When Do Managers Seek Private Equity Backing in Public-to-Private Transactions?

Jana P. Fidrmuc, Peter Roosenboom and Dick van Dijk

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When Do Managers Seek Private Equity Backing in Public-to-Private Transactions?*

Jana P. Fidrmuc[†]
Warwick Business School

Peter Roosenboom[‡]
RSM Erasmus University

Dick van Dijk[§]
Econometric Institute
Erasmus University Rotterdam

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Abstract

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JEL Classification: G32, G34

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[†]Warwick Business School, University of Warwick, Coventry CV4 7AL, United Kingdom, E-mail: Jana.Fidrmuc@wbs.ac.uk (corresponding author)

[‡]Department of Financial Management, RSM Erasmus University, P.O. Box 1738, NL-3000 DR Rotterdam, The Netherlands, e-mail: proosenboom@rsm.nl

[§]Econometric Institute, Erasmus University Rotterdam, P.O. Box 1738, NL-3000 DR Rotterdam, The Netherlands, e-mail: djvandijk@ese.eur.nl

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Abstract

Over the last decade, the going private market has experienced a considerable boom in size and also has become more interesting for private equity investors that are looking to partner with incumbent management. This offers managers the choice to take the firm private themselves in a traditional management buyout or to seek private equity backing. We propose that managers decide for a management buyout without any involvement of private equity in case they are less financially constrained: when their firms are undervalued, have high cash levels, are smaller and less financially visible, and the managers own a large toehold. In contrast, managers invite participation of private equity investors when they cannot complete the deal themselves: in firms that are larger, have less cash and managers own a smaller fraction of the firm. Our analysis on a sample of UK public-to-private transactions completed over the period 1997-2003 provides results that are in line with these predictions.

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1 Introduction

Around the world, the number of firms deciding for a public-to-private transaction has increased dramatically over the last decade. More and more companies consider going private because the reality of being a public company has fallen far short of the anticipated benefits. Another interesting development in the public-to-private market is that private equity investors have considerably increased their investment (Wright et al., 2006; Cumming et al., 2007, Bharath and Dittmar, 2009) and at the same time changed their strategy concerning their targets (Kiechel, 2007). In the 1980s, private equity investors often engaged in highly leveraged transactions many of which were seen as hostile by incumbent management (Lowenstein, 1985; Lehn and Poulsen, 1989). Nowadays, private equity investors are looking to partner with management. Incumbent managers typically remain with the company for some time after the private equity backed deal and, importantly, profit from their involvement in the deal through a generous compensation package (*Wall Street Journal*, 17 May 2007).

The new involvement of private equity investors in the public-to-private (PtP) market presents managers with the choice to take their firms private themselves or to obtain the backing of a private equity house. This paper is the first to examine this decision more closely. We compare MBOs, private equity backed deals and a control group of firms that remained publicly listed as three independent alternatives in a multinomial logistic regression. This helps us to explain the managers' choice between MBOs versus private equity backed deals in the public-to-private process.

The existing literature provides several reasons for why publicly listed firms may decide to go private. For example, managers may decide to take their firms private when they face a takeover threat (Lehn and Poulsen, 1989) or when their firm is undervalued. However, given that the private equity involvement in PtP deals is a relatively new phenomenon, the literature mostly does not investigate the decision of when managers seek private equity backing of the transaction. We put forward five non-mutually exclusive hypotheses all with a common theme that managers are less

likely to rely on private equity backing when they are not financially constrained. In particular, we propose that managers do an MBO (rather than a private equity backed deal) when their firm is relatively more undervalued, is smaller, has high cash levels, managers own a large toehold and the firm is less financially visible. In contrast, managers invite participation of private equity investors and share control when they cannot do the deal themselves: in firms that are larger, have less cash at hand and managers own smaller share of the firm. In what follows, we describe the individual hypotheses in more detail. We should note here that as the focus of the paper is on the managers' choice, we take the interest of private equity investors in the deals as given. We argue that private equity investors are rational and would not be involved in a deal without expecting a positive return.

Undervaluation hypothesis: Survey evidence by Maupin et al. (1984) suggests that perceived undervaluation is one of the primary reasons for PtP transactions as it potentially limits management's ability to use benefits available to public companies as, for example, the accessibility of funds required to finance new investment projects or acquisitions as outside equity becomes more expensive for undervalued firms (Allen and Gale, 1999; Pagano et al., 1998). Undervaluation is also one of the main sources of shareholder wealth gains in PtP transactions (Renneboog et al., 2007). Moreover, undervalued firms are more likely to attract hostile takeover interest (Lehn and Poulsen, 1989) that may lead to managers losing their jobs (Lowenstein, 1985) which further increases managers' incentives for taking their firm private. Moreover, undervaluation is closely associated with financing constraints of the managers as the deal becomes cheaper. We therefore predict that managers are more likely to take their firms private without private equity backing when their firm is more undervalued.

Firm size hypothesis: An important factor that might drive the decision of whether to seek private equity backing when going private is firm size. However, most existing papers investigating the decision to go private have a control group that is matched based on industry and size (Lehn and Poulsen, 1989; Kieschnick, 1998;

Weir et al., 2005) or do not include firm size as an explanatory variable (Halpern et al., 1999). We argue that as firm size gets larger the ability of managers to take the firm private themselves declines because of financial constraints. This increases the need for backing by private equity investors. We use a random control sample which allows us to test this firm size hypothesis.

Cash availability hypothesis: Most of the empirical evidence concerning going private transactions so far is based on Jensen's free cash flow hypothesis. Jensen (1986) proposes that debt-financed going private transactions may provide a solution to firms in cash-rich, slow growth and declining industries that are vulnerable to conflicts of interest between managers and shareholders over payout and investment policies. The empirical studies testing the free cash flow hypothesis in the context of going private transactions, however, provide mixed results (Lehn and Poulsen, 1989; Opler and Titman, 1993; Kieschnick, 1998; Renneboog et al., 2007). In this paper, we focus on a different aspect of cash-rich firms. We do not highlight the agency issues but rather propose that managers of cash-rich firms are less financially constrained to execute the transaction. They may see the potential of a leveraged transaction to gain control over their firms as they have the excess cash available to fund the transaction (Fox and Marcus, 1992) without the backing of a private equity investor.

Managerial toehold hypothesis: Halpern et al. (1999) and Elitzur et al. (1998) argue that managers who own a large stake in the company have more incentives to initiate a levered buyout. Managers with large stakes need to buy relatively fewer shares from other shareholders in order to become the sole owners of the firm. This makes it more financially feasible for them to go private without private equity investors obtaining an equity stake in the company.

