Does Jensen's Free Cash Flow Hypothesis explain European LBOs today?

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Abstract: Jensen's "Eclipse of the public corporation" (1989) predicts that LBO transactions solve the agency problems of publicly listed companies with high levels of undistributed free cash flows (FCFs) and low growth opportunities. So far, empirical evidence in this context is mixed. This study is the first that provides evidence on the application of Jensen's FCF hypothesis (1986) to Leveraged Buyouts (LBOs) in the European market. My univariate and multivariate findings indicate that Continental European companies with high Cash Flows before distribution and few investment opportunities whose P/E ratio is significantly lower than that of their industry peer group are more likely to be an LBO target. I do not find any evidence that European LBO targets suffer from agency problems prior to the transaction.

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Introduction

Identifying companies that are likely targets for leveraged going private transaction (LBO) is a potentially profitable activity for every investor in the stock market. Commonly, in those transactions, shareholders receive premiums within the scope of 35% to 56% of the current share price in the US market.[1] In the European market, premiums range from 36% to 41%[2] This empirical fact leads to the question why Private Equity companies pay a significantly higher price than the current market value for LBO targets. The answer can be found in the characteristics of LBO targets that seem to be different from those of firms remaining public.

In common LBO transactions all public shares outstanding are bought via tender offer by a so-called Private Equity investor. Subsequently, those shares are de-listed from the stock exchange. The main motive of the Private Equity Investor in the acquisition process is not to achieve operating synergies. This would be the main reason in takeovers where a strategic investor (e.g. an industry competitor) instead of a Private Equity Investor is involved (e.g. to increase market share etc.). Private Equity firms only try to detect inefficiencies in the target firm in order to increase its value. The crucial distinction to un-leveraged going private transactions is the use of an extensive amount of debt in LBOs.[3]

Jensen's free cash flow (FCF) hypothesis (1986) is one possible explanation for the increase in value of a listed company via an LBO. It has always been in the focus of former

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[1] For evidence see: De Angelo, De Angelo and Rice (1984), Lowenstein (1988), Lehn and Poulsen (1989) and Weir, Laing and Wright (2005).
[2] For evidence see: Betzer (2005) and Renneboog, Simons and Wright (2005).
[3] Commonly it is assumed that the label "leveraged" can be given when the total funding needs – purchase price, refinancing of existing debt and transaction costs – are financed with a minimum of 50% of debt. (see Halpern, Kieschnick and Rotenberg 1999) The equity is provided by financial investors and to a lesser extent by the company's management.

empirical investigation into the rationale of LBOs. Many papers (i.a. Lehn and Poulsen 1989, Opler and Titman 1993 and Huffman 1995) show results consistent with the free cash flow hypothesis whereas findings by Servaes (1994), Kieschnick (1998) and Halpern, Kieschnick and Rotenberg (1999) contradict Jensen's hypothesis.

If the FCF hypothesis is correct, LBO-targets should be characterized by certain features that make them special. This is the first European study, that identifies the firm characteristics increasing the odds of an LBO.[4] In doing so, I test the FCF hypothesis in the European market with the help of a logit regression model. Firm characteristics of 73 European LBOs are analyzed and compared to a matched sample of 73 European companies staying public. My univariate and multivariate findings indicate that Continental European companies with high Cash Flows before distribution and few investment opportunities whose P/E ratio is significantly lower than that of their industry peer group are more likely to be an LBO target. I do not find any evidence that European LBO targets suffer from agency problems prior to the transaction.

So far, empirical studies investigating the FCF hypothesis on LBOs have come to different inferences due to the application of different econometric methodologies.[5] A logit probability model which is used to identify the characteristics of possible LBO candidates, can generally be estimated in two different ways:

In the first approach, the final sample contains nearly the total quantity of listed companies on a market which is separated into a relatively small LBO sample and a relatively

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[4] Weir, Laing and Wright (2005) investigate 95 going private transactions in the UK. Going private transactions do not have necessarily the features of LBOs (inter alia Jensen (1986) explains in his article the important role of debt in motivating organizational efficiency).
[5] E.g. Lehn and Poulsen (1989) and Kieschnick (1998) apply different maximum likelihood estimators to the same choice based sample. Obviously, the results of both studies are different.

large sample including all other listed firms. Huffman and Niendorf (1997) investigate 180 firms going private between 1980 and 1991 that were formerly traded on the New York Stock Exchange. They employ a random sample including 5418 control group firms in the estimation of their acquisition model. Palepu (1985) has already criticized the "information content of such a sample … leading to relatively imprecise parameter estimates".

