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WHAT DRIVES LEVERAGE IN LEVERAGED BUYOUTS?

AN ANALYSIS OF EUROPEAN LBOS' CAPITAL STRUCTURE

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ABSTRACT

This paper examines leverage in European private equity led LBOs. We use a unique, self-constructed sample of 126 European private equity (PE) sponsored buyouts completed between June 2000 and June 2007. We find that determinants derived from classical capital structure theories do not explain leverage in LBOs, while they do drive leverage in a control group of comparable public firms. Rather, we document that leverage levels in LBOs are related to the prevailing conditions in the debt market. In addition, our results indicate that reputed private equity sponsors use more debt and that secondary buyouts have higher leverage levels.

JEL classification codes: G32 - Financing Policy; Financial Risk and Risk Management; Capital and Ownership Structure**;** G24 - Investment Banking; Venture Capital; Brokerage

Keywords: leverage, capital structure, buyouts, LBO, financial flexibility

1. INTRODUCTION

The capital structure choice of firms is one of the most extensively researched fields in corporate finance. Yet, despite their massive economic importance and critical role in reallocating capital and revitalizing firms[1], very little is known about the financing decision in the specific case of LBOs. Besides the fact that PE firms are relatively new players in the financial markets[2], the main reason for this lack of information is the difficulty of collecting data regarding PE sponsored deals, especially in Europe. The central research objective of this paper is to provide evidence on what determines leverage levels in European private equity led LBOs. We examine how the typical European LBO deal is financed and whether this has changed over time. Next, we investigate to what extent classical capital structure determinants (firm size, collateral value of assets, profitability, growth potential and tax rates), debt market conditions (credit spread and leveraged loan spread) and LBO deal characteristics (type of buyout and reputation of the PE sponsor involved) explain cross-sectional changes in buyout leverage levels.

Studying and understanding LBO leverage is of critical importance as debt financing vastly affects the buyout firm's financial flexibility. Also, empirical studies indicate that buyout firm leverage is a key driver of buyout value creation. In spite of the various potential benefits leverage in LBOs may offer, a major point of criticism is that the high levels of debt may be detrimental with respect to financial flexibility (Rappaport, 1990). Financial flexibility is valuable as it facilitates access to external financing in order to avoid financial distress in the face of unanticipated negative shocks or to readily finance investment when new profitable opportunities arise (Gamba and Triantis, 2008). Literature suggests that one of the most important drivers of firms' capital structure decisions is exactly the desire to attain and preserve financial flexibility (Myers and Majluf, 1984; Pinegar and Wilbricht, 1989; Graham and Harvey, 2001; Bancel and Mittoo, 2004; Brounen et al., 2004). DeAngelo

[1] PE transactions accounted for as much as 16.5 percent ($782 billion) of worldwide M&A deal volume in the record year 2007 (Dealogic).

and DeAngelo (2007) even claim that financial flexibility is the critical missing link for an empirically viable capital structure theory. Leverage is predicted and empirically found to have a negative impact on corporate investment and future growth (Jensen, 1986; Stulz, 1990; Smith and Watts, 1992; Denis and Denis, 1993; Lang et al., 1996; Peyer and Shivdasani, 2001; Firth et al., 2008). This finding is significantly stronger among financially constrained firms (Ahn et al., 2006). Marchica and Mura (2007) confirm that a conservative leverage policy directed at maintaining financial flexibility enhances investment ability. Thus, given the high debt levels in LBOs and the major role of debt as a driver of financial flexibility, it is essential to thoroughly analyze LBO leverage.

Besides its link with financial flexibility, LBO leverage also influences buyout returns. Kaplan and Stein (1993) confirm that the financing structure is significantly related to post-LBO performance. Guo et al. (2009) find that leverage is important in explaining realized returns. Returns to capital are greater when the LBO deal is financed with a greater proportion of bank loans. Kovner (2008) shows that the amount of leverage is an important source of value creation in buyouts.

Our empirical research is performed using cross-section regression analysis on a unique, self-constructed dataset of LBOs, with a sample of comparable public firms servicing as a control group. The LBO dataset involves 126 European buyouts that have been completed between June 2000 and June 2007. We find that classical capital structure determinants do not explain leverage in LBOs, whereas they do for our control group of comparable public firms. Our empirical results confirm that LBOs have higher leverage when debt market liquidity is stronger. This suggests that PE firms may attract more debt when perceived financial flexibility is higher. We find that LBO debt levels are higher when a reputable PE sponsor is involved. Thus, reputed PE firms can create value by allowing their portfolio firms to take on more debt, which implies that, ceteris paribus, their LBO

[2] PE activity has increased enormously over the years. While the total value of firms acquired through leveraged buyouts (LBOs) between 1970 and 2007 has been estimated at about $3.6 trillion, $2.7 trillion of these transactions took place between 2001 and 2007 (World Economic Forum Private Equity Report, 2008).

firms benefit from a higher degree of financial flexibility. We also show that secondary buyouts are more highly levered.

With this paper we intend to contribute to the nearly unexplored research area of the capital structure choice in European LBOs. Only two empirical studies about drivers of leverage levels in LBOs exist. Axelson et al. (2007) analyze the explanatory power of established capital structure theories and debt market liquidity on LBO leverage. Demiroglu and James (2007) study the effects of debt market conditions and PE sponsor reputation on LBO leverage. Besides providing new empirical evidence to this very thin body of research, we also extend existing research in several ways. First, we focus on Europe which is interesting as there are noticeable differences between US and European deals in particular[3], and between the PE industry and financial markets in the US and Europe in general. Therefore, literature abstains from transferring findings from the US VC/PE industry one-to-one to Europe due to a range of economic, legal, institutional and cultural differences (Sapienza et al., 1996; Jeng and Wells, 2000). Our sample consists of 126 European LBOs. Axelson et al. (2007) use a sample of 153 worldwide LBOs that contains European LBOs as well but they do not discuss whether results for US and European deals are similar. Demiroglu and James (2007) examine US public-to-privates (PTPs), which is a specific subsample of LBOs. PTPs are more levered than other deals (Axelson et al., 2007). Second, we use a representative sample of both primary and secondary deals sponsored by 58 buyout funds ranging in size, strategy and reputation. Axelson et al. (2007) only include the 5 largest global buyout funds – as a result, their reputation variable will hardly show any variation and is therefore hard to test. Demiroglu and James (2007) provide evidence for the positive impact of PE fund reputation on leverage for US PTPs. Our study is the first that relates the PE sponsor's reputation to LBO leverage for European LBOs. Third, as both studies referred to above find debt market conditions to play a significant role in explaining LBO leverage, this 'debt market liquidity' factor is examined more thoroughly by including two proxies for this determinant as opposed to one. Summarizing, the uniqueness of this

[3] For instance, US deals rely more heavily on bonds than do European deals, and European bank debt consists of more tranches than US bank debt (Axelson et al., 2007).

study stems from its focus on European LBOs, its representative sample for the overall European LBO market and its inclusion of a very broad range of determinants of LBO leverage into one single study. Finally, this paper focuses on investigating the drivers of LBO leverage whereas the papers mentioned earlier study determinants of both leverage and pricing in buyouts.

This paper proceeds as follows. Section 2 presents our research methodology and sample. Empirical results are presented and discussed in Section 3, while Section 4 concludes.

RESEARCH METHODOLOGY

2.1 Research setup

This paper investigates capital structure choice in European buyouts. The first research subquestion analyzes what the typical LBO financing package looks like, by giving a detailed description of the capital structure at the time of the buyout of a LBO firm from the sample that is considered to be representative.

I. How is a typical European buyout transaction financed?

However, this picture is static. Prior empirical research suggests that the financing package chosen in LBOs changes over time (Kaplan and Stein, 1993; Altman, 2007; Demiroglu and James, 2007), as the markets for the various debt instruments typically included in the debt package evolve over time. In general, patterns of corporate financing decisions have changed over the years and it is therefore important to study these dynamics (Frank and Goyal, 2009). Therefore, the second research subquestion studies potential evolutions in the average LBO financing structure. We here expect to find that the financing package of LBOs develops over time from ‘senior bank debt only’ to a mix of senior bank debt and newer forms of debt financing, like mezzanine and second-lien debt.

II. Has the average financing package of LBOs changed over time?

Next, we want to find out what actually drives the leverage choice in LBOs. It follows from empirical research that the leverage of 'normal' firms to a certain extent can be explained by established capital structure theories. Modigliani and Miller (1958) have shown that under perfect market conditions the capital structure is irrelevant to the value of the firm. When taxes are incorporated, this result changes (Modigliani and Miller, 1963). In later capital structure theories, other market imperfections are introduced. In the static trade-off theory, the optimal capital structure is determined by a trade-off between tax advantages of debt and the costs of financial distress. The pecking order theory states that firms follow a certain pecking order in which they prefer internal over external financing (Donaldson, 1961; Myers, 1984).

From these classical capital structure theories a number of firm characteristics can be derived that are empirically shown to influence firms' financing choice (see for example Harris and Raviv, 1991; Rajan and Zingales, 1995; Frank and Goyal, 2009). It is, however, not clear whether the same determinants that explain the capital structure choice in normal firms also drive the capital structure decision in buyouts. To find out whether classical capital structure theories play a role in the financing decision of LBOs, the capital structure choices of a sample of LBOs are compared to the capital structure choices of similar public firms not involved in an LBO. Comparing LBOs to public peers was previously done by Liebeskind et al. (1992) and Axelson et al. (2007). If both LBO sponsors and public peer firms make optimal financing choices based on the same theories the capital structures in LBO firms and their public peers should be positively correlated. This in turn means that the determinants of the capital structure of LBOs and public peers should also be related. Axelson et al. (2007) show that buyout leverage is mainly driven by other factors than what explains public firm leverage, while Demiroglu and James (2007) do find some support for the classical capital structure determinants.