Low visibility hypothesis: Bolton and von Thadden (1998) and Boot et al. (2006) highlight liquidity and low cost of capital as important benefits of public versus private ownership. Furthermore, thinly traded stocks have lower analyst coverage in general and are at risk of being neglected by investors when taking their investment

decisions (Merton, 1987). Thus, firms that are not able to attract an adequate level of investor recognition have to bear the high cost of stock exchange listing while not taking enough advantage of the benefits of being a public company (Mehran and Peristiani, 2009) and are therefore more likely to go private. Moreover, illiquidity is often associated with high ownership concentration (Rubin, 2007) and therefore lower takeover probability. Also, illiquid stock is more vulnerable to greater mispricing (Mehran and Peristiani, 2009). Existing shareholders that wish to dispose of their thinly traded shares at an attractive price may therefore have little alternative than to agree to sell to management in a going private transaction. We conjecture that this improves the bargaining position of management and enables them to take the firm private at a cheaper price without the need for private equity backing.

Our results on a sample of 54 MBOs and 75 private equity backed buyouts in the UK over the period from 1997 to 2003 are in line with these predictions. Our tests when modeling the managers' decision indicate that managers make the decision to go private and the choice whether or not to partner up with a private equity investor at the same time. One can interpret this as managers seeing only one way of performing the going private transaction: they either opt to take their firm private through an MBO transaction or they seek private equity backing for their deal. The other option is not viable for them and therefore they make the two decisions (to go private and whether or not to seek private equity backing in doing so) at the same time. Moreover, we show that when managers face unwelcome takeover pressure, they decide to take their firm private to keep their job. In this decision, conditional on the firm characteristics, they have a choice to remain in full control (opt for an MBO) or share control with a private equity investor. Managers opt for an MBO when the deal is relatively cheap because of undervaluation of their firm stock, when they already own a large equity stake in the company or when their firms are less financially visible. They are also more likely to take their firm private themselves when the firm has substantial cash holdings that can be used for deal financing. This highlights a slightly different aspect of cash-rich firms than reported in prior studies

(for example, Lehn and Poulsen, 1989 and Opler and Titman, 1993). Taken together, our results suggest that managers only invite private equity investors to back them when they are more financially constrained to complete the deal themselves. This is the case when firms have less cash and managers own a smaller fraction of the company. These results show that MBOs are different from private equity backed deals and so indicate that private equity involvement in the PtP market extends the possibilities for managers when considering a PtP transaction.

The rest of the paper is organized as follows. The next section describes the data set and provides the descriptive statistics. It also describes the regression models. Section 3 shows the results and Section 4 concludes.

2 Data and methodology

2.1 Sample selection and descriptive statistics

Our original sample consists of 221 non-financial firms that have gone private in the United Kingdom during the years 1997-2003. We identify these PtP transactions from the database of the Centre for Management Buyout Research (CMBOR). We do not have data for 9 PtP firms and 32 firms operate in real estate. Therefore, we are left with 180 firms. Further, for all the PtP firms, we also obtain the offer documents accompanying the going private transaction from Thomson Research. We use these documents to determine management involvement and backing by private equity investors. First, we identify deals backed by a private equity house: we have a group of 83 private equity backed deals. In case the transaction is not backed by a private equity house we further examine whether any of the firm's executive directors are involved in the deal. This results in a group of 54 (pure) management buyouts. The remaining 43 transactions are backed by non-executive directors, wealthy families or institutional investors other than private equity houses. As this latter group is very heterogeneous and does not fit our research question, we drop it from our sample. In summary, we have 83 private equity backed deals and 54 MBOs.

In order to model the public-to-private decision, it is essential to establish who

the decision maker is. In case of MBOs, it is clear that management is in control. But is this also the case for private equity backed deals? The offer documents show that 3 private equity backed deals are buy-and-build deals initiated by private equity investors. The purpose of these deals is to merge the target company within an existing portfolio company of the private equity investor, so we exclude these 3 firms from the data set. Further, out of the 80 private equity backed firms, one deal is hostile and 14 bids are contested. The hostile bid results in ousting of the incumbent management. However, none of the 14 contested bids results in managerial change. In total, management is replaced only in 5 deals including the hostile offer. These are usually cases when firms are offered for sale due to insolvency. In further 3 cases, the deal results in a partial managerial change with prior board agreement. To be fully consistent with our model where we assume that the management is in control, we drop the 5 transactions with managerial change from our sample. We end up with 54 MBO deals and 75 private equity backed deals.

To run the multinomial logit, we need a group of control firms that remained publicly listed. We opt for a random sample of control firms. In each year of the sample period of 1997-2003 we randomly select 200 control firms from a population of around 1200 companies that continue to be publicly traded in a given year. The sampling procedure allows for a control firm to be included in the sample more than once. In total, we collect data on 1400 control firm-years that cover 960 different control firms. For both the PtP firms and control firms, we get market prices from Datastream, financial statement data from Worldscope, and hand-collect ownership structure and board composition information from Price Waterhouse Coopers' Corporate Register.

In the going private literature it is common to use a matched control sample of firms that remained public. Firm size and industry classification are the most commonly used matching criteria. In general, the sampling method (a random sample versus a matched sample) does not pose any advantages or disadvantages except for the case where the characteristics used for the matching process are important

determinants of the going private process (Halpern et al., 1999). We prefer random to matched sampling because we believe that firm size is a relevant factor influencing the decision to take the firm private with versus without private equity backing. Moreover, random sampling results in a larger data set. Nevertheless, we employ a matched sample (based on industry and size) as a robustness check.

Table 1 shows our variable definitions and Table 2 shows summary statistics for the random and matched control non-PtP firms, MBOs, and private equity backed deals, respectively. All variables are trimmed at the 1st and 99th percentiles, except the ownership and illiquidity variables. We test for differences in means and medians among our random control group, MBOs and private equity backed deals. We use a t-test for equal means allowing for unequal variances and a Mann-Whitney U-test for equal medians. Below we discuss the statistically significant differences in mean and median first between non-PtP firms versus MBOs and private equity backed deals. Then we turn to significant differences between the two PtP groups.

- insert Tables 1 and 2 about here -

Columns 5 and 6 in Table 2 report p-values for the differences in means and medians between control firms (random sample of non-PtP firms) versus MBOs and private equity backed firms, respectively. PtP firms, both MBOs and private equity backed, are valued less than control firms as indicated by their lower market to book ratios and also experience more takeover rumours. MBO firms are smaller, their shares are traded less actively than the shares of the control firms and are followed by fewer analysts. Moreover, the MBO firms have higher equity stakes held by executive directors and smaller financial institution ownership than the control firms. Private equity backed firms, in contrast, have higher ownership by financial institutions relative to control firms but their ownership concentration is lower. Private equity backed firms have less cash but at the same time are more profitable and pay higher dividends relative to control firms. MBOs pay lower tax.

