ERASMUS UNIVERSITY ROTTERDAM
ERASMUS SCHOOL OF ECONOMICS
MSc Economics & Business
Master Specialisation Financial Economics

A study on the economic impact of private equity club deals in leveraged buyouts

Author:	Ward A. Blokker BSc
Student number:	417525
E-mail:	417525wb@student.eur.nl wardblokker@gmail.com
Thesis supervisor:	Dr. Y. Dai
Second reader:	Dr. V. Volosovych
Finish date:	July 2016

PREFACE AND ACKNOWLEGDEMENTS

With pleasure I present to you this study on the economic impact of private equity club deals in leveraged buyouts. This thesis will conclude my master's degree in Economics & Business Economics (specialisation Financial Economics) at Erasmus University Rotterdam.

The idea for this thesis originated during the Seminar Advanced Corporate Finance: Private Equity. One of the key articles on which I base my research ("*Club deals in leveraged buyouts*" by Officer, Ozbas, and Sensoy, published in 2010) was part of the literature during this seminar. Some time after the seminar, I started an internship at a Dutch private equity firm, where I encountered many "club deals" myself: deals in which private equity acquirers join forces to purchase a target firm. My colleagues told me about the ever-increasing competition in the private equity industry combined with the limited supply of companies to buy in recent years, and I started wondering whether this increased competition could be part of the reason why a substantial amount of targets is purchased by private equity coalitions. Later, I immersed myself in this topic by reading several articles, and decided to write a research proposal about it. I submitted this research proposal to Dr. Dai, my lecturer for the seminar Private Equity, which was the start of an intensive yet insightful period of conducting research and writing this thesis.

First and foremost, I would like to thank my thesis supervisor, Dr. Dai, for the excellent guidance and support, as well as the constructive criticism and responsiveness during the process. I would also like to thank the second reader of this thesis, Dr. Volosovych, for evaluating my work.

I hope you will enjoy reading this thesis.

Ward Blokker
Rotterdam, July 2016

HIGHLIGHTS

The purpose of this research is twofold: 1) to conduct an empirical analysis of the economic impact of private equity club deals on the target company and its stakeholders; 2) to draw conclusions about the incentives of private equity acquirers to form such coalitions. My main results are as follows.

Examining the abnormal returns to target shareholders in a sample of 450 completed private equity buyouts of American and European publicly traded targets, I find:

- From 2000 to 2005, target shareholders receive 16.7% *less* of pre-bid firm equity value in club deals compared to sole-sponsored deals. This effect is mainly attributable to large or "prominent" private equity acquirers forming clubs to acquire targets in the United States;
- From 2006 to 2015, target shareholders receive 10.2% *more* of pre-bid firm equity value in club deals compared to sole-sponsored deals. This effect is mainly attributable to prominent private equity acquirers forming clubs to acquire targets, both in the United States and in Europe.

Examining the ex-post buyout performance of target companies in a subsample of 112 targets for which ex-post buyout data is available, I find:

- Consortium-backed companies experience significantly higher growth of total assets, employees, and turnover after a buyout, relative to sole private equity backed companies;
- After controlling for growth in assets and employees, European club deal targets experience (on average) 3.7% higher productivity growth than the control sample of sole-sponsored buyouts in the three years after the buyout.

Overall, the evidence indicates that:

1) Private equity clubs are better able to enhance the economic performance of their target companies than sole-sponsored private equity buyers;
2) Resource pooling and value creation are rationales for club formation, whereas I cannot rule out that prior to 2006, prominent private equity acquirers formed clubs (in part) to curb competition, particularly in the United States.

ABSTRACT

This research provides evidence on the economic impact of club deal leveraged buyouts –where two or more private equity firms form an alliance to jointly takeover a target firm– in terms of the returns to target shareholders as well as the ex-post buyout performance of target companies. Using a comprehensive sample of completed private equity buyouts of American and European publicly traded targets, I find that from 2000 to 2005, target shareholders receive 16.7% *less* of pre-bid firm equity value in club deals compared to sole-sponsored deals. This effect is mainly attributable to large or "prominent" private equity acquirers forming clubs to acquire targets in the United States. From 2006 to 2015, I find an opposite effect, where target shareholders receive 10.2% *more* of pre-bid firm equity value in club deals compared to sole-sponsored deals. This effect is mainly attributable to prominent private equity acquirers forming clubs, both in the United States and in Europe. I further show that consortium-backed companies experience significantly higher growth of total assets, employees, and turnover after a buyout, relative to sole private equity backed companies. Moreover, European club deal targets experience (on average) 3.7% higher productivity growth than the control sample of sole-sponsored buyouts in the three years after a buyout. This combined evidence indicates that, despite the observed lower target abnormal returns prior to 2006, private equity clubs are better able to enhance the economic performance of their target companies than sole-sponsored private equity buyers. This notion is particularly convincing for the European subsample, where higher measures for productivity growth after a club deal suggest that consortiums are the superior mechanism to enhance the economic efficiency of target companies. Finally, I examine the possible incentives of private equity acquirers to form coalitions, and find convincing evidence for resource pooling and value creation as rationales. However, these motivations for club formation are not able to explain the observed discount in abnormal returns paid to American target shareholders by prominent clubs prior to 2006, indicating these clubs might have been formed to curb competition. That said, it is possible that this lower pricing is an inadvertent by-product of an unobserved benign motivation for club formation.

Keywords: private equity, buyouts, club bidding, takeover auctions, performance

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CHAPTER 1 - Introduction

1.1 Introduction

Global leveraged buyout (henceforth, LBO) deal value grew from $31 billion in 1995 to an enormous $673 billion in 2007, before collapsing in 2008 (Bain & Company, 2015). This LBO wave has triggered renewed debate among economists and policymakers regarding the efficiency and welfare implications of LBOs. Academics such as Jensen (1986) have previously emphasized that in the organizational structure where equity is privately held, better corporate governance is practised as management has a significant stake to align their interests with its owners, and firms have a much higher leverage ratio to restrict managerial interest from spending free cash flow. However, private equity firms are sometimes accused of doing nothing but levering up their portfolio companies, as LBO activity has followed a boom-and-bust pattern in the past negatively related to aggregate credit spreads and the market risk premium (Haddad *et al.*, 2014). Another criticism stems from Bargeron *et al.* (2008), who find that the gains to target shareholders are lower when the acquirer is a private equity firm rather than a public firm, indicating that the large profits earned by some private equity firms may be partly due to expropriation of target shareholders.

In recent years, particular criticism has been directed at so-called club deals, where two or more private equity firms form an alliance to jointly takeover a target firm.[1] This practice has become a widely observed phenomenon in the market for LBOs. Analysing a sample of takeovers of publicly traded targets in the United States, Boone and Mulherin (2011) find that nearly half of all acquisitions by private equity firms between 2003 and 2007 involved a club of two or more such firms. Officer *et al.* (2010) find similar results for deals executed by more prominent private equity firms between 1984 and 2007. The incentives for private equity firms to join forces in such partnerships,

[1] Throughout this thesis I use the terms “club”, “consortium”, and “coalition” interchangeably for this phenomenon.

especially those active in the United States, have been hotly debated. However, current empirical findings are contradictory.

The main concern about club deals is that these private equity partnerships are formed to curb competition. With the formation of a club, private equity buyers may be colluding to depress prices by limiting the number of competing bidders in auctions. Auction literature (e.g., Graham & Marshall, 1989) shows that collusion can reduce prices even in the absence of repeat play and even when collusion does not involve all potential bidders for a target. Hence, the collusion theory predicts that club deals will be associated with a lower level of bidder competition and lower prices paid for target firms. Concerned with the potentially collusive aspect of club bidding, the U.S. Department of Justice started an informal inquiry into the practice in 2006 (Officer *et al*., 2010).

Since the most recent LBO wave, the incentives for private equity firms to collude have likely increased, due to heightened competition in both the U.S. and the European private equity markets. Bain & Company (2015) reports that worldwide exits from buyouts exceeded $450 billion in 2014, surpassing the all-time high by a wide margin. Meanwhile, investors looking to maintain or increase their exposure to this high-returning asset class made 2014 another strong year for fund-raising. As a result, 2014 marked the fourth consecutive year distributions have outpaced capital calls for the investors in private equity funds (i.e. the limited partners). A continued abundance of low-cost debt and high valuation for comparable public companies in most markets has resulted in even more private equity money chasing the same assets. By the end of 2014, freshly committed capital hit a global record of $1.2 trillion, including $452 billion earmarked for buyouts alone (Bain & Company, 2015). However, in recent years there has been a limited supply of companies to buy. Consequently, an increasing amount of firms is sold via intensely competitive auctions, driving up the valuations of private equity targets (Bain & Company, 2015).

Despite these compelling arguments in favour of the collusion theory, numerous benign motivations why bidding coalitions may be formed are posited in the extant literature

on club formation. For example, potential benefits of bidding coalitions arise if they enable several bidders, none of whom have the financial resources to acquire the target alone, to bid by joining their financial strength. Similarly, coalitions may enable firms reluctant to finance high-risk projects internally to spread risks and contemplate bids that would otherwise not be possible (Marquez & Singh, 2013).[2] In stark contrast with the collusion theory, these competitive theories for consortium formation argue that club bidding should increase rather than decrease the number of bidders for the target, resulting in enhanced competition and higher prices for target shareholders, relative to a case where joint bidding is not allowed.

The motivation for forming a coalition most often cited by practitioners is *value creation*, as the club is likely to have a greater value for the target than other potential bidders due to synergies between the private equity partners and the target firm (Marquez & Singh, 2013). To understand how private equity consortiums could create more value for their targets (and, consequently, themselves) than sole-sponsored private equity buyers, one must first analyse the value creation opportunities in LBOs in general. Guo *et al.* (2011) state three such sources. First, firm value will increase if the private equity sponsor can achieve firm specific improvements in operating performance. Second, even without changes in the cash flows subsequent to the buyout, the target firm may benefit from rising market or industry sector valuation multiples after the LBO. Finally, substantial increases in leverage produce larger tax shields, boosting returns by increasing the cash flows available to the providers of capital. While rising multiples affect clubs and sole-sponsored acquirers in the same fashion, various theories exist as to how private equity consortiums perform better than sole-sponsored private equity acquirers on the other two methods of value creation. Scellato and Ughetto (2013) argue that pooling of resources and a combination of complementary skills in clubs may result in more intense monitoring and higher-quality support during the investment phase. This, in turn, can lead to improved operating performance for the target. Malenko and Malenko (2015) theorize that club deals add value because they allow bidders to borrow reputation for non-diversion with creditors from each other. A bidder who has a bad reputation with creditors is not able to raise financing on

[2] See Chapter 2 for a more detailed explanation of these (and other) club deal rationales.

favourable terms. If such a low-reputation bidder can add significant value through operational improvements in a given target, while a high-reputation bidder cannot, then a consortium of the two creates a higher value from the deal than each of the bidders can create on its own. In such a club, the low-reputation bidder benefits as the high-reputation bidder is able to raise financing on favourable terms, and the high-reputation bidder benefits as the low reputation bidder can add value to the target through operational improvements. In all, if coalitions indeed are formed to create value, target firm shareholders capture at least some of the additional value created. However, competition for the target firm is reduced as a result of the club's formation, which could, in turn, reduce acquisitions prices (Marquez & Singh, 2013). Hence, the effect of the value creation theory on acquisition premia is not immediately clear.

Empirical research shows that private equity investors reap higher wealth gains from club deals relative to sole sponsored acquisitions. Guo *et al.* (2011) examine returns to private equity investors in buyouts. The authors find that median market- and risk-adjusted returns to post-buyout capital invested are 40.9%, and that post-buyout return on capital is significantly higher for club deals than for sole-sponsored LBOs. Shareholders of target firms should concern themselves with the source of this higher relative performance of private equity consortiums. If high performance stems solely from additional value created, a club's formation likely serves to increase acquisition prices and is beneficial for target shareholders. On the other hand, if the high returns stem from depressed acquisition prices due to collusive practices or inadvertent reduction in bid competition, a club's formation is detrimental to target shareholders. Another possible explanation for the higher relative performance is target firm characteristics: deals that are particularly attractive based on their prospects at the time of the buyout could be more likely to be shared by more than one private equity firm (Guo *et al*., 2011). In this case, a club's formation has no effect on the price paid to target shareholders.

However, the benefits of value creation in club deals can go above and beyond target shareholders. Policy makers, looking to take a stand on club deals in LBOs, should also consider the interests of other stakeholders of the target firm, such as the employees,

customers, suppliers and the community as a whole. If private equity consortiums are indeed able to add more value to their target than sole-sponsored private equity buyers, these stakeholders could benefit, even if the additional value is not reflected in the acquisition price. So, for additional robustness, it is important to measure the ex-post growth and profitability of target companies when analysing the effect of club deals on stakeholders of the target firm. Moreover, a critical policy issue concerning private equity club deals is whether they enhance economic efficiency. To address this question, the standard empirical approach of analysing the impact of these buyouts on stock prices is, again, not sufficient. Many economists are increasingly sceptical about the "efficient markets" hypothesis, which asserts that changes in share prices following announcements of buyouts reflect changes in future real performance or economic efficiency (Harris *et al.*, 2005). To measure the economic efficiency (i.e. the "social" returns) of private equity buyouts, academics commonly look at the ex-post productivity of target companies (see, e.g., Harris *et al.*, 2005; Lichtenberg & Siegel, 1990). Regardless of their effect on acquisition premia, club deals may be socially beneficial if their pooling of multiple expert opinions helps redeploy target assets to more productive uses (Officer *et al.*, 2010).

Club deals continue to be controversial, yet little evidence from recent academic literature documents whether and how these consortiums create value for their targets.[3] In the light of the academic and policy debate, it is timely to provide systematic evidence on the economic impact of club deals not only in terms of returns to target shareholders, but also on the other stakeholders of the investee company. Therefore, this thesis studies the effects of club deals on both acquisition premia and the ex-post growth, profitability, and productivity of target companies. By comparing the club deals to sole-sponsored LBOs, this thesis draws conclusions on the economic impact of private equity consortiums in LBOs. Additionally, the evidence from both the transaction-level and the ex-post buyout analysis is used to examine whether private

[3] Scellatio and Ughetto (2013) find that for a sample of 241 private-to-private buyouts involving European companies between 1997 and 2004, the presence of multiple investors is negatively associated with ex-post average profitability. However, the results are insignificant in three out of four model specifications.

equity coalitions are formed to curb competition or whether benign, non-collusive rationales such as value creation are more likely.

A limitation of this research is that intent is unobservable - in the case of a club deal discount in acquisition premia paid, it is impossible to distinguish between deliberate collusion and inadvertent reduction in bid competition resulting from the limited number of private equity firms interested in any given target (Officer *et al.*, 2010). Nor is it possible to conclusively prove whether club deals result in increased or decreased social welfare on the long-term (Officer *et al.*, 2010). That said, it is possible to explore the association between club deals and premia paid to target shareholders, and to investigate whether any differences in premia paid in club deals relative to sole-sponsored LBOs are likely to be due to non-collusion explanations, such as benign reasons for deal syndication or target characteristics. It is also possible to compare the ex-post performance of target companies of private equity consortiums to the ex-post performance of target companies of sole-sponsored private equity buyers in the same market, and in this way analyse the economic efficiency of club deals on a company level.

1.2 Research question

The research question of this thesis is:

> **What is the economic impact of private equity club deals on the target company and its stakeholders, and what does this imply with regard to the incentives of private equity acquirers to form such coalitions?**

With this research question I aim to draw conclusions about the economic impact of private equity club deals, providing a resolution to both the academic and the policy debate about the practice. In order to find a substantiated answer to the research

question, the following sub-questions are answered. These three sub-questions are translated into ten testable hypotheses that are presented in Chapter 2.

1. **What is the effect of club deals on the gains to target shareholders, and how does this relate to the gains to target shareholders in sole-sponsored private equity buyouts?**

2. **What is the effect of club deals on the ex-post growth, profitability, and productivity of target companies, when compared to sole-sponsored private equity buyouts?**

3. **Is there evidence that private equity coalitions are formed to curb competition or are benign, non-collusive rationales such as value creation more likely?**

1.3 Contributions to academic literature

This paper makes four major contributions to academic literature. The first concerns the analysis of the ex-post performance of club deal LBO target companies. The economic consequences of buyouts have been hotly debated. However, the discussion about club deals in LBOs has mostly been limited to the bidding process. This paper empirically studies the effect of club deals on the ex-post growth, profitability, and productivity of target companies. The latter is an important measure for the economic efficiency of LBOs, but it has thus far not been applied to private equity club deals. Only when all three are known and compared to sole-sponsored LBOs, can one draw conclusions about the economic implications of club deals in LBOs. Second, several academics have previously conducted empirical research on the effects of club deal LBOs on acquisition premia in the United States (see, e.g., Officer *et al.*, 2010; Boone & Mulherin, 2011). However, their evidence is contradictory. This paper is the first to examine whether a model of competitive bidding by Marquez and Singh (2013),

incorporating value creation between a subset of the bidders in the formation of a club, can reconcile empirical evidence. In doing so, it sheds new light on the economic reasons as to why private equity bidders form clubs in some deals, and not in other deals. Third, all previous academic literature regarding the effects of club deal LBOs on acquisition premia has been focused on the United States. This paper is the first to examine if similar results can be observed in Europe. If a difference is observed, the appropriate stance of European policy makers on club deals might be different to that of American policy makers. Finally, previous academic literature on club deals has exclusively focused on the period up until the most recent LBO boom (2007). As mentioned above, the LBO market has become far more competitive since; moreover, the investigation by the U.S. Department of Justice into the practice in 2006 could have an effect on a possible club deal discount in recent years. This thesis adds to the current body of research by explicitly analysing the 2006 to 2015 period, to see if the economic impact of club deals has changed since the start of that investigation.

1.4 Findings

I use a sample of 450 LBOs in the United States and Europe to examine the effect of club deals on the gains to target shareholders. I find that from 2000 to 2005, target shareholders receive 16.7% *less* of pre-bid firm equity value in club deals compared to sole-sponsored deals. Further examination reveals that the discount is attributable to large or "prominent" private equity club acquirers, i.e. those firms that are likely to have the market power to meaningfully influence competition and prices. Moreover, the discount is mainly visible in the U.S.; I find no significant club deal discount in Europe prior to 2006 (although the number of observations in this subsample is small). From 2006 to 2015, I find an opposite effect, where target shareholders receive 10.2% *more* as a percentage of pre-bid equity value in club deals compared to sole-sponsored deals. This premium is attributable to prominent private equity clubs acquiring targets in both Europe and the U.S.

Using a subsample that consists of 56 American and European club deals targets, plus a matched sample of 56 targets of sole-sponsored private equity acquisitions, I examine the ex-post performance of target companies. I find that consortium-backed companies experience significantly higher growth of total assets, employees, and turnover after a buyout, relative to sole private equity backed companies. Furthermore, I find no significant out- or underperformance on various measures of profitability. Lastly, I find that after controlling for growth in assets and employees, club deal targets experience (on average) 3.7% higher productivity growth than the control sample of sole-sponsored buyouts in the three years after a buyout. This differential is significant at the 5% level, but is only measured for a subsample of European LBO targets. Despite the observed lower target abnormal returns in pre-2006 U.S. prominent club deals, this combined evidence indicates that private equity clubs are better able to enhance the economic performance of their target companies than sole-sponsored private equity buyers. This notion is particularly convincing for the European subsample, where higher measures for productivity growth after a club deal suggest that consortiums are the superior mechanism to enhance the economic efficiency of target companies.

An empirical analysis of the theoretical model by Marquez and Singh (2013), further explained in Section 2.1.1, reveals that it is unlikely value creation is the *only* rationale for forming a coalition. Rather, in this thesis I find three different incentives for private equity firms to form clubs. First, the evidence points towards collusive practices by prominent private equity consortiums, but only in the U.S. and prior to 2006. Here, I find that prominent club deal target shareholders receive statistically and economically significant lower abnormal returns. The discount completely disappears (and even turns into a premium) after 2006, the year in which the U.S. Department of Justice announced its inquiry into possible collusive effects of private equity consortiums. Furthermore, the lower price paid to target shareholders cannot be explained by actual lower ex-post performance of those target companies on measures of growth or profitability, as compared to other club deal targets for which no discount is paid. Lastly, the discount is robust to various target and deal characteristics, including size, return, Tobin's Q, and measures of risk and information complexity. However, considering the potential legal and regulatory implications of the possibility of collusion by (prominent) private

equity firms, it is important to emphasize that the observed discount prior to 2006 could also be an inadvertent by-product of an unobserved benign motivation for club formation. Second, the results indicate that value creation is an important rationale for club formation as well. The post-2005 club deal premium indicates clubs are formed to create value, and target firm shareholders capture at least some of the value created – although the observed evidence is (again) potentially consistent with clubs forming for unobserved reasons, with inadvertent pricing consequences. Moreover, the ex-post buyout analysis reveals that club deal targets significantly outperform sole-sponsored LBO targets on measures of growth and (in Europe) productivity growth. Third, I find strong evidence that resource pooling is an additional rationale for club formation.

1.5 Structure of the thesis

The remainder of this thesis is organized as follows. Chapter 2 presents relevant related literature and the ten hypotheses that are tested. Chapter 3 describes the sample selection procedure and provides summary statistics on the resulting samples. Chapter 4 presents the methodology used to test the hypotheses. Chapter 5 presents the results of the empirical research and the conclusions on the hypotheses. This thesis is concluded with Chapter 6, in which the research question is answered, the results and limitations of the research are discussed, and recommendations for further research are provided.

CHAPTER 2 - Theory and hypotheses

As mentioned in the introduction, two frequently cited economic rationales for club formation are collusion on the one hand and value creation on the other hand. A natural question of interest to target firms' shareholders is whether a club's formation serves to increase acquisition prices due to value creation, or rather reduces them through collusive practices or inadvertent reduction in bid competition. Moreover, policy makers might be interested in the real effects of club deals on target companies. I study the effects of club deals on acquisition premia and on the ex-post performance of target companies to examine the economic impact of private equity club deals on the investee company and its stakeholders. In doing so, I aim to find out whether the collusion or the value creation rationale for club formation is supported by empirical evidence. To this end, the first section of this chapter discusses the existing theoretical and empirical research on collusion and value creation in club deals, and subsequently formulates the first 7 hypotheses. [4]

However, other than value creation and collusion, several alternative economic rationales for club formation are suggested in the extant literatures on strategic alliances, each with its own effect on the acquisition premium and ex-post performance of target companies. Thus, as a crosscheck, and to cover the entire field of private equity club deals, the Section 2.2 describes several of those other rationales and develops three more hypotheses to examine their likelihood.[5]

2.1 Collusion versus value creation

Concerned with the potentially collusive aspect of joint bidding by private equity consortiums, the U.S. Department of Justice started an investigation in 2006 on whether

[4] Throughout this chapter, I set up my hypotheses as alternative hypotheses, which describe the effect or relation I expect to find, whereas the (omitted) null hypotheses would be that the respective effect or relation is non-existent.

[5] All hypotheses presented in this chapter are designed to find a substantiated answer to the research question posited in Section 1.2. Throughout this thesis, Hypotheses 1-4 are used to provide an answer to sub-question 1; Hypotheses 5-7 are used to provide an answer to sub-question 2; and to answer sub-question 3, all hypotheses are used.

such bids dampen takeover competition and reduce the price paid to target shareholders (Berman & Sender, 2006). Former shareholders of companies acquired by private equity during the boom times before the financial crisis have also alleged collusive practices between private equity firms in rigging deal prices. The plaintiffs, which include pension funds and individual investors, disclosed revealing emails between private equity executives (Erman & Hals, 2012). The lawsuit contends that one email exchange is revealing. Using an acronym for a public-to-private transaction, Mr. James, Blackstone Group president, wrote to KKR co-founder Mr. Roberts: "We would very much rather work with you guys than against you. Together we can be unstoppable, but in opposition we can cost each other a lot of money. I hope to be in a position to call you with a large exclusive P.T.P. in the next week or 10 days." Roberts in reply: "Agreed." The emails were allegedly sent after KKR decided to step down in the $17.6 billion bidding for semiconductor company Freescale in 2006. Soon after, Blackstone invited KKR into a bidding group for the radio giant Clear Channel Communications, though the group ended up losing that deal. Of the seven defendants in this private litigation case, six - Bain Capital, Silver Lake, GS Capital Partners, KKR, Blackstone and TPG - have now settled by paying eight- and nine-figure sums, claiming that settling acquisition-related litigation is often in the best interest of their investors (Alden, 2014). The U.S. Department of Justice, on the other hand, never brought any charges.

If private equity partnerships are colluding by limiting the number of competing bidders in an auction for a takeover target, they may be short-changing passive, dispersed shareholders of target publicly traded corporations (Officer *et al.*, 2010). Auction literature (e.g., Graham and Marshall, 1989) shows strong grounding for this concern and argues that collusion has a detrimental effect on acquisition prices. Hence, the collusion theory argues that the use of consortiums will be associated with lower prices relative to a case where club bidding is not allowed. Following this theory there should be no difference in value creation abilities of private equity consortiums, relative to sole-sponsored private equity buyers. In other words, any structural discrepancies in the ex-post performance of target companies should be independent of the number of private equity acquirers, and should instead be attributable to ex-ante buyout target firm characteristics.

Notwithstanding, value creation as a rationale for forming a coalition is both an often-used argument by industry practitioners, and an extensively developed theory in strategic management literature. According to the value creation theory, firms form clubs to facilitate inter-firm learning, to gain access to another firm's capabilities, and to formulate and coordinate technical standards (Mowery *et al.*, 1996). In this case, the club is likely to have a greater value for the target than other potential bidders due to synergies between the private equity partners and the target firm. The target firm shareholders capture at least part of that value creation. However, the competition for the target firm is also reduced as a result of the club's formation (Marquez & Singh, 2013). Which of these effects is likely to dominate under what circumstances is further explained in Section 2.1.1. As, according to this theory, the total value being created is greater in the presence of the club than in its absence, the ex-post performance of target companies should improve when there are multiple private equity acquirers.

2.1.1 Abnormal returns to target shareholders

Triggered by the investigation of the U.S. Department of Justice regarding private equity consortiums in 2006, academics have already looked at possible collusion by private equity consortiums up until 2007. Officer *et al.* (2010) study a sample of completed LBOs of U.S. publicly traded targets conducted by large or "prominent" private equity firms between 1984 and 2007, and find that target shareholders in club deals receive significantly lower premia than in sole-sponsored LBOs and other M&A transactions. The authors focus on large private equity firms in their research, as minor private equity firms are less likely to have the market power to meaningfully reduce competition and prices. The results are robust to several controls for target and deal characteristics, including size, measures of risk, and industry. These results are indicative of collusive practices and lead to my first hypothesis:

> ***H1****: Target shareholders in club deals by prominent private equity firms receive significantly lower premia than target shareholders in sole-sponsored LBOs.*

Officer *et al.* (2010) find a club deal discount in acquisition premia for prominent private equity firms from 1984 to 2005, but also find that this discount virtually disappears in 2006 and 2007. The financial media began expressing concern about club deals at the end of 2005 and the U.S. Department of Justice started an informal inquiry to the practice in 2006. Arguably, this has led to a situation where colluding with a club is not always possible. On the other hand, since the LBO bust in 2008 competition in the market for private equity buyouts has never been greater, due to a continued abundance of low-cost debt and high valuation for comparable public companies in most markets, combined with a limited supply of companies to buy (Bain & Company, 2015). This means that incentives for private equity firms to form clubs in order to depress competition have never been greater. Nonetheless, given the evidence found by Officer *et al.* (2010), I advance with the following hypothesis:

> ***H2****: The club deal discount in acquisitions by prominent private equity acquirers has become less pronounced in 2006 – 2015, when compared to 2000 – 2005.*

Boone and Mulherin (2011) also test issues with private equity bidding using a sample of 870 publicly traded targets in the 2003 to 2007 period, i.e. the time period which was the focus of investigation by the U.S. Department of Justice. Interestingly, the authors find different results. Their dataset includes both prominent private equity firms and smaller private equity firms, and the research does *not* support the view that private equity consortiums facilitate collusion. It is instead consistent with a competitive explanation for consortium formation: both single private equity bidders and private equity consortiums are associated with significantly greater levels of takeover competition than other types of bidders. Furthermore, the authors test if a subsample prominent private equity firms are able to enforce collusion in takeover markets, but do not find any negative effect on acquisition premia, as do Officer *et al.* (2010).

Marquez and Singh (2013) argue that a focus on value creation can reconcile these conflicting results. The authors develop a model that analyses the effect of club deals

on acquisition premia. The model focuses on the trade-off between value creation in a club and effects of club formation on bidder competition. As would be the case when value creation in acquisitions depends on synergies and expertise that are in limited supply, a key feature of the model is that there is a limited number of bidders who might benefit from acquiring the target. The (private equity) club creates value by aggregating, at least partially, bidders' values. The effect of club deals on acquisition premia then depends on both the cost of bidding and the number of potential bidders. If the bidding cost is large, bidders face a real decision of whether or not to incur the cost. In this case, the club's formation is always bad for the target, as the club's higher value for the target leads fewer non-club bidders to enter the auction. Marquez and Singh (2013) further argue that if the cost of bidding is small, the effect of club deals on acquisition premia depends on the number of potential bidders. When there is a small number of bidders, club formation is bad for the target shareholders because a reduction in the number of bidders (due to the club's formation) has a negative impact on the expected value of the winning offer. However, as the number of bidders increases, so that there is a relatively large amount of competition already, the value creation effect of the club begins to dominate, and the target is better of since it captures at least some of that value creation.

Marquez and Singh (2013) claim their model can reconcile said contradictory evidence on club bidding: conditioning on larger firms and deals in Officer *et al.* (2010) likely implies that there would have been a limited amount of competition for the acquisition in any case; whereas "participation costs, such as costs associated with due diligence and agency review, might be lower for the smaller (on average) deals analysed in Boone and Mulherin (2011), making these findings consistent with our results that in more competitive markets, the value creation associated with a club translates into gains for target shareholders" (Marquez & Singh, 2013, p. 501). However, this does not explain why Officer *et al.* (2010) and Boone and Mulherin (2011) find different results for a seemingly similar (sub)sample of prominent private equity firms. According to the model of Marquez and Singh (2013), it is important to systematically control for cross-sectional differences in bidding costs and the number of potential competitors in these deals. Bidding costs include costs associated with due diligence, putting together a legal team and arranging financing, all of which are likely to be greater when the target is

larger in size. Thus, taking deal size as a proxy for participation costs, this line of arguments leads to the following testable hypotheses:

> ***H3****: In a club deal the acquisition premium is negatively related to deal size.*

> ***H4****: In a club deal the acquisition premium is positively related to the potential number of bidders.*

2.1.2 Ex-post performance of target companies

Possible synergies between the private equity partners and the target firm in a club deal generate a considerable interest in assessing the economic impact of such deals on the investee company and its stakeholders. Whereas the discussion about club deals in LBOs has mostly been limited to the bidding process, the economic consequences of sole-sponsored buyouts have been hotly debated. Scholars use a variety of accounting-based measures to identify the effects of buyouts on firm performance, including sales and employment growth (see, e.g., Jelic & Wright, 2011), profitability (see, e.g., Guo *et al*., 2009), and cash flow (see, e.g., Kaplan, 1989; Guo *et al.*, 2009). Efficiency gains are measured in terms of increased productivity (see, e.g., Harris *et al*., 2005) or decreased expenditures (see, e.g., Kaplan, 1989). Following both Scelatto and Ughetto (2013) and Wilson *et al*. (2012), I explore three different dimensions of firm performance that assess the real impact of consortium-backed LBOs on the target company and its stakeholders: size, profitability and productivity. To understand how private equity consortiums could create more value for their targets than sole-sponsored private equity buyers, I first look at the value creation opportunities in LBOs in general. Next, I examine value creation theories in club deal LBOs, to see on which dimensions consortiums may perform better (or worse) than sole-sponsored buyers. Based hereon I formulate my hypotheses.

Guo *et al.* (2011) find that for buyouts completed between 1990 and 2006, median market- and risk-adjusted returns to post-buyout capital invested are 40.9%. Increases

in industry valuation multiples, realized tax benefits from increased leverage and firm specific improvements in operating performance are important factors in explaining these realized returns. The authors describe four factors that may lead to firm specific operating gains. The first is management incentives. As management generally contributes a significant portion of equity financing in the buyout, management incentives are better aligned with shareholders and agency costs are mitigated. The second factor involves the (non-tax related) benefits of increased debt. High debt service levels will induce management to curb wasteful investment and force improvements in operating performance. Third are the benefits of improved governance and monitoring. Guo *et al.* (2011) find that PE firms are active in governance on the board of their portfolio firms, as well as in the selection of management for their portfolio firms, with 37.2% of their sample replacing the CEO at the time of the buyout or within the first year. Other pre-buyout characteristics and activities while private make up the fourth category. For example, the ability to improve operating performance may be the greatest for firms that are underperforming pre-buyout. Moreover, high quality support during the investment phase will lead to, e.g., well-devised acquisition strategies or restructurings. Finally, target firms may reduce their operating capital due to reductions in working capital requirements and value destroying investments (Guo *et al.*, 2011). Taken together, these factors may lead to improvements in operating profitability, due to cost savings and revenue enhancements.

Little empirical evidence from academic literature documents whether and how private equity consortiums create additional value for their targets, as compared to sole-sponsored LBOs. However, several hypotheses have been developed. First, Scellato and Ughetto (2013) argue that pooling of resources and a combination of complementary skills may result in more intense monitoring and higher-quality support during the investment phase. This is expected to help portfolio companies reach higher levels of operating performance. Nonetheless, the authors also suggest that the joint presence of more than one investor can give rise to coordination and agency problems, especially when the strategic objectives of one investor diverges from those of other investors. This would lead to inefficiencies, in turn negatively affecting the operating performance of target companies.

Next, Malenko and Malenko (2015) develop a theory on LBO activity based on the ability of private equity-owned firms to borrow against their sponsors' reputation with creditors. The authors show that club deals create value ex-post as they allow low-reputation bidders with high valuations for their targets to borrow reputation from high reputation bidders with low valuations. Likely, this leads to higher realized tax benefits and higher levels of operating performance in club deals. However, a private equity firm that realizes it will be able to borrow reputation from more reputable bidders in the future by forming a club with them, might have lower incentives to preserve its reputation for non-diversion with creditors. This ex-ante effect can lead to reduced buyout activity and lower expected value from buyouts (Malenko & Malenko, 2015).

Furthermore, Marquez and Singh (2013) model for the social efficiency of club bidding, where social efficiency is enhanced as a result of the formation of the club if the total value being created is greater in the presence of the club than in its absence. This "total value" reflects the expected private value of the winning bidder. The authors theorize that social efficiency with club bidding is always higher, since, in their model, the value of the club represents a combination of the individual values for the target of each bidder in the club, with the club's value aggregating, at least to some extent, the individual values. If the winning club is able to materialize its expected private value, the ex-post performance of the target company will likely be higher than for target companies of non-club acquirers.