III. Can existing capital structure theories explain leverage in LBOs?

From a practitioner's point of view, it is not the classical capital structure theories that explain leverage levels in buyouts, but it is more a matter of how much PE players can borrow - it is thought that PE sponsors borrow as much as they can. This idea has been formalized by Axelson et al. (2007). Support for this suggestion is found in the relatively new debt market timing theory, according to which firms take on more debt when interest rates are relatively low, as this indicates that the debt market is 'overheated' (Baker and Wurgler, 2002; Baker et al., 2003). Krishnaswami and Yaman (2007) confirm the importance of timing with respect to convertible bond issues. Hence for LBOs we expect that more leverage is used in times when debt is cheaper, i.e. when interest rates and credit spreads are low, which is empirically supported by Axelson et al. (2007) and Demiroglu and James (2007).[4] Interest rates and credit spreads represent the availability of debt in the market, more formally referred to as debt market liquidity. We test whether debt market liquidity explains leverage levels in LBOs.

IV. Can debt market conditions explain leverage in LBOs?

Two additional variables that have come up in previous research are also tested: type of buyout deal (primary versus secondary deals) and the reputation of the PE player involved. Axelson et al. (2007) do not find differences in leverage between primary and secondary buyouts. Both Axelson et al. (2007) and Demiroglu and James (2007) confirm that PE firm reputation has a positive impact on the amount of leverage used. Recent literature has identified other variables, which are not considered in our study, that affect LBO leverage. Ivasina and Kovner (2008) document that LBO firm bank relationships affect the terms of their syndicated loans, i.e. they result in lower spreads and lighter covenants, and hence buyout leverage. Shivdasani and Wang (2009) show that supply-side factors like

[4] Moreover, looser credit market conditions accelerate buyout funds' investment activity and produce higher deal returns (Ljungqvist, Richardson and Wolfenzon, 2007).

the expansion of the market for CDOs led to cheaper credit, looser covenants and more aggressive use of bank loans in financing LBOs.

V. *Does buyout deal type or PE sponsor reputation explain leverage in LBOs?*

2.2 Specification of variables

The first two research subquestions consider the financing package of LBOs. We gather detailed information on the various components of the financing packages of the LBOs in the sample. This financial information is then grouped into the equity or one of the debt categories. These debt categories are: senior debt (subdivided into Term loans A, B and C), junior debt (subdivided into mezzanine and second lien) and debt facilities (subdivided into revolving credit lines and capital expenditure facilities). The following two research subquestions involve the determinants of LBO capital structure. This section motivates our choice of the variables used in the regressions and discusses how they are measured.

2.2.1 Dependent variable

In the literature, the most widely employed proxy for firm leverage is its debt-to-equity or debt-to-total-capital ratio. Practitioners, however, assess firm leverage by the ratio of debt to EBITDA (earnings before interest, tax, depreciation and amortization), the EBITDA multiple. This multiple is commonly employed in practice when determining the debt package for LBOs as the amount of debt is largely based on the cash flow the firm can generate in order to support debt repayment. This makes the EBITDA multiple a direct and useful proxy of leverage for LBO practitioners. The debt to EBITDA measure for leverage is employed in earlier empirical research on LBO leverage (Axelson et al., 2007; Demiroglu and James, 2007). As this study specifically investigates determinants of LBO leverage, the EBITDA multiple is chosen as the primary proxy. Additionally, the debt-to-total-capital proxy is used as a control variable. The choice for this control variable is based on Frank and Goyal (2004), who discuss the various definitions of leverage and conclude that the most

appropriate measure is ‘total debt to market value of assets’. For the LBOs we indeed use this measure, while for the public peers we use book values due to data availability.

2.2.2 Independent variables

We aim at measuring the effect of various firm characteristics and macro-economic variables on firm leverage. With respect to the third research subquestion, various firm characteristics that play a role in classical capital structure theories are proxied. Here, our starting point is the determinants found by Rajan and Zingales (1995), Frank and Goyal (2004) and Frank and Goyal (2008) to explain leverage: firm size, collateral value of assets, growth opportunities and profitability. Next, also the corporate tax rate is included in our research as a possible determinant of capital structure, considering the supposedly important role of the tax shield in LBOs. Regarding the fourth research subquestion, two variables are employed to proxy the macroeconomic variable debt market liquidity, as insufficient prior research exists to be able to pin it down exactly. With the fifth research subquestion, two additional potential LBO leverage determinants come into play: the type of LBO deal and the reputation of the PE fund involved.

Firm size

Hypothesis IIIa: The larger the firm size, the higher its leverage.

Large firms are expected to have lower expected pre-bankruptcy costs because they have more diversification possibilities as opposed to small firms. They are also thought to have lower information and transaction costs when issuing debt (Warner, 1977; Ang et al., 1982). The static trade-off theory predicts that lower (pre-)bankruptcy costs are positively related to the use of debt financing, and so in turn firm size should have a positive effect on leverage. Various proxies are used for firm size. The most commonly used proxy for firm size is the natural logarithm of turnover (e.g. Titman and Wessels, 1988; Graham, 2000). Consequently, the natural logarithm of sales is chosen to proxy firm size. A positive feature of the natural logarithm is that it corrects for outliers.

Collateral value of assets

Hypothesis IIIb: The higher the collateral value of a firm's assets, the higher its leverage.

The collateral value of a firm's assets is considered as one of the drivers of the cost of debt. It determines the security that creditors have in case of default and therefore prevents agency problems between equity and debt holders (Jensen and Meckling, 1976). It follows that firms can use more debt financing when they have more collateral. Fixed assets can serve as collateral. Thus, collateral value is proxied by the ratio of fixed to total assets. The expected positive relation between collateral and leverage has been supported in empirical research (Long and Malitz, 1985; Rajan and Zingales, 1995; Frank and Goyal, 2009). However, it should be noted that there also exist theoretical arguments for a negative relation between collateral and debt financing (Grossman and Hart, 1980, 1982). Considering the agency problems between shareholders and management, debt financing can be advantageous. Debt providers can influence management behavior, even to the extent of forcing the firm into liquidation (Harris and Raviv, 1990). But when these debt providers have collateral they may lose the incentive to exercise their power. Hence, the advantage of debt financing disappears when the collateral value of a firm's assets is high, which implies a negative relation between collateral and debt financing.

Growth potential

Hypothesis IIIc: The larger the growth possibilities of a firm, the lower its leverage.

A firm's growth potential is assumed to be negatively related to its leverage, as firms fear that debt financing might limit the growth opportunities they have (Myers, 1977). Firms with high price-to-book (PTB) ratios are believed to have more (future) growth possibilities. Consequently, the PTB ratio (or market-to-book ratio) has been widely used in previous research as a measure of a firm's growth opportunities (Adam and Goyal, 2008). We use this proxy as well. Firms with high PTB ratios face higher costs of financial distress and in turn,

as follows from the static trade-off theory, are expected to take on less debt. Empirical research has found a significant negative relation between a firm's growth opportunities, proxied by the PTB ratio, and its leverage (Rajan and Zingales, 1995; Frank and Goyal, 2004). Demiroglu and James (2007) found a significant negative relation between growth prospects and the amount of leverage used in buyout financing.

Tax rate

Hypothesis IIId: The higher the corporate tax rate a firm faces, the higher its leverage.

An expected positive relation between the corporate tax rate and the (relative) amount of debt follows directly from the static trade-off theory. To empirically assess this hypothesis, a measure for the marginal tax rate is needed. In prior research various proxies for the marginal tax rate are employed, among which the statutory tax rate. The statutory tax rate is the official tax rate a firm faces initially, before deductions. In most countries the statutory tax rates differ according to firm size. As all the 'classical' LBO leverage determinants so far are proxied by public peer characteristics, it fits, accordingly, to use the statutory tax rates for large firms.

Profitability

Hypothesis IIIe: The larger a firm's profitability, the lower its leverage.

The static trade-off theory implies that profitable firms take on relatively more debt financing, in order to compensate for taxes. However, this positive relation is not supported by empirical research findings. Titman and Wessels (1988), Rajan and Zingales (1995), Fama and French (2002) and Frank and Goyal (2009) all report a negative correlation between profitability and debt financing, which supports the pecking order theory.

A negative relation between profitability and debt financing fits within the static trade-off perspective if adaptation costs related to making leverage adjustments are taken into account (Fischer et al., 1989). Firm profitability is proxied by return on assets (ROA).

Debt market liquidity

Hypothesis IV: The cheaper the debt, the higher the leverage that is taken on by (LBO) firms.

The independent variables introduced so far are chosen in light of the classical capital structure theories and supported by substantial empirical evidence. With respect to the special case of LBO capital structure, a new variable, the liquidity in the debt market, is introduced into this spectrum of capital structure determinants. It follows from the market timing theory that the cost of borrowing might influence the amount of debt taken on by firms. This effect will be especially relevant in the case of LBOs, where debt financing plays an important role. It is suggested that when debt is cheaper, rational profit-seeking PE firms will take on more leverage. Therefore, debt market liquidity, a formalized manner of describing the ease of getting financing and the price that has to be paid for it, is expected to affect LBO leverage.

