

Determinants of Financial Covenants in Leveraged Buyouts – Evidence from an Economy with Strong Creditor Rights

Ann-Kristin Achleitner
Center for Entrepreneurial and Financial Studies (CEFS)
Technische Universität München, Arcisstr. 21, 80333 Munich, Germany

Reiner Braun
Center for Entrepreneurial and Financial Studies (CEFS)
Technische Universität München, Arcisstr. 21, 80333 Munich, Germany

Florian Tappeiner
Center for Entrepreneurial and Financial Studies (CEFS)
Technische Universität München, Arcisstr. 21, 80333 Munich, Germany

ABSTRACT

We apply control rights theory to explain the *structure* and *determinants* of financial covenants in private equity backed leveraged buyouts. We analyze 130 German transactions from 2000 to 2008, covering about 40 percent of the LBO market during this period. We consider Germany to be a superior institutional context as creditors have substantial rights in case of borrower default and contracts are negotiated more rigorously. Regarding *structure* we find that the financial covenant structure, in terms of number and types, is standardized and appears to be much more conservative than in the United States. Additionally, our results suggest that financial covenants are designed in a hierarchical manner, with the Debt to EBITDA covenant being the first to breach in early years. Regarding *determinants* we are the first, to our knowledge, to apply a direct measure of financial covenant restrictiveness, which

is the real negotiated item between lead arrangers and sponsors. Our results show that financial covenant restrictiveness is significantly negatively related to the size of the private equity group, which serves as a proxy for reputation. Further we show that target-related factors, like growth and profitability, have a strong impact on financial covenant restrictiveness. With regard to transaction-based factors, increasing financial risk leads to more restrictive financial covenants.

1 Introduction

This paper examines the structure and determinants of financial covenants in leveraged buyouts in Germany, i.e. an institutional setting with strong creditor rights.

Since the 1980ies the private equity market has grown tremendously in terms of size and geographic reach. Strömberg, 2008 estimates the total aggregated global value of firms acquired by private equity since 1970 at \$3.6 trillion, of which the substantial part (\$2.7 trillion) was transacted in the period from 2001 to 2007. While the overall market has grown significantly, the European private equity market increased even faster to become larger than its US counterpart: its relative global market share in terms of number increased from 38.8 percent in the period 1970 to 2000 to 49.9 percent in the period 2001 to 2007 (Strömberg, 2008). After the second leveraged buyout boom had burst in 2008 (Kaplan and Strömberg, 2008) financial covenants – especially their violation and the associated shift of control rights from borrowers to lenders – received increasing attention in academia and the media. However, due to their high secrecy¹ and the scarce data availability – even in the US, as noted by Demiroglu and James, 2007b and Ivashina and Kovner, 2007 – little is still known about

¹ As already noted by Gretchen Morgenson, ‘Why the Secrecy About Financial Covenants?’ NY Times, October 12, 2003.

the structure and design of financial covenants in LBOs and the determinants of their restrictiveness.

Financial covenants have the following economic rationale: They serve as an instrument for the allocation of control rights between lenders and borrowers (Aghion and Bolton, 1992; Hart, 1995). Financial covenants reveal the state of the firm during the borrowing period. If the state of the firm is 'good', equityholders remain in control and might even reap private benefits. In contrast, if the state of the firm is 'bad', i.e. financial covenants are violated and the company is in 'technical default', control rights shift to lenders, who then have the right to call their loans. If the call is executed the borrower might be forced into bankruptcy.

The importance of shifting control rights seems to be directly linked to the ability to force companies into bankruptcy or reorganization following a default (Lerner et al., 2009). This ability heavily depends on the institutional setting. For creditors a default in a country with strong creditor rights seems to be of a less deterrent than in a country with weaker creditor rights. Historically German insolvency law, prescribes a kind of auction-based process that favors liquidation over reorganization (Aghion et al., 1992). While the new German insolvency law of 1999 reduced the incidence of inefficient liquidation (Franks et al., 1996), this process still increases the value for senior lenders since they have a higher probability of being paid off than under US jurisdiction. Consequently, in their creditor rights index, which measures the legal rights of creditors against defaulting debtors, La Porta et al., 1997 find that Germany possesses strong creditor power, a result that was recently confirmed by Allen et al., 2006. This finding is further supported by Djankov et al., 2007, who state that jurisdictions with German legal origins have strong creditor rights. In contrast, the United States mostly apply Chapter 11 of the bankruptcy code that can be described as a structured bargaining process (Aghion et al., 1992). The basic idea of Chapter 11 is that claimants are grouped into classes and a judge supervises the bargaining process among them, while

management usually continues to run the firm and proposes a plan for reorganization. The relatively strong position of the judge and the management in the decision process reduces the legal rights of the creditors (La Porta et al., 1997).² It may therefore be concluded that a default under German law results in more power for a creditor than in a default in the United States, *ceteris paribus*. Following this line of argument, the violation of a financial covenant, which triggers a default of the loan, is economically more efficient for a creditor under German law than under U.S. bankruptcy law. Consequently, financial covenants should be of higher importance in countries with stronger creditor rights implying rigorous negotiations and ex-ante strict contracts. It is for this reason that the German setting might be a very interesting and probably even superior laboratory to explore the structure and determinants of financial covenants in LBOs.

The objective of this paper is to extend the empirical literature along several dimensions: *First*, we provide a detailed description of the structure and design of financial covenants in LBOs – including private-to-private, divisional buyouts and public-to-private transactions – in an economy with strong creditor rights, which leads to stricter ex-ante contracts. The few existing studies like that of Demiroglu and James, 2007b mostly cover US public-to-private transactions, which cover only a small part of the private equity market and are fundamentally different from the more common private-to-private deals and divisional buyouts.³ *Second*, we analyze data on the financial structure in German leveraged buyouts and compare their elements to empirical findings in the US. This analysis includes a time-series comparison of the LBO structure during the ‘overheating’ phase of 2004 to 2007 in contrast to the post-credit crunch LBOs of 2008. *Third*, we provide cross-sectional evidence on the determinants of financial covenant restrictiveness in LBOs. *Fourth*, we construct and apply a novel direct

² The detailed country-specific classification of Djankov et al., 2007 was not available to the authors.

³ Strömberg, 2008 shows that public-to-private transactions only account for 6.7 percent of all transactions, representing 28 percent of the aggregate values between 2001 and 2007.

measure for ex-ante financial covenant restrictiveness, which is the real negotiated item between lenders and borrowers, known as headroom.

In order to achieve the abovementioned goals, we conducted several interviews with senior bankers of reputed lead arrangers, collected first-hand experience by participating in several covenant setting processes during 2008, and aggregated a proprietary dataset from three commercial banks. The resulting dataset includes 130 private equity backed LBOs, representing about 40 percent of the German LBO market, and recapitalizations from more than 18 lead arrangers and 66 private equity sponsors.

First, we find the financing structure of these European deals to be significantly different from those in the US in that they are more ‘conservative’. *Second*, the typical financial covenant structure includes leverage, coverage, and capex covenants. *Third*, these financial covenants are arranged in a hierarchical manner so that the leverage covenant is the first to be breached in case of a negative performance of the buyout company. Consequently, lender and borrower focus their negotiation efforts on the restrictiveness of the leverage covenant as a first signal of negative deviation from the forecasted business model. We are able to assess the restrictiveness with the direct and therefore presumably superior measure of covenant headroom. This negotiated parameter is the percentage deviation that a given operating performance variable is allowed to deteriorate from the agreed forecast before covenant breach. *Fourth*, by resorting to this measure of covenant restrictiveness of the leverage covenant as dependent variable, we find that – consistent with the US markets – borrowers backed by private equity sponsors with higher reputation enjoy laxer financial covenants for a given transaction. An increase of assets under management, as proxy for reputation, by €1 billion or one standard deviation results in a significantly higher leverage covenant headroom of 15 basis points or 75 basis points, respectively (at a mean of 23.6 percent headroom). *Fifth*, we find convincing empirical evidence that higher profitability and strong growth

opportunities of the buyout company decrease financial covenant restrictiveness. A one percentage point or one standard deviation higher EBITDA margin significantly loosens the leverage headroom by about 22 basis points or 177 basis points, respectively. Similarly, increasing the EBITDA growth forecast over the first three years by one percentage point or one standard deviation significantly increases the leverage headroom by 32 basis points or 184 basis points respectively. *Sixth*, as intuition suggests, increasing the leverage level significantly tightens the headroom of all applied financial covenants. Increasing the Debt to EBITDA multiple by 1x reduces the leverage headroom by 97 basis points (one standard deviation increase leads to a 178 basis points reduction in headroom), the interest coverage headroom by 140 basis points (one standard deviation increase results in a 265 basis points reduction in headroom), and the cash flow coverage headroom by 240 basis points (one standard deviation increase leads to 434 basis points reduction in headroom). Interestingly, for credit risk spreads, which reflect the overall market situation, we do not find a statistically significant impact on the restrictiveness of the leverage covenant headroom. However, credit risk spreads have a significant effect on the interest coverage and cash flow coverage headroom, while sponsor- and target related-factors do not seem to have a strong influence. These results support our third finding that (a) transaction parties primarily negotiate the leverage covenant headroom, and (b) the remaining financial covenants are set according to the market environment and financial risk.

The remainder of the paper is organized as follows. In section 2 we describe the theoretical rationale for financial covenants by applying control rights theory. We combine these considerations with empirical evidence to derive implications for the determinants of covenant restrictiveness. In section 3 we introduce the covenant headroom as a new empirical measure for covenant restrictiveness. Section 4 provides a description of the dataset and the sampling process. In section 5 we analyze the financial structure of LBOs over time and

explore the structure of financial covenants. Section 6 shows the results of the multivariate ordinary least square regressions and tests the robustness of the models. Finally, the last section concludes and gives an outlook for future research.

2 Financial covenants in leveraged buyouts: theory and practice

2.1 The rationale for covenants

In general, the incorporation of covenants in credit agreements has two economic rationales: covenants can be a means to prevent value reduction and they are used to allocate control rights (Tirole, 2006).

The first rationale stems from its role to resolve agency conflicts between equityholders and debtholders. Borrowers attempt to reallocate wealth from lenders to themselves (Jensen and Meckling, 1976; Smith and Warner, 1979). Based on the assumption that these post-contractual actions are anticipated by lenders, they will ex-ante price the bond accordingly, which does not affect the total firm value. This constellation would not justify covenants in debt contracts. However, equityholders also have incentives to take actions that optimize their private benefits and are detrimental to the firm value. Covenants are therefore employed by lenders and accepted by borrowers to mitigate this reduction in firm value. Wealth is expropriated from lenders either by actions that increase their expected loss given default, i.e. reducing assets or diluting existing claims, or increasing the riskiness of the firm's cash flows from ex-ante anticipated levels via asset substitution (Jensen and Meckling, 1976; Smith and Warner, 1979; Dewatripont and Tirole, 1994; Tirole, 2006).

The second economic rationale for covenants, in particular for financial covenants, in debt contracts is the allocation of control rights (Aghion and Bolton, 1992; Hart, 1995). As a result of contractual incompleteness, not all potential conflicts of interest between borrower

and lender can be resolved via ex-ante contracting. In the model of Aghion and Bolton, 1992 it is efficient to allocate state contingent control rights to lenders when actions of the equityholder are not verifiable. These control rights depend upon a signal on the state of the firm or the prospects for the firm's future profitability. Following this argument, financial covenants (also known as accounting-based covenants) constitute the instrument that transmits the signal for the 'state of the firm'. If financial covenants show a negative signal, creditors might intervene in managerial decisions. The contingent control function of covenants allows the borrower to reap some private benefits and at the same time gives adequate protection to the debt provider. If the state of the firm is negative at a certain point in time – in this context negative means a breach of financial covenants – the debtholder receives control and obtains the right to limit the extraction of private benefits through ex-post renegotiation.⁴ Intuitively, if the firm performs well and does not breach any financial covenants, the debtholder does not have any means to prevent the equityholder from realizing his private benefits.

