

Master's Thesis

Stockholm School of Economics

Department of Finance

Fall 2016

Managerial Misconduct: Earnings Management in Private-to-Private MBOs

Oscar Lindström* and Mattias Svensson**

December 7, 2016

Abstract. In a Management Buyout (MBO), companies' managers must simultaneously act as both agents of the shareholders, with objective to seek the highest possible valuation, and as buyers, wanting the best deal for themselves. This contradiction gives rise to an agent-principal dilemma, whereby managers have personal incentives to act against the wishes of their principals, the shareholders. This study uses three models to test for value decreasing earnings management preceding private-to-private MBO transactions. The results from the tests suggest that managerial earnings management is systematically prevalent through the use of discretionary expenses.

Keywords. Management buyout, MBO, Earnings management, Private-to-private, Wealth transfer

Tutor. Dong Yan

Contact. For questions or other subjects related to this paper, please use email addresses *22948@student.hhs.se or **22825@student.hhs.se to contact the authors.

Table of contents

1. Introduction.....	3
2. Literature review	5
2.1 Problems with management’s dual roles in MBO transactions.....	5
2.2 Earnings Management.....	6
2.2.1 Types of earnings management	6
2.2.2 Development of earnings management models.....	6
2.2.3 Impact on accounting standards	9
2.2.4 Improved models for measuring earnings management.....	9
2.2.5 Evidence of earnings management during management buyouts.....	11
2.2.6 Selection of other areas of research	13
3. Motivation and Hypotheses	15
4. Data	17
4.1 Selection of MBO companies as treatment group.....	17
4.2 Selection of peers as control group	18
4.3 Accounting data.....	19
4.4 Shareholder data and type of seller.....	20
4.5 Loss of data	20
4.6 Final dataset.....	21
5. Research Design/Methodology	25
5.1 Test of earnings management using working capital accruals.....	26
5.2 Test of real earnings management using revenue manipulation.....	29
5.3 Test of real earnings management using operating expenses manipulation	31
6. Results and discussion.....	33
6.1 Accrual-based tests.....	33
6.2 Real earnings management based tests	36
6.3 Institutional Vendors.....	42
7. Robustness	44
7.1 Year fixed effects – test for omitted macro factors	44
7.2 Systematic industry differences – adding industry based FE-estimators	47
7.3 Testing the common trends assumption – D-I-D in the estimation window.....	50
7.4 Testing the counterfactual:.....	51
8. Conclusions	52
References	53

Appendices.....	56
I. Definitions	56
II. Heteroskedasticity robust regression framework.....	58
III. Common trends assumption test output tables	60
IV. Complete industry classification table.....	62
V. Performance matched working capital accruals model.....	63

1. Introduction

In a Management Buyout (MBO), companies' managers must simultaneously act as both agents of the shareholders, with objective to seek the highest possible valuation, and as buyers, wanting the best deal for themselves. This contradiction gives rise to an agent-principal dilemma, whereby managers have personal incentives to act against the wishes of their principals, the shareholders. One possible way of convincing the equity holder to agree to a lower purchase price could be manipulating the accounting statements so that they present an overly negative view of the company, so called negative earnings management. If such manipulation occurs, it presents an important corporate governance issue since this type of earnings management may give rise to wealth transfers from the current owners to the management team.

The same conflict of interest exists in both private-to-private and public-to-private MBOs, given that the purchasing members of the management team do not already hold a significant equity stake in the company. However, many private companies have a concentrated ownership structure which might result in it being easier for the owners to monitor management actions. On the contrary the absence of analyst coverage may facilitate dubious accounting decisions.

A number of studies have been performed on earnings management in MBOs. However, these studies have solely focused on public-to-private deals due to data limitations in the US and the UK. The overall verdict from these studies remain inconclusive, with several studies finding support for the earnings management hypothesis (e.g. Perry & Williams 1994, Mao & Renneboog 2015) while other fail to find any evidence indicating such manipulation occurs (e.g. DeAngelo 1986, Ofek 1994). This paper extends these earlier studies by focusing on private-to-private transactions, which have previously been excluded. Further, this paper updates these studies by using more recent data, including transactions after the financial crisis of 2008-2009. Finally, using data from a new geographic location, the Nordic countries, may shine light on possible regional differences in management behavior.

The test procedure used in this paper builds on previous studies together with recent findings from accounting research on the measurement of earnings management. The main methodological innovation is the performance of a difference-in-difference test with the inclusion of a novel control group, consisting of buyout transactions wherein management do not participate as buyers. This test format allows us to better exclude transaction related effects on the accounting statements that would not be captured by using for example industry averages, and thereby to avoid a false positive result.

Overall, our tests suggest that earnings management is prevalent prior to Nordic MBO transactions. This study find no evidence of accounting accruals being systematically used to managing reported earnings. Rather, the primary method used appears to be so called real earnings management, mainly through the manipulation of discretionary expenses.

2. Literature review

2.1 Problems with management's dual roles in MBO transactions

As mentioned above, the MBO transaction creates a dilemma for the current management team, requiring them not only to fulfil their fiduciary duties as agents of the shareholders, maximizing shareholder value, but also act as buyers negotiating on their own behalf. The problem is worsened as the managers has superior access to information regarding both company financials and operations. The fiduciary duty of the management to the current shareholders is often regulated both by law and by codes of corporate governance. Neglecting of these duties might therefore not only be a moral issue but could also be illegal. If these laws are effective, this conflict of interests should not be a problem as the punishment should outweigh any personal benefit from such activities. The legal side of the conflict is explored by Anatabwi (2015) who finds that US law is lagging in capturing this problem, and therefore that trying to lower the company's value before purchasing it can pass by without penalty.

Weir et al. (2005) finds that public companies that are going private suffer from a perceived undervaluation and that this effect is the strongest prior to MBO transactions. Warfield et al. (1995) concludes that a large current ownership by top management leads to reduced incentives for manipulation. Further, Chen et al. (2009) finds that the premium paid to buy the outstanding shares of a company in an MBO is negatively correlated with the size of management's equity stake in the company and positively correlated with management's holdings of share options. It therefore seems that there is legal leeway to exploit the asymmetric information held by the management and that it is exploited in one way or another. The view that MBOs are essentially a form of insider trading, as discussed by Cumming et al. (2007), could therefore have some substance to it.

Methods of pushing the price down before an MBO include lowering earnings forecasts as explored by Kaplan (1989), managing reported earnings (e.g. Perry & Williams 1994), and managing real earnings (e.g. Roychowdhury 2006). Top management in any company has all the means necessary to engage in these value-lowering activities, and thereby serve their own interests, using their superior access to information regarding the company. Pre-MBO manipulation suggests that a significant wealth transfer from current owners to the new owners (management) is possible. This paper focuses exclusively on earnings management as method of lowering the company value, as this can be measured with comparably high accuracy.

2.2 Earnings Management

2.2.1 Types of earnings management

Methods used for earnings management include manipulation of accruals, alteration of accounting method, and change in capital structure (Jones 1991), but also comprises real earnings management. Real earnings management methods include delaying income-driving activities to lower earnings today, increasing/decreasing discretionary expenses, and the manipulating production volumes. Manipulating production volumes would have a two-fold effect since it not only could reduce sales today but also, in the presence of economies-of-scale, result in a higher reported cost per unit produced (Roychowdhury 2006).

2.2.2 Development of earnings management models

There are several occasions where top management of a firm has an incentive to increase or decrease reported earnings. As a result, there have been numerous studies on this topic. In this section a brief explanation is given of some of the most important historical models that have been used for detecting earnings management.

Healy (1985) explores discretionary accruals and the accounting decisions made by management who are subject to earnings-based compensation plans. His model is based on total accruals which are defined as net income less operating cash flow. The sign of accruals is compared to the predicted sign based on management's incentives which can be both positive and negative.¹

This model does not use any determinants of non-discretionary accruals and because of that, one drawback of the model is that it assumes a constant average level of non-discretionary accruals. This assumption might be unrealistic since non-discretionary accruals should follow the underlying business (Kaplan 1985, McNichols 2000). Healy finds evidence that managers do manipulate earnings to maximize their bonus payments. Following Healy, most accrual-based models use working capital accruals as base.

¹ Negative earnings management is expected if the earnings will not reach the lower bound for bonus compensation anyway. This way, accrual losses don't need to be realized during a following period where the earnings are high. This is referred to as 'taking a bath'.

DeAngelo (1986) uses a random walk model to measure negative earnings management. In her model, normal accruals are specified as the preceding period's total working capital accruals. Abnormal accruals are determined by the difference between the event period's total accruals and the normal accruals. Unlike Healy, who measured levels of accruals, DeAngelo measures changes in accruals. Total accruals (TAcc) can be divided into discretionary (DAcc) and non-discretionary (NDAcc) which are determined by the underlying business:

$$\Delta TAcc = TAcc_t - TAcc_{t-1} = (DAcc_t - DAcc_{t-1}) + (NDAcc_t - NDAcc_{t-1}) \quad 2.1$$

Like Healy's model, DeAngelo assumes the period-by-period change in non-discretionary accruals is zero on average. Though unlikely, if this is the case, the change in total accruals are determined by the change in discretionary accruals. DeAngelo finds no evidence of earnings management in her sample. However, most later studies have used changes in accruals instead of levels in accordance with DeAngelo.

Jones (1991) investigates whether companies manage earnings downwards during import relief investigations conducted by the US International Trade Commission, in order to improve their chances of receiving import relief. She develops an expectation model which aims to capture only the discretionary component of total accruals. The purpose of the study is to test if the realized discretionary accruals differ from the expected accruals in an income-decreasing matter. Since Jones uses accounting choices as method for earnings management her model is limited to capturing only accrual-based earnings management. In this model, total accruals (TAcc) are determined by the change in non-cash working capital accruals less depreciation expense. Determinants of non-discretionary accruals are (1) changes in revenue (ΔRev) and (2) level of Property, Plant, and Equipment (PPE). All variables are scaled by the previous period's total assets (TA).

$$\frac{TAcc_{i,t}}{TA_{i,t-1}} = \alpha_i \frac{1}{TA_{i,t-1}} + \beta_{1,i} \frac{\Delta Rev_{i,t}}{TA_{i,t-1}} + \beta_{2,i} \frac{PPE_{i,t}}{TA_{i,t-1}} + \varepsilon_{i,t} \quad 2.2$$

Jones finds significant evidence of manipulation in her sample and concludes that this problem needs to be addressed by regulators. Her regression-based expectations model has become widely used in subsequent studies but have also received some criticism. Dechow et al. (2012) states that since regular depreciation expenses should be classified as a non-discretionary accrual, as it cannot be changed without changes to the underlying business (contrary to write-downs of e.g. PPE). It

would be better to exclude the depreciation from the dependent variable and only use working capital accruals, as including it may give rise to misspecification errors.

Dechow & Dichev (2002) find that since the accounting objective of working capital accruals is to match performance with the actual cash flow, the cash flow could be used to find an estimate of non-discretionary accruals. Specifically, a receivable gives information of a future incoming cash flow and a payable of a future outgoing cash flow. However, since these accruals are based on expectations there must be a correction in the future if the expectations are wrong. Their model is specified as follows²:

$$TAcc_t = \beta_0 + \beta_1 OCF_{t-1} + \beta_2 OCF_t + \beta_3 OCF_{t+1} \quad 2.3$$

They argue that non-discretionary accruals and contemporaneous cash flow should show a negative relationship while the future cash flow should show a positive relationship. However, Wysocki (2009) points out that this model will classify discretionary accruals that are made with purpose of smoothing earnings as non-discretionary.

McNichols (2002) finds that the combination of Jones' (1991) model and Dechow & Dichev's (2002) model yields a higher power in explaining working capital accruals.

Roychowdhury (2006) shifts focus from accrual-based earnings management to management of real company activities. He uses a similar approach as Jones (1991), but instead of using working capital as base he uses operating cash flow, cost of goods sold (COGS), change in inventory, and production costs as dependents in his four estimation models. In the model based on operating cash flow he uses sales as determinant of normal cash flow in accordance with Dechow et al. (1998) who find that revenue is a better predictor of future cash flow than current cash flow. The operating cash flow model is specified below:

$$\frac{OCF_t}{TA_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{TA_{t-1}} + \beta_1 \frac{Revenue_t}{TA_{t-1}} + \beta_2 \frac{\Delta Rev_t}{TA_{t-1}} + \varepsilon_t \quad 2.4$$

Roychowdhury finds evidence consistent with real earnings management with his expectation models.

One thing common among the early models is that they focus on accounting decisions and abnormal accruals, and that it is important to try and isolate the discretionary accruals from the

² Where OCF denotes cash flow from operations

normal fluctuations due to the underlying business. Roychowdhury's study of real earnings management also contributes with interesting inputs to the topic since he shows that the previous tests can be remodeled to specify real earnings management. Most of the models have been successful in finding manipulation. Therefore, it seems that when managers had an incentive to manipulate the earnings, they did so on a systematic level. Worth noting is that all studies described above is based in the United States on US data.

2.2.3 Impact on accounting standards

As a response to the systematic accounting manipulation and frauds during the turbulent early 2000s including the Enron scandal, the Sarbanes-Oxley Act (SOX) was passed in the US in 2002. SOX had the goal to restore faith in the integrity and accuracy of financial statements (Cohen et al. 2008) by curbing accounting management and fraudulent behavior. This was to be achieved by introducing more stringent disclosure requirements for all publicly listed firms in the US, widening the scope of company information to be presented.

While SOX or similar legislation have not been directly enacted in Europe, it is likely that the shift from national GAAPs to IFRS could have produced a similar result in the Nordic region. According to IFRS, a company's financial statements must be presented fairly (IAS 1.15) and comply with all requirements in the International Accounting Standards, IFRIC Interpretations and SIC Interpretations (IAS 1.16). It is probable that the IFRS framework require more disclosures than local GAAPs (Wright & Hobbs 2010). Even though IFRS does not have the same protective objective as SOX, it might still be harder to manipulate the accounts with a relatively more extensive set of rules requiring more transparency and disclosures of financial data. Further, some companies with operations in both the United States and Europe must comply with SOX.

