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Keywords: Accounting manipulation, earnings management, leveraged buyout, management buyout, LBO, MBO.

JEL Classifications: G30, G32, M41.

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To address the question as to whether managers manipulate accounting numbers downwards prior to management buyouts (MBOs), we implement an industry-adjusted buyout-specific approach and receive an affirmative answer. In UK buyout companies, negative earnings manipulation (understating the earnings prior to the deal) often occurs, both by means of accrual management and real earnings management. We demonstrate that MBOs are significantly more frequently subject to negative manipulation than leveraged buyouts (LBOs). In non-buyout firms, positive earnings management frequently occurs because it affects managers' bonuses and the likelihood of meeting or beating analysts' expectations which may trigger a positive market reaction. By means of an instrumental variables approach, we examine competing incentives affecting the degree and size of earnings manipulation. Our evidence implies that the (ex ante) perceived likelihood that an MBO will be undertaken has a strong significant effect on negative earnings management, while the external borrowing capacity of the buyout company is not determined by standard capital structure factors, such as earnings numbers. The implementation of the revised UK Corporate Governance Code of 2003 has somewhat reduced the degree of both accrual earnings and real management in MBOs, but since then other manipulation techniques (related to production costs and asset revaluations) are more frequently used, which may be induced by the fact that these manipulation methods are more difficult to detect.

1. Introduction

Prior to management buyouts (MBOs), managers have an incentive to deflate the reported earnings numbers by accounting manipulation in the hope of lowering the subsequent stock price. If they succeed, they will be able to acquire (a large part of) the company on the cheap. It is important to note that accounting manipulation in a buyout transaction may have severe consequences for the shareholders who sell out in the transaction: if the earnings distortion is reflected in the stock price, the stock price decline cannot be undone and the wealth loss of shareholders is irreversible if the company goes private subsequent to the buyout. Mispriced stock and false financial statements are still issues frequently mentioned when MBO transactions are evaluated. The UK's Financial Services Authority (FSA, 2006) ranks market abuse as one of the highest risks and suggests more intensive supervision of leveraged buyouts (LBOs). The concerns about mispriced buyouts are therefore a motive to test empirically whether earnings numbers are manipulated preceding buyout transactions.

Whereas the manipulation of financial statements prior to US MBOs has occasionally been detected in the academic literature over the past 20 years, we wonder whether accounting manipulation has occurred/still occurs in the second most important buyout market, namely that of the UK which is subject to different regulation and enforcement. We focus on the

period since the start of the second LBO wave: 1997-onwards, which also coincides with the tightened corporate governance regulation (Guo et al., 2011) and enhanced reporting integrity (Botsari and Meeks, 2008). We investigate two types of incentives for accounting manipulation in an LBO/MBO context. On one hand, managers may opt to present lower earnings if they are likely to participate in a prospective buyout transaction and will subsequently stay with the company. Negative earnings manipulation or earnings understatement is induced by the *management engagement* incentives. On the other hand, managers' incentive to misrepresent the earnings may be related to the financing of the future transaction. A typical LBO is traditionally financed with 60 to 90 percent debt (Kaplan and Strömberg, 2009) – although this ratio has decreased to 50-60 percent since the recent financial crises. Low earnings (cash flow) numbers would reduce the amount of debt that a firm could bear at the relevering stage. Thus, managers who prepare a corporate sale by means of an LBO could manipulate earnings upwards in order to facilitate the buyout transaction – this is the *external financing* incentive. We distinguish here between MBOs whereby the pre-transaction management remains (financially) involved in the company subsequent to the transaction, and LBOs which we define as transactions without subsequent involvement of the incumbent management.

We not only concentrate on *whether and why* manipulation occurs but also on *how* earnings manipulation can occur by considering accrual management and real earnings management preceding the buyouts. Whereas accrual-based earnings management activities have no cash flow consequences, real earnings management refers to managerial activities which deviate from normal business practices and affect cash flows. We advance an industry-adjusted buyout-specific approach to capture the abnormal accounting numbers which proxy for accounting manipulation. In this context, we also study asset revaluations and transfers across reserve accounts on the balance sheet as a means of external financing manipulation.

The contributions to the literature are the following: First, there is little evidence on earnings manipulation outside the US buyout market, which raises the question as to whether dishonest accounting management is a phenomenon that other markets also suffer from? Moreover, most studies have examined a sample belonging to the first MBO wave of the 1980s. Since then, the corporate governance regulation has been tightened (Guo et al, 2011), and accounting standards became stricter in terms of transparency. For instance, in 2003, the revised Combined Code on Corporate Governance (currently called: the UK Corporate

Governance Code) was implemented to improve financial reporting quality which raises the question whether or not accounting management is still that pronounced? Second, earnings manipulation comprising accrual management and real earnings management are analyzed in the context of buyout transactions, but the management may also resort to (tangible) asset manipulation (asset revaluations and transfers between reserve accounts). We thus investigate multiple manipulation techniques. Third, while raw abnormal accruals are usually calculated in the earnings management literature, they still comprise accruals influenced by specific corporate events and are different across different industries. Therefore, we adjust the raw abnormal accruals for the mean abnormal accruals of non-buyout firms of the same size-group, industry and ex ante performance. In addition to the traditional approach of contrasting buyout firms with a control group of non-buyout peers matched by firm characteristics, we contrast MBOs to LBOs as both types of buyouts induce different incentives for earnings manipulation. We hence compare the adjusted abnormal accounting figures of MBOs and LBOs. In so doing, we provide a test of accounting manipulation directly attributable to manager engagement incentives around the buyout event. Fourth, we analyze the underlying incentives for accounting manipulation and address the endogeneity issue of using the (ex-post) buyout type as a proxy for management engagement incentives by means of a two-staged IV approach. In the first stage, we model the decision to undertake an MBO or LBO using firm characteristics in the year proceeding the accounting manipulation year. In the second stage, we use the predicted MBO as a proxy for the management engagement incentive. We show that the causality is more likely to flow from the management engagement decision to the accounting manipulation decision.

We report the following findings: First, downward earnings management, both in terms of accrual and real earnings management, has been widely used in the UK since the start of the second buyout wave. Our industry-adjusted approach shows that the abnormal accrual figures are significantly more negative than those of non-buyout firms of the same industry and with similar size and ex ante performance. For buyout companies, the accruals decline in the manipulation year (the year prior to the deal announcement) whereas non-buyout companies are generally subject to positive accrual management as positive manipulation can affect managers' bonuses and the likelihood of meeting or beating analysts' expectations which may trigger a positive market reaction. Second, in MBOs, there is evidence of more real earnings manipulation (through production costs and sales revenues) than in LBOs. The external financing incentive – upward earnings manipulation increases the relevering potential in a

buyout transaction – is not supported by our analysis. This may be explained by the fact that during the second LBO wave it was easier to attract external funds, considering the growth in the high yield bond market (by more than 600% since 1997). Credit market conditions rather than company characteristics may determine the financing capacity. Third, besides income statement manipulation, we show that managers are more likely to revaluate assets upwards, the magnitude and frequency is small. The evidence on asset reserves revaluation is consistent with insignificance of the external financing incentive. Fourth, the revised Corporate Governance Code of 2003 has had a significant impact on both accrual and real earnings manipulation. Accrual management did indeed decline since 2003. In contrast, the other manipulation techniques (regarding production costs and asset revaluations) are more frequently used since the tightening of the corporate governance regulation, which may be induced by the fact that these manipulation methods are more difficult to detect. This finding is consistent with some recent US evidence: after the adoption of SOX, companies shifted from accrual management to real earnings management (Cohen et al., 2008). However, in MBOs, both accrual and real earnings manipulations are reduced after 2003. Overall, our findings imply that more stringent accounting rules have been effective to curb dishonest earnings management in management buyout transactions.

The paper is organized as follows. In the next section, we review the literature and develop the hypotheses. Section 3 describes how accounting management is measured and explains the empirical setup. Section 4 reports the sample selection criteria and discusses the descriptive statistics. The empirical results and robustness analyses are set out in Section 5. Section 6 concludes.

2. Literature overview and hypotheses

The US literature on accounting manipulation states that downward earnings management prior to MBOs is expected. In addition to income statement manipulation, we also examine balance sheet manipulation, more specifically: asset reserves revaluation (reflected by revaluations of tangible assets, the recording of increments (or decrements) in the equity account, and changes to the debt-to-equity ratio) preceding the buyouts. The reason for this dual approach is that, as Dechow et al. (2010) suggest, managers can make a variety of accounting choices which are inspired by different (misrepresentation) objectives.

2.1. Accounting manipulation

2.1.1 Earnings manipulation

In the context of the surging MBO activity of the 1980s in the US, virtually every buyout proposal was contested by shareholders claiming that they were cheated (Longstreth, 1984). Even through recommendations by investment banks and approval by independent directors were sought to evaluate the fairness of buyout transactions, doubts about accounting manipulation remained. DeAngelo (1986) did not detect accrual manipulation preceding US MBOs, but Perry and Williams (1994) who worked with a larger sample and utilized a regression-based model to capture discretionary accruals more accurately, did document downward accrual management. Wu (1997) showed that on average, earnings manipulation prior to MBOs decreased the acquisition price by 18.6%. While managers may have good personal reasons to manipulate earnings downwards, they also have incentives to manipulate earnings upwards. Fisher and Louis (2008) stated that managers overstated their earnings to get favorable debt contract terms at the buyout, but for US MBOs, downward accrual management dominated. Ang et al. (2010) confirm that managers tend to manipulate earnings downwards if they continue to have a strong equity tie with the targets after the buyouts.