Additionally, this second economic rationale also provides justification for the combination of financial and non-financial covenants, which can be observed in most LBO credit agreements. In situations in which actions are verifiable ex-post, wealth expropriating actions from equityholders are anticipated by lenders ex-ante and therefore limited. However, the optimal contract in this setting is to combine action restrictions and contingent control rights. First, given a set of action restrictions, providing the equityholder with essential control is superior to a contract with a strictly predefined action set because it creates more flexible decision making, reduces the likelihood of future renegotiations and may incentivize equityholders to maintain a good status of the firm. Second, given a contingent control

⁴ The most prominent example is the case of L.A. Gear where the control finally transferred after a covenant breach DeAngelo et al., 2002.

allocation, limiting the actions of an equityholder during the term of the loan reduces ex-post opportunism of the borrower (Aghion and Bolton, 1992).

The second economic rationale is particularly relevant for our study, due to the focus on financial covenants which might trigger the shift of control to debtholders. Upon covenant breach, the lenders receive the option to waive the breach against a fee, they might also include additional covenants, increase interest rates, reduce allowable borrowings, renegotiate the conditions, increase monitoring activities or collateral requirements, and as the last resort recall the loan (Chen and Wei, 1993; Sweeney, 1994; Beneish and Press, 1995; Dichev and Skinner, 2002; Chava and Roberts, 2008). Before the question is dealt with as to what to do when financial covenants are breached it is essential to understand how they are designed and what drives their restrictiveness. To our knowledge there is no relevant literature that examines the detailed structure of financial covenants in leveraged buyout transactions.

2.2 Implications for the restrictiveness of financial covenants

To understand the design of financial covenants in leveraged buyouts, we turn to theory as well as practice. We apply implications from optimal contracting theory and discuss them with a number of lead arrangers, private equity sponsors, as well as lawyers.⁵ While our discussions do not have the character of a large scale survey, interviewees had more than 150 years in aggregated experience in the leveraged finance segment and represent institutions with a large share of the European buyout market.⁶ Based on the limited empirical evidence on the design of financial covenants in LBOs, their insights were invaluable. We classify the

⁵ We are grateful for valuable input by the following leveraged finance departments: Dresdner Kleinwort, Commerzbank, UniCredit Group, Deutsche Bank, Royal Bank of Scotland, JP Morgan Chase, MedioBanca, Bank of Ireland, HSH Nordbank, following Private Equity Sponsors: Kohlberg Kravis Roberts (KKR), Apax, 3i, Bain Capital, Permira, BC Partners, as well as following lawyers: Latham Watkins, White&Case, Haarman.

⁶ This procedure is similar to the one applied by Chava and Roberts, 2008.

individual drivers into four different categories, namely, sponsor-related, target-related, transaction-related, and macroeconomic factors.

Sponsor-related factors

The perceived quality of the agent might reduce the efforts of the principal to resolve agency problems, i.e. the quality of the agent reduces agency costs of debt. In this context, reputation might serve as a signal for ‘good’ quality of the sponsor and therefore superior operational performance of their portfolio companies. Diamond, 1989 analyses the effect of reputation in debt markets theoretically. He argues that borrowers with a short track record have greater incentives to engage in risk shifting activities than reputable borrowers. For borrowers with successful track records the benefits from a high debt market reputation are considerable, and consequently they act in a way to preserve it. Moreover, private equity sponsors build reputation over time based on their historical investment performance and are able to conserve their outperformance (Kaplan and Schoar, 2005). This superior performance of higher reputed sponsors seems to stem from active ownership and governance mechanisms (Acharya and Kehoe, 2008) but – presumably to a lesser degree – also favorable credit terms for the portfolio firms (see Demiroglu and James, 2007b; Ivashina and Kovner, 2007). Consistent with the view of lenders and sponsors, reputation signals ‘good’ future behavior of the sponsor and therefore leads to reduced restrictiveness of financial covenants. A similar relationship can be observed for the underwriter reputation in IPOs (see e.g. Carter et al., 1998). This argument, which is mostly applied to the conservation of the ‘good’ status of the firm during the loan period, could also be transferred to the behavior of sponsors when their portfolio company is in technical or payment default. Therefore, reputed sponsors have more financial resources to inject additional equity and thereby reduce the probability of default and the loss given default and are also more likely to inject equity to conserve the value of their reputational benefits.

Target-related factors

Myers, 1977 identifies a potential underinvestment problem for levered, high-growth firms. A large portion of the enterprise value is accounted for by assets not yet in place in the form of future investment opportunities, which are dependent on the discretionary decisions of the party in control. These growth opportunities can be regarded as ‘real options’ because borrowers may decide not to exercise their option. There may be the potential problem that, under certain circumstances, borrowers have incentives to reject a positive NPV investment, namely if most of the gains from investing are to be paid to lenders so that borrowers do not earn their required return. Certainly, this is more likely to occur when more costly debt service payments are to be made. This theoretical construct would imply that lenders impose more restrictive covenants on high-growth LBOs. However, these covenants tend to be action restrictions like, for example, on dividend payments. Many empirical studies have confirmed this theory (see e.g. Billett et al., 2007).

Regarding the restrictiveness of financial covenants there are two different views. *First*, Landier and Thesmar, 2009 developed a theoretical model on the interaction of entrepreneurial confidence and financial contracting. They find that optimistic entrepreneurs self-select short-term debt as they are confident that the state of the firm at maturity will be ‘good’, i.e. expect superior growth rates for a given project. This finding may be transferred to financial covenants, which are the signaling device for the state of the firm, projecting that optimistic managers are willing to accept strict financial covenants, as they believe that the state of the firm will remain ‘good’ (Landier and Thesmar, 2009). This is in line with the idea that the choice of covenant restrictiveness serves as a signaling device by borrowers to lenders (Gârleanu and Zwiebel, 2008 and Dessein, 2005). Demiroglu and James, 2007a empirically tested the theoretical implications for financial covenants and found that financial covenants are made restrictive for high growth firms.

Second, restrictive financial covenants may constrain the sponsor and management from taking wealth-increasing actions for the LBO firm, focusing on not violating the financial covenant thresholds. As the embedded growth options for the shareholders are more valuable for high-growth firms, these firms will value flexibility more than comparable low-growth firms. Therefore, high-growth firms may be less likely to accept restrictive financial covenants (Begley, 1994; Kahan and Yermack, 1998; Nash et al., 2003). Other models suggest that optimistic entrepreneurs strongly believe in their own capabilities, i.e. are overconfident, and therefore expect higher cash flows for given projects they are involved in, while simultaneously perceiving lower associated risks (Friedman, 2007). In addition, overconfident managers are convinced that they can successfully manage their firm. Hence, their control aversion is even greater and they might insist even more to prevent a dilution of control over their project (Fairchild, 2007; Friedman, 2007). Therefore, the second view projects less restrictive financial covenants for high-growth firms.

While the influence of growth on the restrictiveness of financial covenants still remains somewhat unclear in the case of LBOs, there is little doubt about the impact of operating performance on the restrictiveness of financial covenants. Operating performance is an important element of credit analysis and the risk of a payment default. Research has demonstrated that historical performance is an informative indicator of future performance and therefore the quality of the borrower and the loan (Dechow, 1994; Dechow et al., 1998). Hence, the lender will assume, *ceteris paribus*, that a more profitable borrower has a higher likelihood of ‘good’ behavior during the life of the loan. Therefore, one might expect that profitability and financial covenant restrictiveness are negatively related, i.e. higher profitability at loan origination leads to less restrictive financial covenants.

Smaller companies face higher financial distress risk due to a lack of reputation, relatively lower bargaining power, asset tangibility, and liquidity. Because small firms are

more likely to have less history or banking relationships, they typically are also more exposed to asymmetrical information (Chen, 1983; Chan et al., 1985). Firm size should therefore be negatively related to the potential for opportunistic behavior of borrowers. Supporting this argument numerous scholars find that larger firms – public or private – have less restrictive covenants written into their loan agreements (among others Malitz, 1986; Bradley and Roberts, 2004; Billett et al., 2007; Demiroglu and James, 2007b).

Transaction-related factors

An increase in the borrower's leverage results in a greater probability of default and increases the potential for opportunistic behavior of the borrower. A wide range of empirical literature finds a positive relation between leverage and the restrictiveness of action restricting covenants (Bradley and Roberts, 2004; Begley and Chamberlain, 2006; Billett et al., 2007). We expect that lenders will anticipate the high potential for opportunistic behavior, all else equal, and demand an earlier shift of control rights, i.e. more restrictive financial covenants.

Macroeconomic factors

Financial covenant restrictiveness may further be affected by the overall credit market conditions. The prevailing credit risk spread mirrors the risk perception of the credit supply-side regarding future default risk. Favorable economic conditions imply lower probabilities of financial distress and thus potentially more relaxed financing terms. Demiroglu and James, 2007b find that macroeconomic conditions have a significant effect on covenant restrictiveness. Intuitively, in the light of an economic downturn lenders might want to gain control faster over a potentially threatened firm. Vice versa, in boom times lenders might apply historical default rates to the future and therefore relax their demand for control rights.

3 Measuring financial covenant restrictiveness in LBOs

Measuring the restrictiveness of covenants is difficult (e.g. Begley, 1990), which explains why there is still no coherence in scholarly work and why researchers apply a wide variety of different measures. Covenant restrictiveness is mostly either tested by accounting for the mere presence of certain covenants (see e.g. Malitz, 1986; Nash et al., 2003; Goyal, 2005; Begley and Chamberlain, 2006; Frankel and Litov, 2007), by designing a covenant index (see e.g. Bradley and Roberts, 2004; Paglia and Mullineaux, 2006; Billett et al., 2007; Demiroglu and James, 2007b), or by the absolute level of covenant thresholds (see e.g. Cotter, 1998; Demiroglu and James, 2007b; Ivashina and Kovner, 2007). While our dataset would allow the calculation of all these measures of restrictiveness, we consider them inappropriate for leveraged buyouts for *two* reasons. *First*, these methods neither reveal any information about the magnitude of the restrictions placed on management by single covenants nor do they measure the degree to which they are binding. *Second*, our sample and interviews suggest that the number and type of financial as well as non-financial covenants are standardized in leveraged buyouts. For example, applying the covenant index, which is proposed by Bradley and Roberts (2004) and covers six covenant indicators (debt issuance sweep, dividend restrictions, collateral, asset sales sweep, equity issuance sweep, and more than two financial covenants), to our sample, we find that 129 out of 130 transactions achieve the highest score on the index.

A measure that incorporates the magnitude of financial covenant restrictiveness is the covenant slack. A few studies, including those of Demiroglu and James, 2007a and Dichev and Skinner, 2002, use this definition that is typically computed as the difference between the *actual* realized financial ratio and the respective covenant threshold. This definition of covenant slack mixes the restrictiveness of financial covenants at loan origination with the actual performance during the loan duration. If a covenant is violated, this measure does not

allow distinguishing between bad performance and/or covenant restrictiveness. Covenant thresholds – applicable for the entire credit period – are determined when the loan is originated based on forecasted financial figures. Therefore we apply an analogous form of *ex-ante slack* to which we and practitioners refer to as *headroom*. Also, headroom is the key negotiated item in financial covenants between the lead arranger and the private equity sponsor. This finding was also confirmed by the interviews with practitioners, who view headroom as the single most influential factor determining the restrictiveness of a financial covenant. As a managing director of Bain Capital stated:

“... The tightness of financial covenants is one of the most essential items during loan negotiations. We would rather accept higher margins than reducing headrooms. Breaching covenants can lead to wiping out our equity position while higher margins only reduce our IRR ...”

Generally, the financial covenant threshold is based on a ratio consisting of a variable representing financial risk and another variable representing operating performance. Financial risk (i.e. net debt, interest, and repayment) is a non-discretionary item for management and directly related to the financing structure of the buyout. Therefore it does not make sense to measure management performance based on the planned financial risk. Hence, headroom is the distance between the agreed forecast of a certain operating performance- based variable⁷ at a given point in time and the level of the variable implied by the covenant threshold. In other words, headroom expresses how much the operating performance variable is allowed to deteriorate, as a percentage of the forecasted amount. This measure reflects the deviation management is allowed to have on the key success metric of LBO firms, namely the EBITDA or unlevered cash flow before financial covenants are breached and control rights are transferred to the lender.

⁷ Mostly EBITDA or unlevered free cash flow.