Turning to the differences between the two groups of PtP firms (Column 7 of Table 2), we observe that private equity backed deals are larger and more profitable

relative to MBO deals. They pay higher dividends and tax. Their market to book ratio is higher indicating that they are less undervalued than the MBO deals. Private equity backed deals also enjoy more financial visibility as they are followed by more analysts and their shares are more actively traded. Ownership structure of the two groups is also significantly different: private equity backed firms have significantly lower executive ownership and higher ownership by financial institutions and their pre-transaction ownership concentration is lower. Finally, private equity backed firms have less cash on hand but higher cash flows. This seems to be a contradiction. However, DeAngelo and DeAngelo (2006) argue that the firm's current cash flow is not a suitable measure of managerial opportunism as it does not reflect the stock of resources at manager's disposal. What matters is managers access to the stock of liquid assets at all points in time which is better reflected in the firm's cash and marketable securities. In fact, free cash flow is highly correlated with the firm's profitability which indicates that it is restricted to affect managerial incentives only at a distribution point (DeAngelo and DeAngelo, 2006) and, thus, it may not be enough to encompass all resources at managers disposal and therefore is not able to generate empirically valid predictions. This suggests that the firm's cash level is a more suitable proxy for free cash at the disposal and discretion of the managers. Table 2 reports that private equity backed deals have less cash on their balance sheet than MBOs.

2.2 Multinomial logistic model

In the empirical analysis we employ multinomial logistic regression (MNLR) models to examine the differences and similarities between traditional management buyouts and private equity backed deals. The model includes also a (random or matched) control group of firms that remained listed, to address the question why the decision to undertake either of the two types of going-private transaction is made. So, we divide our sample of UK firms into three different groups: (1) management buyouts, (2) private equity backed PtP deals, and (3) non-PtPs. We denote the observed

group for firm i by the variable y_i, which can take the discrete values $1, 2, \ldots, M$, where $M = 3$ in our case. In the MNLR model the probability that firm i will belong to group m, conditional on the $(k \times 1)$ vector of explanatory variables x_i consisting of a constant and firm characteristics, is given by

$$P[y_i = m|x_i] = \frac{\exp(\beta_m' x_i)}{\sum_{l=1}^{M} \exp(\beta_l' x_i)}, \qquad \text{for } m = 1, \ldots, M. \tag{1}$$

For identification purposes, we set the coefficients for the non-PtP group of firms equal to 0, that is $\beta_3 = 0$.

The effects of the firm characteristics x_i on the probabilities that a firm engages in the different types of going-private deals is a nonlinear function of the model parameters β_m, such that interpretation of these parameters is not straightforward. For interpretation of the model, it is useful to consider the log-odds ratio of group m versus group l, defined as

$$\log\left(\frac{P[y_i = m|x_i]}{P[y_i = l|x_i]}\right) = x_i'(\beta_m - \beta_l). \tag{2}$$

This shows that firms with a larger value for $x_{i,j}$ more likely belongs to group m than to group l if $(\beta_{m,j} - \beta_{l,j}) > 0$, where $x_{i,j}$ indicates the j-th element of x_i, and $\beta_{m,j}$ and $\beta_{l,j}$ are the corresponding coefficients. Note that this does not necessarily imply that the probability that firm i belongs to group m increases with $x_{i,j}$, as the the odds ratios of group m versus the other categories also change. The net marginal effect of a change in $x_{i,j}$ on the group probability follows from the partial derivative of $P[y_i = m|x_i]$ with respect to $x_{i,j}$, which is given by

$$\frac{\partial P[y_i = m|x_i]}{\partial x_{i,j}} = P[y_i = m|x_i]\left(\beta_{m,j} - \sum_{l=1}^{M} \beta_{l,j} P[y_i = l|x_i]\right). \tag{3}$$

The sign of this derivative depends on the sign of the term between brackets, which may be positive or negative depending on the value of x_i. Hence, the sign of the marginal effect of $x_{i,j}$ on $P[y_i = m|x_i]$ will not always correspond with the sign of the coefficient $\beta_{m,j}$. Also note that the marginal effect depends on the values of the other explanatory variables in x_i, denoted as $x_{i,-j}$. In order to obtain a clear view on

the effect of the variable of interest $x_{i,j}$ one should therefore consider $\frac{\partial P[y_i=m|x_{i,j}]}{\partial x_{i,j}} = \int_{x_{i,-j}} \frac{\partial P[y_i=m|x_i]}{\partial x_i} dx_{i,-j}$, integrating out the effects of these other explanatory variables. In practice this can be done by averaging (3) across all realizations of $x_{i,-j}$ in the sample for each value of $x_{i,j}$.

An important assumption underlying the MNLR model in (1) is independence of irrelevant alternatives (IIA), meaning to say that the odds ratio of remaining public versus going private through an MBO does not depend on the inclusion of the private equity backed PtP deals, which can also be seen from (2). In economic terms, this comes down to the assumption that managers make the decision to go private and the choice whether or not to partner up with a private equity investor at the same time. Put differently, taking their firm private through an MBO transaction or by seeking private equity backing are not considered as competing options for management. We can examine the validity of this hypothesis by testing the IIA assumption, which is done by means of the specification test developed by Hausman and McFadden (1984)).

The MNLR model also provides an easy way to test whether the characteristics of firms involved in MBOs and private equity backed PtP transactions are significantly different. Note that such heterogeneity implies that certain firm characteristics such as analyst coverage and management ownership affect the relative probabilities of a firm belonging to the different groups. In other words, in the MNLR model the coefficients $\beta_{m,j}$ should differ across the MBO and private equity backed groups $m =$ 1 and 2. For an individual variable, $x_{i,j}$ say, the null hypothesis of no heterogeneity across groups m and l can easily be tested by means of a likelihood ratio test of the restriction $\beta_{m,j} = \beta_{l,j}$. The same holds for a given sub-set of the explanatory variables included in the model. Testing whether there is no heterogeneity at all is slightly more complicated, and effectively boils down to testing whether the two groups can be combined into one. This is done by means of the likelihood ratio test developed by Cramer and Ridder (1991).

Finally, we mention an important caveat in the maximum likelihood estimation

of the coefficients in the MNLR model in (1). Our overall data set is not a random sample from the population of all firms. In particular, we include *all* known MBOs and private equity backed deals during the period 1997-2003, but only a selected number of firms is included in the control group. In the case of random sampling, for each year in our sample period we only include 200 of the firms that remain listed, which in total equal 1200, on average. For the matched sampling case, the inclusion of control firms obviously is even more selective. This implies that in both cases PtP firms are considerably overrepresented in our sample compared to the underlying population of firms. Not accounting for this selective sampling would lead to biased estimates of the intercepts and incorrect standard errors for all estimated coefficients; see Kieschnick (1998) and Fok and Franses (2002) for detailed analysis of selective sampling in the context of binary and ordered logit models, respectively. The problem can be remedied by defining modified probabilities as

$$\tilde{P}[y_i = m|x_i] = \frac{\gamma_m P[y_i = m|x_i]}{\sum_{l=1}^{M} \gamma_l P[y_i = l|x_i]}, \qquad \text{for } m = 1, \ldots, M, \tag{4}$$

where γ_m is the fraction of firms in group m that is included in the sample. Hence, in our case $\gamma_1 = \gamma_2 = 1$ while in the random sampling case, for example, we have $\gamma_3 = 1/6$. The correct likelihood function, which is used for parameter estimation then makes use of these corrected probabilities.