Finally, Guo *et al.* (2011) find that the ex post performance of LBOs in the 1990-2006 period is higher in club deals than in sole-sponsored deals, both in terms of return on the price paid and in terms of accounting performance. The authors explain these findings by arguing that deals with better ex-ante prospects attract participation by multiple private equity firms. To proof that any enhanced performance is instead a result of value creation by private equity consortiums, it is important to control for the differences in ex-ante target characteristics between private equity consortiums and single private equity bidders. Given these theoretical expectations, I advance with the following testable hypotheses:

***H5**: Consortium-backed LBO targets show higher levels of growth in comparison to sole-sponsored LBO targets.*

***H6**: Consortium-backed LBO targets show higher levels of profitability in comparison to sole-sponsored LBO targets.*

A critical policy issue concerning club deals is whether they enhance economic efficiency. The standard empirical approaches to measure possible improvements in economic performance of target companies in buyouts consist of analysing the impact of those deals on stock prices or accounting profits. Harris *et al.* (2005) explain why these methods are, by themselves, insufficient. First, economists are increasingly sceptical about the "efficient markets" hypothesis, which asserts that asset prices fully reflect all available information and changes in share prices following announcements of buyouts reflect changes in future real performance or economic efficiency. Second, policy decisions regarding (in this case) club deals hinge to a large extent on their economic efficiency (i.e., the "social" returns to buyouts), and to a lesser extent on their effects on share prices or profitability (i.e., the "private" returns to buyouts). To overcome these limitations when analysing economic efficiency of club deals, Harris *et al.* (2005) assert that a more desirable methodological approach is to assess the productivity of target companies before and after the transaction.

Thus, productivity is arguably a crucial dimension in measuring the economic impact of club deals in LBOs. U.S. and U.K. evidence shows significant increases in productivity following a buyout (Wilson *et al.*, 2012; Harris *et al.*, 2005). After buyouts, managers are expected to seek out more efficient uses of factors of production due to management equity participation, the pressure of high debt servicing levels, and a better corporate governance and monitoring framework. However, productivity prior to the buyout need not be high. Firms that are less productive compared to their peers, could be more attractive LBO targets, as creating value by increasing the productivity of these firms is likely easier. Indeed, Harris *et al.* (2005) find that plants experiencing a management buyout are less productive than comparable plants prior to the buyout, but

experience a substantial increase in total factor productivity after the change in ownership. These post-buyout productivity gains are pervasive across industries and suggest that management buyouts are a successful mechanism for reducing agency costs and enhancing economic efficiency. Whether consortium-backed buyouts show higher levels of productivity vis-à-vis sole-sponsored LBOs, is not immediately clear, and to my knowledge this has not yet been empirically tested in previous academic literature. The theory about club deals in this section implies that private equity consortiums provide more intense monitoring and higher-quality support during the investment phase, as well as higher debt levels, when compared to sole-sponsored private equity acquirers. This could lead to higher productivity growth.

If a private equity consortium is better able to create value by increasing the productivity of its target, the club has an incentive to acquire a target with low ex-ante productivity, as there are more opportunities to increase productivity when productivity prior to the buyout is low. Therefore, it could be the case that club deal targets are even less productive than sole-sponsored LBO targets prior to the buyout. This makes it difficult to hypothesise about the absolute levels of productivity after a club deal. Fortunately, the metric of interest when analysing the improvements in economic efficiency after a buyout is productivity *growth* (see Harris *et al.*, 2005). Therefore, in my seventh hypothesis, I theorize private equity consortiums can help managers to grow productivity even faster than sole-sponsored private equity buyers:

> ***H7:*** *Consortium-backed LBO targets show higher levels of productivity growth in comparison to sole-sponsored LBO targets.*

2.2 Other possible motives for club formation

Section 2.1 examined both the value creation and the collusion rationales for club bidding. However, other incentives may be important as well. Potential benefits of a club to private equity acquirers include the ability to pool resources and information,

as well as the ability to spread risks, enabling firms reluctant to finance high-risk projects internally to contemplate bids that would otherwise not be possible (Marquez & Singh, 2013). Indeed, Boone and Mulherin (2011) find evidence that the use of consortiums by private equity firms is related to proxies for scale, risk and bidder expertise, indicating that clubs are formed for competitive, non-collusive reasons. These alternative economic reasons for club formation each have their own effect on abnormal returns to target shareholders and on the ex-post performance of target companies. Thus, in order to attribute empirical evidence to collusion or value creation, I need to look at these rationales as a crosscheck. Below, I describe the three other motives for club formation in more detail, and formulate hypotheses to examine their likelihood.

2.2.1 Risk reduction

If firms are reluctant to finance high-risk projects internally, risk reduction can be a motive for alliance formation. Hence, diversification motives may induce private equity funds to syndicate sufficiently risky deals. Financial economic literature suggests that under the assumption of perfect capital markets firm-level risk reduction activities are not optimal for diversified shareholders, as they can diversify their own portfolios. However, market frictions may make risk reduction valuable to shareholders. Smith and Stulz (1985) find that among firms facing a convex tax function, a reduction in firm volatility results in significant tax reductions and increased expected post-tax value of the firm. Moreover, the authors argue that expected bankruptcy costs can induce firms to reduce risk, as reducing the variability of the future value of the firm decreases those costs, which in turn benefits shareholders. The risk reduction theory stipulates a positive relation between target firm's risk and club formation between bidders, which leads to the following testable hypothesis:

> ***H8**: There is a positive relation between the target firm's risk and the probability of club formation between private equity bidders*

If coalitions enable the bidders to spread risks and therefore allow them to contemplate bids that would otherwise not be possible, this rationale for club bidding should increase rather than decrease the number of competitors in an auction. Hence, the use of consortiums will be associated with higher prices relative to a case where club bidding is not allowed. Following this theory, differences in the ex-post performance of private equity consortium targets and sole-sponsored private equity targets should all be attributable to target firm characteristics.

2.2.2 Resource pooling

Literature on strategic alliances in general, and club deals specifically, often mentions resource pooling as a possible economic rationale for club bidding (Officer *et al.*, 2010; Boone & Mulherin, 2011; Marquez & Singh, 2013; Kim & Palia, 2014). According to this theory, private equity coalitions may arise if they enable several bidders, none of whom have the financial resources to acquire the target alone, to bid by joining their financial resources. If club deals are a way for private equity bidders to undertake otherwise unattainable large-scale investment projects, I expect a positive relationship between the deal size and the probability of forming a club:

> ***H9****: There is a positive relation between deal size and the probability of club formation between private equity bidders*

This rationale for club bidding should, again, increase the number of competitors and the acquisition premium. Differences in ex-post performance should solely be attributable to target firm characteristics.

2.2.3 Information pooling

Finally, coalitions may enable bidders to share information. Lerner (1994) argues that in venture capital investments, deal syndication allows for superior selection of investments, as two or more venture capital investors combine their superior asymmetric information. In the market for LBOs, one might expect the asymmetric

information to be beneficial in target firms with large number of intangibles such as R&D (Kim & Palia, 2014). Boone and Mulherin (2011) use the standard deviation of the target's stock return as a proxy for information complexity, and argue that bidding by consortiums would be selected when complex information makes information sharing more beneficial.[6] If the information pooling theory holds, I expect a positive relationship between the proxies for information complexity and the probability of forming a club.

> ***H10**: There is a positive relation between information complexity and the probability of club formation between private equity bidders*

Similar to collusion, information pooling reduces the potential number of competitors in an auction. However, if the total level of information in the market is kept constant, then joint bidding can increase the bids due to information pooling. Still, Mares and Shor (2008) show that the reduction in competition effect always dominates. Hence, the information pooling theory predicts lower acquisition premia for club deals than for sole-sponsored LBOs. As, according to this theory, the formation of consortiums allows for superior selection of targets, the theory further predicts higher ex-post performance of target companies, attributable to target firm characteristics.

[6] See Chapter 3 for a detailed explanation of all proxy variables used in this paper.

CHAPTER 3 - Data sources and description

This chapter is organized as follows. Section 3.1 describes the process of forming the base sample of mergers and acquisitions of publicly traded targets from which all datasets used in this research are drawn. Section 3.2 zooms in on the subset of private equity acquisitions in this sample and discusses the explanatory variables needed in determining the abnormal returns to target shareholders in such deals. Section 3.3 explains the process of collecting ex-post performance data of target companies, enabling me to further assess the economic impact of the club deals in the sample from Section 3.2. The data collected up until this point should enable me to examine both the collusion and value creation rationales for club formation. Finally, Section 3.4 describes the data needed to look at other economic reasons for club formation posited in the literature: risk reduction, resource pooling, and information pooling.

3.1 Forming the base sample

My sample of mergers and acquisitions comes from ThomsonONE's Securities Data Corporation (SDC). I start with all mergers and acquisitions announced between 1 January 2000 and 1 January 2016. I further require the deal to be completed by the end of February, 2016, the deal value to be greater than $50 million, and include only those deals where the acquirer is seeking more than 50% of the shares outstanding. The targets must be publicly traded in any stock exchange in the United States or Europe (excluding Russia and Turkey). These screens provide a preliminary sample of 2,006 deal announcements in Europe, and 3,697 deal announcements in the United States.

Next, I determine which of these deals can be classified as LBOs. Boone and Mulherin (2011) claim a distinguishing part of their research is a detailed classification of the bidders in their sample. The authors use source takeover documents and media stories to classify each deal, as opposed to merely relying on the deal synopsis in SDC, as do Officer *et al.* (2010). Following their example, I code indicator variables for whether a private equity firm is involved in the deal and for whether multiple private equity firms are involved. This coding is done by hand for the subsample of deals SDC flags as

"going private". For each of the 1,263 takeovers in this sample, I meticulously scrutinize press releases and media stories on MergerMarket, as well as the transaction synopses from SDC. From these sources, I determine whether the winning bidder was a single private equity firm (Sole PE deal), a consortium of private equity firms (Club deal), or a private firm other than a private equity firm (Other non-public). In the remainder of the transactions, i.e. those which SDC does not flag as "going private", the winning bidder is a publicly traded corporation. I classify these bidders accordingly (Public bidder). These four categories of bidders are also used in the research by Boone and Mulherin (2011) and Officer *et al.* (2010).

This procedure of determining the winning bidder indeed differs in significant dimensions from the procedure used by Officer *et al.* (2010). For the Single and Consortium categories, press releases and media stories on MergerMarket show some discrepancies with SDC information. In particular, SDC synopses under-report private equity (club) deals. Most often, news stories reveal that there were multiple acquirers, while SDC information denotes only one acquirer. In other cases, the reported bidder in SDC was a portfolio firm of a private equity firm, and the private equity firm turned out to be the ultimate bidder. One specific case calls for particular attention. In November 2010, ProSight Specialty Insurance acquired NYMAGIC, a New York-based insurance company. This acquisition was backed by the private equity shareholders of ProSight Specialty Insurance: TPG Capital and GS Capital Partners. Two private equity acquirers were involved in this acquisition, but these firms were already joined in a club when acquiring ProSight Specialty Insurance, and did not form a coalition specifically for the acquisition of NYMAGIC. This causes ambiguity, especially when testing for collusion: as this club already existed prior to the acquisition, its formation could not limit the number of competing bidders in the auction for NYMAGIC. To keep my dataset as clean as possible, I delete this acquisition. Furthermore, I delete those acquisitions in which one PE firm buys another. Boone and Mulherin (2011) exclude REITs and bankruptcies from their sample. In my sample, REIT deals are classified as 'other non-public' deals and therefore are excluded from the private equity sample. Bankruptcies, on the other hand, are not excluded from the sample. Certain private equity firms, e.g. Cerberus Capital Management, specialize in

"distressed investing", where capital is invested in companies or government entities that are experiencing financial or operational distress, default, or are under bankruptcy. This research analyses the economic impact of the entire spectrum of private equity firms engaging in public-to-private transactions. Hence, and similar to Officer *et al.* (2010), bankrupt targets remain in-sample. Ultimately, I find a total of 414 takeovers in the U.S., and another 227 takeovers in Europe, where the winning bidder was a private equity firm or a consortium.

As this research is solely focused on private equity acquisitions, I continue by deleting all deals from countries where I can find neither sole-sponsored nor consortium-backed private equity deals. This leaves 1,829 takeovers and 15 countries in my analysis.[7] The time-series distribution of this sample of 1,829 acquisitions of publicly traded targets is included in Appendices A and B. Appendix table 1 displays the distribution of my European sample by year and acquirer type, Appendix table 2 shows the same data for my American sample. The merger wave of 2003-2008 is evident in both tables, as is the start of another merger wave in 2014. Total deal value in Europe rises from $85,483 million in 2013 to $245,989 million in 2014, an increase of almost 290%. The increase in the U.S. in the same years is slightly lower but still substantial at ~105%. The intensity of private equity deals relative to other types of deals peaks in 2006, when 19.6% of all deals in Europe and 18.7% of all deals in the U.S. are private equity deals. Not surprisingly, this coincides with the peak of the aforementioned LBO wave. However, whereas deal activity by public bidders unambiguously rises again in 2014 and 2015, private equity is struggling to keep up. In Europe, private equity deal value as a percentage of overall deal value drops from 16.7% in 2010 to an underwhelming 0.7% in 2015. In the United States, private equity deal value as a percentage of overall deal value drops from 24.4% in 2013 to 6.0% in 2015.

[7] The countries included in this research are: Belgium, Denmark, Finland, France, Germany, Republic of Ireland, Italy, Jersey, Luxembourg, the Netherlands, Norway, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

3.2 Abnormal returns to target shareholders

3.2.1 Sample specification

Next, I zoom in on the data that is the focus of this research: the subsample of private equity deals. In order to test the effect of these private equity deals on acquisition premia, I need sufficient information on stock prices. To this end, both Officer *et al.* (2010) and Boone and Mulherin (2011) use the Center for Research in Security Prices (CRSP) database. Unfortunately, this database only contains American stocks. Therefore, I continue to match my sample of 642 private equity deals to the Datastream database, with which one can search for daily stock prices from both America and Europe. Similar to Officer *et al.* (2010), I require that the target firm have a stock price in the Datastream database at least once in the seven days prior to the announcement date reported by SDC, and I require a delisting event within one year of the deal effective date in SDC. This ensures that all transactions in the dataset are completed acquisitions. Moreover, it excludes spin-offs from the sample. Boone and Mulherin (2011) restrict their sample to takeovers where the price of the target on the day prior to the takeover is $5 or more, but Officer *et al.* (2010) make no such restriction. As the metric of interest in my research is stock returns, which can be calculated for high-priced stocks as well as low-priced stocks, and this restriction would delete a significant part of my sample, I decide not to impose this restriction. This procedure leaves a sample of 571 completed acquisitions of publicly traded targets by private equity firms, of which 187 are club deals. Table 1 shows this final sample of private equity deals, divided by target nation. The table reveals that the majority of European private equity activity originates in the U.K.: 64% of the total number of deals and 69% of the total deal value is accounted for by British targets. The number of club deals originating in the U.K. is slightly lower at 51% of total number of European club deals, however the deal value ratio is similar at 69%. This is in accordance with the notion that the British private equity industry is the largest and most developed in Europe, second only to the U.S. in global importance (BVCA, 2005).

Table 1
Number of takeovers and total deal value per country in the sample period of 2000 to 2015. This table includes the entire sample of acquisitions of publicly traded targets by private equity acquirers from SDC, for which share price data is available in Datastream. The classification into countries is based on the location of the corporate headquarters of the target. Included in the analysis are the U.S. and all European countries, excluding Russia and Turkey. Included in the table are all countries that result in at least one private equity deal, club or sole-sponsored. The Sole PE deal/Club deal classification is done by hand, using press releases and media stories on MergerMarket, as well as the transaction synopses from SDC. If these sources contain the name of *only one* private equity firm, then the deal is classified as a *Sole PE deal*. If either one of these sources contains the names of *at least two* private equity firms, then the deal is classified as a *Club deal*. In rare cases, the private equity acquirer is accompanied by a strategic buyer. This has no effect on the classification, as only the number of private equity firms is counted. *Total deal value* is the annual sum of the value of transactions as reported by SDC ($m).

Country	Deals by private equity firms			
	Sole PE deals		Club deals	
	No. of deals	Total deal value	No. of deals	Total deal value
Germany	3	1,849	-	-
Belgium	1	917	1	868
Finland	1	239	1	78
Italy	1	590	1	753
Jersey	-	-	1	504
Luxembourg	-	-	1	2,279
Switzerland	-	-	1	411
Denmark	3	1,100	2	4,423
France	6	1,985	2	222
Ireland-Rep	5	4,715	2	2,937
Norway	5	1,743	2	736
Spain	2	906	3	8,592
Sweden	10	3,509	4	9,710
Netherlands	5	3,806	7	5,814
United Kingdom	94	45,787	29	83,086
United States	248	259,361	130	451,706
Total	384	326,507	187	572,122

Table 2 displays the distribution of the final American and European private equity samples by year and acquirer type. The LBO wave of 2006/2007 is clearly visible in both samples: club deal activity in both geographical regions spikes in 2006, in number of deals as well as total deal value. The subsequent collapse of the global LBO market in 2008 is visible in both samples as well. Whereas sole-sponsored LBO activity only begins to decline in 2008, club deal activity already declines (slightly) in 2007.

Table 2
Time-series distribution of the entire sample of private equity acquisitions in the sample period of 2000 to 2015. This table includes all acquisitions of publicly traded targets by private equity acquirers from SDC, for which share price data is available in Datastream. The classification into years is based on announcement dates. The buyer group classification of all deals is done by hand, using press releases and media stories on MergerMarket, as well as the transaction synopses from SDC. The methodology of this classification is explained in the legend to Table 1. *Total deal value* is the annual sum of the value of transactions as reported by SDC ($m).

Year	All deals		Deals by European private equity firms				Deals by American private equity firms			
			Sole PE deals		Club deals		Sole PE deals		Club deals	
	No. of deals	Total deal value	No. of deals	Total deal value	No. of deals	Total deal value	No. of deals	Total deal value	No. of deals	Total deal value
2000	37	13,982	10	3,649	5	1,521	15	5,208	7	3,604
2001	19	8,422	11	2,396	2	3,412	3	2,120	3	493
2002	19	9,919	10	6,755	-	-	5	1,744	4	1,420
2003	30	13,162	11	6,010	3	4,323	12	2,469	4	361
2004	26	27,499	5	2,420	6	6,942	10	10,211	5	7,926
2005	50	64,193	12	5,255	9	18,088	15	12,147	14	28,703
2006	82	273,919	17	10,138	11	39,701	29	44,744	25	179,335
2007	75	232,557	17	17,290	9	33,901	30	51,567	19	129,799
2008	29	14,214	8	2,071	3	3,954	14	5,448	4	2,741
2009	20	8,504	6	1,403	1	64	11	2,461	2	4,577
2010	43	42,827	7	1,914	3	5,873	25	19,009	8	16,031
2011	38	36,775	6	636	1	868	16	11,677	15	23,593
2012	28	14,517	5	1,579	-	-	18	6,864	5	6,073
2013	28	67,148	-	-	1	411	22	55,560	5	11,177
2014	27	38,450	9	4,871	2	592	10	10,391	6	22,597
2015	20	32,540	2	758	1	765	13	17,740	4	13,276
Total	571	898,629	136	67,146	57	120,415	248	259,361	130	451,706

Moreover, club deal activity shows worse recovery than sole sponsored private equity deal activity in subsequent years. Specifically, there are 338 LBOs in my combined sample in the eight-year period from 2000 to 2007, of which 126 (37%) are club deals. For the eight-year period from 2008 to 2015, there are 223 LBOs in my sample, of which 61 (26%) involve private equity consortiums. Measured in total deal value the ratios are 71% to 44%, respectively. This declining trend seems to follow the onset of media and government scrutiny of private equity club deals.

3.2.2 Market return

To calculate the acquisition premia paid to target shareholders in these private equity transactions, I need data on the respective market returns of the countries in which the transactions take place.[8] To this end, I retrieve daily prices of the Russell 3000 and MSCI Europe indices, for the period 1 November 1999 to 1 March 2016, from Datastream. The Russell 3000 index is a capitalization-weighted stock market index that seeks to be a benchmark of the entire U.S stock market. It measures the performance of the 3,000 largest publicly held companies incorporated in the U.S. and represents approximately 98% of the US public equity market (London Stock Exchange Group, 2016). The MSCI Europe Index captures large and mid-cap representation across 15 developed markets countries in Europe.[9] With 444 constituents, the index covers approximately 85% of the public equity in these European markets (MSCI, 2016). Because of the high coverage of both indices in their respective markets, they are a good proxy of the market model for the companies in my sample.

[8] Refer to Chapter 4 for a complete overview of the methodology used in this research.
[9] All countries included in the European part of my analysis are developed market countries (see Table 1). In fact, 13/15 countries included in my dataset are also part of this index. I assume the stock market returns in the other two countries (Jersey and Luxembourg, both contributing 1 deal to my dataset) are similar and can also be proxied by the MSCI Europe index.

3.2.3 Prominent acquirers

I further parse each acquisition in the Club deal category of my data to determine whether one or more of the bidders was a "prominent" private equity firm. Only those private equity acquirers that are likely to have the market power to meaningfully influence competition and prices should be classified as prominent. In my classification, I largely follow the methodology of Officer *et al.* (2010). I begin with the names of the 50 largest private equity firms in the world according to the PEI 300 rankings, available in the May 2015 issue of *Private Equity International* (PEI) magazine. The 2015 PEI 300 rankings are based on the amount of private equity direct investment capital a firm has raised between 1 January 2010 and 1 April 2015. However, U.S. players dominate the top positions in the PEI 300. The top 10 consists of 9 U.S. firms and 1 European firm (CVC Capital Partners). The top 50 contains only 13 European firms. This leads me to theorize that European private equity firms ranked 50^{th} to 100^{th} might also have substantial market power, at least in the European private equity markets. Therefore, I add these firms (Ardian, Nordic, PAI Partners, First Reserve Corporation, HitecVision, Equistone Partners Europe, Montagu Private Equity, AlpInvest Partners and Littlejohn & Co) to my list of prominent private equity firms, but only for the European markets. Lastly, I follow the methodology of Officer *et al.* (2010) by adding the names of the in-house private equity units of the investment banks Merrill Lynch, Morgan Stanley and JP Morgan, as well as historically prominent LBO sponsors Forstmann Little and HM Capital Partners. I find 29 cases within my sample of 57 European club deals where one of the bidders is a prominent private equity firm (51% of the time) and 75 such cases within my sample of 130 U.S. club deals (58% of the time). A list of all prominent private equity firms can be found in Appendix C.

3.2.4 Frequent acquirers

In Europe, the average (median) number of private equity acquirers per club deal is 2.65 (2.00), whereas in the United States this is 2.62 (2.00). The largest number of winning private equity bidders in a club deal is 6 in Europe, and 11 in the United States.

In Table 3 I report information on the most frequently occurring private equity acquirers in my sample. A total of 20 different private equity firms emerge as the winning bidder in my sample at least 8 times. It is noteworthy that the five most frequent occurring U.S. private equity bidders, each winning at least 15 bids in the sample, are TPG Capital, Blackstone Group, KKR, GS Capital Partners and The Carlyle Group. These are the same private equity firms that were the subject of the U.S. Department of Justice inquiry and the subject of private litigation. Of the 20 firms in this sample, 15 are American firms and only 5 are European. This difference is mainly a result of the American private equity market being (much) larger in size than the European private equity market (see Table 2). However, private equity firms are not bound to the geographical region their headquarters is located in. Many of the larger American private equity firms are also active in Europe, and vice versa.

Table 3
Frequent private equity bidders. This table reports private equity firms that made eight or more winning bids in the sample of 571 private equity takeovers. Whether a private equity firm is prominent is decided with the methodology described in Section 3.2.2. *Sole PE deals* and *Club deals* are defined in the legend to Table 1.

	Private equity firm	Headquarters	Prominent PE	Sole PE deals	Club deals	Total
1	TPG Capital	Fort Worth (US)	Y	8	20	28
2	Blackstone Group	New York (US)	Y	11	8	19
3	AlpInvest Partners	Amsterdam (NL)	Y	0	16	16
4	Kohlberg Kravis Roberts & Co	New York (US)	Y	3	13	16
5	Goldman Sachs Capital Partners	New York (US)	Y	1	14	15
6	The Carlyle Group	Washington (US)	Y	8	7	15
7	Thoma Bravo	Chicago (US)	Y	7	8	15
8	Apax Partners	Paris (FR)	Y	9	5	14
9	Apollo Global Management	New York (US)	Y	10	3	13
10	Ardian	Paris (FR)	Y	1	11	12
11	Bain Capital	Boston (US)	Y	3	9	12
12	Golden Gate Capital	San Fransisco (US)	N	7	5	12
13	NB Private Equity Partners	St. Peter Port (GG)	N	0	12	12
14	Leonard Green & Partners	Los Angeles (US)	Y	5	6	11
15	Hellman & Friedman Capital	San Fransisco (US)	Y	3	7	10
16	Providence Equity Partners	Providence (US)	N	3	7	10
17	3i Group	London (UK)	N	6	3	9
18	Silver Lake Partners	Menlo Park (US)	Y	2	7	9
19	Permira Advisers	London (UK)	Y	2	6	8
20	Vector Capital	San Fransisco (US)	N	5	3	8

Table 4

Cross-participation matrix of private equity acquirers. Table shows the number of times the ten most frequent private equity bidders have undertaken club deals with one another. Other prominent private equity firms these ten firms frequently partner with, not mentioned for reasons of brevity, include Silver Lake (9 separate coalitions), Permira (7 separate coalitions), Bain Capital (7 separate coalitions), and Hellman & Friedman (6 separate coalitions).

	TPG Capital	AlpInvest Partners	Black-stone Group	KKR & Co	GS Capital Partners	Ardian	The Carlyle Group	Apollo Global Manage.	Thoma Bravo	Apax Partners
AlpInvest Partners	4	…	…	…	…	…	…	…	…	…
Blackstone Group	3	1	…	…	…	…	…	…	…	…
KKR & Co	3	5	2	…	…	…	…	…	…	…
GS Capital Partners	3	3	2	3	…	…	…	…	…	…
Ardian	3	2	1	3	3	…	…	…	…	…
The Carlyle Group	1	0	1	0	1	1	…	…	…	…
Apollo Management	1	0	0	1	0	1	0	…	…	…
Thoma Bravo	0	0	0	0	0	0	0	0	…	…
Apax Partners	0	1	0	0	0	0	0	0	0	…

Moreover, 15 of the 20 private equity firms in Table 3 can be classified as prominent private equity firms using the methodology described above. The top 10 consists wholly out of prominent private equity firms (3 European and 7 American). I continue to create a cross-participation matrix, shown as Table 4, documenting the number of times these firms form clubs amongst each other. TPG Capital, the most frequent private equity acquirer in my sample, partners three times or more with the other four most frequent private equity acquirers in sample (Blackstone, AlpInvest, KKR, and GS). Other prominent private equity firms these ten firms often partner with, not mentioned in Table 4, include Silver Lake (9 separate coalitions), Permira (7 separate coalitions), Bain Capital (7 separate coalitions), and Hellman & Friedman (6 separate coalitions). Similar to Officer *et al.* (2010) I find that my most prominent private equity firms are more likely to partner with each other than with less prominent private equity firms. Officer *et al.* (2010) argue that this finding is consistent with the prima facie concern

about collusion lowering deal prices: the most prominent private equity firms, which likely have the market power to effectively collude, are the most likely to partner in LBO club deals. However, the large average size of prominent private equity club deals could be an indication that the use of a consortium is directly related to deal size, even for prominent PE firms. Measured in total transaction value, the deal size of an average sole-sponsored deal by a prominent private equity acquirer in the U.S. (Europe) is $1,839 million ($679 million); whereas the deal size of an average club deal by prominent acquirers is $5,155 million ($2,378 million). Furthermore, it is possible that prominent private equity firms often join forces with each other for the purpose of value creation. Chapter 2 explains that firms form alliances to facilitate inter-firm learning and to gain access to the other firm's capabilities. It is not unlikely that the private equity firms classified as prominent have achieved this dominant position in their industry due to superior asymmetric capabilities. In this case, the synergies between these prominent private equity partners and the target firm are likely to be large.

3.2.5 The level of takeover competition

In order for me to empirically test the value creation model of Marquez and Singh (2013), I need to analyse the relationship between acquisition premia in private equity club deals and the level of takeover competition. The traditional measure of competition in a corporate takeover is the number of publicly announced bids for the target. However, Boone and Mulherin (2007) explain that much of the competition in corporate takeovers occurs prior to the public revelation of a bid. This is better understood when one takes a closer look at the auction process. Such a process begins when a selling firm and its investment banker contact a number of potential bidders to gauge their interest in a possible acquisition of the target. Each potential bidder that moves forward is required to execute a confidentiality agreement whereby the bidders receive non-public information but agree not to make an unsolicited bid. The remaining interested parties are subsequently requested to submit a preliminary, non-binding acquisition proposal, also known as an indication of interest. A subset of these bidders is asked to submit binding offers from which the winning bidder is determined.

Indeed, Boone and Mulherin (2007) find that public takeover activity reveals only a fraction of the actual takeover competition. In their sample of 400 takeovers during the 1990s, the authors find that half of the target firms are sold in an auction with multiple potential bidders; a dramatically higher rate of competition than suggested in prior research. Following their methodology, I study the level of takeover competition both in the pre-public bid period to bid announcement as well as in the period after bids are publicly announced. For my subsample of club deals, I estimate the same five levels of competition as used by Boone and Mulherin (2007) in their classification of takeovers: (1) the number of potential bidders contacted by the selling firm and its investment banker; (2) the number of potential bidders that execute a confidentiality agreement with the target; (3) the number of potential bidders submitting a non-binding acquisition proposal for the target; (4) the number of potential buyers making written private bids; and (5) the number of actual bidders that submit a formal offer that was announced in the financial media. These measures show the level of competition at the various stages in the takeover process as described above. The first is a somewhat noisy measure of bidder competition as potential bidders and the target firm incur little costs in entering the "contact" stage of the auction process. However, the remaining measures do pose costs to both the bidders and the target firm and therefore represent real competition. For example, in the "confidentiality agreement" stage, the target bears the cost of revealing public information, whereas the potential bidders need to hire investment banks and legal advisors (Boone & Mulherin, 2011).

To retrieve this data, I review filings from the EDGAR system of the U.S. Securities and Exchange Commission for each club deal acquisition in my sample. The details of the process of each acquisition can be found in the background section of 14A and S-4 filings (for mergers) and 14D filings (for tender offers). Out of my sample of 130 U.S. club deals, I lose 20 announced takeovers for this part of my analysis, as these companies do not have takeover documents available on SEC EDGAR. Unfortunately, it is not possible to gather this data for European club deals, and I have to forgo my European sample of club deals completely when testing Hypothesis 4. The acquisition of Texas Genco Holdings in 2004 serves as an example of my classification of takeover

competition. The SEC PREM14C proxy filing dated September 3, 2004 reports that the target and its investment bank contacted a total of 107 potential buyers, comprised of 58 financial entities and 49 strategic entities. 38 potential buyers expressed interest and agreed to enter into a confidentiality agreement, including 24 financial entities and 14 strategic entities. Ten preliminary indications of interest were received, three bidders made binding private offers and a consortium of Blackstone, Hellman & Friedman, KKR and TPG was the winning bidder.

My average estimation of takeover competition in U.S. club deals (N = 110) is as follows. Roughly 32 potential bidders are contacted for the representative takeover. Of these 32 potential acquirers, on average 13 sign confidentiality agreements; 4.2 make a none-binding offer for the target; 1.6 make a binding private offer; and the average number of public offers is 1.1. Using this methodology, Boon and Mulherin (2011), find that the level of competition in deals in which private equity consortiums are the winning bidders is as great as or greater than that for single private equity deals. This is inconsistent with a collusive explanation for consortium formation. In this analysis, I decide not to estimate the takeover competition in U.S. sole-sponsored LBOs. The purpose of this part of my research is to test Hypothesis 4, stating that the acquisition premium in a club deal is positively related to the potential number of bidders. Measuring differences in the level of takeover competition between club deals and sole sponsored LBOs, though interesting, falls outside of the scope of this thesis. Moreover, I cannot contribute to the analysis by Boone & Mulherin (2011) by measuring the difference in takeover competition in Europe, as the data is not available for my European sample.

3.2.6 Additional explanatory variables and further sample size reduction

The first step in analysing the abnormal returns to target shareholders in private equity deals is conducting an event study, as is further explained in Chapter 4. The next step is examining whether any observed differences in the abnormal returns between sole-sponsored LBOs and club deals are statistically significant. To this end, I use several additional explanatory variables. Following the methodology of Boone and Mulherin (2011), I initially used my whole sample of 558 private equity deals, controlling only for target size and acquisitions in which the payment was all cash. However, with an R-squared measure always lower than 5%, I was not able to explain target returns to a satisfactory level. It is possible that differences in acquisition premium paid originate in different types of targets being acquired by (prominent) clubs versus sole-sponsored acquirers. In an effort enhance the reliability of my results, I investigate observable target characteristics that the literature has found to be important in explaining returns to target shareholders, while acknowledging that I cannot measure differences in dimensions that are unobservable to the econometrician. The inclusion of these control variables reduces my sample size to 450 private equity acquisitions, of which 135 are club deals. In fact, the sample is the same as that described in Section 3.4, where I describe the sample set used to examine other possible motives for club formation. Panel A, B, and C of Table 9 in Section 3.4 provide extensive summary statistics for three variables that are used in this part of the analysis as well (target size, target standard deviation of stock return, and target leverage). Summary statistics of variables not discussed in Section 3.4 are presented in Table 5 below. The far right columns in Table 5 present the differences in the means of the two samples and the corresponding level of significance, as calculated with a two-sided *t*-test.

The first explanatory variable used is, again, target size. Size is measured as the natural logarithm of the market value of equity in the fiscal year preceding the announcement date of the takeover, and is retrieved from Compustat. As explained in Section 3.4, club deal targets are significantly larger than targets of sole-sponsored private equity deals. This fact is consistent with the notion that club deals are a way for private equity firms to share risk inherent in large transactions, and potentially important for the

interpretation of the results from the event study, as previous research has shown target size to be negatively related to target shareholder gains (see, e.g., Officer *et al*., 2010). I include a dummy variable equal to 1 for acquisitions in which the payment is all cash as well. The information on deal consideration is retrieved from SDC. Previous research (e.g., Boone & Mulherin, 2011) indicates that the use of cash has a positive and significant effect on target returns. However, Table 5 shows no significant difference in the use of case between either club deals or prominent club deals and sole-sponsored buyouts. The third control variable is target profitability, measured as the ratio of EBIT to total assets (from Compustat) in the fiscal year prior to the deal announcement. Table 5 indicates that prominent private equity clubs acquire targets with significantly higher ex-ante profitability than targets of sole-sponsored buyouts. Ex-ante more profitable firms could demand higher acquisition premia than less profitable firms.

Next, I consider a measure of target leverage - the ratio of the book value of total debt to the sum of the book value of debt and the market value of equity, in the fiscal year proceeding deal announcement, from Compustat - to explain differences in acquisition premia paid. As explained in Section 3.4.1, targets in sole-sponsored private equity deals have statistically significant *higher* values for this variable (LRATIO). I also consider the Tobin's Q ratio of the target. I use the definition of Kaplan and Zingales (1997): the market value of assets divided by the book value of assets, where the market value of assets is defined as the book value of assets plus the market value of common equity less the sum of the book value of common equity and balance sheet deferred taxes. All data is again retrieved from Compustat. As is shown in Table 5, I cannot reject the null hypothesis that the means of the sole PE sample and the (prominent) club deal sample are equal.

