An Empirical Analysis of the Relation between the Leverage Levels of Private Companies and Leveraged Buyouts and their Leverage Determinants

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Abstract

This paper makes an empirical comparison of leverage levels for Leveraged Buyouts (LBOs) and private companies. We match groups of private companies to recent European LBO transactions and construct a second partly overlapping sample where we match LBO transaction leverage data to their pre-LBO values. In a one-variable regression we find no relation between the leverage levels between private companies and LBOs. However, we do find a relation between pre-LBO and LBO leverage, if leverage is measured as Debt/EBITDA. Analyzing the leverage determinants we find that company characteristics play an important role in the leverage decisions of both the private and the pre-LBO companies, whereas credit market conditions seem to be the most important factor in LBO leverage decisions. The conclusion is in line with previous findings that LBOs take other factors into consideration in their leverage decisions than do non-LBO companies.

Key Words: Leverage, Private Company, Leveraged Buyout
Tutor: Associate Professor Ulf Axelson
Presentation Date: June 11th, 2009
Discussants: Christoffer Geijer and Christofer Nordlander

Acknowledgements: We would like to thank Ulf Axelson for his guidance and advice. We would also like to thank Per-Olov Edlund for his support in econometrical issues.

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I. Introduction

A Leveraged Buyout (LBO) is a transaction type that has become increasingly prevalent over the past 20 years. In the current economic environment with little supply of capital and a falling customer demand, the LBOs' use of high financial leverage is really put to the test. To take the Nordic region as an example, in Sweden we have seen two large LBO companies, Plastal and Thule, having to be handed over from their LBO sponsors to the banks since the two companies could not meet their debt obligations. According to an analysis presented in the Swedish newspaper *Dagens Industri* (2009), as many as an additional 30 large Nordic LBOs were in danger of bankruptcy. Further, a report from *The Boston Consulting Group* and *IESE Business School* (2008) predicts that as much as 40 percent of the global LBO investments may go bankrupt. This situation makes the leverage choices among the LBOs an interesting and highly relevant topic. Whereas previous research has examined leverage decisions by comparing LBOs with publicly traded companies, we compare the LBOs with a much more common legal form of companies that similarly to LBOs is not publicly traded, namely private companies.

The objective of this paper is to analyze the leverage of LBOs and contrast it to that of private companies. We will analyze it in two ways: first, we will investigate whether there is a relation between the leverage levels and second we will analyze the leverage determinants of the two types of companies. Additionally, we will perform a thorough analysis of our data set, since it is new and one of relatively few pan-European private company datasets.

Throughout the paper, an LBO is defined by us as an acquisition of a controlling stake in a company by an LBO sponsor using a significant portion of leverage in the financial structure of the transaction.[1] A sponsor is the private equity fund or funds making the investment, and typically consists of a general partner (GP) and limited partners (LP). The GPs are in control of the sponsor, whereas the LPs often have contributed most of the fund's capital. The GP's are normally heavily incentivized to improve the value of the investments as they get 20 percent of the value increase when the investment is divested. A private company is defined by us as a company that does not have equity listed on any exchange, is not a subsidiary of a public company and does not fall into the definition of an LBO.

[1] The definition is similar to the one used by Axelson et al. (2007)

In order to perform our testing we construct a new sample of private companies using Bureau van Dyke's Orbis database. The basis for this work is a sample of LBO transactions from the Loan Pricing Corporation. We then match the private companies to the LBOs based on size, country, year and Fama-French industry. The resulting dataset consists of information on 661 private companies from eight European countries matched to 76 LBOs from the time period 2002-2007. Irrespective of country and in accordance with our expectations, the leverage used by LBOs as measured as both Debt/EBITDA and Debt/Assets is significantly higher than the leverage of private companies. Comparing the private company leverage for different countries, companies in the UK seem to be using higher leverage than the rest of the sample, while companies in France seem to be using less. We also construct a sample partly overlapping the private company and LBO sample consisting of 50 observations in which we have both the pre-LBO and LBO leverage. Out of these observations, 29 have pre-LBO data on the company characteristics.

To test leverage levels we run one-variable standard OLS regressions, corrected for heteroscedasticity, and let the LBO leverage be explained by private company leverage and pre-LBO leverage, respectively. We use Debt/EBITDA and Debt/Assets as leverage measures. Using the private companies, the results are the same regardless of measure; there is no relation between the LBO and private company leverage. The result did surprise us, but the result is in line with previous findings regarding the relationship between LBO and public company leverage. We also tested to see if there is a relation between pre-LBO and LBO leverage. In this case the results varied depending on the leverage measure; for Debt/EBITDA we did find a relation but for Debt/Assets we did not.

Comparing the results for the two samples used, the first relation suggests that LBOs set their capital structure for different reasons than do private companies whereas the second relation suggests otherwise. The results are not mutually exclusive however, since the pre-LBO sample does not only consist of private companies but also of public companies and secondary buyouts.

To further investigate the somewhat ambiguous leverage relation results we analyze the leverage determinants, as measured by Debt/EBITDA, for private companies and for LBOs and compare the results. First we investigate the leverage determinants for private companies, then for LBOs, and then finally we compare the results. We run two types of regressions for the private companies. In the first we use a dataset of the median values among the private

companies matched to a certain LBO, and in the second we use the individual private company observations. The variable that appears as consistent using both data sets is EBITDA volatility, predictive of less leverage. The variable is included as a proxy for cash flow volatility. As for the LBO debt determinants, we also use two different methods. First, we let the company characteristics of the private companies we matched to a certain LBO transaction explain the LBO leverage. The reason for doing so is that data on the LBO company characteristics in general is very difficult to obtain. Second, we were able to obtain pre-LBO characteristics for a relatively small sample of LBOs and use this data to explain the LBO leverage. Regardless of method the most important determinant for the LBO leverage seems to be the real cost of borrowing, proxied by the local LIBOR rate less inflation and adding the US high yield spread.

The objective of this paper is not to find the explanations for the differences found. Nonetheless, we present a number of *possible* explanations for the results. Starting with the cash flow volatility, one reason could be that LBO sponsors care less about cash flow volatility since they can inject additional capital to an investment if it should be needed, whereas a private company might find it more difficult to obtain additional financing. An explanation for the relevance of the current borrowing cost is that LBOs lever up as much as the current cash flow can support. The reason for this would be for the GPs at the LBO sponsors to lever up the option-like claim they have on their investments through the 20 percent performance fee, thereby increasing its value. Since the management of private companies is not likely to have the same type of reward structure, this would explain the absence of any levering-up in their companies. A less cynical explanation for the relevance of the borrowing costs in LBOs would be that the LBO sponsors optimize the LBO's capital structure and thereby its value given the credit conditions at the time of the transaction.

The implication of these explanations is that economic conditions, such as the current crisis would affect LBOs more adversely than it would affect private companies. The strategy to inject additional capital to an investment if needed, might work very well if only one or a few of a sponsor's investments require injections. However, this will hardly work if a large number of investments need additional capital at the same time. Also, a capital structure that is optimized for a certain credit environment might be very far from optimal when the credit conditions change. The less optimized capital structure of private companies would more easily sustain a changing environment.

The remainder of this paper is structured as follows; in Section II we present some basic corporate finance theory and previous empirical findings; in Section III we describe our methodology and how we obtained our data; Section IV presents some basic descriptives of our data sample and performs some initial testing; Sections V and VI contain the results and analysis of the leverage levels and debt determinant comparisons, respectively. Finally, Section VII concludes and summarizes the paper, as well as suggests areas of interest for future research.

II. Theory

In this section we present a brief overview of basic corporate finance theory and comment on previous empirical findings that are relevant for this paper. Most of the theory presented is not directly applicable to our paper but we believe it is important to understand the underlying ideas and the reasoning throughout the paper. To avoid boring the reader, we try to keep this section short and provide a more extensive presentation of the theories in Appendix B.

The academics have identified two major factors that should affect a company's choice of leverage. The first is the favorable tax treatment of debt and the second is given by agency theory. Miller and Modigliani (1958) show that if one assumes perfect capital markets there is no optimal capital structure and the choice between equity and debt becomes irrelevant. However, when corporate taxes are introduced, the debt has a positive effect on the company's value since interest expenses are tax deductible, and taken to the extreme the optimal capital structure is close to all debt and no equity. One factor balancing this is the cost of financial distress, presented by Myers (1977) among others.

There is a rich literature describing agency theory; the potential problems caused by informational asymmetries between owners/investors and managers and how the use of debt can mitigate these. Myers (1977) shows that companies with relatively large future opportunities should use less debt. Jensen and Meckling (1976) point to the fact that companies that can change their business relatively easily also should use less debt, and Grossman and Hart (1983) show that debt can be used to force managers to pay out company cash flows to investors. Finally, Myers and Majluf (1984) introduce information asymmetry costs for company's raising capital, leading to the prediction that equity will be the last resort as a financing choice whereas self-generated funds will be the most favored choice. We refer to Appendix B for a closer description of these and a few additional theories.

Applying the concepts to an LBO setting introduces one more relation that is exposed to agency problems, that between the GPs that control the funds and the LPs that have invested most of the funds' capital. Given the LBO funds' structure and the GPs' largely incentive based rewards, there is not a complete alignment of interest between the GPs and LPs. An industry standard seems to be that GPs get 20 percent of the increase in value of the investment at the time of the divestment.[2] This gives the GPs an option-like claim on the underlying asset (the company); increasing the volatility of the underlying asset will all else equal increase the value of the option. This type of problem will not be the focus of this paper, but will be helpful when trying to explain our results.

A. Previous Findings

Axelson et al. (2007) used a sample of 153 American and European LBOs from 1985 to 2006. They did an empirical investigation of the relationship between the leverage of public companies and LBOs, and also investigated LBO debt determinants. To their surprise, they found no relation between the leverage of public companies and LBOs. Additionally, the leverage determinants seemed to differ a lot between the two types of companies. For public companies industry return volatility and growth options were found to be the strongest leverage predictors whereas no company specific variables appeared as significant for the LBOs. The factors which most strongly affected the LBOs' leverage were the credit market conditions, particularly the real borrowing cost.

Axelson et al. (2007) used a methodology very similar to ours, matching public companies to the LBOs to generate their sample. However, there are a number of ways in which our paper differs from theirs. Most notably, we use private companies instead of public companies. This results in a slightly different matching procedure and we also have to use different proxies than do Axelson et al., since the available data is not as extensive for private companies as it is for public. Also, we use a larger set of LBOs, which is entirely focused on recent years (2002-2007) and on European observations. The reason we believe that the tedious work of constructing a private company data set would be worth the effort was that it would give

[2] See for instance Fenn et al. (1995)

us the opportunity to expand on their LBO research findings by comparing the transactions to a company form much more prevalent and perhaps more comparable than public companies.[3]

III. Data and Methodology

The data we use has been obtained from two sources; Bureau van Dyke's Orbis database and data from the Loan Pricing Corporation (LPC). We use Bureau van Dyke's Orbis database to get information on our private and public companies as well as for the pre-LBO observations. The database incorporates corporate information from national agencies into a global database and re-classifies the information to fit a standard format. To obtain data on LBO transactions we use information provided by LPC.[4] In addition, we include data on corporate tax rates, local LIBOR rates and inflation rates as well as the US high yields spread.