Debt market liquidity can be proxied by the credit spread in the capital market. Credit spreads, besides compensating for credit risk, stem from the (il)liquidity in the market (Longstaff et al., 2005; Amato and Remolona, 2003). Also, credit spread is the proxy used by both Axelson et al. (2007) and Demiroglu and James (2007). Demiroglu and James (2007) measure credit spread by the spread between BB and AAA bond yields. We use the spread between BBB and AAA bond yields as a first proxy for debt market liquidity (credit spread). Axelson et al. (2007) define conditions in the debt market by 'the local real interest rate (LIBOR) plus the leveraged loan spread'. The second part of this definition refers to a credit spread. Axelson et al. (2007) do not further specify how this is measured. The leveraged loan spread represents the spread in the leveraged loan market, which is the market for syndicated bank loans (Miller, 2006). Data on leveraged loan spreads are

obtained from Standard & Poor's Leveraged Loan Review. We include leveraged loan spread as a second proxy for debt market liquidity.

Primary versus secondary deals

Hypothesis Va: Leverage levels are higher in primary buyouts than in secondary buyouts.

LBO deals can be subdivided into primary and secondary deals, where secondary buyouts are former LBO firms that are bought out by another private equity firm5. Practitioners claim that leverage levels in secondary deals are on average higher. One reason is that the first PE sponsor has already realized much of the organizational and operational restructuring potential and therefore the second PE firm must resort to maximal leverage in order to make profit. A second reason could be that the LBO firm is now financially much stronger and showing better operating performance, which allows higher leverage when the first PE firm exits than when it invested in the firm.

Private equity party reputation

Hypothesis Vb: The higher the reputation of the private equity party involved, the higher the leverage levels in LBOs.

Cotter and Peck (2001) were the first to empirically underline the important role of PE funds (referred to as "buyout specialists") in buyouts. Their view was supported and extended by others, e.g. Kaplan and Schoar (2005), who find that larger and more experienced venture capital funds perform better on both the short and the long term. Hence, reputation may reflect a PE firm's skills in selecting and monitoring firms. Lenders may rationally view borrowing to LBO firms sponsored by reputable PE sponsors as less risky. Furthermore, as argued by Diamond (1989), PE firm reputation reduces the need for bank

monitoring in order to limit moral hazard and thus allows for more bank debt. Demiroglu and James (2007) more specifically address the relationship between PE sponsor reputation and LBO financing. They find that differences in buyout leverage are related to the reputation of the PE fund involved.

Demiroglu and James (2007) measure PE fund reputation by the number of all SDC-recorded public-to-private and private-to-private buyout transactions that the fund invested in during the prior three years. In other words, they define fund reputation by fund activity. In this study, a comparable proxy is used, as PE fund reputation is defined by fund size, measured by funds raised for direct investment. PE fund sizes are obtained from the 2007 PE ranking published by Private Equity International Magazine, an international magazine for the global PE and venture capital industry. This magazine was the first to rank PE firms by size using a consistent methodology, listing them by the amount of capital raised for direct investment over the past five years. The ranking covers a very large part of the PE market; the 50 largest funds included accounted for 75 percent of global PE deal activity since 2002 (see Appendix 1).

2.3 The dataset

For the empirical research, a unique, self-constructed dataset is employed. This dataset encompasses detailed information on a large number of mid-market European LBO deals and matching public peers. Data collection with respect to European buyouts was not an easy task, as in Europe most information on LBOs is kept private. Thanks to access to private files from merchant bank X[6], involving PE-backed LBO deals in which X acted as a lender, information could be collected on 126 buyout transactions. This subsection first describes the process of data collection. Next, it addresses the issue of whether the LBO data is representative for the European LBO market, as a set of deals in which X was a lender is used as a starting point in the data collection process.

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[5] Leveraged buyouts of a higher order than secondary buyouts (tertiary buyouts and higher numbers) are not included in this research.

2.3.1 Data collection

LBO data

For the 126 buyout transactions found in X's documentation, information was collected regarding deal date, deal location, type of LBO deal (primary or secondary), industry (SIC code), PE sponsor involved and the LBO financing package. Most of this information comes from the deal documentation of X. The missing information was completed using the Dealscan and Dealogic databases, company websites of both PE firms and target firms and online published press releases regarding the deals[7]. In some cases non-Euro currencies were reported. These were recalculated into Euros using historical exchange rates. With respect to the capital structures, the initially obtained information on debt instruments used was so broadly categorized that debt structures were reclassified into the three main debt categories: senior debt, second-lien and mezzanine.

Table 1 provides an overview of our research sample of 126 LBOs with respect to locations and deal dates. The LBO dataset obtained covers a time period of seven years, from June 2000 until June 2007. The deals are not equally spread over time but biased towards the more recent years. Two explanations for this are that, first, the LBO market has become more developed in recent years, and second, that data files at X are destroyed after five years unless there is still some activity regarding a deal within these five years, for example because of a recapitalization.[8] The majority of deals took place in the UK, Germany, the Netherlands or France.

The analysis of the details of the LBO financing packages (research questions I and II) is based on 123 LBOs; three deals were excluded from the initial dataset because for these deals the details on the financing package were not available or incomplete. The analysis of the determinants of the capital structure of LBOs (research questions III, IV and

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[6] X is a merchant bank active in the mid-market segment in North-Western Europe. For confidentiality reasons, its name is not disclosed.
[7] Press releases on PE deals were found on the website of AltAssets: http://www.altassets.net.
[8] The latter explanation may potentially lead to a selection problem. In order to rule this out, we have performed our analyses as well for the 2003-2007 subsample. Results remain qualitatively similar.

V) is based on 118 LBOs; eight deals were excluded because no leverage measures could be found.

Insert Table 1 About Here

Public peer data

The second step in the construction of our dataset is to match the LBO firms to comparable public firms. Using Thomson One Banker, these public peers are found by searching for active public companies from the same country and with the same industry classification code (SIC code). Harris and Raviv (1991) show that firms within the same industry class have and hold on to specific relative leverage levels over time. Various industry-specific leverage levels have been documented by Bradley et al. (1984), Long and Malitz (1985) and Kester (1986). Using only the country and industry criteria, sometimes multiple peers result from the search. In these cases, also company size is taken into account, in order to limit the public peer group to a maximum of three peers. Firm characteristics and financial information of these public peers are obtained from Thomson One Banker. We include firm characteristics of public peers as this info is unavailable for our set of LBO firms due to their private nature.

Debt market liquidity

The third step in the sample construction is to collect data on debt market liquidity. The credit spread is measured by the quarterly spread between BBB and AAA bond yields. Quarterly data on leveraged loan spreads (over Euribor) is obtained from Standard & Poor's European Leveraged Loan Review.

2.3.2 Representativity of the dataset and potential biases

The fact that X is the starting point for the data collection might affect the sample's representativity for the European LBO market. X is a merchant bank in the mid-market segment in North-Western Europe. This means that the LBO transactions in the dataset involve medium-sized European LBO deals and the majority of deals take place in North-Western Europe. When comparing the sample with respect to these features to Standard & Poor's statistics on the overall European buyout market (Standard & Poor's LCD European Leveraged Buyout Review 4Q 2007, January 2008), it can be concluded that the sample is representative for the overall European LBO market, as in both the sample and the overall European LBO market there is a bias towards the North-Western European countries. Furthermore, the average sample deal sizes closely resemble the average deal sizes of overall European initial and secondary buyouts.

X is involved as a lender in all of the buyouts, mostly as a participant with another bank as the lead arranger, but also as the lead arranger. Following Sufi (2007), there are three differences between deals in which the bank is a lead arranger and deals in which the bank is a participant lender. First, the lead arranger establishes and maintains the relationship with the borrower while the participant lender has an "arm's-length" relation with the borrower (via the lead arranger). Second, lead arrangers typically hold a larger share of the loan, and thirdly, lead arrangers have more negotiation rights. As these differences are all of administrative nature, it seems unlikely that the inclusion in the sample of deals in which X has a lead arranger role would create a bias towards X's financing choices. Nevertheless, a possible bias towards X's financing choices in the lead arranger deals is examined by introducing a dummy for the lender role of X into the regression analysis (see Table Appendix 2). It follows that the lender role of X does not affect our outcomes.

Finally, as 58 different lead PE sponsors are involved in the sample of 126 buyouts, a potential bias towards the LBO financing choices of a limited range of PE funds can be ruled out. Thus, our sample is not only diverse with respect to the set of PE firms involved, but also with respect to the size of these funds. This as opposed to Axelson et al. (2007), whose sample consists of deals sponsored by the five largest buyout sponsors only.

3. EMPIRICAL RESULTS

This section deals with the research questions empirically and presents the outcomes. Subsection 3.1 addresses research questions I and II, by analyzing the typical financial structure of European LBO transactions and by mapping developments in the financing of European buyouts over time, respectively. Research questions III and IV are discussed in subsection 3.2, where regression analysis is employed to find out whether classical capital structure theories and/or debt market liquidity determine leverage levels in LBOs. Subsection 3.3 tackles research question V. To this end, it is tested if the size of the PE sponsor involved or the type of buyout possibly influence LBO leverage.

3.1 The financial structure of LBOs

The financial structure that PE firms choose for their target firms is different from the financial structure employed by public firms. More specifically, research suggests that the financial structure of buyouts typically consists of 60-80% of debt, as opposed to debt ratios of 20-30% in public firms (Rajan and Zingales, 1995). Besides the quantity of debt used, also debt structures are investigated. Subsection 3.1.1 provides insight into the typical financial structure of buyouts and subsection 3.1.2 analyzes the typical financial structure over time.