The other approach would be the use of a "non-random, equal-share" (Palepu 1985) sample. This approach can lead to incorrect estimates of the model parameters if the necessary modifications to the estimators of the logit regression model are neglected.[6] E.g. Lehn and Poulsen (1989) "apply random sample maximum likelihood estimators to a choice based sample[7] which leads to statistical problems" (Kieschnick 1998) for which they do not account.

This study uses a non-random, equal share sample and it employs the methodology by Manski and Mc Fadden (1981) that is appropriate for the issue at hand. They use a conditional maximum likelihood estimator in order to account for the impact of the choice based sampling method on the estimates of the parameters.

A separate analysis focusing on the European market is needed because, unlike the homogenous US capital market, the European market is heterogeneous in terms of capital market culture and development, legal framework and corporate governance standards. The most important difference lies in the composition of the shareholder structure. Most publicly traded companies in the US and the UK tend to be widely held whereas the ownership structure of most Continental European companies exhibits a large, dominant shareholder (e.g. families or institutional shareholders) who exert considerable control (Grant and Kirchmaier 2004).

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[6] For a detailed description of this approach see: Palepu (1985).
[7] Kieschnick (1998) defines a non-random sample as choice based sample.

Additionally, the market for corporate control is less active and less developed in Continental Europe (Franks and Mayer 1990) and the protection of minority shareholders through binding Corporate Governance – standards hardly present (La Porta et al. 1998). The above-mentioned empirical facts imply that those Continental European companies with an atomistic shareholder structure will suffer more agency problems than their US and their UK counterparts. Their (dispersed) shareholders can neither rely on an effective monitoring nor obtain relevant information based on a good Corporate Governance regime. Therefore, I assume that Jensen's free cash flow hypothesis should apply to European LBOs, and to Continental European LBOs in particular.

Another important contribution to the existing literature is that this study distinguishes FCF before and after distribution. So far, empirical studies investigating the FCF hypothesis only focused on the undistributed FCFs. The undistributed FCFs are defined as FCF after satisfying equity-holders, debt-holders and the public authority. This measure captures the actual agency problem in the company. But Private Equity Investors also look for companies that have high and stable distributed FCFs because under these circumstances they can be confident to be able to serve the high interest payments after the completion of the LBO transaction.

In the following section the sample selection process is described. In the subsequent section the variables measuring the firm characteristics are explained and univariate results are presented. Thereafter, the logit regression methodology is described and the results of the multivariate regression models are outlined. The final section summarizes the results and concludes.

Sampling Process And Data

This paper analyses the differences between companies that undergo an LBO and companies that remain public. In the following I describe the creation of the two different samples, starting with the LBO sample:

By researching the Reuters, Bloomberg and Wall Street Journal Database a total of 176 European going private's that took place from 1996 to 2002 are identified.

Filtering the transactions by the following five criteria leads to the final LBO-sample:

(1) The LBO had to take place in one of the EU member states.[8]

(2) The deal had to be at least 50% debt financed.[9]

(3) A significant majority of the target company's common stock is bought via tender offer.

(4) Complete shareholding data at least one year before the buyout had to be accessible.

(5) The buyout had to be led by a Private Equity Investor as opposed to wealthy individuals or strategic investors.

As the cross-sectional analysis requires some variables to be industry-adjusted, peer groups of five publicly listed competitors for each of the 76 companies were identified. The selection of the peer groups is based on the automatic Bloomberg peer group selection – out of this selection, those five companies that were most comparable to the LBO company with respect

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[8] Based on the composition of the EU in Dec. 2002.
[9] Halpern, Kieschnick and Rotenberg (1999) also use this criterion in order to identify pure LBO transactions. Here, debt financing includes all cash interest bearing debt or debt-like tranches, such as Senior Debt, Mezzanine Notes and Bridge Loans. They did not include debt-like tranches sponsored by the Private Equity investor, such as shareholder loans or PIK notes.

to their operations and regional focus and in terms of size were included in the peer group.[10]

For three companies an appropriate peer group could not be identified.[11]

Finally, I obtained a sample of 73 LBO transactions. There is a clear dominance of UK companies in the sample as of 73 companies 49 are from the UK (see table I).