Finally, I consider stock-return-based measures of pre-deal performance and risk. Following Officer *et al.* (2010), I measure pre-deal target risk with the standard deviation of stock returns calculated from 273 days before the announcement date to 20 days before the announcement date; and pre-deal stock-return performance using buy-and-hold stock returns for trading day -294 to day -43 relative to the announcement

date.[10] Officer *et al*. (2010) find weak evidence that club deal targets have lower return volatility. Both measures are calculated using daily stock price data from Datastream. Table 9 in Section 3.4 shows weak evidence that the null hypothesis that the difference between the standard deviation of stock returns of club deal targets and sole-sponsored targets equals zero can be rejected. Table 5 shows no such evidence for the buy-and-hold stock returns.

Table 5
Summary statistics of explanatory variables used in analysing abnormal returns (number of separate companies, mean, median, and standard deviation). *Sole PE targets* and *Club targets* denote targets of sole-sponsored LBOs and club deals, respectively. *Cash* is a dummy variable equal to 1 for acquisitions in which the payment is all cash. *Profitability* is target EBIT/total assets calculated in the fiscal year preceding the announcement date. *Prior 12-month return* is the compound return to the target's stock over the one year immediately preceding the beginning of the event window. *Tobin's Q* is the target's Q ratio (defined in Kaplan and Zingales, 1997), calculated in the fiscal year preceding the announcement date. The far right columns provide the difference between the mean value of the given variable in the (prominent) club deal sample and the sole PE sample. ***, **, and * indicate that a two-sided *t*-test, testing the null hypothesis that the means of the sole PE sample and the (prominent) club deal sample for that particular variable are equal, can be rejected at the 1%, 5%, and 10% levels, respectively.

Panel A: Combined American and European sample - Sole vs. Club										
Explanatory variable	Sole PE targets				Club targets				*t*-test	
	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	Club - Sole	
Cash	315	0.848	1.000	0.360	135	0.822	1.000	0.384	(0.025)	
Profitability	315	0.073	0.068	0.118	135	0.090	0.082	0.085	0.016	
Prior 12-month return	315	0.158	0.115	0.586	135	0.207	0.137	0.507	0.048	
Tobin's Q	315	2.009	1.672	1.384	135	2.211	1.859	1.510	0.202	

Panel B: Combined American and European sample - Sole vs. Prominent club										
Explanatory variable	Sole PE targets				Club targets				*t*-test	
	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	Prom - Sole	
Cash	315	0.848	1.000	0.360	66	0.833	1.000	0.376	(0.014)	
Profitability	315	0.073	0.068	0.118	66	0.110	0.091	0.098	**0.036**	***
Prior 12-month return	315	0.158	0.115	0.586	66	0.174	0.157	0.436	0.015	
Tobin's Q	315	2.009	1.672	1.384	66	2.648	2.218	1.821	0.639	

[10] This measures the buy-and-hold stock returns for the twelve months prior to the first day of the event window in the event study.

3.3 Ex-post performance of target companies

3.3.1 Gathering data

Next, I strive to assess the real impact of the club deals in my sample from Section 3.2 on the investee company and its stakeholders. To this end, I extract accounting data for the respective targets of those club deals, as well as for the targets of the sole sponsored private equity deals in the sample, which will serve as my control sample. From the company accounts of each target firm in my sample, I collect yearly data on sales (turnover), number of employees, staff costs, profits (EBITDA, EBIT, and net income), total assets, corporate taxes, interest payable, dividends, and retained profit. Following previous studies (Scelatto & Ughetto, 2013; Cressy *et al.*, 2007), a requirement for my final sample is that firms have to report complete financial accounting data for the two year before to three years after the fiscal year in which the acquisition was completed. To extract this data, I first use the Orbis database provided by Bureau van Dijk, which reports financial accounting data for more than 200 million public and private companies worldwide. The data is standardized using 26 balance sheet items and 25 income statement items, enabling cross-border comparisons. My sample of private equity deals as used in Section 3.2 contains 571 different targets.[11] Of those 571, 554 can be found in the Orbis database using a "Bureau van Dijk ID number". The requirement that firms have to report complete financial accounting data for the three years after the fiscal year in which the acquisition was completed implies that the buyout has be completed by December 2012. I continue to delete 74 companies from my sample for which the completion date falls in 2013, 2014 or 2015.

Unfortunately, the ex-post performance data as retrieved from Orbis is scarce, and for the target companies that do have accounting data available, many data points are often missing. This leaves me with too small a sample. Therefore, in the next phase of the data collection, I retrieve the missing data by hand. However, the legal obligation for

[11] As explained later in this section, I make an effort to include in my final sample only target firms acquired in one of the 450 acquisitions discussed in Section 3.2.6.

private companies to file accounts varies widely from country to country, as does the information that companies disclose voluntarily. For example, the philosophy that investors are drawn to companies with nascent profits and evidence of growth potential, all laid out in "open" accounts that present an accurate picture of the company's wellbeing led to the creation of a register that would evolve into the one controlled today by Companies' House in the United Kingdom. This model was never taken up in the United States, which remains "closed" in the way that private companies present their books (Bureau van Dijk, 2015).

Nonetheless, I start with the subsample of U.S. targets, and once again analyse filings from the EDGAR system of the U.S. Securities and Exchange Commission. There are 352 American takeover targets in my sample of acquisitions completed by December 2012. For each of these targets, I meticulously scrutinize EDGAR filings to find annual or quarterly reports for the years t_{-2} to t_{+3}. A total 80 target firms, 32 subject of an acquisition of a private equity consortium and 48 subject of a sole-sponsored buyout, have post-buyout data available from 10-Ks or other SEC filings. For these firms (private) post-buyout data is available, because they either have widely held public debt outstanding or provide historical financial statements at the time of a subsequent IPO, acquisition, or public debt financing (Guo *et al.*, 2011).

My European sample of acquisitions completed by December 2012 consists of 145 takeover targets. To retrieve missing data in this sample, I focus mainly on the United Kingdom, as the majority of private equity deals in my European sample originates there (see Table 1). For all in-sample U.K. companies I collect filed accounts from Companies' House. Not all companies have filed accounts for the full three years after the buyout. Moreover, for smaller companies, I am able to access only an abbreviated profit and loss account. Nonetheless, 81 U.K. companies have sufficient ex-post buyout data available to be included in the sample, 19 of which where targets of club deal LBOs. To complete my European sample, I retrieve missing data from German companies using filings available on the *Unternehmensregister*. Lastly, I analyse all targets in my sample with missing data to see if to see if they have been subject of a subsequent IPO after their buyout (also known as a reversed leveraged buyout). In this

case, companies often disclose historical financial statements. For example, in 2005 Danish facility services company ISS A/S was acquired by a private equity consortium consisting of EQT Partners and GS Capital Partners, and de-listed from the Copenhagen Stock Exchange. In 2014, ISS re-listed on the Copenhagen Stock Exchange, at this time disclosing annual reports for all fiscal years it was a private company on its corporate website. As a final step I calculate all manually convert output to U.S. dollars using historical exchange rates from Datastream. Combining the data from these sources, I arrive at European sample consisting of 108 target companies, 33 of which were the subject of a private equity club deal.

3.3.2 Constructing a matched sample of sole-sponsored buyouts

At this point, I have gathered ex-post performance data of 65 club deal targets. The assessment of the impact of these club deals on the performance of consortium-backed companies requires the identification of an appropriate control sample of sole-sponsored buyouts, in order to have a counterfactual allowing me to control for other influences on post-buyout performance. I proceed to construct a matched sample of sole-sponsored LBO targets from the 136 I have gathered ex-post performance data for, to constitute a control group. Following previous studies (see, e.g., Cressy *et al.*, 2007), I match the control group with the club deal-group by industry, size, and year of acquisition. Thus, for each club deal target in my final sample, I retrieve from SDC the primary industry using the first two digits of the 4-digit Standard Industrial Classification.[12] I then form a list of all sole-sponsored LBO targets in my sample with the same or similar primary industry[13], all the while making sure the completion dates of the acquisitions fall no further than a year from the completion date of the concerning

[12] Note that Cressy *et al.* (2007) use a 4-digit NACE industry classification.
[13] I strive to match companies with exactly the same primary industry. However, as there is only a limited amount of ex-post buyout data available, this is not always possible. In several cases, I match companies based on one of ten major SIC industry classifications instead: (1) agriculture, forestry, fishing (SIC codes 01-09); (2) mining (SIC codes 10-14); (3) construction (SIC codes 15-17); (4) manufacturing (SIC codes 20-39); (5) transportation, public utilities (SIC codes 40-49); (6) wholesale trade (SIC codes 50-51); (7) retail trade (SIC codes 52-59); (8) finance, insurance, real estate (SIC codes 60-67); (9) services (SIC codes 70-89); (10) public administration (SIC codes 91-99).

club deal acquisition. From this list, I choose the company that is the most similar to the private equity consortium-backed company in terms of total sales in the year of the buyout (although often, the number of companies I can choose from is rather limited). Controlling for size and industry across the two groups helps to control for systematic risk, whereas controlling for completion date of the buyout negates the effects of several financial crises on the performance of the targets.[14] I only match U.S. targets with other U.S. targets, and European targets with other European targets. I strive to control for individual countries within Europe as well, however this is not possible in every instance. In those instances, where the club deal target and the matched sole-sponsored buyout target reside in different countries, I made sure there were no complications in cross-border comparisons of the financial data, either through the use of standardized data from the Orbis database, or through matching companies that use the same (IFRS) principles in filing financial reports. My final sample includes 56 club deal targets and 56 matched companies. All of these 112 targets are acquired in one of the 450 private equity acquisitions included in Section 3.2.6. The other nine club deal targets for which ex-post performance data is available are deleted from the sample because I either was not able to find a match, or because the associated acquisition is not included in the sample of Section 3.2.6.

3.3.3 Dependent variables

The real effects of club deals are empirically analysed using different indicators that are based on financial accounting data. Following previous literature (Wilson *et al.*, 2012; Scellato & Ughetto, 2013) the ex-post performance of club deals LBO target companies and matched companies is compared across three dimensions: profitability, size and productivity. In Table 6, I define the dependent variables used in the empirical analyses; in Table 7 I report related summary statistics. As each variable is a dependent variable in a separate regression, the reported differences in sample sizes do not impose statistical difficulties. The explanatory variables used in these regressions are further

[14] More specifically, the collapse of the dot-com bubble during 1999-2001; the financial crisis of 2008-2009; and the European sovereign debt crisis of 2010-2012.

explained in the methodology (Chapter 4).[15] Two companies that form a matched pair (one a target of a club deal and the other a target of a sole-sponsored LBO) always have exactly the same amount of data points available, as can be seen in Table 7. As further explained in Chapter 4, I run a new regression for every subsample, since I want to compare the ex-post buyout performance of private equity club deals to the ex-post buyout performance of *only* the companies matched to these specific club deals. Following this logic, Panel B, C, and D of Table 7 provide the summary statistics for the U.S., European, and prominent club deal subsamples and respective matched sole-sponsored LBO samples. For each dependent variable, I conduct a two-sided *t*-test of the null hypothesis that the means of the club deal sample and the matched sample are equal. The far right columns in Table 7 present the differences in the means of the two samples and the corresponding levels of significance. The remainder of this section discusses the variables used to test for the growth, profitability, and productivity dimensions of ex-post buyout performance.

Table 6
Dependent variables used in the ex-post buyout performance analysis. The far right column denotes the measurement period, stated relative to year t, the fiscal year in which the buyout was completed.

Dependent variable	Definition	Period
GROWTH1	Growth Ln(total assets)	t_{-1} to t_{+3}
GROWTH2	Growth Ln(number of employees (FTE))	t_{-1} to t_{+3}
GROWTH3	Growth Ln(turnover)	t_{-1} to t_{+3}
PROF1A	Mean EBITDA/total assets	t_{+1} to t_{+3}
PROF2A	Mean EBIT/total assets	t_{+1} to t_{+3}
PROF3A	Mean EBITDA/turnover	t_{+1} to t_{+3}
PROF4A	Mean EBIT/turnover	t_{+1} to t_{+3}
PROF1B	EBITDA/total assets	t_{+3}
PROF2B	EBIT/total assets	t_{+3}
PROF3B	EBITDA/turnover	t_{+3}
PROF4B	EBIT/turnover	t_{+3}
PRODUCT1A	Growth Ln(value added)	t_{-1} to t_{+3}
PRODUCT1B	Mean Ln(value added)	t_{+1} to t_{+3}
PRODUCT1C	Ln(value added)	t_{+3}

[15] No additional data collection is necessary for the construction of these explanatory variables, besides company age, which I retrieve from Compustat.

3.3.3.1 Growth

The first dimension I explore is target firm growth. Following previous studies (Wilson *et al.*, 2012; Scellato and Ughetto, 2013), I use the growth rate of both total assets and the number of employees from the year t_{-1} to t_{+3} as dependent variables (GROWTH1 and GROWTH2, respectively). Turnover growth knows several drawbacks as a measure of efficiency, but I include it nonetheless as a dependent variable (GROWTH3) as it is widely used in the literature (see, e.g., Cressy *et al.*, 2007). If my fifth hypothesis holds, I expect the club deal sample to score higher on these three measures of ex-post buyout performance than the control sample. As reported in Table 7, targets of club deals have statistically significant *higher* values for all three variables. On average, the natural logarithm of total assets of club deal targets grows 4.4% over the five-year sample period, as compared to 3.0% for the sole-sponsored buyout sample. The number of employees (turnover) grows 1.7% (2.4%) in the club deal sample, compared to a decrease of 0.4% (+0.2%) in the control sample. The null hypothesis stating the difference between the size of club deals and sole-sponsored deals equals zero can be rejected at the 10% (GROWTH1), 5% (GROWTH2), and 1% (GROWTH3) significance level. Panel B and C of Table 7 show that this difference largely originates in Europe. In fact, I cannot reject the null hypothesis of equal means for any of the three variables in the U.S. sample. Finally, Panel D shows that prominent clubs deal targets outperform sole-sponsored LBO targets on the three dimensions of growth in a similar fashion as club deal targets in general. Overall, this is a first indication that consortium-backed buyouts show higher levels of growth in comparison to sole-sponsored LBOs.

3.3.3.2 Profitability

Concerning profitability, I design four different dependent variables. Operating profitability, scaled by sales or total assets, has been a widely adopted measure of company performance in previous research on buyouts (Guo *et al.*, 2011; Wilson *et al.*, 2012; Scellato & Ughetto, 2013; Kaplan, 1989), and is accepted as a measure of economic efficiency for buyouts. Therefore, I use both EBIT and EBITDA as proxies

for operating profitability, and scale by sales as well as total assets. As is further explained in the methodology chapter, I opt to use two different model specifications. In the first specification, the dependent variables show mean operating profitability in the three-year window after the buyout (PROF1A, PROF2A, PROF3A and PROF4A, see Table 6). In the second specification, the dependent variable is the operating profitability in year t_{+3} (PROF1B, PROF2B, PROF3B and PROF4B, see Table 6). Following my sixth hypothesis, I expect the club deal sample to score higher on these measures of ex-post buyout profitability than the control sample. As reported in Table 7, the average value of the club deal sample is higher than the average value of the control sample for PROF1A, PROF2A, PROF3A and PROF4A; equal to the control sample for PROF3B; and lower than the control sample for PROF1B, PROF2B and PROF4B. However, the null hypothesis that the means of the club deal sample and the matched sample are equal cannot be rejected at conventional levels of significance for any of these variables. In the U.S. sample, (only) the first profitability measure is significantly higher for club deal targets, whereas in the European sample club deal targets significantly underperform on two of the eight profitability measures. In the subsample of club deals by prominent private equity acquirers (Panel D) no significant differences can be observed. Combined with the finding in Table 5 that prominent private equity clubs acquire targets with significantly higher ex-ante profitability, these results indicate that consortium-backed targets might not show higher levels of ex-post buyout profitability in comparison to sole-sponsored LBOs.

3.3.3.3 Productivity

Following the methodology of both Wilson *et al.* (2012) and Scellato and Ughetto (2013), I examine differences in efficiency by specifying a production function, where output (value added) is related to labour and capital inputs.[16] My first dependent variable (PRODUCT1A), the natural logarithm of the growth in value added from the fiscal year prior to the buyout until three years after the buyout, is used as a proxy for

[16] Refer to Chapter 4 for a more detailed explanation of this production function.

productivity growth after the buyout. With this, I test Hypothesis 7. The other two are additional variables, with which I proxy the absolute levels of productivity after a buyout. PRODUCT1B is the average value added in the three years after the buyout, whereas PRODUCT1C measures the value added in year t_{+3}.

Value added is used as a measure of productivity in this (and previous) research as it presents the wealth creation available to the whole company team. Whereas net income or profit is the reward of the proprietors, i.e., the shareholders of a company, value added defines "income" in such a way as to include the rewards of a much wider group than just the shareholders (Morley, 1979). Benefits to suppliers of long- and short-term loan capital, employees and the government are included as well. The income of this group equals net profit with tax, interest and wage costs all added back, and is called value added. The structure of doubly-entry accounting means that there is another way of arriving at value added, as is shown in the following formula:

$$S - B - Dep = W + I + Div + T + R \qquad (1)$$

where

S is sales revenue;
B is the total of bought in materials and services;
Dep is the annual depreciation and amortization charge;
W is the year's wage cost;
I is interest payable for the year;
Div is dividends payable for the year;
T is corporate taxed;
R represents retained profit.

Table 7

Summary statistics of dependent variables used in analysing the ex-post buyout performance of target companies (number of separate companies, mean, median, and standard deviation). The variables are defined in Table 6. Sole PE and Club deals are defined in the legend to Table 1. *Club deal sample* contains all club deal targets in my dataset for which ex-post buyout data is available. *Control sample: Sole PE deals* consists of an equal amount of matched sole-sponsored LBO targets. Matching is done on the basis of the first two digits of the 4-digit Standard Industrial Classification, the completion date of the acquisition, and turnover in the year of the buyout. Panel A reports the values for the combined American and European sample of club deals plus the associated control sample of sole-sponsored LBOs. Panel B reports the same for the U.S. sample, Panel C for the European sample, and Panel D for the subsample of prominent private equity club deals, again with the associated control sample of sole-sponsored LBOs. The far right columns provide the difference between the mean value of the given variable in the (prominent) club deal sample and the sole PE sample. ***, **, and * indicate that a two-sided *t*-test, testing the null hypothesis that the means of the sole PE sample and the (prominent) club deal sample for that particular variable are equal, can be rejected at the 1%, 5%, and 10% levels, respectively.

Panel A: Combined American and European sample

Dependent	All deals				Club deal sample				Control sample: Sole PE deals				*t*-test	
variable	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	Club - Sole	
GROWTH1	112	0.037	0.036	0.043	56	0.044	0.040	0.044	56	0.030	0.032	0.042	**0.014**	*
GROWTH2	104	0.006	0.008	0.052	52	0.017	0.012	0.044	52	(0.004)	(0.004)	0.058	**0.021**	**
GROWTH3	112	0.013	0.011	0.035	56	0.024	0.018	0.033	56	0.002	0.002	0.034	**0.023**	***
PROF1A	110	0.094	0.080	0.141	55	0.106	0.087	0.159	55	0.082	0.071	0.121	0.024	
PROF2A	110	0.039	0.030	0.144	55	0.049	0.031	0.165	55	0.030	0.025	0.121	0.019	
PROF3A	112	0.162	0.129	0.256	56	0.165	0.138	0.260	56	0.159	0.111	0.254	0.006	
PROF4A	112	0.041	0.051	0.212	56	0.042	0.051	0.261	56	0.040	0.049	0.150	0.002	
PROF1B	112	0.103	0.089	0.172	56	0.101	0.094	0.194	56	0.104	0.080	0.148	(0.003)	
PROF2B	112	0.048	0.044	0.176	56	0.044	0.045	0.207	56	0.053	0.043	0.140	(0.009)	
PROF3B	112	0.173	0.144	0.218	56	0.173	0.135	0.237	56	0.173	0.148	0.199	0.000	
PROF4B	112	0.073	0.072	0.196	56	0.070	0.073	0.229	56	0.076	0.063	0.158	(0.006)	
PRODUCT1A	48	0.025	0.016	0.079	24	0.049	0.026	0.086	24	(0.000)	(0.014)	0.063	**0.050**	**
PRODUCT1B	48	12.045	12.205	1.396	24	12.519	12.625	1.553	24	11.572	11.807	1.050	**0.946**	**
PRODUCT1C	48	12.135	12.152	1.383	24	12.671	12.888	1.525	24	11.599	11.510	0.992	**1.072**	***

Table 7 (*continued*)

Panel B: U.S. sample													
Dependent	All deals				Club deal sample				Control sample: Sole PE deals				*t*-test
variable	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	Club - Sole
GROWTH1	56	0.041	0.042	0.031	28	0.040	0.039	0.034	28	0.042	0.042	0.029	(0.002)
GROWTH2	50	0.008	0.010	0.042	25	0.013	0.010	0.032	25	0.004	0.011	0.050	0.009
GROWTH3	56	0.006	0.008	0.030	28	0.012	0.012	0.018	28	0.000	0.005	0.037	0.012
PROF1A	54	0.105	0.084	0.158	27	0.144	0.093	0.208	27	0.067	0.073	0.071	**0.077** *
PROF2A	54	0.038	0.022	0.165	27	0.068	0.022	0.223	27	0.008	0.021	0.060	0.060
PROF3A	56	0.153	0.116	0.271	28	0.167	0.122	0.317	28	0.139	0.091	0.220	0.028
PROF4A	56	0.013	0.042	0.253	28	0.007	0.046	0.325	28	0.019	0.024	0.157	(0.012)
PROF1B	56	0.101	0.086	0.173	28	0.136	0.097	0.222	28	0.066	0.075	0.096	0.070
PROF2B	56	0.035	0.042	0.185	28	0.063	0.044	0.245	28	0.007	0.029	0.089	0.056
PROF3B	56	0.171	0.112	0.232	28	0.190	0.118	0.218	28	0.152	0.105	0.247	0.038
PROF4B	56	0.048	0.050	0.199	28	0.064	0.064	0.209	28	0.031	0.039	0.191	0.032

Panel C: European sample													
Dependent	All deals				Club deal sample				Control sample: Sole PE deals				*t*-test
variable	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	Club - Sole
GROWTH1	56	0.033	0.027	0.052	28	0.048	0.042	0.052	28	0.018	0.023	0.049	**0.030** **
GROWTH2	54	0.004	0.007	0.060	27	0.021	0.019	0.053	27	(0.012)	(0.010)	0.064	**0.033** **
GROWTH3	56	0.020	0.014	0.039	28	0.037	0.029	0.040	28	0.004	(0.002)	0.030	**0.034** ***
PROF1A	56	0.084	0.074	0.123	28	0.070	0.075	0.078	28	0.098	0.070	0.155	(0.028)
PROF2A	56	0.041	0.034	0.123	28	0.031	0.040	0.078	28	0.050	0.027	0.157	(0.020)
PROF3A	56	0.171	0.144	0.242	28	0.163	0.152	0.192	28	0.178	0.133	0.287	(0.015)
PROF4A	56	0.069	0.076	0.157	28	0.077	0.079	0.174	28	0.061	0.074	0.142	0.016
PROF1B	56	0.104	0.091	0.171	28	0.066	0.085	0.157	28	0.142	0.103	0.180	**(0.076)** *
PROF2B	56	0.062	0.048	0.167	28	0.025	0.048	0.161	28	0.099	0.046	0.167	**(0.074)** *
PROF3B	56	0.175	0.165	0.204	28	0.156	0.158	0.257	28	0.194	0.202	0.135	(0.038)
PROF4B	56	0.098	0.096	0.191	28	0.076	0.091	0.250	28	0.120	0.096	0.103	(0.044)
PRODUCT1A	48	0.025	0.016	0.079	24	0.049	0.026	0.086	24	(0.000)	(0.014)	0.063	**0.050** **
PRODUCT1B	48	12.045	12.205	1.396	24	12.519	12.625	1.553	24	11.572	11.807	1.050	**0.946** **
PRODUCT1C	48	12.135	12.152	1.383	24	12.671	12.888	1.525	24	11.599	11.510	0.992	**1.072** ***

Table 7 (*continued*)

Panel D: Combined American and European sample - Subsample of club deals by prominent private equity acquirers														
Dependent	All deals				Prominent club deal sample				Control sample: Sole PE deals				*t*-test	
variable	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	Club - Sole	
GROWTH1	82	0.039	0.037	0.042	41	0.047	0.047	0.044	41	0.031	0.034	0.037	**0.016**	*
GROWTH2	74	0.005	0.009	0.052	37	0.018	0.013	0.043	37	(0.008)	(0.000)	0.058	**0.026**	**
GROWTH3	82	0.010	0.009	0.035	41	0.023	0.014	0.031	41	(0.002)	0.001	0.035	**0.025**	***
PROF1A	82	0.095	0.083	0.138	41	0.116	0.089	0.177	41	0.074	0.073	0.079	0.042	
PROF2A	82	0.038	0.032	0.145	41	0.057	0.032	0.188	41	0.019	0.030	0.079	0.038	
PROF3A	82	0.169	0.130	0.194	41	0.185	0.137	0.191	41	0.153	0.125	0.199	0.032	
PROF4A	82	0.049	0.048	0.176	41	0.057	0.048	0.193	41	0.041	0.044	0.158	0.016	
PROF1B	82	0.101	0.093	0.166	41	0.108	0.096	0.225	41	0.094	0.080	0.072	0.014	
PROF2B	82	0.043	0.046	0.176	41	0.046	0.046	0.241	41	0.040	0.045	0.067	0.006	
PROF3B	82	0.180	0.149	0.228	41	0.163	0.132	0.259	41	0.197	0.153	0.195	(0.034)	
PROF4B	82	0.072	0.072	0.205	41	0.057	0.074	0.252	41	0.086	0.063	0.146	(0.029)	
PRODUCT1A	28	0.009	0.012	0.051	14	0.030	0.029	0.048	14	(0.014)	(0.014)	0.045	**0.044**	**
PRODUCT1B	28	12.404	12.496	1.426	14	13.107	12.916	1.366	14	11.647	11.740	1.088	**1.460**	***
PRODUCT1C	28	12.461	12.694	1.438	14	13.208	12.990	1.361	14	11.656	11.530	1.058	**1.552**	***

Each side of this equation by Morley (1979) equals value added. Some companies report value added in their annual accounts using a Value Added Statement, but for the majority of my sample I calculate the value added myself using the formula above. Unfortunately, American companies report neither wage costs nor the total of bought in materials and services in their 10-k filings, rendering it impossible for me to calculate the value added of the American companies in my sample. This makes my sample size rather small. As can be observed in Table 7, my sample contains 24 separate club deal targets for which added value data is available. All 24 corresponding matched companies also report added value data, whereas I have omitted value added data for all other matched companies.

If club deal targets indeed show higher levels of ex-post buyout productivity growth than sole-sponsored LBO targets, as stated in Hypothesis 7, I expect higher values for PRODUCT1A in my club deal sample. Table 7 reveals that the average growth in value added is 4.9% for the club deal sample, and 0.0% for the control sample. The difference is statistically significant at the 5% level. The measures for absolute productivity are higher in the club deal sample as well, while the null hypothesis that the means are equal can be rejected at the 5% (PRODUCT1B) and 1% (PRODUCT1C) significance level. In the subsample of prominent club deals targets the difference in the latter two variables is higher and more significant, even though the sample size reduces to 28. However, I cannot draw conclusions with regard to productivity until I control for labour and capital inputs in Chapter 5.

3.4 Other possible motives for club formation

Finally, I look at other economic reasons for club formation posited in the literature: risk reduction, resource pooling, and information pooling. My starting point is my sample from Section 3.2: 571 completed acquisitions of publicly traded targets by private equity firms for which share price data is available, of which 187 are club deals. I use both ISIN and CUSIP identifiers to match Compustat/Datastream items with the SDC database, and calculate several explanatory variables. Table 8 explains the

variables used.[17] For one variable (RDE, see Section 3.4.3) only limited data is available from Compustat. As these variables all serve as explanatory variables in the same regression, an equal amount of data points has to be available for each. I decide to run two separate regressions: one where I delete RDE all together (N = 450)[18]; and one including RDE, where I delete all target companies which have missing values for this variable (N = 167). Table 9 presents the summary statistics for both. For each variable, I once more conduct a two-sided *t*-test of the null hypothesis that the means of the sole PE sample and the (prominent) club deal sample are equal. I conduct these *t*-tests in the American sample, the European sample, and the combined sample. The far right columns in Table 9 present the differences in the means of the samples and the corresponding levels of significance. The remainder of this section discusses the proxy variables used for each of the other economic rationales for club formation, as discussed in Chapter 2.

3.4.1 Risk reduction

The first alternative, non-collusive rationale for club formation is risk reduction. The proxy for risk (LRATIO) is the firm's leverage ratio, defined as the total debt to assets ratio in the fiscal year preceding the announcement date. Bradley *et al.* (1984) find firm leverage ratios to be inversely related to earnings volatility and thus to firm risk. Hence, if risk reduction is a possible explanation for club formation between private equity bidders, I expect LRATIO to be inversely related to the probability of forming an alliance. This measure of firm risk is also used in the research by Boone and Mulherin (2011).

[17] As mentioned in Section 3.2.6, the first three variables (LRATIO, LNMVE, and STDEV) are also used as explanatory variables in the abnormal target return regression analyses. See Chapter 4 for more details on all regressions used in this research.
[18] Here, the sample is exactly identical to the one described in Section 3.2.6.

Table 8
Proxy variables and description for each of the posited alternative rationales for club formation. All variables besides STDEV are calculated in the fiscal year preceding the announcement date. Data source is included in parentheses.

Rationale	Variable	Description (source)
Risk reduction	LRATIO	Total debt / (total debt + market value of equity). Total debt = total long-term debt (DLTT) + total debt in current liability (DLC). (Compustat)
Resource pooling	LNMVE	*Ln* (market value of equity (MVE)). MVE = CSHO x PRCC_F, in million dollars. (Compustat)
Information pooling	STDEV	Standard deviation of stock returns calculated from 273 days before the announcement date to 20 days before the announcement date. (Datastream)
Information pooling	RDE	Research and development expense (XRD) / total assets (AT). (Compustat)

As reported in Table 9, targets in sole-sponsored private equity deals have statistically significant *higher* values for LRATIO, indicating that sole-sponsored deals are, on average, less risky than club deals. Only in the European subsample in Panel C, no statistically significant difference can be observed. In all panels, the difference in leverage ratio between prominent club targets and sole-sponsored targets is higher and more significant than the difference between club targets in general and sole-sponsored targets, indicating that targets of prominent private equity clubs carry even more risk than targets of non-prominent private equity clubs.

3.4.2 Resource pooling

Following previous literature (Boone & Mulherin, 2011; Kim & Palia, 2014), I use natural logarithm of the market value of equity of the target firm at the end of the year before the merger announcement date as a proxy for the size of the acquisition project (LNMVE). If club deals are a way for private equity bidders to undertake otherwise unattainable large-scale investment projects, I expect a positive relationship between this proxy and the probability of forming a club. Table 9 shows that the mean natural logarithm of the market value of equity of a club deal target firm (prominent club deal target firm) is 6.020 (6.751) in the U.S. and 6.648 (7.137) in Europe. The mean natural logarithm of the market value of equity of a sole sponsored LBO target firm is lower at 5.396 in the U.S. and 5.622 in Europe. The null hypothesis stating the difference

between the size of club targets and sole-sponsored targets equals zero can be rejected at the 5% significance level, both in Europe and in the United States. The *t*-test examining the difference in the means of the prominent club target and sole PE target samples results in P-values lower than 0.01 for all panels. This is a first indication that consortiums are a competitive response by private equity firms when bidding for larger deals.

3.4.3 Information pooling

Finally, coalitions may enable bidders to share information. As Chapter 2 explains, the combining of superior asymmetric information is expected to be most beneficial when there is a high level of information complexity. I use two proxies to measure information complexity. The first proxy variable (STDEV) is the target firm's standard deviation of stock returns calculated from 273 days before the announcement date to 20 days before the announcement date. Boone and Mulherin (2011) argue that this variable should be positively related to club formation if the information pooling theory holds. Following Kim and Palia (2014), my second measure for information complexity is the ratio of the target firm's R&D expenditure to total assets (RDE). As mentioned in Chapter 2, information pooling may be most beneficial in target firms with a high number of intangibles such as R&D. Hence, if the information pooling theory holds, I expect a positive relationship between RDE and the probability of forming a club. As reported in Table 7, however, the mean R&D expenditures in the club deal sample and the sole PE deal sample are not significantly different from each other. The null hypothesis that the difference between the standard deviation of stock returns of club deal targets and sole-sponsored targets equals zero cannot be rejected at conventional levels of significance in the Regression II sample. In the Regression I sample, this null hypothesis can be rejected at the 10% significance level, but the mean value for the club deal sample is in this case lower than the sole-sponsored LBO sample, indicating less information complexity.

Table 9

Summary statistics of proxy variables used in analysing other possible rationales for club formation (number of separate companies, mean, median, and standard deviation). All variables are calculated in the fiscal year preceding the announcement date, besides STDEV, which is calculated from 273 days before the announcement days to 20 days before the announcement date. *Sole PE targets*, *Club targets*, and *Prominent club targets* denote targets of sole-sponsored LBOs, club deals, and club deals by prominent private equity acquirers, respectively. The far right columns provide the difference between the mean value of the given variable in the (prominent) club deal sample and the sole PE sample. ***, **, and * indicate that a two-sided *t*-test, testing the null hypothesis that the means of the sole PE sample and the (prominent) club deal sample for that particular variable are equal, can be rejected at the 1%, 5%, and 10% levels, respectively. The first three tables contain explanatory variables for a regression where RDE is excluded, while the fourth table shows the explanatory variables for the regression where all variables are included, albeit with a smaller sample size.