2.2.4 Improved models for measuring earnings management

Cohen et al. (2008) find that the method for manipulating earnings in the US changed with the introduction of SOX in 2002. Before SOX the most common method was accrual-based earnings management and after the passing of the act, real earnings management increased significantly while the accrual-based method had a vast decline in usage. This is interesting since most of the earlier research have only focused on the use of accruals as method for earnings management. The authors use the model originally developed by Jones (1991) to identify discretionary accrual-based earnings

management. To measure real earnings management, they alter the model developed by Roychowdhury (2006) to find abnormal operating cash flow.

Dechow et al. (2012) provide a new framework for detecting accrual-based earnings management. Their model is based on previous working capital accruals based tests but with several alterations which are used to increase the power and create a more well specified model. They argue that previous models suffer from omitted variable biases, misspecification and inefficiencies which increases the risk of making both Type I and Type II errors. They find that most of the popular accrual-based models (Healy 1985, Jones 1991, Dechow & Dichev 2002, and McNichols 2002) could be improved.

Dechow et al. argue that abnormal discretionary accruals should reverse in adjacent periods while nondiscretionary accruals should not. Since nondiscretionary accruals are closely tied to operations, substantial changes are most often subject to honest sales anticipations or strategic decisions. Discretionary accruals on the other hand, should reverse since e.g. an overstatement of receivables in one period must be corrected in a later period when it is clear that the cash flow will not occur. Using this logic, they incorporate a reversal period in the previous models instead of only including a manipulation period. By adding the reversal, Dechow et al. finds an increased power as well as a mitigation of correlated omitted variable biases.

Kothari et al. (2005) adds a performance matching variable to these tests. Kothari et al. finds that such an addition improves model accuracy given that the propensity of managers to engage in earnings manipulation is assumed to be uncorrelated with the included performance measure.

Dechow et al. (2012) however criticize the performance matching procedures that are being used as extensions of historical models. They argue that if the performance matching variable fails to capture the potential omitted variable, it only makes matters worse. They therefore suggest the performance matching should be used with caution or excluded from the tests completely. Finally, Dechow et al. find that the residuals in historical models are not independently distributed in their sample when grouping company years by size or return on assets (ROA). This finding is important since the potential heteroscedasticity needs to be taken into account when performing these types of studies.

2.2.5 Evidence of earnings management during management buyouts

There are several studies investigating earnings management preceding an MBO. Some of the studies have indicated the existence of negative earnings management prior to public-to-private MBOs (Wu 1997, Perry & Williams 1994, Mao & Renneboog 2015), but there have also been numerous studies unable to find evidence of manipulation (DeAngelo 1986, Kaplan 1989, Ofek 1994). This section contains a review of the main findings from previous research on this topic, including both descriptions the methodologies used and the results found.

DeAngelo (1986) did not find any significant manipulation with the test described in the previous section. Her sample however includes a number of distressed companies, which might have obfuscated any potential evidence for earnings management. A company with a low survival probability will suffer from distress costs such as loss of employees, customers, suppliers, more restricted and expensive debt, and legal fees; all which all serve to reduce management's incentives to report lower earnings, as the cost of such a decision would overshadow the potential benefits.

Kaplan (1989) investigates 76 large public-to-private MBOs. The study is focused around three performance measures; Operating income, Capital expenditure, and Net operating cash flow which are measured as levels, scaled by total assets or by revenue. To capture industry-specific movements, Kaplan uses the median change for all companies with the same industry SIC-code and a market capitalization of over USD 40 million.

In the US, company information of private companies is highly restricted. Since Kaplan wanted to investigate post-MBO performance he had to find a creative way of obtaining this data. He uses several sources such as articles from the Wall Street Journal, prospectuses for IPOs, prospectuses for acquisitions, and proxies filed by the SEC (10-K) due to the companies' holdings of public debt. This data sourcing would not have been possible for smaller companies and therefore might be subject to selection biases. A further selection bias, discussed by the author, is that the post-deal data is more easily available for companies seeking external financing, such as public debt or new equity from an IPO. Kaplan also finds significant differences in performance between the IPO/sale companies and the ones with public debt and SEC filings. This indicates that the sample is not representative for the whole spectrum of MBO deals.

Kaplan also uses stock price and, if available, post-MBO market values to measure returns to investors. Again, this is subject to selection bias since almost half (11 of 25) of the post-MBO

valuations stem from companies engaging in an IPO, another third (8 of 25) were bought by a public company or were in liquidation.

In his sample, Kaplan finds industry adjusted performance improvements in both operating income and operating cash flow after the company had been bought out in an MBO. He further finds that these improvements do not result from changes in employment and that the actual performance is, for the first two years, worse than management's projections in the 'buyout proxy statement'. The findings are therefore ambiguous. Kaplan concludes that the increased performance is due to improved incentives and not due to superior managerial information since management did not outperform their own, supposedly low, forecasts. He therefore casts doubt on the insider trading argument. Wu (1997) on the contrary, finds evidence of earnings management during approximately the same sample period and that the management in the companies he investigates benefitted by almost USD 50 million on average from the manipulation.

Ofek (1994) also uses an alternate method for investigating manipulation around MBOs. He uses a sample of unsuccessful buyout attempts to see whether upturns in performance after an MBO is derived from organizational improvements or a result of management using private information as rationale for the bid. He argues that organizational changes would not occur if a deal falls through. If management has private information about the company's future performance and placed the bid in order to exploit this information advantage, the improvements should materialize regardless of the success of the bid. This is another way of finding available information after the event period.

Similarly to Kaplan (1989), Ofek uses stock return and operating income as performance measures. His sample consists of 120 MBO bids on American public companies which are either withdrawn by the bidder or rejected by the seller, i.e. the Board of Directors and/or the current shareholders. Ofek could not find any evidence of increases in firm value or in operating performance in the following years regardless of the reason behind the deal falling through. He therefore concludes that managers do not use private information as a base for their MBO bid.

However, another explanation for the absence of improved performance might be that the management is less motivated after their defeat, causing them not to act upon the growth opportunities identified earlier. If this is the case, Ofek's test specification might not be optimal.

Perry & Williams (1994) use Jones' (1991) model on a sample of 175 US public-to-private MBOs from 1981 to 1989. As a control sample, comparable firms measured by revenue and industry SIC-code which were not subject to any deal were selected. They perform tests on both the treatment group and control group to find out if any anomalies were due to systematic movements. Perry & Williams find significant evidence of pre-MBO earnings management.

Worth noting however, is that they use the original model developed by Jones (1991) and therefore include depreciation in their dependent variable which was later advised against by Dechow et al (2012). Due to the US setting and unavailability of private company information, Perry and Williams could not include a reversal period in their tests.

Scholes et al. (2007) use a survey-based method to investigate the information asymmetry in 114 European MBOs of family-owned private companies. They find that the managers in first generation family firms were more likely to respond that "information was shared equally between vendors and purchasers".

Mao & Renneboog (2015) finds signs of manipulation prior to MBOs in the United Kingdom where they investigate public-to-private deals between 1997 and 2007. They use a performance-matched version of Jones' (1991) accrual-based model as well as the real earnings management models used previously by Roychowdhury (2006) and Cohen et al. (2008). They find that earnings is managed downwards prior to MBOs using both real and accrual based maneuvers. Mao & Renneboog's findings indicate that pre-MBO manipulation might still be present in the 2000s.

2.2.6 Selection of other areas of research

2.2.6.1 Post-MBO performance

Several studies have found that companies perform better after an MBO compared to before. Reduced agency costs and a realignment of management's incentives are said to be some of the explanations. Weir et al. (2005) find that there is a higher level of agency costs in firms that are going private and Phan and Hill (1995) find that a higher share of management ownership reduces wasteful spending and increases organizational efficiency. These studies suggest the existence of a principal-agent problem prior to an MBO. Thompson et al. (1992) find that the ownership by management is positively correlated with excess return on capital. Guo et al. (2011) are contradicting these results since they don't find any evidence of increased operating performance due to a higher share of management ownership in buyouts. Desbieres and Schatt (2002) finds that MBO

companies outperform non-buyout companies in the same size and industry both before and after the MBO when examining the French market. However, they also find that the French companies' performance declines after the MBO in contrary to the above mentioned studies which are based in other countries.

2.2.6.2 MBOs compared to other types of buyouts

Wright et al. (2001) suggest that an MBO creates a good opportunity for management to pursue entrepreneurial goals that were not possible during the previous ownership. Meulerman et al. (2009) also argue that the entrepreneurial setting created by an MBO is one of the reasons for managers to initiate this type of transaction.

Lichtenberg and Siegel (1991) investigate US production plants that were subject to buyouts during the first wave of MBOs in the 1980s. They find that when the management was participating in the acquisition, the plants showed a significantly higher production growth than plants acquired in other types of buyouts. Nikoskelainen and Wright (2007) also investigate private equity-backed MBOs and find that they have a significantly higher IRR than other private equity buyouts measured from entry year to exit year. On the other hand, Goosens et al. (2008) do not find any performance differences between private equity-backed MBOs and other private equity buyouts when investigating a Belgian sample of deals.

Chou et al. (2005) finds that managers manipulate earnings upwards through discretionary accruals before offering stock in a reverse LBO.

Research based on Nordic data is scarce. Bergström et al. (2007) investigates operating performance in Swedish buyouts but fail to find any relationship between an increased ownership by management and performance.

Worth to note is that the majority of these studies classify MBOs as private equity buyouts where previous management participates, and they therefore exclude the cases where a private equity firm is absent and the whole company is bought out by the management. This might be due to the data unavailability of private firms. Private equity firms often release information about their historical deals.

3. Motivation and Hypotheses

Due to the reversal of discretionary accruals described by Dechow et al. (2012) and the post-event abnormal performance described by e.g. Kaplan (1989), it is relevant to observe what happens in the MBO-firms in the periods after the deal has taken place. By using Nordic data, this study does not suffer from the same data availability issues as US-based studies. In the Nordic countries (Sweden, Norway, Denmark, Finland, and Iceland), all companies, both public and private, must disclose extensive financial information to the authorities. This information is publicly available directly from the concerned authority or from secondary sources. Not only are we able to use more reliable post-MBO data, we are also able to investigate private-to-private MBOs which we were unable to find any previous studies on. A further contribution would be to use more recent data than previous studies (e.g. Mao & Renneboog 2015) and to include the financial crisis years of 2008-2009.

In a private context, there are two opposing forces affecting the comparison to the public setting (Schulze et al. 2001, Morck and Yeung 2003, Howorth et al. 2004). Firstly, private owners are often more concentrated. It is plausible that a concentrated ownership makes it more difficult for manipulation to pass unnoticed, in the sense these owners may have greater insight in both the operations and the financials of their company. This would lower the information asymmetry and thereby the pre-MBO agency costs. On the other hand, less public scrutiny, might make it easier to manage earnings since the owners might be less educated in interpreting financial reports compared to a group of financial analysts.

In this study, the first test is for working capital accruals based manipulation as described by e.g. Jones (1991).

H1a: Accrual-based earnings management is prevalent prior to MBOs

As mentioned earlier, Cohen et al. (2008) find that the method of earnings management in the US changed with the passage of the Sarbanes Oxley Act in 2002. Prior to this date it was more common with accrual-based management of earnings and after there was a shift towards real earnings management. This study therefore investigates both methods of earnings management since the

introduction of IFRS accounting standards were introduced in the Nordics during part of our sample period³

H1b: Real earnings management is prevalent prior to MBOs

More sophisticated owners should be better at avoiding agency costs because of better governance. Roychowdhury (2006) finds a negative relationship between real earnings management and institutional ownership which supports the view that manipulation is harder when the owners are more sophisticated. This claim corresponds to the second of the two opposing forces affecting private firms discussed at the start of this chapter.

H2: Institutional vendors reduce earnings management prior to MBO transactions

It would be very interesting to also test for the impact of the other of the two opposing forces, namely ownership concentration. This as more concentrated owners should face reduced free-rider problems and might therefore be better at monitoring management actions. However due to data limitations, as explained in the chapter below, this is not possible using our sample.

³ The European Union (EU) adopted the International Financial Reporting Standards (IFRS) for consolidated accounts in January 2005. Norway, which is not a member of the EU, had to adapt to the same policy through the Agreement of the European Economic Area, and therefore also had to fully introduce IFRS in 2005 [Deloitte 2016].

4. Data

Our dataset is constructed by (1) transaction data of MBOs and selected IBOs which are matching our criteria mentioned below, (2) transaction data for peers used as control group, (3) accounting data for all companies included in our treatment and control group, (4) shareholder data to find dispersion in ownership, and (5) seller type information to find cases with institutional vendors.

4.1 Selection of MBO companies as treatment group

Our treatment group are determined by the following criteria:

- (1) Target company incorporated in a Nordic state (Sweden, Norway, Denmark, Finland, or Iceland)
- (2) One or several members of the target company's top management have acquired a controlling stake of the company in one single transaction, i.e. the transaction covers more than 50% of the shares.

This study thus disregards transactions where management acquires a minority stake in the company and cases of limited stake-building, where management acquires a few more shares and thereby achieves control of the company. This due to reduced incentives to manage earnings prior to such transactions. The list of MBO transactions matching our criteria is obtained from the Zephyr database by Bureau van Dijk. The original list consists of 143 MBO transactions, where 140 are private-to-private deals and 3 are public-to-private deals.

Reclassification of IBO companies to be included in the treatment group

If the acquiring management team is backed by an institutional investor such as a private equity firm and the institutional investor is acquiring the majority stake, the deal will often be classified as an IBO instead of an MBO. By examining every deal of this type that occurred in the Nordics by reading press releases or other public details about the deal, some of these transactions have been reclassified as MBOs and included in the treatment group, even if management alone did not acquire more than 50% of the shares. In some cases, the investment by the management team can be substantial, and to aid with the financing, a private equity firm is contacted. In the case of institution-backed management investments which are substantial, we classify the deal as an MBO. The list of MBOs is originally complemented by 17 such "IBO" deals, obtained from Zephyr. One of these deals is of public-to-private nature.