Managers have stronger incentives to understate the earnings numbers in MBOs relative to LBOs. We hereby define an MBO as a leveraged buyout transaction whereby at least one of the pre-buyout managers financially participates in the transaction and stays in the company subsequent to the buyout. According to our LBO definition, the incumbent management (prior to the LBO) will no longer be involved with the company subsequent to the transaction.

From an ownership perspective, managers are (co-)acquirers of MBO targets such that earnings manipulation resulting in a lower purchase price leads to self-dealing. In order to win the support of the management, financial sponsors in pursuit of target companies usually send a “love letter” which comprises an invitation to the current management team for further discussion and the intention to employ them after sealing the deal (Das and Chon, 2011). So, managers intending to stay in the firm have incentives to facilitate the transaction (although the management’s personal benefits in MBOs will largely exceed those in LBOs). Frequently, a ratchet is offered to the management which increases their post-transaction ownership stake in order to motivate them to achieve strong periodic performance and good exit returns[2]

[2] A ratchet is an incentive mechanism which either offers managers a modest equity stake if managers meet

(Renneboog et al., 2007; Yates and Hinchliffe, 2010). Based on the above arguments, we postulate the *managerial engagement hypothesis*: *Prior to MBOs, earnings are manipulated downwards by both accrual management and real earnings management. Moreover, earnings are manipulated downwards to a larger extent in MBOs than in LBOs (H1).*

The implicit assumption underlying this hypothesis is that market participants cannot differentiate between earnings arising from business activities and manipulated earnings. In general, Bradshaw et al. (2001) find that even sophisticated investors, such as auditors and financial analysts, fail to detect accrual anomaly. Likewise, Bhojraj and Swaminathan (2007) show that bond investors do not correctly price accruals. Hence, the possibility of detecting manipulation seems rather low. Moreover, if manipulation is found out, managers could more easily justify downward manipulation than upward manipulation by referring to the principle of accounting conservatism.

Buyout transactions largely rely on external financing, a combination of senior loans, subordinated loans, and high-yield bonds. Ample evidence points out that the debt financier is prone to use earnings numbers to predict future cash flows and make credit decisions (Palepu et al., 2000). In a buyout setting, Fischer and Louis (2008) find that managers who need large external funds to finance an MBO are more likely to report less negative abnormal accruals, although this effect is tempered when fixed assets serve as collateral. Hence, the *external financing incentive* can be formulated as: *Earnings management is negatively related to the amount of external financing needed in a buyout. The relation is mitigated when the buyout company has more fixed assets that can serve as collateral (H2).*

Alternatively, Axelson et al. (2013) contend that managers issue more debts when the credit market is overvalued. Therefore, a high bond market spread, as a proxy for credit market conditions, is a better predictor of buyout leverage than the earnings numbers. Shivdasani and Wang (2011) confirm that the boom in buyout transactions from 2004 to 2007 was fueled by the fast growth in collateralized debt obligations (CDOs).

2.1.2. Asset revaluation manipulation

ex-ante specified performance targets after buyouts (Renneboog et al., 2007) and/or entitles managers to receive a higher proportion of the exit proceeds if an exit is achieved beyond a particular 'hurdle' return rate for investors (Yates and Hinchliffe, 2010).

Whereas the literature on accounting manipulation prior to MBOs traditionally concentrates on earnings management (income statement manipulation) because earnings reflect current performance and are used in valuation exercises, balance sheet manipulation through 'asset revaluation' may also occur. This can also enable a target company to attract more debt to finance the deal. While earnings management is used to influence the stock price, asset revaluation manipulation is mainly used to affect the level of external borrowing.

Asset revaluation may be used more often in the UK than in the US: since the implementation of FRS3 in 1993, companies are encouraged to revalue fixed assets[3] on the ground that they provide useful and value relevant information[4]. The difference between an asset's old carrying value and its revaluation is credited to a revaluation reserve account on the balance sheet. The depreciation charges are subsequently calculated based on the revalued assets. Moreover, the gains or losses on the sale of previously revaluated assets are calculated referring to the new revaluation value instead of historical cost. Hence, the new asset revaluation practice has the following implications: (i) If assets are upwards (downwards) revalued, it increases (decreases) the equity amount via the revaluation reserve account on the balance sheet and thus lowers (boosts) the debt-to-equity ratio; (ii) If assets are revalued upwards, there is no contemporaneous effect on the income statement, but it will lower gains from a future asset disposal as the inflated carrying value will serve as the benchmark value. Meanwhile, the upward revaluation increases the future depreciation charges. If assets are revalued downwards, the net revaluation decrement is expensed on the current income statement.

To sum up, revaluations affect the current debt-to-equity ratio on the balance sheet, the future depreciation on the income statement, and the future gains from asset sales on the income statement. Revaluations are discretionary in nature, because managers can decide whether, when, and what amounts of assets are revalued in financial statements (Lin and Peasnell, 2000).

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[3] Intangible asset revaluation is also permitted, but UK companies hardly use it (Aboody et al., 1999).

[4] Since the EU's adoption of IFRS in 2005, under IAS 16, companies can choose between: (i) the historical cost model; (2) the revaluation model. The Securities and Exchange Commission (SEC) has proposed that all US firms are required to issue financial statements in accordance with IFRS by 2014. Under IFRS, firms are allowed to choose either the cost model or the revaluation model to measure the value of fixed assets (SEC *for Immediate Release 2008-184).*

At first glance, in a highly leveraged buyout, managers have an incentive to revalue assets upwards in order to be able to show a lower leverage ratio which enables them to attract the required amount of debt financing at favorable borrowing terms. Easton et al.'s (1993) survey shows that a key motivation to revalue assets is indeed such debt contract considerations. However, these current gains from upward assets revaluation induce a cost, namely the reduction of a buyout target's future gains. First, the accumulated assets revaluation reserves exhaust companies' possibilities to further use this manipulation tool subsequent to the buyout as the amount of upward revaluation is not unlimited. Second, upward manipulation increases depreciation and decreases net income in the near future. Moreover, as Wright et al. (2001) report, buyout targets often restructure by divesting non-core businesses to remove downside inefficiency. The inflated assets will lower the gains from future asset sales, which will also exert a negative impact on earnings. The resulting lower earnings will directly influence managers' bonuses and ratchets. It is also noteworthy that upward revaluation is also costly, as valuation fees are paid to independent valuators to certify the revaluation. Therefore, a manager has to weigh the costs of future gains against the current benefits. However, in LBOs (as we define them), managers will not be involved subsequent to the buyout and will hence not bear the future cost of upward revaluation. Therefore, we expect that: *assets are revalued upwards to a larger degree in LBOs than in MBOs (H3)*.

Driven by external financing needs, managers could manipulate asset reserves in LBOs/MBOs. However, if the external financing capacity of a target relies more on general credit conditions than on its own credit characteristics, there may not be a need to manipulate asset reserves. Notably, our sample period coincides with the boom of the high-yield bond market and of CDOs. Therefore, easy access to the debt market may dominate the impact of the balance sheet manipulation.

3. Accounting manipulation proxies and empirical models

3.1. Earnings management proxies

Managers use *accounting procedures* and *estimates* that are conform to GAAP in order to present specific earnings numbers and influence equity valuation (Erickson and Wang, 1999). It is rather easy to change the earnings by means of accrual manipulation. The presented bottom-line results can also be influenced by real earnings management of which the advantages (relative to accrual management) are: (i) it is less likely to draw auditors' and

regulators' attention because real earnings management is related to operating decisions and (ii) there is no manipulation limit. Graham et al.'s (2005) survey reveals that executives are more willing to use earnings management through real activities than accrual management. Hence, we will investigate both types of earnings management.

3.1.1. Accrual management proxies

To measure discretionary (abnormal or manipulated) accruals, regression-based models have been developed for which Dechow et al. (1995) and Balatbat and Lim (2003) demonstrate that the modified-Jones model performs best[5]. Still, Kothari et al. (2005) are concerned that ignoring the financial performance in those regression models leads to spurious results, in particular when companies experience an unusual earnings performance. Therefore, we adopt two approaches: First, we directly add an additional performance control variable to our accrual model in order to exclude abnormal accruals resulting from mean reversion in the performance (or performance momentum). Furthermore, as abnormal accruals measured from this performance-adjusted modified-Jones regression model (PAMJ) may comprise abnormal accruals arising from common manipulation incentives (e.g. compensation incentives or meeting analysts' forecasts) or random effects induced by other events, we further adjust the abnormal accruals for (a) industry average abnormal accruals or (b) average abnormal accruals in the same size group within the same industry[6]. Second, we use a performance-matched approach whereby we match the buyout target with a non-buyout company with the same two-digit SIC code and with the closest performance in the year of the buyout. To recapitulate, we start from total accruals and apply the following: (i) the regression-based model removes the normal accruals from the actual total accruals, the performance-adjustment subtracts the performance-related abnormal accruals, and the mean-adjustment or matched approach excludes the non-event abnormal accruals; (ii) Likewise, the performance-matching removes the normal accruals and makes a performance

[5] DeAngelo (1986) uses a random walk model to calculate abnormal accruals and thus assumes that changes in the nondiscretionary part of total accruals equal zero. However, Dechow (1992) empirically shows that there is a significant negative serial correlation in accruals changes. Jones (1991) develops a regression model to predict normal accruals and hence calculate abnormal accruals. Dechow et al. (1995) modify the Jones model by subtracting changes in receivables (which are not exogenous) from changes in sales to predict normal working capital accruals. Dechow and Dichev (2002) use the operating cash flow to calculate abnormal accruals, but this operating cash flow based model only captures working capital induced abnormal accruals and ignores long-term abnormal accruals.