3 Results

Table 3 reports the multinomial logit estimation results with randomly selected and matched control group of non-PtP firms in Panel A and Panel B, respectively. To account for industry and time effects, all regressors are taken in deviation from industry median and annual median values. Our model treats the non-PtP control firms as the omitted category. Hence, Table 3 reports two sets of coefficients: for MBO deals and for private equity backed deals. These coefficients show how the explanatory variables affect the probability of going private through the particular type of transaction relative to the probability of remaining public. The last column

in both panels shows p-values for a likelihood ratio test of equal parameters between MBOs and private equity backed deals. Thus, it shows significance of coefficient differences between the two going private types. Finally, the last two lines of the two panels show p-values for the likelihood ratio test of Cramer and Ridder (1991) that all parameters except the intercept are equal for the corresponding two groups and the independence of irrelevant alternatives test, respectively.

- insert Table 3 about here -

The independence of irrelevant alternatives test reported in the last row (for both random sample and matched control firms) confirms that a multinomial logit model fits our data better than a nested logit model. This also shows that the choice of the particular type of going private deal, whether the deal is indeed supported by a private equity house or is fully led by the management, is independent. Thus, the decision to go private is made at the same time as the decision about the type of the deal. Moreover, the no heterogeneity test of Cramer and Ridder (1991) suggests that the two going private groups have different deal characteristics from the non-PtP firms as well as from each other. The remainder of this section shows how the two groups of PtP firms differ and why they go private.

3.1 Takeover threat and undervaluation

To avoid a credible takeover threat is an important motivation for a manager to decide to take his firm private. The results in Table 3 strongly confirm this conjecture. The positive and significant (at the one percent level) coefficients for rumours show that both PtP types experience relatively high takeover interest in the period before the transaction compared to the control group. The difference in coefficients between the two groups of PtP firms is insignificant. Further, Table 3, Panel A suggests that perceived undervaluation plays an important role for PtP firms. The coefficient for the market to book ratio is significantly negative for both types of PtP deals showing that both MBOs and private equity backed deals are on average

undervalued relative to the firms that remain public. The coefficient for MBOs is more negative relative to private equity backed deals, but the difference is not statistically significant. The results in Panel B with matched control firms are slightly different as only the coefficient for MBOs is negative and significant and the difference between MBOs and private equity backed firms is statistically different at the one percent level. We also include sales growth over the last three years and return on assets as explanatory variables to control for growth prospects. The two variables are not statistically significant.

We perform two additional sensitivity checks to support our undervaluation hypothesis. First, we use the Rhodes-Kropf et al. (2005) market to book decomposition into three components: the firm-specific error; sector error and long-run value to book.[1] The results with the three components are reported in Table 4. The first two components refer to undervaluation: the firm-specific error should reflect deviations of firm value from short-run industry pricing and therefore measure firm-specific undervaluation relative to other peers in the industry at that point in time. The sector error should reflect sector-wide, short-run deviations from long-run pricing of all firms in the same industry and therefore measures short-run undervaluation of the whole industry. The third component separates out long-run growth prospects of the firm. Both coefficients for firm-specific error in Table 4 are significantly negative at the one percent level and not statistically different from each other. At the same time, the coefficient for the sector error is negative and statistically significant at the ten percent level for MBOs whereas it is positive and insignificant for private equity backed deals. The difference between the two coefficients is significant at the ten percent level. This indicates that both MBOs and private equity backed firms are short-run undervalued relative to their industry peers, but MBOs are, on top of this, in undervalued industries. Moreover, the effect of the third component indicates that MBOs are low long-run value to book firms whereas private equity backed deals are

[1]For the decomposition, we use Rhodes-Kropf et al. (2005) Model 3 (on page 577) with industries matching our previous specification in Table 3.

not. Thus, the market to book decomposition indicates that MBOs versus private equity backed PtP firms are different both with respect to undervaluation as well as long-run growth prospects. This is in line with the overall story that managers seeking private equity backing are more financially constrained.

- insert Table 4 about here -

Second, we use insider trading patterns in our firms to support the view that our results on the market to book ratio pick up the effect of private information. If undervaluation is indeed one of the reasons for going private, we could expect that managers trading in advance of the event may partially reveal the importance of that information. In fact, Harlow and Howe (1993) document significant increase in trading by insiders prior to the announcement of US management-led buyouts over the period from 1980 to 1989. They show, however, that this abnormal pattern arises not from increases in purchases but from abnormally low levels of stock sales. Harlow and Howe (1993) argue that this passive insider trading strategy is preferred by managers as it reduces their liability risk. In line with this existing evidence, our management sponsored deals should experience abnormally low insider sales relative to the private equity backed deals and non-PtP firms. In order to show this, Table 4 includes two dummy variables that reflect the insider purchase and sale patterns of executive directors of firms in our sample. In particular, the executive director purchase (sale) dummy is set to one in case an executive director purchased (sold) some shares of his/her own firm in the calendar year prior to the announcement and set to zero otherwise. Our results confirm that managers of MBOs tend to sell their shares significantly less often than their counterparts in non-PtP firms and private equity backed deals. We do not see any significant differences for the purchase patterns. Thus, our results are in line with Harlow and Howe (1993) and support our conclusion that firm undervaluation is more important in motivating MBOs versus private equity backed deals.

3.2 Firm size, cash availability and managerial toehold

We can explore the effect of size only relative to the random sample of control non-PtP firms (in Panel A of Table 3) as size is one of the matching requirements in Panel B. The coefficient estimates for size (log of total book value of assets) are not in line with our hypothesis that buying smaller firms implies looser financial constraints and therefore should be associated with MBOs. In fact, the two coefficients have opposite signs and both are insignificant. Inspecting the correlation matrix, however, we find high positive correlation between size and thin trading. This means that inclusion of the thin trading variable in the regression strongly impacts the coefficients for size. As both variables are important and their correlation does not affect other coefficients, we opt to include both total assets and thin trading in our main model. However, Table 5 reports a set of regression results without thin trading. Both of the size coefficients are now negative and statistically significant at conventional levels. Equality of the two coefficients, however cannot be rejected. This suggests that both MBOs and private equity backed PtP firms are smaller relative to the control sample.

- insert Table 5 about here -

Free cash at discretion of managers is the next characteristic that may motivate a PtP deal and potentially distinguish MBOs from private equity backed deals. We conjecture that more cash rich firms are more likely to go private without private equity backing because they have the means of doing so. The coefficients for our cash variable in Panel A of Table 3 are positive for MBOs and negative for private equity backed deals. Even though only the latter coefficient is significant at the ten percent level, they are statistically different from each other at the five percent level. In Panel B the coefficient for MBOs is statistically significant at the ten percent level and the difference is significant at the one percent level. Thus, our results suggest a sharp difference in the effect of cash levels: MBOs seem to be cash rich while private equity backed deals suffer very low cash levels. We control for

payout ratio and leverage as cash, dividend and capital-structure decisions may be interconnected (DeAngelo and DeAngelo, 2006). Table 3 shows that neither payout ratio nor leverage are statistically significant at conventional levels.