In some cases, a company could be targeted to be bought out by a private equity firm or other institutional buyer which initiates the buyout process. As a second step, the current management might be offered the opportunity to buy in, this in order to incentivize them to stay with the company after the deal is completed. In these cases, management has less incentive to manage earnings downwards pre-MBO and more importantly, much less time to do so. We have chosen to include all IBO deals that match our criteria even though this might lead to the inclusion of these types of low incentive partnerships.

4.2 Selection of peers as control group

Previous studies (e.g. Perry & Williams 1994, Mao & Renneboog 2015) have used companies in the same industry, with the same size, and which are not subject to any deal during the same time-period as the control group in their tests. Their control group therefore captures potential industry related shocks occurring in proximity to the deal. This seems like a good fit in many cases when testing for earnings management. However, when investigating MBOs we argue that an even better fit would be to choose peer companies that, on the contrary, have also been bought out. As mentioned earlier, there are many studies suggesting that companies subject to a buyout have different characteristics and performance compared to non-buyout companies. We want our control group to share as many characteristics as possible with our treatment group in order to eliminate the risk of misidentifying accounting effects caused by the deal itself as an indicator of earnings management. We investigate whether there are significant wealth transfers taking place when the management acts as both buyers and agents. It would therefore be a good idea to examine if there is a difference to the cases where the management team only acts as agents but the company is still to be bought out. We argue that the closest type of deal to an MBO where the current management is not involved as buyers is an IBO. The IBO deals however, all have sophisticated buyers which may not be the case in every private MBO, even though it is common.

IBOs include buyouts made by private equity firms which these are often described as aggressive in restructuring and trying to improve the target's performance quickly since they only have a limited time before they need to exit the company again. For example, Cressy et al. (2007), find that operating profits are greater for PE-backed companies over the first three post-buyout years compared to companies that are not bought out.

Here we also use Zephyr to source peer IBO transactions. Importantly, we use Zephyr's complete list of acquirers for every deal to ensure the management in whole or part in part was not present among the acquiring parties. We base the matched transactions on the following hierarchy:

(1) Target company must be incorporated in a Nordic state, if possible after step (2), (3) and (4), in the same country as the corresponding treatment company. (2) The target company must be matched to a treatment company by industry using SIC-code with at least two digits. (3) The peer transaction took place as close in time as possible to the matched MBO deal. (4). The target company is matched to a treatment company by size by using as closely matched revenue as possible for the year of transaction.

If the management has an equity stake before an IBO but will sell the whole share to the buying institution, they might have an incentive to manage the price upwards before the deal in accordance with Chou et al. (2005) instead of downwards in the case of an MBO. Therefore it is important to make two tests, one difference-in-difference test and one test on the treatment firms to check for a negative difference from zero.

We rely on Zephyr's lists of acquirers for our control group of deals. If some part of the pre-IBO management is taking part in the deal as a buyer but not listed by Zephyr, the deal is wrongly classified as a peer instead of treatment firm in our study. The hierarchy used implicitly prioritizes eliminating potential industry shocks over size-related effects.

4.3 Accounting data

All limited liability companies in the Nordic states are required to disclose annual reports to the concerned authorities. The annual reports must be submitted either in IFRS format or local GAAP format depending on requirements such as size or number of employees. This means that accounting data is public and obtainable for our sample firms. If there has been a transaction of a firm which is not a limited liability company, we would not be able to find accounting data for this firm.

We have used Amadeus by Bureau van Dijk as main source of accounting data. Income statement and balance sheet items can be retrieved on a company-by-company basis which means we had to source the company information one at a time. To supplement Amadeus, we have used the Retriever database for accounting data and annual reports of Swedish companies, Proff.no and Proff.dk for accounting data from Norwegian and Danish companies and Danish annual reports

from Virk.dk, published by the Danish Business Authority (Erhvervsstyrelsen). All supplementary sources are also company-by-company based.

All sources are secondary except from Virk.dk and annual reports obtained from Retriever, which are primary. Primary sources for annual reports are either the companies themselves, if they are willing/able to provide this data, or the concerned public authority from which annual reports can be purchased.

4.4 Shareholder data and type of seller

Shareholder information and seller type are obtained from Zephyr. The shareholder information is based on Zephyr's independence index where we classify a non-majority ownership (Zephyr's A+ to C index score) as an independent ownership of the company with dispersed ownership and a majority ownership (Zephyr's C- and D index scores) as a concentrated ownership. We however only found 12 companies with dispersed ownership in our sample. This is probably due to the fact that most companies in our sample are private.

The vendor is classified as institutional if it is labelled as a private equity firm, mutual fund, hedge fund, financial institution, bank, venture capital firm etc. in Zephyr. 27 companies in our sample had institutional sellers.

4.5 Loss of data

A total of 48 transactions have been removed from our sample due to lack of accounting data. The absence of accounting data could be due to a post-MBO liquidation or merger of the company as this tends to make the databases remove the old company data. In some cases we were able to retrieve the information of these companies directly from the public authority which still had the data available, but in most cases we could not find the information needed. Our sample might therefore be subject to survivorship bias. Exclusion from our sample could also be due to the target company being created from a previous division in the selling company before the transaction. In these cases there will not exist any accounting data before the MBO for the target company.

The Danish Financial Statement Act, section 32, states that the companies which are not subject to IFRS accounting standards do not need to disclose revenue and Cost of Goods Sold. Some companies therefore choose to have gross profit as top line in their income statements. As revenue is a crucial input in our models, we had no choice but to exclude these companies from our data.

Among the Danish firms, we might have a selection bias if the companies choosing to not disclose revenue and COGS are more/less prone to manipulation than others.

Some companies have chosen to change their fiscal years in conjunction with the MBO. In several of these cases the financial data is reported for either less or more than 12 months for the period after the transaction. This specific period is therefore not comparable with periods before and after. Though this change of policy might cover up manipulation, we cannot rely on the reported financials. These companies have also been cut from our data which may have resulted in the exclusion of manipulation firms. In some cases however, the financials are reported in a manner where they can be compared to precedent and adjacent periods. These companies remain in our sample.

In our sample, some companies were created closely before the MBO. During the first year of incorporation these companies showed revenue of zero. We do not include the company years with zero in revenue in our sample.

4.6 Final dataset

The final treatment sample consists of 112 companies and 928 company years. By using the criteria mentioned above, we identify 100 matched peer transactions to be used in our control group. See descriptive statistics below.

4.6.1 Treatment sample - MBOs

Table 1: MBO sample distribution by industry

US SIC Industry classification	Observations	% of total
Manufacturing	50	44.6%
Services	30	26.8%
Wholesale trade	9	8.0%
Construction	8	7.1%
Transportation & public utilities	6	5.4%
Retail trade	4	3.6%
Finance, insurance, real estate	3	2.7%
Agriculture, forestry, fishing	2	1.8%
Sum	112	100%

Industry classification is performed when possible using reported SIC-codes from Amadeus, if there is no record of the company industry, we select the SIC-code that best corresponds to the company's main business area. Companies with two-digit SIC-codes 20-39 are classified as

manufacturing and remaining companies as non-manufacturing, for a complete description of the classification table used see appendix III.

Table 2: MBO sample distribution by country of MBO target incorporation

Country	Observations	% of total
Sweden	45	40.2%
Finland	26	23.2%
Norway	24	21.4%
Denmark	17	15.2%
Sum	112	100%

Most transactions are observed in Sweden, with the fewest observations made in Denmark. The latter is partly a result of data limitations due to the aforementioned lower disclosure requirements for Danish firms not subject to IFRS.

Table 3: MBO sample distribution by year

Year	Observations	% of total
2015	7	6.3%
2014	9	8.0%
2013	14	12.5%
2012	10	8.9%
2011	16	14.3%
2010	9	8.0%
2009	9	8.0%
2008	8	7.1%
2007	6	5.4%
2006	11	9.8%
2005	13	11.6%
Sum	112	100%

Table 3 shows the spread of MBO transactions by year. The number of transactions per year appears to be relatively stable, however a noticeable drop occurs in 2007 prior to the financial crisis (perhaps due to high valuations making MBOs expensive) this pattern holds during the crisis years and until activity grows greatly in 2011. Note that not all transactions from 2015 can be used to perform all tests below as post-deal data is not yet available in case of matching calendar and reporting years.

4.6.2 Control sample – IBOs

Table 4: Control sample distribution by industry

US SIC Industry classification	Observations	% of total
Manufacturing	43	43.0%
Services	30	30.0%
Wholesale trade	9	9.0%
Construction	7	7.0%
Transportation & public utilities	4	4.0%
Retail trade	4	4.0%
Finance, insurance, real estate	2	2.0%
Agriculture, forestry, fishing	1	1.0%
Sum	100	100%

Both samples display very similar industry compositions, this a result of our first order condition when selecting peers being industry classification. However due to data limitations the number of peers is lower than the number of treatment firms, this explains the minor deviation observed in industry percentages.

Table 5: Control sample distribution by country target incorporation

Country	Observations	% of total
Sweden	48	48.0%
Finland	17	17.0%
Norway	17	17.0%
Denmark	18	18.0%
Sum	100	100%

The control sample displays some differences in deal geographies, the main difference being fewer deals taking place in Norway and Finland than in the MBO sample. That this occurs is not unexpected as some deviation was expected as a result of the selection criteria used.

Table 6: Control sample distribution by year

Year	Observations	% of total
2015	4	4.0%
2014	5	5.0%
2013	18	18.0%
2012	13	13.0%
2011	10	10.0%
2010	11	11.0%
2009	1	1.0%
2008	11	11.0%
2007	9	9.0%
2006	7	7.0%
2005	11	11.0%
Sum	100	100%

Looking at the timing of the peer deals shows a difference between private equity backed IBOs and the MBO sample in the dramatic fall in deal activity following the financial market turmoil in 2008, with only one matched deal found in 2009. It could be speculated that this is a result of PE funds experiencing difficulties in finding the appropriate funding (e.g. high-yield debt) in the wake of the financial crisis which could explain the observed pattern. However, great care must be taken not to draw any extensive conclusions from this sample composition as we only match the peers by deal year after controlling for industry, size and location.

The described deviation means that a robustness test for time-specific shocks must be performed, since the peer group by itself is unable to eliminate such factors completely. This is especially clear for deals occurring in 2009, as most of which could only be matched with deals from 2008 and 2010.

4.6.3 Revenue statistics

Table 7: Descriptive statistics: Revenue

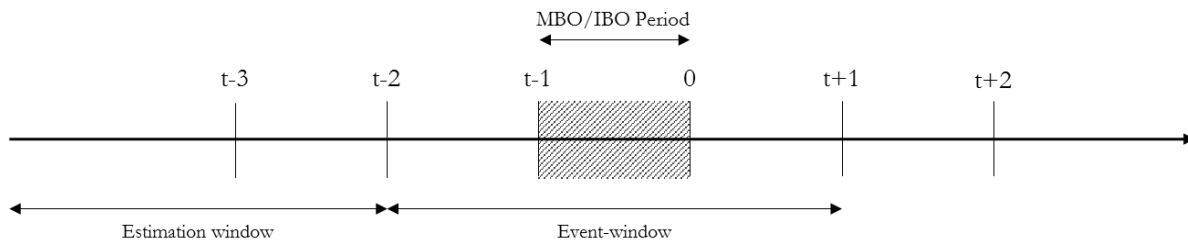
The table below displays descriptive statistics for reported revenue last year prior to the transaction.

All values in thousand euros (EUR) using the exchange rate at the time of reporting

	MBOs	Peers
Mean	31 598	151 849
Std.dev.	97 934	747 262
Max	963 679	7 136 000
3rd quartile	28 847	51 570
Median	7 392	15 648
2nd quartile	2 703	4 562
Min	44	108

One important cross-sample difference is the difference in average firm size with IBO firms being significantly larger in terms of revenue. Both samples however show a more similar intra-quartile distribution with a few outliers have skewing the mean values. This considerable difference in average size across the groups is not optimal but due to limited transaction activity and this study prioritizing matching by industry and time, we were unable to find a better fit in terms of size. This stresses the need for controlling also for size-related effects in the tests below, as the presence of such otherwise could result in a bad control bias.

5. Research Design/Methodology



In order to test our above-mentioned hypotheses, we run three main tests. Each test follows the same general structure:

1. Use of the estimation window data (containing both the treatment firms and control group) to approximate a model for the expected level of the test variable in any specific year.
2. Using the regression model developed in step 1, the deviation from the expected level of the test variable is calculated for all years (including the event window).
3. A difference-in-difference regression is run using dummy variables to test the null hypothesis that there is no significant post-treatment difference in deviations from model predictions, as calculated above, between the MBO firms and the non-MBO peers.

Since the test uses panel data and earlier studies (Perry & Williams 1994) have indicated the presence of intra-firm autocorrelation, we use cluster-robust regressions in all our tests. However, for comparability reasons the result from instead using a robust regression framework is presented in appendix II. The overall test methodology relies strongly on that the common trends assumption holds in the estimation window, and that our control group consisting of IBO transactions is a valid counterfactual for the MBO deals. For related discussion see chapter 6 and peer selection under chapter 4.

Below follows an in-depth description of each of the three tests run, the first aims to identify accruals-based earnings management and the subsequent two tests for different forms of real earnings management.