In the data construction of our private company dataset we used the LBO transactions from the LPC as a starting point. If a particular LBO-transaction could be matched with a group of at least five private companies within an estimated enterprise value range of 75 percent smaller and up to 150 percent larger in the same Fama-French industry,[5] for the same country, and with data for the same year as the LBO transaction, we included the LBO and the private companies in our sample. We estimated the private company enterprise value using average enterprise value over book value ratios for public companies in the same Fama-French industry, year and continent. The reason for not using the LBO asset value as a starting point instead of the enterprise value is that such data was often missing. In the cases where we could find more than ten private companies that fit the criteria we used the ten companies with the estimated market values closest to the market value of the LBO transaction.

The public company dataset that we used for robustness check purposes was collected in much the same way as the private company sample. The only difference was that the median asset value of the private companies was used as a starting point for the size range.

As for the pre-LBO data, we once again used the LBO transaction data from LPC as a starting point. We went through all LBO transactions that were in line with the rest of our data with respect to time period and country to find pre-LBO characteristics in Orbis. This data formed a pre-LBO data set, including pre-LBO leverage and in some cases also additional

[3] Neither LBOs nor private companies are affected by the agency problems associated with dispersed ownership
[4] The LPC data is partly overlapping the sample used by Axelson et al. (2007)
[5] We use the Fama-French 48 industry classifications, information on the classifications can be found on http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/

balance sheet and income statement data from the year before the transaction occurred. We were also able to compile data on the debt over total assets ratio after the transaction for a relatively small number of LBOs.

Generating the data set with the LBO transactions as a basis may result in a bias in the private company data. Ideally we would have wanted to test whether the data is unbiased or not by comparing it with a randomly generated private data set containing the same variables as we collected. Unfortunately, we have not been able to access such a data set and constructing it ourselves for this purpose was not possible within the frame of this paper.

The resulting data covers the years 2002 to 2007, with the main bulk of observations from 2004 and onwards. The reason for the time span and the weighting towards the latter years is that it gets increasingly difficult to obtain information from Orbis the further back in time we go, especially for private companies. Geographically, the sample covers eight countries in Europe, with a clear weighting towards France and the UK. The reason for this is that it is much easier to match a group with at least five companies since these two countries have a relatively larger number of companies. The reason that the data is limited to Europe is the poor availability of private company data for other parts of the world.

We collect balance sheet and income statement data from Orbis. From the balance sheet we include; *total assets*, *intangible fixed assets*, *tangible fixed assets*, *long term debt*, *other non-current liabilities*, *loans*, *creditors* and *other current liabilities*. From the income statement we include; *turnover*, *depreciation* and the five year history for *EBITDA* and *return on capital employed*. In cases when the companies had gaps in their five year history we estimated the gap values by using the median of the other years. However, if a company had missing data for more than two years we excluded it from our sample. From LPC we get the LBO data on *Debt/EBITDA*. The dataset also includes corporate tax rates as well as local LIBOR and inflation rates and the US high yield spread. The descriptive statistics will be presented in Section IV.

There are two aspects of how we treat the data that we find worth mentioning. First, in much of our testing we use something we call matched medians, this is the median values for a group of observations matched to a particular LBO transaction. The advantage of using matched medians is that much of the extreme values are automatically sorted out, whereas the disadvantage is that the number of observations decreases substantially. Second, using Debt/EBITDA as the leverage measure comes with a few drawbacks. For instance, a negative

multiple would strictly mathematically be interpreted as a very low leverage, even if the case in reality is the opposite. To account for this we reset all negative individual values to high positive values in the groups of matched medians, to increase the median value, and exclude all negative multiples when using individual observations.[6] Further, a low EBITDA in a single year can severely inflate the multiple; therefore we exclude all Debt/EBITDA values above 10.

IV. Descriptives

In Tables I to IV, we report descriptive statistics for our sample of LBOs and for the private companies we were able to match to these LBOs. The total number of LBOs that we were able to match is 76, resulting in a sample of 76 LBOs and 76 groups of matched private companies consisting of 661 individual private companies in total. The country distribution for the sample is reported in Table I; 30, 26 and 18 percent are made up by UK, France and Germany respectively. The country distribution for the individual observations is similar to the distribution of the grouped medians.

Table II reports descriptive statistics on how the observations are distributed over time. The sample displays a distribution with a fairly even spread between 2004 and 2007 and with a smaller emphasis placed on 2002 and 2003; the two years only represent 18 percent of the total sample. The individual company observations again show a similar distribution.

The distribution of the Fama-French industries is reported in Table III, 22 industries out of 48 are represented. Even though the distribution is fairly even across the industries, industry groups 21("Machinery") and 43 ("Restaurants, Hotels and Motels") stand out, each making up 9.2 percent of the total sample.

The average and median sizes of the companies are reported in Table IV. The average asset values in USD terms for the individual private observations is about 316 and ranging from 0.028 to 2,800 million. The average *enterprise* value for the LBOs is higher at USD 768 million, ranging from 81 to 3,400 million.

One potential source of bias in our samples is that such a large part of the data is from the UK and France. For instance, this might be problematic if the accounting rules differ between countries, resulting in numbers that are not entirely comparable. However, we do believe that we mitigate this risk by only including observations from countries in the European Union.

[6]The values are set to 1000 which is substantially higher than the median thereby affecting the median upwards

Another potential bias is towards the latter years in the time series, as we have a relatively smaller number of observations for 2002 and 2003. In the analysis in Sections V and VI we will include macro variables and country dummy variables to capture any effects caused by this slight imbalance in the data distribution.

Apart from the private company sample and the LBO sample we also use a pre-LBO sample and a public company sample for some specifications. Tables V and VI present some country and time statistics of the two samples. For the pre-LBO observations, most of the observations are from the UK (44 percent); France (18 percent) and Germany (12 percent). The sample is relatively evenly spread through the 2004-2007 period and only 10 percent of the sample is from 2002-2003. The public company data is even more focused country wise with 50 percent of the observations from the UK and 30 percent from France. The years 2003-2004 represent between 15 and 25 percent each whereas only 4 percent is from 2002.

A. Private Company Leverage

Since our sample is one of relatively few pan-European private company samples, we spend this subsection taking a closer look at the private company leverage data.

Starting in column one of Table VII we present the leverage measures for the individual companies and grouped medians. For individual companies, median Debt/EBITDA is 0.99 while the average is 1.97. For Debt/Assets the median is 15.7 percent and the average value is substantially higher at 25.1 percent. Regardless of leverage measures the table shows rather large differences between median and average, indicative of many observations with relatively high values. Moving on to the grouped median sample, its median Debt/Assets is in line with the value of the individual companies, but it has a substantially higher median Debt/EBITDA at 1.84. The differences between the median values and the average values are much smaller for the matched median sample since the median methodology sorts out many of the extreme values.

In columns 2 to 9 in Table VII we present the leverage measures by country. For the individual company sample the median Debt/EBITDA is in the range 0.04 to 2.64 while the median Debt/Assets is in the range 1.0 to 44.4 percent. One observation is that companies from Germany and France seem to have relatively low leverage while companies from Belgium and UK seem to have higher leverage.

We perform a formal investigation of company leverage for different geographies using the non-parametric Mann-Whitney *U* Test and report the results in Table VIII.[7] As already indicated in Table VII, we find that the leverage of the UK companies is significantly higher than the leverage used by French companies. The leverage used in the UK is also higher than the one used in non-French and non-UK companies. Further, we find that the French companies in our sample have a lower leverage than non-French and non-UK companies. The results are significant at the one percent level and hold regardless of leverage measure and whether we use individual observations or matched medians. We would like to emphasize that *this does not automatically mean that companies in some countries use less leverage than companies in other countries per se* since we have not controlled for company specific or macro factors.

Table VII also presents leverage measures by year. In the individual company sample, the median Debt/EBITDA ranges between 0.62 to 1.54 while median Debt/Assets is between 12.8 to 30.4 percent. The respective average values have somewhat larger ranges of values. In the grouped median sample the median Debt/EBITDA is somewhat wider while the Debt/Assets range is narrower. Two years stand out from the rest, 2002 seems to the lowest leverage regardless of measure and the use of sample and 2004 seems to have the highest leverage in most specifications.

Performing the same formal test as we did for country differences and reporting the results in Table IX we see that the leverage for 2002 is indeed significantly lower than for both 2004 and non-2002 and non-2004 leverage. Comparing the 2004 leverage with non-2002 and non-2004 leverage we see that Debt/Assets in the individual company sample is statistically larger, but not for any of the other specifications. If macro factors such as borrowing costs and tax rates are important determinants in the leverage decision, then this pattern would likely emerge. Whether this is really the case or not will be further investigated in Section VI. Another potential reason for the observed differences is that we have a country-bias in our sample, for the 2002 data roughly 80 percent of the observations are from the "low-leverage countries" France and Sweden.

[7] The Mann-Whitney test is performed by ranking the observations of two samples for which one wants to test if there is a significant difference in expected values. The reason for using a non-parametric test is that we cannot specify the stochastic distribution of the leverage data. For a more thorough explanation of the test we recommend reading Newbold et al. (2003) pages 543-547

B. LBO Leverage

In Table X we present the leverage for the LBO transactions. The median Debt/EBITDA is 4.75 with an average very close to it at 4.88, indicating that there are not many outliers in the set. There seems to be a difference across countries, where Spain and Italy have the highest leverage and France and Sweden the lowest. There also seems to be some time variation in the leverage used, with an increasing trend in the leverage from 2002 to 2007. Performing formal tests of these indications confirm that there are significant differences in the leverage levels, as can be seen in Table XI. The UK observations have significantly higher leverage than French observations. The French observations also have significantly less leverage than non-UK and non-French observations. As for year differences, the leverage levels in 2007 are significantly higher than the 2002 leverage levels. However, just as a reminder, we have not explicitly controlled for any macro or company specific factors and the results should therefore be interpreted with caution.

We were able to get information on book assets for 27 of the LBOs and get a median of 125.6 percent and an average of 140.7 percent. It may seem strange to have debt representing more than 100 percent of book asset values but it is an effect of our data collection methodology. Since there are strong reasons to suspect that LBO companies revise their book values upwards following the LBO we use the asset values prior to the transaction to avoid a potential accounting-bias.

C. Comparisons of Private Company and LBO Leverage Levels

To make a preliminary comparison of the relation between private company and LBO leverage, we take a look at the leverage levels in our sample, using the same non-parametric testing as in subsection *A*.

We report the results of the formal tests investigating whether LBO leverage is higher than private company leverage in Table XII. Unsurprisingly, regardless of leverage measure and geography, we find the leverage in LBOs to be significantly higher than in private companies.

It should be noted that, as in *A.* and *B.*, we have not explicitly controlled for company specific or macro factors and therefore the results might be a result of these factors and not a result of whether a company is classified as private or LBO.[8]

V. The Relation of LBO Leverage Levels to Private Company and Pre-LBO Leverage

The statistical testing of our sample in Section IV revealed, as expected, that the leverage used in LBOs is significantly higher than the leverage used by private companies. This leads to the question whether there is a relation between the leverages, which is what we analyze first. Then we also investigate if there is a relation between the LBO leverage and the leverage that the target had prior to the LBO, the pre-LBO leverage.