Accordingly, we define *headroom* as the percentage difference between the EBITDA or cash flow implied by the covenant threshold and the agreed upon financial forecasted EBITDA or cash flow by the private equity sponsor. The ratio also depends upon credit-related metrics like level of debt, interest and debt service. However, during negotiations these are influenced by the decision of leverage levels, maturities, redemption schedules, spreads, and utilized debt instruments. Headroom is applied to all the major performance-related financial covenants, i.e. (senior) leverage, interest cover, cash flow cover. For a typical schematic example of the interaction between threshold, forecast and headroom see Figure 1 in the appendix.

The covenant headroom for the different ratios coming into effect in year t , where $t=0$ is the year of the transaction, is calculated as:

$$Headroom_t^P = - \left(\frac{P_{Cov_t}}{P_{Proj_t}} - 1 \right) * 100 ,$$

P_{Cov_t} ... Operating performance measure implied by financial covenant threshold in t

P_{Proj_t} ... Projected operating performance of the agreed financing case in t

Hence, financial covenant restrictiveness is expressed as the headroom that is granted by lenders: the more headroom, i.e. the higher the allowed deterioration from the forecast, the less restrictive the financial covenant. Consequently, headroom is an appropriate measure of restrictiveness in LBOs for *three* major reasons. *First*, it is the measure that is primarily negotiated between lead arrangers and sponsors concerning the design of financial covenants. *Second*, it directly measures the degree of restrictiveness without applying any proxies. *Third*, it reduces the potential of accounting based manipulation as the numerator P_{Cov_t} and the

denominator P_{Proj_t} are defined identically.⁸ Before analyzing the structure and restrictiveness of financial covenants in LBOs, we will describe our sample and discuss potential selection issues.

4 Sample

4.1 Description

For our analysis we draw on the credit documentation of 134 highly leveraged transactions in Germany structured by at least 18 banks⁹ as mandated lead arrangers (MLA) between 2000 and 2008. Of these transactions, 130 were sponsored by 66 private equity firms, 4 were corporate takeovers and therefore omitted from the final sample. Similar to Kaplan and Ruback, 1995 we include 21 leveraged recapitalizations as they are identical to LBOs except that this type of transaction does not include the repurchase of the entire company's stock. Additionally, our conversations with bankers reveal that they do not perceive any difference in terms of deal structuring between PE-sponsored LBOs and recapitalizations.¹⁰

Since detailed information on LBOs is usually kept private, in order to obtain this sample we asked leveraged finance departments of three major European commercial banks to grant access to their confidential data of their leveraged buyout investments. Our query included transactions for which these banks functioned as mandated lead arrangers and co-lead arrangers, i.e. were responsible for structuring the credit terms, as well as those for which another bank assumed this role and they were only senior claimholders of the syndicated loan, i.e. participants. For all three banks the documentation was identical that on all transactions they provided the credit agreements, information memoranda for syndication and the

⁸ Note that this does not imply that definitions of financial ratios in the credit agreement do not have an impact on financial covenants in general and the headroom in particular.

⁹ The named 18 banks, which cover about 60 deals analyzed, are known to the authors. Of the remaining deals only one of the lead arrangers is known.

¹⁰ Controlling for recapitalizations in our cross-sectional analysis does not change our reported results.

underlying financial models. These documents were screened for all relevant data including sources and uses of the transaction financing, historical ($t = -3$ to $t = -1$), actual¹¹ ($t = 0$), and projected financial statements ($t = 1$ to $t = 5$), ownership structures, financial and non-financial covenants, and covenant clauses, as well as other deal-related details.

Table I presents the number, mean, median, minimum and maximum of the analyzed LBOs by calendar year of the effective deal date. The bottom panel reports the direction and the significance of the Wilcoxon rank-sum test that we carry out in order to identify time trends (see also Kaplan and Stein, 1993). Throughout the paper we apply three distinct time periods for our sample that approximate the respective phases in the private equity cycle: 2000 to 2003 (pre-credit boom), 2004 to 2007 (credit boom), and 2008 (post-credit boom).¹² The results show that the banks were active in the leveraged loan market before the credit boom, which led many commercial banks to join this market. Additionally, the development of the deal frequency shows that our sample mirrors the overall market development of the leveraged loan market. Interestingly, we were able to capture data on seven transactions, which were closed in 2008; however, all of these seven transactions were closed before Lehman Brothers faced insolvency.

[Insert Table I here]

While only two transactions in our sample were public-to-private (P2P) transactions, the median transaction had considerable sales of €276.4 million (mean: €13.6 million) supporting the importance of non-P2P LBOs, i.e. divisional, private-to-private and secondary

¹¹ Underlying financial information at deal date is validated by auditors.

¹² The first two phases are equal to the phases applied by Demiroglu and James, 2007b; Brinkhuis and De Maeseneire, 2009. We do not test for prespecified break points, like the test for equality developed by Chow, 1960, because we do not expect any structural change in the design of financial covenants during the sample period.

transactions.¹³ The median EBITDA is €35.0 million (mean: €78.4 million) and the sample does not include any turnaround situations, i.e. buyout companies exhibiting a negative EBITDA. The median enterprise value is €20.5 million (mean: €39.2 million). The aggregated enterprise value of all 130 transactions amounts to €4 billion.

4.2 Sample selection issues

When discussing potential selection issues, an obvious argument is that we do not have a random sample in the sense that we gathered data from three commercial banks' documentations. However, the strategy of assessing deals, for which the three banks served as mandated lead arrangers (MLAs) and as participants – thereby increasing the number of MLAs in the sample – reduces the bias through bank-specific lending practices such as tightness of relationship with the borrower, final hold, (re-)negotiation rights, etc.

Table II shows that, excluding recapitalizations, the collected data represents more than 40 percent of the total LBO transaction volume of the German buyout market between 2001 and 2008.¹⁴ Compared to the Western European market, the world's single largest private equity market, our sample covers about 6.7 percent of the CMBOR data and 5.8 percent of the sample aggregated by Lerner, Strömberg and Sorensen 2009.

[Insert Table II here]

Although our sample only includes German deals, the results may be extended to European leveraged buyouts for several reasons. *First*, Germany constitutes one of the three largest European buyout markets (Burrows and Wright, 2008). *Second*, several deals are included from midmarket private equity sponsors with a focus on Germany, the vast majority of deals were conducted by pan-European and/or global sponsors, who are organized in

¹³ For a similar comparison see Strömberg, 2008.

¹⁴ Transactions smaller than €10 million are omitted from the market volume. Transactions with an enterprise value of less than €10 million are mostly financed by government-backed banks and not financed by syndicated loans.

international teams. Although there is a significant difference between Europe and the US, large sponsors structure their deals in different European countries in a similar way. *Third*, the included banks are all international leveraged finance players who are active all over Europe and work with international teams. The credit committees, which decide about the loan, are all centralized and they decide about all loans made by the bank in Europe.

5 Descriptive statistics

5.1 Trends in financing structures of European LBOs

It is important to address the financing structure underlying the LBOs and specifically discuss the significant changes that occurred between the credit boom period and the era of financial crisis in 2008. This procedure is complementary to the work of Axelson et al., 2007; Demiroglu and James, 2007b; Brinkhuis and De Maeseneire, 2009.

[Insert Table III here]

Table III presents the capital structure and the pricing of the transactions over time, again including non-parametric trend analysis in the bottom panel. The time series of absolute transaction values with a median of €230.5 million does not indicate a statistically significant time trend, which conflicts with the argument that only large deals suffered from the financial crisis. Regarding the pricing of the transactions, the median EBITDA multiple was 6.9x throughout the observed period. The median total leverage level is 4.3x for the data sample. While leverage levels significantly increased during the boom time relative to the 2000 to 2003 levels, they experienced an insignificant decrease in 2008. This pattern is also observable for senior leverage levels. Most interestingly, the equity contribution in 2008 increased significantly compared to the boom period of 2004 to 2007. In 2008, while prices stayed constant and leverage levels decreased, sponsors had to increase their equity injection

in order to get a transaction financed. Overall our mean and median equity contributions of 32.6 percent and 33.6 percent respectively, are in line with recent studies of Demiroglu and James, 2007b; Brinkhuis and De Maeseneire, 2009. Another important point to mention, which is not shown in the table, is that second lien loans were heavily included in leveraged loans from 2004 to 2007. Of the seven deals in 2008, none included a second lien tranche, however.

Looking at spreads in Table IV, we see that there is great homogeneity of interest rates on traditional bank debt¹⁵ across borrowers of differing total risk, which is identical to the findings of Kaplan and Stein, 1993 and predicted by the model of Diamond, 1993.¹⁶ In the cross section, pooling all the 123 deals between 2000 and 2008, 80 buyout transactions have a Term A spread of 2.25 percent, while 115 of 123 have a spread between 2.0 and 2.5 percent. Over time, spreads on traditional bank debt are homogenous as well, although time trends are significant. The median values of Term A spreads are 2.25, 2.25 and 2.5 percent from 2000 to 2003, 2004 to 2004 and 2008 respectively. These patterns are observed for all tranches of traditional bank debt. Similar to the spread between BB and AAA corporate bond yields, term A and term B spreads as well as all-in-drawn spreads exhibit a significant U-shaped development over the time periods. Interestingly, recent findings in the US show higher flexibility in loan spreads Demiroglu and James, 2007b, which might indicate a more mature and flexible syndicated loan market.

[Insert Table IV here]

¹⁵ Traditional bank debt is defined as senior debt tranches, which typically includes A, B, C term loans, a revolving credit facility and a capex facility (Kaplan and Stein, 1993). These facilities are all covered in the senior credit agreement. Revolving credit facility and capex facility have the same terms as Term A loans and are therefore not included in the table. For US transactions Demiroglu and James, 2007b report that Term B loans and second lien loans are frequently held by institutional lenders. This only applies to second lien loans in Europe.

¹⁶ Kaplan and Stein, 1993 therefore look at the fee-adjusted spread, which shows some higher degree of variation. However, this measure overstates the returns to lenders that actually fund the loan and bear the risk.

Notably, subordinated spreads exhibit significantly decreasing cash spreads during the boom phase, while the payment-in-kind¹⁷ (PIK) spread increases. Increasingly utilized noncash interest payments in booming credit markets were already observed by Kaplan and Stein, 1993. Another way to defer interest payments are PIK toggles, which give the borrowers the option to defer cash interest by adding it to outstanding principal. In contrast to the US market, where Demiroglu and James, 2007b reported that 20 percent of their buyouts include PIK toggles, the European LBO market appears to be more conservative regarding cash interest deferrals. Only one transaction in our sample, which took place in 2006, included a PIK toggle in their subordinated loans.

In line with the model on the structure of debt contracts for highly levered borrowers by Diamond, 1993, our sample shows that shorter-term debt is senior to longer term debt. Interestingly, maturities exhibit a similarly homogenous structure as senior loan spreads. For example, out of the 123 Term A loans, 101 have a maturity of 84 months or seven years.

Already Kaplan and Stein, 1993 already pointed out that their spread analysis ignores a potentially important set of ‘non-price terms of credit’, such as for example covenants, which might adjust the risk-return payoff for lenders. For instance, the utilization of strict covenants might have enabled banks to largely eliminate default losses for their share of the LBO financing, thus allowing them to lend at the same interest rate in all deals (see also the theoretical model of Diamond, 1993).

5.2 *Financial covenant structure*

Financial covenants constitute limits on the level of accounting figures expressed in both, relative and absolute value (Bradley and Roberts, 2004; Tirole, 2006). In transactions with senior and subordinated financing, there are two credit agreements which regulate the claims

¹⁷ Payment-in-kind means that interest is not paid in cash but via the issuance of additional debt.

of the lenders against the borrower and an intercreditor agreement that regulates the claims between senior and subordinated lenders. While both the senior and the subordinated credit agreement include separate financial covenants, senior debt covenants are commonly more restrictive in order to enable senior lenders to receive control rights in advance of subordinated claims (Miller and Chew, 2007). Financial covenant restrictiveness – in contrast to the mere inclusion of covenants – is typically not standardized and is subject to negotiation between borrowers and intermediaries or lenders.