Insert Table I here

Following Lehn and Poulsen (1989) and Weir, Laing and Wright (2005) I construct a matched sample of 73 LBO targets and 73 firms that remained public. Manski and McFadden (1981) show that in a population where the number of LBOs is very small relative to the number of non-LBOs the information content of a choice-based sample is higher than that of a random sample. The matching criteria are firm size and industry. It is necessary to control for industry effects because over-sampling and accordingly over-representation of one industrial group could lead to biased outcomes (Song and Walking 1993). Industry was measured by the Bloomberg industrial classification and size by market capitalization.

In order to account for the sampling procedure used where the number of LBOs is overstated and the number of companies remaining public is understated I employ choice based maximum likelihood estimators in my regression analysis.[12]

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[10] The balance sheet data used comes from the balance sheets in the three years prior to the announcement date of the buyout. Between the companies in the Peer Group the currency can differ in cases where I could not find enough comparable companies in the same country. Therefore, I corrected these differences by converting the different rates into one official exchange rate.

[11] These companies are: Allied Textile Companies, Ferretti SpA and Riverdeep.

[12] For reasons given in Amemiya (1985) the matching with regard to industry and size does not lead to biased estimators and therefore can be ignored in the following.

Financial data and company data employed throughout the analysis come from Datastream and Bloomberg.

Insert Table II here

Table II shows various descriptive statistics of the LBO sample. The relationship between the average and the median transaction value in Table II indicates that there are a few large transactions and a lot of smaller ones over the sample period. The majority of transaction volumes (more than 68%) lies below EUR 400m .

Univariate Analysis of LBO characteristics

Table III provides summary statistics and significance tests for univariate differences in firm characteristics between firms undergoing an LBO and firms remaining public.

Insert Table III here

According to Jensen (1986) conflicts over the distribution of earnings between management and shareholders are strong when the firm's FCF-level is high. He defines FCF as follows:

"Free cash flow is cash in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital."

The previous LBO literature has identified difficulties in measuring FCFs because it is not easy to identify a company's projects with a positive net present value.[13] Therefore, I use two measures of the FCF. First, following the previous literature (see e.g. Lehn and Poulsen 1989 and Halpern, Kieschnick and Rotenberg 1999) I use the undistributed Cash Flows (FCF (AD)) to the shareholders, debt-holders and the public authority. It is a reasonable proxy for the degree of the agency problem within the company:

FCF (AD) = (EBITDA – TAX – INTERESTS – DIVIDENDS)/SALES   (1)

On the other hand I employ a measure of FCF before distribution FCF (BD) because Private Equity Investors look for companies that have a high level of distributed cash flows and whose market value does not reflect this fact:

$FCF\ (BD)$ = EBITDA/SALES   (2)

In order to measure the underperformance of those companies on the stock market I employ two different measures:

First, the company's P/E-ratio compared to its industry peer group shows the valuation of the company's operations compared to its competitors. The P/E-ratios employed in this study are based on a mean of ten trading days, measured two months prior to the LBO announcement.

Second, the devaluation of the firm's stock over time before the LBO transaction is another way to measure underperformance. The numerator of the variable PRICE is defined

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[13] See Halpern, Kieschnick and Rotenberg (1999).

as the ratio of the closing market price two months prior to the LBO transaction divided by the average price, measured over 500 trading days counting backwards from two months prior to the LBO transaction. In order to exclude market movements I divide this figure by the equivalent ratio of the respective country MSCI market index.

Table III shows that the undistributed FCF is not significantly different between the two samples. The average FCF ratio is somewhat higher for the public companies (0.071) than for the LBO sample (0.061). This result is consistent with findings by Kieschnick (1998), Halpern, Kieschnick and Rotenberg (1999) and Weir, Laing and Wright (2005). The FCF before distribution on the other hand is significantly higher for the LBO sample (0.404) than for the companies remaining public (0.162). Furthermore, the stock performance with regard to the industry peer group and over time is weaker for the LBO companies. These findings are consistent with the FCF hypothesis.