An alternative interpretation of the low cash levels of private equity backed deals might be firm insolvency and inability to pay interest payments. To account for this possibility, we check average interest coverage across deciles of cash levels of the private equity backed firms. This exercise, however, shows that interest coverage is not related to cash level of the private equity backed deals. Including interest coverage in the regression does not result in a significant coefficient for the private equity backed deals nor does this affect the cash coefficient.[2]

As a sensitivity check we also estimate excess cash, recently proposed to proxy for corporate cash reserves (Opler et al., 1999 and Dittmar and Mahrt-Smith, 2007). We estimate a cash regression that should determine normal cash levels used to cover companies liquidity needs.[3] Residuals of this regression then measure cash reserves held in excess of those needed for operations and investments. These resources are most probably used at managers' discretion (Dittmar and Mahrt-Smith, 2007). In Table 6, we partition the cash variable from Panel A of Table 3 into two separate variables: normal cash and excess cash representing the fitted values and residuals from the cash regression, respectively. The results for excess cash are equally strong despite fewer observations due to data availability for the cash regression. The regression in Table 6 includes also free cash flow and shows that free cash flow does not affect the decision to do a public-to-private deal.

- insert Table 6 about here -

[2]All results are available upon request.

[3]Following Opler et al. (1999) and Dittmar and Mahrt-Smith (2007) we regress the natural logarithm of cash over net assets (total assets minus cash and marketable securities) on the natural logarithm of net assets, market to book adjusted for net assets, net working capital over net assets, capital expenditures over net assets, R&D over net assets, free cash flow over net assets, leverage and a dividend dummy. All variables are industry and time adjusted. Due to missing data, we are able to obtain only 1,437 observations for excess cash compared to 1,579 observations in our full sample.

Our next deal characteristic concerns pre-transaction ownership. Table 3 shows that the coefficient for executive ownership in MBO deals is positive and significant at the one percent level while the coefficient is not significant for private equity backed firms. The difference in coefficients between the two types of PtP firms is significant at the one percent level. This shows that high executive ownership increases the probability of an MBO relative to both non-PtP firms and private equity backed firms. We also check for ownership concentration measured by the Herfindahl index. The results suggest that ownership concentration is significantly higher for MBOs and lower for the private equity backed deals which is in line with higher executive ownership for MBOs.[4]

3.3 Financial visibility

Finally, we turn to the effect of financial visibility. The results in Table 3 show that low financial visibility increases chances of MBOs whereas it is not important for private equity backed deals. In Panel A, the coefficient for the number of analysts following a firm is negative and significant at the ten percent level for MBOs whereas it is positive but not significant for private equity backed deals. Importantly, the two coefficients are significantly different at the five percent level indicating that firms that decide for an MBO suffer significantly lower financial visibility relative to private equity backed deals. Analyst following is, however, not significant in Panel B of Table 3 with the matched sample. This is perhaps due to the smaller number of observations. The results for thin trading (high fraction of zero returns) are even stronger. Thin trading is associated with higher probability of an MBO relative to both the non-PtP control firms as well as private equity backed deals (both statistically significant at the one percent level).

An important issue is that our results for financial visibility may be driven by size as the two variables are closely related (O'Brien and Bhushan, 1990). Put differently, it may be the case that our PtP firms, especially the MBO deals, are relatively small

[4]All results are available upon request.

and then of course, they are thinly traded and not followed intensively by analysts. Even though we implicitly control for firm size in the matched sample and still get strong results for thin trading, to make a stronger case for our visibility hypothesis, we check distribution of PtP firms across the size spectrum of our sample and relate analyst coverage and thin trading for PtP versus non-PtP firms within all size groups. Table 7 shows mean values of analyst coverage and thin trading measures as well as frequencies of private equity backed and management sponsored deals across size deciles (measured by total assets). The table shows that low analyst coverage and thin trading are indeed negatively correlated with size. However, it also shows that even though the going private firms are significantly underrepresented among the smallest and largest firms, PtP firms are relatively evenly spread across the remaining 8 middle size deciles. Thus, this indicates that the association between financial visibility and probability of going private is not due to the size effect.

- insert Tables 7 and 8 about here -

To push this argument further, Table 8 reports the same statistics by size deciles separately for the non-PtP random sample firms, private equity backed firms, and MBOs, respectively. Panel A, reporting the means for the non-PtP firms, reinforces the overall trend that analyst coverage is increasing and thin trading falling with size. The same pattern is reflected in Panel B for private equity backed firms. Overall, private equity backed deals seem to be slightly less frequently traded but equally monitored by analysts relative to the non-PtP firms across all size deciles. In contrast, Panel C shows sharply lower analyst coverage and thinner trading for MBOs relative to the non-PtP firms across all size deciles. Thus, this shows that the management sponsored deals suffer lower financial visibility relative to both private equity backed deals as well as the non-PtP deals. Moreover, this effect is clearly present across all size deciles and, thus, is not driven by size.

Another closely related argument is that the going private firms might be more likely to be listed on the Alternative Investment Market (AIM) with lower listing

requirements which in turn would drive the visibility result. The last column in Tables 7 and 8 reports AIM listing frequency among our firms and does not detect any significant trend. Also, in an unreported regression, we include an AIM dummy as an additional regressor. As the coefficients are not significant and the other results remain unaffected we conclude that AIM listing does not drive our results. Overall, our results show that management sponsored deals suffer both lower analyst coverage and are less frequently traded and therefore have less reasons to remain publicly listed whereas this is not the case for the private equity backed deals. Considering financial visibility, MBOs and private equity backed firms are significantly different.

4 Conclusions

This paper is the first to examine the managerial decision to seek private equity backing in taking the firm private. Our analysis is conditioned on management taking the going private decision and keeping their jobs afterwards. Our main findings are threefold. The first important insight is that managers decide about going private and whether or not to involve private equity investors as part of the deal simultaneously. This indicates that the alternative way of going private is not viable in their situation. Second, we show that PtP transactions are often triggered by a takeover threat which highlights the managerial desire to keep their job. We also find that both types of PtP firms are smaller relative to the control sample of firms that remained listed on the stock exchange. Finally, our analysis reveals that managers prefer to take their firms private themselves without the backing of private equity house if they are less financially constrained. This allows them to remain in full control instead of sharing control with a private equity investor and reap the benefits of the deal for themselves. In particular, our analysis shows that managers decide to take their firm private when it is relatively cheaper because of undervaluation of their firms stock, when they already own a large equity stake in the company or when their firms are less financially visible in sense that their stock is thinly traded and they are followed by fewer analysts. Managers are also more

likely to take their firm private when the firm has substantial cash holdings that can be used for deal financing. Managers tend to invite private equity investors to back them when they are more financially constrained. This is the case when their firms have less cash and managers own a smaller fraction of the company. So, our results show that the two types of PtP firms have significantly different characteristics. We interpret this result as indicating that private equity involvement in the PtP market extends the possibilities for managers when considering a PtP transaction.