To investigate the LBO and private company relation we use the matching procedure described in Section III. That is, we match every LBO transaction in our sample with a group of at least five private companies based on year, country, industry and size, as described more in detail in Section III. Then we use the median values from the group of private companies to match them with the LBO.

We use Debt/EBITDA as our measure of leverage and run the regression:

(1) $$\left(\frac{Debt}{EBITDA}\right)_{LBO} = \alpha_0 + \alpha_1 \left(\frac{Debt}{EBITDA}\right)_{private} + \varepsilon_i$$

The results are reported in Table XIII and are also shown as a scatter plot in Figure I. As can be seen in the figure, there appears to be no relation between the contrasted Debt/EBITDA multiples. The results are confirmed by the regression. The coefficient of the private company Debt/EBITDA is positive but very close to zero and insignificant. The R^2 is close to zero, at 0.006. The intercept is significant though, indicating the same as the statistical testing in Section IV did, that the leverage of LBOs is higher than that of private companies.

For a smaller part of our sample we were able to collect information on the Debt/Assets percentage as well. We re-run Specification 1, replacing Debt/EBITDA with Debt/Assets to see if the results remain using another leverage measure:

[8] Our matching procedure should have controlled for these factor to some extent, but not fully

(2) $$\left(\frac{Debt}{Assets}\right)_{LBO} = \alpha_0 + \alpha_1 \left(\frac{Debt}{Assets}\right)_{private} + \varepsilon_i$$

The results presented in Table XIV are in line with the results from Specification 1, the R^2 is 0.021 and the private leverage coefficient is insignificant. Once again the only significant variable is the intercept term, entering positive as expected.

There are at least two possible explanations for the results. First, if private companies and LBOs and/or their respective lenders considered the same factors when setting the leverage we would have expected to see a relation. Thus, the lack of a relation would indicate that the relevant factors differ between the two types of companies. Section VI will investigate the relevant factors further. The second explanation is that our matching procedure fails to match LBOs with private companies with similar characteristics. We do not believe that this is the case and present evidence indicating that the matching procedure does work in the robustness check subsection below.

Moving on to investigating the leverage relation between LBO and pre-LBO leverage, we build a partly new dataset, going through a sample of 249 LBO transactions and using all observations for which we can find the pre-LBO leverage. 50 observations have Debt/EBITDA measures for both pre-LBO and the actual LBO; of these 17 observations also have Debt/Asset values.

We start with the regression:

(3) $$\left(\frac{Debt}{EBITDA}\right)_{LBO} = \alpha_0 + \alpha_1 \left(\frac{Debt}{EBITDA}\right)_{pre-LBO} + \varepsilon_i$$

The result is presented in Table XV, the pre-LBO variable is positive and significant. Unsurprisingly, the intercept is also significant and positive. Thus, it seems like pre-LBO leverage predicts the level of LBO leverage, with an R^2 of 0.123.

Just as we did for the LBO and private company analysis we re-run Specification 3 using Debt/Assets instead of Debt/EBITDA:

(4) $$\left(\frac{Debt}{Assets}\right)_{LBO} = \alpha_0 + \alpha_1 \left(\frac{Debt}{Assets}\right)_{pre-LBO} + \varepsilon_i$$

As can be seen in Table XVI, the Debt/Assets variable is insignificant and the R^2 is lower than for Specification 3 at 0.062. It might seem surprising that the regressions show a relationship for leverage as measured by Debt/EBITDA but not when it is measured as Debt/Assets, one possible explanation for this has to do with the data used. The sample that has Debt/Asset values is much smaller than the Debt/EBITDA which does make it less likely for variables to appear as significant.

The results using the two different samples (LBO/private companies and LBO/pre-LBO) are somewhat contrasting, leaving any conclusions about the leverage relation hard to make. One reason for the difference in results is that not all pre-LBO values are from private companies. In fact, only 31 out of the 50 observations are private companies, the rest being public (16) and secondary buyouts (3).

A. Relation to Previous Empirical Findings

In their 2007 working paper Axelson et al. found no relation between the Debt/EBITDA for LBOs and a set of matched public companies. We believe that our results add to their findings by showing that there is no relation for Debt/EBITDA multiples between private companies and LBOs either. However, the results in our pre-LBO and LBO comparison are contradictory to the combination of the authors' and our findings regarding private and public companies. Since the pre-LBO transactions in most cases are public or private companies (a few are LBO's undergoing a secondary buyout), if there was no relation between either public company and LBO leverage, nor private company and LBO leverage, we would not expect to find a relation between pre-LBO and LBO leverage.

B. Robustness Checks

One potential reason for the non-relation result is that the matching procedure used does not match LBO transactions with private companies with similar characteristics. In order to partly rule out this explanation, we matched the private companies with public companies using the same matching procedure. Then we re-run the Specifications 1 and 2, letting the public company leverage be explained by the private leverage:

(5) $$\left(\frac{\boldsymbol{Debt}}{\boldsymbol{EBITDA}}\right)_{\boldsymbol{public}} = \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1}\left(\frac{\boldsymbol{Debt}}{\boldsymbol{EBITDA}}\right)_{\boldsymbol{private}} + \boldsymbol{\varepsilon_i}$$

(6) $$\left(\frac{Debt}{Assets}\right)_{public} = \alpha_0 + \alpha_1 \left(\frac{Debt}{Assets}\right)_{private} + \varepsilon_i$$

Assuming that the matching procedure matches companies with similar characteristics and that there is a relation between private and public company leverage we would expect to see significant private company coefficients and relatively high R^2 values.

We report the results in Tables XVII and XVIII. For both specifications the private company leverage coefficient is positive and significant, with R^2s of 0.08 and 0.29, respectively.

We interpret the result as a strong indicator that the matching procedure does work for matching private and public companies. We can find no credible reason for why the procedure should be better fitted for matching private companies to public than to LBOs. Therefore, we believe that the result also indicates that the matching procedure works in general. In connection to the analysis of debt determinants in Section VI we will perform further robustness checks on the matching procedure; the result once again strongly indicates that the procedure works.

Another way of testing the validity of the matching procedure would be to match the private company leverage with the pre-LBO leverage for the LBO transactions to investigate whether there is a relation between the two. If we found a pre-LBO leverage relation but no LBO relation, that would be clear evidence proving the robustness of our result. However, since the pre-LBO sample and private company samples are only partly overlapping, the resulting sample was too small to deliver any reliable results in this robustness check.

VI. Comparison of the Leverage Determinants for Private Companies and LBOs

In this section we take a closer look at the determinants of leverage choices for the LBOs as well as for private companies in order to be able to make a comparison of the two.

Depending on the type of company we investigate leverage determinants for we use slightly different versions of the regression:

(7) $$\begin{aligned} ln\left(\frac{Debt}{EBITDA}\right)_i = {} & \alpha_0 + \alpha_1(5\ Y\ Avg\ RoCE)_i + \alpha_2(RoCE\ Volatility)_i + \alpha_3(EBITDA\ Volatility)_i \\ & + \alpha_4\left(\frac{Tangible\ Assets}{Total\ Assets}\right)_i + \alpha_5 ln(Assets)_i + \alpha_6(Corporate\ Tax\ Rate)_i \\ & + \alpha_7(Credit\ Conditions)_i + D_{UK} + D_{France} + \varepsilon_i \end{aligned}$$

All regressions in this section are fairly simple OLS regression corrected for heteroscedasticity using White's correction. We would also like to point out to the reader that, strictly speaking, the error term should be normally distributed for the significance levels to be accurate, which is not the case in our data. However, this should be more of a technicality than a real problem in the interpretation of our results.[9] The reason for not including any Debt/Assets measures is that the LBO sample for which we both had Debt/Assets and company characteristics was too small to draw any conclusions from in this multivariable regression. Before presenting the results we explain the meaning and reason for inclusion for each variable and how it is calculated.

- *5Y Avg RoCE* is a proxy for company profitability. The expected sign of the variable depends on which theory we use. According to the pecking-order theory in which it is expensive to raise outside capital due to information asymmetries high past profitability should predict less leverage since the company would be able to finance itself with internally generated funds. The opposite is true looking at the tax shields first put forth by Miller and Modigliani (1963). Following this, high past profitability should predict high leverage since there are relatively larger tax gains to capture. The variable is calculated as average value of the return on capital employed over the five years ending at the year of the transaction.

- *RoCE Volatility* is included as a proxy for profitability volatility. High volatility should decrease the value of the debt tax shield since the likelihood of being able to capture the tax gains in each given year decreases, hence we expect the variable to affect leverage negatively. It is calculated as the standard deviation of the return on capital employed over the five year period ending with the year of the LBO transaction.

- *EBITDA Volatility* is a proxy of cash flow volatility. A more volatile cash flow makes it less likely that a company would be able to pay off its debt obligations in each year, increasing the likelihood of bankruptcy and thereby the costs of financial distress.

[9] This statement reflects the opinion of Associate Professor Per-Olov Edlund at the Center for Economic Statistics at Stockholm School of Economics, who we consulted regarding this matter

Therefore we expect it to enter as negative in the regression. The variable is calculated over the same time period as *RoCE Volatility*, and is standardized to be in percent rather than in USD terms.

- *Tangible Assets/Total Assets* is a proxy for information asymmetries and collateral. We would expect that companies with a high ratio would have a relatively large part of their value tied to those assets; this will make the growth option part of the value less important, thereby reducing the information gap between financiers and the company. It is also a good proxy for the available collateral in a company. Collateral should make uncertainty of the company's future less important for financiers since they can be paid in assets to cover their claims as predicted by Myers and Majluf (1984). Following this, we expect the variable to have positive effects on leverage.

- *ln(Assets)* is included as a proxy for company size. Previous papers have found size to be relevant for leverage and argue that size is a proxy for maturity (See for instance Farooqi-Lind (2006) and Titman and Wessles (1988)). Large, or mature, companies can be assumed to have more diversified businesses and should not be able to change business risk level as easily as less mature companies. In addition, Diamond (1989) argues that large and thereby older firms have built up a reputation that they want to conserve. These three factors should make information asymmetries smaller for larger companies. Therefore, we expect the variable to affect leverage positively. The variable is calculated as the logarithm of the book value of total assets.

- *Corporate Tax Rate* is included to account for the tax benefits that come with the use of debt. Since a higher tax rate indicates a larger tax relief using debt, we expect the variable to enter positively. The variable is calculated as the statutory corporate tax rate in the country of the LBO transaction. It is important to point out that the tax rate that should affect decision on whether to take on additional debt is the *marginal* tax rate. Unfortunately, it is very difficult to obtain for a company outsider and therefore we use the statutory tax rate to proxy for it.

- *Credit Conditions* is a proxy for real borrowing costs. It is calculated as the local LIBOR less the inflation rate for the country in which the LBO transaction occurred and adding to it the US high yield spread. Assuming that the cost of equity is fixed, we expect the variable to enter as negative. Admittedly, the assumption of fixed equity cost is a strong one, but measuring the cost of equity for private companies is very difficult, if at all possible.