5.1 Test of earnings management using working capital accruals

Step 1. Estimate normal levels of working capital accruals:

The model used to detect accrual manipulations is based on the one developed by Jones (1991) but following the recommendation by Dechow et al. (2012) we exclude depreciation and only use working capital accruals as dependent variable to reduce misspecification issues.

$$TAcc = (\Delta Current Assets - \Delta Cash) - (\Delta Current Liabilities - \Delta Short term debt) \quad 5.1$$

The first step in this framework is to estimate a “normal” level of change in working capital accruals, this is done using a cluster robust regression with the following model specification:

$$\frac{TAcc_t}{TA_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{TA_{t-1}} + \beta_1 \frac{\Delta Rev_t}{TA_{t-1}} + \beta_2 \frac{PPE_t}{TA_{t-1}} + d_1 PE + \varepsilon_t \quad 5.2$$

Where:

- $TAcc_t$ = Difference in total working capital accruals year t.
- ΔRev_t = Change in revenue between year t and year t-1, in domestic currency units.
- PPE_t = Gross property, plant and equipment, book values as reported year t.
- TA_{t-1} = Total assets at reported book value during year t-1.
- PE = Is a dummy variable set to 1 for firms acquired in PE-backed transactions.
- ε_t = Error term.

The first factor, ΔRev_t , aims to capture the working capital effect of an increase/decrease in revenue during the last twelve months. The second factor, PPE_t , is included to capture the effect of different sizes in firm property, plant and equipment. One addition is made to the model recommended by Dechow is the PE dummy, which is included to improve the accuracy of our difference-in-difference test. The PE Dummy is included to capture any permanent difference in performance between firms that are subject to a private equity backed transaction, one source of such potential differences could be that PE firms can successfully identify outperforming firms, a claim supported by previous studies (e.g. Kaplan 1989). Note that both MBO and IBO transactions may be backed by a PE fund, then PE dummy is therefore not interchangeable with a peer group dummy.

Note that the regression variables, including the dependent working capital accruals, are scaled with the size of the company's balance sheet in the previous period. This to facilitate cross-firm comparability and reduce heteroscedasticity. To control for size related effects and reduce potential omitted variable bias we also include a third regression factor measuring only the inverse of firm total assets in the previous period.

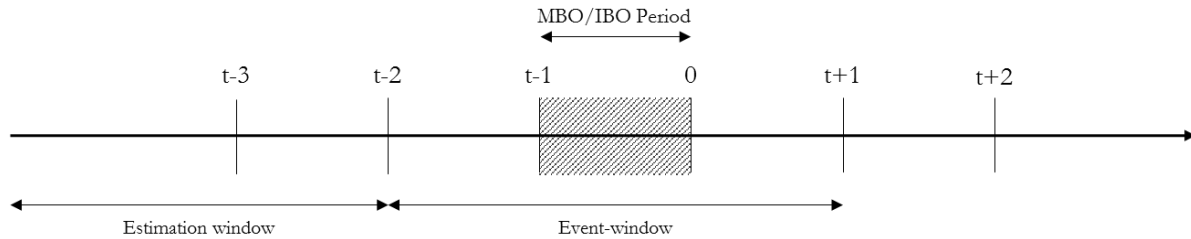
Step 2. Calculate the deviation from normal levels for each period

Using the above model, the deviation from the value predicted is calculated for each time-period, and defined as abnormal working capital accruals (AA).

$$\frac{AA}{TA_{t-1}} = \frac{\frac{TAcc_t}{TA_{t-1}}}{\text{Realized } \Delta WC \text{ accruals (TAcc)}} - \underbrace{\left(a_0 + a_1 \frac{1}{TA_{t-1}} + b_1 \frac{\Delta Rev_t}{TA_{t-1}} + b_2 \frac{PPE_t}{TA_{t-1}} + d_1 IBO \right)}_{\text{Expected } \Delta WC \text{ accruals}} \quad 5.3$$

Note that also this measurement of abnormal accruals is scaled by the size of the company's balance sheet. As a result of this our measure of abnormal accruals is to be interpreted as a percentage of the firm's start-of-period assets.

Step 3. Run logistic regression with time-dummies to test the earnings management hypothesis:



The levels of abnormal accruals (AA) calculated above is now used as the dependent variable in a difference-in-difference test. The control group is used as the proxy for what behavior the MBO firms would show in the absence of management's conflict of interest. Each year in the event window we test for if there is a significant difference in abnormal accruals calculated in step 2 between the MBO and IBO firms.

Both the reporting year preceding the transaction (t-1) and the two years following it (t0 and t+1) are of interest, as the test aims to, in accordance with Dechow et al (2012), check for a post transaction reversal. Two post-transaction years are included as the transactions may occur during

different times at year-zero, e.g. if one MBO occurs in January reversion is likely to occur during the same financial year, however if the deal is completed in December, no effect could be observed until the next year. Manipulation could occur during any period prior to the deal when measuring real earnings management, however for accrual based manipulation, the year directly preceding the deal is of most interest (as such manipulations must be reversed shortly after they have been made).

This test is conducted by associating each of the event-window year with a dummy variable, these will represent the counterfactual change in abnormal accruals in the absence of management's conflict of interest. To this test three interference dummies are added, to capture the difference in average AA if the firm also is subject to an MBO transaction.

$$\begin{aligned} \frac{AA}{TA_{t-1}} = & \alpha_0 + d_1 Dummy_{t-1} + (d_2 Dummy_{t-1} * MBO) + d_3 Dummy_{t0} \\ & + (d_4 Dummy_{t0} * MBO) + d_5 Dummy_{t+1} + (d_6 Dummy_{t+1} * MBO) + \varepsilon \end{aligned} \quad 5.4$$

Prior to running this regression, the data is winsorized for the one percent of the most extreme observations of AA in either direction. This to ensure the robustness of our result and remove the impact of extreme observations on our result.

5.2 Test of real earnings management using revenue manipulation

Step 1. Estimate normal levels of operating cash flows:

To test for the revenue-based real earnings management we follow the example of Roychowdhury (2006) and Cohen et al. (2008) by using an expectations model based on operating cash flow and where revenue determines normal operating cash flow. The overall test design closely resembles that for accrual based earnings management.

First a normal level of operating cash flow is estimated using the following model:

$$\frac{OCF_t}{TA_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{TA_{t-1}} + \beta_1 \frac{Revenue_t}{TA_{t-1}} + \beta_2 \frac{\Delta Rev_t}{TA_{t-1}} + d_1 PE + \varepsilon_t \quad 5.5$$

Where:

- OCF_t = Level of total operating cash flow in year t, in number of domestic currency.
- $Revenue_t$ = Gross property, plant and equipment, book values as reported year t.
- ΔRev_t = Change in revenue between year t and year t-1, in domestic currency units.
- TA_{t-1} = Total assets at reported book value during year t-1.
- PE = Is a dummy variable set to 1 for firms acquired in PE-backed transactions.
- ε_t = Error term.

Reported revenue is included to capture the immediate operating cash flow effect of this year's sales. The difference in revenue between this and last year captures potential lag effects as a result from large changes in revenues across the years (e.g. the conversion of accounts receivable into cash). The total assets variable is used to remove potential size related effects and reduces sample heteroscedasticity. As above a cluster-robust regression is run due to the presence of outliers and reduce the impact of autocorrelation, allowing us to better estimate the relationship between the determinants and operating cash flow in normal conditions.

Step 2. Estimate deviation from the normal level of operating cash flows

As in the previous model, the deviation from the value predicted by our estimation model is calculated for each time-period, and here defined as abnormal operating cash flows (AOCF).

$$AOCF_t = \frac{OCF_t}{TA_{t-1}} - \left(a_0 + a_1 \frac{1}{TA_{t-1}} + b_1 \frac{Revenue_t}{TA_{t-1}} + b_2 \frac{\Delta Rev_t}{TA_{t-1}} + d_1 IBO \right) \quad 5.6$$

This value should, as with AA, be interpreted as a percentage of opening total assets deviation from the model expected operating cash flow. Finally, the vector of AOCF is winsorized in the same manner as AA (one percent in both directions) to eliminate the most extreme outliers and ensure result robustness.

Step 3. Run difference-in-difference regression with time-dummies:

This test uses the same framework as the accrual based test but in interpreting the results, there are a few key differences:

1. If real earnings management is present it should become clear, at latest, in the year *following* the MBO transaction, when managers act to reverse their previous revenue reducing activities.
2. There is not necessarily a pre-deal period during which negative manipulation would clearly show, e.g. if managers simply refrain from making revenue generating changes to the current business.

A positive shock to abnormal operating cash flow during the post-MBO period would therefore support the hypothesis that real earnings management takes place prior to the transaction.

The following test function is used:

$$\frac{AOCF}{TA_{t-1}} = \alpha_0 + d_1 Dummy_{t-1} + (d_2 Dummy_{t-1} * MBO) + d_3 Dummy_{t0} + (d_4 Dummy_{t0} * MBO) + d_5 Dummy_{t+1} + (d_6 Dummy_{t+1} * MBO) + \varepsilon \quad 5.7$$

5.3 Test of real earnings management using operating expenses manipulation

Step 1. Estimate normal levels of operating expenses:

First, in order to accurately capture only the effect from cost of goods sold and discretionary expenses, we define operating expenses as:

$$OpEx = Revenue - Operating Income + Non Cash Items^4 - \Delta Working Capital$$

The normal level of this measurement is estimated using the following function:

$$\frac{OpEx_t}{TA_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{TA_{t-1}} + \beta_1 \frac{Revenue_t}{TA_{t-1}} + d_1 PE + \varepsilon_t \quad 5.8$$

Where:

- OpEx_t = Operating expenses as defined above, in number of domestic currency units.
- Revenue_t = Gross property, plant and equipment, book values as reported year t.
- TA_{t-1} = Total assets at reported book value during year t-1
- PE = Is a dummy variable set to 1 for firms acquired in PE-backed transactions.
- ε_t = Error term

Based on the same reasoning as above, the regression is run using cluster-robust methodology.

Step 2. Estimate deviation from the normal level of operating expenses

The deviation from expected operating expenses (AOpEx) is calculated as:

$$\frac{AOpEx_t}{TA_{t-1}} = \frac{OpEx_t}{TA_{t-1}} - \left(\alpha_0 + \alpha_1 \frac{1}{TA_{t-1}} + \beta_1 \frac{Revenue_t}{TA_{t-1}} + d_1 IBO \right) \quad 5.9$$

This value should, as all deviations above, be read as a percentage of opening total assets deviation from the expected operating cash flow. The resultant vector of deviations is winsorized using the same methodology as in previous tests.

⁴ Includes depreciation, depletion, amortization and impairment charges

Step 3. Run difference-in-difference regression with time-dummies:

The time dummy tests for expense based real earnings management exactly mirrors that for revenue based earnings management. Any decision to excessively inflate operating costs is expected to reverse during either the same year or the year following the MBO, resulting in a negative shock to abnormal operating expenses.

$$\frac{AOpEx_t}{TA_{t-1}} = \alpha_0 + \alpha_0 + d_1Dummy_{t-1} + (d_2Dummy_{t-1} * MBO) + d_3Dummy_{t0} + (d_4Dummy_{t0} * MBO) + d_5Dummy_{t+1} + (d_6Dummy_{t+1} * MBO) + \varepsilon \quad 5.10$$

6. Results and discussion

6.1 Accrual-based tests

Descriptive statistics for the regression model used to estimate normal levels of changes in accounting accruals is presented below.

Table 4: Estimation model - Working Capital Accruals

The table below presents the results of the OLS-regression used to estimate normal working capital accruals with cluster-robust standard errors.

	Estimate	SE	t-stat	p-value
Intercept	0.0002	0.0114	0.0194	0.9846
1 / Opening assets	-1643.9	2123.4	-0.7742	0.4392
Δ Revenue / Opening assets	-0.0248	0.0129	-1.9236	0.0550
PPE / Opening assets	0.0142	0.0262	0.5403	0.5892
PE Dummy	0.0156	0.0117	1.3383	0.1814

Number of observations: 494

p-values based on a two-tailed test

R-squared: 0.0247

Contrary to the result in previous studies (e.g. Perry and Williams 1994), this model provides only limited explanatory power for our dataset, explaining less than 3% of the overall sample variance. This lower value is a direct result of the test using clustered standard errors, repeating the same analysis with heteroscedasticity robust standard errors gives an R-square of over 15% (see appendix II). We argue that such an alternative test incorrectly overstates the model's explanatory power due to intra-firm autocorrelation, a common problem when using panel data, and that the lower value is a more reliable measure. However, this low score may impair the accuracy of our abnormal accruals measure. More recent studies (e.g. Mao and Renneboog 2015) did find a better fit with a similar model (without clustering standard errors), they however use ROA as a performance extension to the original Jones model. When adding ROA to our model for comparison, the fit is improved slightly however the explanatory power remains weak (Appendix V).

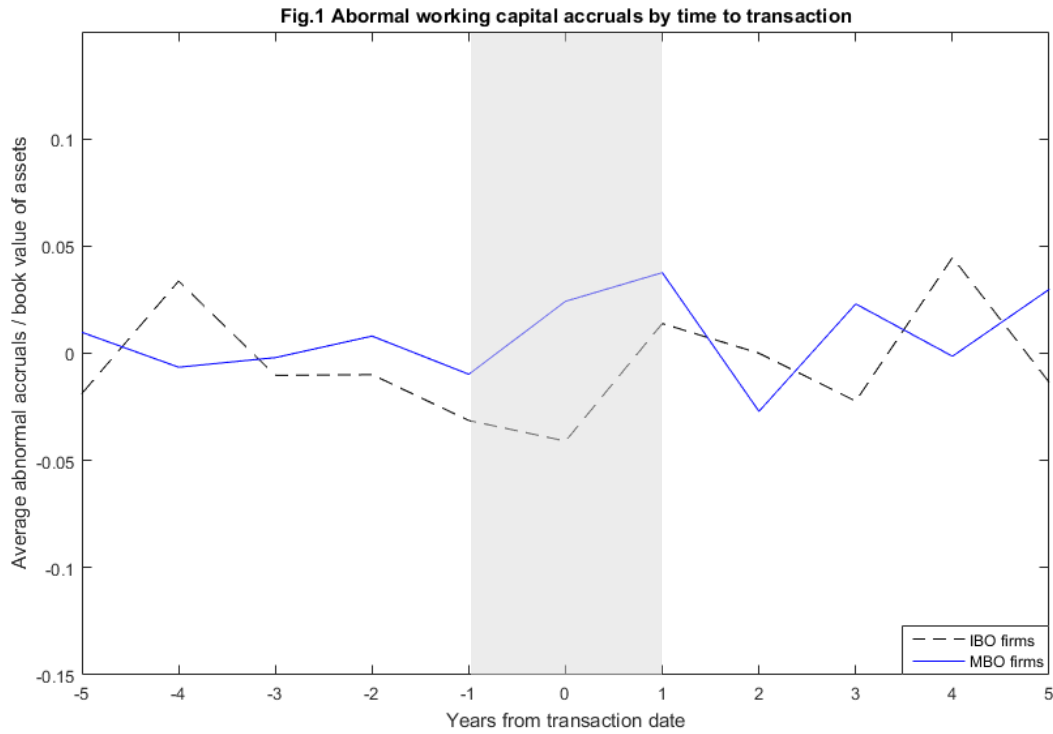


Table 5: Abnormal Accruals - D - i - D

The table below presents the treatment group results of the dummy-regression for abnormal working capital accruals. The time dummies alone are to be interpreted as the average treatment effect for the control group, the interference dummies check for the deviation from this value if the transaction is an MBO.