Financial covenants can be classified into two mutually exclusive fundamental categories: incurrence and maintenance covenants (Demiroglu and James, 2007b). The former category of covenants is tested only in case the borrower takes, or attempts to take, certain ex-ante defined actions, which might extract wealth from debtholders like dividend payments or the issuance of additional debt (Lai and Bavaria, 2007). This type of financial covenants restricts the actions of borrowers if certain accounting-based thresholds are not satisfied (Eilers et al., 2009). By contrast, maintenance covenants have to be met on an ongoing basis over the term of the loan, independent of any wealth-shifting attempts of the borrower. Generally, maintenance covenants are seen as wealth-increasing measures compared to incurrence covenants for lenders as they are assumed to yield generally higher recovery rates in case of payment default.¹⁸ Leveraged loans traditionally incorporate maintenance covenants. However, in overheated credit markets leveraged loans might incorporate incurrence covenants instead of maintenance covenants. The structure including incurrence covenants is known as ‘covenant-lite’ deals (see Demiroglu and James, 2007b; Lai and Bavaria, 2007).

¹⁸ S&P estimates that loans with incurrence covenants have 8 percent to 14 percent lower recovery rates Lai and Bavaria, 2007.

In order to be able to assess the structure of financial covenants in leveraged loans, it is essential to understand the identified structure in comparable private debt and leveraged loan agreements. Demerjian, 2007, groups the different financial covenant ratios into five classes¹⁹:

1. *Coverage ratios*: (operating performance indicator) / (cash flow burden indicator from debt)
2. *Current ratios*: (current assets) / (current liabilities)
3. *Leverage ratios*: (debt indicator) / (operating performance indicator)
4. *Gearing ratios*: (debt indicator) / (assets or equity)
5. *Net Worth ratios*: (assets) - (liabilities)

Chava and Roberts, 2008 provide a broad overview of financial covenant restrictions in private debt agreements in the US. According to their dataset, covering 9,264 loans, the most frequent financial covenants included in private debt agreements are leverage ratios, i.e. maximum Debt to EBITDA, net worth, and coverage ratios. Minimum gearing ratios are slightly less important but still frequently utilized. In US leveraged loans the most important type of financial covenant according to Demiroglu and James, 2007b is the Debt to EBITDA financial covenant that belongs to the category of leverage ratios.

Our dataset shows that European leveraged loans predominantly contain two out of the aforementioned five classes of financial covenants (see Table V). Demerjian, 2007 predicts and finds that borrowers with positive earnings, high profitability and low earnings volatility are likely to contain predominantly *coverage* and *leverage* covenants. Since buyout firms predominantly belong to this class of borrowers it is not surprising that their financial

¹⁹ In order to eliminate any confusion among private-equity-academics and practitioners we label Demerjian's *Debt to Cash Flow* ratio as *Leverage* ratio and the Debt to Equity ratio as *Gearing*. This is in line with the studies of Axelson et al., 2007; Demiroglu and James, 2007b.

covenant structure mostly contains *coverage* covenants, i.e. interest coverage and cash flow coverage, and *leverage* covenants, i.e. Debt to EBITDA and Senior Debt to EBITDA²⁰ covenants. The frequency of individual inclusion of the different financial covenants in leveraged loan agreements is presented in Table V.

[Insert Table V here]

Leverage covenants are the most important class of covenants in leveraged loans (Demiroglu and James, 2007b; Ivashina and Kovner, 2007). Accordingly, the Debt to EBITDA covenant is included in 95 percent of the analyzed leveraged loans. Intuitively, if the LBO-financing contains subordinated loans, senior lenders might demand a covenant for the Senior Debt to EBITDA ratio in order to assess their specific risk more adequately. Since not all LBOs include subordinated financing, this covenant is not as frequently utilized and only included in 15 percent of the loans.²¹ However, taken together, 97 percent of the analyzed credit agreements contain either a Debt to EBITDA or a Senior Debt to EBITDA covenant, reflecting their importance in leveraged loans.

The second important group of covenants in leveraged loans is the limitation on *coverage* ratios. The cash flow coverage covenant, which puts a minimum limit on the ratio of unlevered free cash flow to debt service (i.e. interest and redemption), is nearly present in all credit agreements. This seems plausible as this ratio expresses the anticipated distance from cash generated from operations to payment default, which constitutes a crucial signal for financial risk to debt markets. Another commonly used *coverage* ratio is the interest coverage, which sets a maximum limit to the ratio of EBITDA to interest payments. This ratio seems

²⁰ The Debt to EBITDA and Senior Debt to EBITDA covenant are not mutually exclusive. Both types might be used together.

²¹ Senior Debt to EBITDA covenants are utilized in most but not in all of the transactions with subordinated tranches. In cases where there is subordinated debt and not Senior Debt to EBITDA covenant, subordinated lenders receive the same number and type of financial covenants but with a higher headroom (typically 10 percent), i.e. a looser threshold. Another way of deferring the shift of control rights for subordinated lenders is that they receive their control rights after a certain time lag (typically 90 days) in comparison to senior lenders.

marginally less important to lenders, presumably because both numerator and denominator are implicitly included in the Debt to EBITDA or cash flow coverage ratio.

In addition to the five groups identified by Demerjian, 2007, leveraged loans frequently contain restrictions on capital expenditures (capex covenant). Interestingly, this type of covenant is aligned with lender and sponsor interests. Lenders try to limit wealth extraction due to agency theoretic overinvestment problems between lenders and borrowers (Jensen and Meckling, 1976; Myers, 1977) and sponsors are keen to limit capital expenditures to reduce agency problems between owners and management, which is supported by empirical findings of Kaplan, 1989.

In contrast to the US sample of Demiroglu and James, 2007b which contains 22 covenant-lite loan packages out of 122 deals, our sample includes only one covenant-lite loan package. This deal was originated in 2006. There might be two not necessarily mutually exclusive explanations for this difference. *First*, the mentioned US sample of Demiroglu and James, 2007b includes public-to-private deals only²², which are generally larger in size and might be financed by sponsors with higher reputation than our dataset and therefore have looser covenant settings. Our single covenant-lite deal is also very large in size and sponsored by a very highly reputed international private equity group (PEG). *Second*, the lower number of leveraged loans with covenant-lite structures might indicate that lenders in economies with strong creditor rights allocate a higher value to financial covenants and are not as willing to use this instrument to force the borrower into bankruptcy, even in times of high sponsor power.

In accordance with the results of Demerjian, 2007 and in line with our interviews, the sample does not contain any *net worth*, *current* or *gearing* covenant. Hence, these financial

²² Ivashina and Kovner, 2007 do not include covenant-lite loans in their sample.

covenants were not of relevance for the LBO market between 2000 and 2008. Ivashina and Kovner, 2007 as well as Demiroglu and James, 2007b also confirm our finding for the US.

Besides the usage of individual financial covenants, it is interesting to note how they are used in interaction. Table VI shows that of the possible 32 (2^5) covenant combinations, there are a total of 13 combinations found in the sample of loan contracts. However, as suggested by our conversations, European leveraged loans seem to contain a standardized menu of financial covenants. Our sample shows that the standard financial covenant setting contains Debt to EBITDA (and/or Senior Debt to EBITDA), cash flow coverage, interest coverage and capex covenant (see Table VI) constituting about 70 percent of our sample. As said before, due to the high degree of standardization, the number of financial covenants seems not to be a good measure of restrictiveness in leveraged buyouts, which is supported by anecdotal evidence from our interviews.

[Insert Table VI here]

5.3 Financial covenant thresholds and headrooms

The development of thresholds and headrooms across all types of financial covenants over time and the planning horizon are reported and analyzed using Wilcoxon rank-sum test statistics in Table VII, which shows the covenant thresholds for $t = 1$ to $t = 3$ from 2000 to 2008.²³

[Insert Table VII here]

Notably, leverage covenant thresholds decrease over the planning horizon being mechanically driven by the reduction of net debt and the planned growth of EBITDA (assuming constant headroom). While not statistically significant, leverage covenant

²³ Analysis of planning horizons is only conducted until $t = 3$ because interviews suggested that a detailed plan is only conducted until $t = 3$ and then extrapolated to further years.

thresholds increased from pre-2004 to the presumably overheated period of 2004 to 2007, mainly driven by the increased leverage levels at loan inception. Intuitively, after the burst of the credit bubble, leveraged covenant thresholds decreased in 2008. However, headrooms were still higher than in the phase of 2000 to 2003. Interestingly, this observation even amplified in the forecasted headrooms for $t = 2$ and $t = 3$, being statistically significant for 2000 to 2003 vs. 2004 to 2007 and 2000 to 2003 versus 2008. This finding points out that not only the leverage covenants were initially set loosely during boom times, but were also set even more loosely over the maturity of the loan. In contrast to the leverage covenant threshold, the interest cover covenant threshold increases over the planning horizon. This observation seems mechanical, since interest payments stay fairly stable – as only the relatively lower spread Term A loan is redeemed - and EBITDA is mostly forecast to grow (again assuming a constant headroom). During the credit boom, the interest cover threshold was significantly lower than pre-credit boom levels. Compared to the boom days, in 2008 the interest covenant threshold increased again, but was still significantly lower than pre-credit boom levels.

Most striking is the setting of the cash flow covenant threshold. *First*, it does only experience very little variation over the planning horizon. *Second*, in earlier years some cash flow covenant thresholds were greater than 1, but during the boom times the threshold was standardized to 1. This seems puzzling, as financial covenants are presumably utilized to serve as a signal for the state of the firm so that lenders can intervene early to limit wealth reduction. However, if a cash flow covenant of 1 is violated, the firm cannot satisfy its debt obligations from its ongoing cash flows. Only if the existing cash level is sufficient to cover outstanding payments or if equity injections by sponsors are made, can the firm avoid payment default. However, banks do not anticipate borrowers having any cash on hand and the option of equity injection only applies in few cases as seen by many buyout companies in

2008/2009. Thus, assuming none of the two aforementioned possibilities, this setting would not give the lender any time to intervene before they are confronted with default payments. Consequently, lenders might apply some specific logic in their financial covenant setting where the cash flow cover covenant is used as a signal of last resort.

In contrast to thresholds, headrooms are easier to interpret as they provide a direct view of the restrictiveness of financial covenants. Table VIII presents the development of the headrooms for the leverage, interest coverage and cash flow coverage covenants over time from $t = 1$ to $t = 3$.

[Insert Table VIII here]

In our sample headrooms experience relatively higher variation in comparison to thresholds and hardly any clear-cut time trends can be identified. Therefore, most trends only give a suggestion of the trend. However, as indicated by the time trend for the leverage and interest cover covenant headroom at $t = 1$, covenants were set less restrictive during the first year, i.e. with a higher headroom, during the credit boom phase of 2004 to 2007 in comparison to pre- and post-crunch time. Interestingly, over the planning horizon the variance of leverage and interest cover headrooms become larger, showing the non-standardized character of covenant setting. Additionally, the headroom analysis for $t = 3$ shows that from 2000 to 2003 covenants were relieved faster over time in comparison to both the boom and the post-boom phases.

The cash flow cover covenant headroom is difficult to interpret. As indicated by the threshold, which is standardized to 1, the cash flow cover headroom results from negotiated items of the financing structure. Therefore, the cash flow covenant headroom is not directly subject to negotiation. However, the negotiated financing structure, especially interest and redemption schedules, as well as the agreed operating cash flow forecast determine the

headroom. For example, if the sponsor and the lead arranger negotiated a cash flow cover ratio of 1.3 in $t=1$, this would imply a headroom of 23 percent ($-[(1/1.3)-1]*100$), assuming a covenant threshold of 1. Hence, since it directly measures the distance to payment default, the cash flow cover covenant headroom seems to be a good indicator of the overall financial risk of the transaction and is a direct outcome of the agreed financing case.

While the leverage as well as the interest cover covenant headrooms are directly negotiated and the interpretation of restrictiveness is straight-forward, the headroom of the cash flow covenant can be interpreted in two ways: On the one hand, a large headroom indicates a large distance to a violation of the covenant and would imply a loose covenant setting. On the other hand, large headroom in the cash flow cover covenant could be the outcome of a conservative capital structure. Therefore, the cash flow cover covenant headroom cannot be taken as a proxy for covenant restrictiveness, as it is a mechanistic product incorporating both financial structure and financial covenant restrictiveness.²⁴

5.4 *Financial covenant pecking order*

The data analysis process reveals a pattern that suggests that financial covenant headrooms are not designed independently of each other. The observed covenant thresholds suggested that the lead arrangers implement a ‘pecking order’ in the design of financial covenants meaning that the utilized covenants are meant to be violated sequentially. In particular the cash flow cover covenant threshold, which is mostly set equal to 1, shows that this type of covenant is not used as a signal to intervene but as a lever of last resort. This finding indicates that the *leverage* covenant and the *interest coverage* covenant are likely to be utilized to fulfill the signaling function of shifting control rights from the owners to the

²⁴ For example: a very reputed sponsor might receive a low cash flow cover headroom because he receives more leverage than comparable non-reputed sponsors. This is not a signal for the restrictiveness of the cash flow cover covenant.

lenders, who might then intervene to protect their loans. Another explanation might be that EBITDA is a smoothed proxy for cash flow, implying that cash flow is more volatile than EBITDA, which might lead to higher renegotiation costs for tight cash flow coverage covenants.