Another central argument of Jensen's hypothesis is that LBO targets are companies with stable business histories and low prospects for profitable investment, i.e. low growth opportunities. I employ Tobin's q which is defined as the ratio of the firm's market value of assets divided by its replacement costs[14] as proxy for a firm's growth opportunities. Tobin (1969) describes firms with q's less than 1 as firms that have no incentive to invest because their capital equipment is worth less than the costs of replacing it. Results in Table III support the previous reasoning because LBO firms have significantly lower q ratios than companies remaining public. This finding confirms prior findings by Halpern et al (1999) and Weir, Laing and Wright (2005).

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[14] As other empirical studies I use the book value of assets as substitute for its replacement costs (see eg. Weir/Laing 2002).

Despite these unfavorable growth opportunities the FCF hypothesis predicts that likely LBO targets invest in negative net present value projects because managers want to increase their private benefits through empire building. Therefore, PE-Investors take a closer look at companies that "overinvest" with regard to their industry peers. In those companies, a more efficient structuring of the capital expenditures (CAPEX) will lead to a higher firm value. To capture inefficient investments I compare the companies' CAPEX to its industry peers' CAPEX.

Results in Table III do not support the notion that likely LBO targets invest more than their industry counterparts remaining public. This strengthens empirical evidence by Halpern, Kieschnick and Rotenberg (1999).

As a robustness check for the variables testing agency problems – namely undistributed FCF and CAPEX – I also investigate the shareholder structure in likely LBO firms and firms remaining public. In companies with scattered shareholdings the free rider problem prevents investors – especially those with small holdings – from sacrificing their resources to monitor the management (Amihud 1989 and Jensen and Murphy 1990). This "free-riding"-behaviour of the individual small shareholders leads to a situation where the company's shares are traded at a discount on the stock exchange. Following this argument, potential acquirers should try to identify those companies in order to reap the gains after the elimination of those agency costs.

Therefore, I expect that companies with a higher free float are more likely to undergo an LBO transaction than companies with large blockholders.

But Grossmann and Hart's (1980) free riding argument in takeover situations may predict differently. They found that shareholders in an atomistic shareholder structure do not want to tender their shares to the bidder whenever they assume that the intrinsic value of the firm is higher than the offer price. This behaviour can be explained by the fact that small shareholders are not pivotal in the success of the takeover and therefore, they prefer to wait until the new acquirer has increased the value of the firm. Following this argument, the probability of conducting an LBO transaction should be lower for companies with an atomistic shareholder structure.

The free float is being determined by subtracting all shareholdings of investors with a share of more than 5%[15] of the share capital from the total share capital. These shareholdings are based on the last annual financial statement published prior to the LBO announcement. In contrast to common stock exchange free float-definitions,[16] shareholdings of mutual funds are considered not to be free float as soon as they are in excess of 5%. It can be argued that these sizeable shareholdings give the fund a certain degree of influence. In addition, such funds will probably pay more attention to management's actions than funds with smaller shareholdings. Even though it is unlikely that fund managers with large shareholdings will actively interfere, they will surely have and use the opportunity to directly approach management to express their views.[17]

As can be seen in table XV, the firm's free float level does not explain the buyout activity of PE-investors. This leads us to the conclusion that either non or both of the above mentioned effects have a significant influence on the probability to go private.

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[15] Although shareholdings below 5% have to be declared in the UK, I applied the 5% threshold European wide in order to get consistent results (e.g. the German regulation defines the threshold as 5% and therefore it is not possible to get information about shareholdings below 5%).
[16] E.g. the definition of the Deutsche Börse AG.
[17] As a robustness check I also computed the free float level by applying the common definition of free float as stated by the Deutsche Börse AG. This average free float level is 0.743 for the companies staying public and 0.749 for the LBOs. There is no significant difference between the two samples.

Another important argument in Jensen's FCF hypothesis is the benefit of debt in motivating managers to work more efficiently. PE-Equity firms look for companies that underutilize their debt capacity. Managers in those firms control the distribution of the FCFs. By increasing the debt-level in the company's capital structure the management is forced to distribute future FCFs to debt-holders and hence can make a credible signal to investors not to waste FCFs. The best proxy in this context is the ratio of nebt debt to EBITDA. Net debt is the sum of long and short term debt less cash and marketable securities. The lower the ratio the more the company can be indebted in the future and the more the management can be disciplined with the help of leverage. Consistent with the results of Halpern, Kieschnick and Rotenberg (1999) for the US market I do not find evidence of a beneficial role of debt in European LBOs.