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Table 1: Variable Definitions

Total assets	total assets (in Pound Sterling millions)	Worldscope
Leverage	total debt divided by total assets	Worldscope
ROA	net income divided by total assets	Worldscope
Market to book	market capitalization plus total debt divided by total assets	Worldscope
Market to book decomposition into		
firm-specific error	first component of the decomposition due to Rhodes-Kropf et al. (2005) Model 3 with industries matching our specification as in Table 3, Panel A; this component measures deviation of firm value from short-run industry pricing	Own estimations
sector error	second component of the decomposition (described in firm-specific error) that measures short-run deviation from long-run pricing of all firms in the same industry	Own estimations
long-run value to book	third component of the decomposition (described in firm-specific error) that measures deviation of long-run pricing of all firms in the same industry from the firm book value	Own estimations
Rumours	number of takeover rumours during two calendar years before PtP transaction	Lexis Nexis and SDC M&A
Director buying	dummy variable that is set to one in case executive directors were buying shares of their own firm during January to December of the calendar year before PtP transaction or in the previous year for the non-PtP firms and zero otherwise	Hemmington Scott
Director selling	dummy variable that is set to one in case executive directors were selling shares of their own firm during January to December of the calendar year before PtP transaction or in the previous year for the non-PtP firms and zero otherwise	Hemmington Scott
Sales growth	sales growth during 3 financial years before PtP transaction average	Worldscope
Analysts following	number of analysts following the company in December of the calender year before PtP transaction	IBES
Thin trading	fraction of days with zero percent return during January to December of the calendar year before PtP transaction or in the previous year for the non-PtP firms	Datastream
Ownership of		
executives	percentage of shares held by executive directors of the company	Corporate Register
non-executives	percentage of shares held by non-executive directors of the company	Corporate Register
financial inst.	percentage of shares held by financial institutions (e.g. pension funds, mutual funds, insurance companies, banks, venture capitalists)	Corporate Register
other firms	percentage of shares held by industrial firms	Corporate Register
individuals	percentage of shares held by persons that are not directors of the company	Corporate Register
Herfindahl index	sum of squared equity stakes held by the individual blockholders	Corporate Register
Cash	cash and marketable securities divided by total assets	Worldscope
Excess cash	residuals of a regression of the natural logarithm of cash over net assets (total assets minus cash and marketable securities) on the natural logarithm of net assets, market to book adjusted for net assets, net working capital over net assets, capital expenditures over net assets, R&D over net assets, free cash flow over net assets, leverage and a dividend dummy; all variables are industry and time adjusted	Own estimations based on Opler et al. (1999) and Dittmar and Mahrt-Smith (2007)
Normal cash	fitted values of a regression as defined in excess cash above	Own estimations
Free cash flows	(ebitda - taxes - interest - cash dividend - stock repurchases) divided by sales	Worldscope
Investment	capital expenditures divided by sales	Worldscope
Payout ratio	cash dividend divided by the sum of net income and depreciation	Worldscope
Tax	income taxes divided by sales	Worldscope
AIM	dummy variable that is set to one in case the firm is listed on the alternative market with lower listing requirements	Corporate Register

Table 2: Basic Statistics by PtP Type

Variable	Means				t-test p-values		
	non-PtP random	non-PtP matched	MBO	PE	random MBO	random PE	MBO PE
Panel A							
Total assets	706.2	113.1	53.4	170.5	0.000	0.000	0.000
Leverage	0.199	0.187	0.177	0.186	0.173	0.223	0.373
ROA	−0.020	0.035	−0.020	0.043	0.359	0.002	0.038
Market to book	1.541	1.205	0.703	1.065	0.000	0.000	0.000
Rumours	0.204	0.023	0.407	0.533	0.003	0.000	0.080
Sales growth	0.155	0.137	0.121	0.133	0.268	0.221	0.422
Analysts following	3.028	2.845	1.815	3.200	0.000	0.260	0.000
Thin trading	0.530	0.603	0.745	0.564	0.000	0.058	0.000
Ownership of							
executives	0.088	0.121	0.223	0.084	0.000	0.415	0.000
non-executives	0.032	0.043	0.029	0.027	0.344	0.239	0.430
financial inst.	0.187	0.209	0.147	0.304	0.030	0.000	0.000
other firms	0.030	0.050	0.011	0.023	0.001	0.201	0.132
individuals	0.124	0.091	0.177	0.073	0.035	0.000	0.001
Herfindahl index	0.187	0.092	0.216	0.122	0.162	0.000	0.003
Cash	0.132	0.129	0.154	0.085	0.178	0.000	0.013
Free cash flows	−0.089	−0.055	−0.181	0.033	0.228	0.000	0.047
Investment	0.098	0.095	0.063	0.065	0.228	0.000	0.047
Payout ratio	0.188	0.337	0.178	0.370	0.456	0.019	0.082
Tax	0.020	0.022	0.016	0.022	0.098	0.215	0.058
Number of obs.	1400	129	54	75			

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Variable	Medians				U-test p-values		
	non-PtP random	non-PtP matched	MBO	PE	random MBO	random PE	MBO PE
Panel B							
Total assets	67.0	50.7	39.6	66.3	0.001	0.449	0.000
Leverage	0.173	0.155	0.146	0.178	0.103	0.461	0.196
ROA	0.044	0.058	0.042	0.071	0.153	0.000	0.001
Market to book	1.013	0.868	0.654	0.835	0.000	0.027	0.000
Rumours	0	0	0	1	0.009	0.000	0.112
Sales growth	0.071	0.088	0.016	0.065	0.032	0.432	0.037
Analysts following	2	2	1	3	0.000	0.114	0.000
Thin trading	0.571	0.621	0.766	0.594	0.000	0.346	0.000
Ownership of							
executives	0.015	0.038	0.158	0.017	0.000	0.078	0.000
non-executives	0.002	0.005	0.001	0.001	0.453	0.148	0.333
financial inst.	0.151	0.180	0.101	0.306	0.050	0.000	0.000
other firms	0	0	0	0	0.083	0.183	0.334
individuals	0.055	0.036	0.109	0.031	0.018	0.008	0.001
Herfindahl index	0.118	0.014	0.152	0.059	0.081	0.012	0.003
Cash	0.070	0.076	0.072	0.045	0.320	0.019	0.068
Free cash flows	0.048	0.058	0.031	0.050	0.034	0.403	0.029
Investment	0.038	0.039	0.031	0.038	0.018	0.300	0.111
Payout ratio	0.180	0.327	0.197	0.235	0.470	0.008	0.106
Tax	0.015	0.016	0.012	0.020	0.077	0.193	0.028
Number of obs.	1400	129	54	75			

Note: This table shows the means and medians across the random and matched samples of non-PtP firms, all PtP firms, as well as management buyouts (MBO) and private equity backed (PE backed) deals. The last three columns show p-values for t-test for equal means allowing for unequal variances in Panel A and a Mann-Whitney U-test for equal medians in Panel B. All variables are trimmed at the 1st and 99th percentiles, except for the ownership and illiquidity variables. See Table 1 for variable definitions.