	Estimate	SE	t-stat	p-value
Intercept	-0.0006	0.0040	-0.1720	0.8634
t-1 Dummy	-0.0307	0.0174	-1.7668	0.0774
t-1*MBO	0.0183	0.0237	0.7724	0.4400
t0 Dummy	-0.0404	0.0272	-1.4845	0.1379
t0*MBO	0.0622	0.0389	1.5971	0.1104
t+1 Dummy	0.0146	0.0286	0.5089	0.6109
t+1*MBO	0.0207	0.0371	0.5595	0.5759

Number of observations: 1699

p-values based on a two-tailed test

R-squared: 0.00616

The result from the time-dummy test finds no significant evidence negative abnormal accruals prior to the transaction. This result is not in line with Mao and Renneboog (2015), who find evidence of downwards accruals-manipulation one year prior to the MBOs in their sample. A possible reason for this difference may be that most their observations occur prior to adoption of IFRS; which together with subsequent regulatory changes in the wake of the 2008 financial crisis may have

limited companies' ability to pursue this type of earnings manipulation. Mao and Renneboog mention this trend in their paper, wherein they find evidence of a decline in accruals-based earnings management after 2003, when a revised version of the UK corporate governance code was introduced. However, in our data the average abnormal working capital accrual change directly prior to the deal is negative for both groups. This could potentially be a result of outside macro factors during the observed years or improved working capital management, which with sophisticated buyers could push up the company valuation. The result further puts into question the test assumption that a systematic negative shock to abnormal accruals prior to the deal necessarily would imply active negative earnings management, as there is no reason to suspect such behavior in the peer sample.

Also in the post deal period, we fail to identify any significant difference in unexpected working capital accruals between the IBO and MBO firms. The first report immediately following the transaction appears to display widely different average AA between the MBO and IBO firms (see t0 dummies above), however due to limited test power no significant result is clear. It could be that, as discussed earlier, the timing of the reversal will differ depending on when during the year the underlying transaction takes place.

6.2 Real earnings management based tests

6.2.1 Operating Cash Flow (model 2)

Table 6: Estimation model - Operating Cash Flow

The table below shows the results of the regression used to estimate the normal relation between revenues and operating cash flows, presented here with cluster-robust standard errors.

	Estimate	SE	t-stat	p-value
Intercept	-0.0290	0.0380	-0.7630	0.4458
1 / Opening assets	5625.6	3594.5	1.5650	0.1182
Revenue / Opening assets	0.0499	0.0135	3.7004	0.0002
Δ Revenue / Opening assets	0.0882	0.0391	2.2547	0.0246
PE Dummy	0.0414	0.0305	1.3554	0.1759
Number of observations: 494			p-values based on a two-tailed test	
R-squared: 0.2363				

We replicate the test developed by Roychowdhury (2006), confirmed by Cohen et al (2008) and run by Mao and Renneboog (2015) on an MBO sample, to predict revenue based real earnings management. The model provides a much stronger explanatory value than the accruals prediction model, with an R-square of above 23% when using clustered standard errors. This value is slightly lower than in previous studies (Roychowdhury finds an R-square of approximately 40%), but the model still offers a good degree of explanatory power. Very important to note however, is that the data displays significant negative autocorrelation on the firm level. A direct result of this autocorrelation is that when the same test is performed in a non-cluster-robust framework, a much lower R-square is given (appendix II). The high explanatory power increases the reliability of our subsequent tests, but an important caveat is that most variation in operating cash flows remain unexplained, which together with the autocorrelation indicates that there is a considerable risk for omitted variable bias using model.

In earlier studies, a positive abnormal operating cash flow is interpreted as consistent with negative earnings management. For instance, Mao & Renneboog (2015) writes:

“...a reduction in lenient credit terms will decrease the sales volumes and therefore lead to low earnings numbers, but will increase the collection of current sales' receipts and thus raise the level of OCF⁵.”

⁵ OCF = Operating Cash Flow

When Mao and Renneboog find a significantly positive abnormal cash flow for their MBO firms they draw the conclusion that the managers of these firms engage in real earnings management. Our result from the abnormal cash flow test is presented below:

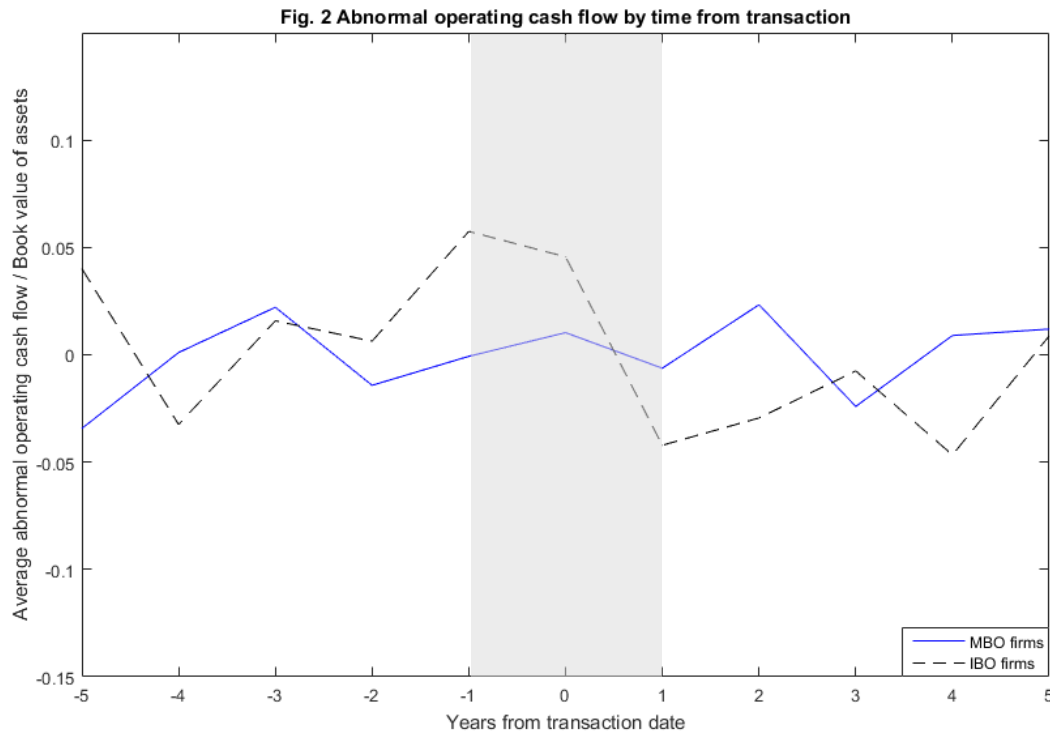


Table 7: Abnormal Operating Cash Flow - D - i - D

The table below presents the treatment group results of the dummy-regression for abnormal operating cash flow. The time dummies alone are to be interpreted as the average treatment effect for the control group, the interference dummies check for the deviation from this value if the transaction is an MBO.

	Estimate	SE	t-stat	p-value
Intercept	-0.0046	0.0103	-0.4440	0.6571
t-1 Dummy	0.0622	0.0207	3.0071	0.0027
t-1*MBO	-0.0623	0.0314	-1.9808	0.0478
t0 Dummy	0.0500	0.0287	1.7421	0.0817
t0*MBO	-0.0392	0.0470	-0.8359	0.4033
t+1 Dummy	-0.0379	0.0348	-1.0895	0.2761
t+1*MBO	0.0326	0.0458	0.7116	0.4768

Number of observations: 1699

p-values based on a two-tailed test

R-squared: 0.00617

This test result is highly unexpected. As mentioned above, previous studies' interpretations say that if negative earnings management is present, the treatment sample should display abnormally high operating cash flow in the period preceding the transaction (and vice-versa after its completion). What this test instead shows is that our control group, which we can reasonably assume has no interest in manipulating down their company valuation, as they will hold no share in the company after the deal, display exactly this type of behavior. This closely resembling the result found by Mao Reneboog's for their MBO transactions. Contrary, the MBO transactions studied displays no signs of increased unexpected operating cash flows. These firms have significantly lower pre-deal abnormal operating cash-flow than their IBO peers, with an average treatment effect of close to zero. By studying the associated graph (fig. 2) the pattern becomes even clearer, with the average level of cash flow over assets remaining relatively constant for all years in the MBO sample.

Our result therefore indicates that the kind of behavior found in previous studies is not unique to MBOs, supporting further the argument for using a peer group of completed deals. The management teams in our control group should have no incentives to manipulate earnings to favor the buyer. Even if the IBO firms' managers would engage in earnings management, logic suggests that it should take the opposite direction, i.e. aiming to increase rather than decrease the company valuation.

One possible explanation for the observed result could be sellers trying to increase the value before the deal by reducing net working capital. If working capital is managed downwards, e.g. by reducing the number of credit days given to customers, all else equal we should observe a decrease in accounts receivable which lowers working capital, increases operating cash flow and by result the company value.

6.2.2 Operating Expenses (Model 3)

The final model, that is used to measure the two combined effects of earnings management using production volume and/or discretionary expenses has some overlap with the above test (as operating cash flow captures not only cash inflows, but also outflows), but this test has two significant advantages: ease of interpretability and model fit.

Table 8: Estimation model - Operating Expenses

The table below shows the results of the regression model used to estimate the normal level of operating expenses* presented here with cluster-robust standard errors.

	Estimate	SE	t-stat	p-value
Intercept	0.0717	0.0543	1.3203	0.1874
1 / Opening assets	-14127	5746.6	-2.4583	0.0143
Revenue / Opening assets	0.9160	0.0245	37.35	0.0000
PE dummy	-0.0971	0.0360	-2.6985	0.0072

Number of observations: 494

p-values based on a two-tailed test

R-squared: 0.9694

*See definition

The very simple model used (assuming that the normal level of expenses is completely determined by the same period revenue and assets and our PE dummy), display the strongest level of explanatory power among the three tests performed, with an r-square value of above 96%. As such a normal expected level can be accurately predicted, the risk for omitted variables is almost eliminated. A good fit is to be expected if the operating margins stay relatively constant over time. Interesting to note is that, the PE dummy here gives some support to the claim that PE funds have superior ability to identify overperforming companies. With the average target company in PE-backed transactions displaying a significantly lower pre-deal level of operating expenses (on average 9.7% of the firm's reported assets).

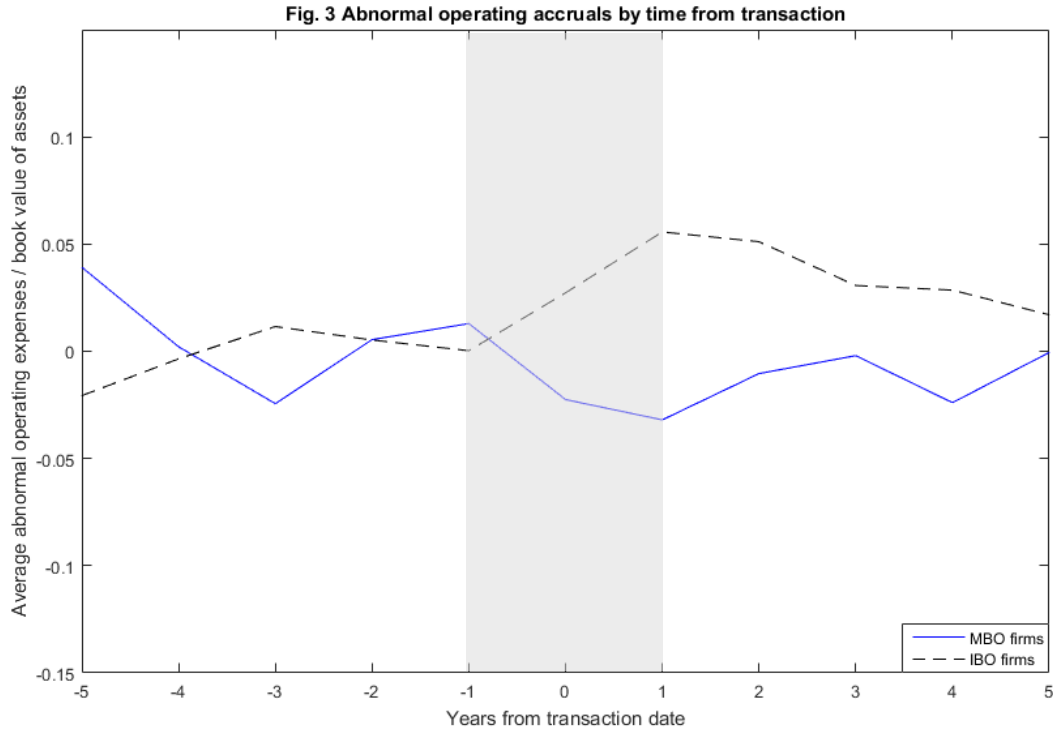


Table 9: Abnormal Operating Expenses - D-i-D

The table below presents the treatment group results of the dummy-regression for abnormal operating expenses*.