Table IX shows that financial covenants are stricter in the early years of the planning horizon and are relaxed over time.²⁵ While all three financial covenants adhere to this systematic, the leverage covenant shows a faster relief (delta of medians $t = 1$ versus $t = 3$ equals 5.8 percentage points) than the interest coverage (delta of medians $t = 1$ versus $t = 3$ equals 2.2 percentage points) and the cash flow cover covenant (delta of medians $t = 1$ versus $t = 3$ equals 3.4 percentage points). Compared to the other two, the cash flow cover incorporates scheduled repayments that typically increase over time, keeping the debt service relatively constant, while leverage levels decrease.

To test whether financial covenants are designed in a hierarchical manner and whether this structure changes over time, we compare headroom levels of the financial covenants over time using a Mann-Whitney mean comparison test (t-values are reported on the right hand side in Table IX). We find that the leverage headroom in $t = 1$ is significantly smaller than the headrooms of the interest coverage and cash flow coverage covenant. This result implies that in the first year after the transaction a buyout firm would first breach the leverage covenant then the interest coverage and lastly the cash flow coverage covenant.²⁶ Therefore, in line with evidence from interviews and empirical results (see Demiroglu and James, 2007b; Ivashina and Kovner, 2007), transacting parties heavily negotiate the leverage covenant

²⁵ Demiroglu and James, 2007b report stricter covenant levels over time. However, they draw their conclusion based on the covenant thresholds, while we analyze the covenant headroom. Our dataset supports their finding of declining covenant thresholds.

²⁶ Note that this implication is based on the assumption that the elasticity between EBITDA and unlevered free cash flow is equal to 1, i.e. $\Delta\text{EBITDA} = \Delta\text{FCF}$. While in the general corporate world cash flows are more volatile than EBITDA, we believe that in leveraged buyouts deteriorating EBITDA levels increase the probability of a reduction of capital expenditures in order to avoid covenant violations and therefore smooth cash flow levels in downside scenarios.

headroom, which is the first to show a signal of shifting control rights. Over time, with decreasing leverage, this picture gradually changes. In $t = 3$ the interest coverage ratio is the first one to be violated. In later years ($t > 4$) and increasing repayments of senior bullet B and C tranches as well as mezzanine redemption, the cash flow covenant becomes the strictest covenant (not shown in analysis for the sake of brevity). However, if the leverage covenant is not violated during the early years, the overall leverage is reduced while equity is increased leading to lower financial risk. Apparently, covenant restrictiveness is most important in the early years of the transaction, which is supported by our conversations with bankers.

[Insert Table IX here]

To sum up, our analysis shows that there is a financial covenant pecking order. The leverage covenant seems to be the most important financial covenant and the leverage headroom, particularly during the first two years, is the crucial determinant of the restrictiveness of financial covenants and therefore heavily negotiated between sponsors and lead arrangers. It would therefore be interesting to explain the cross-sectional variation of the leverage headroom during the first two years after loan origination.

6 Multivariate analysis of drivers of restrictiveness

6.1 Determinants of financial covenant restrictiveness

In Table X we examine the determinants of financial covenant restrictiveness in senior bank loan contracts of buyout firms using a sample of 130 buyouts.²⁷ We have shown that the leverage headroom is the one to be breached first and to be actually negotiated between lenders and sponsors. Therefore, we use the most restrictive, i.e. smallest, headroom of the leverage covenant in the first two years after the transaction as the dependent variable. We run

²⁷ Missing variables lead to a final sample of 118 buyouts for the multivariate regression.

ordinary least square regressions, and the coefficients represent the percentage change of the headroom dependent on a change of the independent variable. For estimating p-values we use heteroskedasticity-consistent (Huber-White) standard errors since White- as well as Breusch-Pagan-tests indicate heteroskedasticity of the estimated residuals.

Further, the independent variables used, *leverage*, *profitability* and *growth* raise concerns that the models might suffer from multicollinearity. However, the variance inflation factors (VIF) of these variables are less than 1.28 in all models, suggesting that multicollinearity is not severe.

[Insert Table X here]

In regression (1), the baseline specification, we model the net leverage headroom as a function of PEG size, leverage, and credit risk spread. In line with Demiroglu and James, 2007b we find that PEG size significantly increases net leverage headroom. An increase of assets under management by €1 billion or one standard deviation results in higher leverage covenant headroom of 15 basis points or 75 basis points, respectively (at a mean of 23.6 percent headroom). Similar to Gompers and Lerner, 1999; Kaplan and Schoar, 2005 we use size of the private equity sponsors as an approximation of experience and reputation. PEG size is measured as assets under management, which is aggregated by the size of the sponsor's historically raised funds. At the transaction date the funds aggregated from the five years prior to the deal are accumulated from ThomsonVentureEconomics. When PEGs differ significantly in size, we assume that PEG size is a better proxy for reputation than the number of completed deals. Size incorporates historical performance, the trust that capital markets have in the future performance of the PEG, and the market power of the PEG. The historical number of deals might only be a good proxy when differentiating between PEGs of homogenous size like in the sample of Demiroglu and James, 2007b, who analyze P2P deals.

However, our sample includes several small local PEGs who were able to complete a lot of deals of relatively small enterprise values in contrast to large global PEGs like KKR or Blackstone. Our conversations with bankers reveal that they perceive large players with a low number of historical deals to have a higher reputation than smaller players with a large number of deals. Nevertheless, substituting assets under management by the logarithm of one plus the number of deals during the last three years yields similar robust results. The logarithm of one plus the number of deals during the last three years and the logarithm of assets under management have a correlation of 0.73. The positive relationship of PEG size or number and covenant restrictiveness is robust against the inclusion of additional testable variables.

Table XI reports the accumulated assets under management from 2000 to 2008 of the 20 largest private equity sponsors included in our sample. It shows that our sample includes large very reputable international PEGs. Additionally, we compared our sponsors to the ranking conducted by Private Equity International.²⁸ Our sample includes eight out of the top ten private equity groups in 2009 that conducted 25 of our 130 transactions. More than half of our deals (68 to be exact) were conducted by the top 100 private equity groups of 2009.

[Insert Table XI here]

In line with theoretical and empirical literature, we can show that higher leverage, i.e. more financial risk, leads to more restrictive financial covenants, i.e. lower headroom. Leverage, however, might be an endogenous variable, as it not only affects financial covenant restrictiveness but also vice versa covenant restrictiveness might have an influence on leverage (Billett et al., 2007). While a detailed analysis of this potential problem is provided

²⁸ Private Equity International (PEI) yearly ranks private equity firms by size according to their raised funds in terms of US dollars over a five year period. An overview of the PEI 300 ranking in 2009 may be retrieved at: http://www.abraaj.com/mediacenter/Files/PEI_300_2009_Executive_Summary.pdf.

in Section 6.2 on robustness below, our results show that our models do not exhibit endogeneity, which is supported by characteristics regarding the process of headroom determination. Therefore, increasing the Debt to EBITDA multiple by 1x reduces the leverage headroom by 97 basis points (a one standard deviation increase results in a 178 basis points reduction in headroom), the interest coverage headroom by 140 basis points (a one standard deviation increase results in a 265 basis points reduction in headroom), and the cash flow coverage headroom by 240 basis points (a one standard deviation increase results in a 434 basis points reduction in headroom).

Models (2), (4) and (5) show that increased profitability, measured as EBITDA/sales²⁹, at transaction ($t = 0$) leads to significantly less restrictive covenants, i.e. higher headroom. This finding suggests that lenders consider achieved profitability as a signal that future behavior of management will be positive and therefore lenders grant more flexibility to management in terms of less restrictive financial covenants. An EBITDA margin, which is higher by one percentage point or one standard deviation, increases the leverage headroom by about 22 basis points or 177 basis points, respectively.

In models (3) to (5) we add a growth variable, proxied by projected EBITDA growth from $t = 0$ to $t = 3$, to the covenant restrictiveness equation. We find strong evidence that financial covenants are less restrictive for higher growth firms, i.e. receive higher net leverage headroom. Accordingly, increasing the EBITDA growth forecast over the first three years by one percentage point or one standard deviation increases the leverage headroom by 32 basis points or 184 basis points, respectively. Substituting EBITDA growth by sales growth yields

²⁹ In our view EBITDA/sales is a better proxy for profitability than EBITDA/assets because assets represent the purchase price at $t = 0$. Therefore, EBITDA/assets would be the reciprocal of the EBITDA multiple of the enterprise value and highly negatively correlated with leverage, leading to multicollinearity problems. However, including EBITDA/assets, does not change the results and profitability remains highly significant in all models.

robust results.³⁰ Whereas theory predicts different directions we find direct evidence that shareholders and management of high-growth firms value flexibility more than shareholders of comparable low-growth firms. At first, this finding appears to contradict the results of many scholars, e.g. Billett et al., 2007³¹, who suggest that higher growth firms receive more restrictive covenants. But most past studies evaluate covenant protection by the mere counting of action-restricting covenants in the context of agency theory. Our research design allows us to draw direct conclusions regarding the potential shifting of control rights, which are not in conflict with action-restricting covenants, but are complementary and might adhere to a different economic logic. Therefore, while high growth firms might receive more action-restricting covenants, they apparently negotiate higher flexibility for their financial covenants, leading to lower restrictiveness. However, the significant influence of growth expectations on headroom could also have a mechanical reason in leveraged loan contract design, which we can explain by way of an example: A mandated lead arranger analyzes two companies A and B, which are identical in each aspect except for their growth forecast, with A having higher growth prospects. The MLA conducts worst case scenario analyses for both firms, which are consequently identical. Setting the covenant according to this analysis, both firms receive the same threshold. However, since the headroom expresses the distance between forecast and threshold, firm A automatically receives higher headroom.

Interestingly, the size of the firm does not have a significant impact on financial covenant restrictiveness. One explanation might be that potential lenders in the credit market are more concerned with the reputation of the sponsor than with the target, implicitly transferring the

³⁰ The market-to-book ratio is difficult to determine for non-public private equity transactions because (1) the book value before acquisition is not known and (2) even if it were known, the corporate structure changes significantly in a buyout disqualifying the historical book value of equity.

³¹ Billett et al., 2007 find a significant relationship for the growth proxy market-to-book, although they did not find any significant relationship for their sales growth proxies.

sponsor-related reputation to the borrowing firm. Removing the size of the PEG does not alter the coefficients and t-values of the size variables.

Finally, macroeconomic conditions seem to drive covenant restrictiveness of leveraged loans. Hence, the credit spread between AAA and BB bonds is negatively related to headroom. In other words, the more risk averse the credit suppliers, the more restrictive are financial covenants.

After the examination of the drivers of the net leverage headroom's restrictiveness, which is the most important financial covenant in leveraged buyouts, it is essential to see what drives the restrictiveness of the interest coverage and the cash flow cover covenants. Again we use ordinary least square regressions to determine the drivers behind the restrictiveness of the respective covenant. In Table XII we report only the variables included in model (5) in the net leverage headroom equation.

[Insert Table XII here]

All reported variables are also tested in the specifications of models (1) to (4) in Table X, but show no different results and are therefore not reported. Interestingly, the drivers seem to be totally different from the leverage headroom determinants. The hypothesized pecking order of financial covenants predicts that sponsors try to heavily negotiate the leverage headroom. The reason for this is, as already pointed out, that the leverage covenant is the first to be violated in case of a deterioration of financials, and therefore the first to trigger a shift in control rights to lenders. Therefore, sponsor- and target-related factors should play a bigger role in determining the net leverage headroom than in the restrictiveness of the interest and cash flow coverage headroom. As can be seen in Table XII, sponsor- and target-related factors do not have a significant effect on the restrictiveness of the two coverage covenants. Their setting seems to be heavily influenced by credit market environments and transaction

fundamentals, which might have a direct mechanical influence on the coverage ratio. For example, an increased leverage leads, *ceteris paribus*, to higher repayments and a higher denominator reducing the forecast of the cash flow coverage ratio and therefore the distance, i.e. the headroom, to the cash flow coverage covenant.