3.1.1 The typical financial structure of European buyouts

This subsection aims at presenting a more detailed understanding of what the financing package of a typical European LBO actually looks like, which is important considering the complicated nature of LBO financing. To this end, an in-depth description of the financial structure of a typical European buyout transaction that is representative for the

European buyout market with respect to its financing characteristics is provided[9]. In Table 2 the financial structure of the buyout is presented.

Insert Table 2 About Here

The total buyout deal value amounted to €1230m, which was financed by €435m of equity and €795m of debt. In other words, the financial structure of this buyout consisted of 35% equity and 65% debt, which is close to the average of our sample. The equity part consisted of three categories: management equity, instant equity and subordinated loan stock. What is more interesting about the financial structure in buyouts is the variety of types of debt that are used. The senior debt makes up for most of the debt (64%). Also, a substantial tranche of mezzanine debt was attracted. Mezzanine was divided into two equal tranches, one with warrants and the other without, both appealing to different types of investors in the European mezzanine market. Another popular type of debt used in LBOs, second-lien debt, was not used in this transaction. It should be noted here that second-lien debt typically started to appear in buyout financing in 2004 (Standard & Poor's, LCD European Leveraged Buyout Review 4Q 2007, January 2008) and our example LBO deal took place in 2003. In addition to the senior and junior debt, two types of debt facilities were attracted: a revolving credit facility and a CAPEX/acquisition facility.

When practitioners talk about buyout deals, they use EBITDA multiples, as this relates debt financing to the firm's ability to repay debt. In the case of the example deal, the main characteristics of the deal in practitioners' terms are that the (total) debt multiple is 5.3 and the enterprise value multiple is 8.2. Very high multiples are considered to describe so-called 'aggressive' financing (referring to high debt combined with low company income) and low multiples are often regarded as a sign of undervaluation. What is high and what is low is not that straightforward, but depends on many factors, like the size of the buyout, the

[9] Due to disclosure regulations, the name of the buyout target and PE firm involved cannot be revealed.

country where the buyout takes place, the target's industry and the time at which the buyout occurs. Overall, average buyout multiples are significantly higher in the US than in Europe, stable industries are financed with higher multiples than cyclical industries, larger buyouts are financed with higher multiples than buyouts with a smaller deal size and average multiples vary according to the state of the buyout market. The average debt multiple in 2003 for European buyouts was 4.4 (European Leveraged Loan Review, August 2007), so it can be concluded that the financing of the example LBO deal is quite aggressive for that time. The average 2006 debt multiple for European buyouts was 6.3.

Axelson et al. (2007) also present an example of the capital structure of a typical buyout, which has 25% of equity financing and is equal to their sample average. This is well below the mean of our sample. The variety of types of debt used is similar. It should be noted that their example of a typical buyout involves a secondary deal, which we found to take on more debt.

3.1.2 Developments in buyout financing

This subsection gives a more general overview of the financial structure of the LBOs in the sample and addresses changes in the average financing package over time. As such, our study pioneers in providing a detailed overview of the composition and evolution of the financing package of European LBOs.

Axelson et al. (2007) were the first to collect a large dataset (153 LBOs) of US and European LBOs and their financing characteristics. In their investigation of LBO debt structure, they differentiate between European and US buyouts but they do not take the differences in transaction dates (which range between 1985 and 2006) into account. Average LBO leverage levels vary over time, implying that the composition of the LBO debt structure is subject to change according to time. Therefore, an overview of the average LBO debt structure based on the whole sample is of limited value. We incorporate a time factor by differentiating according to the year in which the buyout was completed.

The analysis can broadly be divided into two parts. In the first part the use of debt in the sample is discussed in a more general sense, after which, in the second part, a detailed

analysis of the various components of the LBO capital structure is given. Next to describing the composition of buyout capital structure, also changes in the average LBO financing structure are examined, by comparing the buyouts completed in the 2000 to 2003 period to buyouts completed in the 2004 to 2007 period[10]. To this end, unpaired t-tests are performed, testing the null hypothesis that the averages of the two groups are equal.

Table 3 provides an overview of the overall use of debt in the sample, describing how much debt (as a percentage of total capital) has been used in the financing of LBOs over the years and what categories this debt consisted of. Both mean and median values are provided. Considering the relatively small sample size, the median values are expected to be more reliable than the means. The use of debt in buyout financing slightly increased over time, from about 68 to 71 percent of total capital. However, this increase is not significant. The low availability of data on this variable for the years 2000 to 2002 could play a role here. As for the debt categories, throughout the years senior debt has always taken up the largest part of debt financing, amounting to about 61 to 79 percent of total debt. Senior debt financing remained very popular and has slightly (insignificantly) increased. Junior debt takes up about 15 to 18 percent of total debt, but there seems to be no clear upward or downward trend over the years. Most buyouts (85 percent) make use of debt facilities, but the overview shows a decline (although not significant) in the amount of debt facilities from about 15 percent in the 2000 to 2003 period to about 5 to 7 percent in 2007. Debt to EBITDA levels have risen significantly, from a mean of 4.53 to 5.35.

Insert Table 3 About Here

While most of the above changes are not significant, taking a closer look at the trends in LBO financing structure confirms significant evolutions within these categories. Table 4 provides an overview by year of the mean and median values of the different types of debt

[10] The choice of these two groups can be motivated as follows. First, it cuts the data sample in half with respect to years. Second, 2004 to 2007 was a period of sharp growth in the buyout market, as opposed to the relatively calm and steady buyout market in 2000 to 2003.

instruments used. There has been a significant decline in the use of Term A loans in combination with significant increases in the use of Term loans B and C. This could be explained by the difference between Term A loans versus Term B and C loans. In the syndicated loan market, Term A loans are sold to (commercial) banks, while Term B and C loans are sold to institutional investors (Miller, 2006). The exhibited trend therefore represents an increased popularity of the institutional debt market. The analysis in Table 3 gave an inconclusive outcome with respect to the development of the junior debt category. As shown in Table 4, this is the result of the opposing trends of the two types of debt within this category. While the use of mezzanine financing decreased slightly over the years, a new type of junior debt, second lien debt, entered the European market from 2004 onwards (see Standard & Poor's LCD European Leveraged Buyout Review 4Q 2007). Second lien debt use increased from 0 percent in the 2000 to 2003 period up to about 8 percent in 2007. The first second-lien debt used in the data sample was for a buyout deal completed in September 2004. Finally, the decreasing trend with respect to the category of debt facilities can be explained by a significant decline in the amounts of revolving credit facilities employed.

Our results can be extended to explain the developments in the European LBO market in general, as we have verified that our dataset adequately reflects the European buyout market, by comparing the yearly debt structure composition of our dataset to that of the European buyout market, as recorded by Standard & Poor's (Standard&Poor's LCD European Leveraged Buyout Review). Both groups exhibit an almost identical composition of LBO debt structure throughout the years.

Our outcomes are in line with Demiroglu and James (2007). Their sample of US PTPs has a somewhat lower average equity percentage of 30-35% but the composition of debt shows similar evolutions: traditional bank debt, revolving credit lines and Term A loans became less popular over time, whereas second lien debt and Term B loans were being used more frequently.

Insert Table 4 About Here

3.2 Determinants of LBO leverage

In this section research questions III and IV are addressed. We first test for potential multicollinearity problems. The correlation matrix in Table 5 shows that our regressors are not highly correlated. This is confirmed by an analysis of unreported VIF inflation factors. Table 6 presents the descriptive statistics for all regression variables. The average LBO firm in our sample has sales of 456 mio euro, a price-to-book ratio of 4.08 and a return on assets of 9.55%. It has on average 28.41% of fixed assets, a tax rate of 29.95%, a credit spread of 0.81% and a leveraged loan spread of 2.83%. The mean debt to assets ratio is 70% for our sample of LBO firms and 29% for our control sample of public companies. The average debt level corresponds to a Debt/EBITDA multiple of 5.22 for LBO firms and 1.33 for the control group of listed firms.

Insert Table 5 & 6 here

3.2.1 Comparison of leverage levels

If the capital structure choice for LBOs is comparable to that of public firms, it follows that leverage levels of LBO firms and matched public firms should be positively related. This can easily be tested by regressing LBO leverage on public peer leverage, as is done by both Axelson et al. (2007) and Demiroglu and James (2007). However, both empirical studies do not find a significant relationship. The evidence presented in Table 7 confirms these findings. For all leverage measures (Debt/EBITDA, Ln Debt/EBITDA, Debt/Capital)[11] there is no significant relation between the leverage levels of LBOs and their public peers. Moreover, regressing LBO leverage on public peer leverage produces very weak regression models.

[11] As a robustness check, we also performed all regression analyses of this section and the next sections using Senior Debt/EBITDA, Ln Senior Debt/EBITDA and Senior Debt/Capital. Using these alternative leverage measures does not influence our findings.

A possible explanation for not finding a significant relationship is that leverage choices made at the moment of completion of the buyout transaction concern temporary leverage levels, as opposed to the steady long-term leverage levels chosen by public firms (Demiroglu and James, 2007). However, this possibility has been thoroughly examined by Axelson et al. (2007). No relation was found between planned future LBO leverage and matched public firm leverage or between LBO leverage and the leverage of 'up-to-date' public peers, i.e. public peers that recently adjusted their leverage. An alternative explanation for this outcome is that capital structure decisions of LBOs and public peers are based on different motivations. This possibility is addressed in the following subsections.