Panel A: Combined American and European sample

Explanatory	Sole PE targets				Club targets				Prominent club targets				*t*-test			
variable	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	Club - Sole		Prom - Sole	
LNMVE	315	5.475	5.427	1.273	135	6.248	6.246	1.665	66	6.880	7.187	1.639	**0.773**	**	**1.405**	***
LRATIO	315	0.258	0.162	0.268	135	0.188	0.121	0.222	66	0.160	0.099	0.205	**(0.070)**	**	**(0.099)**	***
STDEV	315	0.030	0.023		135	0.026	0.022		66	0.025	0.021		(0.003)		(0.005)	

Panel B: U.S. Sample

Explanatory	Sole PE targets				Club targets				Prominent club targets				*t*-test			
variable	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	Club - Sole		Prom - Sole	
LNMVE	205	5.396	5.389	1.366	86	6.020	5.989	1.748	44	6.751	7.112	1.769	**0.624**	**	**1.356**	***
LRATIO	205	0.283	0.218	0.284	86	0.189	0.110	0.235	44	0.158	0.105	0.207	**(0.095)**	**	**(0.125)**	***
STDEV	205	0.034	0.025		86	0.028	0.024		44	0.027	0.021		(0.005)		(0.007)	

Panel C: European sample

Explanatory	Sole PE targets				Club targets				Prominent club targets				*t*-test			
variable	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	Club - Sole		Prom - Sole	
LNMVE	110	5.622	5.538	1.070	49	6.648	6.511	1.440	22	7.137	7.450	1.344	**1.026**	**	**1.515**	***
LRATIO	110	0.211	0.131	0.230	49	0.187	0.139	0.200	22	0.163	0.087	0.205	(0.025)		(0.049)	
STDEV	110	0.023	0.021		49	0.024	0.020		22	0.021	0.019		0.001		(0.002)	

Panel D: Combined American and European sample - Including RDE

Explanatory	Sole PE targets				Club targets				Prominent club targets				*t*-test			
variable	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	N	Mean	Median	St. dev.	Club - Sole		Prom - Sole	
LNMVE	110	5.669	5.650	1.395	54	6.566	6.845	1.544	31	7.219	7.229	1.219	**0.898**	**	**1.550**	***
LRATIO	110	0.269	0.207	0.261	54	0.184	0.150	0.179	31	0.153	0.121	0.151	**(0.085)**	**	**(0.116)**	**
STDEV	110	0.030	0.023		54	0.027	0.023		31	0.023	0.021		(0.002)		**(0.007)**	*
RDE	110	0.088	0.026	0.141	54	0.083	0.056	0.126	31	0.087	0.021	0.154	(0.005)		(0.001)	

CHAPTER 4 - Methodology

The methodology chapter is divided into four parts. First, Section 4.1 explains the basic regression models used throughout this research. Thereafter, Section 4.2 describes the methodology with which I test the abnormal returns to target shareholders in private equity acquisitions. Section 4.3 then explains how the ex-post performance to LBO target shareholders is measured. Finally, Section 4.4 develops a model that links consortium formation to the proxies for target scale, risk and information complexity discussed in the previous chapter.

4.1 Basic regression models

4.1.1 Multiple regression analysis with cross-sectional data

Throughout my research, I use multiple regression analysis to draw ceteris paribus conclusions about how several explanatory variables affect certain dependent variables.[19] Multiple regression analysis is used mainly because it allows me to explicitly control for many other factors that simultaneously affect the dependent variable, while testing the effect of a particular independent variable. In most cases, the method of ordinary least squares (OLS) is applied to estimate the multiple regression model, as most tests adhere to the Gauss-Markov assumptions for cross-sectional regressions.[20] Under these assumptions, the OLS estimators are the best linear unbiased estimators (Woolridge, 2015). Hereafter the Gauss-Markov assumptions are briefly discussed.

The first assumption is that the population model is linear in its parameters. Econometrically a multiple linear regression model with cross-sectional data is written in the population as (Woolridge, 2015):

[19] As advised by the Financial Economics thesis guide I use EVIEWS to run the regressions.
[20] When testing for alternative rationales for club formation (Section 4.4) I use a probit regression with maximum likelihood estimation instead.

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + u \quad (2)$$

where

y is the dependent variable;

x_k denotes the explanatory variables;

u is the error term;

β_0 is the intercept parameter;

β_k is the slope parameter associated with x_k.

The second assumption requires a random sample of *n* observations, $\{(x_{i1}, x_{i2}, \dots, x_{ik}, y_i): i = 1,2, \dots, n\}$, following this population model. Third, none of the independent variables must be constant and there should be no exact linear relationships among the independent variables (i.e. there is no perfect collinearity). Fourth, the error term *u* adheres to the zero conditional mean assumption: all factors in *u* are uncorrelated with the explanatory variables. Finally, *u* has the same variance given any value of the explanatory variables (Woolridge, 2015). The latter two assumptions can be expressed as follows:

$$E(u|x_1, x_2, \dots, x_k) = 0 \quad (3)$$

$$Var(u|x_1, x_2, \dots, x_k) = \sigma^2 \quad (4)$$

4.1.2 Simple regression analysis with panel data

Most regressions in this research comprise only cross-sectional elements and adhere to the methodology set out in Section 4.1.1. However, the regressions used for the event study analysis (Section 4.2.1) comprise both time-series and cross-sectional elements (i.e. panel data). Moreover, these regressions are simple in that they explain the dependent variable as a function of a single independent variable. In this case, similar Gauss-Markov assumptions apply and OLS is again applied to estimate the regression model. A simple regression analysis with panel data can be written as:

$$y_{it} = \beta_0 + \beta_1 x_{it} + u_{it} \quad (5)$$

where *i* denotes the cross-sectional unit and *t* the time period (Woolridge, 2015).

4.1.3 Robustness tests

Section 4.1.1 explains the five Gauss-Markov assumptions for cross-sectional regressions a test must adhere to, in order for the OLS estimators to be the best linear unbiased estimators. Throughout this analysis, I use several robustness tests to check the validity of these Gauss-Markov assumptions.

If an independent variable is an exact linear combination of the other independent variables, the model suffers from perfect collinearity, and it cannot be estimated by OLS. High (but not perfect) correlation between two or more independent variables is called multicollinearity. In the presence of multicollinearity, the OLS estimators of the correlated variables are less precise (Woolridge, 2015). To test for collinearity between variables, I use the "Coefficient Variance Decomposition" tool in EVIEWS, which provides information on the eigenvector decomposition of the coefficient covariance matrix. Two or more variables with variance-decomposition values greater than 0.5 associated with a small condition number indicate the possibility of collinearity between those two variables.[21] None of the independent variables in the final regression analyses applied in this research show such evidence of multicollinearity.

Including irrelevant variables in a multiple regression model does not affect the unbiasedness of OLS estimators, but due to multicollinearity, this *can* have undesirable effects on the variances of OLS estimators. To maximize the precision of the OLS estimators, I make an effort to delete redundant variables in the regressions. When examining the abnormal returns to target shareholders, the ex-post performance of target companies, or the other possible motivates for club formation, I start by including

[21] For more information on the subject, see Belsley *et al*. (2005).

all control variables mentioned in their respective sections of Chapter 3. I subsequently test for the redundancy of each variable and decide whether to delete it from the regression or not. EVIEWS provides a "Redundant Variable Test", where one can examine whether a variable or a subset of variables in an equation have zero coefficients and might thus be deleted from the equation. If this test does not reject the null hypothesis that the variable (series) does not belong to the equation at a 10% significance level, I remove the variable(s) from the equation.[22]

The fifth Gauss-Markov assumption is homoscedasticity: the error term of the regression must have the same variance given any values of the explanatory variables. Ordinary least squares estimates are consistent in the presence of heteroscedasticity, but the conventional computed standard errors are no longer valid (Woolridge, 2015). I use the White (1980) test to examine heteroscedasticity in the residuals. This is a test of the null hypothesis of no heteroscedasticity against heteroscedasticity of unknown, general form. It involves regressing the squared OLS residuals on the fitted and squared fitted values of the independent variables. White (1980) derives a heteroscedasticity consistent covariance matrix estimator which provides consistent estimates of the coefficient covariances in the presence of conditional heteroscedasticity of unknown form. If the null hypothesis of homoscedasticity is rejected at the 10% level, I use these Huber-White robust covariance estimators.[23]

For every regression, EVIEWS runs a test of the hypothesis that all of the slope coefficients (excluding the intercept) are zero. The *F*-statistic and corresponding *p*-value of this test are presented for every regression output in Chapter 5. If the *p*-value is less than 0.05 I reject the null hypothesis that all of the slope coefficients are zero. Whenever I choose to employ Huber-White robust covariance estimators, I furthermore report a robust Wald *F*-statistic and *p*-value for the hypothesis that all non-intercept coefficients are equal to zero.

[22] I follow this procedure for all control variables in my regressions, except for several variables included solely to enhance the robustness of the tests (e.g. year, industry, or country dummies). These variables remain in the regressions even if EVIEWS classifies them as redundant.
[23] For more information on the subject, see White (1980).

4.2 Abnormal returns to target shareholders

The first major question in my analysis concerns the effect that the bidding of private equity consortiums has on prices paid in corporate takeovers. If private equity clubs engage in collusion, then the prices paid in club deals should be measurably lower than the prices paid in sole-sponsored LBOs (Boone & Mulherin, 2011). I address this question by estimating the abnormal returns to shareholders of club deal targets vis-à-vis sole-sponsored LBO targets using event study analysis.

4.2.1 Event study analysis

An event study measures the economic impact of a specific event on the value of a firm using security prices. Club and sole-sponsored LBOs constitute the events in this research and the security prices used are the daily stock prices of the target companies. Chapter 2 briefly discusses the notion that economists are increasingly sceptical about rationality in the marketplace, which asserts that asset prices fully reflect all available information and consequently reflect the full effects of a LBO immediately after it has been announced. This is the reason why direct ex-post buyout performance measures of the economic impact of these LBOs are discussed in Section 4.3. Nonetheless, an event study is a useful addition to direct performance related measures, as direct ex-post buyout performance measures require years of observation and –in the case of public-to-private LBO transactions- struggle with limited data availability. Moreover, I am interested to see how the results of my event study analysis compare to that of other scholars, most notably Officer *et al.* (2010) and Boone and Mulherin (2011). As discussed in the literature review, these authors find conflicting evidence regarding the abnormal returns to target shareholders after a club deal, and in my research I try to reconcile these conflicting results. I further contribute to academic literature with this event study by using a different sampling period (including LBOs in 2008-2015) and different geographies (including European countries) than previous authors.

The sample selection criteria for the inclusion of a given firm in the study is described in Chapter 3. I collect all daily return data from Datastream. The initial task in an event study is to define the event window. Following Officer *et al.* (2010), I use three different event windows (all days are *trading* days relative to the deal announcement day (0)): day -42 to day -1 (labelled *runup*); day 0 to day +126 or the delisting date, whichever occurs first (labelled *markup*); and day -42 to day +126 or the delisting date, whichever occurs first (labelled *premium*). The market may acquire information about the LBO prior to the actual announcement, and by examining pre-event returns in the *runup* and *premium* event windows, I can investigate this possibility.

My univariate event study analysis of target returns follows MacKinlay's (1997) methodology. Appraisal of the impact of the LBO requires a measure of abnormal return. This is the actual ex-post return of a target's shares over the event window minus the normal return of the firm of the event window, where the normal return is defined as the expected return without conditioning on the buyout taking place:

$$AR_{it} = R_{it} - E(R_{it}|X_t) \qquad (6)$$

where

AR_{it} is the abnormal return for firm *i* and time period *t*;
R_{it} is the actual return for firm *i* and time period *t*;
$E(R_{it}|X_t)$ is the normal return for firm *i* and time period *t*.

In formula (6) X_t is the conditioning information for the normal return model. I opt for the market model where X_t is the market return (rather than the constant mean return model where X_t is a constant). The market model assumes a linear relation between the security return and the market return (MacKinlay, 1997).

I estimate the market model parameters for each target using daily returns from trading day -379 to trading day -127 relative to the deal announcement date as my estimation window (as do Officer *et al.*, 2010). For any security *i* the market model is:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$$
$$E(\varepsilon_{it}) = 0 \qquad var(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2 \tag{7}$$

where

R_{mt} is the period-*t* return on the market;

ε_{it} is the zero mean disturbance term;

α_i, β_i, and $\sigma_{\varepsilon_i}^2$ are the parameters of the market model.

As discussed in Section 3.2.2, I use two broad stock indices to approximate the market portfolio: the Russell 3000 index for the U.S. market and MSCI Europe index for the 15 developed markets countries included in my European sample. I use ordinary least squares as an estimation procedure for the market model parameters of each target firm. Note that α_i, β_i, and ε_{it} are equal to β_0, β_1, and u_{it} in equation (5).

With the parameter estimates for the normal return model in place, the abnormal returns can be calculated (MacKinlay, 1997):

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \tag{8}$$

where $\hat{\alpha}_i$ and $\hat{\beta}_i$ are the OLS estimators for the market model parameters. Note that if the LBO has no economic impact on the value of the target firm, the abnormal returns should be jointly normally distributed with a zero conditional mean. Finally, the abnormal return observations must be aggregated in order to draw overall inferences for the (club deal) LBO. The aggregation takes place first across securities and then through time. Given *N* LBOs, the sample aggregated abnormal returns for trading day *t* is:

$$\overline{AR}_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \tag{9}$$

The concept of cumulative abnormal return (CAR) is necessary to accommodate multiple period event windows, such as the ones used in this research. If t_1 is the first trading day of the event window and t_n is the last, then the CAR for the event period (and its variance) is:

$$\overline{CAR_i}(t_1, t_n) = \sum_{t=t_1}^{t_n} \overline{AR}_t \tag{10}$$

$$var[\overline{CAR_i}(t_1, t_n)] = \sum_{t=t_1}^{t_n} \left[\frac{1}{N^2} \sum_{i=1}^{N} \sigma_{\varepsilon_i}^2 \right] \tag{11}$$

Using these estimates, the CAR for any event period and any number of LBOs can be analysed (MacKinlay, 1997). [24]

4.2.2 Regression analyses of abnormal target returns

To measure the effect of private equity clubs while controlling for deal characteristics, I run several regression analyses of target CARs. I start by designing a multiple regression analysis that test for significant differences in acquisition premia paid to target shareholders in club deals vis-à-vis target shareholders in sole-sponsored LBOs. I then discuss regressions that test whether target shareholders in club deals by *prominent* private equity firms receive significantly lower premia than target shareholders in sole-sponsored LBOs, and whether a possible club deal discount has become more or less pronounced after 2005. This enables me to answer Hypothesis 1 and 2. Finally, I design a regression analysis to test whether the value creation theory of Marquez and Singh (2013) is a satisfactory explanation for the observed target returns in private equity club deals. If this is the case, the acquisition premium in a club deal should be negatively related to deal size (Hypothesis 3), and positively related to

[24] Note that this method of calculating CARs is also used in the research by Officer *et al.* (2010). Boone and Mulherin (2011) instead use the Fama-French three factor model to estimate CARs. Re-running this analysis using other methods including a CAPM or multifactor model of CARs as well as buy-and-hold abnormal returns falls outside of the scope of this paper and therefore serves as a recommendation for further research.

the potential number of bidders (Hypothesis 4). In all regressions I control for several deal and target characteristics, as discussed in Chapter 3.

4.2.2.1 The effect of club deals on CARs

It its most simple form I use the following model to examine the link between target returns and private equity consortiums:

$$CAR = f(Club\ deal\ dummy, Control\ variables) \quad (12)$$

which means that the abnormal return (the dependent variable) is a function of there being multiple private equity acquirers or not and various control variables (independent variables). To measure the effect of private equity consortiums on the abnormal returns to target shareholders, while controlling for deal and target characteristics, I use two different models. I run these models for three different samples: 1) the combined American and European sample; 2) the U.S. sample; and 3) the European sample.[25] In previous research (e.g., Boone & Mulherin, 2011; Schwert, 2000) academics have argued that longer event windows better capture the revelation of information prior to the formal announcement of a takeover as well as the evolution of the likely success of a deal over the full extent of the takeover process. With this in mind, I run the following regressions on the cumulative abnormal returns of the *premium* (-42 to +126) event window:

$$CAR_i = \beta_0 + \beta_1 * CLUB_i + \beta_2 * PRE\_06_i + \beta_3 * STDEV_i + \beta_4 * BHR12_i + u_i \quad (13)$$

$$CAR_i = \beta_0 + \beta_1 * CLUB_i + \beta_2 * PRE_{06_i} + \beta_3 * PRE\_06 * CLUB_i + \beta_4 * STDEV_i + \beta_5 * BHR12_i + u_i \quad (14)$$

[25] Note that I include an additional dummy variable (*Europe*) equal to 1 if the target company is European in each regression where I use the combined American and European sample. This variable serves to increase the robustness of my results by accounting for differences in abnormal returns caused solely by the target company residing in a different geographical area.

where

CLUB is a dummy variable equal to 1 for club deals;
STDEV is the standard deviation of target stock returns calculated from 273 trading days before the announcement date to 20 days before the announcement date;
BHR12 is the target buy-and-hold stock return for the twelve months preceding the event window;
PRE_06 is a dummy variable equal to one if the announcement of the transaction takes place prior to 2006.

In the European subsample, the target's leverage ratio (*LRATIO*) and total turnover, both measured in the fiscal year preceding the announcement date, have some additional explanatory power and are included in the regressions. However, I make an effort to delete redundant variables in all regressions to maximize the precision of the OLS estimators, and in the U.S. subsample and the combined American and European sample these control variables are consequently omitted. The "Redundant Variable Test" provided by EVIEWS could furthermore not reject the null hypothesis that the following control variables do not belong to the equations at a 10% significance level: the natural logarithm of the target market value of equity at the end of the fiscal year before the buyout announcement date (*LNMVE*)[26]; a dummy variable equal to 1 for acquisitions in which the payment is all cash (*Cash*); target EBIT/total assets calculated in the fiscal year preceding the announcement date (*Profitability*); and the target's Q ratio (defined in Kaplan and Zingales, 1997), calculated in the fiscal year preceding the announcement date (*Tobin's Q*). Hence, none of these variables is included in the final regression analyses. The pre-2006 dummy variable is included in every regression to account for possible differences in abnormal returns caused solely by the target company being acquired in a different time period.

[26] Note that in *all* regression analyses of abnormal target returns, I examine whether proxies for target size (*LNMVE*), target risk (*LRATIO*), and target information complexity (*STDEV*) – i.e. the other possible rationales for club formation as described in Section 2.2 – are able to explain target CARs.

4.2.2.2 The effect of prominent club deals on CARs

In Hypotheses 1 and 2 I argue that target shareholders likely receive lower premia in club deals sponsored by prominent private equity firms, and that the club deal discount in those deals is likely less pronounced after 2005. In order to meaningfully compare the acquisition premia paid by prominent private equity club acquirers to the acquisition premia paid by other types of bidders, I categorize all deals into one of four acquirer groups: 1) non-prominent sole-sponsored private equity acquirer (*NP_SP*); 2) prominent sole-sponsored private equity acquirer (*PROM_SP*); 3) non-prominent private equity club acquirer (*NP_CLUB*); or 4) prominent private equity club acquirer (*PROM_CLUB*). The latter three I am most interested in (i.e. in these bidder groups I expect the most interesting results), and therefore I include those as dummy variables in the regressions below, together with various control variables. This enables me to more specifically examine which bidder group has the most significant effect on abnormal returns paid to target shareholders. I again run these regressions for the *premium* event window.

$$CAR_i = \beta_0 + \beta_1 * PROM\_SP_i + \beta_2 * NP\_CLUB_i + \beta_3 * PROM\_CLUB_i + \beta_4 * PRE\_06_i + \beta_5 * STDEV_i + \beta_6 * BHR12_i + u_i \quad (15)$$

$$CAR_i = \beta_0 + \beta_1 * PROM\_SP_i + \beta_2 * NP\_CLUB_i + \beta_3 * PROM\_CLUB_i + \beta_4 * PRE\_06_i + \beta_5 * PRE\_06 * PROM\_SP_i + \beta_6 * PRE\_06 * NP\_CLUB_i + \beta_7 * PRE\_06 * PROM\_CLUB_i + \beta_8 * STDEV_i + \beta_9 * BHR12_i + u_i \quad (16)$$

Equation (15) enables me to test Hypothesis 1, whereas controlling for effects prior to 2006 in equation (16) enables me to test Hypothesis 2. Similar to the regressions in Section 4.2.2.1, *LRATIO* and target turnover are added as control variables only in the European subsample, and *LNMVE, Cash, Profitability*, and *Tobin's Q* are redundant and omitted in all samples.

4.2.2.3 Testing the value creation theory

In Hypotheses 3 and 4 I theorize that in a club deal, the acquisition premium is negatively related to deal size and positively related to the potential number of bidders. Confirming these hypotheses would indicate that value creation rationales (as opposed to collusive rationales) can explain club formation. Data on the potential number of bidders is only available for the U.S. and only collected for club deal LBOs. Hence, I perform the following regression analyses only for a subsample of American club deals:

$$CAR_i = \beta_0 + \beta_1 * LNMVE_i + \beta_2 * NBO_i + \beta_3 * NDA_i + \beta_4 * WPB_i + \beta_5 * PRE\_06_i + \beta_6 * STDEV_i + \beta_7 * BHR12_i + u_i \quad (17)$$

$$CAR_i = \beta_0 + \beta_1 * LNMVE_i + \beta_2 * NBO_i + \beta_3 * NDA_i + \beta_4 * WPB_i + \beta_4 * PROM\_CLUB_i + \beta_5 * LNMVE * PROM\_CLUB_i + \beta_6 * NBO * PROM\_CLUB_i + \beta_7 * NDA * PROM\_CLUB_i + \beta_8 * WPB * PROM\_CLUB_i + \beta_9 * PRE\_06_i + \beta_{10} * STDEV_i + \beta_{11} * BHR12_i + u_i \quad (18)$$

where

NBO is the number of non-binding offers for the target;
NDA is the number of non-disclosure agreements for the target;
WPB is the number of written private bids for the target.

In these regressions, *LNMVE* is the proxy for deal size and *NBO, NDA,* and *WPB* are proxies for the potential number of bidders. In controlling for the number of potential bidders, I exclude the number of potential bidders contacted by the selling firm and its investment banker, as this is a somewhat noisy measure of competition (see Section 3.2.4). Moreover, the actual number of bidders that submit a formal public offer is not included, as the measure of interest in this analysis is the *potential* number of bidders (see Section 2.1.1). Equation (17) enables me to test the validity of Hypotheses 3 and 4; I include Equation (18) to examine whether any potential relationship I find is

stronger or less strong in the subsample of prominent club acquirers. Once more, *LRATIO, Cash, Profitability,* and *Tobin's Q* are redundant and omitted in these regressions. However, *LNMVE* is an explanatory variable interest, and is included regardless of possible redundancy. A pre-2006 dummy is again included to increase the robustness of the results.

4.3 Ex-post buyout performance of target companies

To analyse the ex-post buyout performance of club deal targets, I compare consortium-backed buyouts to a matched sample of sole-sponsored buyouts on their performance on measures for growth, profitability and productivity.

4.3.1 Regression models to analyse target firm growth

It its most simple form I use the following model to examine the link between target firm growth and private equity consortiums:

$$\textit{Target firm growth} = f(\textit{Club deal dummy, Control variables}) \qquad (19)$$

which means that growth (the dependent variable) is a function of there being multiple private equity acquirers or not and various control variables (independent variables). As discussed in Section 3, I use three different independent variables to proxy target firm growth: *GROWTH1, GROWTH2,* and *GROWTH3,* as defined in Table 7.[27] Moreover, I use two different models for the first variable. Econometrically the regression formulas are:

[27] A quick recapitulation:
GROWTH1 is the growth in *Ln*(total assets) from t_{-1} to t_{+3};
GROWTH2 is the growth in *Ln*(number of employees (FTE)) from t_{-1} to t_{+3};
GROWTH3 is the growth in *Ln*(turnover) from t_{-1} to t_{+3}.

$$GROWTH1_i = \beta_0 + \beta_1 * CLUB_i + \beta_2 * GROWTH\_ASSETS1_i + \beta_3 * LRATIO_i + \beta_4 * LNMVE_i + \beta_5 * STDEV_i + \beta_6 * PRE\_06_i + \beta_7 * AGRI_i + \beta_8 * CONSTR_i + \beta_9 * MANU_i + \beta_{10} * TRADE_i + \beta_{11} * TRANS_i + u_i \quad (20)$$

$$GROWTH1_i = \beta_0 + \beta_1 * CLUB_i + \beta_2 * ASSETS1_i^2 + \beta_3 * LNMVE_i + \beta_4 * STDEV_i + \beta_5 * PRE\_06_i + \beta_6 * AGRI_i + \beta_7 * CONSTR_i + \beta_8 * MANU_i + \beta_9 * TRADE_i + \beta_{10} * TRANS_i + u_i \quad (21)$$

$$GROWTH2_i = \beta_0 + \beta_1 * CLUB_i + \beta_2 * STDEV_i + \beta_3 * AGE_i + \beta_4 * PRE\_06_i + \beta_5 * AGRI_i + \beta_6 * CONSTR_i + \beta_7 * MANU_i + \beta_8 * TRADE_i + \beta_9 * TRANS_i + u_i \quad (22)$$

$$GROWTH3_i = \beta_0 + \beta_1 * CLUB_i + \beta_2 * SALES_i^2 + \beta_3 * AGE_i + \beta_4 * PRE\_06_i + \beta_5 * AGRI_i + \beta_6 * CONSTR_i + \beta_7 * MANU_i + \beta_8 * TRADE_i + \beta_9 * TRANS_i + u_i \quad (23)$$

where

GROWTH_ASSETS1 is the growth in Ln(total assets) from t_{-2} to t_{-1};
ASSETS1 is Ln(total assets) in t_{-1};
EMPLOYEES1 is Ln(employees) in t_{-1};
SALES is Ln(turnover) in t_{-1};
AGE equals the target's age in years at the time of the buyout;
AGRI, CONSTR, MANU, TRADE, and *TRANS* are industry dummies.

Thus, when looking at the logarithmic growth rate of total assets from year t_{-1} to t_{+3}, I control for both the past growth of total assets (from t_{-2} to t_{-1}) in Equation (20) and the level of total assets in the year prior to the deal (t_{-1}) in Equation (21), as do Scellato and

Ughetto (2013). When analysing the logarithmic growth rate of turnover I only control for the turnover in the year prior to the deal. In Equation (22), the number of employees prior to the buyout is not helpful in explaining the growth of employees after the buyout, and is therefore omitted from the regression. Wilson *et al.* (2012) include industry risk as a dependent variable in their regression. To infer ceteris paribus conclusions about how club deals affect growth I aim to control for proxies of target risk as well. I proceed to include *LNMVE* (proxy for risk associated with target size), *LRATIO* (proxy for cash flow risk) and *STDEV* (proxy for risk associated with information complexity) from Section 3.4 in every model. However, *LNMVE* is redundant in equation (22) and (23); *LRATIO* is redundant in Equation (21), (22), and (23); *STDEV* is redundant in Equation (23). Pre-deal profitability (EBIT/total assets in t_{-1}) is redundant in all regressions. Finally, the target buy-and-hold stock return for the twelve months preceding the buyout announcement is not able to explain any variance in the dependent variables.

In the matching methodology described in Section 3.3.2, I already control for major industry classifications, as well as the date of the acquisition, when forming a matched sample of sole-sponsored LBO targets. Nonetheless, for additional robustness, I include variables controlling for industry and time period in my regressions as well. The sample size in my regressions is, unfortunately, quite low (ranging from 38 to 112), which renders it impossible for me to create a control variable for every year and every SIC industry classification. Instead, I opt to control for any structurally different effects prior to 2006 with the same pre-2006 dummy used in previous regressions; and I use six major industry dummies. The industry dummies are defined as follows: *AGRI* denotes agriculture, forestry, and fishing companies (SIC codes 01-09); *CONSTR* denotes construction and mining companies (SIC codes 10-17); *MANU* is the classification for manufacturing companies (SIC codes 20-39); *TRANS* concerns transportation and public utilities companies (SIC codes 40-49); and *TRADE* denotes both wholesale and retail trade companies (SIC codes 50-59). The final industry classification (services: SIC codes 70 – 89) is left out of the regressions to prevent difficulties in calculating the OLS estimators. SIC codes 60-67 (finance, insurance, real estate) and SIC codes 91-99 (public administration) are not present in the sample set.

Following the analysis in Section 4.2, I am also interested in the performance of prominent club deals and club deals occurring prior to 2006 on the three measures of growth, as well as any difference in performance between my U.S. and European sample. However, I compare consortium-backed buyouts to a matched sample of sole-sponsored buyouts. Any subsample (e.g. the subsample of prominent consortium-backed buyouts) should be compared *only* to the sole-sponsored buyouts matched to that specific subsample. Therefore, I run the regressions above several times for multiple different subsamples: 1) a subsample of prominent club deal targets and their respective matched sole-sponsored LBO targets; 2) U.S. club deals targets and matched companies; 3) European club deals targets and matched companies; and 4) pre-2006 club deal targets and matched companies. In the regressions on the first two subsamples I once again include dummy variable equal to 1 if the target company resides in Europe.

4.3.2 Regression models to analyse target firm profitability

Here, I use the same model to examine the link between target firm profitability and private equity consortiums:

$$\textit{Target firm profitability} = f(\textit{Club deal dummy, Control variables}) \quad (24)$$

which again means that profitability (the dependent variable) is a function of there being multiple private equity acquirers or not and various control variables (independent variables). As discussed in Section 3, I use four different variables to measure operating profitability, each with two specifications: one where the mean operating profitability is measured in the three-year window after the buyout, and one where the operating profitability is measured in year t_{+3}. These specifications are in line with previous research on the ex-post profitability of buyouts (see, e.g., Cressy *et al.*, 2007; Scellato & Ughetto, 2013). This results in a total of eight different dependent

variables. [28] Furthermore, I use one regression model per dependent variable. Econometrically the regression formulas look as follows[29]:

$$PROF1A_i = \beta_0 + \beta_1 * CLUB_i + \beta_2 * PROF1_i + \beta_3 * ASSETS1_i^2 + \beta_4 * LNMVE_i + \beta_5 * PRE\_06_i + \beta_6 * AGRI_i + \beta_7 * CONSTR_i + \beta_8 * MANU_i + \beta_9 * TRADE_i + \beta_{10} * TRANS_i + u_i \quad (25)$$

$$PROF2A_i = \beta_0 + \beta_1 * CLUB_i + \beta_2 * PROF2_i + \beta_3 * ASSETS1_i^2 + \beta_4 * LNMVE_i + \beta_5 * PRE\_06_i + \beta_6 * AGRI_i + \beta_7 * CONSTR_i + \beta_8 * MANU_i + \beta_9 * TRADE_i + \beta_{10} * TRANS_i + u_i \quad (26)$$

$$PROF3A_i = \beta_0 + \beta_1 * CLUB_i + \beta_2 * PROF3_i + \beta_3 * ASSETS1_i^2 + \beta_4 * LNMVE_i + \beta_5 * PRE\_06_i + \beta_6 * AGRI_i + \beta_7 * CONSTR_i + \beta_8 * MANU_i + \beta_9 * TRADE_i + \beta_{10} * TRANS_i + u_i \quad (27)$$

$$PROF4A_i = \beta_0 + \beta_1 * CLUB_i + \beta_2 * PROF4_i + \beta_3 * ASSETS1_i^2 + \beta_4 * LNMVE_i + \beta_5 * PRE\_06_i + \beta_6 * AGRI_i + \beta_7 * CONSTR_i + \beta_8 * MANU_i + \beta_9 * TRADE_i + \beta_{10} * TRANS_i + u_i \quad (28)$$

where

[28] To recapitulate:
PROF1A is the mean EBITDA/total assets from t_{+1} to t_{+3};
PROF2A is the mean EBIT/total assets from t_{+1} to t_{+3};
PROF3A is the mean EBITDA/turnover from t_{+1} to t_{+3};
PROF4A is the mean EBIT/turnover from t_{+1} to t_{+3};
PROF1B equals EBITDA/total assets in t_{+3};
PROF2B equals EBIT/total assets in t_{+3};
PROF3B equals EBITDA/turnover in t_{+3};
PROF4B equals EBIT/turnover in t_{+3}.

[29] The regression models for *PROF1B*, *PROF2B*, *PROF3B*, and *PROF4B* are equal to the regression models for *PROF1A*, *PROF2A*, *PROF3A*, and *PROF4A*, respectively. Here, only the regression formulas for the former are shown. The formulas for the latter are omitted for reasons of brevity.

PROF1 equals EBITDA/total assets in t_{-1};
PROF2 equals EBIT/total assets in t_{-1};
PROF3 equals EBITDA/turnover in t_{-1};
PROF4 equals EBIT/turnover in t_{-1}.

Redundant variables omitted from these equations are *LRATIO*, *STDEV*, the target buy-and-hold stock return for the twelve months preceding the buyout announcement, and target age at the time of the buyout. I run these regressions not only for the complete sample of club deal targets and associated matched companies, but also for the four different subsamples described in Section 4.3.1. Europe-dummies are included in the first two subsamples.

4.3.3 Regression models to analyse target firm productivity

To examine productivity, I specify a production function where the output (value added) is related to labour and capital inputs, along with some control variables and the club deal dummy. Following previous studies of the impact of buyouts on productivity (e.g. Wilson *et al.*, 2012; Harris *et al.*, 2005) the production function specification is Cobb-Douglas. In its most simple form the regression model looks as follows:

$$\textit{Value added} = f(\textit{Capital, Labour, Club deal dummy, Control variables}) \qquad (29)$$

As discussed in Section 3, I use three different independent variables to proxy target firm productivity: *PRODUCT1A*, *PRODUCT1B*, and *PRODUCT1C*.[30] The first variable is designed to test Hypothesis 7 ("*Consortium-backed LBO targets show higher levels of productivity* growth *in comparison to sole-sponsored LBO targets*"); whereas the other two variables are used to perform additional tests that examine the differences in absolute levels of productivity after a buyout. I test each variable with a single regression model. Econometrically the regression formulas look as follows:

[30] *PRODUCT1A* equals the growth in *Ln*(value added) from t_{-1} to t_{+3};
PRODUCT1B equals the mean *Ln*(value added) from t_{+1} to t_{+3};
PRODUCT1C equals *Ln*(value added) in t_{+3}.

$$PRODUCT1A_i = \beta_0 + \beta_1 * GROWTH\_ASSETS2_i + \beta_2 * GROWTH\_EMPLOYEES_i + \beta_3 * CLUB_i + \beta_4 * LNMVE_i + \beta_5 * PRE\_06_i + \beta_6 * AGRI_i + \beta_7 * CONSTR_i + \beta_8 * MANU_i + \beta_9 * TRADE_i + \beta_{10} * TRANS_i + u_i \quad (30)$$

$$PRODUCT1B_i = \beta_0 + \beta_1 * AVG\_ASSETS2_i + \beta_2 * AVG\_EMPLOYEES_i + \beta_3 * CLUB_i + \beta_4 * LNMVE_i + \beta_5 * PRE\_06_i + \beta_6 * AGRI_i + \beta_7 * CONSTR_i + \beta_8 * MANU_i + \beta_9 * TRADE_i + \beta_{10} * TRANS_i + u_i \quad (31)$$

$$PRODUCT1C_i = \beta_0 + \beta_1 * ASSETS2_i + \beta_2 * EMPLOYEES2_i + \beta_3 * CLUB_i + \beta_4 * LNMVE_i + \beta_5 * PRE\_06_i + \beta_6 * AGRI_i + \beta_7 * CONSTR_i + \beta_8 * MANU_i + \beta_9 * TRADE_i + \beta_{10} * TRANS_i + u_i \quad (32)$$

where

GROWTH_ASSETS2 is the growth in Ln(total assets) from t_{-1} to t_{+3};
GROWTH_EMPLOYEES is the growth in Ln(employees) from t_{-1} to t_{+3};
AVG_ASSETS is the average value of Ln(total assets) over t_{+1} to t_{+3};
AVG_EMPLOYEES is the average value of Ln(employees) over t_{+1} to t_{+3};
ASSETS2 is Ln(total assets) in t_{+3};
EMPLOYEES2 is Ln(employees) in t_{+3}.