	Estimate	SE	t-stat	p-value
Intercept	0.0086	0.0127	0.6777	0.4981
t-1 Dummy	-0.0083	0.0216	-0.3853	0.7001
t-1*MBO	0.0182	0.0306	0.5943	0.5524
t0 Dummy	0.0191	0.0260	0.7318	0.4644
t0*MBO	-0.0446	0.0384	-1.1602	0.2461
t+1 Dummy	0.0473	0.0226	2.0959	0.0362
t+1*MBO	-0.0823	0.0328	-2.5070	0.0123

Number of observations: 1699

p-values based on a two-tailed test

R-squared: 0.0051

The difference-in-difference test shows no clear difference between the groups prior to the transaction, this in-line with our discussion regarding the difficulty in detecting real earnings management before it is reversed. The post transaction period result is however much more interesting: The average treatment effect for the IBO firms is significantly positive, i.e. operating costs are higher than our model would predict in the year following the transaction. Such a result is

not unexpected, as it might be due to reorganization expenses realized as the acquirer attempts to improve future profitability, something which institutional buyers such as private equity firms are (in)famous for doing. This Contrary to this result, the MBO firms not only display a significantly lower abnormal operating expense level, but also a negative average treatment effect, with operating expenses in our MBO sample is on average four percentage units lower than the model would predict.

The result is in line with what would be expected should management manipulate earnings prior to the deal. An action taken immediately after the MBO which significantly lowers operating expenses is suspicious. Though Kaplan (1989) interprets the increase in post-MBO performance observed in his sample as not due to manipulation, a claim supported by other studies arguing that managers are held back and prevented from taking the actions they want, it is unlikely that the fruits from the previously prevented investments should materialize as fast as one year after the MBO. Further if the previous owners impeded management's investments or reorganization projects, it is difficult to find an argument for how MBO firms manage to avoid the associated short-term expenses shown in our IBO sample. Kaplan's findings also reached over a longer period of time which makes it easier to argue for a non-manipulation explanation.

Phan & Hill 1995 find that management ownership is positively correlated with reduced wasteful spending. This could be one interpretation of our result. However, even if this is the case, the management team has still failed in their fiduciary duties. Delaying value creating activities until after the transaction is merely another form of real earnings management, whereby managers use their superior information to transfer wealth to themselves.

6.3 Institutional Vendors

Our final hypothesis is tested in a similar fashion as the ownership dispersion. All treatment companies with institutional sellers are captured by a dummy variable equal to one if this is the case and zero otherwise. Below we repeat each of the difference in difference tests with an additional level for each interference dummy, to capture the difference between MBO:s where the previous owner was a financial institution compared with other types of owners, i.e. the counterfactual is other types of MBOs and not the IBOs

Table 10: Abnormal Operating Cash Flow- institutional seller test

The table below presents the treatment group results of the difference-in-difference test between MBO transactions where the seller is a financial institution compared with other types of owners.

	Estimate	SE	t-stat	p-value
Intercept	-0.0098	0.0111	-0.8869	0.3753
t-1 Dummy	0.0675	0.0208	3.2451	0.0012
t-1*MBO	-0.0718	0.0356	-2.0199	0.0436
t-1*MBO*Inst. seller	-0.0005	0.0480	-0.0112	0.9911
t0 Dummy	0.0553	0.0287	1.9236	0.0546
t0*MBO	-0.0489	0.0479	-1.0218	0.3070
t0*MBO*Inst. seller	0.0401	0.0267	1.4979	0.1343
t+1 Dummy	-0.0326	0.0348	-0.9369	0.3489
t+1*MBO	0.0279	0.0492	0.5668	0.5709
t+1*MBO*Inst. seller	-0.0204	0.0785	-0.2601	0.7948

Number of observations: 1699

p-values based on a two-tailed test

Table 11: Abnormal Operating Expenses - institutional seller test

The table below presents the treatment group results of the difference-in-difference test between MBO transactions where the seller is a financial institution compared with other types of owners.

	Estimate	SE	t-stat	p-value
Intercept	0.0086	0.0128	0.6771	0.4984
t-1 Dummy	-0.0083	0.0216	-0.3849	0.7003
t-1*MBO	0.0300	0.0346	0.8682	0.3854
t-1*MBO*Inst. seller	-0.0488	0.0389	-1.2542	0.2099
t0 Dummy	0.0191	0.0261	0.7312	0.4648
t0*MBO	-0.0420	0.0414	-1.0122	0.3116
t0*MBO*Inst. seller	-0.0109	0.0606	-0.1805	0.8568
t+1 Dummy	0.0473	0.0226	2.0940	0.0364
t+1*MBO	-0.0818	0.0372	-2.1998	0.0280
t+1*MBO*Inst. seller	-0.0023	0.0376	-0.0614	0.9511

Number of observations: 1699

p-values based on a two-tailed test

As the tables above show there is no indication of any systematic difference in our earnings management measures between firms sold in a management buyout by the different seller categories. While this is contrary to the result in Roychowdhury's (2006), it is not entirely unexpected due to the nature of our data. Most previous studies have focused on public-to-private transactions, where the average target company has a widely dispersed group of owners. Compared to the owners in such companies, financial institution should have a greater ability to oversee management actions, and limit earnings manipulations. In our sample, most transactions are of private firms, many of which are subsidiaries to industrial companies operating in the same industry. The owners in such a situation are not unlikely to be able to exercise a similar, or higher, level of control to that of an institutional owner.

7. Robustness

To ensure result robustness, a number of different variations of the main test are run in this chapter. See also appendix II for the results when using heteroscedasticity robust standard errors instead of clustering standard errors by firm.

7.1 Year fixed effects – test for omitted macro factors

The first test is performed to check for period specific effects which could be an indication of an omitted macro variable inducing model bias, e.g. if the financial crisis limited the possibility for negative earnings management. To do this we manipulate the difference-in-difference test, by adding a separate dummy for each year an observation is made.

Table 12: Abnormal accruals - year fixed effects test

This table presents the same model as in table 5 with the addition of a number of year dummies, to control for omitted variable bias. No dummies are included for years prior to 2001.

	Estimate	SE	t-stat	p-value
Intercept	-0.0840	0.0493	-1.7027	0.0888
t-1 Dummy	-0.0280	0.0182	-1.5371	0.1245
t-1*MBO	0.0170	0.0240	0.7086	0.4787
t0 Dummy	-0.0396	0.0279	-1.4217	0.1553
t0*MBO	0.0635	0.0389	1.6296	0.1034
t+1 Dummy	0.0182	0.0290	0.6260	0.5314
t+1*MBO	0.0186	0.0375	0.4965	0.6196
Dummy2001	0.0342	0.0807	0.4240	0.6716
Dummy2002	0.0456	0.0598	0.7615	0.4465
Dummy2003	0.0662	0.0540	1.2258	0.2204
Dummy2004	0.0808	0.0494	1.6356	0.1021
Dummy2005	0.0748	0.0645	1.1601	0.2462
Dummy2006	0.0611	0.0610	1.0013	0.3168
Dummy2007	0.0909	0.0517	1.7592	0.0787
Dummy2008	0.1155	0.0525	2.2004	0.0279
Dummy2009	0.0595	0.0514	1.1583	0.2469
Dummy2010	0.0907	0.0519	1.7458	0.0810
Dummy2011	0.1025	0.0516	1.9879	0.0470
Dummy2012	0.0797	0.0519	1.5341	0.1252
Dummy2013	0.0536	0.0516	1.0371	0.2998
Dummy2014	0.0831	0.0527	1.5782	0.1147
Dummy2015	0.0982	0.0519	1.8932	0.0585

Number of observations: 1699

p-values based on a two-tailed test

Adding these fixed effects dummies have limited impact on the already weak result from the accruals manipulation test. Note that two year dummies have significant positive impact on the abnormal accruals variable. This could as earlier be a result if macro factors affecting these two years, an argument given some validity since the most significant observation is seen in year 2008, in midst of the financial crisis. However great caution should be taken in interpreting the cause of this result as the original model only provides minimal explanatory power in our sample.

Table 13: Abnormal operating cash flow - year fixed effects

This table presents the same model as in table 7 with the addition of a number of year dummies, to control for omitted variable bias.

	Estimate	SE	t-stat	p-value
Intercept	0.0538	0.0482	1.1159	0.2646
t-1 Dummy	0.0611	0.0221	2.7683	0.0057
t-1*MBO	-0.0589	0.0311	-1.8949	0.0583
t0 Dummy	0.0547	0.0301	1.8155	0.0696
t0*MBO	-0.0419	0.0469	-0.8935	0.3717
t+1 Dummy	-0.0419	0.0357	-1.1756	0.2399
t+1*MBO	0.0335	0.0466	0.7180	0.4729
Dummy2001	-0.0662	0.0672	-0.9841	0.3252
Dummy2002	-0.1103	0.0680	-1.6229	0.1048
Dummy2003	-0.1001	0.0554	-1.8086	0.0707
Dummy2004	-0.0862	0.0613	-1.4056	0.1600
Dummy2005	-0.0847	0.0707	-1.1985	0.2309
Dummy2006	-0.0775	0.0647	-1.1983	0.2310
Dummy2007	-0.0456	0.0538	-0.8468	0.3972
Dummy2008	-0.0884	0.0540	-1.6386	0.1015
Dummy2009	-0.0009	0.0505	-0.0173	0.9862
Dummy2010	-0.0638	0.0527	-1.2113	0.2259
Dummy2011	-0.0924	0.0514	-1.7980	0.0724
Dummy2012	-0.0490	0.0516	-0.9492	0.3427
Dummy2013	-0.0382	0.0522	-0.7304	0.4652
Dummy2014	-0.0483	0.0523	-0.9235	0.3559
Dummy2015	-0.0657	0.0539	-1.2205	0.2224

Number of observations: 1699

p-values based on a two-tailed test

The main finding from the operating cash flow test remains even when isolating potential time related fixed effects, with no time dummy having significant impact. The difference between MBO and non-MBO firms is however made less clear and is pushed below the 5% significance level, however in light of that no year dummy has a significant result this is likely caused by model over specification.

Table 14: Abnormal operating cash expenses - year fixed effects

This table presents the same model as in table 9 with the addition of a number of year dummies, to control for omitted variable bias.

	Estimate	SE	t-stat	p-value
Intercept	0.0571	0.0604	0.9455	0.3445
t-1 Dummy	-0.0107	0.0222	-0.4817	0.6301
t-1*MBO	0.0164	0.0311	0.5266	0.5985
t0 Dummy	0.0147	0.0268	0.5493	0.5829
t0*MBO	-0.0445	0.0388	-1.1490	0.2507
t+1 Dummy	0.0487	0.0227	2.1473	0.0319
t+1*MBO	-0.0812	0.0329	-2.4696	0.0136
Dummy2001	0.0070	0.0459	0.1521	0.8791
Dummy2002	0.0458	0.0780	0.5873	0.5571
Dummy2003	0.0011	0.0631	0.0175	0.9860
Dummy2004	-0.0137	0.0628	-0.2174	0.8279
Dummy2005	0.0086	0.0665	0.1298	0.8967
Dummy2006	-0.0173	0.0604	-0.2862	0.7748
Dummy2007	-0.0788	0.0628	-1.2542	0.2099
Dummy2008	-0.0689	0.0623	-1.1051	0.2693
Dummy2009	-0.0760	0.0615	-1.2363	0.2165
Dummy2010	-0.0498	0.0621	-0.8017	0.4228
Dummy2011	-0.0459	0.0623	-0.7367	0.4614
Dummy2012	-0.0532	0.0624	-0.8528	0.3939
Dummy2013	-0.0421	0.0630	-0.6689	0.5037
Dummy2014	-0.0402	0.0621	-0.6473	0.5175
Dummy2015	-0.0433	0.0630	-0.6876	0.4918

Number of observations: 1699

p-values based on a two-tailed test

As with operating cash flows, the abnormal operating expenses test shows no significant time related fixed effect. The initial result holds with almost unchanged strength in our extended test.

7.2 Systematic industry differences – adding industry based FE-estimators

In line with the test for year specific effects, a test is performed to exclude that the indications of earnings management observed are a result of systematic industry differences. The risk for this is deemed as relatively minor, since the first selection criteria when building the control sample was industry classification. However, it is still possible that the estimation models used are less reliable for companies in one or several of the specified industry groups. The test used closely resembles that for year specific effects, each industry classification is associated with a dummy variable, these are then added to the original difference-in-difference regression. Note that we set manufacturing firms to be the base case (this being the most common firm type in our data) and these firms are not mapped to a dummy.

Table 15: Abnormal accruals - industry fixed effects test

This table presents the same model as in table 5 with the addition of a number of industry dummies, to control for omitted variable bias. Note that the manufacturing is set as the base case, and not given an unique dummy variable, all other dummies are to be interpreted as deviation from this industry group.

	Estimate	SE	t-stat	p-value
Intercept	-0.0010	0.0049	-0.1974	0.8436
t-1 Dummy	-0.0331	0.0174	-1.9056	0.0573
t-1*MBO	0.0221	0.0237	0.9341	0.3507
t0 Dummy	-0.0425	0.0273	-1.5581	0.1199
t0*MBO	0.0657	0.0390	1.6851	0.0926
t+1 Dummy	0.0125	0.0287	0.4365	0.6627
t+1*MBO	0.0241	0.0371	0.6506	0.5156
Services	0.0055	0.0097	0.5687	0.5698
Wholesale trade	0.0108	0.0132	0.8165	0.4146
Construction	0.0098	0.0128	0.7649	0.4447
Transportation & public utilities	-0.0120	0.0173	-0.6953	0.4872
Retail trade	-0.0140	0.0109	-1.2886	0.1981
Finance, insurance, real estate	0.0137	0.0241	0.5673	0.5708
Agriculture, forestry, fishing	-0.0055	0.0360	-0.1516	0.8796

Number of observations: 1699

p-values based on a two-tailed test

Adjusting for firm industries produce the result the most interesting result so far in the accruals test. While the test strength still is too low to identify any significant results, there seems to be signs of a difference in firm behavior during the first post-transaction reporting period (year zero), with non-MBO firms on average displaying negative abnormal accruals and the average MBO firm showing positive. However, none of the industry dummies are significant which once again carries the risk of

model over specification, together with the other limitations discussed earlier, this means that great caution must be taken in drawing any conclusion from this test.