[6] For each year and each two-digit SIC code industry, we divide the control observations portfolio into terciles by ranking firms according to their total assets. We then match the buyout company with the non-buyout companies based on the same size tercile in the same year and the same two-digit SIC code. We name this approach as the same size group matching.

and non-event accrual adjustment. As a consequence, the remaining part of the abnormal accruals (calculated by means of either approach) captures the industry-adjusted buyout-specific manipulation.

The performance-adjusted modified -Jones regression model (PAMJ)

To measure the PAMJ model, we cross-sectionally estimate the discretionary accruals for each year using all firm-year observations with the same two-digit SIC code. There are important advantages of this approach relative to a time-series one, because PAMJ (i) imposes less restrictions on data - it does not require long time-period accounting information; (ii) partially controls for industry-wide factors which affect total accruals; and (iii) allows the coefficients to vary across time (Kasnik, 1999). Furthermore, Peasnell et al. (2000) state that the cross-sectional model is more able to capture the magnitudes of accrual management. The expectations model is measured as follows:

$$\frac{TACC_{i,t}}{Assets_{i,t-1}} = \beta_0 \left[\frac{1}{Assets_{i,t-1}}\right] + \beta_1 \left[\frac{(\Delta Sales_{i,t} - \Delta Receivables_{i,t})}{Assets_{i,t-1}}\right] + \beta_2 \left[\frac{PPE_{i,t}}{Assets_{i,t-1}}\right] + \beta_3 ROA_{i,t} + \varepsilon_{i,t} \quad (1)$$

where, for fiscal year *t* and firm *i*, *TAAC* stands for the total accruals defined as $TAAC_{i,t} = EBXI_{i,t} - OCF_{i,t}$, the difference between Earnings Before Extraordinary Items (*EBXI*)[7] and Cash Flow from Operations (*OCF*) [8]. $\Delta Sale_{i,t}$ and $\Delta Receivables_{i,t}$ stand for changes in sales and receivables, respectively. $PPE_{i,t}$ is gross Property, Plant and Equipment and $Assets_{i,t-1}$ represents the total book value of assets. Kothari et al. (2005) demonstrates that using contemporary $ROA_{i,t}$ produces less miss-specified tests relative to lagged $ROA_{i,t-1}$. All variables, except $ROA_{i,t}$, are scaled by lagged total assets to mitigate heteroskedasticity in residuals. The normal accruals, $NTAAC_{i,t}$, are then calculated as follows:

$$NTAAC_{i,t} = \tilde{\beta}_0 \left[\frac{1}{Assets_{i,t-1}}\right] + \tilde{\beta}_1 \left[\frac{(\Delta Sales_{i,t} - \Delta Receivables_{i,t})}{Assets_{i,t-1}}\right] + \tilde{\beta}_2 \left[\frac{PPE_{i,t}}{Assets_{i,t-1}}\right] + \tilde{\beta}_3 ROA_{i,t} \quad (2)$$

Hence, the predicted raw abnormal total accruals $RAW\_ABN\_TAAC_{i,t}$ are the difference between observed total accruals and normal total accruals:

[7] Sales minus cost of sales and SG&A expenses give the operating income; adjusting for other operations related revenues and expenses leads to Profit before Interest; minus net interest payable yields the profit before tax; minus tax gives Profit after Tax; and minus minority interest yields the Earnings (or Profit) before Extraordinary items.

[8] Hribar and Collins (2002) state that accrual estimates calculated from balance sheets can be contaminated by measurement error and therefore prefer accruals from cash flow statement. For instance, M&As increase net current assets on the balance sheet, but do not affect the income statement account. Ball and Shivakumar (2008) confirm that the balance sheet approach is biased to upward earnings management and the amount of discretionary accrual is overestimated.

$$RAW\_ABN\_TAAC_{i,t} = \frac{TAAC_{i,t}}{Assets_{i,t-1}} - NTAAC_{i,t} \quad (3)$$

To remove the non-event specific abnormal accruals, we subtract the mean abnormal accruals of the control observations (firms in the same year and with the same two-digit SIC code) from the raw abnormal accruals, which yields the industry-adjusted buyout-specific abnormal accruals:

$$Madj\_ABN\_TAAC_{i,t} = RAW\_ABN\_TAAC_{i,t} - Mean\_ABN\_TAAC_{i,t} \quad (4)$$

For our robust tests, we will also subtract the mean abnormal accruals of the control observations in the same size group within an industry from $RAW\_ABN\_TAAC_{i,t}$ and label it as $MadjSize\_ABN\_TAAC_{i,t}$.

The performance-matched modified -Jones regression model (PMMJ)

An alternative approach to control for performance consists of adjusting the estimated abnormal accruals by subtracting the estimated abnormal accruals of a performance-matched company. While the notation remains the same as above, we first estimate the expectations model without a performance regressor.

$$\frac{TACC_{i,t}}{Assets_{i,t-1}} = \beta_0 \left[\frac{1}{Assets_{i,t-1}}\right] + \beta_1 \left[\frac{(\Delta Sales_{i,t} - \Delta Receivables_{i,t})}{Assets_{i,t-1}}\right] + \beta_2 \left[\frac{PPE_{i,t}}{Assets_{i,t-1}}\right] + \varepsilon_{i,t} \quad (5)$$

which yields the normal accruals:

$$NTAAC_{i,t} = \tilde{\beta}_0 \left[\frac{1}{Assets_{i,t-1}}\right] + \tilde{\beta}_1 \left[\frac{(\Delta Sales_{i,t} - \Delta Receivables_{i,t})}{Assets_{i,t-1}}\right] + \tilde{\beta}_2 \left[\frac{PPE_{i,t}}{Assets_{i,t-1}}\right] \quad (6)$$

and enables us to calculate the predicted raw abnormal accruals:

$$RAW\_ABN\_TAAC_{i,t} = \frac{TAAC_{i,t}}{Assets_{i,t-1}} - NTAAC_{i,t} \quad (7)$$

We then select for each firm in the buyout year a matched firm from the non-buyout companies with the same two-digit SIC code and with the closest $ROA_{i,t}$. Raw abnormal accruals are calculated for both the buyout samples and the control observations and the difference comprises the industry-adjusted buyout-specific abnormal accruals:

$$ABN\_TAAC_{i,t} = \left(RAW\_ABN\_TAAC_{i,t}\right)_{sample} - \left(RAW\_ABN\_TAAC_{i,t}\right)_{control} \quad (8)$$

3.1.2. Real earnings management proxies

The three most common types of real earnings manipulation comprise: (i) Sales manipulation; (ii) Production manipulation; and (iii) Expenses manipulation.

Sale manipulation occurs when managers (temporarily) influence earnings and thus the bottom line earnings numbers by changing the sales price or/and credit terms. In a buyout context, managers attempt to lower the sales and thus the earnings by imposing a sales price premium or/and offering less lenient credit terms. For instance, by temporarily reducing lenient credit terms, customers may delay their purchases in the current period. Consequently, the sales decline and the earnings are deflated, but given the tightening of the credit terms, the collection of current period's sales increases which boosts the cash inflow. All in all, the effect of this type of sales manipulation is expected to result in a higher level of operating cash flow.

Prior to the buyout, managers can slow down production in order to reduce net earnings. On the one hand, by producing fewer units, the fixed costs are spread over a small number of units and the fixed cost per unit augments and, since the production is below its optimal scale, the marginal cost per unit rises as well. Hence, the total cost per unit increases, which implies higher reported cost of goods and lower operating margins. On the other hand, the other production and holding costs for inventory decline. As a result, the total production costs, a sum of the cost of goods and changes in inventory, are reduced as the decline in the latter is expected to dominate the increase in the former (Roychowdhury, 2006) which leads to a low ratio of production costs to sales.

Finally, the management can also increase the discretionary expenses by e.g. expanding the selling, general, and administrative expenses (SG&A) to make the current earnings decline[9].

Our approach to estimate the abnormal real activities manipulation is also based on cross-sectional models. We use both performance-adjusted and performance-matched methods to derive industry-adjusted buyout-specific real earnings management proxies.

Sales Manipulation

Our expectations model is formulated as follows:

$$\frac{OCF_{i,t}}{Assets_{i,t-1}} = \beta_0 \left[\frac{1}{Assets_{i,t-1}}\right] + \beta_1 \left[\frac{Sales_{i,t}}{Assets_{i,t-1}}\right] + \beta_2 \left[\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}}\right] + \beta_3 ROA_{i,t} + \varepsilon_{i,t} \quad (9)$$

[9] Given the lack of information on SG&A expenses for the control group, we focus on the first two types of real activities manipulation.

with all the variables as defined above. We obtain the normal operating cash flows ($NOCF_{i,t}$) by means of the β-estimates from the above equation :

$$NOCF_{i,t} = \tilde{\beta}_0 \left[\frac{1}{Assets_{i,t-1}}\right] + \tilde{\beta}_1 \left[\frac{Sales_{i,t}}{Assets_{i,t-1}}\right] + \tilde{\beta}_2 \left[\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}}\right] + \tilde{\beta}_3 ROA_{i,t} \quad (10)$$

To remove the non-event specific abnormal cash flows, we subtract the mean abnormal operating cash flows of the control firms (of the same year and with the same two-digit SIC code) from the raw operating cash flows, which yields the industry-adjusted event-specific abnormal operating cash flows:

$$Madj\_ABN\_OCF_{i,t} = RAW\_ABN\_OCF_{i,t} - Mean\_ABN\_OCF_{i,t} \quad (11)$$

As before, we also use two alternative calculations: we subtract the mean abnormal operating cash flows of the control firms in the same size group within the same industry from $RAW\_ABN\_OCF_{i,t}$ and label it $MadjSize\_ABN\_OCF_{i,t}$. We also use a performance-matched approach: a matched firm is selected by a non-buyout company in the same two-digit SIC code and year with the closest $ROA_{i,t}$. Raw abnormal operating cash flows are calculated for both the sample and the control observations. The difference is the buyout-specific abnormal operating cash flows:

$$ABN\_OCF_{i,t} = \left(RAW\_ABN\_OCF_{i,t}\right)_{sample} - \left(RAW\_ABN\_OCF_{i,t}\right)_{control} \quad (12)$$