- D_{UK} and D_{France} are country dummy variables for the UK and France respectively. We include them to control for potential country differences not captured by the other variables included since the analysis in Section IV gave us reason to suspect that there might be such differences. The reason for not including more country dummy variables was the result of a trade-off between consistent treatment of the data on the one hand and the desire to keep some degrees of freedom on the other hand.

A. Leverage Determinants for Private Companies

To test the leverage determinants for private companies we first run Specification (8):

(8)
$$\begin{aligned} ln\left(\frac{Debt}{EBITDA}\right)_{private} = {} & \alpha_0 + \alpha_1(5\,Y\,Avg\,RoCE)_{private} + \alpha_2(RoCE\,Volatility)_{private} \\ & + \alpha_3(EBITDA\,Volatility)_{private} + \alpha_4\left(\frac{Tangible\,Assets}{Total\,Assets}\right)_{private} \\ & + \alpha_5 ln(Assets)_{private} + \alpha_6(Corporate\,Tax\,Rate)_{private} \\ & + \alpha_7(Credit\,Conditions)_{private} + D_{UK} + D_{France} + \varepsilon_i \end{aligned}$$

The data set used is the groups of matched median values. As can be seen from the results of Specification 8, presented in Table XIX, the only significant company characteristic variable is *RoCE Volatility*, entering unexpectedly as positive. The other company characteristic variables (*5Y Avg RoCE*; *EBITDA Volatility*; *Tangible Assets/Total Assets* and *ln(Assets)*) enter with the expected signs but are insignificant. Though, it should be noted that *EBITDA Volatility* is close to being significant, with a p-value of 11.7 percent. *Credit Conditions* and *Tax Rate* are both insignificant, and *Tax Rate* enters as negative opposed to our prior expectations. The UK and the French dummies are both significant, with the UK entering as positive and the French dummy entering as negative. The R^2 is slightly more than 0.4.

We also re-run Specification 8 using the individual company observations instead of the matched medians. The benefit of using the individual observations is that the sample size increases from 76 to over 500 observations. Unfortunately, the data also becomes more idiosyncratic with more extreme values, which would otherwise have been filtered away by the median approach. As can be seen in Table XX, the larger number of observations results in more variables being significant. Most notably, *RoCE Volatility* is no longer significant but still positive and *EBITDA Volatility* and *Tangible Assets/Total* Assets are significant and with the expected signs. Also, *5Y Average RoCE* appears as significantly negative. This is the opposite sign compared with the result using the matched median sample, but in that case the variable was not significant. *Credit Conditions* and *Tax Rate* are still negative and insignificant, and the two country dummies are significant with the same sign as when using the matched median sample. Reflective of the more idiosyncratic individual data, the R^2 drops from 0.40 to 0.19.

To summarize the findings regarding private company Debt/EBITDA determinants, a few of the determinants seem to be consistent using both the matched median and the individual sample observations. Most notably, *EBITDA Volatility* is significant using the individual sample and has a p-value of 11.7 percent using the matched median, showing that it is an important factor regardless of sample. This indicates that the cash flow volatility plays a role in private company leverage decisions. Further, the country dummies are significant thorough-out. It indicates that there are country-specific factors that explain the leverage level. One such potential reason suggested by Giannetti (2003) among other, is creditor protection.

On the other side of the spectra, *ln(Assets);Credit Conditions* and *Corporate Tax Rate* are not significant in any case. Thus, the real cost of debt does not seem to predict the use of leverage in private companies. One last thing to comment on is that *RoCE Volatility* goes from being significantly positive using the matched median sample to becoming insignificant and negative for the individual observations. We can think of no explanation for why this variable is positive. A somewhat speculative suggestion for the result is that it is an effect of our methodology of taking the median values.

B. Leverage Determinants for LBOs

We analyze the debt determinants for LBOs in two ways. First we analyze the specification below:

(9)
$$\begin{aligned} ln\left(\frac{Debt}{EBITDA}\right)_{LBO} = {} & \alpha_0 + \alpha_1(5\ Y\ Avg\ RoCE)_{private} + \alpha_2(RoCE\ Volatility)_{private} \\ & + \alpha_3(EBITDA\ Volatility)_{private} + \alpha_4\left(\frac{Tangible\ Assets}{Total\ Assets}\right)_{private} \\ & + \alpha_5 ln(Assets)_{private} + \alpha_6(Corporate\ Tax\ Rate)_{private} \\ & + \alpha_7(Credit\ Conditions)_{private} + D_{UK} + D_{France} + \varepsilon_i \end{aligned}$$

We use the median values of the matched group of private companies as explanatory variables for all company characteristic variables in the specification. The reason for doing so instead of using the actual values is that the company characteristics of LBOs rarely are disclosed by the LBO sponsors.

The results for Specification 9 are presented in Table XXI. One company characteristic variable enter as significant; *ln(Assets)*, and it enters positively as expected. Three other variables also turn out as significant and negative; *Corporate Tax Rate*, *Credit Conditions* and the French dummy. We find the explanatory power of the model to be rather good, with an R^2 of 0.38.

We analyze the debt determinants further by running the specification below:

(10)
$$\begin{aligned} ln\left(\frac{Debt}{EBITDA}\right)_{LBO} = {} & \alpha_0 + \alpha_1(5\ Y\ Avg\ RoCE)_{pre-LBO} + \alpha_2(RoCE\ Volatility)_{pre-LBO} \\ & + \alpha_3(EBITDA\ Volatility)_{pre-LBO} + \alpha_4\left(\frac{Tangible\ Assets}{Total\ Assets}\right)_{pre-LBO} \\ & + \alpha_5 ln(Assets)_{pre-LBO} + \alpha_6(Corporate\ Tax\ Rate)_{pre-LBO} \\ & + \alpha_7(Credit\ Conditions)_{pre-LBO} + D_{UK} + D_{France} + \varepsilon_i \end{aligned}$$

For Specification 10 we construct a partly new sample of LBOs. Out of 249 LBO transactions provided by LPC, we use those transactions for which we can find pre-LBO company characteristics. The resulting sample consists of 29 observations. The results, presented in Table XXII, are very similar to the results in Specification 9. *Corporate Tax Rate* and *Credit Conditions* are still significant with the same signs as when we use the private company matched median sample. *ln(Assests)* is no longer significant but still positive. The R^2 is pretty high at

0.674. In the second column we present the results for a regression where the pre-LBO leverage is explained by pre-LBO characteristics. Worth noting is that neither *Corporate Tax Rate* nor *Credit Conditions* are significant.

Summarizing the results for LBO leverage determinants we see that *Corporate Tax Rate* and *Credit Conditions* are significant through-out, regardless of the sample used. The fact that a high *Corporate Tax Rate* seems to predict lower leverage is rather puzzling and opposed to what theory would predict. One possible explanation might come from the fact that the statutory tax rate does not vary much over the time span covered by our sample for any country. This gives the tax variable dummy-like characteristics, and if the countries in our sample with the lowest corporate tax rates also are the ones experiencing the highest LBO leverage that would explain our result. Indeed, for two of the countries than we did not include dummy variables for, Germany and Italy, that make up some two thirds of the private company sample excluding the dummy countries UK and France, this is exactly the case. Germany with a relatively high corporate tax rate has a lower median Debt/EBITDA (4.80) compared to the relatively low tax country Italy with a median value of (5.50). Potential reasons for this include institutional differences as well as the competitiveness in the LBO deals. Another explanation is that the variable is a bad proxy for the companies' marginal tax rate. The highly significant and negative *Credit Conditions* variable suggests that the real borrowing cost plays a large role in the LBO leverage decision. For *ln(Assets)*, we see two possible explanation for it being positive and significant using the private company matched median sample, indicating that larger LBOs use higher leverage. The first is a theory based explanation, also presented in the beginning of this section. This stated that larger companies are more diversified and have less growth options than smaller companies and therefore have a larger optimal leverage. In the beginning of this section another theory, which would predict positive *ln(Assets)* but that uses reputation as the argument therefore, is presented alongside the diversification and growth options. We would like to point to the fact that this theory is not likely to explain the positive variable in this case. The reason is that the relevant reputation in this situation might be the reputation of the LBO sponsor rather than the reputation of the company undergoing an LBO transaction.

The second explanation is that we may have an endogeneity problem in the variables. If there is a relation between pricing and leverage our matching procedure would make *ln(Assets)* appear relevant, even if it is not. The reason being that since the starting point in our procedure is

the enterprise value at the LBO, an expensive and thereby highly levered transaction would be matched against larger companies, as measured by the total asset value. Indeed, there is a rather strong and highly significant correlation between the Debt/EBITDA and Debt/EV in both the pre-LBO/LBO sample and the private company/LBO sample (not reported).[10]

C. Comparison of Leverage Determinants for LBOs and Private Companies

It is apparent from the results in subsections *A.* and *B.* that different factors seem to be relevant for the leverage decisions for the two types of companies. For LBOs the most important factor, that we find consistently negative and significant, is the real borrowing cost as proxied by *Credit Conditions*. Macro conditions do not seem to play a large part in the leverage of private companies, though. The variable that appeared as significant or close to being significant was *EBITDA Volatility*, included as a proxy for cash flow volatility.

One explanation for why the cash flow volatility might be of greater importance for private companies in the leverage decision than for LBOs has to do with the kind of owner for the respective type of company. LBO sponsors in general have relatively good access to cash and have possibility to inject more funds into a LBO. A private company, on the other hand, might not find it as easy to find financing and the cash flow volatility thereby gets more important as a factor.

We believe that the difference in the importance of the real cost of borrowing can have at least two different explanations. The first is that the capital structure of a private company is something that might have evolved over time, possibly centered on long-term target ratios,[11] whereas the LBO capital structure is a discrete decision. If we assume that the LBOs optimize their capital structure given current conditions, the current borrowing cost would of course be of importance. The other explanation, which in a sense is a continuation of the leverage optimization idea, also put forth by Axelson et al. (2007), is that the LBO takes on as much debt as its current cash flow can support. If so, the borrowing cost would matter since an LBO would be able to support more debt principal in relation to its cash flow if the interest that must be paid is low. Even if this strategy might not be optimal from an enterprise value perspective, it might still be optimal for the LBO sponsors. This is because their stake in the investments is mainly

[10] The correlation coefficient of the pre-LBO/LBO sample is 0.67. For the private company/LBO sample the coefficient is 0.62. Both are significant at the one percent level

[11] This idea is supported by Fischer et al. (1989)

their performance fee, normally 20 percent of the price increase from acquisition to divestment. This gives the LBO sponsors an option-like claim on their investments, and by levering the underlying asset (the company); they might increase the value of their option.[12] There are also incentives in place for lenders to lend more to a LBO than what might be optimal from the lenders perspective. The reason is that the employees of financial institutions are rewarded on a commission like basis for lending and also for the side business that might result from it.

A final explanations for the results suggested to us by practitioners is that there is a great emphasis in the LBO industry to be "top-quartile" in terms of investment returns. This LBO fund competition might be a reason for taking on leverage without considering the company characteristics.