The univariate tests do not support Jensen's hypothesis that likely European LBO candidates suffer from agency problems. However, they support other important arguments of the FCF hypothesis: LBO firms show high FCF before distribution, significantly poorer stock price performance with regard to competitors and in the course of time, and low growth opportunities.

The univariate analysis has the disadvantage that it cannot capture the interactions between the explanatory variables. Therefore, I now turn to a multivariate regression analysis.

Multivariate Analysis of LBO characteristics

Empirical Model

The dependent variable under scrutiny is a binary variable indicating whether a company was taken private via LBO in the time period from 1997 to 2002 (1=LBO, 0=staying public). A simple linear regression does not account for the particular requirements of the dependent variable that only takes on the values 0 or 1. The problems of OLS regression in the context of a binary dependant variable are the following:[18]

First, the fitted value of the dependant variable in a simple OLS regression is not restricted to take on values between 0 and 1. Second, estimating the coefficients in line with OLS assumptions puts improper restrictions on the residuals of the model.

Palepu (1985) shows that under certain circumstances[19] the functional relationship between the likelihood of a company undergoing an LBO and its characteristics can be represented by the following probability model:

$$p(i, t) = \frac{1}{1 + e^{-\beta x(i,t)}} \tag{3}$$

The explanatory variables follow the Type I extreme value distribution which implies that P(i,t) is a logit probability function. The intuition behind this model can be explained as follows:[20]

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[18] For a detailed discussion of the logit model see: e.g. Greene (2003).
[19] Inter alia these assumptions are that there is a large amount of bidders for the target company and that the shareholders of the target accept the best offer for their shares.
[20] For details see: Palepu (1985).

The probability of an LBO transaction depends on the number of offers potential acquirers make for this target company. This again depends on the specific characteristics of the company which are measured by the matrix x(i,t). The probability distribution of these random variables determine the specific functional form of the acquisition model.

In the context of this analysis – employing a choice based sample - I conduct a conditional maximum likelihood estimation[21] in order to account for the sample selection and to avoid biases in the estimators of the intercept and the variance estimates.

Multivariate Results

I estimate three different empirical models. The first model includes all variables that have a potential influence on the probability of a going private transaction. Besides the variables included in the univariate analysis I add four interaction terms in order to capture the influence of the different Corporate Governance Standards in the UK and Continental Europe. The four additional interaction terms included are FCF (AD), FCF (BD), CAPEX and Free Float multiplied each with a dummy that is one for Continental Europe and 0 for the UK.

The second model is a restricted model which only includes those variables that are significant in model one. In model three I exclude two variables of the first model in order to avoid multicollinearity problems between the independent variables.[22] Table IV displays the results of the three different logit models.[23]

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[21] For details see: Manski and McFadden (1981).
[22] I excluded all variables whose correlation coefficient with another variable is larger than 50%. These variables are: FCF (AD) and Size (high pairwise correlation with FCF (BD) and Tobin's Q, respectively).
[23] There is no evidence of heteroscedasticity in the residuals of all three regressions as the likelihood ratio statistics for testing the homoscedasticity assumption in all three models are below their 95% critical values.

Insert Table IV here

The likelihood ratio statistics for models I and III are significant at the 5% level and for model II at the 1% level. These statistics are used to test the overall significance of the models

The McFadden R-squared ratio is an analog to the R^2 reported in linear regressions and hence measures the explanatory power of the models. Throughout the models the explanatory power is quite high as the ratios are 25.9%, 14.2% and 24.4%, respectively. Similar studies like Huffman (1995) (R^2s ranging from 3.73% to 6.23%) and Palepu (1985) (R^2s ranging from 6.95% to 12.45%) show significantly lower R^2s than this study.

In model I, there are three variables that affect the probability of companies going private. Firstly, there is the FCF (BD) variable for Continental European companies which captures the operating performance of the target company and is significant at the 5% level. In addition, the variables P/E and the Tobin's q are significant at the 10% level. Thus, the multivariate results confirm the univariate results at least for Continental European companies and to a lesser degree for all European companies. The variables FCF (AD), FCF (BD), PRICE, CAPEX, Free Float, Net Debt/EBITDA, Size, FCF (AD) Conti.Europe, Free Float Conti.Europe and CAPEX Conti.Europe have all insignificant coefficients. Therefore, the results of the multivariate analysis fail to support the FCF hypothesis in all its details.