Thus, I control for capital (total assets) and labour (employees) over the same period in which value added is measured in the dependent variable. I further again include a club deal dummy to find out if there is a positive productivity differential of consortium-backed firms over sole-sponsored LBO targets. Redundant variables omitted from these equations are *STDEV*, *LRATIO*, *AGE*, and the target buy-and-hold stock return for the twelve months preceding the buyout announcement. Again, it would be interesting to

see if prominent club deal targets perform better on these measures of productivity than club deal targets in general, and if performance on productivity has changed since 2006. Unfortunately, I cannot run these regressions for subsamples of prominent club deal targets or pre-2006 club deal targets, as decreasing the already small sample size (N = 48) would severely harm the reliability of the regressions.

4.4 Other possible motives for club formation

Boone and Mulherin (2011) find evidence that the use of consortiums by private equity firms is related to proxies for scale, risk and information complexity, indicating that clubs are formed for competitive, non-collusive reasons. To see if I find similar results in my dataset, I largely follow their methodology in this section.

I want to estimate the probability that an observation (a target company) with particular characteristics (particular values for scale, risk, and information complexity) will fall into a specific one of two categories (consortium-backed buyout or sole-sponsored buyout). In this case the dependent variable is the aforementioned club deal-dummy, which is binary and explains a qualitative event, rather than having a quantitative meaning. The multiple linear regression model with a binary dependent variable is called the linear probability model: the OLS estimates are now interpreted as changes in the probability of "success" (dependent variable = 1), given a one-unit increase in the corresponding explanatory variable (Woolridge, 2015). However, with a binary dependent variable the population model is no longer linear in its parameters and the first Gauss-Markov assumption is violated. Not surprisingly, the linear probability model has drawbacks: it can produce probabilities that are less than zero or greater than one and it contains heteroscedasticity, which can invalidate test statistics. Therefore, I divert from the multiple linear regression model as discussed in Section 4.2.1. Similar to Boone and Mulherin (2011), my empirical model is a probit regression with a maximum likelihood estimation. It its most simple form I use the following model to examine the link between private equity consortiums and the three rationales for club formation:

$$\textit{Club deal dummy} = f(\textit{Target size, Target risk, Information complexity, Control variables}) \tag{33}$$

The dependent variable equals one when the winning bidder is a club of two or more private equity firms, and zero otherwise. The explanatory variables in the probit regression relate to the risk reduction, resource pooling, and information pooling incentives for club formation, as explained in Section 2. The model uses all deals where a private equity firm or club is the winning bidder.

Furthermore, to test for any possible differences in the motives for prominent private equity firms to join forces in a consortium, I run a separate regression with the aforementioned prominent club deal dummy as the dependent variable. As discussed in Section 3, I run two different models for the dependent variables: one including a control variable that measures the target firm's R&D expenditures and one without this variable. Econometrically the regression formulas look as follows:

$$CLUB_i = \beta_0 + \beta_1 * STDEV_i + \beta_2 * LRATIO_i + \beta_3 * LNMVE_i + \beta_4 * PRE\_06_i + u_i \tag{34}$$

$$CLUB_i = \beta_0 + \beta_1 * STDEV_i + \beta_2 * LRATIO_i + \beta_3 * LNMVE_i + \beta_4 * RDE_i + \beta_5 * PRE\_06_i + u_i \tag{35}$$

$$PROM\_CLUB_i = \beta_0 + \beta_1 * STDEV_i + \beta_2 * LRATIO_i + \beta_3 * LNMVE_i + \beta_4 * PRE\_06_i + u_i \tag{36}$$

$$PROM\_CLUB_i = \beta_0 + \beta_1 * STDEV_i + \beta_2 * LRATIO_i + \beta_3 * LNMVE_i + \beta_4 * RDE_i + \beta_5 * PRE\_06_i + u_i \tag{37}$$

where PRE_2006 controls for any possible differences in the incidence of consortiums prior to 2006. I run these regressions for the combined American and European sample, as well as for the U.S. sample and the European sample separately. In the first scenario

I once more include a Europe-dummy, that controls for differences in the incidence of (prominent) consortiums in Europe.

CHAPTER 5 – Empirical results

This chapter presents the results of the empirical analyses discussed in the previous chapter, and provides conclusions for all ten hypotheses posited in Chapter 2. The chapter is organized as follows. Section 5.1 presents the results of the event study, as well as the results of the subsequent regression analyses of abnormal target returns in private equity acquisitions. Section 5.2 then compares the ex-post buyout performance of consortium-backed targets on measures for growth, profitability and productivity to the ex-post buyout performance of a matched sample of sole-sponsored buyouts. Combining the results of these two sections enables me to draw conclusions on the economic impact of club deals in LBOs. Furthermore, I conclude whether value creation and/or collusion are likely rationales for club formation. As a cross-check, Section 5.3 presents the results of the probit regressions testing whether the use of consortiums by private equity firms is related to proxies for scale, risk and information complexity.

5.1 Abnormal returns to target shareholders

This section presents the results of the event study, as well as the results of the subsequent regression analyses of abnormal target returns in private equity acquisitions. Here, I aim to provide a definitive answer to my first four hypotheses. To recapitulate, the hypotheses read:

> ***H1****: Target shareholders in club deals by prominent private equity firms receive significantly lower premia than target shareholders in sole-sponsored LBOs.*
>
> ***H2****: The club deal discount in acquisitions by prominent private equity acquirers has become less pronounced in 2006 – 2015, when compared to 2000 – 2005.*

***H3**: In a club deal the acquisition premium is negatively related to deal size.*

***H4**: In a club deal the acquisition premium is positively related to the potential number of bidders.*

5.1.1 Results of the event study

The first major question in my analysis concerns the effect that bidding by private equity clubs has on the prices paid in corporate takeovers. If these clubs engage in collusion, then prices paid in club deals should be measurably *lower* than prices paid in sole-sponsored LBOs; if clubs are able to create more value in their targets, and target firm shareholders capture part of the additional value created, then prices paid in club deals should be measurably *higher* than prices paid in sole-sponsored LBOs. In Chapter 2, I further hypothesise that prominent private equity firms have more market power to constrain competition with meaningful pricing consequences. Moreover, I argue that there may be a shift in the premia paid in club deals in 2006, due to increased financial media attention to club deals in 2005 and the start of an investigation by the U.S. Department of Justice to the practice in 2006. Using the event study methodology as explained in Section 4.2.1, I calculate the Cumulative Abnormal Returns (CARs) of 450 private equity targets in my sample over the market model, in three different event windows.

Table 10 displays the means of the cumulative abnormal return measure classified by acquirer type, deal period, and across three different samples (combined, U.S., and Europe). The far right columns show the difference between, first, average club deal CARs and average sole-sponsored deal CARs, and second, average prominent club deals CARs and average CARs of deals with other types of bidders. From these four columns, it immediately becomes clear that the differences in the first categorization (club deals versus sole-sponsored private equity deals) are substantially smaller than the differences in the second categorization (prominent club deals versus non-

prominent sole-sponsored deals, prominent sole-sponsored deals, and non-prominent club deals). Moreover, the difference in abnormal returns paid in prominent club deals vis-à-vis other types of deals is mostly negative prior to 2006, and mostly positive post 2005. I conduct two-sided *t*-tests to see whether the observed differences are significantly different from zero, and find that in the full sample, second categorization, pre-2006 deals, the cumulative abnormal returns of prominent club deals in both the *markup* and the *premium* event windows are significantly *lower* than the CARs of sole-sponsored deals (both non-prominent *and* prominent). The economic magnitude of the difference is substantial at -15.1% for non-prominent sole-sponsored deals and -17.4% for prominent sole-sponsored deals over the longest event window. Thus, prior to 2006, target shareholders gain considerably less from acquisitions by clubs of prominent private equity acquirers than from acquisitions by other types of private equity acquirers. In the separate pre-2006 U.S. sample the difference is only significant for the *markup* event window, and in the pre-2006 Europe sample the difference is only significant for non-prominent sole-sponsored deals, though the number of observations is significantly smaller in these subsamples.

In the post-2005 subsample, prominent clubs deals have a *higher* CAR than all other types of deals in all event windows. This difference is however only significant at the 10% for the *runup* event window when comparing prominent club deals with prominent sole-sponsored deals, and insignificant otherwise. In the post-2005 U.S. sample this difference is mostly positive as well, but not significant; whereas in the post-2005 European subsample there is an insignificant positive difference between prominent club deals and both types of sole-sponsored deals in all event windows, and a significant insignificant positive difference between prominent club deals and non-prominent club deals. The difference is substantial at +25.0%. The mostly insignificant results for the *runup* measures throughout Table 10 suggest that pre-announcement information leakage or deal anticipation is not different in club deals than in other types of deals. This finding is consistent with the findings of Officer *et al.* (2010).

Table 10

Cumulative abnormal returns in private equity acquisitions. This table reports the average values of abnormal target returns for the sample of 450 private equity takeovers. Abnormal target returns are cumulative abnormal returns (CARs) estimated using a market model for the 352 trading day period ending 127 trading days prior to the takeover announcement date, which is used as day 0. The market index is the Russell 3000 index for the U.S. market and the MSCI Europe index for the European market. Data are reported first for the *Sole PE deals* and *Club deals* bidder categories as defined in the legend to Table 1, and second for whether one or more of the acquirers is a prominent private equity firm. A private equity firm is classified as prominent according to the methodology set out in Section 3.2.3. *Non-prom. sole PE* is a dummy variable equal to one if the winning bidder is a single, non-prominent private equity acquirer. *Prominent sole PE* is a dummy variable equal to one if the winning bidder is a single prominent private equity acquirer. *Non-prom. club* is a dummy variable equal to one if the winning bidder is two or more non-prominent private equity firms. *Prominent club* is a dummy variable equal to one if the winning bidder is two or more private equity firms, of which at least one can be classified as prominent. Data are shown first for the full sample, and subsequently for the deals in which the announcement data falls prior to 2006 and after 2005, respectively. The CARs are estimated for three different event windows around the deal announcement date: *runup* (-42, -1), *markup* (0, +126), and *premium* (-42, +126). Panel A reports the CARs for the combined sample, Panel B for the U.S. sample, and Panel C for the European sample. The far right columns provide the difference between the mean CAR in the (prominent) club deal sample and all other samples. ***, **, and * indicate that a two-sided *t*-test, testing the null hypothesis that the means of the (prominent) club deal sample and the other samples are equal, can be rejected at the 1%, 5%, and 10% levels, respectively.

Panel A: Combined American and European sample													
		All deals, Categorization I		All deals, Categorization II				*t*-test					
		Sole PE deals	Club deals	Non-prom. sole PE	Prominent sole PE	Non-prom. club	Prominent club	Club - Sole	Prom. club - NP sole		Prom. club - Prom. sole		Prom. club - NP club	
All deals	N	315	135	213	102	69	66							
	Runup (-42, -1)	5.24%	7.09%	5.80%	4.07%	4.39%	9.91%	1.85%	4.11%		5.84%		5.52%	
	Markup (0, +126)	21.99%	17.91%	22.81%	20.29%	16.48%	19.40%	(4.09%)	(3.41%)		(0.88%)		2.93%	
	Premium (-42, +126)	27.23%	24.99%	28.61%	24.36%	20.86%	29.31%	(2.88%)	0.70%		4.96%		8.45%	
Pre-2006 deals	N	95	45	70	25	27	18							
	Runup (-42, -1)	7.06%	6.08%	6.52%	8.58%	4.85%	7.92%	(0.98%)	1.40%		(0.66%)		3.07%	
	Markup (0, +126)	17.44%	11.12%	17.41%	17.52%	17.90%	0.94%	(6.32%)	**(16.47%)**	***	**(16.58%)**	**	**(16.96%)**	***
	Premium (-42, +126)	24.50%	17.19%	23.93%	26.10%	22.75%	8.86%	1.60%	**(15.07%)**	**	**(17.24%)**	*	(13.90%)	
Post-2005 deals	N	220	90	143	77	42	48							
	Runup (-42, -1)	4.46%	7.59%	5.45%	2.61%	4.09%	10.66%	3.14%	5.20%		**8.05%**	*	6.57%	
	Markup (0, +126)	23.96%	21.30%	25.46%	21.18%	15.56%	26.33%	(2.66%)	0.87%		5.14%		10.77%	
	Premium (-42, +126)	28.42%	28.89%	30.91%	23.79%	19.65%	36.98%	(4.63%)	6.07%		13.19%		17.33%	

Table 10 (*continued*)

Panel B: U.S. Sample											
		All deals, Categorization I		All deals, Categorization II				*t*-test			
		Sole PE deals	Club deals	Non-prom. sole PE	Prominent sole PE	Non-prom. club	Prominent club	Club - Sole	Prom. club - NP sole	Prom. club - Prom. sole	Prom. club - NP club
All deals	N	205	86	138	67	42	44				
	Runup (-42, -1)	4.09%	7.11%	5.44%	1.32%	4.87%	9.24%	3.01%	3.80%	7.92%	4.37%
	Markup (0, +126)	25.08%	21.40%	26.20%	22.76%	20.42%	22.33%	(3.68%)	(3.88%)	(0.44%)	1.90%
	Premium (-42, +126)	29.17%	28.50%	31.64%	24.08%	25.29%	31.57%	(5.09%)	(0.07%)	7.49%	6.28%
Pre-2006 deals	N	48	23	34	14	16	7				
	Runup (-42, -1)	2.30%	6.28%	2.13%	2.72%	6.96%	4.75%	3.98%	2.62%	2.03%	(2.21%)
	Markup (0, +126)	23.56%	16.24%	22.88%	25.23%	22.39%	2.18%	(7.32%)	**(20.70%) ***	**(23.04%) ***	**(20.21%) ***
	Premium (-42, +126)	25.86%	22.53%	25.00%	27.95%	29.35%	6.93%	2.08%	(18.07%)	(21.01%)	(22.42%)
Post-2005 deals	N	157	63	104	53	26	37				
	Runup (-42, -1)	4.64%	7.41%	6.52%	0.95%	3.58%	10.09%	2.77%	3.57%	9.14%	6.51%
	Markup (0, +126)	25.54%	23.28%	27.29%	22.11%	19.21%	26.14%	(2.26%)	(1.15%)	4.03%	6.93%
	Premium (-42, +126)	30.18%	30.68%	33.81%	23.06%	22.79%	36.23%	(7.12%)	2.42%	13.17%	13.44%

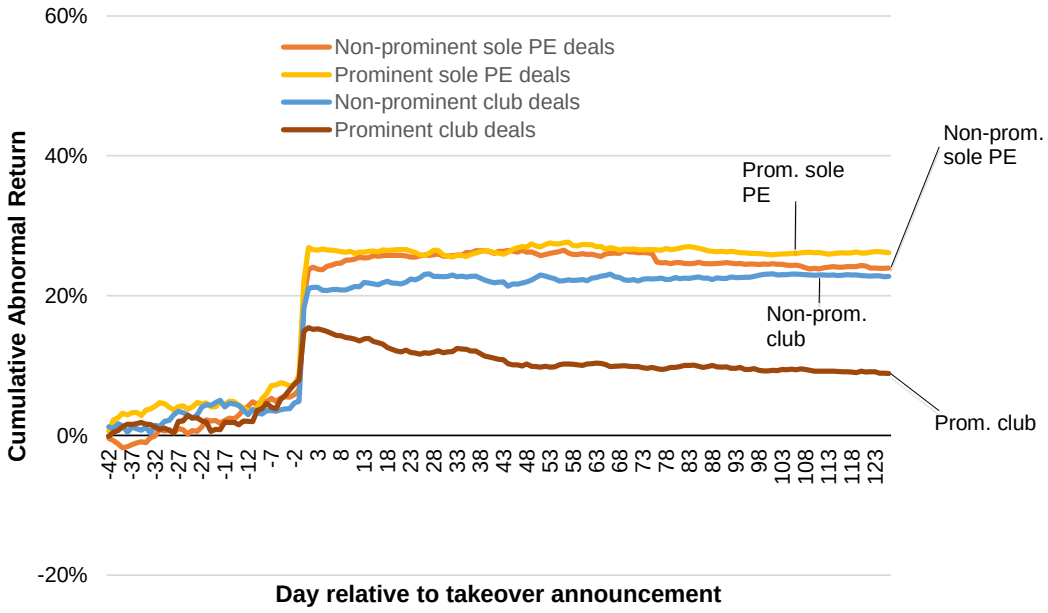
Panel C: European sample											
		All deals, Categorization I		All deals, Categorization II				*t*-test			
		Sole PE deals	Club deals	Non-prom. sole PE	Prominent sole PE	Non-prom. club	Prominent club	Club - Sole	Prom. club - NP sole	Prom. club - Prom. sole	Prom. club - NP club
All deals	N	110	49	75	35	27	22				
	Runup (-42, -1)	7.38%	7.05%	6.47%	9.33%	3.64%	11.24%	(0.33%)	4.77%	1.91%	7.60%
	Markup (0, +126)	16.24%	11.78%	16.57%	15.55%	10.34%	13.55%	(4.46%)	(3.02%)	(1.99%)	3.22%
	Premium (-42, +126)	23.63%	18.84%	23.04%	24.88%	13.98%	24.80%	1.25%	1.76%	(0.08%)	10.82%
Pre-2006 deals	N	47	22	36	11	11	11				
	Runup (-42, -1)	11.92%	5.86%	10.67%	16.03%	1.79%	9.93%	(6.06%)	(0.74%)	(6.10%)	8.15%
	Markup (0, +126)	11.18%	5.76%	12.24%	7.72%	11.37%	0.15%	(5.42%)	**(12.09%) ****	(7.57%)	(11.22%)
	Premium (-42, +126)	23.11%	11.62%	22.91%	23.75%	13.16%	10.08%	0.64%	**(12.83%) ***	(13.67%)	(3.08%)
Post-2005 deals	N	63	27	39	24	16	11				
	Runup (-42, -1)	4.00%	8.03%	2.60%	6.26%	4.92%	12.56%	4.03%	9.96%	6.29%	7.64%
	Markup (0, +126)	20.02%	16.69%	20.56%	19.13%	9.62%	26.96%	(3.33%)	6.39%	7.82%	**17.33% ***
	Premium (-42, +126)	24.02%	24.72%	23.16%	25.40%	14.54%	39.52%	1.38%	16.35%	14.12%	**24.98% ****

A more striking way to look at the results in Table 10 is that prior to 2006, over the *premium* period, target shareholders gain 195% *greater* abnormal returns, on average, if the acquisition is by a prominent sole private equity firm rather than a prominent club (26.10% vs. 8.86%). Post-2005 target shareholders need to settle for, on average, 36% *smaller* abnormal returns in the same scenario (23.79% vs. 36.98%). This large difference is important, as it provides a first indication that prominent private equity firms mainly influence the abnormal returns paid if they join forces in a club, and to a much lesser extent when they acquire targets by themselves.

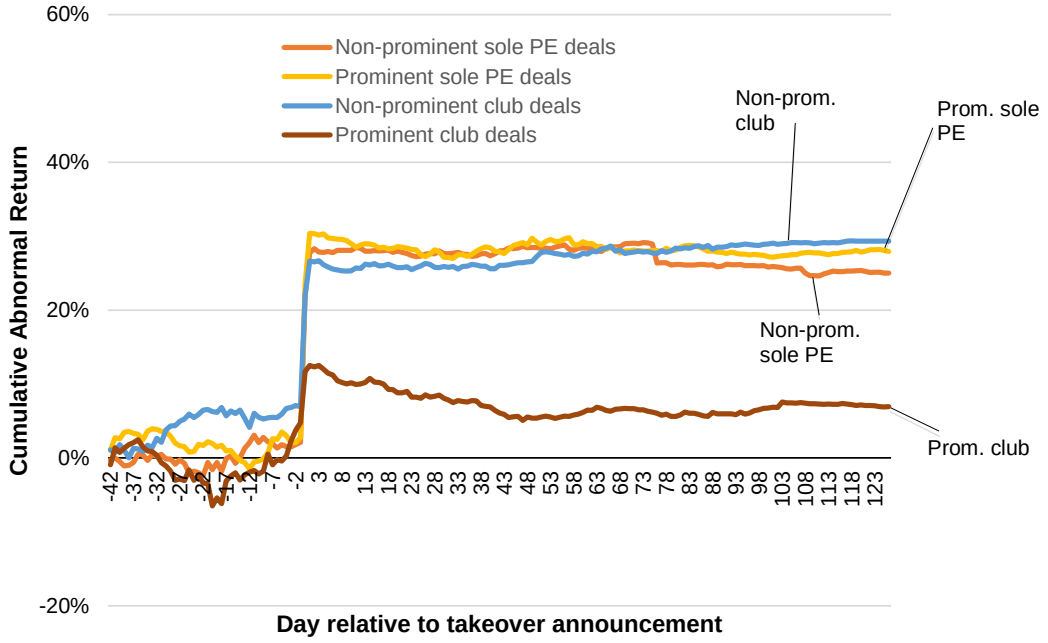
The CARs of the pre-2006 deals are graphed for all three samples in Figure 1, and the CARs of the post-2005 deals for all three samples are graphed in Figure 2. The second categorization of bidder types is used in both figures, as the first categorization reveals less significant differences. The graphs for the first categorization of bidder types are, however, included in the Appendix, as are all graphs for the combined sample of pre-2006 and post-2005 deals. In Figure 1 and 2, the dark red line reports prominent club deal targets return over the full (*premium*) event window. The sample size for each graph is the same as that reported in Table 10. It is noteworthy that prior to 2006, in the period centred around the announcement date (day 0), the return to prominent club deals is already visibly smaller that the return to any other type of bidders. Moreover, following the announcement date the return to prominent club deals trends *downwards*, whereas the return to other types of bidders remains relatively flat. In contrast, post-2005 the announcement date-return to prominent club deals is somewhat equal to the return of prominent and non-prominent sole-sponsored PE deals (but higher than the return to non-prominent club deals), and following the announcement date the return trends *upwards* (whereas the return to other types of bidders, again, remains relatively flat). Either way, it seems that when a prominent club acquires a target, part of the absorption of information into equity prices occurs only after the announcement date. Figure 1 displays especially striking results in the U.S. subsample (Panel B): whereas the average CARs paid by the other categories of bidders are very much alike, the average CARs paid by prominent clubs are substantially lower over the *markup* window.

Figure 1
Cumulative Abnormal Returns in private equity acquisitions – Pre-2006 deals. *Non-prominent sole PE deals, Prominent sole PE deals, Non-prominent club deals,* and *Prominent club deals* are dummy variables for deal categories described in the legend to Table 10. Day 0 is the deal announcement date. All deals included in these graphs have deal announcement dates that fall prior to 2006. Panel A reports the CARs for the combined sample, Panel B for the U.S. sample, and Panel C for the European sample.

Panel A: Combined American and European sample



Panel B: U.S. sample



Panel C: European sample

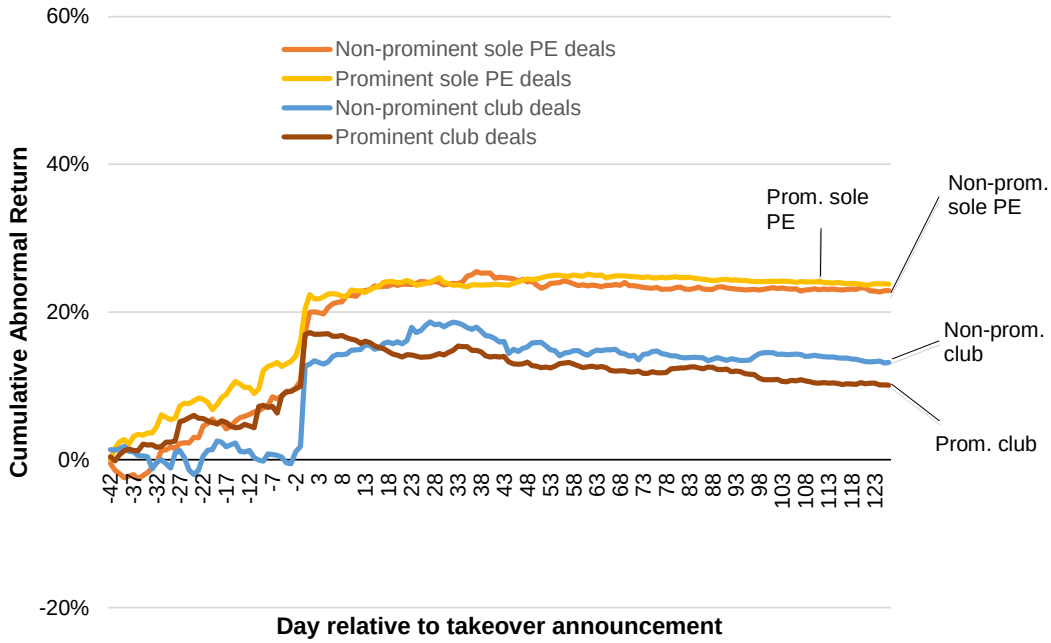
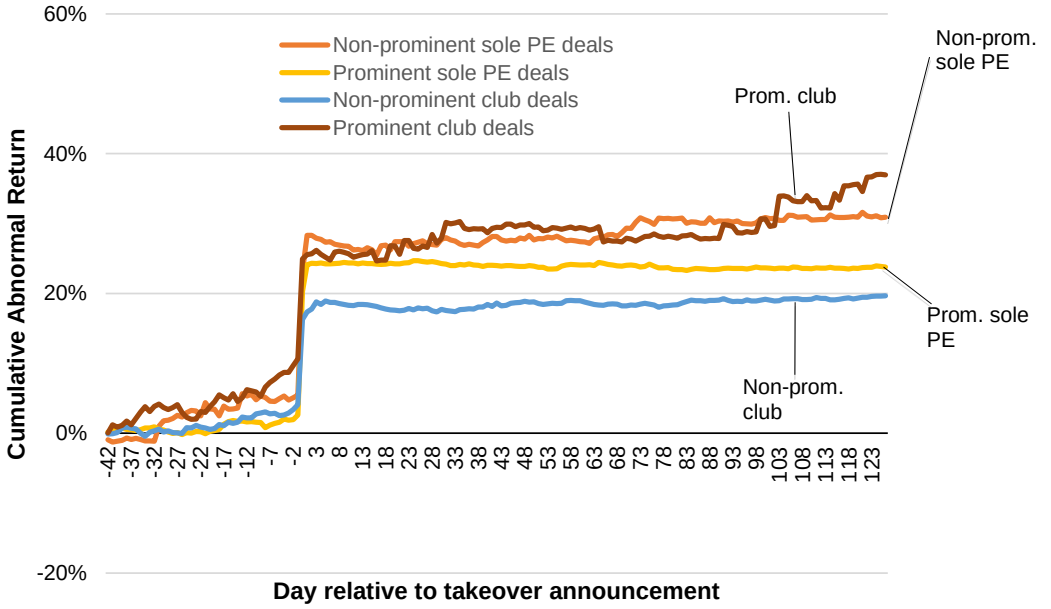
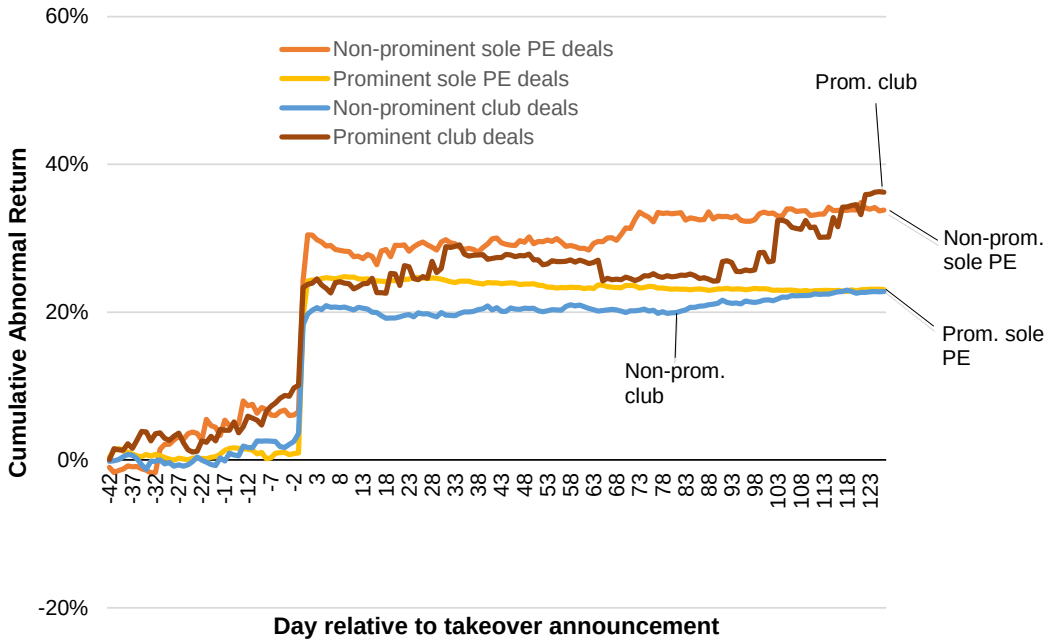


Figure 2
Cumulative Abnormal Returns in private equity transactions – Post-2005 deals. Cumulative Abnormal Returns – Pre-2006 deals. *Non-prominent sole PE deals*, *Prominent sole PE deals*, *Non-prominent club deals*, and *Prominent club deals* are dummy variables for deal categories described in the legend to Table 10. Day 0 is the deal announcement date. All deals included in these graphs have deal announcement dates that occur post-2005. Panel A reports the CARs for the combined sample, Panel B for the U.S. sample, and Panel C for the European sample.

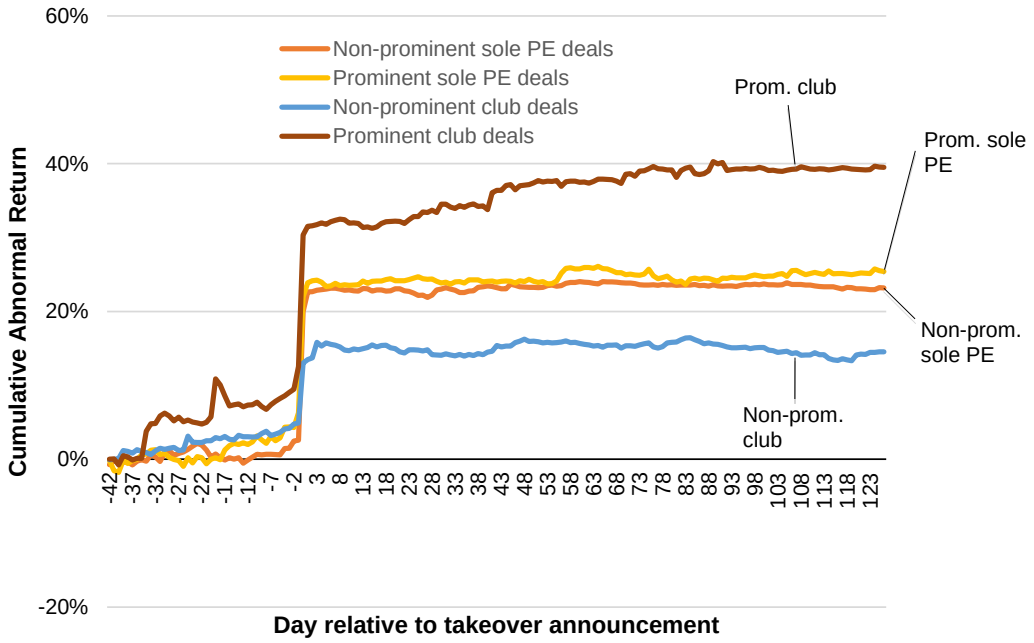
Panel A: Combined American and European sample



Panel B: U.S. sample



Panel C: European sample



Furthermore, in the European subsample (Panel C in both Figure 1 and 2) it is noteworthy that prior to 2006, prominent club deals and non-prominent club deals (the blue line) seem to follow a similar trend: the CARs of both types of deals are substantially lower than the CARs of prominent and non-prominent sole-sponsored private equity deals. However, post-2005 the contrast between prominent and non-prominent club deals could not be greater, with the return to prominent club deals being far higher than the return to sole-sponsored deals, and the return to non-prominent club deals being far lower.

Overall the results of this event study show that, without controlling for deal and target characteristics, the difference between average acquisition premia paid in club deals and sole-sponsored LBOs is relatively small. The difference between average acquisition premia paid in prominent club deals and other types of deals, on the other hand, is large. In fact, prominent club acquirers paid a significantly lower acquisition premium than other types of bidders prior to 2006, which gives a first indication that these larger private equity firms might have the market power to meaningfully influence prices and competition. The differences changed signs post-2005, which indicates that the increased financial media and government scrutiny to the practice of club deals had an effect on prices paid. However, it is possible that prominent private equity clubs pay different premia to targets shareholders than do other types of acquirers because they seek to acquire different types of firms. It is also possible that the difference between acquisition premia paid in club deals versus sole-sponsored deals becomes more pronounced once I control for target characteristics. In the regression analyses in the next section I find out whether the observed results hold.

5.1.2 Regression analyses of abnormal target returns

Next, I aim to find out if the observed differences in acquisition premia are statistically significant once I control for several target and deal characteristics that might have an effect on the acquisition premium paid. To this end, I run regression analyses of target CARs. Table 11 reports the regression analyses. As described in the methodology section of this paper, I run all regressions on the abnormal returns of the *premium* (-42

to +126) event window, as academics have argued that longer event windows better capture the revelation of information prior to the formal announcement of a takeover as well as the evolution of the likely success of a deal over the full extent of the takeover process (Boone & Mulherin, 2011). Moreover, the post-announcement date trends in the average CARs of prominent club deals in Figure 1 and 2 confirm the importance of using a long event window.

Explanatory variables include a dummy for private equity consortiums, comparing the results to those of single private equity bidders (models I and II); or dummies for prominent single private equity bidders, non-prominent consortiums, and prominent consortiums, comparing the results to those of non-prominent single bidders (models III and IV). In all models, I control for possible structural differences in abnormal returns in pre-2006 acquisitions. Moreover, models II and IV explicitly measure whether the impact of (prominent) clubs on target premia is more negative in the period prior to 2006. I further include a Europe-dummy in Panel A to account for structural any differences in CARs paid to European target shareholders. The significance of this dummy in all models generates considerable interest in analysing the results from the American and European subsample separately in Panel B and C.