Production manipulation

We take the following production cost expectation model as our basis:

$$\frac{PROD_{i,t}}{Assets_{i,t-1}} = \beta_0 \left[\frac{1}{Assets_{i,t-1}}\right] + \beta_1 \left[\frac{Sales_{i,t}}{Assets_{i,t-1}}\right] + \beta_2 \left[\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}}\right] + + \beta_3 \left[\frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}}\right] + \beta_4 ROA_{i,t} + \varepsilon_{i,t} \quad (13)$$

where, for fiscal year t and firm i, $PROD_{i,t}$ is the production cost and equals the sum of the Cost of Goods ($COGS_{i,t}$) and the change in Inventory ($\Delta INVENTORY_{i,t}$). The normal production cost is calculated as:

$$NPROD_{i,t} = \tilde{\beta}_0 \left[\frac{1}{Assets_{i,t-1}}\right] + \tilde{\beta}_1 \left[\frac{Sales_{i,t}}{Assets_{i,t-1}}\right] + \tilde{\beta}_2 \left[\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}}\right] + \tilde{\beta}_3 \left[\frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}}\right] + \tilde{\beta}_4 ROA_{i,t} \quad (14)$$

$NPROD_{i,t}$ is the normal production cost, calculated from the parameter estimates of the expectations model. As before, to remove the non-event specific abnormal production cost, we subtract the mean abnormal production cost of the control firms (of the same year and with the same two-digit SIC code) from the raw production cost. The industry-adjusted

event-specific abnormal production cost is then:[10]

$$Madj\_ABN\_PROD_{i,t} = RAW\_ABN\_PROD_{i,t} - Mean\_ABN\_PROD_{i,t} \quad (15)$$

3.2. Asset revaluation manipulation.

Asset revaluation is calculated as the change in revaluation reserves[11] on the balance sheet (Black *et al.*, 1998; Cheng and Lin, 2009). Asset revaluation reserves' reduction (inflation) in the manipulation year implies downward (upward) revaluation. As revaluations are industry-specific, we further subtract the industry's average revaluation or the average revaluation by the same size group within the same industry from the raw asset revaluation numbers to capture the industry-adjusted buyout-specific abnormal revaluation. As changes in asset reserves may reflect transfers among different reserve accounts, we collect detailed information on revaluation reserves from annual reports and record the frequency of four different types of revaluation while considering transferring reserves: (i) "No change" indicates that the asset revaluation reserves remain the same in both the manipulation and the prior year; (ii) "Upward revaluation" indicates that there are overstated revaluation activities in the manipulation year (relative to the year before the manipulation year); (iii) "Downward revaluation" captures the opposite case, and (iv) "Transfer" refers to the change in revaluation reserves arising from a transfer between the revaluation reserves account and other reserves accounts[12].

3.3. The determinants of earnings management

To analyze the determinants of earnings management, we take the above proxies based on accruals, production, or sales manipulation and relate them to a set of firm, transaction, and industry characteristics which include the choice of the buyout type (MBO versus LBO). This induces a problem as the buyout type choice is not exogenous and can be influenced by the

[10] We also use two alternative measures: the mean abnormal production cost of the control observations in the same size group within the same industry is subtracted from $RAW\_ABN\_PROD_{i,t}$ and label it as $MadjSize\_ABN\_PROD_{i,t}$. We use a performance-matched approach: a matched firm is selected by a non-buyout company in the same two-digit SIC code and year with the closest $ROA_{i,t}$. Raw abnormal production cost is calculated for both sample and control observations. The difference is proxied as the event-specific abnormal production cost: $ABN\_PROD_{i,t}=(RAW\_ABN\_PROD_{i,t})_{sample} - (RAW\_ABN\_PROD_{i,t})_{control}$.

[11] Aboody *et al.* (1999) collect revaluation numbers from companies' annual reports and cross check these numbers with data in Datastream. They report that only three discrepancies related to the 5485 firm-year observations.

[12] For instance, Usborne plc underwent buyout in 1998. The 1997 (1996) annual report showed £32000 (£84000) in the revaluation reserves account. The decline in revaluation reserves by £52000 is not due to revaluation, but arose from transferring out of revaluation reserves account to the P&L reserves account. Although a revaluation decrease could be noted, the sum of the revaluation reserves account and P&L reserves account remained the same and the equity was is not influenced by such transfers.

degree of earnings management as well as some firm specific characteristics such as the management's equity stake or the degree of board independence. Given that the realized MBO as a proxy for the management engagement incentive is endogenous determined, we adopt a two-stage instrument variable method. The Zephyr database reveals that the deal initiation takes place almost one year prior to the actual buyout announcement. Furthermore, Ang et al.'s (2010) empirical evidence confirms that the causality is more likely to flow from the buyout decision to earnings manipulation. Therefore, the first stage regression models the buyout choice and the predicted buyout choice will be included in the second stage regression as an explanatory variable of the degree of earnings manipulation.

The MBO versus LBO choice in year *t-1* is a function of the variables at year *t-2*:

$$
\begin{aligned}
&Dum\_MBO_{i,t} = \\
&\beta_0 + \beta_1 Management\ Own_{i,t-2} + \beta_2 Non\text{-}Executive\ Own_{i,t-2} \\
&+\beta_3\ Largest\ Owner\ Instit_{i,t-2} + \beta_4\ Independent\ Diretors_{i,t-2} + \beta_5\ Board\ Size_{i,t-2} \\
&+\beta_6\ Analysts_{i,t-2} + \beta_7\ LSE\ Listing_{i,t-2} \\
&+\beta_8\ MTB_{i,t-2} + \beta_9\ ROA_{i,t-2} + \beta_{10}\ Cash\ to\ Assets_{i,t-2} + \beta_{11}\ Debt\ to\ Assets_{i,t-2} + \beta_{12}\ Size_{i,t-2} \\
&+ YearFixedeffects + IndustryFixedeffects + \varepsilon_{i,t}
\end{aligned}
\tag{16}
$$

where the dependent variable is the realized buyout type ($Dum\_MBO_{i,t}$ which equals one for an MBO and zero for an LBO). *Management Own*$_{i,t-2}$ and *Non-Executive Own*$_{i,t-2}$ are the respective percentages of equity held by the management team and the non-executive directors. *Largest Owner Instit*$_{i,t-2}$ equals one when the largest shareholder in the buyout company is institutional investors, and zero otherwise. *Independent Directors*$_{i,t-2}$, is the number of independent directors divided by board size. *Board Size*$_{i,t-2}$ is the number of board members. *Analysts*$_{i,t-2}$ is the number of financial analysts following the buyout company. *LSE Listing*$_{i,t-2}$ equals one in case of a listing on the London Stock Exchange (LSE), and zero in case of a listing on the Alternative Investment Market (AIM). $MTB_{i,t-2}$ is the Market-to-Book ratio; *Cash to Assets*$_{i,t-2}$ is cash and marketable securities divided by total assets; *Debt to Assets*$_{i,t-2}$ is total debt over total assets, and *Size*$_{i,t-2}$ is the logarithm of total assets.

The choice of variables included in this first stage regression is affected by the reasons for the buyout that are usually mentioned in the official offer documents. As a key reason is "to simplify the management structure to bring it more in line with companies' prospects", we include managerial ownership. Another frequently mentioned reason for a buyout is "to remove costs associated with a listing" as companies with illiquid stocks are not able to

attract sufficient investor recognition and the listing costs may therefore outweigh the benefits. Illiquidity is often linked with high ownership concentration which implies that shareholders intending to dispose of their shares may have little alternative than to sell to the management or a buyout sponsor (Fidrmuc et al., 2013). Therefore, we expect that low visibility (proxied by analyst following and type of market listing) positively correlates to MBOs. The board needs to issue an independent evaluation of possible buyout choices and make a recommendation to investors. Therefore, a more independent board and a stronger ownership stake held by the non-executive directors may imply less collusion with the management, which may reduce the probability of an MBO. Lastly, we also include the cash balance and leverage ratio in the first stage regression.