In this paragraph we allow ourselves to speculate in some of the implications of the explanations above. In a situation where borrowing costs increase, re-financing becomes more difficult and general demand falls (much like the current situation) LBOs might be particularly exposed. Taking on leverage without taking into consideration the cash flow volatility and counting on being able to inject additional capital if needed might not work if several of a LBO sponsors investments need capital injections at the same time, there will simply not be enough capital available. Taking on as much leverage as the cash flow at the time of the transaction can support has the same implications. The more general explanation that the LBOs optimize the leverage given current credit conditions (general in the sense that it does not necessarily mean to optimize the value of the LBO sponsors performance option), also predicts largely the same. In this case, the supposed costs associated with the non-optimization of the leverage for private companies can be seen as insurance for changing conditions in the future. Their capital structure built up under different macro conditions might give the companies a better chance to avoid bankruptcy under future conditions.

[12] The argument should hold even if the LBO sponsors have invested their own money in the fund as well, as long as their investment does not make up 100 percent of the fund

D. Relation to Previous Research

In their comparison between public companies and LBOs Axelson et al. (2007) found that none of the company characteristic variables in a leverage cross-section were significant for the LBOs. The most important factor seemed to be the local real interest on levered loans, defined in the same way as we define our *Credit Conditions* variable. For the public companies, on the other hand, all company characteristic variables entered as significant, and the borrowing cost did not seem to matter at all. It should be noted, though, that we do not use the same company characteristics variables as them since we had to adapt the variables to the data available for private companies. All in all, their results are highly similar to ours and we believe that we add to them by showing that their results hold in a comparison with private companies as well.

E. Robustness Checks

As in Section V the validity of our results are depending on whether the matching procedure we used to match LBOs to private companies was able to find private companies with characteristics similar to the LBO's. If it did not work, the results that company characteristics are not important in the leverage choices of LBOs could be an artifact of the fact that the characteristics we use in the regression are in fact not representative for the LBOs. The results of the robustness checks in Section V gave strong indications that the procedure did work. However, given the importance of the procedure in this subsection we investigate this matter further to increase the procedure's validity.

We match our groups of private companies to groups of public companies. Then we run two specifications:

(11)
$$\begin{aligned} ln\left(\frac{Debt}{EBITDA}\right)_{public} = {} & \alpha_0 + \alpha_1(5\ Y\ Avg\ RoCE)_{private} + \alpha_2(RoCE\ Volatility)_{private} \\ & + \alpha_3(EBITDA\ Volatility)_{private} + \alpha_4\left(\frac{Tangible\ Assets}{Total\ Assets}\right)_{private} \\ & + \alpha_5 ln(Assets)_{private} + \alpha_6(Corporate\ Tax\ Rate)_{private} \\ & + \alpha_7(Credit\ Conditions)_{private} + D_{UK} + D_{France} + \varepsilon_i \end{aligned}$$

(12)
$$ln\left(\frac{Debt}{EBITDA}\right)_{public} = \alpha_0 + \alpha_1(5\,Y\,Avg\,RoCE)_{public} + \alpha_2(RoCE\,Volatility)_{public} + \alpha_3(EBITDA\,Volatility)_{public} + \alpha_4\left(\frac{Tangible\,Assets}{Total\,Assets}\right)_{public} + \alpha_5 ln(Assets)_{public} + \alpha_6(Corporate\,Tax\,Rate)_{public} + \alpha_7(Credit\,Conditions)_{public} + D_{UK} + D_{France} + \varepsilon_i$$

If the matching procedure does work we would expect the result in Specification 11, where we let the matched median values of the private companies explain the public company leverage, to be very similar to the result in Specification 12, where the public leverage is explained by the public companies' actual characteristics. Comparing the results in Tables XXIII and XIV, even if different variables enter as significant, we see that all company characteristic variables enter with the same signs for both specifications. The R^2s are 0.44 and 0.33 for the Specifications 11 and 12, respectively. We interpret the fact that it is lower when we use the private company medians as that the matching procedure is not as accurate as using the actual value, but still produces satisfactory matches.

VII. Conclusions

This paper had the objective of empirically comparing the capital structures of private companies and LBOs. We found this to be an interesting topic partly because of the increased importance of LBOs in the marketplace over the past 20 years but mainly because of the challenges LBOs face amid the current economic conditions, challenges accentuated by the LBOs' use of high financial leverage. Previous empirical research has compared the LBO leverage with that of public companies making our comparison with private companies new.

In order to make the comparison we construct a new dataset consisting of more than 600 private companies matched to 76 LBO transactions. The LBOs and the private companies are from the years 2002-2007 and cover 8 European countries. We make two types of comparisons. First, we investigate whether there is a relation between the level of leverage for private companies and LBOs. We do not find such a relation, but we find a relation for pre-LBO and LBO leverage. Second, we investigate the leverage determinants for private companies and LBOs and find that cash flow volatility seems to be the most important factor for private companies whereas the real borrowing costs seems to be the most important for LBOs.

One possible explanation for the observed result is that cash flow volatility might be unimportant for LBOs since they have the possibility of injecting additional capital if an investment should need it, something that might be difficult for a private company to do. As for the importance of real borrowing costs, there are at least two possible explanations. First, the LBO sponsors might lever up the individual transaction as much as the cash flows allow, the reason would be to increase the value of the option like claim they have thanks to the performance fee structure. Second, the LBO sponsors might optimize the LBOs enterprise value through the leverage choices given the credit environment at the time of the transaction. Regardless of the explanation, the implications are similar; LBOs will find it particularly difficult to withstand an economic environment like the current due to the leverage they use.

An area of future research that we would find particularly interesting is a closer look at the relation of LBO leverage and LBO sponsor incentives. One way of doing this could be to compare the leverage decisions made by publicly traded sponsors, where some of the performance fees go to the sponsors' shareholders, and normal non-traded sponsors, where all the performance fees go to the persons making the leverage decisions. An additional suggestion is to compare the bankruptcy rates of private companies and LBOs over the credit crunch period, when such data becomes available. This could confirm or reject our predicted implications.

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Appendix A: Tables and Figures

Table I: Country Descriptives for Private Companies and LBOs [a]

	Private		*LBO*
	Individual observations	Grouped observations	
Belgium	33	4	4
	(4.99%)	(5.26%)	(5.26%)
France	185	20	20
	(27.99%)	(26.32%)	(26.32%)
Germany	110	14	14
	(16.64%)	(18.42%)	(18.42%)
Italy	64	7	7
	(9.68%)	(9.21%)	(9.21%)
Netherlands	8	1	1
	(1.21%)	(1.32%)	(1.32%)
Spain	32	4	4
	(4.84%)	(5.26%)	(5.26%)
Sweden	18	3	3
	(2.72%)	(3.95%)	(3.95%)
UK	211	23	23
	(31.92%)	(30.26%)	(30.26%)
Total	661	76	76

[a] The table reports the descriptive statistics by country for the sample of private companies and LBOs. The first number represents the number of observations there are for every specific country and the number in parenthesis represents the relevant portion in percentage. For the private companies both the individual observations and the matched medians are reported. As the private grouped medians are based on the LBO transactions, the same numbers are reported. The main conclusion from the table is that a large proportion of the observations are made up of the UK, France and, to some extent, Germany.

Table II: Year Descriptives for Private Companies and LBOs [a]

	Private		*LBO*
	Individual observations	Grouped observations	
2007	121	14	14
	(18.31%)	(18.42%)	(18.42%)
2006	119	14	14
	(18.00%)	(18.42%)	(18.42%)
2005	164	18	18
	(24.81%)	(23.68%)	(23.68%)
2004	136	16	16
	(20.57%)	(21.05%)	(21.05%)
2003	85	9	9
	(12.86%)	(11.84%)	(11.84%)
2002	36	5	5
	(5.45%)	(6.58%)	(6.58%)
Total	661	76	76

[a] The table reports the descriptive statistics by year for the sample of private companies and LBOs. The first number represents the number of observations there are for every specific year and the number in parenthesis represent the relevant portion in percentage. For the private observations both the individual observations and the matched medians are reported. As the private grouped medians are based on the LBO transactions, the same numbers are reported. As can be seen, a slight emphasis is placed on 2004 and 2005 whereas observations from 2002 make up the smallest part.

Table III: Fama-French Industry Descriptives for Private Companies and LBOs [a]

	Private		*LBO*
Fama-French industry	Individual observations	Grouped observations	
2	51	6	6
	(7.72%)	(7.89%)	(7.89%)
7	47	5	5
	(7.11%)	(6.58%)	(6.58%)
9	10	1	1
	(1.51%)	(1.32%)	(1.32%)
11	10	1	1
	(1.51%)	(1.32%)	(1.32%)
13	20	2	2
	(3.03%)	(2.63%)	(2.63%)
14	46	5	5
	(6.96%)	(6.58%)	(6.58%)
15	5	1	1
	(0.76%)	(1.32%)	(1.32%)
16	6	1	1
	(0.91%)	(1.32%)	(1.32%)
17	33	4	4
	(4.99%)	(5.26%)	(5.26%)
18	16	2	2
	(2.42%)	(2.63%)	(2.63%)
21	58	7	7
	(8.77%)	(9.21%)	(9.21%)
23	34	4	4
	(5.14%)	(5.26%)	(5.26%)
31	19	2	2
	(2.87%)	(2.63%)	(2.63%)
32	30	4	4
	(4.54%)	(5.26%)	(5.26%)
33	34	4	4
	(5.14%)	(5.26%)	(5.26%)

Table III: Cont'd

	Private		*LBO*
Fama-French industry	Individual observations	Grouped observations	
34	58	6	6
	(8.77%)	(7.89%)	(7.89%)
37	12	2	2
	(1.82%)	(2.63%)	(2.63%)
38	10	1	1
	(1.51%)	(1.32%)	(1.32%)
40	19	2	2
	(2.87%)	(2.63%)	(2.63%)
41	35	4	4
	(5.30%)	(5.26%)	(5.26%)
42	48	5	5
	(7.26%)	(6.58%)	(6.58%)
43	60	7	7
	(9.08%)	(9.21%)	(9.21%)
Total	661	76	76

[a] The table reports the descriptive statistics by industry for the sample of private companies and LBOs. The first number represents the number of observations there are for every specific industry and the number in brackets represent the relevant portion in percentage. For the private companies both the individual observations and the matched medians are reported. As the private grouped medians are based on the LBO transactions, the same numbers are reported. The observations are fairly evenly distributed over the industries; no industry represents a proportion larger than ten percent. However, groups 21("Machinery") and 43 ("Restaurants, Hotels and Motels") stand out, each making up 9.2 percent of the total sample.

Table IV: Size Descriptive Statistics for Private Companies and LBOs [a]

	Private	LBO
	Asset value	Enterprise Value
USD 000'		
Minimum	2,434	81,000
Average	315,719	767,741
Median	203,212	487,235
Maximum	2,810,441	3,407,270

[a] The table reports size descriptive statistics for the samples of private companies and LBOs. For the private companies we report the assets value as reported in their annual reports and for the LBO's we report their enterprise values. All values are reported in thousands of USD. The reported figures are the minimum and maximum values, the average and the median. The average asset value in USD of the individual private observations is about 316. The values range from 0.028 to 2,800 million. The average *enterprise* value of the LBOs is higher at USD 768 millions, ranging from 81 to 3,400 millions.