6.2 Robustness

Many scholars suspect and find evidence for simultaneous causality between leverage and covenant restrictiveness (Bradley and Roberts, 2004; Billett et al., 2007). While we believe that their findings are correct, their analysis focused on the mere existence of covenants and not on the inherent restrictiveness of financial covenants. Negotiations on leverage take place at the beginning of the loan arrangements (mostly at the proposal stage), while the restrictiveness of financial covenants (i.e. headroom) is negotiated during the final phase of the loan arrangement (for a more detailed description see also Ivashina and Kovner, 2007). Hence, we conceptually expect no problem of endogeneity, i.e. that the level of headroom has a causal effect on the level of leverage, in our models of financial covenant restrictiveness. Nonetheless, in order to test for these effects we conducted Wu-Hausman tests. We used all-in-drawn spread as instrument for the suspected endogenous leverage variable: Like leverage, all-in-drawn spread, defined as the value-weighted sum of the spreads over EURIBOR of the utilized senior and subordinated tranches, is a parameter of the credit contract that is set at the beginning of the loan negotiations and should be exogenous to the financial covenant models for several reasons: *First*, the pricing of the different tranches in leveraged loans is mostly driven by credit markets and therefore experiences very low variations as also noted for buyouts in the 1980ies by Kaplan and Stein, 1993. *Second*, standardized spreads are characteristic for European credit markets, in contrast to spreads in the US that are negotiated to be more flexible as indicated by Demiroglu and James, 2007; Ivashina and Kovner, 2007. Consequently, our interviews with lead arrangers and sponsors

support the assumption that there is no link between spreads and financial covenant restrictiveness.

Further, all-in-drawn spread, as defined above, is a relevant variable, as leverage and all-in-drawn spread are strongly correlated (correlation coefficient: 0.4338). This relationship is mechanical as more expensive subordinated debt is used in more highly leveraged transactions Axelson et al., 2007. Regressing leverage on all-in-drawn spread results in a highly significant coefficient (t-value of 5.36, i.e. a p-value of 0.000). The Wu-Hausman tests indicate no relevant endogeneity in the models, since the residuals from the reduced form regression on leverage have no significant impact on headrooms in the initial structural form.

An additional concern might be the adequateness of our measure for covenant restrictiveness. According to Dichev and Skinner, 2002, borrowers might engage in accounting manipulation to avoid financial covenant violation. This behavior might reduce the effectiveness of financial covenants overall and thus the importance of their restrictiveness. However, several reasons argue against a substantial accounting manipulation in leveraged loans. First, lead arrangers have considerable experience in originating and monitoring loans, reducing the ability of borrowers to ‘consistently fool private lenders via accounting manipulation’ (Chava and Roberts, 2008). Second, building on the first argument, lead arrangers define financial covenants in great detail and the calculations are specified ex-ante and implemented in the financial models.³² Third, credit agreements constitute a ‘GAAP freeze’, which does not allow any changes in accounting principles. Fourth, the quarterly calculation of financial covenants during the lifetime of the loan has to be certified by auditors and the chief financial officer of the firm. Finally, evidence suggests that managers prefer to

³² For definition guidelines, see the loan market association. In practice, definitions are individually negotiated and can become quite complex.

cut investments to accounting manipulation in order to prevent covenant violations (Graham et al., 2005; Chava and Roberts, 2008).³³

7 Conclusion

This paper provides a detailed view on the structure, the time-series and cross-sectional variations of financial covenants in leveraged buyouts. We believe that the institutional context in Germany provides a superior laboratory setting, as Germany is a country with strong creditor rights and financial covenants are subject to rigorous negotiations between sponsors and lead arrangers. We analyze a proprietary dataset of 130 European LBOs collected from three major commercial banks, including deals from over 16 lead arranging banks and 66 private equity sponsors.

Regarding the financing structure we find several differences in the European leveraged loan market compared to related studies in the US like that by Demiroglu and James, 2007b. Our data suggests that financing structures did not identically follow the aggressiveness in US financing structures during the ‘overheating phase’ from 2004 to 2007. Although leverage levels rose, spreads shrank, PIK components increased, and financial covenants were loosened, European leveraged loan structures were more conservative with regards to second lien tranches, the utilization of PIK toggles, and covenant-lite structures. Especially, the conservative usage of covenant-lite structures indicates that lenders in economies with strong creditor rights assign a higher value to financial covenants than lenders in economies with weak creditor rights. Similarly to Kaplan and Stein, 1993 we find that there is a great homogeneity among spreads of different tranches. Additionally, financing structures turned significantly more conservative in 2008: lenders demanded higher equity contributions,

³³ While cutting investment does not improve financial covenants directly, the cash preserved by not undertaking investments is considered in the net debt calculation. (Net debt = Debt – Cash).

spreads increased, second liens were no longer available and financial covenants were tightened. Although our sample is up-to-date (as of 2009), we were not able to analyze any deal in the post-Lehman era, i.e. closed in the last quarter of 2008 or later.

The financial covenant structure of the observed deals shows that three types of financial covenants are mainly utilized in LBOs: *Leverage* (i.e. Debt to EBITDA), *coverage* (i.e. EBITDA to interest and unlevered cash flow to debt service), and *capex* covenants. Interestingly, we find that, regarding restrictiveness, financial covenants are set in a hierarchical manner: the *leverage* covenant is set to be the first financial covenant to signal a violation and to trigger a shift of control rights. Consequently, private equity sponsors and lead arrangers primarily negotiate the restrictiveness of the *leverage* covenant.

To assess the determinants of financial covenant restrictiveness, we apply a new form of ex-ante covenant slack that we call headroom (in line with practitioners' terminology). We regress this headroom on a set of sponsor-related, transaction-related and macroeconomic variables. Our results suggest that loans for borrowers backed by more highly reputed private equity sponsors, measured in terms of size as done by Kaplan and Schoar, 2005, receive a looser financial covenant setting, which is in line with the findings of Demiroglu and James, 2007b; Ivashina and Kovner, 2007. Additionally, we find strong evidence that high growth opportunities decrease the restrictiveness of financial covenants. This finding supports the argument that high-growth companies assign more value to flexibility than low-growth firms. Regarding profitability, our analysis suggests that more profitable firms receive looser covenants. Hence, lenders seem to exert less control and grant more flexibility to borrowers whose performance signals historically 'good' behavior. Interestingly, we do not find any empirical support that company size is related to financial covenant restrictiveness. Seemingly, the syndicated loan market for buyouts confers the reputation of the sponsor on the borrower.

Finally, we find that leverage as well as market credit spreads determine the restrictiveness of financial covenants. Intuitively and in line with many scholars, leverage and credit spread are significantly positively related to restrictiveness. Our tests for robustness provide evidence that the restrictiveness of financial covenants is not simultaneously determined with leverage levels in LBOs. This finding does not contradict that of Billett et al., 2007, as they analyze action-restricting covenants, which are negotiated in parallel to the leverage level.

Taking into account that financial covenants regained high significance as control mechanisms in LBOs after the recent credit crunch, future research seems worthwhile. An interesting and important research question, which has not been empirically proven by academics, is the impact of financial covenants on the probability of (payment) default and loss given default. Another important issue is the information asymmetry between private equity sponsors, lead arrangers and participants in the loan. The restrictiveness of financial covenants might be related to additional contractual clauses. The reason is that financial covenants might serve as guard posts in the relationship between arranger and participant, while less transparent agreements are set between arranger and sponsor to the detriment of the participant.

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Figure 1
EXEMPLARY FINANCIAL COVENANT DESIGN

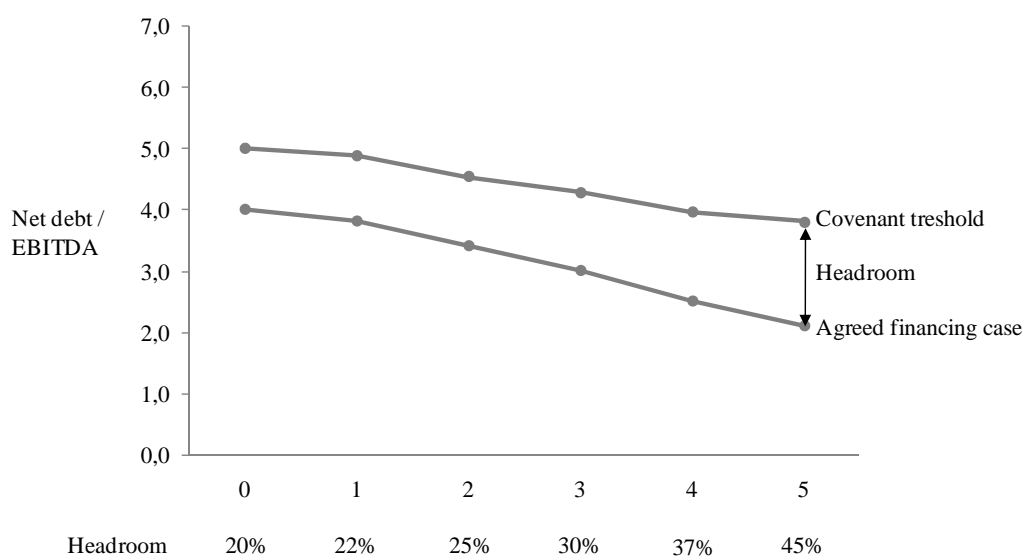


Table I
SIZE OF LBOs

Table I presents summary statistics by year for the sample of 130 PE sponsored LBOs and recapitalizations completed between January 2000 and August 2008, which equals all deals where data was available until March 2009. Sales and EBITDA equal audited pro-forma figures for the end of fiscal year of the transaction (t=0), which equals the underlying financial during loan origination. Enterprise value equals the transaction value excluding transaction costs (due diligence, arrangement fees etc.). The panel below presents Wilcoxon rank-sum tests used to compare the values of the variables in three distinct time periods. (+) and (-) signs indicate the direction of the time trend. *, **, and *** indicate whether the Wilcoxon rank-sum test is statistically significant at 10 percent, 5 percent, and 1 percent levels, respectively.

	Number of PE led LBOs	Sales				EBITDA				Enterprise Value			
		Mean	Median	Min	Max	Mean	Median	Min	Max	Mean	Median	Min	Max
		<i>(€ millions)</i>											
		<i>(€ millions)</i>											
		<i>(€ millions)</i>											
2000	1	<i>Not shown here for anonymity reasons. Available to reviewer.</i>											
2001	2	2038.4	2038.4	920.4	3156.4	269.2	269.2	150.4	387.9	1445.1	1445.1	940.2	1950.0
2002	6	965.8	399.4	43.6	3383.2	98.5	42.4	21.6	227.9	713.5	304.5	168.2	1839.2
2003	7	444.5	68.9	18.6	1870.9	55.5	11.6	5.9	185.5	409.1	52.2	22.1	1568.0
2004	20	1044.4	476.6	67.0	5169.0	128.5	96.1	7.7	517.0	862.7	676.3	41.6	2691.0
2005	28	595.5	353.9	27.3	5107.4	76.3	49.2	2.9	276.7	536.1	237.8	15.7	1887.5
2006	30	525.1	171.0	15.9	2403.8	49.1	25.2	1.4	283.5	308.2	117.6	15.8	2526.2
2007	29	383.3	163.9	19.3	4163.4	68.3	28.6	7.3	646.9	526.5	195.0	33.9	3335.2
2008	7	392.5	244.9	74.5	1439.0	72.9	35.5	17.2	283.7	459.6	267.6	129.9	1517.4
Total	130	613.6	276.4	15.9	5169.0	78.4	35.0	1.4	646.9	539.2	220.5	15.7	3335.2
2000-2003 vs. 2004-2007				(-)				(-)				(-)	
2004-2007 vs. 2008				(+)				(+)				(+)	
2000-2003 vs. 2008				(-)				(+)				(+)	

Table II
SAMPLE COMPARISON

The table presents the €volumes of LBOs in the sample in relation to the German and Western European LBO market by year. Volume figures are in millions € deflated to 2008. Comparisons to market studies are in percent. The sample includes 109 PE-backed LBOs completed in Germany between July 2000 and August 2008. Total enterprise value excludes transaction costs (due diligence, arrangement fees etc.). Information on market figures is obtained from two sources. *First*, market data is aggregated from the Centre for Management Buy-out Research at Nottingham University Business School and includes all PE and non-PE sponsored LBOs larger than €10 million in transaction value completed in Germany, and Western Europe respectively, over the entire sample period. Year 2008 market figures are for the first 6 months only. *Second*, the sample is compared to the comprehensive dataset of Lerner et al., 2009 covering the years from 2000 to 2007.