Insert Table 7 About Here

3.2.2 The classical capital structure theories and LBO leverage

To test whether the classical capital structure theories hold for public firms and LBO firms alike, we regress both LBO leverage and public peer leverage on a set of classical leverage determinants. The research process can be divided into two parts. First, we perform a regression analysis regarding the control group of public peers to check whether the selected variables adequately explain leverage. Next, we regress LBO leverage on the same leverage determinants. The regression results regarding the control group of public peers are summarized in Table 8. It can be concluded that the classical capital structure determinants indeed have explanatory power with respect to leverage levels in public firms. Firm size, profitability, growth potential and collateral asset value all have a significant effect on firm leverage. Best results are obtained when leverage is measured by the (Ln) debt to EBITDA multiple. Only the tax rate does not appear to be of significant influence, regardless of the leverage measure chosen. This could be explained by the fact that our proxy for the tax rate, the statutory corporate tax rate, might substantially differ from the actual corporate tax rate which firms face. The signs of the coefficients are all but one in line with our hypotheses. The expected positive relation between firm size and leverage is not confirmed by the regression results. Instead, a (significant) negative relation is found.

Insert Table 8 About Here

Table 9 presents the regression results on LBO leverage and the same classical capital structure determinants. Regression outcomes are presented with respect to all three leverage measures. For the third regression analysis, where leverage is proxied by debt to total assets, the model as a whole is not significant. The other two regression models are also not very strong, especially not when compared to the public peer regression models. As for the various classical capital structure determinants, none of the variables that exhibited a significant effect on the public peers is significant for the LBOs. Only the corporate tax rate, which did not have any explanatory power in the public peer group, emerges as a significant determinant of LBO leverage. However, a negative instead of the anticipated positive relation between tax and leverage is found. We conclude that leverage in LBOs cannot be explained by the same variables as leverage in comparable public firms.

Insert Table 9 About Here

3.2.3 Debt market liquidity and LBO leverage

Our results show that average debt multiple levels in LBOs change over time. This implies that there might be a time related factor that influences the leverage choice. In line with this, practitioners claim that leverage is driven by debt market liquidity. This idea is formalized in the fourth research sub question. The related hypothesis is that cheaper debt, which is translated into lower credit spreads and lower leveraged loan spreads, corresponds to higher debt levels. While this liquidity effect is thought to play a role in all types of firms, it is expected to be strongest in the case of LBOs given the important role of debt financing in LBOs.

First, this liquidity effect is tested with respect to the public peer group. To this end, the debt market liquidity measures are entered into the regression model of the previous subsection (see Table 10). The influence of the classical firm characteristics on leverage largely remains the same. However, the outcomes do not support the debt market liquidity hypothesis. The leveraged loan spread has no significant effect on leverage and the coefficient for the credit spread has a significantly positive coefficient, which is in contrast to expectations. For instance, Graham and Harvey (2001) indicate that executives view the level of interest rates as a critical factor in their capital structure decisions.

Insert Table 10 About Here

Next, the explanatory power of the debt market conditions is tested with respect to leverage in LBOs. We add proxies for debt market conditions to the classical regression model in Table 11. Again, the inclusion of debt market conditions does not alter the previously documented non-significant influence of the classical capital structure determinants on LBO leverage. However, we provide support for the debt market liquidity hypothesis, as the leveraged loan spread shows a very significant negative relationship to LBO leverage. The credit spread is insignificant. We confirm that capital structure choice in LBOs is affected by prevailing debt market conditions.

Insert Table 11 About Here

3.2.4 LBO deal type/PE sponsor reputation and LBO leverage

As formalized in our fifth research question, this section studies whether two more factors have any explanatory power for the capital structure choice in LBOs: the type of deal (primary versus secondary) and the reputation of the PE player involved.

Primary versus secondary deals

In Table 12, we enter a dummy for the type of deal (primary versus secondary) into the regression analysis. We find that leverage levels are significantly higher for secondary deals, whereas Axelson et al. (2007) find no differences between primary and secondary deals.

Insert Table 12 About Here

Private equity party reputation

In order to test whether PE reputation influences LBO leverage, our sample is divided into groups based on the size of the (lead) PE fund involved. Dummies are entered into the regression analysis accordingly. The sample is split in one group of LBOs led by a top-50 size (large) PE fund and another group of LBOs not led by a top-50 size (small) fund. Table 13 presents the results. LBO leverage is significantly higher in deals sponsored by the top-50 size PE funds. Consequently, more reputable PE sponsors can attract more leverage for their LBO deals.

Insert Table 13 About Here

4. CONCLUSION

4.1 Discussion

LBOs are characterized by their intensive use of debt financing. High leverage is crucial because of the limited equity PE funds invest, but theory suggests that debt financing also serves many other roles, like its disciplinary role for the target firm and its role as a tax shield. On the other hand, debt involves disadvantages, like increased bankruptcy costs and reduced financial flexibility. The established capital structure theories claim that these and other factors drive the financing choice in LBOs. However, practitioners think differently about what drives the leverage levels in LBOs. They believe that LBO leverage is driven by the prevailing liquidity in the debt market.

To find out what truly drives leverage in LBOs, we have collected a unique research sample of 126 European PE sponsored buyouts completed between June 2000 and June 2007. We have analysed the capital structure details of these LBOs. On average, 71 percent of buyout financing consists of debt. Over time, this percentage has increased insignificantly. Within this debt package, changes have taken place with respect to the debt instruments used. Regarding senior debt financing, the importance of Term loan A has diminished in favour of Term loans B and C, implying a trend towards the institutional debt market. Regarding junior debt financing, the use of mezzanine financing decreased slightly over the years, while a new type of junior debt, second lien debt, entered the European market from 2004 onwards.

Next, we examine the explanatory power of a broad range of variables with respect to European LBO leverage. We find that determinants derived from the classical capital structure theories cannot explain leverage in LBOs, while they do so significantly in the case of a set of comparable public firms. On the other hand, debt market conditions do not impact public peer leverage, but they are significantly related to LBO leverage. Thus, as suggested by practitioners, the capital structure choice with respect to LBOs is heavily influenced by the prevailing conditions in the debt market. When credit conditions loosen, LBOs use relatively more debt, suggesting that PE firms may attract more debt when perceived financial flexibility is higher. We also find that the involvement of a reputable PE fund in a

buyout results on average in higher leverage levels. Reputed PE sponsors are more capable of obtaining high leverage for their target firms. They can create value by providing their portfolio firms with more financial flexibility which allows to take on more debt. Secondary LBOs also show higher leverage levels. Our results for determinants of capital structure in European LBOs are largely in line with (US) findings of Axelson et al. (2007) and Demiroglu and James (2007).

4.2 Limitations and avenues for further research

A first limitation arises from the research sample used. The collected data comes from LBO deals in which merchant bank X was involved. A possible solution to this bias would be to collect a larger data sample stemming from multiple and independent data sources. Yet, we feel that any potential bias would have a limited impact on our results. First, our dataset is representative for the European LBO market according to S&P`s statistics. Second, 58 different PE players are involved in our LBO deals, which makes it unlikely that X's involvement in a deal would affect leverage levels. Third, we find no difference between deals where X was a lead or non-lead lender. Another way to improve our study would be to enlarge our sample size and to include pre-LBO financials of the buyout firms for classical capital structure theory variables instead of proxying them by matched public firm financials. However, information on pre-LBO financials is notoriously hard to find. These limitations open up many potential avenues for further research.

Another bias may arise from the natural market developments that could not all be taken into account. As is claimed in the 2007 Special Issue on Private Equity of the Journal of Applied Corporate Finance, innovations in the market, such as activities of PE funds and the innovation of the credit risk mitigation techniques, have reduced the costs of reorganizing companies. This makes leverage ratios increase and costs of borrowing decrease (Altman, 2007). It also leads to the question if there is another factor at work behind debt market liquidity. What makes debt market liquidity vary so much over time? Next, one particular outcome of this paper is fascinating: when debt becomes cheaper, why do public firms not react like PE firms and increase their leverage?

These issues call for further analysis. Finally, it would be very interesting to empirically study whether the extensive amount of debt used in LBOs reduces financial flexibility. If so, it would be worthwhile to investigate to what extent this is the case and how PE sponsors deal with this.

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TABLE 1

Overview of locations and deal dates of LBO research sample

This table presents an overview of the locations (by country) and the deal dates (by year) of the research sample of leveraged buyouts. The year 2007 concerns the first half of the year as the dataset only includes deals until June 2007.

	2000	2001	2002	2003	2004	2005	2006	2007	Total
UK	1	4	2	2	6	6	11	1	33
Germany	2	1	3	3	8	9	6	2	34
France	2	2	3		2	2	4		15
Netherlands		1	1	3	4	7	6		22
Belgium				2	2		1		5
Denmark				2			2		4
Sweden					1	1	1	1	4
Ireland					1		1		2
Switzerland							1		1
Finland							1		1
Norway							1		1
Spain							1		1
Italy								2	2
Austria								1	1
Total	5	8	9	12	24	25	36	7	126

TABLE 2

The financing structure of a typical LBO

This table presents the details on the financing structure of a typical leveraged buyout deal. The first column presents the details of the financial structure on which the table reports. The second column reports the amounts in million Euros. The third column reports the enterprise value multiple, the equity multiple, the total debt multiple and the senior debt multiple, respectively. The fourth column provides information on the repayment terms of the debt. The fifth column reports information on the pricing of the debt. The abbreviation *bp* stands for basis points (over Euribor). Sources: X's deal documentation and own calculations.