Table 16: Abnormal operating cash flow -industry fixed effects test

This table presents the same model as in table 7 with the addition of a number of industry dummies, to control for omitted variable bias. Note that the manufacturing is set as the base case, and not given an unique dummy variable, all other dummies are to be interpreted as deviation from this industry group.

	Estimate	SE	t-stat	p-value
Intercept	0.0078	0.0135	0.5783	0.5631
t-1 Dummy	0.0589	0.0207	2.8533	0.0044
t-1*MBO	-0.0583	0.0316	-1.8477	0.0648
t0 Dummy	0.0469	0.0287	1.6347	0.1023
t0*MBO	-0.0354	0.0470	-0.7536	0.4512
t+1 Dummy	-0.0409	0.0345	-1.1867	0.2355
t+1*MBO	0.0348	0.0454	0.7661	0.4437
Services	-0.0075	0.0250	-0.2988	0.7651
Wholesale trade	-0.0495	0.0304	-1.6278	0.1038
Construction	0.0047	0.0257	0.1835	0.8544
Transportation & public utilities	-0.0667	0.0451	-1.4785	0.1395
Retail trade	-0.0184	0.0546	-0.3370	0.7362
Finance, insurance, real estate	0.0563	0.0804	0.7008	0.4835
Agriculture, forestry, fishing	-0.0489	0.0371	-1.3175	0.1878

Number of observations: 1699

p-values based on a two-tailed test

The pattern with the control firms showing positive abnormal cash flow prior to the transaction holds also under these conditions. As with the previous test no industry dummy has a significant impact on the test variable. The same problem as in the year fixed effect test arises in that the added variables result in that, at the 5% level, no significant difference between MBO and IBO firms can be observed. The implications of this are however limited, since the main result from the original test was related to the behavior of the peer firms.

Table 17: Abnormal operating expenses - industry fixed effects test

This table presents the same model as in table 9 with the addition of a number of industry dummies, to control for omitted variable bias. Note that the manufacturing is set as the base case, and not given an unique dummy variable, all other dummies are to be interpreted as deviation from this industry group.

	Estimate	SE	t-stat	p-value
Intercept	-0.0120	0.0168	-0.7160	0.4741
t-1 Dummy	-0.0030	0.0215	-0.1412	0.8877
t-1*MBO	0.0115	0.0306	0.3770	0.7062
t0 Dummy	0.0232	0.0257	0.9036	0.3663
t0*MBO	-0.0502	0.0382	-1.3139	0.1891
t+1 Dummy	0.0516	0.0221	2.3342	0.0197
t+1*MBO	-0.0849	0.0323	-2.6251	0.0087
Services	0.0146	0.0326	0.4467	0.6551
Wholesale trade	0.0578	0.0341	1.6964	0.0900
Construction	0.0014	0.0362	0.0380	0.9697
Transportation & public utilities	0.1259	0.0608	2.0707	0.0385
Retail trade	0.0849	0.0753	1.1271	0.2599
Finance, insurance, real estate	-0.0788	0.0915	-0.8620	0.3888
Agriculture, forestry, fishing	-0.0476	0.0860	-0.5534	0.5801

Number of observations: 1699

p-values based on a two-tailed test

The final test once again reinforces the robustness of the results from the operating expenses test, the findings from the main test do not only hold, but become stronger when considering industry fixed effects. This test is also the first test in which there is a significant result from one of the industry dummies, with transportation and public utilities having significantly higher abnormal operating expenses (over total assets) than the manufacturing firms. This is not an unexpected finding, since this industry group is largely characterized by capital-intensive, low-margins businesses e.g. airlines and utilities. Caution is however necessary when extrapolating this result, since our dataset only includes ten transportation and public utilities firms.

7.3 Testing the common trends assumption – D-I-D in the estimation window

One of the key test assumptions is that both IBO and MBO firms display the same behavior outside the event window, more specifically this means that the estimation models must be equally accurate for both types of firms prior to information of the deal reaches management. If this condition is not satisfied it would put into question both the control group selection and the overall models used to estimate earnings management.

Figures 1-3 give some early indication that the condition holds, however a more thorough test is required. To test whether the common trend assumption can be rejected in our data we repeat the main difference-in-difference tests but including also dummies for the estimation years. If any of the interference dummies show an estimate that is significantly different from zero, then the CTA deemed to be violated.

Performing the above procedure shows that none of the estimation models (for both accruals and real earnings management) display any signs of the systematic differences accuracy between IBO and MBO firms (see appendix III). This result supports the assumption that our peer group is a good counterfactual to the MBO transaction firms.

7.4 Testing the counterfactual:

In order to control for the possibility that the result in the operating expenses test is only a reflection of that managers in the IBO firms manipulate pre-deal earnings upwards, we repeat the test using a non-D-I-D-framework. Only the MBO firms are given time-dummies this time, in this way we can determine if the estimates for the MBO firms is significantly lower than zero (and not only significantly lower than the IBO firms). Note the estimation model coefficients are kept the same, i.e. are estimated using the full-sample.

Table 18: Abnormal operating expenses, not using D-I-D

This table presents the results for the MBO firms in terms of difference from the overall sample mean for abnormal operating expenses (0.0058)

	Estimate	SE	t-stat	p-value
Intercept	0.0099	0.0127	0.7785	0.4364
t-1 MBOs	0.0030	0.0212	0.1434	0.8860
t0 MBOs	-0.0324	0.0250	-1.2988	0.1942
t+1 MBOs	-0.0419	0.0209	-2.0046	0.0452

Number of observations: 1699

p-values based on a two-tailed test

This test support the result from above that MBO firms display an unexpected negative shock to operating expenses one year after the MBO transaction. A similar, but not significant, effect is visible already during year zero. This supports our previous discussion of that deals occurring early in a year could display reversal behavior already during the first post-deal financial year.

8. Conclusions

In this study, we find evidence in line with pre-MBO earnings management also among private-to-private transactions. Our test identifies significant evidence of cost based earnings management in our sample, supporting the result from earlier studies which have noted a shift towards real earnings management and a decrease in accruals based manipulation. The method for manipulating the price downwards we find evidence for appears to be inflating, or delaying cuts to, operating expenses before the transaction and immediately cut the unnecessarily high costs afterwards. We deem the most likely explanation of this pattern to be manipulation of discretionary expenses, e.g. R&D or marketing. Part of the observed effect could however come from production volume manipulation, especially if economies of scale are present. This could be an interesting topic for future research, where a larger sample would allow for distinguishing between the two effects.

These findings are consistent despite a series of robustness tests. However, only one of our three main tests show significant results in line with our hypothesis. Contrary to the latest studies (e.g. Mao & Renneboog 2015) we do not find evidence of pre-MBO manipulation when using the same famous accrual-based test developed by Jones (1991) or when using the operating cash flow-based test of real earnings management. This may be due to the use of different control groups where we argue that our control group of IBO-targets is preferable since buyout targets should share special characteristics which are not present in going concern companies which are not subject to any type of acquisition. However, an important factor to consider for the accruals based test is that a considerable number of firms in our dataset are subsidiaries to same-industry parents, such firms may have only limited discretion when choosing accounting policies, which may push them towards using real earnings management methods.

Our tests find no evidence of systematic differences in earnings management between firms owned by financial institutions and other types of owners. This contradicting the findings by Roychowdhury (2006). However, his study was performed on public firms with dispersed owner groups. In our data, only 12 MBO target firms were not held by a single majority owner, and many of these firms are wholly owned subsidiaries of same industry parents. Such parent firms are not unlikely to have equal, or greater, ability to review management actions to that of an institutional owner.

References

- Anabtawi, I., 2015. Predatory Management Buyouts.
- Bergström, C., Grubb, M. and Jonsson, S., 2007. The operating impact of buyouts in Sweden: A study of value creation. *The journal of Private equity*, 11(1), p.22.
- Chen, K., Kim, Y.C. and Marcus, R.D., 2009. Hands in the Cookie Jar? The Case of Management Buyouts. *The Case of Management Buyouts (March 18, 2009)*.
- Chou, D.W., Gombola, M. and Liu, F.Y., 2006. Earnings management and stock performance of reverse leveraged buyouts. *Journal of Financial and Quantitative Analysis*, 41(02), pp.407-438.
- Cohen, D.A., Dey, A. and Lys, T.Z., 2008. Real and accrual-based earnings management in the pre- and post-Sarbanes-Oxley periods. *The accounting review*, 83(3), pp.757-787.
- Cressy, R., Munari, F. and Malipiero, A., 2007. Playing to their strengths? Evidence that specialization in the private equity industry confers competitive advantage. *Journal of Corporate Finance*, 13(4), pp.647-669.
- Cumming, D., Siegel, D.S. and Wright, M., 2007. Private equity, leveraged buyouts and governance. *Journal of Corporate Finance*, 13(4), pp.439-460.
- Danish financial statement act, *Årsregnskabsloven (ARL)*, 2015
- DeAngelo, L.E., 1986. Accounting numbers as market valuation substitutes: A study of management buyouts of public stockholders. *Accounting Review*, pp.400-420.
- Dechow, P.M., Kothari, S.P. and Watts, R.L., 1998. The relation between earnings and cash flows. *Journal of accounting and Economics*, 25(2), pp.133-168.
- Dechow, P.M. and Dichev, I.D., 2002. The quality of accruals and earnings: The role of accrual estimation errors. *The accounting review*, 77(s-1), pp.35-59.
- Dechow, P.M., Hutton, A.P., Kim, J.H. and Sloan, R.G., 2012. Detecting earnings management: A new approach. *Journal of Accounting Research*, 50(2), pp.275-334.
- Deloitte, 2016. Use of IFRS by jurisdiction. [Online], Available at <http://www.iasplus.com/en/resources/ifrs-topics/use-of-ifrs>.
- Desbrières, P. and Schatt, A., 2002. The impacts of LBOs on the performance of acquired firms: the French case. *Journal of Business Finance & Accounting*, 29(5-6), pp.695-729.
- Goossens, L., Manigart, S. and Meuleman, M., 2008. The change in ownership after a buyout: impact on performance. *The Journal of Private Equity*, 12(1), p.31.

- Guo, S., Hotchkiss, E.S. and Song, W., 2011. Do buyouts (still) create value?. *The Journal of Finance*, 66(2), pp.479-517.
- Healy, P.M., 1985. The effect of bonus schemes on accounting decisions. *Journal of accounting and economics*, 7(1), pp.85-107.
- Howorth, Carole, Paul Westhead, and Mike Wright. "Buyouts, information asymmetry and the family management dyad." *Journal of Business Venturing* 19.4 (2004): 509-534.
- Jones, J.J., 1991. Earnings management during import relief investigations. *Journal of accounting research*, pp.193-228.
- Kaplan, S., 1989. The effects of management buyouts on operating performance and value. *Journal of financial economics*, 24(2), pp.217-254.
- Kothari, Sagar P., Andrew J. Leone, and Charles E. Wasley. "Performance matched discretionary accrual measures." *Journal of accounting and economics* 39.1 (2005): 163-197.
- Lichtenberg, F.R. and Siegel, D., 1991. The impact of R&D investment on productivity—New evidence using linked R&D—LRD data. *Economic inquiry*, 29(2), pp.203-229.
- Mao, Y. and Renneboog, L., 2015. Do managers manipulate earnings prior to management buyouts?. *Journal of Corporate Finance*, 35, pp.43-61.
- McNichols, M.F., 2000. Research design issues in earnings management studies. *Journal of accounting and public policy*, 19(4), pp.313-345.
- McNichols, M.F., 2002. Discussion of the Quality of Accruals and Earnings: The Role of Accrual Estimation Errors. *The Accounting Review: Supplement 2002*, 77(s-1), pp. 61-69.
- Meuleman, M., Amess, K., Wright, M. and Scholes, L., 2009. Agency, strategic entrepreneurship, and the performance of private equity-backed buyouts. *Entrepreneurship Theory and Practice*, 33(1), pp.213-239.
- Morck, Randall, and Bernard Yeung. "Agency problems in large family business groups." *Entrepreneurship Theory and Practice* 27.4 (2003): 367-382.
- Nikoskelainen, E. and Wright, M., 2007. The impact of corporate governance mechanisms on value increase in leveraged buyouts. *Journal of Corporate Finance*, 13(4), pp.511-537.
- Ofek, E., 1994. Efficiency gains in unsuccessful management buyouts. *The Journal of Finance*, 49(2), pp.637-654.
- Perry, S.E. and Williams, T.H., 1994. Earnings management preceding management buyout offers. *Journal of Accounting and Economics*, 18(2), pp.157-179.

Phan, P.H. and Hill, C.W., 1995. Organizational restructuring and economic performance in leveraged buyouts: An ex post study. *Academy of Management Journal*, 38(3), pp.704-739.

Roychowdhury, S., 2006. Earnings management through real activities manipulation. *Journal of accounting and economics*, 42(3), pp.335-370.

Scholes, M.L., Wright, M., Westhead, P., Burrows, A. and Bruining, H., 2007. Information sharing, price negotiation and management buy-outs of private family-owned firms. *Small Business Economics*, 29(3), pp.329-349.

Schulze, W.S., Lubatkin, M.H., Dino, R.N. and Buchholtz, A.K., 2001. Agency relationships in family firms: Theory and evidence. *Organization science*, 12(2), pp.99-116.

Sarbanes-Oxley Act, 2002. United States Code, Public Law 107–204, 116 Stat 745.