Total enterprise value			
Sample	Market Coverage		
(€millions)	of Germany <i>Sample vs. CMBOR</i> as %	of Western Europe <i>Sample vs. CMBOR</i> as %	of Western Europe <i>Sample vs. Lerner 2009</i> as %
	<i>Not shown here for anonymity reasons. Available to reviewer.</i>		
3,365.7	42.32	5.39	5.37
4,874.5	51.43	7.28	6.68
3,197.4	24.14	4.89	4.69
13,837.7	67.47	16.80	11.59
8,769.5	60.46	6.81	4.60
6,791.9	27.83	4.03	2.62
13,947.3	52.70	8.09	8.16
2,756.4	42.85	7.36	NA
57,540.1	40.18	6.72	5.79

Table III
KEY VALUATION AND FINANCING DATA

The table presents market trends in Germany during the July 2000 to August 2008 period for 130 PE sponsored LBOs and recaps. Transaction total capital equals transaction total sources (or uses). Transaction value (enterprise value) excludes transaction costs. Net debt equals total debt less cash and cash equivalents. Senior debt includes term loan facilities (A, B, C, and D tranches) as well as second-lien loans. EBITDA equals the pro-forma figure for the end of fiscal year of the transaction (t=0). Equity contribution is the equity to transaction total capital ratio with equity including common and preferred equity, earn-outs as well as shareholder and vendor loans. PE sponsor reputation by deals is the number of deals the PE sponsor was involved in in Europe during the 36 months prior to the transaction. PE sponsor reputation by funds is the PE sponsor's sum of funds raised during the 2000 to 2008 period. In case several PE sponsors are involved in a deal the sponsor with the highest reputation is applicable. Information on PE sponsor fundraising and deals is obtained from Thomson ONE Banker database. The bottom panel of the table presents Wilcoxon rank-sum tests used to compare the values of the variables in three distinct time periods. (+) and (-) signs indicate the direction of the time trend. *, **, and *** indicate whether the Wilcoxon rank-sum test is statistically significant at 10 percent, 5 percent, and 1 percent levels, respectively.

Deal year	Statistics	Transaction total capital (€millions)	Transaction value to EBITDA multiple x	Leverage (Net debt to EBITDA) x	Senior Leverage (Net senior debt to EBITDA) x	Equity contribution (as % of total capital)
2000	Median n	<i>Not shown here for anonymity reasons. Available to reviewer</i>				
2001	Median n	1493.6 2	5.9 2	3.6 2	3.1 2	37.6 2
2002	Median n	332.3 6	7.7 6	3.9 6	3.5 6	46.6 6
2003	Median n	55.4 7	4.7 7	3.3 7	2.3 7	43.1 7
2004	Median n	705.0 20	7.3 20	4.6 20	3.6 20	30.4 20
2005	Median n	252.5 28	7.0 28	4.3 28	3.6 28	27.7 28
2006	Median n	123.6 30	6.6 30	4.4 30	3.6 30	32.6 30
2007	Median n	202.0 29	7.6 29	4.8 29	4.1 29	33.1 29
2008	Median n	273.1 7	7.9 7	4.1 7	3.2 7	37.5 7
Total	Median n	230.5 130	6.9 130	4.3 130	3.6 130	33.5 130
2000-2003 vs. 2004-2007		(-)	(+)	(+)**	(+)***	(-)***
2004-2007 vs. 2008		(+)	(-)	(-)	(-)	(+)***
2000-2003 vs. 2008		(+)	(+)	(+)*	(+)	(+)

Table IV
DETAILED FINANCING DATA

The table presents annual means and medians of maturity and spreads of the financial sources used in our sample of 130 LBOs arranged between 2000 and 2008. The bottom panel of the table presents Wilcoxon rank-sum tests used to compare the values of the variables in three distinct time periods. (+) and (-) signs indicate the direction of the time trend. *, **, and *** indicate whether the Wilcoxon rank-sum test is statistically significant at 10 percent, 5 percent, and 1 percent levels, respectively.

Deal year	Statistics	Maturity	Spread	Maturity	Spread	Maturity	Spread	Maturity	Spread	Maturity	Cash spread	PIK spread	All in drawn	All in drawn	Credit risk	
		term A loans (months)	term A loans (as %)	term B loans (months)	term B loans (as %)	term C loans (months)	term C loans (as %)	second lien loans (months)	second lien loans (as %)	mezzanine tranche (in months)	mezzanine tranche (as %)	mezzanine tranche (as %)	spread (as %)	senior spread (as %)	spread (as %)	
2000	Median n	<i>Not shown here for anonymity reasons. Available to reviewer</i>														
2001	Median n	84.0 2	2.25 2	96.0 2	2.75 2	108.0 2	3.38 2	.	.	120.0 1	5.00 1	3.00 1	3.27 2	2.60 2	9.40 2	
2002	Median n	84.0 6	2.25 6	96.0 6	2.75 6	108.0 3	3.25 3	.	.	120.0 5	5.00 5	4.50 5	3.96 6	2.55 6	5.68 6	
2003	Median n	84.0 7	2.50 7	96.0 5	2.75 5	108.0 3	3.25 3	.	.	108.0 3	5.00 3	5.00 3	3.04 6	2.55 7	3.67 7	
2004	Median n	84.0 20	2.25 20	96.0 19	2.75 19	108.0 18	3.25 18	114.0 3	5.50 4	120.0 11	5.00 12	6.00 12	3.94 19	2.63 19	1.77 20	
2005	Median n	84.0 28	2.25 28	96.0 28	2.75 28	108.0 25	3.25 25	114.0 11	5.50 10	120.0 18	4.75 17	5.50 17	3.53 26	2.67 26	2.40 28	
2006	Median n	84.0 27	2.25 27	96.0 29	2.75 29	108.0 18	3.06 18	114.0 6	4.75 6	120.0 16	4.50 15	5.25 16	2.93 28	2.53 30	1.86 30	
2007	Median n	84.0 25	2.25 25	96.0 29	2.75 29	108.0 20	3.19 20	114.0 9	4.50 8	120.0 14	4.35 16	5.13 16	3.43 27	2.56 27	1.32 29	
2008	Median n	84.0 7	2.50 7	96.0 7	3.00 7	108.0 7	3.50 7	.	.	120.0 5	4.50 5	5.50 5	4.42 7	2.94 7	4.74 7	
Total	Median n	84.0 123	2.25 123	96.0 126	2.75 126	108.0 96	3.25 96	114.0 29	4.75 28	120.0 74	4.50 75	5.25 75	3.45 122	2.61 125	2.12 130	
Time trend:																
2000-2003 vs. 2004-2007		(+)**	(-)***	(+)	(-)***	(+)	(-)**	n.m.	n.m.	(+)***	(-)***	(+)	(-)	(+)	(-)***	
2004-2007 vs. 2008		(+)	(+)***	(-)	(+)***	(-)	(+)***	n.m.	n.m.	(+)	(+)	(-)	(+)**	(+)***	(+)***	
2000-2003 vs. 2008		(+)	(+)*	(+)	(+)***	0	(+)***	n.m.	n.m.	(+)	(+)	(+)	(+)*	(+)***	(+)	

Table V
FREQUENCY OF FINANCIAL COVENANTS

The table presents the inclusion of financial covenants in the loan agreement of 130 PE sponsored LBOs and recapitalizations completed between July 2000 and August 2008. The second column presents the mean number of covenants included by year. The pre-defined observation list comprises 5 financial covenants. The numbers in the upper rows represent the number of observations that included the respective covenant in the loan. In the lower rows we display these observations as percentage of all transactions completed during the year.

Deal year	Mean number of financial covenants included	Statistics	Net-Debt-to-EBITDA	Net-Seniordebt-to-EBITDA	Cash flow coverage	Interest coverage	Capex covenant	Covenant-lite
2000	5.00	Included						
		Fraction (%)	<i>Not shown here for anonymity reasons. Available to reviewer</i>					
2001	4.00	Included	2	0	2	2	2	0
		Fraction (%)	100.0	0.0	100.0	100.0	100.0	0.0
2002	4.17	Included	6	2	6	6	5	0
		Fraction (%)	100.0	33.3	100.0	100.0	83.3	0.0
2003	3.29	Included	5	1	7	7	3	0
		Fraction (%)	71.4	14.3	100.0	100.0	42.9	0.0
2004	4.05	Included	20	6	19	19	17	0
		Fraction (%)	100.0	30.0	95.0	95.0	85.0	0.0
2005	3.68	Included	27	5	28	22	21	0
		Fraction (%)	96.4	17.9	100.0	78.6	75.0	0.0
2006	3.33	Included	29	3	29	19	20	1
		Fraction (%)	96.7	10.0	96.7	63.3	66.7	3.3
2007	3.38	Included	27	2	27	21	21	0
		Fraction (%)	93.1	6.9	93.1	72.4	72.4	0.0
2008	4.00	Included	7	0	7	7	7	0
		Fraction (%)	100.0	0.0	100.0	100.0	100.0	0.0
Total	3.62	Included	124	20	126	104	97	0
		Fraction (%)	95.4	15.4	96.9	80.0	74.6	0.0

Table VI
THE MENU OF FINANCIAL COVENANTS

The table presents the distribution of loans across different combinations of five financial covenants as well as the respective headroom statistics for the leverage covenant. The sample includes 130 PE sponsored LBOs and recapitalizations completed between July 2000 and August 2008 in Germany.

Fraction of loans (as %)	Net-Debt-to-EBITDA	Net-Seniordebt-to-EBITDA	Interest coverage	Cash flow coverage	Capex covenant
56.2	Yes	No	Yes	Yes	Yes
13.8	Yes	No	No	Yes	No
13.1	Yes	Yes	Yes	Yes	Yes
6.2	Yes	No	Yes	Yes	No
3.8	Yes	No	No	Yes	Yes
1.5	No	No	Yes	Yes	No
0.8	Yes	Yes	Yes	Yes	No
0.8	Yes	No	Yes	No	Yes
0.8	Yes	No	Yes	No	No
0.8	No	Yes	Yes	No	Yes
0.8	No	Yes	No	Yes	No
0.8	No	No	No	Yes	No
0.8	No	No	No	No	No

Table VII
TRENDS IN COVENANT THRESHOLDS OF LBOs

The table presents annual means and medians of leverage covenant, interest cover covenant, and cash flow cover covenant thresholds determined in the loan contracts to be obeyed one year (t = 1), two years (t = 2), and three years (t = 3) after the transaction was completed for our sample of 130 LBOs arranged between 2000 and 2008. The bottom panel of the table presents Wilcoxon rank-sum tests used to compare the values of the variables in three distinct time periods. (+) and (-) signs indicate the direction of the time trend. *, **, and *** indicate whether the Wilcoxon rank-sum test is statistically significant at 10 percent, 5 percent, and 1 percent levels, respectively.