Table V: Country Descriptive Statistics for Public Companies and Pre-LBO Observations [a]

	Public			*Pre-LBO*		
	Grouped observations	Average Debt/EBITDA	Median Debt/EBITDA	Individual observations	Average Debt/EBITDA	Median Debt/EBITDA
Belgium	-			-		
	-			-		
Denmark	-			1		
	-			(2.00%)		
France	14			9		
	(30.43%)			(18.00%)		
Germany	8			6		
	(17.39%)			(12.00%)		
Italy	1			3		
	(2.17%)			(6.00%)		
Luxemburg	-			1		
	-			(2.00%)		
Netherlands	-			3		
	-			(6.00%)		
Spain	-			2		
	-			(4.00%)		
Sweden	-			3		
	-			(6.00%)		
UK	23			22		
	(50.00%)			(44.00%)		
Total	46	1.57	1.30	50	1.87	1.44

[a] The table reports the descriptive statistics by country for the sample of public companies and for the one of pre-LBO observations. The first number represents the number of observations there are for every specific country and the number in parenthesis represent the relevant portion in percentage. As can be seen the public company data is mostly made up of the UK and France whereas the pre-LBO observations are made up to a large extent by the UK, France and Germany.

Table VI: Year Descriptive Statistics for Public Companies and Pre-LBO Observations [a]

	Public			*Pre-LBO*		
	Grouped observations	Average Debt/EBITDA	Median Debt/EBITDA	Individual observations	Average Debt/EBITDA	Median Debt/EBITDA
2007	7			12		
	(15.22%)			(24.00%)		
2006	11			13		
	(23.91%)			(26.00%)		
2005	10			10		
	(21.74%)			(20.00%)		
2004	9			10		
	(19.57%)			(20.00%)		
2003	7			3		
	(15.22%)			(6.00%)		
2002	2			2		
	(4.35%)			(4.00%)		
Total	46	1.57	1.30	50	1.87	1.44

[a] The table reports the descriptive statistics by year for the sample of public companies and for the one of pre-LBO observations. The first number represents the number of observations for every specific year and the number in parenthesis represent the relevant portion in percentage. For both samples the observations are fairly evenly spread out over the years 2003-2007. 2002 however, only make up a small part in both samples.

Table VII: Leverage Descriptives for Private Companies [a]

	All Sample	*Belgium*	*France*	*Germany*	*Italy*	*The Netherlands*	*Spain*	*Sweden*	*UK*	*Excluding France*	*Excluding UK*
Individual Observations											
Average Debt/EBITDA	1.97	2.88	1.03	1.71	2.03	2.81	2.17	1.38	3.01	2.37	1.57
Median Debt/EBITDA	0.99	2.26	0.34	1.16	1.12	2.64	0.85	0.04	2.38	1.57	0.62
Average Debt/Assets	25.09%	39.15%	10.65%	17.34%	24.90%	39.65%	32.03%	12.30%	39.15%	30.71%	18.50%
Median Debt/Assets	15.68%	38.20%	4.27%	13.70%	16.25%	44.38%	31.79%	0.95%	37.32%	24.78%	10.59%
Matched Medians											
Average Debt/EBITDA	2.49	5.88	1.15	1.27	2.20	2.64	1.52	0.91	4.45	2.99	1.64
Median Debt/EBITDA	1.84	5.18	0.55	1.35	2.67	2.64	1.27	0.78	3.34	2.31	1.34
Average Debt/Assets	23.01%	45.60%	5.29%	12.96%	19.34%	44.38%	28.62%	6.69%	41.38%	29.10%	15.03%
Median Debt/Assets	19.27%	49.17%	4.33%	15.61%	20.75%	44.38%	28.73%	0.85%	34.08%	24.31%	11.25%

Table VII: Cont'd

	2002	*2003*	*2004*	*2005*	*2006*	*2007*
Individual						
Average Debt/EBITDA	1.23	1.81	1.86	1.93	2.19	2.29
Median Debt/EBITDA	0.62	0.68	1.09	1.05	0.86	1.54
Average Debt/Assets	12.78%	17.44%	30.35%	24.52%	27.71%	28.41%
Median Debt/Assets	5.97%	9.96%	21.42%	15.49%	16.96%	19.89%
Matched Medians						
Average Debt/EBITDA	1.55	2.28	2.81	2.40	2.69	2.54
Median Debt/EBITDA	1.52	1.91	1.85	1.84	0.89	2.47
Average Debt/Assets	15.18%	16.02%	28.50%	21.83%	51.05%	20.21%
Median Debt/Assets	18.69%	19.45%	24.53%	18.02%	23.21%	18.12%

[a] The table reports leverage descriptives for the private companies. First, leverage descriptives for the full sample is displayed and thereafter follows the leverage by country and by year. Both the individual observations and the grouped medians are reported by country and by year. The leverage descriptives reported are average and median Debt/EBITDA and average and median Debt/Assets. The sample appears to display some variations depending on geography and time. One observation is that companies from Germany and France seem to have relatively low leverage while companies from Belgium and UK seem to have higher leverage. Two years stand out from the rest, 2002 has the lowest leverage regardless of measure and the use of sample and 2004 has the highest leverage in most specifications.

Table VIII: Differences between Private Leverage in Different Geographies[a]

Test method: non-parametric Mann-Whitney *U* statistic		
	Debt/EBITDA	Debt/Assets
UK Leverage$_{private}$ > France Leverage$_{private}$		
Individual Companies	Yes***	Yes***
Grouped Medians	Yes***	Yes***
UK Leverage$_{private}$ > Non-France and non-UK Leverage$_{private}$		
Individual Companies	Yes***	Yes***
Grouped Medians	-	-
Non-France and non-UK Leverage$_{private}$ >France Leverage $_{private}$		
Individual Companies	Yes***	Yes***
Grouped Medians	-	-

****Significant at one percent level **Significant at five percent level *Significant at ten percent level*

[a] We test for differences in leverage between countries using the Mann-Whitney U statistic, we use a non-parametric test since we cannot specify the distribution of neither leverage measure (interested readers may find more information on the test in Newbold et al. (2003) p. 543-547). We use both Debt/EBITDA and Debt/Assets as leverage measures and run the test both for the sample of matched medians and individual companies. Cells marked with a "-" indicate that the specification cannot be tested because there are to few observations. As can be seen the UK leverage is significantly larger than the French and the non-UK and non-French leverage. Further, the non-UK and non-French leverage is higher than the French leverage. All results are significant at the one percent level.

Table IX: Year-wise Differences of Private Company Leverage [a]

Test method: non-parametric Mann-Whitney *U* statistic		
	Debt/EBITDA	Debt/Assets
$Leverage_{2004} > Leverage_{2002}$		
Individual Companies	Yes***	Yes***
Grouped Medians	-	-
$Leverage_{Non\text{-}2002\ \&\ non\text{-}2004\ Years} > Leverage_{2002}$		
Individual Companies	Yes*	Yes***
Grouped Medians	-	-
$Leverage_{2004} > Leverage_{non\text{-}2002\ \&\ non\text{-}2004\ Years}$		
Geography: France		
Individual Companies	No	Yes***
Grouped Medians	No	No

****Significant at one percent level **Significant at five percent level *Significant at ten percent level*

[a] We test for differences in leverage between different years using the Mann-Whitney U statistic. We use both Debt/EBITDA and Debt/Assets as leverage measures and run the test both for the sample of matched medians and individual companies. Cells marked with a "-" means that the Specification cannot be tested because there are to few observations. We see that the leverage in 2002 is significantly smaller than the leverage 2004 as well as smaller than non-2002 andnon-2004 years. The 2004 leverage is found to be significantly lower than non-2002 and non-2004 leverage measuring leverage as Debt/Assets and using the individual company sample but not for any other specifications.

Table X: Leverage Descriptives for LBOs[a]

	All Sample	*Belgium*	*France*	*Germany*	*Italy*	*The Netherlands*	*Spain*	*Sweden*	*UK*	*Excluding France*	*Excluding UK*
Average Debt/EBITDA	4.88	4.58	4.27	4.85	5.50	5.30	6.18	4.23	5.12	5.09	4.77
Median Debt/EBITDA	4.75	4.55	4.25	4.50	5.30	5.30	6.00	4.00	5.30	4.95	4.70
Average Debt/Assets	140.65%	195.88%	99.82%	166.08%	99.99%	313.72%	163.34%	-	138.70%	154.94%	142.22%
Median Debt/Assets	125.64%	195.88%	117.92%	105.17%	99.99%	313.72%	163.34%	-	145.30%	147.32%	125.64%
	2002	*2003*	*2004*	*2005*	*2006*	*2007*					
Average Debt/EBITDA	4.14	3.91	4.11	5.06	5.40	5.88					
Median Debt/EBITDA	4.00	3.40	4.03	4.90	5.55	5.65					
Average Debt/Assets	82.95%	120.78%	124.95%	124.13%	106.08%	208.22%					
Median Debt/Assets	82.95%	77.28%	110.08%	117.92%	99.99%	175.92%					

[a] The table reports leverage descriptives for the LBOs. First, leverage descriptives for the full sample is displayed and thereafter follows the leverage by country and by year. Both the individual observations and the grouped medians are reported by country and by year. The leverage descriptives reported are average and median debt over EBITDA and average and median debt over total assets. The sample appears to display some variations depending on geography and time. There seems to be a difference across countries, where Spain and Italy have the highest leverage and France and Sweden the lowest. There also seems to be some time variation in the leverage used, with an increasing trend in the leverage from 2002 to 2007.

Table XI: Tests for Country and Year Differences in the LBO Leverage[a]

Test method: non-parametric Mann-Whitney *U* statistic	
	Debt/EBITDA
$LBO\ Leverage_{UK} > LBO\ Leverage_{France}$	Yes**
$Leverage_{UK} > Leverage_{Non\text{-}UK\ and\ Non\text{-}France}$	No
$Leverage_{France} < Leverage_{Non\text{-}UK\ and\ Non\text{-}France}$	Yes**
$Leverage_{2007} > Leverage_{2002}$	Yes**

****Significant at one percent level **Significant at five percent level *Significant at ten percent level*

[a] We test for differences in the LBO leverage with respect to countries and years using the Mann-Whitney U Statistic. For the countries, we focus on our two largest subsamples; the UK and France. As can be seen, the UK leverage is higher than the French, but not significantly higher than the leverage for the non-UK and non-French observations. The leverage for the French observations is significantly lower than for the non-UK and non-French observations. As for time differences, the leverage at the end of our sample period, 2007, is significantly higher than the leverage in the beginning of the period, 2002.