Thompson, R.S., Wright, M. and Robbie, K., 1992. Management equity ownership, debt and performance: some evidence from UK management buyouts. *Scottish Journal of Political Economy*, 39(4), pp.413-430.

Warfield, T.D., Wild, J.J. and Wild, K.L., 1995. Managerial ownership, accounting choices, and informativeness of earnings. *Journal of accounting and economics*, 20(1), pp.61-91.

Weir*, C., Laing, D. and Wright, M., 2005. Undervaluation, private information, agency costs and the decision to go private. *Applied Financial Economics*, 15(13), pp.947-961.

Wright, C. and Hobbs, S., 2010. Impact and Implications of IFRS Conversion or Convergence. *Bank Accounting & Finance*.

Wright, M., Hoskisson, R.E., Busenitz, L.W. and Dial, J., 2001. Finance and management buyouts: agency versus entrepreneurship perspectives. *Venture Capital: An International Journal of Entrepreneurial Finance*, 3(3), pp.239-261.

Wu, Y.W., 1997. Management buyouts and earnings management. *Journal of Accounting, Auditing & Finance*, 12(4), pp.373-389.

Wysocki, P., 2009. Assessing earnings and accruals quality: US and international evidence. *Unpublished working paper. Cambridge: MIT Sloan School of Management*.

Appendices

I. Definitions

MBO = A management buyout (MBO) is an event where at a part of, or the entire, management team of a company buys the company that employs them from the current shareholders. Such transaction may encompass either the entire company or a part of it. Public-to-private deals are transactions where the target company initially is publicly listed, but is delisted as all the shares are bought out. Private-to-private describes the buyout of a non-public firm. To finance the deal, the acquiring management is sometimes backed by an institutional buyout specialist such as a private equity firm which acquires the remaining equity stake. In our data, all transactions that cover at least 50 % of the equity capital and through which management significantly increases their ownership stake in their company are classified as MBOs.

IBO = institutional buyout, defined in this study as a transaction wherein a private equity or venture capital fund acquires the controlling interest in a company without management's participation.

LBO = leveraged buyout, a buyout transaction performed using high levels of debt financing often using the target company's assets as collateral.

Non-discretionary items = Accounting posts determined by company operations, e.g. cost of goods sold or revenue, i.e. these levels cannot be set at management discretion.

Discretionary items = Items whose level, at least in the short-term, can be determined by management e.g. research and development spending or marketing costs.

Accrual based earnings management = Every accounting statement includes a large number of accrual items; these are used to adjust the timing of when revenue and costs are recognized in order to better represent the underlying business operations. Manipulation such accruals would have a direct impact of the reported profit or loss during the period and could be used as an instrument to affect the perceived company value. An example of this would be excessively writing down the value of outstanding accounts receivable to reduce reported profits. Note that any such unsubstantiated manipulation must be reversed in a later period when the expected loss fails to materialize.

Real earnings management = Real earnings management would be an alternative way of lowering the company valuation prior to an MBO. Such could both coexist with accrual-based earnings

management or be used as a substitute, if e.g. more sophisticated accounting standards prevent the latter from being used. There are two main categories of real earnings management, both of which we test for, the first relating to revenue and the second to costs.

Examples of negative real earnings management include:

- Delaying the timing of sales, e.g. by offering harsher credit terms or lower discounts.
- Reducing the production output, this increases the cost of goods sold when economies of scale are present.
- Increasing discretionary expenses, spending more on R&D, advertising et cetera lowers reported profits prior to the deal.

II. Heteroskedasticity robust regression framework

Table I: Estimation model - Working Capital Accruals

The table below presents, for comparability reasons, the estimation model for normal accruals using heteroscedasticity robust standard errors.

	Estimate	SE	t-stat	p-value
Intercept	0.0064	0.0103	0.6226	0.5338
1 / Opening assets	-27343.0	2967.1	-9.2157	0.0000
Δ Revenue / Opening assets	0.0246	0.0063	3.8766	0.0001
PPE / Opening assets	0.0048	0.0267	0.1814	0.8562
PE Dummy	0.0054	0.0120	0.4535	0.6504

Number of observations: 494

p-values based on a two-tailed test

R-squared: 0.149

Table II: Abnormal Accruals - D - i - D

The table below presents the treatment group results of the dummy-regression for abnormal working capital accruals. The time dummies alone are to be interpreted as the average treatment effect for the control group, the interference dummies check for the deviation from this value if the transaction is an MBO.

	Estimate	SE	t-stat	p-value
Intercept	-0.0003	0.0061	-0.0532	0.9576
t-1 Dummy	-0.0234	0.0228	-1.0286	0.3038
t-1*MBO	0.0095	0.0302	0.3158	0.7522
t0 Dummy	-0.0362	0.0214	-1.6913	0.0910
t0*MBO	0.0568	0.0288	1.9692	0.0491
t+1 Dummy	0.0197	0.0220	0.8954	0.3707
t+1*MBO	0.0186	0.0301	0.6173	0.5371

Number of observations: 1699

p-values based on a two-tailed test

R-squared: 0.0058

Table III: Estimation model - Operating Cash Flow

The table below presents, for comparability reasons, the estimation model for normal operating cash flows using heteroscedasticity robust standard errors.

	Estimate	SE	t-stat	p-value
Intercept	0.0043	0.0186	0.2288	0.8191
1 / Opening assets	-10140.0	4238.8	-2.3922	0.0171
Revenue / Opening assets	0.0416	0.0065	6.4038	0.0000
Δ Revenue / Opening assets	0.0301	0.0103	2.9413	0.0034
PE Dummy	0.0263	0.0170	1.5423	0.1236

Number of observations: 494

p-values based on a two-tailed test

R-squared: 0.167

Table IV: Abnormal Operating Cash Flow - D - i - D

The table below presents the treatment group results of the dummy-regression for abnormal operating cash flow. The time dummies alone are to be interpreted as the average treatment effect for the control group, the interference dummies check for the deviation from this value if the transaction is an MBO.

	Estimate	SE	t-stat	p-value
Intercept	-0.0031	0.0077	-0.4039	0.6863
t-1 Dummy	0.0673	0.0284	2.3672	0.0180
t-1*MBO	-0.0758	0.0376	-2.0157	0.0440
t0 Dummy	0.0598	0.0267	2.2427	0.0250
t0*MBO	-0.0525	0.0360	-1.4604	0.1444
t+1 Dummy	-0.0279	0.0274	-1.0179	0.3089
t+1*MBO	0.0145	0.0376	0.3860	0.6996

Number of observations: 1699

p-values based on a two-tailed test

R-squared: 0.0074

Table V: Estimation model - Operating Expenses

The table below presents, for comparability reasons, the estimation model for normal operating expenses using heteroscedasticity robust standard errors.

	Estimate	SE	t-stat	p-value
Intercept	-0.0047	0.0154	-0.3039	0.7613
1 / Opening assets	9825	3636.6	2.7017	0.0071
Revenue / Opening assets	0.9485	0.0049	195.19	0.0000
PE dummy	-0.0692	0.0148	-4.6886	0.0000

Number of observations: 494

p-values based on a two-tailed test

R-squared: 0.99

*See definition

Table VI: Abnormal Operating Expenses - D-i-D

The table below presents the treatment group results of the dummy-regression for abnormal operating expenses using heteroskedasticity robust standard errors.

	Estimate	SE	t-stat	p-value
Intercept	-0.0018	0.0065	-0.2724	0.7853
t-1 Dummy	-0.0123	0.0242	-0.5089	0.6109
t-1*MBO	0.0311	0.0320	0.9706	0.3319
t0 Dummy	0.0096	0.0227	0.4232	0.6722
t0*MBO	-0.0292	0.0306	-0.9541	0.3402
t+1 Dummy	0.0350	0.0233	1.5018	0.1333
t+1*MBO	-0.0666	0.0319	-2.0832	0.0374

Number of observations: 1699

p-values based on a two-tailed test

R-squared: 0.0034

III. Common trends assumption test output tables

Table VII: Abnormal accruals - CTA test

This table presents the same model as in table 5 with the additional dummies to confirm that the common trends assumption holds

	Estimate	SE	t-stat	p-value
Intercept	0.0020	0.0060	0.3322	0.7398
t-5 Dummy	-0.0208	0.0359	-0.5784	0.5631
t-5*MBO	0.0286	0.0545	0.5238	0.6005
t-4 Dummy	0.0317	0.0285	1.1110	0.2667
t-4*MBO	-0.0402	0.0342	-1.1746	0.2403
t-3 Dummy	-0.0123	0.0228	-0.5399	0.5893
t-3*MBO	0.0083	0.0298	0.2776	0.7814
t-2 Dummy	-0.0120	0.0185	-0.6452	0.5189
t-2*MBO	0.0180	0.0255	0.7063	0.4801
t-1 Dummy	-0.0333	0.0179	-1.8668	0.0621
t-1*MBO	0.0216	0.0237	0.9076	0.3642
t0 Dummy	-0.0429	0.0278	-1.5425	0.1231
t0*MBO	0.0652	0.0390	1.6705	0.0950
t+1 Dummy	0.0119	0.0298	0.3991	0.6899
t+1*MBO	0.0237	0.0371	0.6392	0.5228

Number of observations: 1699

p-values based on a two-tailed test

Table VIII: Abnormal operating cash flow - CTA test

This table presents the same model as in table 7 with the additional dummies to confirm that the common trends assumption holds

	Estimate	SE	t-stat	p-value
Intercept	-0.0036	0.0134	-0.2676	0.7890
t-5 Dummy	0.0437	0.0453	0.9647	0.3348
t-5*MBO	-0.0744	0.0670	-1.1105	0.2669
t-4 Dummy	-0.0289	0.0416	-0.6947	0.4873
t-4*MBO	0.0335	0.0530	0.6320	0.5275
t-3 Dummy	0.0194	0.0317	0.6118	0.5408
t-3*MBO	0.0063	0.0399	0.1581	0.8744
t-2 Dummy	0.0099	0.0283	0.3492	0.7270
t-2*MBO	-0.0205	0.0359	-0.5721	0.5673
t-1 Dummy	0.0611	0.0224	2.7253	0.0065
t-1*MBO	-0.0582	0.0315	-1.8476	0.0648
t0 Dummy	0.0492	0.0297	1.6591	0.0973
t0*MBO	-0.0353	0.0469	-0.7536	0.4512
t+1 Dummy	-0.0386	0.0357	-1.0814	0.2797
t+1*MBO	0.0359	0.0456	0.7865	0.4317

Number of observations: 1699

p-values based on a two-tailed test

Table IX: Abnormal operating expenses - CTA test

This table presents the same model as in table 9 with the additional dummies to confirm that the common trends assumption holds

	Estimate	SE	t-stat	p-value
Intercept	0.0077	0.0161	0.4748	0.6350
t-5 Dummy	-0.0283	0.0398	-0.7123	0.4764
t-5*MBO	0.0599	0.0528	1.1345	0.2567
t-4 Dummy	-0.0112	0.0329	-0.3396	0.7342
t-4*MBO	0.0056	0.0457	0.1232	0.9020
t-3 Dummy	0.0039	0.0310	0.1249	0.9006
t-3*MBO	-0.0360	0.0373	-0.9650	0.3347
t-2 Dummy	-0.0024	0.0288	-0.0832	0.9337
t-2*MBO	0.0002	0.0339	0.0057	0.9955
t-1 Dummy	-0.0074	0.0243	-0.3039	0.7612
t-1*MBO	0.0127	0.0307	0.4125	0.6800
t0 Dummy	0.0196	0.0270	0.7259	0.4680
t0*MBO	-0.0498	0.0385	-1.2941	0.1958
t+1 Dummy	0.0480	0.0238	2.0158	0.0440
t+1*MBO	-0.0877	0.0329	-2.6659	0.0078

Number of observations: 1699

p-values based on a two-tailed test

IV. Complete industry classification table

Table X: Industry classification table

Industry classification	Lower SIC bound	Upper SIC bound
Agriculture, forestry, fishing	100	999
Mining	1000	1499
Construction	1500	1799
Manufacturing	2000	3999
Transportation & public utilities	4000	4999
Wholesale trade	5000	5199
Retail trade	5200	5999
Finance, insurance, real estate	6000	6799
Services	7000	8999
Public administration	9100	9999

This appendix describes the process used to classify firms by industry group. First the SIC-code corresponding to each firm is identified, each such SIC-code is mapped to one of the wider industry groups using the table above. E.g. a firm with a reported SIC-code between 1500 to 1799 is classified as a construction company.

V. Performance matched working capital accruals model

Table XI: Extended estimation model - Working Capital Accruals

The table below presents the estimation model for abnormal accruals using the extended formulation proposed by Kothari et al (2005).

	Estimate	SE	t-stat	p-value
Intercept	-0,0031	0,0128	-0,2384	0,8117
1 / Opening assets	-1015,1	2075,4	-0,4891	0,6250
Δ Revenue / Opening assets	-0,0230	0,0142	-1,6233	0,1052
PPE / Opening assets	0,0150	0,0264	0,5703	0,5688
RoA	-0,0237	0,0503	-0,4714	0,6376
PE Dummy	0,0216	0,0116	1,8610	0,0633

Number of observations: 494

p-values based on a two-tailed test

R-squared: 0.0285

Table XII: Performance matched abnormal Accruals - D - i - D

This table presents the results of the dummy regression for abnormal accruals using the extended estimation model

	Estimate	SE	t-stat	p-value
Intercept	0,0216	0,0043	5,0763	0,0000
t-1 Dummy	-0,0108	0,0174	-0,6228	0,5335
t-1*MBO	-0,0141	0,0236	-0,5965	0,5509
t0 Dummy	-0,0218	0,0274	-0,7970	0,4256
t0*MBO	0,0317	0,0390	0,8132	0,4162
t+1 Dummy	0,0340	0,0287	1,1853	0,2361
t+1*MBO	-0,0100	0,0372	-0,2695	0,7876

Number of observations: 1699

p-values based on a two-tailed test