Model II only includes the significant variables of the first model and therefore serves as robustness-check. It shows the same results as model I. Due to multicollinearity problems in model I (for details see: footnote 21) I estimate a third model where I omit the highly

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correlated variables that cause these problems. The results of model III confirm the results of the first two models.

In summary, companies whose P/E ratio is significantly lower than that of their industry peer group and that have low growth opportunities are more likely to undergo an LBO in Europe. In addition to that, the likelihood of an LBO is higher for Continental European companies that have high Cash Flows before distribution. Finally, all variables proxying for agency problems (namely FCF (AD), CAPEX and Free Float) in the multivariate analysis are insignificant. Thus, I can conclude that the elimination of agency problems through the Private Equity Investor cannot explain the odds of companies going private in the European markets.

Conclusion

In this study the application of Jensen's free cash flow hypothesis (1986) to European LBO transactions is examined. Results from univariate and multivariate analyses indicate that the predictions derived from the FCF hypothesis are not supported in all its details. Neither the level of FCF after distribution (a variable used in recent studies for the US, e.g. Lehn and Poulsen 1989 and Opler Titman 1993) - nor other variables testing the mitigation of agency problems through an LBO significantly influence the probability of European companies going private.

Still, I find distinguishing features of LBO targets and companies remaining public that confirm former empirical results by Halpern, Kieschnick and Rotenberg (1999) for the US market and Weir, Laing and Wright (2005) for the UK market.

The univariate results indicate that LBO firms tend to have lower growth opportunities and poorer performance than their industry counterparts prior to the LBO announcement and have significantly higher FCFs before distribution to debt- and equity holders and the government. These results are consistent with Jensen's theory since these features characterize companies in cash-rich industries with stable operating earnings and few investment opportunities whose market value does not reflect the intrinsic value of the firm. The multivariate results confirm the univariate findings for Continental European firms and, to a lesser degree, for all European companies.

The implications of these results are that corporate governance does not seem to matter with regard to the probability of a company being taken private. The past operating performance, the prospects of the future operating performance and the firm's stock price are the driving forces influencing the odds of a company becoming an LBO target.

Future investors in European equity markets should take these considerations into account when making their investment decisions because shareholders of companies going private in European markets earn abnormal returns in the range from 28% to 29%.[24]

Therefore, further research into this topic should try to examine the possibility of identifying the ex-ante probability of future LBO transactions in order to derive a profitable investment strategy.

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[24] For evidence see: Andres, Betzer and Hoffmann (2005) and Renneboog, Simons and Wright (2005).

Table I

Country Composition

Country	Sum
Austria	1
Denmark	1
Finland	1
France	9
Germany	7
Ireland	2
Netherlands	1
Sweden	3
UK	48
Overall Sum	73

Table II

Number, average transaction value, median transaction value and total deal value of the 73 sample LBOs 1997-2002

Transaction Values are taken from the *Bloomberg* database

Year	Number of LBOs	Average of transaction value (in Mio. €)	Median of transaction value (in Mio. €)	Total Deal Value (in Mio. €)
1997	2	166.0	166.0	332.0
1998	10	510.8	204.1	5108.1
1999	27	417.8	201.3	11279.4
2000	20	389.8	428.6	7795.8
2001	5	452.0	314.0	2259.8
2002	9	634.3	223.0	5708.6
1997-2002	73	445.0	220.0	32483.7

Table III

Results of the Univariate Analysis

The following table compares the LBO companies with the companies remaining public. The data is taken from the last published balance sheet before the buyout announcement (apart from the *P/E* and the *PRICE* variables). The FCF (AD) variable measures the earnings before depreciation and amortization but after tax, interest payments and dividends standardized with total sales. The FCF (BD) represents the EBITDA divided by total sales. The relative *P/E-ratio* is computed by dividing the company's *P/E-ratio* by the *P/E-ratio* of the industry peer-group. The numerator of the variable *price* is defined as the ratio of the closing market price two months prior to the LBO transaction divided by the average price, measured over 500 trading days counting backwards from two months prior to the LBO transaction. In order to exclude market movements I divide this figure by the equivalent ratio of the respective country MSCI market index. *Tobin's q* is the ratio of the firm's market value of assets divided by its book value. The variable *CAPEX* is computed by dividing the average capital expenditures of the company over a 3 year horizon by the average capital expenditures of its industry competitors over the same time period. The *free float* is being determined by subtracting all shareholdings of investors with a share of more than 5% of the share capital from the firm's total share capital. The *Size* variable is simply the market value of equity.