Deal year	Statistics	Leverage covenant threshold in t=1	Leverage covenant threshold in t=2	Leverage covenant threshold in t=3	Interest cover covenant threshold in t=1	Interest cover covenant threshold in t=2	Interest cover covenant threshold in t=3	Cash flow cover covenant threshold in t=1	Cash flow cover covenant threshold in t=2	Cash flow cover covenant threshold in t=3
2000	Median	---	---	---	---	---	---	---	---	---
	n	<i>Not shown here for anonymity reasons. Available to reviewer</i>								
2001	Median	4.83	4.30	3.68	2.68	3.00	3.30	1.00	1.00	1.00
	n	2	2	2	2	2	2	2	2	2
2002	Median	4.05	3.40	2.85	3.03	3.50	4.05	1.00	1.00	1.03
	n	6	6	6	6	6	6	6	6	6
2003	Median	2.50	2.50	2.0	4.00	4.00	4.00	1.05	1.10	1.10
	n	7	7	7	7	7	7	7	7	7
2004	Median	5.30	4.55	4.10	2.42	2.68	2.98	1.00	1.00	1.00
	n	20	20	20	20	20	20	20	20	20
2005	Median	4.60	4.22	3.71	2.30	2.44	2.67	1.00	1.00	1.00
	n	28	28	28	28	28	28	28	28	28
2006	Median	4.42	3.85	3.35	1.83	1.98	2.13	1.00	1.00	1.00
	n	30	30	30	30	30	30	30	30	30
2007	Median	5.30	4.50	4.20	1.85	2.00	2.20	1.00	1.00	1.00
	n	29	29	29	29	29	29	29	29	29
2008	Median	4.19	3.50	3.00	2.50	2.70	2.90	1.00	1.00	1.00
	n	7	7	7	7	7	7	7	7	7
Total	Median	4.60	4.10	3.50	2.20	2.40	2.60	1.00	1.00	1.00
	Std.	1.85	1.74	1.58	1.14	1.30	1.35	0.05	0.05	0.06
	n	130	130	130	130	130	130	130	130	130
Time trend:										
2000-2003 vs. 2004-2007		(+)**	(+)***	(+)***	(-)***	(-)***	(-)***	(-)***	(-)**	(-)**
2004-2007 vs. 2008		(-)	(-)	(-)	(+)	(+)	(+)	(-)	(-)	(-)
2000-2003 vs. 2008		(+)	(+)**	(+)**	(-)**	(-)***	(-)*	(-)**	(-)**	(-)**

Table VIII
COVENANT HEADROOMS

The table presents the development of leverage covenant headroom over the four years following a buyout as well as the headrooms of three other financial covenants one year after loan inception. The sample includes 130 PE sponsored LBOs and recapitalizations completed between July 2000 and August 2008 in Germany. The bottom panel of the table presents Wilcoxon rank-sum tests used to compare the values of the variables in three distinct time periods. (+) and (-) signs indicate the direction of the time trend. *, **, and *** indicate whether the Wilcoxon rank-sum test is statistically significant at 10 percent, 5 percent, and 1 percent levels, respectively.

Deal year	Statistics	Leverage covenant	Leverage covenant	Leverage covenant	Interest cover	Interest cover	Interest cover	Cash flow cover	Cash flow cover	Cash flow cover
		headroom	headroom	headroom	covenant headroom	covenant headroom	covenant headroom	covenant headroom	covenant headroom	covenant headroom
		in t=1 (as %)	in t=2 (as %)	in t=3 (as %)	in t=1 (as %)	in t=2 (as %)	in t=3 (as %)	in t=1 (as %)	in t=2 (as %)	in t=3 (as %)
2000	Median									
	n									
		<i>Not shown here for anonymity reasons. Available to reviewer</i>								
2001	Median	20.15	22.46	19.16	21.97	21.12	26.58	50.97	34.41	26.37
	n	2	2	2	2	2	2	2	2	2
2002	Median	25.10	27.89	31.36	20.38	20.71	24.54	24.83	27.50	31.40
	n	6	6	6	6	6	6	6	6	6
2003	Median	19.80	22.68	38.19	30.59	39.92	51.90	23.62	27.68	39.92
	n	5	5	5	5	5	5	5	5	5
2004	Median	25.10	26.90	28.00	25.70	26.20	24.40	33.32	29.33	30.70
	n	20	20	20	19	19	19	18	18	18
2005	Median	20.83	23.86	26.67	20.54	20.87	21.36	28.49	28.31	32.77
	n	27	27	27	22	22	22	28	28	28
2006	Median	21.17	24.00	30.00	24.44	25.79	28.43	34.16	31.25	28.30
	n	29	29	29	19	19	19	29	29	29
2007	Median	25.37	26.46	30.06	25.95	25.93	28.13	27.89	30.14	32.89
	n	27	27	26	21	21	21	27	27	27
2008	Median	23.56	25.00	25.00	22.45	25.00	25.22	28.99	27.54	39.39
	n	7	7	7	7	7	7	7	7	7
Total	Median	22.61	25.48	28.41	23.90	25.00	26.09	28.57	29.81	31.97
	Std.	88.84	11.79	14.50	10.76	10.63	12.42	16.05	11.73	12.50
	n	124	124	123	103	103	103	123	123	123
Time trend:										
2000-2003 vs. 2004-2007		(+)	(+)	(-)	(+)	(-)	(-)**	(+)	(+)	(+)
2004-2007 vs. 2008		(-)	(-)	(-)	(-)	(-)	(-)	(-)	(+)	(+)
2000-2003 vs. 2008		(+)	(-)	(-)*	(+)	(-)	(-)*	(+)	(+)	(+)

Table IX
COVENANT PECKING ORDER

The table presents the means and medians of leverage covenant, interest coverage covenant, and cash flow coverage covenant in our sample of 130 PE sponsored LBOs completed between July 2000 and August 2008. The t-values at the right hand-side show the results of mean comparison results between the different types of headrooms. The bottom panel presents the results of Mann-Whitney tests comparing headrooms in one year (t = 1) and three years (t = 3) after completion of transaction. *, ** and *** indicate p-values of 10 percent, 5 percent, and 1 percent, respectively.

Forecasted year	Statistics	Headroom Mean and Median			t-values		
		Leverage (as %)	Interest cover (as %)	Cash Flow Coverage (as %)	Cash flow vs. Leverage t-value	Interest cover vs. Leverage t-value	Cash flow cover vs. Interest cover t-value
t=1	Mean	23.8	24.8	31.3	5,1 ***	2,1 **	3,8 ***
	Median	22.6	23.9	28.6			
	<i>n</i>	124	103	123			
t=2	Mean	27.6	25.9	30.6	2,6 ***	0.5	3,0 ***
	Median	25.5	25.0	29.8			
	<i>n</i>	124	103	123			
t=3	Mean	31.9	28.4	33.1	1.0	-0.6	2,4 ***
	Median	28.4	26.1	32.0			
	<i>n</i>	123	103	123			
t=3 versus t=1	z-scores	5.25 ***	2.67 ***	1.82 *			

Table X
REGRESSION RESULTS LEVERAGE COVENANT HEADROOM

The table presents the results of ordinary least squares regressions with heteroskedasticity-consistent standard errors on the determinants of leverage covenant headroom using a sample of 130 PE sponsored LBOs and recapitalizations completed between July 2000 and August 2008. Leverage headroom is the permitted percentage reduction of forecasted EBITDA before breaching the leverage covenant. For each transaction we select the tightest leverage headroom of the first two years following the transaction as the measure of maximal restrictiveness. Private Equity group (PEG) assets under management are the aggregated funds raised within the five years prior to the transaction in billions of € as reported by ThomsonVentureEconomics. In case more than one PE sponsor is involved in the transaction, it is resorted to the largest sum of funds raised. Profitability is measured by return on sales defined as the EBITDA to sales ratio as of transaction year. We use the projected compounded average growth (CAGR) rate of EBITDA from transaction year to the following three years as measure of growth opportunities. Small cap deals are those with a total transaction value (equity plus net debt plus transaction costs) of less than €100m, mid cap deals (the reference category) range from €100m to €500m, and large cap deals exceed €500m. Leverage is defined as net debt to EBITDA ratio at transaction. Net debt equals total debt less cash and cash equivalents. The bold numbers in the upper rows represent the regression coefficients. *, ** and *** indicate p-values of 10 percent, 5 percent, and 1 percent, respectively. In the lower rows the detailed p-values are reported.

Parameter	(1)	(2)	(3)	(4)	(5)
<i>Sponsor-related Factors</i>					
PEG Assets under management	0.0021 *** 0.0058	0.0021 *** 0.0040	0.0019 *** 0.0051	0.0018 ** 0.0131	0.0015 ** 0.0307
<i>Target-related Factors</i>					
Profitability		0.1754 * 0.0918		0.1932 * 0.0584	0.1949 * 0.0589
Projected EBITDA growth			0.2674 ** 0.0114	0.2878 *** 0.0059	0.2976 *** 0.0051
Small Cap					-0.0009 0.9509
Large Cap					0.0062 0.6281
<i>Transaction-related Factors</i>					
Leverage	-0.0069 0.1036	-0.0070 * 0.0755	-0.0086 * 0.0505	-0.0088 ** 0.0323	-0.0093 ** 0.0338
<i>Macroeconomic Factors</i>					
Credit risk spread (as %)	-0.0016 0.5322	-0.0014 0.5724	-0.0026 0.3006	-0.0022 0.3040	-0.0027 0.2360
Constant	0.2647 *** 0.0000	0.2338 *** 0.0000	0.2499 *** 0.0000	0.2147 *** 0.0000	0.2158 *** 0.0000
Observations	120	119	119	118	118
F- value	3.3081	3.2946	4.4826	4.0074	3.0264
R squared	0.0472	0.1201	0.1144	0.2007	0.2022
R squared (adjusted)	0.0225	0.0892	0.0834	0.1650	0.1514

Table XI**LARGEST PRIVATE EQUITY GROUPS INCLUDED IN DATA SET**

The table shows the aggregated funds raised from 2000 to 2008 of the 20 largest PEGs in the sample in million €. Funds raised were aggregated from ThomsonVentureEconomics. Additionally the table reports the number of deals included in our sample of these 20 largest PEGs.

Ranking of PEG	Raised Funds 2000-2008	Number of Deals in Sample
<i>number</i>	<i>bn€</i>	<i>no.</i>
1	37	1
2	33	3
3	31	6
4	30	7
5	24	3
6	18	4
7	17	3
8	16	4
9	15	5
10	15	1
11	15	4
12	10	2
13	10	1
14	10	5
15	10	1
16	10	3
17	9	7
18	8	4
19	8	5
20	7	1

Table XII**REGRESSION RESULTS INTEREST COVERAGE AND CASH FLOW COVERAGE COVENANT HEADROOM**

The table presents the results of ordinary least squares regressions with heteroskedasticity-consistent standard errors on the determinants of leverage covenant headroom using a sample of 130 PE sponsored LBOs and recapitalizations completed between July 2000 and August 2008. Interest coverage covenant headroom is the permitted percentage reduction of the ratio of forecasted EBITDA to interest payments before breaching the interest coverage covenant. For each transaction we select the tightest interest coverage headroom of the first two years following the transaction as the measure of maximal restrictiveness. Private Equity group (PEG) assets under management are the aggregated funds raised within the five years prior to the transaction in billions of € as reported by Thomson Venture Economics. In case more than one PE sponsor is involved in the transaction, it is resorted to the largest sum of funds raised. Profitability is measured by return on sales defined as the EBITDA to sales ratio as of transaction year. We use the projected compounded average growth (CAGR) rate of EBITDA from transaction year to the following three years as measure of growth opportunities. Small cap deals are those with a total transaction value (equity plus net debt plus transaction costs) of less than €100m, mid cap deals (the reference category) range from €100m to €500m, and large cap deals exceed €500m. Leverage is defined as net debt to EBITDA ratio at transaction. Net debt equals total debt less cash and cash equivalents. The bold numbers in the upper rows represent the regression coefficients. *, ** and *** indicate p-values of 10 percent, 5 percent, and 1 percent, respectively. In the lower rows the detailed p-values are reported.

Parameter	Interest coverage headroom	Cash flow coverage headroom
<i>Sponsor-related Factors</i>		
PEG Assets under management	-0.001 0.426	-0.001 0.722
<i>Target-related Factors</i>		
Profitability	-0.010 0.885	0.204 0.156
Projected EBITDA growth	0.482 0.018	0.138 0.553
Small Cap	0.084 ** 0.023	-0.003 0.902
Large Cap	0.035 0.141	0.032 0.267
<i>Transaction-related Factors</i>		
Leverage	-0.015 ** 0.015	-0.024 *** 0.000
<i>Macroeconomic Factors</i>		
Credit risk spread (as %)	-0.013 *** 0.005	-0.011 * 0.064
Constant	0.274 *** 0.000	0.338 *** 0.000
Observations	101	122
F- value	2.851	2.867
R squared	0.091	0.130
R squared (adjusted)	0.043	0.076