In the second stage, we replace the MBO dummy by the predicted MBO from the first-step regression.

$$Abnormal_{i,t} = \beta_0 + \beta_1 Pred\_Dum\_MBO_{i,t} + \beta_2\ Dum\_External\ Financing_{i,t} + \beta_3 SPPE_{i,t-2} + \beta_4 Dum\_External\ Financing_{i,t} * SPPE_{i,t-2} + \beta_5\ NOA_{i,t-2}(INVREC_{i,t-2}) + YearFixedeffects + IndustryFixedeffects + \varepsilon_{i,t} \quad (17)$$

The dependent variable $Abnormal_{i,t-1}$ stands for $MadjSize\_ABN\_TAAC_{i,t-1}$ (or $Madj\_ABN\_TAAC_{i,t-1}$ or $ABN\_TAAC_{i,t-1}$), $MadjSize\_ABN\_OCF_{i,t-1}$, and $MadjSize\_ABN\_PROD_{i,t-1}$ which are abnormal accruals/operating cash flows/production costs of the buyout companies adjusted for the mean accruals/operating cash flow/production costs of the same size group. The *management engagement incentive* variable is proxied by $Pred\_Dum\_MBO_{i,t}$. We expect a negative coefficient on this variable because in MBOs managers are expected to manipulate the earnings downwards and benefit from a subsequent low purchase price (relative to LBOs). The variable $Dum\_External\ Financing_{i,t}$[13] proxies for the *external financing incentive* and equals one when the target raises external funds at the transaction. The indicator variable is expected to have a positive sign, as the external financing ability will depend on positive earnings and thus mitigate the downward manipulation. $SPPE_{i,t-2}$ (property, plant and equipment (PPE)) scaled by the beginning total assets) captures the availability of tangible assets that can serve as collateral. The internal manipulation capacity is captured by the net operating assets ($NOA_{i,t-2}$), which is equity minus cash and marketable securities plus total debt (at the beginning of the year), divided by total

[13] We use the dummy variable to ensure the proxy is not driven by the type of financing and extreme values of external funds. Moreover, some transactions only mention that they have external borrowing without releasing the exact amount.

sales (of the previous year). The larger the accumulated $NOA_{i,t-2}$, the lower the possibility to manipulate accruals. The nature of accrual accounting indicates that the total amount of accruals is fixed in the long run. Therefore, managers' opportunistic manipulation in one period has a reverse effect on manipulation in subsequent periods (Barton and Simko, 2002). When earnings are manipulated upwards by accruals, the value of the net assets on the balance sheet increases. All else being equal, the overstated net assets become less efficient at generating a given level of sales in the following periods, which explains the negative relationship between the level of net operating assets and accrual manipulation. The level of the stock of inventories and receivables ($INVREC_{i,t-2}$) captures the managerial flexibility to manipulate real activities. The stock of inventories and receivables is positively correlated with the flexibility to manipulate real earnings (Roychowdhury, 2006). We also add time and industry fixed-effects. All the aforementioned accounting variables are lagged; variable definitions are presented in Table 1.

[Insert Table 1 about here]

4. Data description

4.1 Data source and sample selection

This study comprises all completed whole-company UK buyouts that occurred in the period 1997 to 2007. The period corresponds with the second wave in the UK, which picked up in 1997 and slowed down over the course of time and then fell abruptly with the emergence of the financial crises starting at the end of 2007. The transactions are retrieved from the database of the Mergers and Acquisitions of the Security Data Company's online database (SDC), Venture Expert of Thomson One, Zephyr of Bureau van Dijk, Centre for Management Buyout Research (CMBOR), and Capital IQ. All deal information has been cross-checked by means of these datasets. To identify whether at least one member of the current management team participates in the transaction and stays in the firm subsequent to the buyout (our definition of an MBO), we gather the deal's details from the above datasets as well as from the news releases in the Factiva, LexisNexis, Google news, and the offer documents. The accounting data is mainly obtained from DataStream (DS), but we complement missing information by the annual reports downloaded from Thomson One and Fame. Corporate governance proxies are collected from annual reports and external financing information are gathered from the offer documents (also downloaded from Thomson One).

We collect a total of 407 buyout transactions and retain 168[14] public-to-private transactions which satisfy the following criteria:

- We retain 353 whole-company public-to-private buyouts (PtP buyouts): 14 private-to-private buyouts and 32 divisional buyouts are dropped for reasons of data limitations. Eight companies that still remained public companies were also not included in the final database.
- Missing data in Datastream reduced the sample to 299 buyouts.
- We excluded the financial services industry (SIC codes 6000-7000) and the regulated industries (SIC codes 4400-5000), which reduced the sample to 233.
- We faced problems with availability or quality of (accounting) information (in spite of disposing of the offer documents) and reduced the sample to 199 (ten companies had no SIC code; for twelve firms the net CF information was unavailable; ten firms lacked information on receivables; and two did not disclose any information on PPE).
- As small companies are exempt from external auditing, we exclude these three firms, hence retaining a sample of 196 firms.[15]
- The inability to find a matching control firm leaves a sample of 178.
- We dropped ten observations, because we required at least 10 observations in each two-digit SIC industry per year to ensure the statistic power in the cross-sectional regressions. In the remaining 168 observations, we have all the necessary data to calculate the various accounting manipulation proxies for 163 transactions.

4.2. Data description

Panel A of Table 2 shows the distribution of buyouts over time: the number of the buyouts has risen since 1997 and peaked around 1999-2000, consistent with Wright's et al. (2009) evidence that UK LBOs reached a new record in 2000 with total value of 38.4 billion euro. Following the stock market downturn of early 2000, the buyout market rebounded in late 2002 and 2003. Our sample includes companies from a wide business spectrum with most buyouts occurring in business services, retailing, and manufacturing industries. In the

[14] This is not a small sample in the light of the US research on MBO/LBOs: DeAngelo's (1986) sample consists of 64 MBOs (1973-1982). Perry and Williams' (1994) study includes 175 MBOs (1981-1988), and Fischer and Louis' (2008) sample has 138 observations (1985-2005). Ang et al. (2010) study 163 MBOs (1997-2007). These US studies only require a minimum of 5 observations for their cross-sectional regressions, but we adopt more strict requirements for our cross-sectional regressions.

[15] According to Company Act 2006, small companies are those with (a) Turnover < 2.8million GBP& Total assets <1.4million GBP (Before 2004) and (b) Turnover<5.6million GBP & Total assets < 2.8million GBP (Since 2004).

high-tech industry, more buyouts have occurred (accounting for almost 14% of the total transactions). This trend is in conjunction with Kaplan and Strömberg's (2009) view that the industry scope of buyouts is broadening beyond the mature, high cash flow, high debt capacity type of industries.

[Insert Table 2 about here]

The total assets of the average sample firm equal GBP 171.34 million in the year prior to the buyout. MBOs are relatively smaller, faster growing, less levered, but more cash-rich companies than LBOs. In two thirds of our buyout sample, at least one incumbent manager is involved in the transaction and stays on subsequent to the buyout-when we label the transaction as an MBO. MBOs are associated with a large ex ante equity stakes held by managers (18.3% versus only 6.0% in LBOs) and the management is more frequently the largest shareholder. Institutional ownership concentration does not differ between MBOs and LBOs. LBOs have a higher proportion of independent directors than MBOs (47.82% versus 43.68%) and are followed by twice as many analysts[16].

5. Results

5.1 Earnings manipulation

5.1.1. Accrual management

We first calculate normal (or expected) accruals by means of the performance-adjusted modified-Jones model (Panel A of Table 3) which is based on 163 cross-sectional regressions. The factor most influencing the expected total accruals is the scaled *PPE* (β_2), the long-term component of total accruals. Expectedly, this parameter estimate is negative, because *PPE* is related to depreciation which negatively contributes to total accruals. Of the 163 cross-sectional regressions, 87.20% of the scaled PPE's coefficients are significant at the conventional levels. The coefficient on the change in net sales (β_1) is negative and insignificant in more than half of regressions. More importantly, $ROA_{i,t}$ plays a significantly positive role (β_3) as a control variable, which justifies the performance adjustment in the modified-Jones model. The concern that $ROA_{i,t}$ partially captures the effect of sales is not substantiated, as their correlation is low and insignificant. The model's mean adjusted R^2 for the 163 cross-sectional expectation models amounts to 47.2% (significantly higher than the

[16] The correlation between all independent variables is small (below the absolute value of 0.5) with exception of a positive correlation of 0.6 between the number of analysts following the firm and firm size. To avoid multicollinarity, these variables are not simultaneously included in the same model.

non-performance-adjusted Jones model with an R^2 of only 27.0%).

When we compare the real total accruals with the predicted ones from Panel A, resulting in the raw abnormal total accruals (*RAW_ABN_TAAC*) of Panel B of Table 3, we observe that buyout companies have negative total raw accruals (-3%). This degree of downward accrual management is comparable with the US literature (Perry and Williams, 1994; Fisher and Louis, 2008). Both MBOs and LBOs have negative accrual management (-3% and -2%, respectively, but the difference is not significant; Panel B of Table 3). When we adjust the raw abnormal accruals for the industry-mean total accruals or for the mean of the same industry size group, we can draw two conclusions: (i) the abnormal accrual figures become significantly more negative: for all buyout companies, they decline from -3% to -12%. This implies that non-buyout companies are generally subject to positive accrual management (by 9% of the assets). This finding is unsurprising, because positive manipulation can affect managers' bonuses and the likelihood of meeting or beating analysts' expectations which may trigger a positive market reaction. (ii) The difference in industry-adjusted abnormal accruals of MBOs and LBOs is striking: downward accrual management is twice as high in MBOs (-15%) than in LBOs (-7%).

In sum, from the analysis of the industry-adjusted buyout-specific accruals approaches, we reach these conclusions: (i) In spite of the improved corporate governance over the past 15 years (Guo et al., 2011) and enhanced accounting regulation, downward earnings management preceding buyouts still frequently takes place, as indicated consistently by three types of accrual proxies. (ii) MBOs are associated with larger deflated accrual manipulation than LBOs. The industry-mean adjusted abnormal accruals of MBOs account for approximately 29% of reduced earnings and are thus not only statistically but also economically significant. LBOs are also associated with negative earnings management as well which may very well be the consequence of the 'love letters' sent by bidding companies: when managers cooperate with buyout sponsors to help reduce the transaction value, the losses of reduced premiums for managers may be compensated by the monetary rewards offered by bidding companies. The findings of this subsection strongly support hypothesis 1 (*managerial engagement hypothesis*) that managers deflate earnings numbers by means of accrual management.