To control for target characteristics, I include the standard deviation of stock returns calculated from 273 days before the announcement date to 20 days before the announcement date, as well as the compound return to the target's stock over the one year immediately preceding the beginning of the *runup* period. Lastly, in the European subsample (Panel C), the target's leverage ratio and total turnover, both measured in the fiscal year preceding deal announcement, have some additional explanatory power. Other proxies for target characteristics that the literature has found to be important in explaining returns to target shareholders are not able to do so once I control for *STDEV* and *Prior 12-month return*. Additional robustness tests could not reject the null hypothesis that the following variables do not belong to the equations at a 10% significance level: the natural logarithm of the target market value of equity at the end of the fiscal year before the buyout announcement date (*LNMVE*); a dummy variable equal to 1 for acquisitions in which the payment is all cash (*Cash*); target EBIT/total assets calculated in the fiscal year preceding the announcement date (*Profitability*); and

the target's Q ratio (defined in Kaplan and Zingales, 1997), calculated in the fiscal year preceding the announcement date (*Tobin's Q*). In an effort to maximize the precision of the OLS estimators these variables are omitted from the regressions.[31]

Model I reveals that, without controlling for pre-2006 club deals, I can find no significant difference in abnormal returns paid to club deal target shareholders whatsoever. However, the pre-2006 dummy is negative and significant. Not surprisingly, the results in model II, where I control for pre-2006 club deals, are far more interesting. I find that 1) after 2005, target shareholders receive (on average) 10.2% *more* as a percentage of pre-bid equity value in club deals compared to sole-sponsored deals; 2) prior to 2006, target shareholders receive 16.7% *less* as a percentage of pre-bid equity value in club deals compared to sole-sponsored deals. Both results are significant at the 10% level. No significant difference was found in the first categorization of Table 10 in Section 5.1.1, but controlling for structural differences in Europe, as well as pre-bid risk and buy-and-hold return of the targets in these regressions, does reveal significant differences. I further find that pre-bid risk has a positive and highly significant effect on CARs, whereas pre-bid return has a negative and highly significant effect on CARs.

In summary, I find that club deal target shareholders receive statistically and economically significant lower abnormal returns prior to 2006; this discount is robust to controls for target and deal characteristics; and the discount completely disappears in the year in which the U.S. Department of Justice publicly reported that it was investigating private equity consortiums, and in which seven of the largest private equity firms worldwide were sued for collusion in a private litigation case. This evidence is consistent with that of Officer *et al*. (2010), and points towards collusive practices by private equity consortiums prior to 2006, though it is possible that the lower pricing of club deals is an inadvertent by-product of an unobserved benign motivation for club formation. Interestingly, the discount not only disappears in 2006, but also changes into a premium of 10.2% as a percentage of pre-bid equity value, again

[31] This way, I explicitly examine whether proxies for target size (*LNMVE*), target risk (*LRATIO*), and target information complexity (*STDEV*) are able to explain target CARs.

robust to controls for target characteristics. This is the first evidence I find in favour of value creation theory: if coalitions are able to pay more for their targets, it is likely that clubs indeed are able to create additional value, and target firm shareholders capture part of this value created.

In models III and IV of Table 11, I aim to further investigate the notion that *prominent* club acquirers have a larger impact in abnormal returns paid to target shareholders than do non-prominent club acquirers. To this end, I examine the differences in abnormal returns to target shareholder for four different acquirer groups: non-prominent single buyers, prominent single buyers, non-prominent club buyers, and prominent club buyers. Keeping in mind the large difference in abnormal returns paid prior to 2006 and post-2005, I am mostly interested in the results of model IV. The results indicate that the observed post-2005 club deal premium originates in deals involving prominent club acquirers, and not in deals involving non-prominent club acquirers. Post-2005, target shareholders receive (on average) 19.5% more of pre-bid firm equity value in prominent club deals vis-à-vis non-prominent sole-sponsored deals. The difference is significant at a 5% level. The abnormal returns to prominent sole-sponsored deals and non-prominent club deals are both not significantly different from the abnormal returns to non-prominent sole-sponsored deals. The fact that prominent clubs are able to pay significantly more for their targets is consistent with the theory that these prominent private equity firms often join forces with each other for the purpose of value creation. Chapter 2 explains that firms form alliances to facilitate inter-firm learning and to gain access to the other firm's capabilities. It is not unlikely that the private equity firms classified as prominent have achieved this dominant position in their industry due to superior asymmetric capabilities. In this case, the synergies between these prominent private equity partners and the target firm are likely to be large.

When looking at the subsample of European deals (Panel C), I find similar results, as prominent clubs pay 18.0% more in pre-bid target firm equity value than do non-prominent sole-sponsored acquirers (significant at the 10% level), whereas the abnormal returns from other types of acquirers are insignificantly different from those of non-prominent sole-sponsored acquirers. In the American subsample (Panel B), the results are slightly more ambiguous since both prominent club acquirers and prominent

sole sponsored acquirers pay more in pre-bid target firm equity value than do non-prominent sole-sponsored acquirers. However, the difference is higher for prominent club acquirers than it is for prominent sole-sponsored acquirers (23.5% versus 15.0%), as is the significance level (4.84% versus 5.56%). In conclusion I find evidence for higher abnormal returns to target shareholders in prominent club deals vis-à-vis other types of private equity deals post-2005, both in Europe and the United States.

Much like the post-2005 results, I find that the pre-2006 club deal discount originates in deals involving prominent club acquirers, and not in deals involving non-prominent club acquirers. In fact, prior to 2006, target shareholders receive (on average) 20.1% less of pre-bid firm equity value in prominent club deals vis-à-vis non-prominent sole-sponsored deals. The difference is significant at a 10% level. Once more, the abnormal returns to prominent sole-sponsored deals and non-prominent club deals are both not significantly different from the abnormal returns to non-prominent sole-sponsored deals. This is consistent with the theory that only prominent private equity firms have the market power to effectively influence prices and competition. The Europe-dummy is positive and significant, indicating that this effect might be more pronounced in my American subsample. Indeed, Panels B reveals that pre-2006 American target shareholders received a discount of no less than 34.3% in prominent club deals, compared to non-prominent sole-sponsored deals (significant at the 10% level); whereas abnormal returns to both prominent sole-sponsored deals and non-prominent club deals were not significantly different from the abnormal returns to non-prominent sole-sponsored deals. I find no evidence of a (prominent) club deal discount prior to 2006 *at all* in Europe (Panel C). The lack of significance could, however, be caused by the smaller number of observations in this subsample (there are 22 European club deals in the pre-2006 sample). Nonetheless, these results indicate that if collusive practices by private equity consortiums are the cause of the lower premia, collusion took place mostly in the U.S., only amongst prominent private equity consortiums, and only prior to 2006.

Table 11
Multivariate regression estimates explaining cumulative abnormal target returns. This table reports regressions of target returns for the subsample of 450 private equity deals for which target firm characteristics data is available. Target abnormal returns are estimated using the market model for the 252 trading days ending 127 trading days prior to the announcement date of the takeover, which is used as day 0. Returns are calculated for the *premium* (-42, +126) event window. *Club, Prominent sole PE, Non-prominent club,* and *Prominent club* are dummy variables for deal categories described in the legend to Table 10. *Pre-2006* is a dummy variable equal to 1 for deals announced prior to 2006. *Europe* is a dummy variable equal to 1 for European targets. *STDEV* is the standard deviation of stock returns calculated from 273 days before the announcement date to 20 days before the announcement date. *Prior 12-month return* is the compound return to the target's stock over the one year immediately preceding the beginning of the *runup* period (i.e. ending on trading day -43). Panel A reports the CARs for the combined sample, Panel B for the U.S. sample, and Panel C for the European sample. *t*-Statistics are in brackets. ***, **, and * indicate that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

Panel A: Combined American and European sample				
Dependent variable: CAR				
Model	I	II	III	IV
Club	0.048	**0.102***		
	[1.084]	[1.745]		
Prominent sole PE			**0.091***	0.089
			[1.939]	[1.509]
Non-prominent club			0.021	0.065]
			[0.411]	[1.038]
Prominent club			**0.137***	**0.195****
			[1.905]	[2.107]
Pre-2006	**-0.087***	-0.035	-0.078	-0.035
	[-1.815]	[-0.612]	[-1.640]	[-0.447]
Pre-2006 x Club		**-0.167***		
		[-1.792]		
Pre-2006 x Prominent sole PE				0.024
				[0.250]
Pre-2006 x Non-prominent club				-0.120
				[-0.966]
Pre-2006 x Prominent club				**-0.201***
				[-1.652]
STDEV	**16.534*****	**16.336*****	**16.742*****	**16.816*****
	[3.256]	[3.206]	[3.313]	[3.313]
Prior 12-month return	**-0.257*****	**-0.252*****	**-0.255*****	**-0.251*****
	[-4.492]	[-4.268]	[-4.479]	[-4.302]
Europe	**0.107****	**0.107****	**0.110****	**0.112****
	[2.399]	[2.406]	[2.450]	[2.497]
Intercept	-0.192	-0.212	-0.232	-0.250
	[-1.355]	[-1.454]	[-1.558]	[-1.617]
Observations	450	450	450	450
R-squared	0.489	0.491	0.493	0.496
Adjusted R-squared	0.483	0.484	0.485	0.485
F-statistic	84.906	71.343	61.501	43.230
Prob(F-statistic)	0.000	0.000	0.000	0.000
Akaike info criterion	1.462	1.462	1.462	1.470
Schwarz criterion	1.517	1.525	1.535	1.570
Hannan-Quinn criterion	1.484	1.487	1.491	1.510
Huber-White	Yes	Yes	Yes	Yes
Wald F-statistic	7.053	6.788	5.357	4.547
Prob(Wald F-statistic)	0.000	0.000	0.000	0.000

Table 11 (*continued*)

Panel B: U.S. sample				
Dependent variable: CAR				
Model	I	II	III	IV
Club	0.096	**0.137***		
	[1.588]	[1.771]		
Prominent sole PE			**0.150****	**0.150***
			[2.257]	[1.922]
Non-prominent club			**0.115***	0.125
			[1.833]	[1.512]
Prominent club			**0.176***	**0.235****
			[1.722]	[1.982]
Pre-2006	-0.095	-0.046	-0.085	-0.041
	[-1.277]	[-0.484]	[-1.155]	[-0.321]
Pre-2006 x Club		-0.157		
		[-1.196]		
Pre-2006 x Prominent sole PE				0.009
				[0.061]
Pre-2006 x Non-prominent club				-0.039
				[-0.244]
Pre-2006 x Prominent club				**-0.343***
				[-1.793]
STDEV	**17.350*****	**17.433*****	**17.651*****	**17.676*****
	[3.408]	[3.419]	[3.489]	[3.465]
Prior 12-month return	**-0.258*****	**-0.253*****	**-0.256*****	**-0.256*****
	[-3.793]	[-3.626]	[-3.808]	[-3.672]
Intercept	-0.231	-0.246	**-0.292***	**-0.304***
	[-1.603]	[-1.647]	[-1.866]	[-1.846]
Observations	291	291	291	291
R-squared	0.522	0.524	0.528	0.531
Adjusted R-squared	0.516	0.516	0.518	0.516
F-statistic	78.254	62.733	52.906	35.321
Prob(F-statistic)	0.000	0.000	0.000	0.000
Akaike info criterion	1.771	1.775	1.774	1.788
Schwarz criterion	1.834	1.851	1.862	1.914
Hannan-Quinn criterion	1.796	1.805	1.809	1.339
Huber-White	Yes	Yes	Yes	Yes
Wald F-statistic	9.415	7.648	7.702	5.517
Prob(Wald F-statistic)	0.000	0.000	0.000	0.000

Table 11 (*continued*)

Panel C: European sample				
Dependent variable: CAR				
Model	I	II	III	IV
Club	0.002	0.045		
	[-0.032]	[0.713]		
Prominent sole PE			0.021	0.014
			[0.360]	[0.180]
Non-prominent club			-0.071	-0.026
			[-1.047]	[-0.385]
Prominent club			0.113	**0.180***
			[1.622]	[1.783]
Pre-2006	-0.064	-0.028	-0.067	-0.034
	[-1.458]	[-0.559]	[-1.545]	[-0.605]
Pre-2006 x Club		-0.115		
		[-1.164]		
Pre-2006 x Prominent sole PE				0.032
				[0.278]
Pre-2006 x Non-prominent club				-0.121
				[-0.693]
Pre-2006 x Prominent club				-0.144
				[-1.282]
STDEV	**4.759***	**4.766***	**4.983****	**4.996****
	[1.750]	[1.791]	[2.006]	[2.014]
Prior 12-month return	**-0.213*****	**-0.212*****	**-0.216*****	**-0.215****
	[-2.709]	[-2.650]	[-2.731]	[-2.542]
LRATIO	0.137	0.133	0.178	0.175
	[1.166]	[1.155]	[1.508]	[1.500]
Sales (t_{-1})	-0.025	-0.023	**-0.034***	**-0.032***
	[-1.556]	[-1.497]	[-1.966]	[-1.896]
Intercept	**0.296*****	**0.273*****	**0.330*****	**0.304*****
	[2.763]	[2.657]	[2.965]	[2.877]
Observations	159	159	159	159
R-squared	0.203	0.211	0.232	0.244
Adjusted R-squared	1.170	0.173	0.189	0.185
F-statistic	6.159	5.500	5.396	4.111
Prob(F-statistic)	0.000	0.000	0.000	0.000
Akaike info criterion	0.261	0.264	0.250	0.274
Schwarz criterion	0.400	0.423	0.429	0.512
Hannan-Quinn criterion	0.317	0.329	0.323	0.371
Huber-White	Yes	Yes	Yes	Yes
Wald F-statistic	3.062	2.667	2.469	2.666
Prob(Wald F-statistic)	0.007	0.013	0.015	0.004

I interpret these results as partially supporting Hypothesis 1, as target shareholders in club deals by prominent private equity firms received significantly lower premia than target shareholders in sole-sponsored LBOs prior to 2006 – although the difference is more pronounced in the American subsample. Furthermore, I find strong support for Hypothesis 2. Not only has the club deal discount for larger firms has become less pronounced in 2006 – 2015, when compared to 2000 – 2005; I also find clear evidence for *higher* abnormal returns to target shareholders in prominent club deals vis-à-vis other types of private equity deals post-2005, both in Europe and the United States.

The adjusted R-squared measure is upward of 49% in the models in Panel A, and upward of 52% in the models of Panel B, which is fairly high for this type of research.[32] Despite the addition of two more explanatory variables (*LRATIO* and *Sales*) I am able to explain a significantly smaller proportion of the sample variation in target CARs in the European subsample. Nonetheless, the Wald *F*-statistic reveals that all tests are robust, and the adjusted R-squared measures are compatible with those in the research by Boone & Mulherin (2011).

5.1.3 Testing the value creation theory

Marquez and Singh (2013) argue that a focus on value creation in club deals can explain why acquisition premia paid is such deals are sometimes higher, and other times lower than the acquisition premia paid in sole-sponsored private equity deals. The authors create a theoretical model that focuses on the trade-off between value creation in a club and effects of club formation on bidder competition. As explained in Section 2.1.1, according to this model, the club's formation is bad for the target if there is a small number of potential bidders in an acquisition, and if bidding cost is high. For a large number of potential bidders and small bidding costs, the value creation effect of the

[32] The highest adjusted R-squared measure found in similar research by Boone and Mulherin (2011) is 21.5%, and the highest R-squared found in similar research by Officer *et al*. (2010) is 37%. These statistics should be compared with the statistics in Panel B of Table 11, as the abnormal returns to American shareholders are examined in both studies.

club begins to dominate, and the target is better off since it captures at least some of that value creation. This section examines whether the model by Marquez and Singh (2013) is able to explain the empirical results found in Section 5.2.1. To this end, I take deal size as a proxy for bidding costs, and use various measures of the level of takeover competition both in the pre-public bid period to bid announcement as described in Section 3.2.5. Due to limitations in data availability, I can only perform the analysis in the U.S. sample. Table 12 reports the regression analyses for a subsample of 104 American prominent and non-prominent club deals.

Prior research (e.g. Boone & Mulherin, 2011; Schwert, 2000) indicates that target size has a negative and significant effect on target returns, consistent with the model of Marquez and Singh (2013). However, as described in the previous section and shown in Table 12, **I find no significant effect of *LNMVE* on abnormal target returns once I control for *STDEV* and *Prior 12-month return*. These findings do not provide support for Hypothesis 3**. **I do find evidence, significant at the 5% level, that the acquisition premium paid is positively related to the number of potential buyers making written private bids. This is consistent with Hypothesis 4**. I do not find any significant effect for *NDA* (the number of potential bidders that execute a confidentiality agreement with the target) or *NBO* (the number of potential bidders submitting a non-binding acquisition proposal for the target), but this could be because these two measures of takeover competition are somewhat more noisy than *WPB*, the number of potential buyers that make written private bids. More problematic in using these results to explain my findings from the previous section is that, in model II, I find no significant effect of the *WPB* measure on the acquisition premia paid in prominent club deals. Table 11, Panel B shows that prominent club deals have a significant effect on the abnormal returns paid to target shareholders, and non-prominent club deals do not.

Table 12
Multivariate regression estimates explaining the effect of target size and number of potential bidders on cumulative abnormal target returns. This table reports regressions of target returns for the subsample of 104 private equity club deal acquisitions of U.S. targets for which data on the potential number of bidders is available. Target abnormal returns are estimated using the market model for the 252 trading days ending 127 trading days prior to the announcement date of the takeover, which is used as day 0. Returns are calculated for the *premium* (-42, +126) event window. *LNMVE* is the natural logarithm of the market value of equity, measured at the end of the fiscal year preceding the deal announcement date. *NDA* is the number of potential bidders that execute a confidentiality agreement with the target. *NBO* the number of potential bidders submitting a non-binding acquisition proposal for the target. *WPB* the number of potential buyers making written private bids. *Prominent club*, *Pre-2006*, *STDEV* , and *Prior 12-month return* are described in the legend to Table 11. *t*-Statistics are in brackets. ***, **, and * indicate that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

American club deal sample		
Dependent variable: CAR		
Model	I	II
LNMVE	-0.015	-0.019
	[-1.139]	[-0.825]
NBO	0.000	0.002
	[0.373]	[0.929]
NDA	-0.007	-0.007
	[-1.065]	[-0.774]
WPB	**0.065****	**0.081****
	[2.578]	[2.053]
Prominent club		-0.012
		[-0.061]
LNMVE x Prominent club		0.010
		[0.376]
NBO x Prominent club		-0.005
		[-1.197]
NDA x Prominent club		0.003
		[0.196]
WPB x Prominent club		-0.013
		[-0.240]
Pre-2006	-0.041	-0.051
	[-0.778]	[-0.935]
STDEV	**10.804*****	**10.892*****
	[4.185]	[4.168]
Prior 12-month return	**-0.269*****	**-0.275*****
	[-6.019]	[-5.680]
Intercept	0.054	0.033
	[0.396]	[0.180]
Observations	104	104
R-squared	0.404	0.427
Adjusted R-squared	0.361	0.352
F-statistic	9.299	5.658
Prob(F-statistic)	0.000	0.000
Akaike info criterion	-0.416	-0.359
Schwarz criterion	-0.212	-0.029
Hannan-Quinn criterion	-0.333	-0.225
Huber-White	No	No

I conclude that the value creation theory by Marquez and Singh (2013) is not able to *fully* explain the abnormal returns paid to target shareholders in club deals by prominent private equity acquirers in the United States. This does *not* mean that value creation cannot be a rationale for prominent private equity acquirers to join in clubs, or that there is no additional value created in club deals.[33] It *does*, however, make it unlikely that the observed differences in acquisition premia paid in the U.S. in Table 11 can be fully explained by value creation as a rationale for forming a coalition – other factors seem to be at play.

5.2 Ex-post performance of target companies

This paper sets out to analyse the economic impact of private equity club deals in LBOs. Section 5.1 presented empirical evidence showing that prior to 2006, prominent club deals had a negative impact on stock prices of target companies, and starting 2006, prominent club deals have a positive impact on stock prices of target companies. However, measuring possible improvements in economic performance of target companies by analysing the impact of club deals on stock prices is, by itself, not sufficient, as is explained in Section 2.1.2. Not only are scholars increasingly sceptical about the efficient markets hypothesis, but policy decisions regarding (in this case) club deals also hinge to a large extent on their economic efficiency (i.e., the "social" returns to buyouts), as opposed to their effects on share prices or profitability (i.e., the "private" returns to buyouts) (Harris *et al.*, 2005). To overcome these limitations in analysing economic efficiency of club deals, and to increase the robustness of my research, I complement my event study analysis from Section 5.1 with direct ex-post buyout performance measures. In this section, I present a set of OLS model specifications used to analyse the relationship between club deals and the ex-post performance of target firms. I compare the ex-post performance of club deal targets and matched sole-sponsored LBO targets along three dimensions: growth, profitability, and productivity. In doing so, I strive provide a definitive answer to the following three hypotheses:

[33] Empirical evidence on whether additional value is created in club deals is provided in Section 5.2.

***H5**: Consortium-backed LBO targets show higher levels of growth in comparison to sole-sponsored LBO targets.*

***H6**: Consortium-backed LBO targets show higher levels of profitability in comparison to sole-sponsored LBO targets.*

***H7:** Consortium-backed LBO targets show higher levels of productivity growth in comparison to sole-sponsored LBO targets.*

Due to data availability limitations, I am not able to conduct the analyses in this section over the exact sample of 450 private equity targets acquired in the transactions analysed in Section 5.1. Instead, I use 56 club deal targets from this sample for which ex-post buyout accounting data is available, as well as 56 matched sole-sponsored LBO targets from the same sample for which ex-post buyout accounting data is available.

5.2.1 Growth

Table 13 reports the regression analyses on target growth for a subsample of 56 American and European, prominent and non-prominent club deal targets for which ex-post buyout accounting data was available, as well as 56 matched sole-sponsored LBO targets. Panel A presents the results for the entire sample of 112 target companies. I am also interested in the performance of prominent club deals and club deals occurring prior to 2006 on the three measures of growth, as well as any difference in performance between my U.S. and European sample. However, I compare consortium-backed buyouts to a matched sample of sole-sponsored buyouts. Any subsample should be compared only to the sole-sponsored buyouts matched to that specific subsample. Therefore, I run the regressions several times for multiple different subsamples: Panel B presents a subsample of prominent club deal targets and their respective matched sole-sponsored LBO targets; Panel C presents U.S. club deals targets and matched companies; Panel D presents European club deals targets and matched companies; and Panel E presents pre-2006 club deal targets and matched companies.

GROWTH1, *GROWTH2*, and *GROWTH3* denote the growth in the natural logarithm of assets, employees, and turnover, respectively, from year t_{-1} to t_{+3} (where t denotes the fiscal year in which the acquisition was completed). Moreover, in Panel A and B I use two different models for *GROWTH1*: one where I control for the past growth of assets (t_{-2} to t_{-1}) and one where I control for the level of assets in the year prior to the deal (t_{-1}). The latter is better able to explain variance in the dependent variable, and from Panel B onwards, I solely rely on this model. Sales or turnover in the year prior to the deal is important in explaining the sample variation in *GROWTH3*, but the number of employees prior to the buyout is not helpful in explaining the growth of employees after the buyout, and is therefore omitted from the regression. In compliance with previous research (Scellato & Ughetto, 2013) I find a negative relationship between past size and subsequent growth rates in *GROWTH1* and *GROWTH3*. Moreover, older firms show lower growth, larger firms show higher growth, less risky firms (i.e. firms with a higher *LRATIO*) show higher growth, and firms with higher information complexity (*STDEV*) show higher growth. The pre-2006 control variables reveals no structural differences in growth for companies acquired prior to 2006; whereas the Europe dummy reveals that the growth in assets might be different for European companies.

The adjusted R-squared measure in *GROWTH1*, model II is 40%, and *GROWTH3* is 24%. I am able to explain a significantly smaller proportion of the sample variation in *GROWTH2* (adjusted R-squared is 9%). The Wald *F*-statistic reveals that regressions on the growth rate of employees are no longer robust at the 5% level from Panel C onwards, and therefore this regression is omitted from Panel C, D, and E.[34]

The dummy variable Club equals one for the subsample of firms that have been subject to a club deal in year t. **The results indicate that consortium-backed companies experience significantly higher growth in total assets, employees, and turnover compared to the control group across almost all regressions and model**

[34] Note that the regression on *GROWTH3* in Panel C is only robust at the 10% level. In this case, the low significance is caused by including the pre-2006 dummy as well as the three industry dummies, none of which is able to significantly explain any variation in the dependent variable. In a separate regression, not included for brevity, I drop these control variables, causing the *P*-value of the *F*-statistic to drop below 1%, whilst generating similar value and significance for the club deal dummy.

specifications, providing strong support for the Hypothesis 5.[35] In the full sample, I find that club deal targets are associated with (on average) 1.8% higher growth in assets, 2.1% higher growth in employees, and 2.8% higher growth in turnover over the t_{-1} to t_{+3} period, once I control for the aforementioned target characteristics. The results are significant at the 5% level. In the prominent club deal sample (Panel B), the regressions on *GROWTH2* and *GROWTH3* show higher values for the club-dummy, but in the regression on *GROWTH1*, i.e. growth in assets, the club deal dummy is not significant (*P* value equals 14.9%). Even though this could be the result of the smaller sample size, these results do not convince me that prominent private clubs perform even better than clubs in general on these measures of target growth. Furthermore, comparing Panel C with Panel D reveals that European club deal targets show higher and more significant growth after a buyout. Lastly, despite the small sample size in Panel E (N = 38), I find convincing evidence that consortium-backed companies experience significantly higher growth of total assets and turnover compared to the control group here as well. The outperformance is even higher and more significant than that in Panel A (4.6% higher growth in total assets and 5.7% higher growth in turnover, significant at the 1% level). This fact is potentially important, as it means that the in Section 5.1 observed discount to target shareholders in club deals prior to 2006 is not correlated with worse ex-post performance of the target companies in this sample on measures of growth.

[35] These results are especially impressive keeping in mind that previous academics (Cressy *et al.*, 2007; Scellato and Ughetto, 2013) find significant outperformance of sole-sponsored buyout targets on these measures of growth, compared to a matched sample of non-PE backed private companies.

Table 13
Multivariate regression estimates of the determinants of growth. This table presents regression estimates of the determinants of ex-post buyout target growth. *GROWTH1*, *GROWTH2*, and *GROWTH3* denote the growth in the natural logarithm of assets, employees, and turnover, respectively, from year t_{-1} to t_{+3} (where t denotes the fiscal year in which the acquisition was completed). *LRATIO*, *LNMVE*, and *STDEV* are defined as in Table 8. The definitions of the five industry dummies are provided in Section 4.3.1. *t*-Statistics are in brackets. ***, **, and * indicate that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

Panel A: All club deal targets & matched companies				
Dependent variable:	GROWTH1	GROWTH1	GROWTH2	GROWTH3
Model	I	II	I	I
Club	**0.017****	**0.018****	**0.021****	**0.028*****
	[2.077]	[2.512]	[2.146]	[4.577]
Growth assets ($t_{-2,}$ t_{-1})	**-0.372****			
	[-2.612]			
Assets^2 (t_{-1})		**-0.001*****		
		[-7.832]		
Sales^2 (t_{-1})				**-0.000*****
				[-2.705]
LRATIO	**-0.091*****			
	[-4.459]			
LNMVE	-0.004	**0.027*****		
	[-1.221]	[6.178]		
STDEV	**0.576****	**0.518****		
	[2.085]	[2.197]		
Age (t)			-0.000	**-0.000****
			[-1.157]	[-2.146]
Europe	**-0.017****	**-0.017****	-0.007	0.008
	[-2.128]	[-2.429]	[-0.679]	[1.269]
Pre-2006	0.003	0.005	-0.008	0.001
	[0.324]	[0.650]	[-0.745]	[0.240]
Industry: Agriculture	0.015	0.011	-0.008	0.008
	[0.676]	[0.577]	[-0.282]	[0.506]
Industry: Construction	0.003	0.022	0.033	0.001
	[0.159]	[1.187]	[1.205]	[0.038]
Industry: Manufacturing	-0.002	-0.000	**-0.024***	0.002
	[-0.172]	[-0.005]	[-1.698]	[0.206]
Industry: Transportation	**-0.027****	**-0.017***	**-0.027***	**-0.016***
	[-2.488]	[-1.760]	[-1.893]	[-1.846]
Industry: Wholesale/retail	-0.006	-0.002	-0.015	-0.004
	[-0.648]	[-0.222]	[-0.999]	[-0.493]
Intercept	**0.076*****	**0.080*****	0.015	**0.049*****
	[3.069]	[3.795]	[1.440]	[2.855]
Observations	112	112	104	112
R-squared	0.304	0.459	0.149	0.312
Adjusted R-squared	0.219	0.400	0.087	0.244
F-statistic	3.598	7.726	2.409	4.577
Prob(F-statistic)	0.000	0.000	0.026	0.000
Akaike info criterion	-3.588	-3.858	-3.089	-4.037
Schwarz criterion	-3.272	-3.567	-2.886	-3.770
Hannan-Quinn criterion	-3.460	-3.740	-3.007	-3.929
Huber-White	No	No	No	No

Table 13 (*continued*)

Panel B: Prominent club deal targets & matched companies			
Dependent variable:	GROWTH1	GROWTH2	GROWTH3
Model	I	I	I
Club	0.013	**0.026****	**0.032*****
	[1.532]	[2.265]	[3.988]
$Assets^2(t_{-1})$	**-0.001*****		
	[4.985]		
$Sales^2(t_{-1})$			**-0.000***
			[-1.724]
LNMVE	**0.024*****		
	[4.076]		
STDEV	**0.865*****		
	[3.028]		
Age (t)		-0.000	-0.000
		[-0.908]	[-1.663]
Europe	-0.013	-0.002	0.013
	[-1.468]	[-0.146]	[1.457]
Pre-2006	-0.003	-0.003	-0.002
	[-0.410]	[-0.213]	[-0.213]
Industry: Construction	0.006	0.032	-0.003
	[0.283]	[1.148]	[-0.156]
Industry: Manufacturing	-0.005	**-0.040****	-0.002
	[-0.452]	[2.212]	[-0.205]
Industry: Transportation	**-0.025****	-0.030*	-0.015
	[-2.359]	[-1.955]	[-1.569]
Industry: Wholesale/retail	-0.004	-0.018	-0.002
	[-0.397]	[-1.012]	[-0.194]
Intercept	**0.063****	0.016	**0.039***
	[2.348]	[0.561]	[1.814]
Observations	82	74	82
R-squared	0.436	0.218	0.284
Adjusted R-squared	0.356	0.122	0.194
F-statistic	5.482	2.269	3.172
Prob(F-statistic)	0.000	0.033	0.003
Akaike info criterion	-3.841	-3.076	-3.949
Schwarz criterion	-3.518	-2.796	-3.656
Hannan-Quinn criterion	-3.711	-2.964	-3.831
Huber-White	No	No	No

Panel C: U.S. club deal targets & matched		
Dependent variable:	GROWTH1	GROWTH3
Model	I	I
Club	0.005	**0.022****
	[0.762]	[2.567]
$Assets^2(t_{-1})$	**-0.002*****	
	[-5.413]	
$Sales^2(t_{-1})$		**-0.000****
		[-2.610]
LRATIO	**0.065****	
	[2.033]	
LNMVE	**0.036*****	
	[4.739]	
STDEV	0.661	
	[1.214]	
Pre-2006	0.005	-0.010
	[0.591]	[-1.121]
Industry: Manufacturing	0.000	0.011
	[0.015]	[0.927]
Industry: Transportation	0.000	0.001
	[0.008]	[0.057]
Industry: Wholesale/retail	-0.002	0.003
	[-0.193]	[0.327]
Intercept	**0.068****	**0.061****
	[2.438]	[2.504]
Observations	56	56
R-squared	0.533	0.190
Adjusted R-squared	0.442	0.091
F-statistic	5.838	1.915
Prob(F-statistic)	0.000	0.097
Akaike info criterion	-4.518	-4.172
Schwarz criterion	-4.157	-3.919
Hannan-Quinn criterion	-4.378	-4.074
Huber-White	No	No

Table 13 (*continued*)

Panel D: European club deal targets & matched		
Dependent variable:	GROWTH1	GROWTH3
Model	I	I
Club	**0.037*** **	**0.037*** **
	[3.359]	[4.246]
Assets^2 (t_{-1})	**-0.001*** **	
	[-5.503]	
Sales^2 (t_{-1})		-0.000
		[-1.327]
LNMVE	**0.029*** **	
	[4.096]	
Age (t)		**-0.000***
		[-1.826]
Pre-2006	0.013	0.012
	[1.161]	[1.340]
Industry: Agriculture	0.006	0.003
	[0.245]	[0.196]
Industry: Construction	0.030	-0.013
	[1.328]	[-0.745]
Industry: Manufacturing	-0.003	-0.012
	[-0.198]	[-0.976]
Industry: Transportation	**-0.034***	**-0.037*** **
	[-2.010]	[-2.944]
Industry: Wholesale/retail	0.004	-0.015
	[0.248]	[-1.061]
Intercept	**0.071** **	**0.048** **
	[2.477]	[2.343]
Observations	56	56
R-squared	0.521	0.457
Adjusted R-squared	0.427	0.351
F-statistic	5.552	4.308
Prob(F-statistic)	0.000	0.000
Akaike info criterion	-3.455	-3.917
Schwarz criterion	-3.093	-3.773
Hannan-Quinn criterion	-3.315	-3.861
Huber-White	No	No

Panel E: Pre-2006 club deal targets & matched		
Dependent variable:	GROWTH1	GROWTH3
Model	I	I
Club	**0.046*** **	**0.057*** **
	[3.155]	[4.329]
Assets^2 (t_{-1})	**-0.001*** **	
	[-3.256]	
Sales^2 (t_{-1})		-0.000
		[-1.362]
Age (t)	**0.000***	
	[2.000]	
Europe	-0.009	0.019
	[-0.535]	[1.442]
Industry: Construction	0.028	0.035
	[0.846]	[1.258]
Industry: Manufacturing	-0.011	0.005
	[-0.549]	[0.286]
Industry: Transportation	**-0.048***	-0.028
	[-1.942]	[-1.277]
Industry: Wholesale/retail	-0.024	-0.004
	[-1.298]	[-0.311]
Intercept	**0.136*** **	0.023
	[3.363]	[0.713]
Observations	38	38
R-squared	0.472	0.474
Adjusted R-squared	0.326	0.352
F-statistic	3.239	3.866
Prob(F-statistic)	0.009	0.004
Akaike info criterion	-3.425	-3.692
Schwarz criterion	-3.253	-3.563
Hannan-Quinn criterion	-3.364	-3.646
Huber-White	No	No

5.2.2 Profitability

The second dimensions that I explore to test the real effects of club deals is profitability. Academics such as Cressy *et al*. (2007) find that private equity-backed buyouts have higher post-buyout operating profitability than comparable companies ("The Jensen hypothesis"), and I aim to find out if the operating profitability of private equity consortium-backed buyouts is even higher. I use four different measures of operating profitability. *PROF1* is EBITDA scaled by total assets, *PROF2* is EBIT scaled by total assets, *PROF3* is EBITDA scaled by turnover, and *PROF4* equals EBIT scaled by turnover. Moreover, following previous academics (Cressy *et al*., 2007; Scellato & Ughetto, 2013) I opt to use two different model specifications: in specification *A*, the dependent variable is the mean operating profitability in the three-year window after the buyout. In specification *B*, the dependent variable is the operating profitability in year t_{+3}. Results are presented in Table 14.

The findings do not support Hypothesis 6. In fact, I find no significant correlation between the *Club* variable and the profitability of the target firms in any of the model specifications. Similar to the equations for growth in the previous section, I run the profitability regressions several times for multiple different subsamples, including a subsample of prominent club deal targets, U.S. club deals targets, European club deals targets and pre-2006 club deal targets. In all subsamples, no significant out- or underperformance of the consortium-backed companies vis-à-vis the control group of sole-sponsored private equity-backed buyouts is found.[36] In line with previous research (Cressy *et al*., 2007; Scellato and Ughetto, 2013), past profitability is positive and highly significant for all model specifications, stressing the presence of considerable firm-level persistence in profitability.