Table 3: Multinomial Logistic Regression Analysis of Factors Influencing the Likelihood of Going Private Transactions

Variable	Management buyouts		Private equity backed deals		LR test of equal parameters
	coeff.	s.e.	coeff.	s.e.	
Panel A: Random sample					
Constant	−6.377	(0.305)***	−5.004	(0.219)***	
Rumours	1.407	(0.325)***	1.547	(0.248)***	0.722
Market to book	−0.833	(0.264)***	−0.420	(0.195)**	0.182
Sales growth	0.284	(0.401)	0.057	(0.385)	0.674
ROA	−0.132	(0.720)	2.131	(1.374)	0.118
Ln total assets	0.111	(0.159)	−0.198	(0.123)	0.115
Cash	1.048	(0.898)	−1.926	(1.147)*	0.031
Payout ratio	0.205	(0.384)	0.460	(0.317)	0.600
Leverage	−0.465	(0.978)	−0.659	(0.879)	0.880
Executive ownership	3.220	(0.727)***	0.104	(0.952)	0.005
Analysts following	−0.161	(0.084)*	0.046	(0.055)	0.030
Thin trading	3.562	(1.011)***	−0.330	(0.797)	0.002
Tax	6.815	(5.812)	4.463	(4.892)	0.749
No heterogeneity test	0.000		0.000		0.000
IIA test	1.000		1.000		

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Variable	Management buyouts		Private equity backed deals		LR test of equal parameters
	coeff.	s.e.	coeff.	s.e.	
Panel B: Matched sample					
Constant	−6.529	(0.373)***	−5.258	(0.269)***	
Rumours	4.151	(0.825)***	4.387	(0.773)***	0.618
Market to book	−1.034	(0.414)**	0.098	(0.262)	0.006
Sales growth	0.503	(0.529)	−0.097	(0.605)	0.352
ROA	−1.009	(1.523)	0.243	(1.486)	0.429
Cash	2.274	(1.302)*	−2.269	(1.647)	0.006
Payout ratio	−0.140	(0.140)	0.057	(0.112)	0.210
Leverage	0.009	(1.254)	0.878	(1.216)	0.553
Executive ownership	2.834	(1.132)**	−1.639	(1.347)	0.007
Analysts following	0.005	(0.104)	0.022	(0.065)	0.864
Thin trading	5.810	(1.568)***	−0.271	(1.072)	0.000
Tax	−2.694	(9.700)	−5.298	(8.583)	0.809
No heterogeneity test	0.000		0.000		0.000
IIA test	1.000		1.000		

Note: The table reports estimation results for the multinomial logistic regression model given in (1), using the non-PtP firms as reference group. The model is estimated using 54 MBOs and 75 PE backed deals over the period 1997-2003. Panel A shows results with a random sample of 1400 non-PtP firms. Panel B shows results with a size- and industry-matched sample of non-PtP firms. All regressors are industry and time adjusted as they enter the multinomial logit model as deviations from the industry and year median. Standard errors are given in parentheses, with ***, **, and * indicating significance at the 1%, 5% and 10% level, respectively. The final column shows p-values for the LR test of equal parameters for the two sub-groups of PtP deals. The line "No heterogeneity test" reports p-values for the LR test of Cramer and Ridder (1991) that all parameters except the intercepts are equal for two groups. The first two numbers in this line compare the non-PtP group with the MBOs and PE backed deals, respectively. The line "IIA test" reports p-values for the Hausman and McFadden (1984) LR test for the validity of the independence of irrelevant alternatives (IIA) assumption, omitting the indicated group from the model. Variable definitions are provided in Table 1.

Table 4: Multinomial Logistic Regression Analysis of Factors Influencing the Likelihood of Going Private Transactions (Sensitivity Checks I)

Variable	Management buyouts		Private equity backed deals		LR test of equal parameters
	coeff.	s.e.	coeff.	s.e.	
Constant	−6.762	(0.374)***	−5.249	(0.258)***	
Rumours	1.236	(0.329)***	1.548	(0.256)***	0.436
Firm-specific error	−0.720	(0.248)***	−0.877	(0.221)***	0.471
Sector error	−1.406	(0.755)*	0.429	(0.760)	0.078
Long-run value to book	−0.888	(0.273)***	−0.040	(0.232)	0.011
Director buying	0.149	(0.321)	−0.200	(0.271)	0.393
Director selling	−0.999	(0.624)*	0.293	(0.327)	0.042
Sales growth	0.455	(0.413)	0.088	(0.376)	0.500
ROA	0.117	(0.791)	1.478	(1.162)	0.307
Ln total assets	0.173	(0.154)	−0.202	(0.121)*	0.050
Cash	1.340	(0.958)	−2.329	(1.199)*	0.010
Payout ratio	0.326	(0.387)	0.648	(0.342)*	0.521
Leverage	−1.793	(1.424)	0.676	(1.064)	0.144
Executive ownership	3.101	(0.737)***	0.284	(0.963)	0.012
Analysts following	−0.177	(0.089)**	0.036	(0.057)	0.033
Thin trading	4.132	(0.978)***	−0.502	(0.792)	0.000
Tax	9.330	(6.043)	6.614	(4.927)	0.719
No heterogeneity test	0.000		0.000		0.000
IIA test	1.000		1.000		

Note: The table reports estimation results for the multinomial logistic regression model given in (1), using a random sample of 1400 non-PtP firms as reference group. The model is estimated using 54 MBOs and 75 PE backed deals over the period 1997-2003. All regressors are industry and time adjusted as they enter the multinomial logit model as deviations from the industry and year median. Standard errors are given in parentheses, with ***, **, and * indicating significance at the 1%, 5% and 10% level, respectively. The final column shows p-values for the LR test of equal parameters for the two sub-groups of PtP deals. The line "No heterogeneity test" reports p-values for the LR test of Cramer and Ridder (1991) that all parameters except the intercepts are equal for two groups. The first two numbers in this line compare the non-PtP group with the MBOs and PE backed deals, respectively. The line "IIA test" reports p-values for the Hausman and McFadden (1984) LR test for the validity of the independence of irrelevant alternatives (IIA) assumption, omitting the indicated group from the model. Variable definitions are provided in Table 1.