[Insert Table 3 about here]

As a robustness check, we use a performance-matched modified-Jones regression model,

which controls for the effect of performance on accruals by assigning to each target a non-buyout counterpart from the same industry and a performance profile that is similar in the manipulation year. The difference in abnormal accruals of the buyout targets and that of control companies yields peer-controlled abnormal accruals. The results of this analysis yields very similar results[17]: for both MBOs and LBOs, the downward accruals manipulation is significantly negative, but the manipulation in MBOs is even much larger (about eight times) than in LBOs.

5.1.2. Real earnings management

We turn to real earnings management and focus on sales and production manipulation. The expectations model for the former is presented in Panel A of Table 4. The contemporaneous sales are, as expected, strongly positively correlated to the operating cash flows (OCF), and so is ROA. The explanatory power of the model is high with an average adjusted R^2 of 73.17%. Panel B of Table 4 indicates that the abnormal operating cash flows are positive for both MBOs and LBOs targets, which is in line with the prediction that managers will delay sales to depress net income by using real earnings management. For instance, a reduction in lenient credit terms will decrease the sales volumes and therefore lead to low earnings number, but will increase the collection of current sales' receipts and thus raise the level of OCF. We observe that sales manipulation is carried out in MBOs (the four proxies are statistically significantly different from zero), but the evidence for LBOs is weaker. This finding supports hypothesis 1 that managers manipulate earnings downward by delaying sales. One further point regarding our industry-adjusted buyout-specific approaches needs to be made: since both the industry-mean adjusted OCF and the same industry-size group adjusted OCF are lower than the raw OCF, it implies that the industry peers (the non-MBO and non-LBO firms) engage in negative sales manipulation, which is used to boost earnings numbers. This is consistent with the motive of positive accrual management used by the industry peers for increasing the bonus or meeting/beating analyst forecast.

[Insert Table 4 about here]

In relation to production manipulation, we observe that sales are a key predictor of the production costs (Panel A of Table 5). This coefficient's magnitude (0.75) is comparable with that Roychowdhury's (2006) model, namely (0.78) and the sign of sales is positive, as expected. The adjusted R^2 amounts to 96.61%. Panel B of Table 5 further supports hypothesis

[17] The results are not shown for reasons of conciseness; tables are available upon request.

1, in that negative production manipulation occurs prior to buyouts, which leads to lower earnings figures. That is, managers intend to slow down production to manage earnings downwards. We also disclose that MBOs are related to significant under-production manipulation, while production manipulation in LBOs does not occur according to the industry-adjusted buyout-specific and the matching-adjusted approaches. Buyout targets decrease production while industry competitors increase production to inflate the earnings numbers, which is consistent with the role of positive accrual management and negative sales manipulation.

[Insert Table 5 about here]

In sum, in addition to the downward accrual management, we present further evidence on negative real earnings management preceding buyout transactions. What is more, MBOs are associated with more negative earnings manipulation relative to LBOs. Hypothesis 1 is supported by both accrual management and real earnings management.

Since accrual management and real earnings management may be correlated, we report the correlation matrix in Table 6. Abnormal accruals and abnormal cash flows are significantly negatively correlated, which implies that companies are engaging in accrual management and real earnings management at the same time. Likewise, the negative correlation between abnormal cash flows and abnormal production costs suggests that both types of real earnings management are initiated by the average MBO.

[Insert Table 6 about here]

5.2. Asset revaluation

Whereas in LBOs, upward asset revaluation takes place, this is not the case in MBOs (as reflected in the abnormal revaluation numbers of Panel A of Table 7). Given that asset revaluation is industry-specific (industries with high capital intensity can revalue their assets to a larger extent), we control for industry effects by adjusting the raw figures for (i) the industry mean; (ii) the mean of the same industry-size group, and (iii) peer-effects by employing a matched control sample of non-buyouts. These three adjustments consistently show that managers do not manipulate the value of the assets through revaluation in MBOs, but do so in case of LBOs. In the context of the results of the previous subsection, a logical explanation is that MBO managers intend to keep corporate value as low as possible. In contrast, LBO managers who anticipate that they will not be involved in the post-LBO phase can facilitate the buyout by revaluing the assets upwards which reduces the debt-to-equity

ratio and in turn increases the debt capacity of the un-levered transaction.

When we dig deeper into the components of the asset revaluation reserves and distinguish between pure asset revaluation changes and the changes following the transfers of asset revaluation reserves to other reserve accounts, we show in Panel B of Table 7 that although MBO managers have an incentive to revaluate their assets downwards, they do not do so in 70.30% of the cases. The main reason is that of these 70.30% of the MBOs, 87% are not able to decrease the revaluation reserves because their asset revaluation reserves were already at zero prior to the buyout.

In short, when we examine the abnormal revaluation reserves, LBOs are associated with more frequent upward revaluations than MBOs. This partially supports the Hypothesis 2 of external financing incentive: upward revaluations are used to increase the borrowing capacity by ex ante reducing the debt-to-equity ratio. It also provides evidence on Hypothesis 3 that LBOs are associated with more upward revaluation than MBOs. However, it should be noted that the evidence is not very strong as in absolute terms, neither the MBOs nor the LBOs frequently revalue their assets. The reason may be that when credit markets are booming, revaluations are not really necessary.

[Insert Table 7 about here]

5.3 Robustness tests

To evaluate the robustness of our primary findings on accounting manipulation, we conduct four robustness checks.

First, it is possible that the management has made the manipulation decision not in the year or months prior to the buyout transaction but at an earlier time. Therefore, we measure all accounting manipulation proxies at a time preceding the transaction by more than one year (the fiscal year is then ending 13 to 24 months prior to the buyout). Overall, we hardly find any significant results for the year prior to what we call the manipulation year. If there is evidence of accounting manipulation or asset revaluation, it occurs immediately preceding the buyouts[18].

[18] This finding also partially supports the expectation that the causality is more likely to go from the buyout decision to earnings manipulation and not the other way around. Tables with results are available upon request.

Second, we examine whether the enactment of the revised UK Corporate Governance Code of 2003 reduces the degree of accounting manipulation. Following the introduction of Sarbanes-Oxley (SOX) Act of 2002, the 'Combined Code' of 1998 was revised in 2003 to improve financial reporting quality and the accountability of the board of directors, the audit committees, and the auditors. We partition the sample period into two subperiods: 1997-2003 and 2004-2007. From the abnormal accruals part of Table 8, we discover that active accrual manipulation was larger before the change in corporate governance regulation (the 1997-2003 subperiod), although it still takes place subsequent to 2003. In contrast, the other manipulation techniques (related to production costs and asset revaluations) are more frequently used after the change in the accounting regime, which may be induced by the fact that these manipulation methods are more difficult to detect. This finding is also consistent with US evidence: since the adoption of SOX, companies shift from accrual management to real earnings management (Cohen et al., 2008). When we redo the above tests for the sample of MBOs only, we find that the above findings are upheld.

[Insert Table 8 about here]

Third, we base our tests on the differences between the medians for the MBOs and LBOs (for the panels B of the Tables 3-5 and 7) and find that the results are very similar[19].

Fourth, we also perform a time-series approach to estimate abnormal accruals, operating cash flows and production costs. For each individual buyout company, we run a time-series regression using company data over a six year period ending in the year before the manipulation year to measure the normal accruals, operating cash flows, and production costs, and hence both accrual and real earnings management. The limitation of this method is that a sufficiently long time series (we take at least six years) of accounting numbers prior to the manipulation period ought to be available for each firm in order to estimate the parameter coefficients. Although this approach reduces the sample size to 72 observations, we still find negative accrual management preceding MBOs.

5.4. The determinants of earnings manipulation

In this section, we concentrate on the question why firms resort to accounting manipulation: does the management engagement incentive dominate or the external financing reason?

[19] For the sake of brevity, the results are not reported; tables are available upon request.

5.4.1. Managerial incentives versus external financing reasons

It is important to note that when we relate the earnings manipulation variables to the MBO/LBO dummy variable, the latter captures the ex ante probability of management engagement but measures it with error. Some companies consider an MBO but end up with an LBO which imposes a bias on the resulting coefficients from the probit models. Furthermore, the type of buyout is not exogenous to the degree of earnings manipulation. To address these concerns, we make use of a stage instrumental variables method. The first-stage equation models the MBO choice and the second equation explains the accounting manipulation behavior. So, we test whether or not managers manipulate earnings when they perceive the buyout type. As suggested by Berry (2011), an OLS model is preferred in the first stage even for an independent dummy variable, the reason being that only OLS estimation produces first stage residuals that are uncorrelated with the covariates and fitted values. As a robustness check, we will also employ a probit model for the first stage estimation following Wooldridge (2002).

We choice a set of instrumental variables (IVs) based on the economic rationale underlying the buyouts: managerial ownership concentration, non-executive ownership concentration, and firm size. Panel A of Table 9 demonstrates that these IVs are significantly related to the MBO decision. The higher is the manager's equity investment in the target company, the higher probability of an MBO. When the level of non-executive ownership is higher and the target firm is larger, the company is more likely to undergo an LBO. Smaller firms are more likely to be acquired through an MBO. The Hausman endogeneity test rejects the null hypothesis that the realized buyout type is exogenous. A p-value of 0.26 from overindentifying restriction test indicates that at least one of the IVs is exogenous. To test the relevance of the IVs, the F-statistics are required to be larger than 10 to avoid weak IVs; our F-test amounts to 18.4 which implies that our IVs are characterized by a sufficiently large correlation with the endogenous regressor.