	Amount (million €)	**EBITDA multiple**	**Repayment term (in years)**	**Pricing (spread over Euribor)**
Enterprise Value	1225	8.2		
Total Equity	430 (=35%)	2.9		
Management equity	2.5			
Instant equity	2.5			
Subordinated loan stock	425			
Total Debt	795 (=65%)	5.3		
Total Senior Debt	510	3.4		
Term Loan A	250		7	225bp
Term Loan B	130		8	275bp
Term Loan C	130		9	325bp
2nd Lien	0			
Mezzanine	165			Two tranches
Total debt facilities	120			
Revolving credit facility	50		7	225bp
Capex/Acquisition facility	70		7	225bp

TABLE 3

Developments in buyout financing, broad statistics

This table presents broad statistics on the capital structure of the sample of 123 European buyouts, which were completed between June 2000 and June 2007. The first eight rows report means and medians by year for a range of leverage ratios that are specified in the columns. The following two rows report the averages for the first four years and the last four years, respectively. In the last two rows the value of the various leverage ratios between two time periods are compared; the direction of the time trend is reported (by + and – signs) and the p-value of the t-test statistic (unpaired t-test) for the significance of the time trend is reported. *,** and *** indicate significance levels of 10%, 5% and 1% levels, respectively.

Year	Total Debt to Capital		Senior Debt to Total Debt		Junior Debt to Total Debt		Debt Facilities to Total Debt		Debt to EBITDA	
	Mean	*Median*	*Mean*	*Median*	*Mean*	*Median*	*Mean*	*Median*	*Mean*	*Median*
2000	-	-	70.59%	73.07%	16.29%	7.48%	13.12%	13.65%	3.86	4.00
2001	-	-	71.29%	66.71%	16.18%	16.47%	12.54%	11.95%	5.25	5.50
2002	-	-	62.89%	61.67%	16.70%	19.18%	20.41%	20.00%	4.38	4.79
2003	67.85%	68.00%	71.58%	72.25%	12.60%	16.88%	15.82%	14.87%	4.62	4.61
2004	71.44%	71.17%	69.98%	69.32%	15.30%	17.50%	14.71%	12.97%	4.51	4.30
2005	70.59%	70.91%	75.80%	73.31%	14.39%	17.87%	9.81%	8.91%	5.08	5.10
2006	69.51%	71.24%	66.75%	66.67%	16.87%	17.55%	16.38%	14.63%	6.07	5.78
2007	71.97%	71.43%	75.74%	79.11%	16.76%	20.00%	7.50%	5.75%	5.75	5.80
AVG '00-'03	67.85%	68.00%	68.21%	68.42%	16.14%	15.00%	15.66%	15.12%	4.53	4.72
AVG '04-'07	70.88%	71.19%	72.07%	72.10%	15.83%	18.23%	12.10%	10.57%	5.35	5.24
Time trend 2000-2003 vs. 2004-2007	(+)		(+)		(+/-)		(-)		(+)***	
p-value	0.587		0.489		0.883		0.551		0.005	

Table 4: Developments in buyout financing, detailed statistics

This table presents broad statistics on the capital structure of the sample of 123 European buyouts, which were completed between June 2000 and June 2007. The first eight rows report means and medians by year for a range of leverage ratios that are specified in the columns. The following two rows report the averages for the first four years and the last four years, respectively. In the final two rows the value of the various leverage ratios between two time periods are compared; the direction of the time trend is reported (by + and – signs) and the p-values of the t-test statistics (unpaired t-test) for the significance of the time trend are reported. *,** and *** indicate significance levels of 10%, 5% and 1% levels, respectively.

Year	Term Loan A to Total Debt		Term Loan B to Total Debt		Term Loan C to Total Debt		Mezzanine to Total Debt		Second Lien to Total Debt		RCF to Total Debt		Capex to Total Debt	
	Mean	*Median*	*Mean*	*Median*	*Mean*	*Median*	*Mean*	*Median*	*Mean*	*Median*	*Mean*	*Median*	*Mean*	*Median*
2000	48.36%	48.63%	18.95%	22.02%	3.27%	0.00%	16.29%	7.48%	0.00%	0.00%	13.12%	13.65%	0.00%	0.00%
2001	46.04%	46.39%	18.38%	17.16%	6.87%	1.58%	16.18%	16.47%	0.00%	0.00%	12.54%	11.95%	0.00%	0.00%
2002	30.39%	29.81%	17.21%	17.55%	15.29%	16.67%	16.70%	19.18%	0.00%	0.00%	17.27%	13.70%	3.14%	0.00%
2003	36.70%	35.05%	17.73%	16.91%	17.15%	16.38%	12.60%	16.88%	0.00%	0.00%	12.79%	13.85%	3.03%	0.00%
2004	33.73%	34.66%	19.23%	17.86%	17.03%	17.10%	14.44%	15.80%	0.86%	0.00%	9.86%	10.69%	4.85%	0.00%
2005	30.62%	28.57%	25.94%	23.92%	19.24%	21.20%	11.12%	14.46%	3.27%	0.00%	8.08%	7.13%	1.73%	0.00%
2006	23.68%	21.16%	23.68%	22.92%	19.39%	20.96%	13.51%	15.46%	3.35%	0.00%	12.25%	7.11%	4.13%	0.00%
2007	17.37%	18.38%	28.96%	28.63%	29.41%	28.63%	8.38%	11.07%	8.38%	7.11%	4.21%	4.51%	3.29%	0.00%
AVG '00-'03	39.24%	39.97%	18.32%	18.41%	10.65%	8.66%	16.14%	15.00%	0.00%	0.00%	14.12%	13.29%	1.54%	0.00%
AVG '04-'07	26.35%	25.69%	24.45%	23.33%	21.27%	21.98%	11.86%	14.20%	3.97%	1.78%	8.60%	7.36%	3.50%	0.00%
Time trend 2000-'03 vs. 2004-'07	(-)***		(+)***		(+)***		(-)		(+)***		(-)**		(+)	
p-value	0.000		0.004		0.001		0.211		0.004		0.047		0.219	

TABLE 5

Correlation matrix

This table reports the correlations between the various independent variables. The following abbreviations are used: LNSALES = the natural logarithm of sales, PTB = the price-to-book value, ROA = the return on assets, FIXED = the ratio of fixed to total assets, TAX = the corporate tax rate, CREDITSPR = the credit spread, and LEV.LOANSPR = the leveraged loan spread.

	LN SALES	**PTB**	**ROA**	**FIXED**	**TAX**	**CREDIT SPREAD**	**LEV.LOAN SPREAD**
LN SALES	1						
PTB	-0.033	1					
ROA	-0.059	0.049	1				
FIXED	-0.027	0.142	-0.211	1			
TAX	-0.150	-0.013	-0.007	-0.016	1		
CREDIT SPREAD	-0.061	0.260	-0.086	0.274	0.285	1	
LEV.LOAN SPREAD	-0.032	0.122	0.027	0.093	0.189	0.405	1

TABLE 6

Descriptive statistics

This table reports descriptive statistics for the regression variables. Panel A reports the descriptive statistics for the dependent variables for both the LBOs and the public peer group. Panel B reports the descriptive statistics for the independent variables. The following abbreviations are used: LNSALES = the natural logarithm of sales, PTB = the price-to-book value, ROA = the return on assets, FIXED = the ratio of fixed to total assets, TAX = the corporate tax rate, CREDITSPR = the credit spread, and LEV.LOANSPR = the leveraged loan spread.

Panel A: Descriptive statistics for dependent variables

	LBOs		**Public Peers**	
	DEBT / EBITDA	***DEBT / CAPITAL***	***DEBT / EBITDA***	***DEBT / CAPITAL***
Mean	5.22107	0.70120	1.33255	0.29318
Median	5.30000	0.70828	0.65334	0.23760
Maximum	9.00000	0.90963	8.78216	0.95650
Minimum	2.70000	0.42045	0.00683	0.00190
Observations	114	74	112	111

Panel B: Descriptive statistics for independent variables

	LNSALES	**PTB**	**ROA**	**FIXED**	**TAX**	**CREDITSPR**	**LEV.LOANSPR**
Mean	6.12436	4.08446	9.55145	28.4092	29.9593	0.80697	2.82580
Median	5.80715	2.52000	7.90000	28.4750	30.0000	0.65634	2.82477
Maximum	10.8707	102.100	81.6500	80.6000	37.8000	2.02000	3.01222
Minimum	2.05027	0.21000	0.08000	0.58667	12.5000	0.54054	2.53540
Observations	117	117	117	118	118	118	118

TABLE 7

LBO leverage and public peer leverage

This table reports OLS regressions of LBO leverage on public peer leverage, using different measures: (1) Debt to EBITDA, (2) the natural logarithm of Debt to EBITDA and (3) Debt to total capital or total assets for LBOs and public peers, respectively. Regression coefficients and relevant statistical measures are reported. T-statistics are reported in parentheses. *,** and *** indicate that coefficients are significantly different from zero at the 10%, 5% and 1% levels, respectively.