	LBOs		Public Companies		
	Mean	SD	Mean	SD	T-Statistic
FCF (AD)	0.061	0.142	0.071	0.069	-0.590
FCF (BD)	0.404	0.709	0.171	0.162	**2.806***
P/E	0.814	0.486	1.050	0.454	**-4.157***
PRICE	0.812	0.301	1.002	0.562	**-5.400***
Tobin's q	1.754	2.988	4.397	7.997	**-7.558***
CAPEX	1.194	0.876	1.129	0.609	0.636
Free Float	0.477	0.190	0.454	0.194	1.034
Net Debt/EBITDA	0.706	4.253	0.788	3.690	-0.165
Size	227.034	383.616	277.622	785.821	-1.127

*significant at the 5% level.

Table IV

Estimated Coefficients and t-statistics (in parentheses) of the logit regression models

The table shows results of binary logit regressions corrected for choice based sampling for 73 European LBOs and 73 companies remaining public between 1997-2002. The first model includes all variables that have a potential influence on the probability of a going private transaction. The second model is a restricted model which only includes those variables that are significant in model I. In model III I exclude five variables of the first model in order to avoid multicollinearity problems. To estimate the models I use LIMDEP (version 7.0).

explanatory variable	expected sign	model I	model II	model III
Constant	+/-	0.249 (0.19)	-0.286 (-0.43)	0.252 (0.19)
FCF (AD)	+	-1.668 (-0.51)		
FCF (BD)	+	0.015 (0.67)		0.027 (0.36))
P/E	-	**-1.524 (-1.69)***	**-1.014 (-1.75)***	**-1.642 (-1.79)***
PRICE	-	-1.024 (-1.13)		-0.885 (-1.063)
Tobin's q	-	**-0.245 (-1.92)***	**-0.206 (-1.87)***	**-0.258 (-1.91)***
CAPEX	+	0.426 (1.07)		0.441 (1.11)
Free Float	+	0.606 (0.29)		1.077 (0.57)
Net Debt/EBITDA	-	-0.045 (-0.25)		-0.060 (-0.27)
Size	-	0.017 (1.21)		
FCF (AD) Conti.Europe	+	-14.136 (-1.36)		-13.13 (-1.021)
FCF (BD) Conti.Europe	+	**0.129 (2.30)****	**0.016 (2.17)****	**0.037 (2.267)*****
Free Float Conti.Europe	+	-2.263 (-0.80)		-2.588 (-0.91)
CAPEX Conti.Europe	+	-0.581 (-0.45)		-0.567 (-0.46)
N		146	146	146
Mc Fadden R^2		0.259	0.142	0.244
LR-statistic		36.87	20.09	34.63
Significance level		0.022	0.008	0.014

*significant at the 10% level, **significant at the 5% level, ***significant at the 1% level

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Annex:

LBO – Sample from 1997 to 2002

Corporation	Country	Successful Offer Date	Deal Value Mill. €	Private Equity House
Wellman	UK	16.12.1997	151.3	Alchemy Partners
Betterware	UK	22.12.1997	180.7	Natwest
JLI Group	UK	06.01.1998	83.7	Phildrew Ventures
B.Elliot	UK	16.02.1998	122.1	Morgen Grenfell
Watmoughs	UK	23.02.1998	1026.4	Investcorp
Brunner Mond	UK	24.03.1998	304.3	Citicorp Venture
Tunstall Group	UK	19.05.1998	92.1	Intermediate Capital Group
Thorn	UK	30.06.1998	1447.6	Nomura
Willis Corroon	UK	22.07.1998	1517.3	KKR
Concentric	UK	06.08.1998	176.3	Natwest
UPF Group	UK	04.09.1998	106.4	Phildrew Ventures
Ushers of Trowbridge	UK	21.12.1998	231.9	Alchemy Partners
Hall Engineering	UK	01.04.1999	208.3	Candover
Hozelock	UK	08.01.1999	129.3	CVC Capital Partners
Westminster Health Care	UK	22.03.1999	325.2	Goldman
Honsel AG	D	24.03.1999	160	Carlyle
Avonside	UK	09.04.1999	37.2	Alchemy Partners
Tracker Network	UK	30.04.1999	61.7	Apax
KTM Sportmotorcycle AG	AU	05.05.1999	163	BC Partners
Hillsdown Holding	UK	14.05.1999	1370.1	Hicks, Muse, Tate
Greycoat Plc	UK	21.05.1999	797	Mercury Private Equity
Denby Group	UK	26.05.1999	74.7	Phildrew Ventures
Salehurst	UK	26.05.1999	34.4	Natwest
Symonds	UK	27.05.1999	59.7	Natwest
Adscene	UK	29.06.1999	141.4	3i
Friedrich Grohe	D	16.07.1999	1134	BC Partners
Eldon	S	10.08.1999	355.4	EQT Partners
Wyko Group	UK	24.08.1999	203.4	Royal Bank Dev. Capital
Clondalkin Group	IRL	08.09.1999	540	Candover
Rep	F	15.09.1999	67.1	ABN Amro
Norcros	UK	06.10.1999	285.0	Natwest
Saunatec Oy	FIN	09.11.1999	21.9	Sponsor Capital
Wardle Storeys	UK	17.11.1999	201.3	Alchemy Partners
Gautier France	F	18.11.1999	91.5	Axa
Monark Stiga	S	19.11.1999	151.3	UBS Capital
Lambert Fenchurch	UK	22.11.1999	389.8	DLJ Phoenix Private Equity
Epwin Group	UK	25.11.1999	98.9	ABN Amro
United Biscuits	UK	14.12.1999	2984.1	Hicks, Muse, Tate
Michel Thierry	F	31.12.1999	251.5	Paribas
CPL Aromas	UK	14.01.2000	37.7	Intermediate Capital Group
Autodis Finelist	UK	11.02.2000	482.4	Butler Capital Partners
Wassall	UK	11.02.2000	1121.4	KKR
Marie Brizard	F	30.03.2000	175.3	Duke Street Capital
Hogg Robinson	UK	10.05.2000	640.8	Schroders Ventures
Knürr	D	11.05.2000	76.7	3i
Kiekert AG	D	07.06.2000	613.6	Schroders Ventures
De Dietrich	F	03.07.2000	457.3	ABN Amro

Wolstenholme Rink	UK	25.07.2000	103.1	Rutland Fund Management
Vulcanic	F	23.08.2000	40.6	Axa
Wickes	UK	01.09.2000	538.6	Duke Street Capital
Powell Duffryn	UK	03.11.2000	884.2	Nikko Principal Investment
Peter Black Holdings	UK	15.11.2000	477.2	3i
Flender AG	D	29.11.2000	474.6	Citicorp Venture
Fives-Lille	F	04.12.2000	220	Industri Kapital
Brooks Service Group	UK	05.12.2000	49.9	Alchemy Partners
Koninklijke Ahrend	NL	05.12.2000	333.5	HAL Investments
Perkins Foods	UK	18.12.2000	399.9	ABN Amro
Fairview Holdings	UK	21.12.2000	597.3	3i
Bourne End Properties	UK	22.12.2000	71.7	Merril Lynch
Anglian Group	UK	12.03.2001	314	Alchemy Partners
Perstorp	S	22.03.2001	767.4	Industri Kapital
WT Foods	UK	11.06.2001	207.9	Bridgepoint Capital
Britax	UK	04.07.2001	872.9	Royal Bank Private Equity
Oasis	UK	13.07.2001	97.6	PPM Ventures
Vest-Wood A/S	DK	12.03.2002	215.9	Axcel Private Equity
Labeyrie Group	F	15.03.2002	193	Industri Kapital
Gardena	D	21.03.2002	298.0	Industri Kapital
Jefferson Smurfit	IRL	02.05.2002	3700	Madison Dearborn Partners
Kunick	UK	23.05.2002	223	Electra Partners Europe
FCX International	UK	29.05.2002	91.9	Alchemy Partners
Créatifs	F	04.06.2002	67	Alcyon Finance
Brake Brothers	UK	25.06.2002	669.8	CD&R
Edscha	D	12.12.2002	250.0	Carlyle