Table XII: Differences between Private and LBO Leverage[a]

Test method: non-parametric Mann-Whitney *U* statistic		
	Debt/EBITDA	Debt/Assets
$Leverage_{LBO} > Leverage_{private}$ *Geography: All*		
Individual Companies	-	-
Grouped Medians	Yes***	Yes***
$Leverage_{LBO} > Leverage_{private}$ *Geography: UK*		
Individual Companies	-	-
Grouped Medians	Yes*	-
$Leverage_{LBO} > Leverage_{private}$ *Geography: France*		
Individual Companies	-	-
Grouped Medians	Yes***	-
$Leverage_{LBO} > Leverage_{private}$ *Geography: Germany*		
Individual Companies	-	-
Grouped Medians	Yes***	-
$Leverage_{LBO} > Leverage_{private}$ *Geography: Excluding France and UK*		
Individual Companies	-	-
Grouped Medians	Yes***	-

****Significant at one percent level **Significant at five percent level *Significant at ten percent level*

[a] We test for differences in leverage between private companies and LBOs using the Mann-Whitney U Statistic. We test for differences in the whole sample (for both matched medians and individual companies) as well as for geographical sub-samples. Cells marked with a "-" means that the Specification cannot be tested because there are to few observations. We find that for all combinations of geographies and leverage measures, the LBO leverage is significantly higher than the private company leverage at the one percent level.

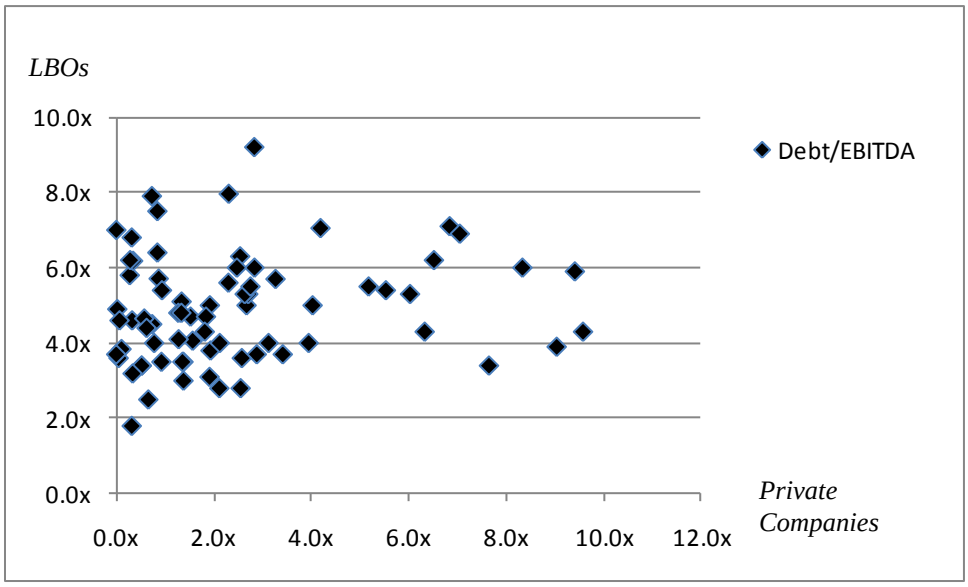
Table XIII: Private Debt/EBITDA Explaining LBO Debt/EBITDA[a]

	Dependent Variable: $(Debt/EBITDA)_{LBO}$
	All Countries
Constant	4.782***
	(22.559)
$(Debt/EBITDA)_{private\ median}$	0.031
	(0.693)
R^2	0.006
Adjusted R^2	-0.007
n Observations	76

****Significant at the one percent level **Significant at the five percent level *Significant at the ten percent level*

[a] The table reports regression results in which Debt/ EBITDA for the private medians are regressed on the same leverage measure for the LBOs. The first row in each cell is the point estimate while the numbers in parenthesis are the associated t-values. The model displays no explanatory power as R^2 is very low for all the regressions performed and as none of the coefficients are significant, only the constants are significant in all the regressions performed.

Figure I: Relation for Debt/EBITDA Levels for Private Companies and LBOs[a]



[a] The figure displays Debt/EBITDA, with the LBO values on the Y-axis and the private company values on the X-axis. As can be seen, no clear pattern emerges. All Debt/EBITDA for private companies with a value of more than 10.0 have been excluded since they are considered outliers. For an explanation for the removal we refer to Section III.

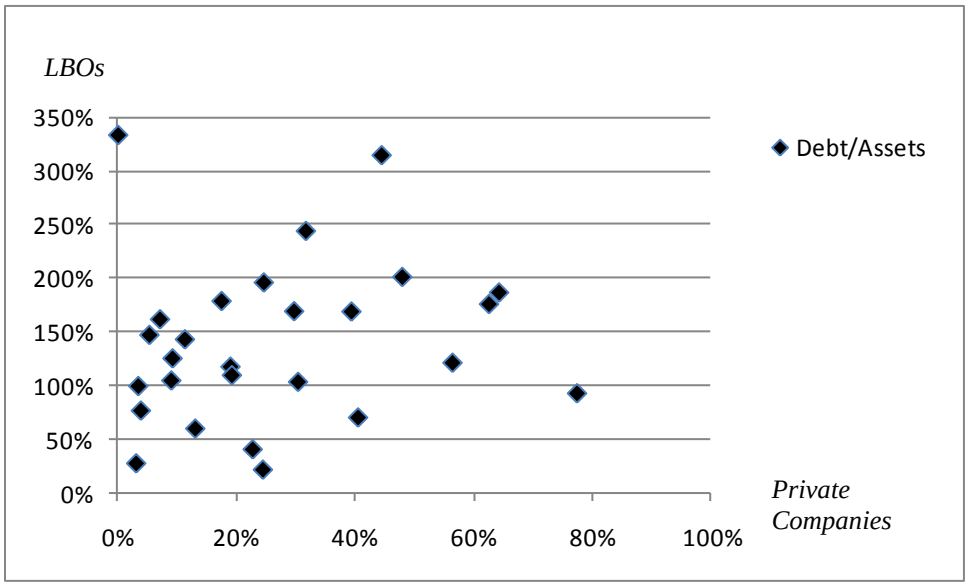
Table XIV: Private Debt/Assets Explaining LBO Debt/Assets [a]

	Dependent Variable: $(Debt/Assets)_{LBO}$
	All Countries
Constant	1.268***
	(5.293)
$(Debt/Assets)_{private\ median}$	0.524
	(0.738)
R^2	0.021
Adjusted R^2	-0.018
n Observations	27

****Significant at the one percent level **Significant at the five percent level *Significant at the ten percent level*

[a] The table reports regression results in which debt over total assets for the private medians are regressed on the same leverage measure for the LBOs. The first column displays results for the entire sample. No results are reported for the sub-samples as there are too few observations. The first row in each cell is the point estimate while the numbers in parenthesis are the associated t-values. The model displays no explanatory power as R^2 is low and as the coefficient is insignificant, only the constants is significant on the one percent level.

Figure II: Relation for Debt/Assets Levels for Private Companies and LBOs [a]



[a] The figure displays Debt/Assets, with the LBO values on the Y-axis and the private company values on the X-axis. As can be seen, there does not seem to be a relation between the LBO and the private company multiples. The reason some Debt/Asset values are more than 100 percent is an effect of our data collection methodology. Since there are strong reasons to suspect that LBO companies revise their book values upwards following the LBO we use the asset values prior to the transaction to avoid a potential accounting-bias.

Table XV: Pre-LBO Debt/EBITDA Explaining LBO Debt/EBITDA[a]

	Dependent Variable: $(Debt/EBITDA)_{LBO}$
	All Countries
Constant	4.8360***
	(19.097)
$(Debt/EBITDA)_{pre\text{-}LBO}$	0.2441**
	(2.594)
R^2	0.123
Adjusted R^2	0.105
n Observations	50

****Significant at the one percent level **Significant at the five percent level *Significant at the ten percent level*

[a] We run a standard OLS-regression and correct it for heteroscedasticity using White's correction to test the specification. The first row in each cell is the point estimate while the numbers in parenthesis are the White corrected t-values. We let the LBO-leverage be explained by the pre-LBO leverage. As pre-LBO leverage we use the values as of the reporting closest, but prior, to the LBO. In column one, we see that the LBO leverage is higher than the pre-LBO leverage as indicated by a positive and significant constant. We also see a relation between LBO and pre-LBO leverage as indicated by a significant and positive pre-LBO leverage coefficient.

Table XVI: Pre-LBO Debt/Assets Explaining LBO Debt/Assets[a]

	Dependent Variable: $(Debt/Assets)_{LBO}$
	All Countries
Constant	1.215
	(1.212)
$(Debt/Assets)_{pre\text{-}LBO}$	0.191
	(0.992)
R^2	0.062
Adjusted R^2	-0.001
n Observations	17

****Significant at the one percent level **Significant at the five percent level *Significant at the ten percent level*

[a] We run a standard OLS-regression and correct it for heteroscedasticity using White's correction to test the specification. The first row in each cell is the point estimate while the numbers in parenthesis are the White corrected t-values. We let the LBO-leverage be explained by the pre-LBO leverage. As pre-LBO leverage we use the values as of the reporting closest, but prior, to the LBO. The private company Debt/Asset variable is positive but not significant.

Table XVII: Private Debt/EBITDA Explaining Public Debt/EBITDA[a]

	Dependent Variable: $(Debt/EBITDA)_{public\ median}$
	All Countries
Constant	0.704**
	(2.501)
$(Debt/EBITDA)_{private\ median}$	0.159*
	(1.849)
R^2	0.079
Adjusted R^2	0.056
n Observations	42

****Significant at the one percent level **Significant at the five percent level *Significant at the ten percent level*

[a] The table reports regression results in which the natural logarithm of debt over EBITDA for the private medians are regressed on the same leverage measure for public medians. The first row in each cell is the point estimate while the numbers in parenthesis are the associated t-values. There seems to be relation between the public and private company leverage since the private company Debt/EBITDA variable enters as positive and significant.

Table XVIII: Private Debt/Total Assets Explaining Public Debt/Assets[a]

	Dependent Variable: $(Debt/Assets)_{public\ median}$
	All Countries
Constant	0.066***
	(3.410)
$(Debt/Assets)_{private\ median}$	0.248***
	(4.266)
R^2	0.293
Adjusted R^2	0.277
n Observations	46

****Significant at the one percent level **Significant at the five percent level *Significant at the ten percent level*

[a] The table reports regression results in which Debt/Assets for the private medians are regressed on the same leverage measure for public medians. The first row in each cell is the point estimate while the numbers in parenthesis are the associated t-values. The model displays some explanatory power as R^2 is larger than zero and as the coefficient for the private medians is positive and significant at the one percent level.