[36] The regression estimates of these models are excluded from Table 14 for reasons of brevity.

Table 14
Multivariate regression estimates of the determinants of profitability. This table presents regression estimates of the determinants of ex-post buyout target profitability. *PROF1* is EBITDA scaled by total assets, *PROF2* is EBIT scaled by total assets, *PROF3* is EBITDA scaled by turnover, and *PROF4* equals EBIT scaled by turnover. In specifications *A*, the dependent variable is the mean operating profitability in the three-year window after the buyout. In specifications *B*, the dependent variable is the operating profitability in year t_{+3}. t denotes the fiscal year in which the acquisition was completed. *LNMVE* is defined as in Table 8. The definitions of the five industry dummies are provided in Section 4.3.1. *t*-Statistics are in brackets. ***, **, and * indicate that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

All club deal targets & matched companies				
Dependent variable:	PROF1A	PROF1B	PROF2A	PROF2B
Club	0.009	-0.016	0.008	-0.021
	[0.440]	[-0.555]	[0.354]	[-0.733]
EBITDA/total assets (t_{-1})	**0.813*** **	**0.844*** **		
	[9.233]	[7.575]		
EBIT/total assets (t_{-1})			**0.878*** **	**0.935*** **
			[9.466]	[7.497]
Assets^2 (t_{-1})	**0.002*** **	**0.003*** **	**0.002*** **	**0.002*** **
	[4.751]	[4.048]	[4.195]	[3.424]
LNMVE	**-0.065*** **	**-0.080*** **	**-0.057*** **	**-0.066*** **
	[-4.624]	[-4.193]	[-3.983]	[-3.400]
Europe	0.029	**0.049***	**0.042***	**0.058***
	[1.312]	[1.700]	[1.918]	[1.957]
Pre-2006	-0.004	-0.015	0.000	-0.006
	[-0.169]	[-0.523]	[0.014]	[-0.189]
Industry: Agriculture	-0.065	-0.057	-0.074	-0.031
	[-1.146]	[-0.739]	[-1.284]	[-0.392]
Industry: Construction	**-0.097***	-0.069	**-0.095***	-0.072
	[-1.722]	[-0.908]	[-1.668]	[-0.926]
Industry: Manufacturing	-0.018	-0.022	-0.006	-0.005
	[-0.612]	[-0.568]	[-0.213]	[-0.132]
Industry: Transportation	**-0.060***	-0.059	**-0.065** **	-0.061
	[-1.943]	[-1.435]	[-2.095]	[-1.456]
Industry: Wholesale/Retail	**-0.047***	-0.054	-0.037	-0.046
	[-1.750]	[-1.510]	[-1.365]	[-2.260]
Intercept	-0.047	-0.015	-0.080	-0.053
	[-0.757]	[-0.179]	[-1.296]	[-0.638]
Observations	110	112	110	112
R-squared	0.511	0.400	0.521	0.394
Adjusted R-squared	0.456	0.334	0.467	0.328
F-statistic	9.312	6.058	9.679	5.918
Prob(F-statistic)	0.000	0.000	0.000	0.000
Akaike info criterion	-1.586	-0.993	-1.559	-0.934
Schwarz criterion	-1.291	-0.702	-1.264	-0.642
Hannan-Quinn criterion	-1.466	-0.875	-1.439	-0.816
Huber-White	No	No	No	No

Table 14 (*continued*)

All club deal targets & matched companies				
Dependent variable:	PROF3A	PROF3B	PROF4A	PROF4B
Club	-0.028	-0.032	-0.022	-0.037
	[-0.656]	[-0.948]	[-0.540]	[-1.037]
EBITDA/turnover (t_{-1})	**0.960*** **	**0.919*** **		
	[7.136]	[8.740]		
EBIT/turnover (t_{-1})			**0.625*** **	**0.644*** **
			[4.213]	[4.844]
Assets^2 (t_{-1})	0.001	0.001	0.001	0.001
	[0.940]	[1.489]	[1.484]	[1.501]
LNMVE	-0.027	-0.034	-0.036	-0.025
	[-0.987]	[-1.578]	[-1.379]	[-1.057]
Pre-2006	0.039	0.019	0.047	0.036
	[0.896]	[0.567]	[1.147]	[0.966]
Europe	0.016	0.010	**0.071***	0.057
	[0.361]	[0.287]	[1.750]	[1.570]
Industry: Agriculture	**0.238** **	0.043	-0.026	0.065
	[2.072]	[0.479]	[-0.236]	[0.672]
Industry: Construction	-0.048	0.019	-0.100	-0.034
	[-0.418]	[0.215]	[-0.933]	[-0.353]
Industry: Manufacturing	0.032	-0.023	0.038	-0.013
	[0.538]	[-0.490]	[0.684]	[-0.270]
Industry: Transportation	-0.002	-0.042	-0.032	-0.063
	[-0.027]	[-0.869]	[-0.562]	[-1.218]
Industry: Wholesale/Retail	0.013	-0.033	0.052	-0.028
	[0.227]	[-0.763]	[0.616]	[-0.597]
Intercept	0.040	0.025	-0.108	-0.087
	[-0.334]	[0.270]	[-0.951]	[-0.860]
Observations	112	112	112	112
R-squared	0.391	0.485	0.216	0.264
Adjusted R-squared	0.324	0.429	0.130	0.184
F-statistic	5.826	8.593	2.502	3.269
Prob(F-statistic)	0.000	0.000	0.008	0.001
Akaike info criterion	-0.180	-0.673	-0.305	-0.526
Schwarz criterion	0.111	-0.382	-0.014	-0.235
Hannan-Quinn criterion	-0.062	-0.555	-0.187	-0.408
Huber-White	No	No	No	No

5.2.3 Productivity

To overcome the aforementioned limitations when analysing economic efficiency of buyouts, Harris *et al.* (2005) assert that a more desirable methodological approach is to assess the productivity of target companies before and after the transaction. The authors find that in the U.K., plants involved in MBOs were less productive (measured in total factor productivity) than other plants in the same industry before experiencing a buyout, but that the productivity gains were higher after the buyout. They subsequently conclude that MBOs are a useful mechanism for reducing agency costs and enhancing economic efficiency. Wilson *et al*. (2012) find similar results, and also find that the efficiency differential is positive in the post-buyout period. Here, I apply a similar approach to club deals. Following the methodology of Wilson *et al*. (2012), I specify a production function where the output (value added) is related to labour and capital inputs, along with some control variables and a club deal dummy.

I use three different production functions in this analysis. In the first, I account for the possibility that consortium-backed LBO targets are even less productive than sole-sponsored LBO targets ex-ante, and measure the productivity *growth*. Here, the dependent variable (*PRODUCT1A*) equals the growth in *Ln*(value added) from t_{-1} to t_{+3}. In the regression, I observe how much of the output growth can be explained by labour and capital growth during the same period of time, along with several controls for target characteristics, and which part of the output growth can be explained by a club deal dummy. In the other two production functions, the independent variables are *PRODUCT1B* (the mean *Ln*(value added) from t_{+1} to t_{+3}) and *PRODUCT1C* (the natural logarithm of value added in t_{+3}), respectively. Labour and capital inputs in the regressions are again measured in the same time period as the dependent variable. Controls for target characteristics and a club deal dummy are added as well.

Table 15
Multivariate regression estimates of the determinants of productivity. This table presents regression estimates of the determinants of ex-post buyout target productivity and productivity growth. *PRODUCT1A* equals the growth in *Ln*(value added) from t_{-1} to t_{+3}; *PRODUCT1B* equals the mean *Ln*(value added) from t_{+1} to t_{+3}; *PRODUCT1C* equals *Ln*(value added) in t_{+3}. t denotes the fiscal year in which the acquisition was completed. *LRATIO*, *LNMVE*, and *STDEV* are defined as in Table 8. *t*-Statistics are in brackets. ***, **, and * indicate that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively.

All club deal targets & matched companies			
Dependent variable:	PRODUCT1A	PRODUCT1B	PRODUCT1C
Club	**0.037****	-0.115	-0.028
	[2.220]	[-0.601]	[-0.138]
Growth assets (t_{-1}, t_{+3})	**0.410*****		
	[2.754]		
Growth FTE (t_{-1}, t_{+3})	**0.558*****		
	[3.642]		
Average assets (t_{+1}, t_{+3})		**0.526*****	
		[3.248]	
Average FTE (t_{+1}, t_{+3})		**0.312*****	
		[4.647]	
Assets (t_{+3})			**0.584*****
			[3.630]
FTE (t_{+3})			**0.335*****
			[4.774]
LNMVE	**-0.018*****	0.171	0.021
	[-2.907]	[1.056]	[0.133]
Pre-2006	0.027	-0.209	-0.136
	[1.601]	[-1.088]	[-0.667]
Industry: Agriculture	**0.123*****	-0.304	-0.209
	[4.074]	[-0.894]	[-0.578]
Industry: Construction	-0.069	0.320	0.207
	[-1.128]	[0.507]	[0.309]
Industry: Manufacturing	0.037	0.256	0.379
	[1.460]	[1.040]	[1.440]
Industry: Transportation	-0.000	-0.033	0.103
	[-0.011]	[-0.124]	[0.363]
Industry: Wholesale/Retail	0.001	-0.130	-0.046
	[0.044]	[-0.513]	[-0.173]
Intercept	**0.080***	1.530	1.463
	[2.005]	[1.180]	[1.122]
Observations	48	48	48
R-squared	0.670	0.867	0.846
Adjusted R-squared	0.581	0.830	0.804
F-statistic	7.527	23.878	20.280
Prob(F-statistic)	0.000	0.000	0.000
Akaike info criterion	-2.923	1.933	2.055
Schwarz criterion	-2.494	2.362	2.483
Hannan-Quinn criterion	-2.761	2.095	2.217
Huber-White	No	No	No

Value added data is not available for any of the American targets in my sample. Table 15 reports the regression analyses on target productivity for a subsample of 24 European (prominent and non-prominent) club deal targets for which value added data was available, as well as 24 matched sole-sponsored LBO targets. Redundant variables omitted from these equations are *STDEV*, *LRATIO*, *AGE*, and the target buy-and-hold stock return for the twelve months preceding the buyout announcement. Once more, I control for structural differences in productivity prior to 2006, as well as in several major industry groups. Unfortunately, I cannot run these regressions for subsamples of prominent club deal targets or pre-2006 club deal targets, as decreasing the already small sample size ($N = 48$) would severely harm the reliability of the regressions. **The first productivity function shows that, after controlling for growth in assets and employees, as well as target size prior to the buyout, club deal targets experience (on average) 3.7% higher productivity growth than the control sample of sole-sponsored buyouts over the (t_{-1}, t_{+3}) period. The differential is significant at the 5% level. This finding strongly supports Hypothesis 7**. This means that club acquirers are better able to grow the value added (i.e. the "income" of not only company shareholders, but also suppliers of loan capital, employees, and the government) of their targets whilst keeping the workforce and assets constant, than are sole-sponsored private equity acquirers (in the first three years after the buyout). The other two production functions reveal no significant out- or underperformance of the consortium-backed companies vis-à-vis the control group of sole-sponsored private equity-backed buyouts on absolute measures of productivity after the buyout. This indicates that private equity club deals acquire targets with lower ex-ante productivity than do sole-sponsored private equity acquirers, but that the productivity gains are higher after the buyout.

The models appear well specified with strongly significant and positive signs on labour and capital inputs, in line with previous research (see, e.g., Wilson *et al.*, 2012). The R-squared measures for the *PRODUCT1B* and *PRODUCT1C* regressions are both high (86% and 84%, respectively) and compatible with those in similar research by Wilson *et al.* (2012). The R-squared measure for *PRODUCT1A* is lower, but still substantial at 51%, and well above the R-squared in similar research by Scellato and Ughetto (2013).

I further find evidence that target size is negatively associated with productivity growth. Overall, these results suggest that private equity consortiums are the superior mechanism for enhancing the economic efficiency of their targets in Europe.

As I am not able to estimate similar productivity functions for the U.S. sample of club deals and matched companies, I cannot measure if the in Section 5.1 observed discount to U.S. target shareholders in club deals prior to 2006 is correlated with actual worse ex-post productivity of the target companies in this sample.

5.2.4 Conclusion

In analysing the economic impact of private equity club deals in Sections 5.1 and 5.2, I find that prominent private equity club target shareholders received significantly lower acquisition premia in the U.S. prior to 2006, robust to controls for target characteristics. Moreover, this discount cannot be explained by lower ex-post performance of those targets on measures of growth or profitability, as compared to other club deal targets for which no discount is paid. Further, I find the distribution of the CARs in the American club deal sample cannot be fully explained by the value creation model of Marquez and Singh (2013). This evidence points towards collusive practices by prominent private equity consortiums, but only in the U.S. and prior to 2006. It is, however, possible that this lower pricing is not a consequence of collusion, but an inadvertent by-product of an unobserved (benign) motivation for club formation.

After 2005 I find that prominent private equity clubs pay a significant premium vis-à-vis other types of private equity acquirers (including non-prominent club acquirers) for their targets. Furthermore, Section 5.2 presents evidence that club deal targets significantly outperform a matched sample of sole-sponsored LBO targets on measures of growth, and that in Europe, club deal targets exhibit higher levels of productivity growth than sole-sponsored LBO targets after a buyout. This evidence makes it likely that value creation is a rationale for private equity bidders to join in clubs as well, especially concerning private equity clubs acquiring targets in Europe. Once more, it is also possible that this premium is not the result of deliberate value creation in

(prominent) clubs, but the by-product of a different, unobserved motivation for club formation.

Meanwhile, the ex-post buyout performance analysis reveals no indication of higher value creation in prominent club deals vis-à-vis non-prominent club deals, although the difference cannot be tested for the measures of productivity. This leaves the differences between the post-2005 CARs paid in prominent and non-prominent club deals unexplained. It is possible that the increased media and government attention to the practice of clubbing starting 2006 is mostly felt by prominent private equity acquirers, forcing them to give up a higher part of their additional value created after the buyout in the form of prices paid to target shareholders.

5.3 Other possible rationales for club formation

Boone and Mulherin (2011) argue that in applying the rule of reason to joint bidding in the market for corporate control, antitrust authorities would assess whether there was any evidence of competitive, non-collusive reasons for the formation of consortiums. One of such reasons for the formation of consortiums, value creation, has been examined in the previous sections. To examine if there is more evidence for such motivations, this section presents a model of consortium formation according to the methodology of Boone and Mulherin (2011). Using this model, I strive to answer my last three hypotheses. To recapitulate, the hypotheses read:

> ***H8****: There is a positive relation between the target firm's risk and the probability of club formation between private equity bidders.*
>
> ***H9****: There is a positive relation between deal size and the probability of club formation between private equity bidders.*
> ***H10****: There is a positive relation between information complexity and the probability of club formation between private equity bidders.*

The empirical model consists of several probit regressions, using the same sample of 450 private equity deals examined in Section 5.1. The dependent variables are dummy variables that equal 1 if the target firm is bought by two or more private equity firms (*Club*) or two or more private equity firms, of which at least one can be classified as prominent (*Prominent club*). The explanatory variables include target characteristics that are likely to influence the choice by a private equity firm to employ a consortium when bidding in a takeover, as well as a pre-2006 and a Europe dummy that control for any possible differences in the relative incidence of consortiums prior to 2006 and in Europe, respectively. Characteristics likely to influence the choice by a private equity firm to employ a consortium are target size (approximated by *LNMVE*), risk (approximated by *LRATIO*) and information complexity (approximated by *STDEV* and *RDE*).

The model of consortium formation is presented in Table 16. Panel A presents the results for the full sample, whereas Panel B and C present the results for the U.S. and European subsample, respectively. *RDE* suffers from data availability limitations and substantially reduces the size of the sample. Therefore, I include this variable only for the full sample and in separate regression models (model II and IV). The results are as follows. **Book leverage is negatively and significantly related to consortium formation in the U.S. As firm leverage ratios are inversely related to firm risk (Bradley *et al.*, 1984), this suggests that consortium formation is tied to considerations of risk. However, the effect disappears in the smaller sample of prominent club deal targets in Panel B, whereas it is not visible at all in the European sample (Panel C). This partially proofs Hypothesis 8. In agreement with the results of Boone and Mulherin (2011), target size is positively and significantly (at the 1% level) related to club formation in all model specifications. This strongly supports Hypothesis 9. It indicates that scale is an important factor in determining both club and prominent club formation. The target return standard deviation has a positive and significant (at a 5% level) coefficient in for prominent clubs, but the estimate is disappears in the second model specification, and is not significant at all in Panel C (Europe). The other proxy for information complexity, *RDE*, shows no significant results. Hence, the results are not robust and the evidence for**

Hypothesis 10 is weak at best. The coefficients on pre-2006 and Europe are not significant in any of the model specifications, indicating that (prominent) consortiums were not more or less likely to be formed prior to 2006 or in Europe.

Section 2.2 mentions that these alternative rationales for club formation each have their own effect on the abnormal returns paid to target shareholders: risk reduction and resource pooling would both increase the number of competitors in an auction and thus the acquisition premium, as they allow bidders to spread risks and therefore contemplate bids that would otherwise not be possible. Information pooling, on the other hand, reduces competition and hence the acquisition premium paid. The effect of these combined rationales on acquisition premium paid is somewhat ambiguous, though it seems that positive effect on abnormal returns of resource pooling as a rationale for club formation should dominate, as *LNMVE* is the most significant and robust throughout all model specifications. However, I regard the results in this section as complementary to the observed evidence for collusion and value creation in this chapter, since I controlled for *LNMVE*, *STDEV*, and *LRATIO* in explaining the abnormal returns to target shareholders in Section 5.1, as well as in explaining ex-post buyout performance in Section 5.2.

The pseudo-R-squared measures in the regressions are higher for the regressions where *Prominent club* is the dependent variable, indicating that these regression have more explanatory power. Five out of eight regressions have higher pseudo-R-squared values than those in similar research by Boone & Mulherin (2011) (pseudo-R-squared equals 12.3%).

Table 16
Modelling consortium formation. This table reports several probit regression analyses of the likelihood a target firm is bought by a (prominent) private equity club. The regressions in Panel A) use the target firms of the same subsample of 450 private equity deals used in Table 11; those in Panel B) and C) use a subsample of 291 U.S. targets and 159 European targets, respectively. The dependent variables, *Club* and *Prominent club*, are dummy variables that equal 1 if the target firm is bought by two or more private equity firms or two or more private equity firms, of which at least one can be classified as prominent, respectively. *STDEV* is the standard deviation of stock returns calculated from 273 days before the announcement date to 20 days before the announcement date. *LRATIO* is the leverage ratio, measured in the fiscal year preceding the deal announcement date. *LNMVE* is the natural logarithm of the market value of equity, measured at the end of the fiscal year preceding the deal announcement date. *RDE* is the research and development expense, measured in the fiscal year preceding the deal announcement date. *Europe* is a dummy equal to 1 for European targets. *Pre-2006* is a dummy variable equal to 1 for deals announced prior to 2006. *z*-Statistics are in brackets. ***, **, and * indicate that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% levels, respectively. The pseudo-R-squared, likelihood ratio chi-square value, and chi-square *p*-value are reported in the bottom of the table.

Panel A: Combined American and European sample				
Dependent variable	Club	Club	Prom. club	Prom. club
Model	I	II	I	II
STDEV	3.259	10.358	**5.859****	-2.364
	[1.246]	[1.613]	[2.075]	[-0.190]
LRATIO	**-0.557****	**-1.000***	**-0.673***	-0.946
	[-2.020]	[-1.821]	[-1.755]	[-1.232]
LNMVE	**0.237*****	**0.300*****	**0.388*****	**0.482*****
	[4.892]	[3.548]	[6.528]	[4.463]
RDE		-0.573		0.079
		[-0.655]		[0.078]
Europe	-0.091	-0.298	-0.172	-0.375
	[-0.660]	[-1.151]	[-0.995]	[-1.176]
Pre-2006	0.234	0.061	0.065	-0.200
	[1.644]	[0.246]	[0.359]	[-0.615]
Intercept	**-1.903*****	**2.216*****	**-3.392*****	**-3.586*****
	[-5.710]	[-3.458]	[-7.996]	[-4.049]
Observations	450	164	450	164
Obs with Dep=1	135	54	66	31
McFadden R-squared	0.060	0.094	0.147	0.222
LR-statistic	32.776	19.478	55.190	35.341
Prob(LR-statistic)	0.000	0.003	0.000	0.000
Akaike info criterion	1.171	1.230	0.736	0.836
Schwarz criterion	1.217	1.343	0.781	0.949
Hannan-Quinn criterion	1.189	1.276	0.754	0.882

Table 16 (*continued*)

Panel B: U.S. sample		
Dependent variable	Club	Prom. club
Model	I	I
STDEV	1.710	**5.529***
	[0.570]	[1.855]
LRATIO	**-0.731****	-0.750
	[-2.129]	[-1.615]
LNMVE	**0.160*****	**0.344*****
	[2.715]	[4.862]
Pre-2006	0.308	-0.069
	[1.633]	[-0.277]
Intercept	**-1.401*****	**-3.066*****
	[-3.452]	[-6.158]
Observations	291	291
Obs with Dep=1	86	44
McFadden R-squared	0.047	0.137
LR-statistic	16.522	33.916
Prob(LR-statistic)	0.002	0.000
Akaike info criterion	1.192	0.767
Schwarz criterion	1.255	0.830
Hannan-Quinn criterion	1.217	0.793

Panel C: European sample		
Dependent variable	Club	Prom. club
Model	I	I
STDEV	14.824	3.405
	[1.492]	[0.241]
LRATIO	-0.445	-0.502
	[-0.831]	[-0.739]
LNMVE	**0.435*****	**0.480*****
	[4.641]	[4.182]
Pre-2006	0.059	0.211
	[0.263]	[0.768]
Intercept	**-3.412*****	**-4.203*****
	[-5.039]	[-4.609]
Observations	159	159
Obs with Dep=1	49	22
McFadden R-squared	0.126	0.179
LR-statistic	24.854	22.912
Prob(LR-statistic)	0.000	0.000
Akaike info criterion	1.142	0.723
Schwarz criterion	1.238	0.819
Hannan-Quinn criterion	1.181	0.762

CHAPTER 6 – Summary and conclusion

After providing conclusions for the ten hypotheses based on empirical research in Chapter 5, this last chapter summarizes those conclusions and provides an answer to the research question (Section 6.1). Subsequently, the conclusions are discussed and compared with the existing literature (Section 6.2). Lastly, I point out the limitations of my analyses and give recommendations for further research (Section 6.3).

6.1 Summary of the main findings

The main concern about club deals is that, with the formation of such a coalition, private equity buyers may be colluding to depress prices by limiting the number of competing bidders in auctions. On the other hand, the motivation for forming a club most cited by practitioners is value creation, as the club is likely to have a greater value for the target than other potential bidders due to synergies between the private equity partners and the target firm (Marquez & Singh, 2013). In this thesis, I set out to measure the economic impact of private equity club deals on target companies, and compare it to the economic impact of sole-sponsored private equity deals on target companies. This leads to the following research question:

> **What is the economic impact of private equity club deals on the target company and its stakeholders, and what does this imply with regard to the incentives of private equity acquirers to form such coalitions?**

This research question was set out in Chapter 1 to provide a resolution to both the on-going academic and the policy debate about the practice. I provide a substantiated answer to the research question by answering the three sub-questions, also posited in Chapter 1 and recapitulated in this section. To answer sub-question 1, I use the conclusions from Hypotheses 1-4; to answer sub-question 2, I use the conclusions from Hypotheses 5-7; and to answer sub-question 3, I use the conclusions from Hypotheses 1-10.

Sub-question 1: **What is the effect of club deals on the gains to target shareholders, and how does this relate to the gains to target shareholders in sole-sponsored private equity buyouts?**

The standard empirical approach to addressing the question whether private equity buyouts result in an improvement in economic performance is by analysing their impact on stock prices (see, e.g., Kaplan, 1989). Therefore, I first look at the effect of different private equity deals on acquisition premia. Using a sample of 450 LBOs in the United States and Europe, I find that from 2000 to 2006, target shareholders receive 16.7% *less* as a percentage of pre-bid equity value in club deals compared to sole-sponsored deals. From 2005 to 2015, I find an opposite effect, where target shareholders receive 10.2% *more* as a percentage of pre-bid equity value in club deals compared to sole-sponsored deals. These results are robust to numerous target and deal characteristics. Further examination reveals that the pre-2006 discount is mainly attributable to prominent private equity clubs acquiring targets in the U.S.; I find no significant club deal discount in Europe prior to 2006. However, the sample size of pre-2006 European club deals is small (N = 22). Whether a significant pre-2006 club deal discount can be observed in Europe by extending the sample period farther back than 1 January 2000, is a recommendation for further research. The post-2005 premium is mainly attributable to prominent private equity clubs acquiring targets in both Europe and the U.S. At the very least, this means that the impact of prominent club deals on target shareholders has changed substantially, and that post-2005, public company target shareholders are (on average) better off when selling their shares to a prominent club instead of a sole-sponsored private equity acquirer. This conclusion holds both in the United States and in Europe.

Sub-question 2: **What is the effect of club deals on the ex-post growth, profitability, and productivity of target companies, when compared to sole-sponsored private equity buyouts?**

However, measuring the economic impact of (club) LBOs by analysing their impact on stock prices has been criticized by academics, who are increasingly sceptical about the "efficient markets" hypothesis, which asserts that changes in share prices following announcements of buyouts reflect changes in future real performance or economic efficiency (Harris *et al*., 2005). Moreover, policy makers, looking to take a stand on club deals in LBOs, should also consider the interest of other stakeholders of the target firm, such as the employees, government, customers, suppliers and the community as a whole. Regardless of their effect on acquisition premia, club deals may be socially beneficial if their pooling of multiple expert opinions helps redeploys assets to more productive uses (Officer *et al*., 2010). To overcome these difficulties and as an additional robustness test, I also measure the direct ex-post buyout performance of the subsample of LBO targets included in the event study, for which accounting data after the buyout is available. The final sample consists of 56 American and European club deals targets, plus a matched sample of 56 targets of sole-sponsored private equity acquisitions. I compare the economic and financial performance of club deal targets vis-à-vis sole-sponsored LBO targets by measuring ex-post growth, profitability, and productivity.

I find that consortium-backed companies experience significantly higher growth of total assets, employees, and turnover after a buyout, relative to sole private equity backed companies. The effect holds at the 1% significance level for a subsample of targets acquired from 2000 to 2005. Furthermore, I find no significant out- or underperformance of the consortium-backed companies vis-à-vis the control group of sole-sponsored private equity backed buyouts on various measures of profitability. Lastly, I find that after controlling for growth in assets and employees, as well as target size, risk, and age prior to the buyout, club deal targets experience (on average) 3.7% higher productivity growth than the control sample of sole-sponsored buyouts over the (t_{-1}, t_{+3}) period. This differential is significant at the 5% level, but is only measured for a subsample of European LBO targets. Club deal targets do not significantly outperform sole-sponsored targets in absolute measures of productivity in the first three years after a buyout. This indicates that private equity consortiums acquire targets with lower ex-ante productivity than do single private equity acquirers, but that the productivity gains

after the buyout are higher. This evidence is consistent with private equity clubs enhancing social efficiency by creating more value for their targets (Marquez & Singh, 2013) and with the notion that the pooling of resources and a combination of complementary skills in a club result in more intense monitoring and higher-quality support during the investment phase (Scellato & Ughetto, 2013).

Despite the lower target abnormal returns in pre-2006 U.S. prominent club deals, the evidence so far indicates that private equity clubs are better able to enhance the economic performance of their target companies than sole-sponsored private equity buyers. This evidence is particularly convincing for the subsample of European targets, where significantly higher measures for productivity growth after a club deal indicate that private equity consortiums are the superior mechanism to enhance the economic efficiency of target companies. Examining how productivity growth in U.S. club deals relates to U.S. sole-sponsored deals is complex due to data availability limitations and serves as a recommendation for further research.

> ***Sub-question 3:*** **Is there evidence that private equity coalitions are formed to curb competition or are benign, non-collusive rationales such as value creation more likely?**

Sections 5.1 reveals that prior to 2006, target shareholders receive 16.7% *less* as a percentage of pre-bid equity value in club deals compared to sole-sponsored deals. Moreover, this discount originates in deals involving prominent private equity acquirers, who most likely have the market power to meaningfully reduce competition and prices. In the subsamples, this discount is only significant for target companies in the U.S., though the lack of significance in the European subsample could be caused by the small number of observations. These results are robust to proxies for target size, risk and information complexity and are therefore not a by-product of the observed benign motivations for club formation: resource pooling, risk reduction, and information pooling. Moreover, the distribution of the CARs in the American club deal sample cannot (fully) be explained by the value creation model of Marquez and Singh (2013), making it unlikely that the observed differences in acquisition premia paid by

prominent private equity clubs in the U.S. can be fully explained by value creation as a rationale for forming a coalition. Next, the discount completely disappears (and even turns into a premium) after 2006, the year in which the U.S. Department of Justice announced its inquiry into possible collusive effects of private equity consortiums, and the year in which seven prominent private equity firms where accused of collusion in a private litigation case. Furthermore, the lower price paid to target shareholders cannot be explained by actual lower ex-post performance of those target companies on measures of growth or profitability, as compared to other club deal targets for which no discount is paid. In fact, pre-2006 club deal targets show 4.6% higher growth in total assets and 5.7% higher growth in turnover, significant at the 1% level, than a matched sample of sole-sponsored LBO targets over the t_{-1} to t_{+3} period. Although I cannot measure whether (American) club deal targets prior to 2006 show lower levels of ex-post productivity growth, overall this evidence points towards collusive practices by prominent private equity consortiums, but only in the U.S. and prior to 2006. However, keeping in mind the potential legal and regulatory implications of the possibility of collusion by prominent private equity firms, it is important to emphasize that the patterns I find in the data are not necessarily due to collusion. It is possible that the discount is an inadvertent by-product of an unobserved benign motivation for club formation. It is also possible that there are unobservable factors that both drive club formation and can explain the lower CARs paid from 2000 – 2005 and the break in 2006, even in the absence of changes in competition. My results so far strongly agree with the results of Officer *et al.* (2010).

The results indicate that value creation is an important rationale for club formation as well. Post-2005 I find significant evidence for a club deal premium. In fact, target shareholders receive (on average) 10.2% *more* as a percentage of pre-bid equity value in club deals compared to sole-sponsored deals. These results are, again, robust to proxies for target size, risk and information complexity. This indicates that post-2005, clubs are formed to create value, and target firm shareholders capture at least some of the value created. Once more, this difference originates in deals involving prominent private equity acquirers. The results are subject to similar limitations: it is possible that the premium is an inadvertent by-product of another unobserved motivation for club

formation. The ex-post buyout performance analysis reveals that the combined group of prominent and non-prominent club deal targets significantly outperforms sole-sponsored LBO targets is various measures of growth. This difference is significant for target acquired prior to 2006 as well. Most importantly, the analysis in Section 5.2 reveals that private equity consortiums are able to add value in European targets by redeploying assets and labour to more productive uses. The combined evidence is indicative of value creation as an important rationale for club formation, over the whole sample period, both in the U.S. and in Europe, although the evidence is strongest for European LBOs.

Meanwhile, the ex-post buyout performance analysis reveals no indication of higher value creation in prominent club deals vis-à-vis non-prominent club deals, although the difference cannot be tested for the measures of productivity. This leaves the differences between the post-2005 CARs paid in prominent and non-prominent club deals unexplained. It is possible that the increased media and government attention to the practice of clubbing starting 2006 is mostly focused on prominent private equity acquirers, forcing them to give up a higher part of their additional value created after the buyout in the form of prices paid to target shareholders. Nonetheless, testing whether prominent private equity firms are better at increasing the productivity of their targets is a recommendation for further research.

Besides collusion and value creation, I find strong evidence that resource pooling is an additional rationale for club formation. This means that private equity coalitions arise partly because they enable several bidders, none of whom have the financial resources to acquire the target alone, to bid by joining their financial resources. I find somewhat less convincing evidence that coalitions are formed to reduce risk.

Overall, the incentives of private equity acquirers to form coalitions are numerous. Prior to 2006, prominent equity firms where most likely able to curb competition when acquiring targets in the U.S., and these partnerships may have been formed to curb competition. However, in Europe I can find no evidence indicating collusion may be an incentive for (prominent) private equity firms to join in clubs, and post-2005

prominent private equity firms on average pay a premium to be able to form a club. Over the whole sample, additional value creation seems to serve as an incentive for club formation, not only because the aforementioned premium paid, but also because of the substantial outperformance in various ex-post buyout performance of club deal targets vis-à-vis sole-sponsored LBO targets (especially in Europe). Lastly, I find strong evidence that resource pooling is a rationale for club bidding.

6.2 Discussion of the findings

Academic literature relevant to this thesis can be roughly divided into two subjects: (i) the effect of club deals on acquisition premia and (ii) the effect of club deals on the ex-post performance of target companies.

Concerning the bidding process, the results of this thesis agree to a large extent with the findings of Officer *et al*. (2010), who come to a similar conclusion for the U.S. market. The authors find a club deal discount in acquisition premia paid to target shareholders for prominent private equity firms from 1984 to 2005, and also find that this discount disappears in 2006 and 2007. My contribution to their research is twofold. First, by extending the sample period to 2015, I show that the club deal discount in prominent club deals not only disappears after 2005, but also turns into a significant *premium*, likely because the increased media and government scrutiny is mostly directed towards prominent private equity acquirers, forcing them to give up a higher part of the additional value created than non-prominent club acquirers. Second, I include Europe in the analysis, and find that prominent clubs pay a premium vis-à-vis other types of private equity bidders to acquire a European target post-2005. I find no evidence of a significant club deal discount here, though the lack of significance could be the result of a small sample size.

However, the results of my thesis differ to a large extent from those found by Boone and Mulherin (2011) in their research. The authors focus their research on acquisitions of U.S. targets in the 2003 to 2007 period, and find no significantly lower target

abnormal returns in private equity consortium deals, pre-2006 or otherwise. Also when controlling for prominent private equity club deals, no significant difference is found. In an effort to reconcile the contradictory evidence on club bidding, this paper is the first to empirically test the value creation model of Marquez and Singh (2013) (see Section 5.1.3). Unfortunately, the model is unable to fully explain my results. After careful reconsideration, my explanations why Boone and Mulherin (2011) were not able to find a club deal discount prior to 2006 are as follows. Firstly, since the authors focus on a relatively small time period, their sample of private equity acquisitions is small as well. Their sample consists of 95 sole-sponsored LBOs and 75 club deals. My sample consists of 315 sole-sponsored and 135 club LBOs. The sample of Officer *et al.* (2010) may be relatively small as well, with 128 sole-sponsored LBOs and 70 clubs deals, but their sample consists solely of LBOs by prominent acquirers, for which we have seen the effect to be the strongest. Secondly, the authors do indeed examine prominent private equity club deals in their sample, however they do not explicitly test the abnormal return to *pre-2006* target shareholders in prominent club deal acquisitions. Finally, Boone and Mulherin (2011) do not control for the pre-buyout standard deviation or buy-and-hold return of the target companies, and as a result the R-squared measure in their research is substantially lower than that in the research by Officer *et al.* (2010) or myself.