	(1) LBO Debt / EBITDA	(2) LBO Ln Debt / EBITDA	(3) LBO Debt / Capital
Public Co. Debt/EBITDA	0.03		
	[0.50]		
Public Co. Ln Debt/EBITDA		0.00	
		[-0.14]	
Public Co. Debt/Assets			-0.05
			[-1.35]
Constant	5.17	1.63	0.71
	[36.02]***	[69.09]***	[49.11]***
# Obs.	108	108	70
R^2	0	0	0.01
F-stat	0.25	0.02	1.83
Prob(F-stat]	0.62	0.89	0.18

TABLE 8

Regression of public peer leverage on 'classical' determinants

This table reports OLS regressions of public peer leverage, as measured by (1) Debt to EBITDA, (2) the natural logarithm of Debt to EBITDA and (3) Debt to total assets, respectively, on the 'classical' capital structure determinants firm size, collateral, growth potential, corporate tax rate and profitability. Regression coefficients and relevant statistical measures are reported. T-statistics are reported in parentheses. *,** and *** indicate that coefficients are significantly different from zero at the 10%, 5% and 1% levels, respectively.

	(1) Debt / EBITDA	(2) Ln (Debt / EBITDA)	(3) Debt / Total assets
Firm size	-0.3329***	-0.4178***	0.0215*
	(-4.0971)	(-5.4839)	(1.6884)
Collateral	0.0135*	0.0106	0.0041***
	(1.6816)	(1.3921)	(3.1617)
Growth potential	0.0088	-0.0238*	-0.00267
	(0.4669)	(-1.7285)	(-1.1538)
Corp. tax rate	0.0292	0.0239	0.0003
	(0.7703)	(0.6772)	(0.0493)
Profitability	-0.0231**	-0.0686***	-0.0011
	(-2.5637)	(-4.3044)	(-0.4130)
Constant	2.5727*	1.5536	0.0546
	(1.9160)	(1.2172)	(0.2558)
F-statistic	6.5197	11.5295	2.8280
Prob(F-statistic)	0.0000	0.0000	0.0195
R-squared	0.2369	0.3522	0.1187
Adj. R-squared	0.2005	0.3217	0.0767
# Observations	112	112	111

TABLE 9

Regression of LBO leverage on 'classical' determinants

This table reports OLS regressions of LBO leverage, as measured by (1) Debt to EBITDA, (2) the natural logarithm of Debt to EBITDA and (3) Debt to total assets respectively, on the 'classical' capital structure determinants firm size, collateral, growth potential, corporate tax rate and profitability. Regression coefficients and relevant statistical measures are reported. T-statistics are reported in parentheses. *,** and *** indicate that coefficients are significantly different from zero at the 10%, 5% and 1% levels, respectively.

	(1) Debt / EBITDA	(2) Ln (Debt / EBITDA)	(3) Debt / Total assets
Firm size	-0.0707	-0.0143	0.0006
	(-1.1364)	(-1.2071)	(0.1090)
Collateral	-0.0081	-0.0014	0.0003
	(-1.3213)	(-1.1645)	(0.5916)
Growth potential	-0.0153	-0.0036*	0.0017
	(-1.4013)	(-1.7227)	(0.2309)
Corp. tax rate	-0.0673**	-0.0140**	-0.0028
	(-2.3979)	(-2.6198)	(-0.9867)
Profitability	-0.0179	-0.0032	-0.0003
	(-1.5944)	(-1.4869)	(-0.2551)
Constant	8.1232***	2.2176***	0.7711***
	(7.9529)	(11.401)	(7.8765)
F-statistic	2.39378	2.7209	0.3242
Prob(F-statistic)	0.042281	0.0235	0.8967
R-squared	0.100605	0.1128	0.0236
Adj. R-squared	0.058577	0.0713	-0.0492
# Observations	113	113	73

TABLE 10

Regression of public peer leverage on 'classical determinants' and debt market liquidity

This table reports OLS regressions of public peer leverage, as measured by (1) Debt to EBITDA, (2) the natural logarithm of Debt to EBITDA and (3) Debt to total assets respectively, on both the 'classical' capital structure determinants firm size, collateral, growth potential, corporate tax rate and profitability, and the debt market liquidity, as measured by credit spread and leveraged loan spread. Regression coefficients and relevant statistical measures are reported. T-statistics are reported in parentheses. *,** and *** indicate that coefficients are significantly different from zero at the 10%, 5% and 1% levels, respectively.

	(1) Debt / EBITDA		**(2) Ln (Debt / EBITDA)**		**(3) Debt / Total assets**	
Firm size	-0.3560***	-0.3572***	-0.4162***	-0.4172***	0.0212*	0.0212*
	(-4.5246)	(-4.4765)	(-5.5713)	(-5.5944)	(1.6801)	(1.6871)
Collateral	0.0072	0.0106	0.0061	0.0092	0.0047***	0.0044***
	(0.8824)	(1.3164)	(0.7996)	(1.2201)	(3.5139)	(3.3990)
Growth potential	-0.0273*	-0.0218	-0.0319**	-0.0281**	-0.0017	-0.0022
	(-1.8557)	(-1.4946)	(-2.2820)	(-2.0608)	(-0.7272)	(-0.9501)
Corp. tax rate	-0.0048	0.0114	-0.0015	0.0072	0.0034	0.0024
	(-0.1260)	(0.3023)	(-0.0419)	(0.2045)	(0.5505)	(0.4031)
Profitability	-0.0514***	-0.0525***	-0.0686***	-0.0714***	-0.0011	-0.0007
	(-3.123451)	(-3.1373)	(-4.3858)	(-4.5649)	(-0.4066)	(-0.2581)
Credit spread	0.8311*		0.9404**		-0.1144	
	(1.9245)		(2.2929)		(-1.6342)	
Lev. loan spread		0.9748		2.6059**		-0.3299*
		(0.8306)		(2.3754)		(-1.7293)
Constant	3.3466**	0.6784	1.6993	-5.2347*	0.0356	0.9118*
	(2.5363)	(0.2033)	(1.3561)	(-1.6783)	(0.1679)	(1.6921)
F-statistic	6.8023	6.1286	10.8701	10.9692	2.8393	2.8998
Prob(F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0134	0.0118
R-squared	0.2799	0.2594	0.3832	0.3853	0.1407	0.1433
Adj. R-squared	0.2388	0.2170	0.3479	0.3502	0.0912	0.0939
# Observations	112	112	112	112	111	111

TABLE 11

Regression of LBO leverage on 'classical determinants' and debt market liquidity

This table reports OLS regressions of LBO leverage, as measured by (1) Debt to EBITDA, (2) the natural logarithm of Debt to EBITDA and (3) Debt to total assets, respectively, on both the 'classical' capital structure determinants firm size, collateral, growth potential, corporate tax rate and profitability, and the debt market liquidity, as measured by the credit spread and the leveraged loan spread. Regression coefficients and relevant statistical measures are reported. T-statistics are reported in parentheses. *,** and *** indicate that coefficients are significantly different from zero at the 10%, 5% and 1% levels, respectively.

	(1) Debt / EBITDA		**(2) Ln (Debt / EBITDA)**		**(3) Debt / Total assets**	
Firm size	-0.0698	-0.0681	-0.0141	-0.0138	0.0007	0.0004
	(-1.1185)	(-1.1756)	(-1.1913)	(-1.2521)	(0.1362)	(0.0765)
Collateral	-0.0073	-0.0054	-0.0012	-0.0008	0.0003	0.0003
	(-1.1567)	(-0.9433)	(-1.0303)	(-0.7747)	(0.5691)	(0.6032)
Growth potential	-0.0140	-0.0103	-0.0033	-0.0026	0.0013	0.0019
	(-1.2389)	(-1.0101)	(-1.5720)	(-1.3519)	(0.2689)	(0.3954)
Corp. tax rate	-0.0633**	-0.0456*	-0.0134**	-0.0098*	-0.0029	-0.0032
	(-2.1433)	(-1.7153)	(-2.3818)	(-1.9472)	(-0.9915)	(-1.1044)
Profitability	-0.0180	-0.0157	-0.0031	-0.0027	-0.0003	-0.0004
	(-1.5996)	(-1.5030)	(-1.4894)	(-1.3878)	(-0.2791)	(-0.3650)
Credit spread	-0.1463		-0.0218		0.0176	
	(-0.4335)		(-0.3389)		(0.2829)	
Lev. loan spread		-3.44823***		-0.6591***		0.0714
		(-4.1746)		(-4.1932)		(0.8230)
Constant	8.0935***	17.077***	2.2131***	3.9294***	0.7592***	0.5824**
	(7.8763)	(7.2784)	(11.305)	(8.7994)	(7.0840)	(2.3350)
F-statistic	2.0110	5.2057	2.2678	5.5495	0.2798	0.3818
Prob(F-statistic)	0.0705	0.0001	0.0424	0.0000	0.9446	0.8881
R-squared	0.1022	0.2276	0.1138	0.2390	0.0248	0.0335
Adj. R-squared	0.0514	0.1839	0.0636	0.1960	-0.0639	-0.0543
# Observations	113	113	113	113	73	73

TABLE 12

Leverage and deal type

This table reports OLS regressions of LBO leverage, as measured by (1) Debt to EBITDA, (2) the natural logarithm of Debt to EBITDA and (3) Debt to total assets, on the 'classical' capital structure determinants firm size, collateral, growth potential, corporate tax rate and profitability, the debt market liquidity measured by the leveraged loan spread, and a dummy for the type of deal (0= primary buyouts, 1= secondary buyouts). Regression coefficients and relevant statistical measures are reported. T-statistics are reported in parentheses. *,** and *** indicate that coefficients are significantly different from zero at the 10%, 5% and 1% levels, respectively.

