	+	-0.132	-1.192	-0.100	-0.821
Collusion	-	0.063	0.345	0.137	0.605
Control					
Improved	+	0.430	2.018 *	0.394	1.685
Contested	+	0.692	1.381	0.699	1.251
Interest	-	15.339	0.915	24.181	1.294
Year dummies		yes		yes	
N		153		153	
R2		0.212		0.199	
Adjusted R2		0.099		0.085	
F-Statistic		1.882		1.742	
Prob. (F-stat)		0.020		0.037	

* and ** indicate statistical significance at the 5% and 1% level respectively (two-tailed test)

Table 12
Estimated coefficients of the regression of the premiums over stage 2

		Model 7		Model 8		Model 9		Model 10	
		Dep. Var. = Premium 20 days - Stage 2 Unrestricted		Dep. Var. = Premium 40 days - Stage 2 Unrestricted		Dep. Var. = Premium 20 days - Stage 2 Restricted		Dep. Var. = Premium 40 days - Stage 2 Restricted	
Variable	Exp. sign	Coef.	T-value	Coef.	T-value	Coef.	T-value	Coef.	T-value
Constant		0.414	1.317	0.108	0.251	0.333	5.923 **	0.415	4.893 **
Taxes	+	0.321	1.594	0.695	1.739				
Leverage	-	-0.072	-2.875 **	-0.071	-2.226 *	-0.073	-3.484 **	-0.067	-2.021 *
FCF	+	-0.072	-0.958	-0.204	-1.227				
Stake	-	-0.041	-0.194	-0.259	-0.902				
Stake25	+	0.000	0.005	0.055	0.505				
Freefloat	+	-0.014	-0.187	0.045	0.464				
Law	-	-0.016	-0.553	-0.006	-0.169				
Listing	-	0.062	1.752	0.088	1.637				
Price	-	-0.109	-2.312 *	-0.128	-1.989 *	-0.147	-3.180 **	-0.170	-2.230 *
Involvement	-	0.003	0.062	0.021	0.285				
Transactions	+	-0.005	-0.166	0.000	-0.005				
Collusion	-	-0.072	-1.980 *	-0.072	-1.598	-0.072	-2.541 *		
Control									
Improved	+	-0.037	-1.102	0.077	1.287				
Contested	+	0.072	1.314	0.127	1.286				
Interest	-	-1.168	-0.253	3.576	0.535				
Year dummies		yes		yes		no		no	
N		153		153		153		153	
R2		0.250		0.212		0.190		0.092	
Adjusted R2		0.143		0.099		0.173		0.080	
F-Statistic		2.330		1.883		11.625		7.579	
Prob. (F-stat)		0.003		0.020		0.000		0.001	

* and ** indicate statistical significance at the 5% and 1% level respectively (two-tailed test)

Table 13

Redundant variables tests of the variables: *Taxes, FCF, Stake, Stake25, Law, Listing, Involvement, Transactions, Collusion* (only for model 8), *Improved, Contested, Interest* and *Year dummies*

	Model 7	Model 8
F-statistic	0.665	1.194
Probability	0.823	0.278
Log likelihood ratio	11.782	21.728
Probability	0.759	0.195