The main finding of the second stage is that the predicted MBO proxy is significantly negatively related to the abnormal accruals (Model (1) of Panel B of Table 9) and a positive relation with sales manipulation (Model (2)). Both these findings support Hypothesis 1 in that managers are more prone to participate in accounting manipulation in order to obtain a lower purchase price via both accrual and real earnings manipulation. In case of an MBO, the mean

abnormal accruals is 18.4% of total assets lower than the accruals of firms of the same size group and within the same industry. This decrease leads to a decline in earnings by 30%, which is also economically significant. The external financing incentive does not emerge as a reason for accrual or real earnings manipulation. The reason for its insignificance may be that over the period 1997 to 2007 a fast-growing high-yield bond market emerged (the GBP 5.4 billion high-yield bond market of 1997, soared to 32 billion in 2007). Axelson et al. (2013) argue that the main robust predictor of buyout leverage consists of the credit market conditions of the high-yield bond market. Thus, our Hypothesis 2 on the external financing incentive is not upheld. The inactive revaluation frequency presented in Panel B of Table 7 is squared with this finding.

[Insert Table 9 about here]

5.4.2. Robustness tests

To verify the results of the above subsection, we perform four robustness tests.

First, as an alternative dependent variable for accrual management, we use the performance-matched abnormal accruals (see Section 3). The perceived MBO probability still has a significantly negative impact on accrual manipulation (-0.151 in Model (1) of Table 10). When we use either the raw abnormal operating cash flow (OCF) or the industry mean adjusted OCF as a proxy for sales manipulation, the perceived MBO remains positive and statistically significant (0.077 in Model (2)).

Second, we use two alternative estimation approaches. In the first stage, we use a probit model (rather than OLS) to predict the MBO likelihood and then use this predicted value as a regressor in the second stage. We confirm that the management engagement incentive plays a crucial role in negative accrual manipulation (Model (3)). We also apply a GMM IV approach and obtain a coefficient for the predicted MBO (-0.186 in Model (4)) which happens to be similar to that that of the two-stage approach (-0.184). As the standard errors are close, there is almost no efficiency gains from GMM approach relative to a two-staged method.

Third, we explore the effect of the enactment of the revised UK Corporate Governance Code of 2003 on both accrual and real activity manipulation. Model (5) of Table 10 shows that the implementation of the revised Code (as captured by the interaction term) mitigates the magnitude of manipulation in the case of an MBO. This suggests that the revised Code has

improved the financial statement quality of a potentially problematic group of firms. Model (6) estimates the effect of the revised Code on sales manipulation. After the Code's revision, the real earnings manipulation in predicted MBOs is reduced as well. Taking these two pieces of evidence on accrual and real earning manipulations together, we could argue that the revised Code enhances the reporting integrity of suspected companies during the MBO event, which could therefore lead to more fair and transparent transactions.

Fourth, to verify that the causality goes from the buyout decision to earnings management, we estimate the realized buyout type dummy variable on different proxies for earnings manipulation in addition to factors influencing buyout choice. In untabulated results, we do not find any significant impact of earnings management on the choice of buyout type. The key determinants remain management equity ownership, non-executive shareholdings and company size.

[Insert Table 10 about here]

6. Conclusions

In this paper, we investigate accounting manipulation prior to buyout transactions in the UK during the second buyout wave of 1997 to 2007 (when the buyout market collapsed following the banking crisis). We find that buyout targets engage in negative earnings manipulation, through both accrual management and real earnings management. Moreover, MBOs (wherein at least one member of the management team will be involved in the subsequent buyout) are associated with significantly more manipulation relative to LBOs. This is not unexpected: when the management contemplates an MBO, negative earnings manipulation may negatively influence the acquisition price. This is evidence of managerial self-dealing. Our managerial engagement incentive hypothesis is strongly supported for UK MBOs. However, the external financing incentive (increasing earnings and cash flows may lead to higher valuation which may enable the firm to be acquired with more leverage) does not play a prominent role in our UK buyout setting. This finding is in line with the evidence of Axelson et al. (2013) in that the buyout leverage is not determined by standard capital structure factors. Manipulation through inactive asset reserves revaluation is also consistent with the insignificance of the external financing incentive. We also document that the implementation of the revised UK Corporate Governance Code (of 2003) leads to increases in real earnings manipulation in general.

Our study extends the related research along four dimensions. First, while the first US LBO wave of the 1980s is well analyzed, little evidence is provided on the accounting manipulation during the second LBO wave and outside the US. We show that accounting manipulations ahead of the UK buyouts still prevail. Second, we advance an industry-adjusted buyout-specific approach to have a better proxy for accounting manipulation. The industry adjustment removes the common components of abnormal accounting numbers and allows for varied accounting discretion across industries. We further compare manipulation in MBOs and LBOs to examine buyout-event specific abnormal earnings behavior. Third, to explore the effect of competing incentives on accounting manipulation, we address the endogeneity issue of the ex-post buyout type by using the two-stage IV approach. We show that the causality goes from the decision of the buyout to accounting manipulation rather than vice versa. Fourth, we evaluate the policy effect of the revision of UK Corporate Governance Code on reporting quality. Even through self-interested managers still attempt to maximize their wealth through accounting manipulation, the magnitude of manipulation in MBOs is mitigated after the implementation of the revised UK Corporate Governance Code.

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Table 1: Definition of Variables

Table 1 defines the variables and presents the data sources. t stands for the buyout year, t-1 for the manipulation year, and t-2 is the year preceding the manipulation year.

Panel A: Dependent variables

Variables	Definition	Source
First stage regression dependent variable		
Dum_MBO	Dummy variable equals 1 in case of an MBO (at least one member of the pre-transaction management team participates in the buyout and subsequently stays in the firm), and 0 in case of an LBO (without subsequent involvement of the incumbent management) otherwise.	SDC, Capital IQ, Zephyr, Venture Expert and news release.
Second stage regression dependent variable		
ABN_TAAC	Matched Abnormal Accruals: raw abnormal accruals minus abnormal accruals of matched control observations selected from non-buyout companies with same two-digit SIC code and in same year and with closest ROAi,t.	Calculations with DataStream data
MadjSize_ABN_TAAC	Industry-Size Mean Adjusted Abnormal Accruals: raw abnormal accruals minus mean abnormal accruals of the control observations for same year and with same size group at same two-digit SIC code.	Calculations with DataStream data
MadjSize_ABN_OCF	Industry-Size Mean Adjusted Abnormal Operating Cash Flow: raw abnormal operating cash flow minus mean abnormal operating cash flow of control observations for same year and with same size group at same two-digit SIC code.	Calculations with DataStream data
MadjSize_ABN_PROD	Industry-Size Mean Adjusted Abnormal Production Cost: raw abnormal production costs minus mean abnormal production costs of control observations for same year and with same size group at same two-digit SIC code.	Calculations with DataStream data
RAW_ABN_OCF	Raw Abnormal Operating Cash Flow.	Calculations with DataStream data

Panel B: First stage regression independent variables

Variables	Definition	Source
Analysts	Number of financial analysts following pre-buyout target.	DataStream
Board Size	Number of directors on the board.	Annual reports
Cash to Assets	Cash and Marketable Securities divided by total assets of (pre-buyout) target.	Annual report
Debt to Assets	Total debt divided by total assets of (pre-buyout) target.	Annual report
Independent Directors	Proportion of independent directors on the board.	Annual reports
Largest Owner Instit	Dummy variable equals 1 if an institutional investor is the largest shareholder in pre-buyout target and 0 otherwise.	Annual reports
LSE Listing	Dummy variable equals 1 when listed on the London Stock Exchange, and 0 when listed on the Alternative Investment Market.	DataStream
Management Own	Ownership stake (%) held by management in pre-buyout target.	Annual reports
MTB	Market-to-book value of (pre-buyout) target.	DataStream
Non-Executive Own	Ownership stake (%) held by non-executives in pre-buyout target.	Annual reports
ROA	Return on assets of (pre-buyout) target.	Annual report
SIZE	Logarithm of total assets of (pre-buyout) target.	Annual report

Panel C: Second stage regression independent variables

Variables	Definition	Source
Dum_External Financing	Dummy equals 1 if pre-buyout target raises external funds and 0 otherwise.	SDC, Capital IQ, Zephyr, Venture Expert and offer documents.
INVREC	Sum of inventories and receivables, divided by total assets.	DataStream
NOA	Net operating assets: Sum of shareholders' equity minus cash and marketable securities and plus total debt, divided by total sales.	DataStream
Pred_Dum_MBO	Predicted MBO obtained from first stage regression (of 2SLS model).	
SPPE	Total Fixed Assets or gross Property, Plant and Equipment (PPE) of pre-buyout target, divided by lagged total assets.	DataStream and Annual reports
YearCode	Dummy variable equals 1 if buyout year is after the implementation of the revised Corporate Governance Code in 2003 and zero otherwise.	DataStream

Table 2: Sample Description

This table reports the distributions of UK buyouts by year (panel A) and by industry (panel B) over the period 1997 (the start of the second MBO/LBO wave) to 2007 (when the MBO/LBO market severely declines following the financial crises). The industries are classified based on the Fama-French 10 industry classification. The financial services industry and the utilities' sector are excluded. We further divide Fama-French's "Others" category into the business service industry and construction industry, such that we end up with nine industry categories. Sources: CMBOR, SDC, Venture Expert, Zephyr and Capital IQ.