	(1) Debt / EBITDA	(2) Ln (Debt / EBITDA)	(3) Debt / Total assets
Firm size	-0.0675	-0.0137	0.0003
	(-1.1794)	(-1.2618)	(0.0559)
Collateral	-0.0056	-0.0009	0.0003
	(-0.9836)	(-0.8206)	(0.5839)
Growth potential	-0.0085	-0.0022	0.0020
	(-0.8355)	(-1.1617)	(0.4216)
Corp. tax rate	-0.0384	-0.0083	-0.0033
	(-1.4471)	(-1.6518)	(-1.1168)
Profitability	-0.0146	-0.0025	-0.0004
	(-1.4100)	(-1.2854)	(-0.3749)
Lev. loan spread	-3.4697***	-0.6638***	0.0727
	(-4.2540)	(-4.2980)	(0.8313)
Dummy=1	0.3905*	0.0841**	-0.0067
	(1.9318)	(2.1990)	(-0.3433)
Constant	1.6758***	3.8605***	0.5840**
	(7.2153)	(8.7778)	(2.3256)
F-statistic	5.1102	5.6196	0.3397
Prob(F-statistic)	0.0001	0.0000	0.9327
R-squared	0.2541	0.2725	0.0353
Adj. R-squared	0.2044	0.2240	-0.0686
# Observations	113	113	73

TABLE 13

Leverage and PE sponsor size

This table reports OLS regressions of LBO leverage, as measured by (1) Debt to EBITDA, (2) the natural logarithm of Debt to EBITDA and (3) Debt to total assets, respectively, on the 'classical' capital structure determinants firm size, collateral, growth potential, corporate tax rate and profitability, the debt market liquidity measured by the leveraged loan spread, and a dummy for the size of the private equity fund involved (0= buyouts that are sponsored by private equity players that *do not* belong in the top-50 of largest private equity funds, 1= buyouts that are sponsored by private equity players that *do* belong in the top-50 of largest private equity funds). PE fund size is taken from The Private Equity International ranking for 2007 as published by Private Equity International Magazine in its May 2007 Issue. Regression coefficients and relevant statistical measures are reported. T-statistics are reported in parentheses. *,** and *** indicate that coefficients are significantly different from zero at the 10%, 5% and 1% levels, respectively.

	(1) Debt / EBITDA	(2) Ln (Debt / EBITDA)	(3) Debt / Total assets
Firm size	-0.0677	-0.0137	0.0005
	(-1.1967)	(-1.2748)	(0.0943)
Collateral	-0.0035	-0.0005	0.0002
	(-0.6252)	(-0.4554)	(0.3545)
Growth potential	-0.0081	-0.0022	0.0021
	(-0.8029)	(-1.1521)	(0.4382)
Corp. tax rate	-0.0471*	-0.0101**	-0.0030
	(-1.8117)	(-2.0484)	(-1.0335)
Profitability	-0.0136	-0.0024	-0.0004
	(-1.3305)	(-1.2134)	(-0.3886)
Lev. loan spread	-3.8328***	-0.7320***	0.075086
	(-4.6659)	(-4.6815)	(0.8661)
Dummy=1	0.4870***	0.0923**	-0.0216
	(2.4785)	(2.4673)	(-1.1071)
Constant	1.7862***	4.0780***	0.5793**
	(7.7219)	(9.2609)	(2.3266)
F-statistic	5.5562	5.8547	0.5034
Prob(F-statistic)	0.0000	0.0000	0.8286
R-squared	0.2703	0.2807	0.0514
Adj. R-squared	0.2216	0.2328	-0.0507
# Observations	113	113	73

TABLE APPENDIX 2

Regression results with dummy lead arranger role

The table reports OLS regressions of LBO leverage, as measured by (1) Debt to EBITDA, (2) the natural logarithm of Debt to EBITDA and (3) Debt to total assets, respectively, on the 'classical' capital structure determinants firm size, collateral, growth potential, corporate tax rate and profitability, the debt market liquidity measured by the leveraged loan spread, and a dummy for the lender role of X (0 = participant lender, 1 = lead arranger). Regression coefficients and relevant statistical measures are reported. T-statistics are reported in parentheses. *,** and *** indicate that coefficients are significantly different from zero at the 10%, 5% and 1% levels, respectively.

	(1) Debt / EBITDA		(2) Ln (Debt / EBITDA)		(3) Debt / Total assets	
Firm size	-0.0717	-0.0701	-0.0147	-0.0144	0.0007	0.0004
	(-1.1364)	(-1.1979)	(-1.2294)	(-1.2964)	(0.1400)	(0.0822)
Collateral	-0.0076	-0.0056	-0.0013	-0.0009	0.0002	0.0003
	(-1.1795)	(-0.9775)	(-1.0850)	(-0.8445)	(0.5137)	(0.5476)
Growth potential	-0.0141	-0.0104	-0.0034	-0.0026	0.0012	0.0018
	(-1.2419)	(-1.0158)	(-1.5804)	(-1.3636)	(0.2602)	(0.3853)
Corp. tax rate	-0.0640**	-0.0463*	-0.0136**	-0.0100*	-0.0029	-0.0033
	(-2.1484)	(-1.7275)	(-2.4012)	(-1.9751)	(-1.0275)	(-1.1362)
Profitability	-0.0183	-0.0160	-0.0033	-0.0028	-0.0002	-0.0003
	(-1.6126)	(-1.5222)	(-1.5252)	(-1.4315)	(-0.2926)	(-0.3768)
Credit spread	-0.1462		-0.0217		0.0168	
	(-0.4311)		(-0.3369)		(0.2701)	
Lev. loan spread		-3.4495***		-0.6596***		0.0703
		(-4.1584)		(-4.1811)		(0.8056)
Dummy = 1	-0.1065	-0.1149	-0.0340	-0.0356	-0.0203	-0.0197
	(-0.2669)	(-0.3104)	(-0.4481)	(-0.5062)	(-0.4772)	(-0.4644)
Constant	8.1445***	1.7136***	2.2294***	3.9475***	0.7656***	0.5909**
	(7.7595)	(7.2490)	(1.1156)	(8.7809)	(7.0474)	(2.3489)
F-statistic	1.7187	4.4377	1.9578	4.7599	0.2695	0.3541
Prob(F-statistic)	0.1123	0.0002	0.0677	0.0001	0.9635	0.9251
R-squared	0.1028	0.2283	0.1154	0.2408	0.0282	0.0367
Adj. R-squared	0.0429	0.1768	0.0564	0.1902	-0.0764	-0.0669
# Observations	113	113	113	113	73	73

Appendix 1: Private Equity International Ranking 2007

This appendix presents the Private Equity International Ranking 2007 as published by Private Equity International Magazine in its May 2007 Issue. Firms were ranked by the amount of capital they raised for direct private equity investment over the past 5 years.

1 The Carlyle Group	*$32.5 billion*
2 Kohlberg Kravis Roberts	*$31.1 billion*
3 Goldman Sachs Principal Investment Area	*$31 billion*
4 The Blackstone Group	*$28.36 billion*
5 TPG	*$23.5 billion*
6 Permira	*$21.47 billion*
7 Apax Partners	*$18.85 billion*
8 Bain Capital	*$17.3 billion*
9 Providence Equity Partners	*$16.36 billion*
10 CVC Capital Partners	*$15.65 billion*
11 Cinven	*$15.07 billion*
12 Apollo Management	*$13.9 billion*
13 3i Group	*$13.37 billion*
14 Warburg Pincus	*$13.3 billion*
15 Terra Firma Capital Partners	*$12.9 billion*
16 Hellman & Friedman	*$12 billion*
17 CCMP Capital	*$11.7 billion*
18 General Atlantic	*$11.4 billion*
19 Silver Lake Partners	*$11 billion*
20 Teachers' Private Capital	*$10.78 billion*
21 EQT Partners	*$10.28 billion*
22 First Reserve Corporation	*$10.1 billion*
23 American Capital	*$9.57 billion*
24 Charterhouse Capital Partners	*$9 billion*
25 Lehman Brothers Private Equity	*$8.5 billion*

26 Candover	*$8.29 billion*
27 Fortress Investment Group	*$8.26 billion*
28 Sun Capital Partners	*$8 billion*
29 BC Partners	*$7.9 billion*
30 Thomas H. Lee Partners	*$7.5 billion*
31 Leonard Green & Partners	*$7.15 billion*
32 Madison Dearborn Partners	*$6.5 billion*
33 Onex	*$6.3 billion*
34 Cerberus Capital Management	*$6.1 billion*
35 PAI Partners	*$6.05 billion*
36 Bridgepoint	*$6.05 billion*
37 Doughty Hanson & Co	*$5.9 billion*
38 AlpInvest Partners	*$5.4 billion*
39 TA Associates	*$5.2 billion*
40 Berkshire Partners	*$4.8 billion*
41 Pacific Equity Partners	*$4.74 billion*
42 Welsh, Carson, Anderson & Stowe	*$4.7 billion*
43 Advent International	*$4.6 billion*
44 GTCR Golder Rauner	*$4.6 billion*
45 Nordic Capital	*$4.54 billion*
46 Oak Investment Partners	*$4.06 billion*
47 Clayton, Dubilier & Rice	*$4 billion*
48 ABN AMRO Capital	*$3.93 billion*
49 Oaktree Capital Management	*$3.93 billion*
50 Summit Partners	*$3.88 billion*