Concerning the effect of club deals on the ex-post performance of target companies, existing literature is scarce. Numerous authors analyse the ex-post performance of sole-sponsored LBOs on measures of growth, profitability, and productivity (see, e.g., Wilson *et al*., 2012; Scellato & Ughetto, 2013); very few have extended this analysis to club deal LBOs. Guo *et al.* (2011) find evidence that the operating performance of club deals is higher for club deals than for sole-sponsored LBOs, but attribute this to ex-ante target characteristics. Scellato and Ughetto (2013) find that ex-post profitability in club deal targets is insignificantly different from ex-post profitability in sole-sponsored LBO targets. My largest contribution to this field of research is the finding that club deal targets in Europe show higher levels of productivity growth after a buyout vis-à-vis sole-sponsored LBO targets, which suggests club deals are the superior mechanism for enhancing economic efficiency.

6.3 Limitations of this research

I recognize that this research has several limitations. In this section, I highlight several issues. Related to these issues are recommendations for further research.

A first limitation of this research is that intent is unobservable - in the case of a club deal discount in acquisition premia paid, it is impossible to distinguish between deliberate collusion and inadvertent reduction in bid competition resulting from the limited number of private equity firms interested in any given target (Officer *et al.*, 2010). I am only able to investigate motivations for club formation that are related to observable target characteristics, and cannot rule in or out motivations unobservable to the econometrician. In the case of higher abnormal returns paid to target shareholders in a club deal, similar logic applies: rather than deliberate value creation, it is possible that the premium is an inadvertent by-product of another unobserved motivation for club formation. In addition, it is possible that there are unobservable factors that both drive club formation and can explain the lower CARs paid from 2000 – 2005, the 2006 break, and the subsequent higher CARs paid even in the absence of changes in competition or value creation opportunities, though this seems unlikely.

Moreover, I did not conclusively prove whether club deals result in increased or decreased social welfare on the long-term, but merely analysed the economic efficiency of club deals on a (target) company level. Malenko and Malenko (2015) argue that a private equity firm that realizes it will be able to borrow reputation from more reputable bidders in the future by forming a club with them, might have lower incentives to preserve its reputation for non-diversion with creditors. The authors argue this ex-ante effect can lead to reduced buyout activity. Examining whether there is empirical evidence for this theory is a recommendation for further research.

A third limitation concerns the samples I used to test the effect of clubs deals first on the abnormal returns paid to target shareholders and second on the ex-post performance of target companies. First, due to data availability limitations the sample sizes are not the same: I use 112 target companies to test the ex-post performance, out of 450 LBOs

used to examine the abnormal returns paid. Furthermore, these 112 companies are subject to sample selection bias. American firms either have private post-buyout data available, because they have widely held public debt outstanding or because they provide historical financial statements at the time of a subsequent IPO, acquisition, or public debt financing (Guo *et al.*, 2011). For European firms more post-buyout data is available if the firm is larger in size. This means that only the larger or more successful (in the case of an IPO) of the 450 target firms is included in my final sample. However, because I compare club deal targets to sole-sponsored deal target from the same sample, this sample selection bias is present in both the club deal sample *and* the control sample, and is not likely of significant influence in my results.

Another, related, limitation lies in the construction of a matched sample of sole-sponsored buyouts when examining the ex-post performance of target companies. Due to data availability limitations, I am often not able to match club deal targets to sole-sponsored LBO targets based on their exact SIC code, and instead have to rely on 10 major SIC industry classifications. Moreover, I strive to control for size, but often the respective sizes of the matched companies still show large differences. I aim to increase the robustness of my research by controlling for target industry and size once more in the regression analyses. To circumvent these difficulties, a larger sample size is needed. This could likely be achieved by analysing the ex-post performance of private companies that are the subject of a private equity club deal. In my research this is not possible, as I aimed to compare the ex-post performance of targets to the acquisition premium paid in the acquisition. Hence, doing so serves as a recommendation for further research.

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APPENDICES

Appendix A - Distribution of the U.S. sample.

This table contains the time-series distribution of a sample of acquisitions of publicly traded targets from SDC. The classification into years is based on announcement dates. The classification of all public-to-private deals is done by hand, using press releases and media stories on MergerMarket, as well as the transaction synopses from SDC. If these sources contain the name of *only one* private equity firm, then the deal is classified as a Sole PE deal. If either one of these sources contains the names of *at least two* private equity firms, then the deal is classified as a Club deal. In rare cases, the private equity acquirer is accompanies by a strategic buyer. This has no effect on the classification, as only the number of private equity firms is counted. The remaining transactions in sample where the acquirer is privately held are classified as Other non-public. This includes deals by strategic acquirers, as well as by REITs, pension funds, etc. A winning bidder that is a publicly traded corporation is classified as Public bidder. Total deal value is the annual sum of the value of transactions as reported by SDC ($m).

Year	All deals		Deals by private equity firms				Other deals			
			Sole PE deals		Club deals		Other non-public		Public bidder	
	No. of deals	Total deal value	No. of deals	Total deal value	No. of deals	Total deal value	No. of deals	Total deal value	No. of deals	Total deal value
2000	442	1,051,698	16	5,530	9	4,387	29	8,114	388	1,033,667
2001	273	374,669	4	2,995	3	493	18	4,159	248	367,022
2002	203	169,247	9	2,857	6	2,253	17	5,327	171	158,809
2003	233	253,901	13	2,559	5	461	20	4,940	195	245,942
2004	230	393,833	11	10,721	5	7,926	14	7,434	200	367,751
2005	253	537,903	19	14,519	14	28,703	29	28,346	191	466,336
2006	327	788,544	34	47,208	27	186,298	43	75,949	223	479,087
2007	335	694,824	30	51,567	21	137,605	49	62,897	235	442,756
2008	178	385,709	16	6,884	5	2,792	16	30,384	141	345,649
2009	146	326,505	13	3,161	2	4,577	5	448	126	318,319
2010	223	359,063	27	19,993	9	18,243	19	13,410	167	307,199
2011	173	379,580	16	11,677	15	23,593	19	7,022	123	337,288
2012	177	206,978	18	6,864	6	6,909	24	9,664	129	183,541
2013	172	275,909	23	56,204	5	11,177	24	28,950	120	179,578
2014	184	567,665	10	10,391	6	22,597	14	29,847	154	504,831
2015	148	513,823	13	17,740	4	13,276	10	11,165	121	471,642
Total	3,697	7,279,852	272	270,872	142	471,290	350	328,055	2,932	6,209,416

Appendix B - Distribution of the European sample

This table contains the time-series distribution of a sample of acquisitions of publicly traded targets from SDC. Countries included in the analysis: Belgium, Denmark, Finland, France, Germany, Republic of Ireland, Italy, Jersey, Luxembourg, the Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom. The classification into years is based on announcement dates. The classification of all public-to-private deals is done by hand, using press releases and media stories on MergerMarket, as well as the transaction synopses from SDC. The methodology of the classification in the four different buyer groups is explained in the legend to Appendix Table 1. Total deal value is the annual sum of the value of transactions as reported by SDC ($m).

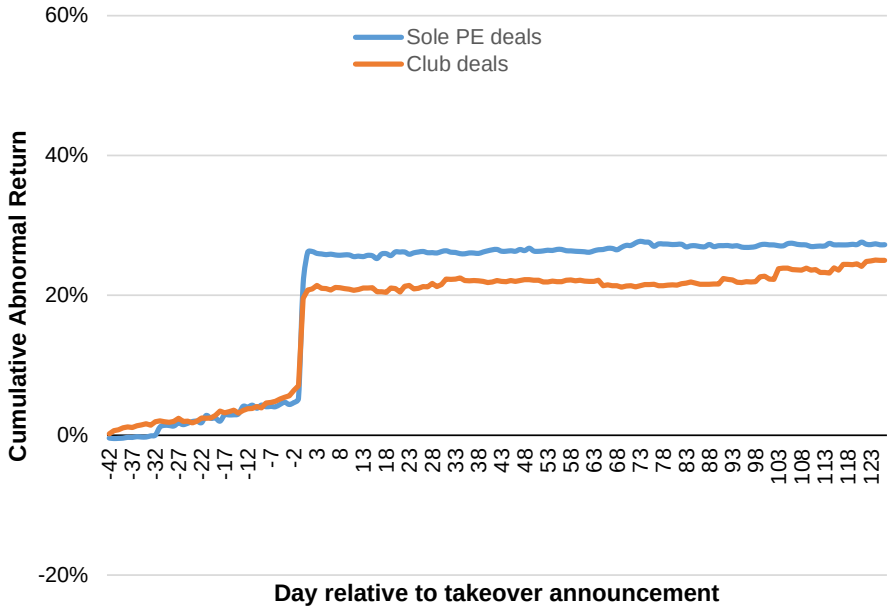
Year	All deals		Deals by private equity firms				Other deals			
			Sole PE deals		Club deals		Other non-public		Public bidder	
	No. of deals	Total deal value	No. of deals	Total deal value	No. of deals	Total deal value	No. of deals	Total deal value	No. of deals	Total deal value
2000	212	305,068	11	4,029	7	2,277	25	9,973	169	288,789
2001	119	150,855	16	4,180	3	3,747	16	9,277	84	133,651
2002	101	107,089	10	6,755	2	1,291	16	23,658	73	75,386
2003	115	118,846	13	6,444	5	9,453	15	6,057	82	96,892
2004	99	237,651	6	2,708	7	7,306	8	2,800	78	224,836
2005	158	249,087	12	5,255	9	18,088	13	27,280	124	198,463
2006	168	445,116	20	10,672	13	44,210	21	21,442	114	368,793
2007	180	425,416	18	17,485	10	34,998	24	16,665	128	356,267
2008	129	186,752	8	2,071	3	3,954	20	7,230	98	173,496
2009	78	68,844	6	1,403	2	182	6	2,164	64	65,096
2010	81	47,654	8	2,103	3	5,873	14	8,920	56	30,758
2011	116	125,935	7	691	2	929	25	59,122	82	65,193
2012	68	104,278	6	3,438	-	-	11	4,502	51	96,338
2013	56	85,483	3	1,735	1	411	11	13,220	41	70,117
2014	89	245,989	11	5,118	2	592	13	14,043	63	226,236
2015	60	217,022	2	758	1	765	3	11,383	54	204,116
Total	1,829	3,121,084	157	74,843	70	134,076	241	237,737	1,361	2,674,428

Appendix C - List of prominent PE firms

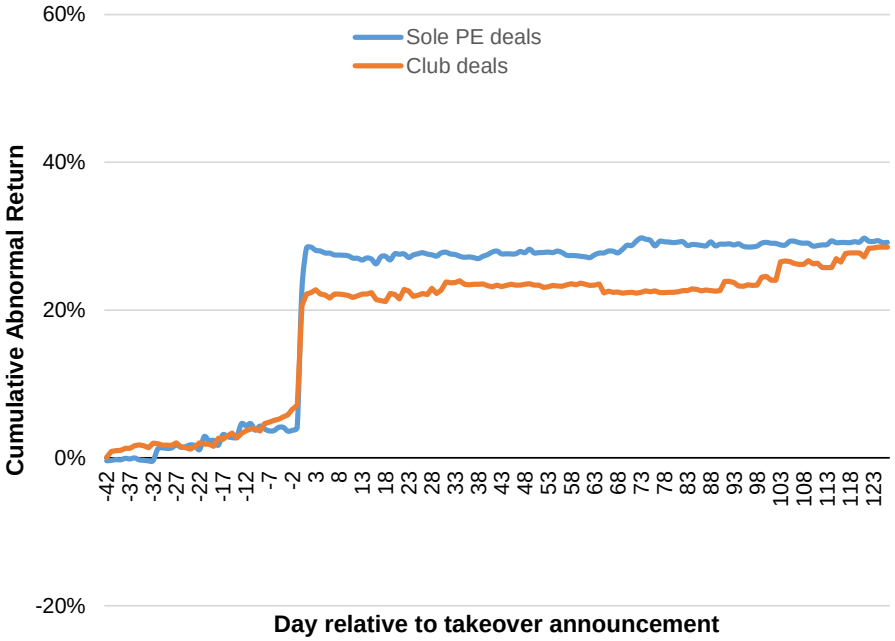
	2015 PEI 300 rank	Firm	PEI 300 five-year fundraising total ($m)	Headquarters
I. The PEI top 50 private equity firms worldwide	1	The Carlyle Group	$31,906.7	Washington, DC
	2	TPG	$30,333.0	Fort Worth
	3	Kohlberg Kravis Roberts	$29,105.1	New York
	4	The Blackstone Group	$25,565.9	New York
	5	Apollo Global Management	$22,200.0	New York
	6	CVC Capital Partners	$21,178.4	London
	7	EnCap Investments	$21,147.8	Houston
	8	Advent International	$15,735.4	Boston
	9	Warburg Pincus	$15,243.0	New York
	10	Bain Capital	$14,565.5	Boston
	11	Vista Equity Partners	$11,814.0	Austin
	12	Partners Group	$11,198.0	Baar-Zug
	13	Silver Lake	$11,074.5	Menlo Park
	14	Hellman & Friedman	$10,900.0	San Francisco
	15	Centerbridge Capital Partners	$10,496.8	New York
	16	Energy Capital Partners	$10,436.4	Short Hills
	17	Permira	$10,412.5	London
	18	EQT Partners	$10,383.0	Stockholm
	19	NGP Energy Capital Management	$9,832.6	Irving
	20	Riverstone Holdings	$9,164.3	New York
	21	Goldman Sachs Principal Investment Area	$9,143.3	New York
	22	Ares Management	$8,929.0	Los Angeles
	23	Neuberger Berman Group	$8,844.0	New York
	24	Stone Point Capital	$8,759.3	Greenwich
	25	American Securities Capital Partners	$8,640.0	New York
	26	BC Partners	$8,601.0	London
	27	Clayton Dubilier & Rice	$8,539.2	New York
	28	General Atlantic	$8,510.0	Greenwich
	29	Cinven	$8,248.7	London
	30	Russian Direct Investment Fund (RDIF)	$8,159.6	Moscow
	31	Onex	$8,081.1	Toronto
	32	Thoma Bravo	$8,005.6	Chicago
	33	HgCapital	$7,955.6	London
	34	Apax Partners	$7,815.3	London
	35	Insight Venture Partners	$7,679.0	New York
	36	Triton Partners	$7,673.5	Frankfurt
	37	Bridgepoint	$7,300.5	London
	38	BDT Capital Partners	$7,275.0	Chicago
	39	GTCR Golder Rauner	$7,124.2	Chicago
	40	Pamplona Capital Management	$6,741.6	London
	41	Tiger Global Management	$6,735.0	New York
	42	Welsh Carson Anderson & Stowe	$6,672.0	New York
	43	RRJ Capital	$6,662.0	Hong Kong
	44	Baring Private Equity Asia	$6,450.0	Hong Kong
	45	Sequoia Capital	$6,433.1	Menlo Park
	46	The Energy & Minerals Group (EMG)	$6,345.0	Houston
	47	Leonard Green & Partners	$6,250.0	Los Angeles
	48	Oaktree Capital Management	$6,076.9	Los Angeles
	49	The Abraaj Group	$6,001.0	Dubai
	50	Georgian Co-investment Fund (GCF)	$6,000.0	Tbilisi
II. Other European firms in the top 100	59	Ardian	$4,797.7	Paris
	62	Nordic	$4,654.3	Stockholm
	69	PAI Partners	$4,273.0	Paris
	70	First Reserve Corporation	$4,223.0	Greenwich
	76	HitecVision AS	$3,870.0	Stavanger
	79	Equistone Partners Europe	$3,759.0	London
	86	Montagu Private Equity	$3,563.2	London
	91	AlpInvest Partners	$3,471.7	Amsterdam
	94	Littlejohn & Co	$3,340.0	Greenwich
III. From Officer et al. (2010)	52	JP Morgan Asset Management	$5,606.5	New York
	144	Morgan Stanley Investment Management	$2,154.9	New York
	n.a.	Merrill Lynch	n.a.	New York
	n.a.	Forstmann Little	n.a.	New York
	n.a.	HM Capital Partners	n.a.	Dallas

Appendix D - Cumulative Abnormal Returns graphed – All deals

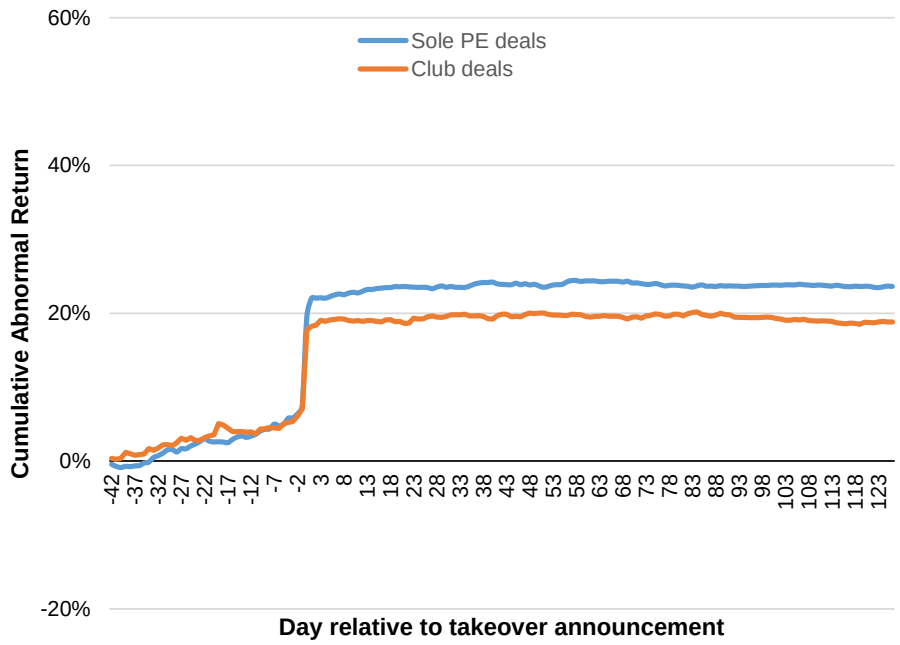
Panel A: Combined American and European sample



Panel B: U.S. sample

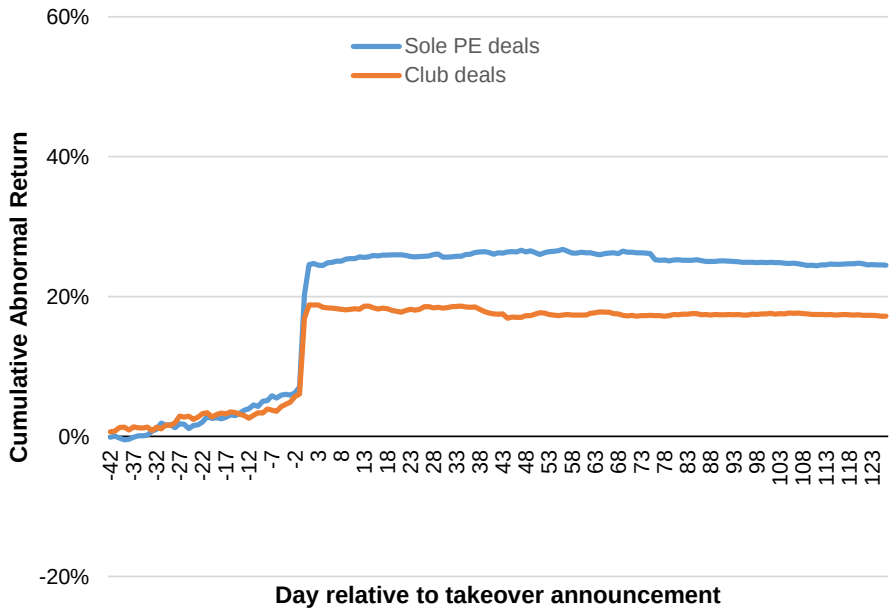


Panel C: European sample

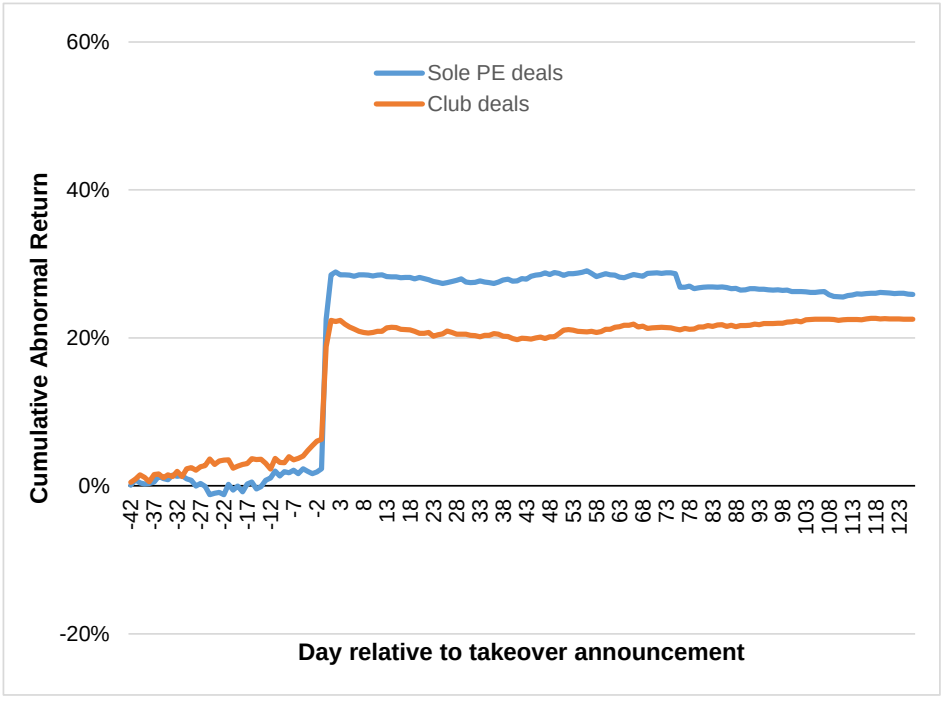


Appendix E - Cumulative Abnormal Returns graphed – Pre-2006 deals

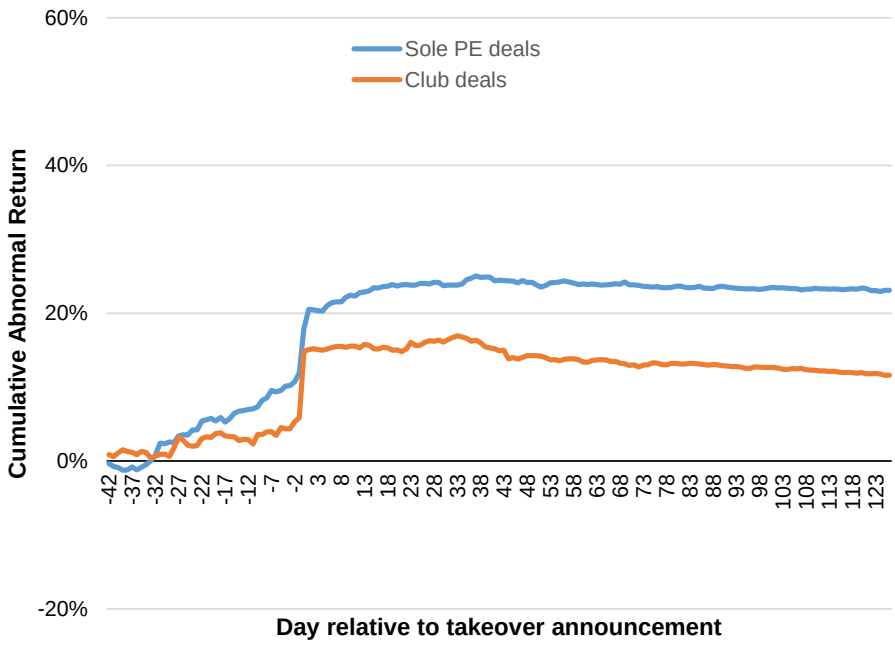
Panel A: Combined American and European sample



Panel B: U.S. sample

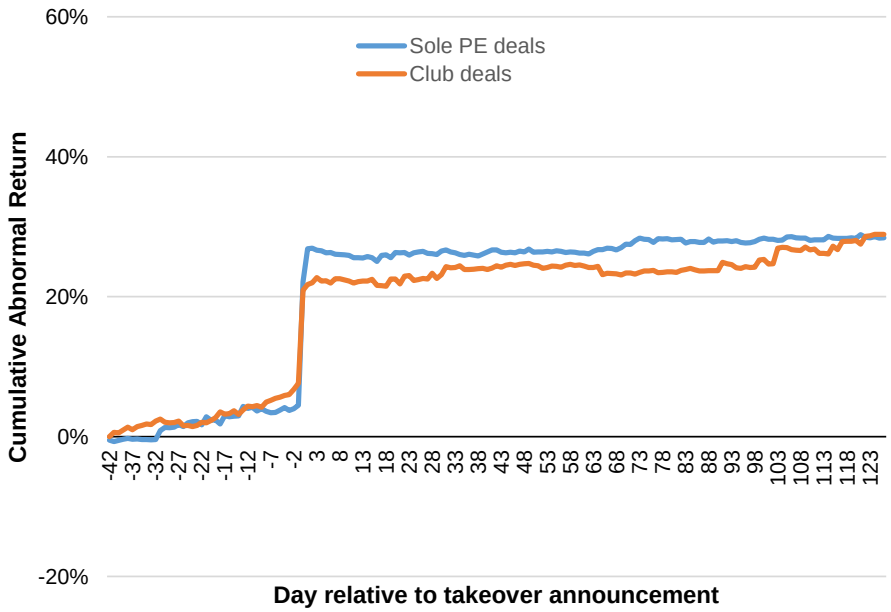


Panel C: European sample

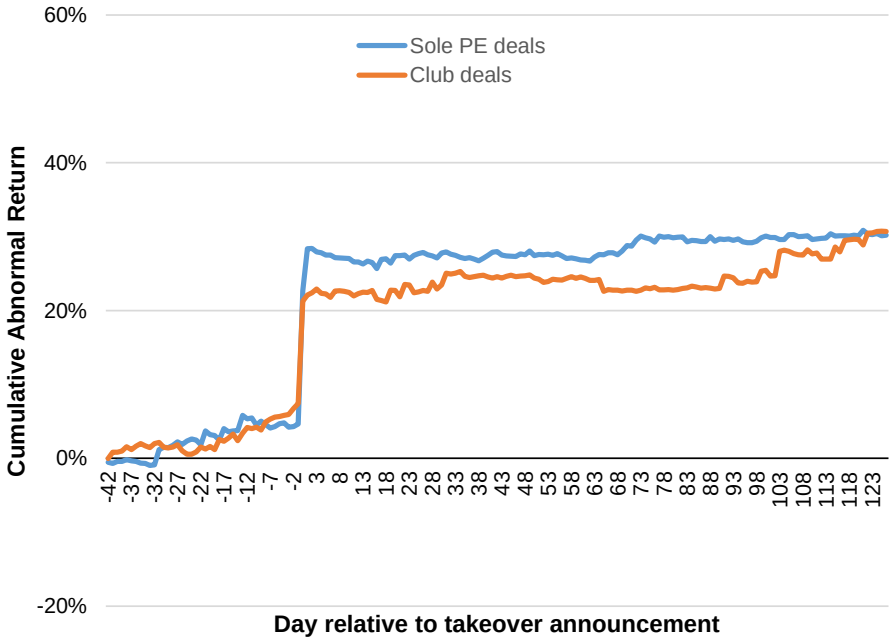


Appendix F - Cumulative Abnormal Returns graphed – Post-2005 deals

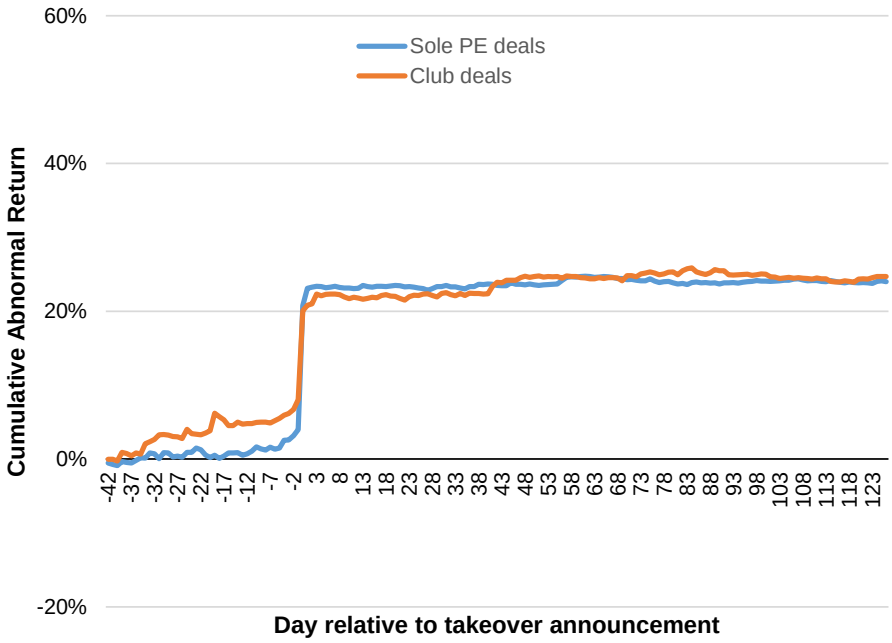
Panel A: Combined American and European sample



Panel B: U.S. sample

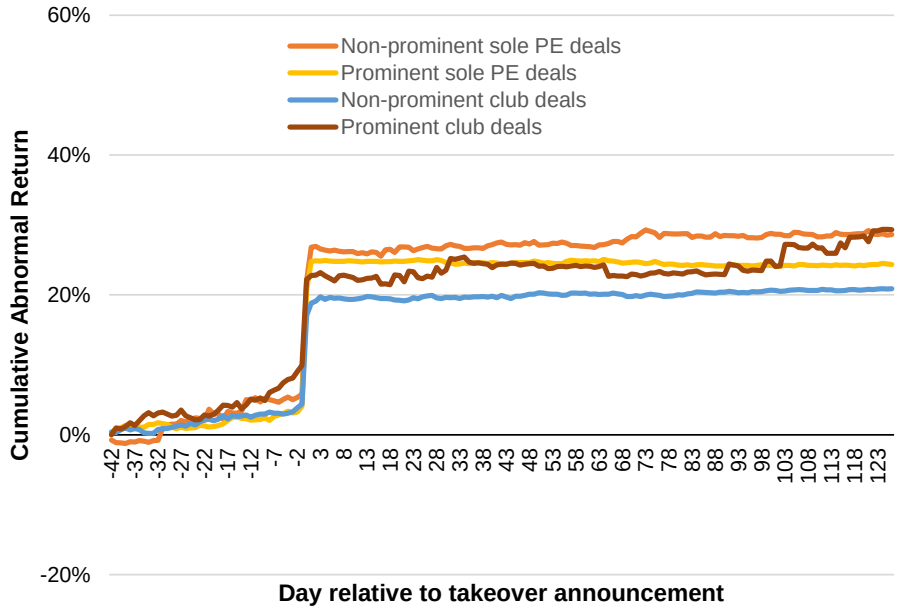


Panel C: European sample

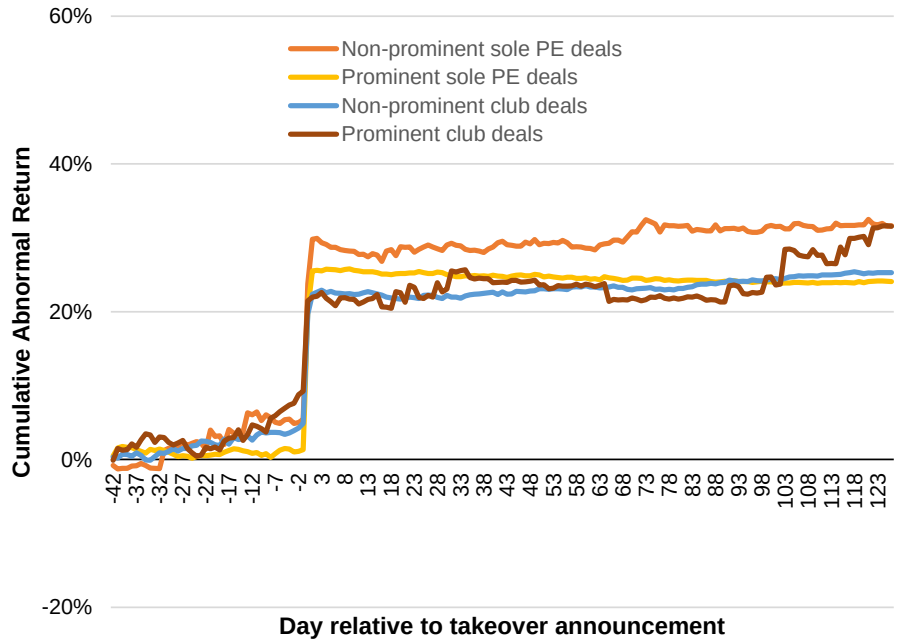


Appendix G - Cumulative Abnormal Returns graphed – All deals (2)

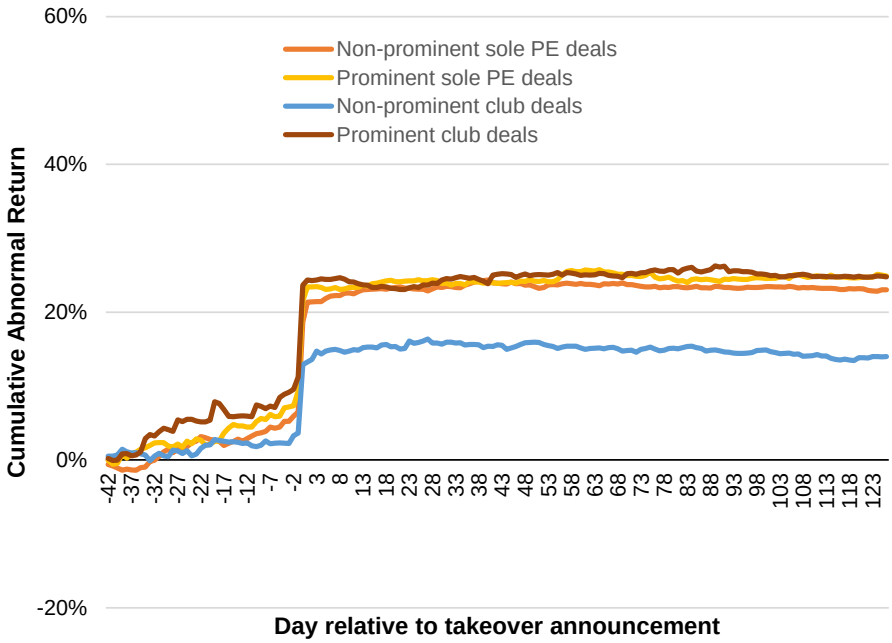
Panel A: Combined American and European sample



Panel B: U.S. sample



Panel C: European sample


60%
40%
20%
0%
-20%
Cumulative Abnormal Return
Non-prominent sole PE deals
Prominent sole PE deals
Non-prominent club deals
Prominent club deals
-42
-37
-32
-27
-22
-17
-12
-7
-2
3
8
13
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Day relative to takeover announcement