Table 5: Multinomial Logistic Regression Analysis of Factors Influencing the Likelihood of Going Private Transactions (Sensitivity Checks II)

Variable	Management buyouts		Private equity backed deals		LR test of equal parameters
	coeff.	s.e.	coeff.	s.e.	
Constant	−6.172	(0.286)***	−5.013	(0.218)***	
Rumours	1.357	(0.320)***	1.549	(0.247)***	0.620
Market to book	−1.215	(0.260)***	−0.383	(0.180)**	0.006
Sales growth	0.171	(0.393)	0.056	(0.384)	0.834
ROA	−0.054	(0.698)	2.151	(1.378)	0.125
Ln total assets	−0.260	(0.116)**	−0.161	(0.085)*	0.476
Cash	1.116	(0.871)	−1.889	(1.142)*	0.027
Payout ratio	0.203	(0.362)	0.469	(0.318)	0.570
Leverage	0.045	(0.948)	−0.686	(0.876)	0.561
Executive ownership	3.256	(0.723)***	0.127	(0.949)	0.004
Analysts following	−0.164	(0.085)*	0.047	(0.055)	0.027
Tax	6.794	(5.736)	4.300	(4.899)	0.733
No heterogeneity test	0.000		0.000		0.000
IIA test	1.000		1.000		

Note: The table reports estimation results for the multinomial logistic regression model given in (1), using a random sample of 1400 non-PtP firms as reference group. The model is estimated using 54 MBOs and 75 PE backed deals over the period 1997-2003. All regressors are industry and time adjusted as they enter the multinomial logit model as deviations from the industry and year median. Standard errors are given in parentheses, with ***, **, and * indicating significance at the 1%, 5% and 10% level, respectively. The final column shows p-values for the LR test of equal parameters for the two sub-groups of PtP deals. The line "No heterogeneity test" reports p-values for the LR test of Cramer and Ridder (1991) that all parameters except the intercepts are equal for two groups. The first two numbers in this line compare the non-PtP group with the MBOs and PE backed deals, respectively. The line "IIA test" reports p-values for the Hausman and McFadden (1984) LR test for the validity of the independence of irrelevant alternatives (IIA) assumption, omitting the indicated group from the model. Variable definitions are provided in Table 1.

Table 6: Multinomial Logistic Regression Analysis of Factors Influencing the Likelihood of Going Private Transactions (Sensitivity Checks III)

Variable	Management buyouts		Private equity backed deals		LR test of equal parameters
	coeff.	s.e.	coeff.	s.e.	
Constant	−6.134	(0.321)***	−5.783	(0.341)***	
Rumours	1.298	(0.424)***	1.547	(0.280)***	0.564
Market to book	−0.981	(0.300)***	−0.381	(0.220)*	0.094
Sales growth	0.310	(0.398)	0.346	(0.373)	0.944
ROA	−0.220	(0.774)	0.364	(1.188)	0.670
Ln total assets	0.003	(0.170)	−0.103	(0.137)	0. 617
Excess cash	0.542	(0.328)*	−0.734	(0.616)	0.042
Normal cash	−0.007	(0.094)	−0.062	(0.081)	0.642
Free cash flow	0.060	(0.236)	0.056	(0.448)	0.993
Payout ratio	0.169	(0.380)	0.523	(0.327)	0.472
Leverage	0.728	(1.251)	−1.198	(1.515)	0.310
Executive ownership	3.204	(0.792)***	0.800	(1.017)	0.043
Analysts following	−0.146	(0.090)*	0.031	(0.062)	0.088
Thin trading	3.060	(1.092)***	−0.159	(0.887)	0.018
Tax	7.173	(6.270)	6.997	(5.375)	0.983
No heterogeneity test	0.000		0.000		0.000
IIA test	1.000		1.000		

Note: The table reports estimation results for the multinomial logistic regression model given in (1), using a random sample of 1400 non-PtP firms as reference group. The model is estimated using 54 MBOs and 75 PE backed deals over the period 1997-2003. All regressors are industry and time adjusted as they enter the multinomial logit model as deviations from the industry and year median. Standard errors are given in parentheses, with ***, **, and * indicating significance at the 1%, 5% and 10% level, respectively. The final column shows p-values for the LR test of equal parameters for the two sub-groups of PtP deals. The line "No heterogeneity test" reports p-values for the LR test of Cramer and Ridder (1991) that all parameters except the intercepts are equal for two groups. The first two numbers in this line compare the non-PtP group with the MBOs and PE backed deals, respectively. The line "IIA test" reports p-values for the Hausman and McFadden (1984) LR test for the validity of the independence of irrelevant alternatives (IIA) assumption, omitting the indicated group from the model. Variable definitions are provided in Table 1.

Table 7: Summary Statistics of Firms Grouped by Size

	Mean by deciles of size						
Decile	Size	PtP(%)	MBO(%)	PE(%)	Thin trading	Analysts following	AIM
1 (small)	3.97	3.3	2.0	1.3	0.80	1.79	0.10
2	11.86	9.8	5.2	4.6	0.72	2.07	0.16
3	20.55	9.2	5.9	3.3	0.69	1.97	0.09
4	33.88	11.1	4.6	6.5	0.66	2.22	0.10
5	52.08	15.7	7.8	7.8	0.59	2.75	0.08
6	81.61	13.7	5.9	7.8	0.59	3.37	0.12
7	136.85	7.8	2.6	5.2	0.53	3.33	0.14
8	261.43	7.8	1.3	6.5	0.46	3.63	0.11
9	749.28	5.9	0.0	5.9	0.27	4.42	0.12
10 (large)	7170.42	0.0	0.0	0.0	0.10	4.34	0.14
Total	856.32	8.4	3.5	4.9	0.54	2.99	0.12

Note: The table reports mean values of several variables across size deciles where size is measured by total assets. Variable definitions are provided in Table 1.

Table 8: Summary Statistics of Firms Grouped by Size

	Mean by deciles of size			
Decile	Size	Thin trading	Analysts following	AIM
Panel A: Non-PtP firms				
1 (small)	4.09	0.79	1.79	0.15
2	12.32	0.72	2.10	0.15
3	21.49	0.68	2.03	0.09
4	34.97	0.66	2.25	0.11
5	53.42	0.57	2.95	0.06
6	84.80	0.58	3.41	0.13
7	141.75	0.53	3.36	0.13
8	268.83	0.45	3.62	0.11
9	734.29	0.27	4.39	0.12
10 (large)	7020.87	0.10	4.35	0.13
Panel B: Private-equity backed PtP deals				
1 (small)	4.40	0.71	2.50	0.00
2	11.67	0.70	2.57	0.28
3	18.64	0.69	2.40	0.00
4	35.45	0.61	2.70	0.00
5	53.79	0.50	2.58	0.17
6	80.79	0.60	3.00	0.08
7	132.52	0.65	3.00	0.13
8	264.90	0.46	4.50	0.20
9	789.61	0.39	4.67	0.22
10 (large)	−−	−−	−−	−−
Panel C: Management buyouts				
1 (small)	4.42	0.92	0.67	0.33
2	11.49	0.77	1.25	0.12
3	19.18	0.79	0.89	0.00
4	31.44	0.79	2.29	0.14
5	52.20	0.74	2.33	0.08
6	81.22	0.71	2.44	0.11
7	150.52	0.56	2.00	0.00
8	207.21	0.60	2.00	0.00
9	−−	−−	−−	−−
10 (large)	−−	−−	−−	−−

Note: The table reports mean values of thin trading, analysts following and frequency of AIM listing across size deciles for the non-PtP firms (Panel A), management buyouts (Panel B), and private equity backed PtP deals (Panel C). Size is measured by total assets. Variable definitions are provided in Table 1.

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