Table XIX: Private Company Debt/EBITDA Determinants using the Matched Median Sample[a]

	Dependent Variable: ln(Debt/EBITDA)$_{\text{private } median}$
	All Countries
Constant	0.2219
	0.062
5 Y Avg RoCE $_{\text{private } median}$	1.7597
	0.642
RoCE Volatility $_{\text{private } median}$	3.9994*
	1.714
EBITDA Volatility $_{\text{private } median}$	-1.2745[b]
	-1.591
Tangible Assets/Tot Assets $_{\text{private } median}$	0.6163
	0.831
ln(Assets) $_{\text{private } median}$	0.0498
	0.293
Corporate Tax Rate	-1.8085
	-0.240
Credit conditions	-1.1061
	-0.218
UK	1.0858**
	2.039
France	-0.7292*
	-1.889
R^2	0.404
Adjusted R^2	0.319
n Observations	73

****Significant at the one percent level **Significant at the five percent level *Significant at the ten percent level*

[a] We run a standard OLS-regression and correct it for heteroscedasticity using White's correction to test the specification. The first row in each cell is the point estimate while the numbers in parenthesis are the White corrected t-values. *RoCe Volatility* and the country dummies enter as significant. EBITDA volatility is close to being significant with a p-value of 11.7 percent.

[b] p-value 11.7 %

Table XX. Private Company Debt/EBITDA Determinants using Individual Observations[a]

	Dependent Variable: $\ln(\text{Debt/EBITDA})_{\text{private}}$		
	All Countries	*Only UK*	*Only France*
Constant	0.2070	-1.8476	2.4062
	0.143	-0.973	0.309
5 Y Avg RoCE $_{\text{private}}$	-0.0059*	-0.0089*	-0.0108**
	-1.898	-1.862	-2.501
RoCE Volatility $_{\text{private}}$	0.0026	0.0085***	0.0022
	0.922	2.827	0.727
EBITDA Volatility $_{\text{private}}$	-0.0010***	-0.0004	-0.0009***
	-5.860	-0.231	-5.505
Tangible Assets/Tot Assets $_{\text{private}}$	0.0134***	0.0125***	0.0071
	4.900	3.226	1.197
ln(Assets) $_{\text{private}}$	-0.0208	0.1703	0.0661
	-0.270	1.180	0.404
Corporate Tax Rate	-0.0095	-	-0.1212
	-0.297	-	-0.504
Credit conditions	-0.0189	-0.0433	0.0326
	-0.724	-0.722	0.559
UK	0.4862*	-	-
	1.852	-	-
France	-0.5451***	-	-
	-3.292	-	-
R^2	0.192	0.160	0.096
Adjusted R^2	0.178	0.124	0.053
n Observations	527	147	156

****Significant at the one percent level **Significant at the five percent level *Significant at the ten percent level*

[a] We run a standard OLS-regression and correct it for heteroscedasticity using White's correction to test the specification. The first row in each cell is the point estimate while the numbers in parenthesis are the White corrected t-values. We use the individual private company sample after having removed all negative and outlier observations. For the whole sample *5Y Avg RoCE*, *EBITDA Volatility*, *Tangible Assets7Total* Assets and the country dummies are significant. In columns two and three we present the results for the UK and French subsamples. as can be seen the results remain largely the same.

Table XXI. LBO Debt Determinants Using the Matched Private Company Observations[a]

	Dependent Variable: ln(Debt/EBITDA)$_{LBO}$
	All Countries
Constant	1.3229*
	(1.878)
5 Y Avg RoCE $_{private\ median}$	0.7828
	(1.660)
RoCE Volatility $_{private\ median}$	-0.5785
	(-1.183)
EBITDA Volatility $_{private\ median}$	0.0594
	(0.378)
Tangible Assets/Tot Assets $_{private\ median}$	0.0651
	(0.416)
ln(Assets) $_{private\ median}$	0.1112***
	(2.956)
Corporate Tax Rate	-2.4222*
	(-1.746)
Credit conditions	-5.5689***
	(-3.297)
UK	-0.1480*
	(-1.717)
France	-0.1343
	(-1.547)
R^2	0.389
Adjusted R^2	0.306
n Observations	76

****Significant at the one percent level **Significant at the five percent level *Significant at the ten percent level*

[a] We run a standard OLS-regression and correct it for heteroscedasticity using White's correction to test the specification. The first row in each cell is the point estimate while the numbers in parenthesis are the White corrected t-values. *ln(Assets)*; *Credit Conditions* and *Corporate Tax Rate* as well as the country dummies enter as significant. However, *Corporate Tax Rate* enters with the wrong sign.

Table XXII: Pre-LBO Characteristics explaining LBO Debt/EBITDA[a]

	Dependent Variable: ln(Debt/EBITDA) public *median*	
	LBO Leverage	*Pre-LBO Leverage*
Constant	2.2659***	-12.3412
	(3.248)	(-1.312)
5 Y Avg RoCE pre-LBO	0.5625	0.9300
	(1.435)	(0.283)
RoCE Volatility pre-LBO	-0.3556	-0.1557
	(-1.021)	(-0.042)
EBITDA Volatility pre-LBO	-0.0102	0.4680
	(-0.208)	(0.849)
Tangible Assets/Tot Assets pre-LBO	-2.8794**	17.6277
	(-2.132)	(1.066)
ln(Assets) pre-LBO	0.0453	0.4737
	(1.350)	(1.081)
Corporate Tax Rate	-0.2414	1.6077
	(-1.649)	(1.112)
Credit conditions	-3,8562 **	-17,6289
	(-2,712)	(-1,16139)
UK	-0.1296	2.1598
	(-1.541)	(1.324)
France	-0,0170	0,3755
	(-0,236)	(0,430)
R^2	0.674	0.254
Adjusted R^2	0.519	-0.099
n Observations	29	29

****Significant at the one percent level **Significant at the five percent level *Significant at the ten percent level*

[a] We run a standard OLS-regression and correct it for heteroscedasticity using White's correction to test the specification. The first row in each cell is the point estimate while the numbers in parenthesis are the White corrected t-values. In the left columns Tangible/Total Assets and Credit Conditions are significant. In the right column all variables enter as insignificant.

Table XXIII: Private Debt Determinants on Public Company Debt/EBITDA[a]

	Dependent Variable: ln(Debt/EBITDA)
	All Countries
Constant	13.6036
	(1.084)
5 Y Avg RoCE private *median*	-2.3793
	(-1.212)
RoCE Volatility private *median*	3.7415
	(1.325)
EBITDA Volatility private *median*	-1.5054**
	(-2.125)
Tangible Assets/Tot Assets private *median*	1.33155
	(1.534)
ln(Assets) private *median*	0.2200
	(1.314)
Corporate Tax Rate	-42.286
	(-1.247)
Credit conditions	2.0949
	(0.237)
UK	-3.4864
	(-1.235)
France	-1.0148
	(-0.845)
R^2	0.333
Adjusted R^2	0.167
n Observations	46

****Significant at the one percent level **Significant at the five percent level *Significant at the ten percent level*

[a] We run a standard OLS-regression and correct it for heteroscedasticity using White's correction [reference] to test the specification. The only variable that enters as significant is *EBITDA Volatility*.

Table XXIV: Public Company Debt/EBITDA Determinants using Public Matched Median Sample[a]

	Dependent Variable: ln(Debt/EBITDA)$_{public\ median}$
	All Countries
Constant	-0.6161
	(-0.065)
5 Y Avg RoCE $_{public\ median}$	-4.9308**
	(-2.411)
RoCE Volatility $_{public\ median}$	2.8199
	(0.669)
EBITDA Volatility $_{public\ median}$	-0.0605
	(-0.116)
Tangible Assets/Tot Assets $_{public\ median}$	2.4369***
	(3.053)
ln(Assets) $_{public\ median}$	0.0291
	(0.168)
Corporate Tax Rate	0.7728
	(0.031)
Credit conditions	-4.9360
	(-0.730)
UK	-0.5166
	(-0.251)
France	0.5980
	(0.609)
R^2	0.437
Adjusted R^2	0.296
n Observations	46

****Significant at the one percent level **Significant at the five percent level *Significant at the ten percent level*

[a] We run a standard OLS-regression and correct it for heteroscedasticity using White's correction to test the specification. *5Y Average RoCE* and *Tangible Assets/Total Assets* are the only significant variables. All company characteristic variables enter with the same sign as when we explain the public company leverage using the private company sample in Table XXIII.

Appendix B: Basic Corporate Finance Theory

In this appendix we present an overview of the basic corporate finance theory that is necessary to understand the background of our paper. We include this section so that students with a background other than finance can follow the reasoning through-out the paper.[13]

Modigliani and Miller (1958) showed that under the assumption of perfect capital markets a company's choice of capital structure should not affect its value. Under the assumption, investors can undo the capital structure which would give rise to arbitrage opportunities if any particular structure would be valued higher than any other. However, by introducing corporate taxes they show that the mix of debt and equity will affect the value, where larger use of debt will increase total company value. The reason for the positive value impact is that by using debt the company can transfer a larger amount of the free cash flow to its investors without paying taxes, since interest rates are tax deductable. In a 1963 paper Modigliani and Miller actually show that the equilibrium capital structure in a world with corporate taxes is to use all debt and no equity financing.

The basic insight of their findings is not that all companies should use all debt financing but rather why not all companies use all debt financing. There must be some kind of counter-weights to the benefits of debt tax shields. Several such counter-weights have been suggested by researchers trying to answer Modigliani's and Millers' open question.

Costs of financial distress is one of the counter-weights, it can be divided in direct and indirect costs. The direct costs, such as the cost of bankruptcy proceedings, have generally been found small. For instance, Warner (1977) finds in a study of America railway companies that the average direct bankruptcy cost is about one percent of the enterprise value. This is generally believed to be a far too small number to explain the observed equity proportion in capital structures. Myers (1977) presents a potentially very large indirect agency cost, the debt overhang problem or the underinvestment problem. A company's value can be thought of as consisting of two parts; the value of present ongoing projects and the value of future projects. He shows that a company will pass up on positive present value projects if it has too much debt in relation to total company value. The reason is that even though the project has a positive present value, it is not positive to the equity holders. The finding implies that the optimal capital structure of companies

[13] For a more extensive overview of corporate finance theory we recommend Grinblatt and Titman (2004)

with large future investment opportunities should include less debt than for companies with small future opportunities.

Jensen and Meckling (1976) point to another agency problem with debt, asset substitution. If equity is thought of as an option on the company, it can easily be shown that equity holders have the incentive to increase the riskiness of the business. Since this is anticipated by lenders, companies with plenty of opportunity to shift the risk-profile will be able to borrow less than companies with less opportunity.

There is a large literature on the principal-agent problems arising from the separation of ownership and day to day management, e.g. theories of perks, empire building and overconfidence. (See for instance Jensen (1986), Jensen and Meckling (1976) and Heaton (2002)). Grossman and Hart (1982) show that debt can be a way to mitigate such problems by forcing managers to pay out part of the companies' free cash flow to investors. This theory predicts that firms with large free cash flows and few positive present value investment opportunities should use more debt than companies with plenty of investment opportunities or with small free cash flows.

Myers and Majluf (1984) present a theory of a company's financing based on asymmetric information where managers know more about the company's prospects than investors. Since there will be costs associated with the asymmetric information managers will prefer to use financing that suffers as little as possible of it. This result is called the pecking order theory and predicts that companies will use internally generated funds first, debt issues second and equity issues only as a last resort. In their paper they also present factors that mitigate information asymmetries such as collateral. Diamond (1989) adds another factor that might mitigate information asymmetries. He argues that companies that have been in contact with capital markets for a long time can, and will have incentives to, establish a reputation and that this will mitigate the asymmetries

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