Panel A: Distribution of leveraged (management) buyouts over time

Year	Number	Percent (%)
1997	4	2.5
1998	19	11.7
1999	36	22.1
2000	22	13.5
2001	11	6.8
2002	13	8.0
2003	17	10.43
2004	8	4.91
2005	10	6.13
2006	13	7.98
2007	10	6.13
Total	163	100

Panel B: Distribution of leveraged buyouts across industries

Industry	Number	Percent (%)
Consumer NonDurables	17	10.4
Consumer Durables	6	3.7
Manufacturing	27	16.6
High-Tech	22	13.5
Wholesale, Retail, and Some Services	42	25.8
Healthcare, Medical Equipment, and Drugs	4	2.5
Business Services	36	22.1
Construction	9	5.5
Total	163	100.0

Table 3: Accrual Management (Performance-Adjusted Modified-Jones Model)

Raw abnormal accruals are measured by the difference between actual total accruals and the estimated accruals from the expectation model. Panel A presents the expected accruals that are obtained from the following expectations model:

$$\frac{TAAC_{i,t}}{Assets_{i,t-1}} = \beta_0 \left[\frac{1}{Assets_{i,t-1}}\right] + \beta_1 \left[\frac{(\Delta Sales_{i,t} - \Delta Receivables_{i,t})}{Assets_{i,t-1}}\right] + \beta_2 \left[\frac{PPE_{i,t}}{Assets_{i,t-1}}\right] + \beta_3 ROA_{i,t} + \varepsilon_{i,t}$$

where, for fiscal year t and firm i, *TAAC* is the total accruals defined as $TACC_{i,t} = EBXI_{i,t}$-$OCF_{i,t}$, (Earnings before Extraordinary Items (*EBXI*) minus Cash Flow from Operating activities (*OCF*)). $\Delta Sale_{i,t}$ stands for the change in Sales, $\Delta Receivables_{i,t}$ is the change in Receivables, and $PPE_{i,t}$ is the gross Property, Plant and Equipment. $Assets_{i,t-1}$ represents the book value of Total Assets. Performance is measured by $ROA_{i,t}$. All variables (except *ROA)* are scaled by lagged total assets to mitigate heteroskedasticity in residuals. In panel B, the industry mean-adjusted abnormal accruals ($Madj\_ABN\_TAAC_{t-1}$) are calculated by subtracting the mean abnormal accruals of the control observations in the same year and within the same two-digit SIC code from the raw abnormal accruals ($RAW\_ABN\_TAAC_{t-1}$). Industry-size mean adjusted abnormal accruals ($MadjSize\_ABN\_TAAC_{t-1}$) are calculated by subtracting the mean abnormal accruals of the control observations falling in the same industry-size group from the raw abnormal accruals. ***, ** and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

Panel A. Descriptive statistics

All companies	Mean	Median	St.Dev	Min	Max
β_0	-35.43	30.21	765.49	-4389.51	2982.24
t test	(0.09)	(0.13)	(1.74)	(8.58)	(7.77)
β_1	-0.03	-0.02	0.10	-0.33	0.42
t test	(0.67)	(0.50)	(1.94)	(10.48)	(8.33)
β_2	-0.09	-0.09	0.04	-0.22	0.03
t test	(4.01)	(3.68)	(2.30)	(11.16)	(0.64)
β_3	0.41	0.39	0.28	-0.38	1.13
t test	(3.38)	(2.81)	(2.97)	(6.11)	(14.92)
Adj. R^2 (%)	47.18	50.32	22.18	5.75	95.29

Panel B. Performance-adjusted regression-based abnormal accruals

Abnormal accruals	Total	MBO	LBO	Diff
$RAW\_ABN\_TAAC_{t-1}$	-0.03***	-0.03***	-0.02***	-0.01
$Madj\_ABN\_TAAC_{t-1}$	-0.12***	-0.14***	-0.07***	-0.07***
$MadjSize\_ABN\_TAAC_{t-1}$	-0.12***	-0.15***	-0.07***	-0.08***
Nr. of observations	163	108	55	

Table 4: Sales Manipulation

The raw abnormal operating cash flows ($RAW\_ABN\_OCF_{t-1}$) are measured by the difference between actual total operating cash flows and the estimated cash flows from an expectation model of which the results are presented in Panel A:

$$\frac{OCF_{i,t}}{Assets_{i,t-1}} = \beta_0 \left[\frac{1}{Assets_{i,t-1}}\right] + \beta_1 \left[\frac{Sales_{i,t}}{Assets_{i,t-1}}\right] + \beta_2 \left[\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}}\right] + \beta_3 ROA_{i,t} + \varepsilon_{i,t}$$

In panel B, the industry-mean adjusted abnormal cash flows ($Madj\_ABN\_OCF_{t-1}$) are calculated by subtracting the mean abnormal operating cash flows of the control observations (from the same year and within the same two-digit SIC code) from the raw abnormal cash flows. Industry-size mean adjusted abnormal cash flows ($MadjSize\_ABN\_OCF_{t-1}$) are obtained by subtracting the mean abnormal cash flows of the control observations falling in the same industry-size group from the raw abnormal cash flows. Matching-adjusted abnormal operating cash flows (ABN_OCF_{t-1}) consist of the difference in abnormal operating cash flows between the sample buyouts and control firms (each target is matched with a non-buyout control company with the closest $ROA_{i,t}$ and with the same two-digit SIC code and for the same year). ***, ** and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

Panel A. Descriptive statistics

All companies	Mean	Median	St.Dev	Min	Max
β_0	53.4	-80.22	1073.62	-4010.94	9049.37
t test	(0.17)	(0.33)	(1.60)	(3.88)	(4.29)
β_1	0.04	0.03	0.03	-0.01	0.12
t test	(3.35)	(2.79)	(2.21)	(0.25)	(10.24)
β_2	-0.02	-0.02	0.11	-0.43	0.31
t test	(0.47)	(0.36)	(1.73)	(6.58)	(4.13)
β_3	0.61	0.62	0.28	-0.19	1.53
t test	(4.99)	(3.77)	(4.59)	(0.66)	(35.44)
Adj. R2 (%)	73.17	76.31	17.98	4.82	97.92

Panel B. Abnormal operating cash flows

Abnormal operating CF	Total	MBO	LBO	Diff
$RAW\_ABN\_OCF_{t-1}$	0.03^{***}	0.03^{**}	0.02^{**}	0.01
$Madj\_ABN\_OCF_{t-1}$	0.02^{***}	0.02^{***}	0.02^{*}	0.00
$MadjSize\_ABN\_OCF_{t-1}$	0.02^{***}	0.02^{***}	0.01	0.01
ABN_OCF_{t-1}	0.02^{***}	0.03^{***}	0.01	0.02
Nr. of observations	163	108	55	

Table 5: Production Manipulation

The raw abnormal production costs ($RAW\_ABN\_PROD_{t-1}$) are measured by the difference between actual total production costs and the estimated production costs from an expectation model of which the results are presented in panel A:

$$\frac{PROD_{i,t}}{Assets_{i,t-1}} = \beta_0 \left[\frac{1}{Assets_{i,t-1}}\right] + \beta_1 \left[\frac{Sales_{i,t}}{Assets_{i,t-1}}\right] + \beta_2 \left[\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}}\right] + \beta_3 \left[\frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}}\right] + \beta_4 ROA_{i,t} + \varepsilon_{i,t}$$

In Panel B, the Industry-mean adjusted abnormal production costs ($Madj\_ABN\_PROD_{t-1}$) are calculated by subtracting the mean abnormal production costs of the control firms (within the same two-digit SIC code and of the same year) from the raw abnormal production costs. The industry-size mean adjusted abnormal production costs ($MadjSize\_ABN\_PROD_{t-1}$) are calculated by subtracting the mean abnormal production costs of the control firms (falling in the same industry-size group as the target firms) from the raw abnormal production costs of the target buyouts. The matching-adjusted abnormal production costs (ABN_PROD_{t-1}) consist of the difference in abnormal production costs between the sample firms and the control firms. We match each target buyout with a non-buyout control company with the closest $ROA_{i,t}$ and in the same two-digit SIC code and year. ***, ** and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

Panel A. Descriptive statistics

All companies	Mean	Median	St.Dev	Min	Max
β_0	-2373.5	-1419.8	5900.4	-49035	10780.9
t test	(1.97)	(1.67)	(2.28)	(9.89)	(2.91)
β_1	0.75	0.75	0.11	0.39	0.99
t test	(18.62)	(16.48)	(12.24)	(2.23)	(88.56)
β_2	0.1	0.1	0.41	-1.27	3.34
t test	(0.67)	(0.68)	(1.64)	(4.09)	(4.75)
β_3	-0.08	0.00	0.38	-1.82	0.51
t test	(0.18)	(0.08)	(1.58)	(4.93)	(4.05)
β_4	-0.52	-0.53	0.64	-2.14	2.99
t test	(1.28)	(1.15)	(1.47)	(8.14)	(2.10)
Adj. R^2 (%)	96.61	97.47	2.42	89.73	99.87

Panel B. Abnormal production costs

Abnormal production costs	Total	MBO	LBO	Diff
$RAW\_ABN\_PROD_{t-1}$	-0.06**	-0.07**	-0.04	-0.03
$Madj\_ABN\_PROD_{t-1}$	-0.03*	-0.04**	0.01	-0.02
$MadjSize\_ABN\_PROD_{t-1}$	-0.03	-0.04*	0.00	-0.03
ABN_PROD_{t-1}	-0.06	-0.06*	-0.02	-0.04
Nr. of observations	159	104	55	

Table 6: Correlation Matrix for Earnings Management Proxies

We present the Pearson correlation matrix between accrual and real earnings management proxies. *MadjSize_ABN_TAAC$_{t-1}$* is industry-size mean adjusted abnormal accruals (obtained by subtracting the mean abnormal accruals of the control firms of similar size (in the same year) and within the same two-digit SIC code) from the raw abnormal accruals. *MadjSize_ABN_OCF$_{t-1}$* is the industry-size mean adjusted abnormal operating cash flows. MadjSize_*ABN_PROD$_{t-1}$* is the industry-size mean adjusted abnormal production costs. Panel A shows the matrix based on all buyouts. Panel B (C) shows the matrix for MBOs (LBOs). ***, ** and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

Panel A. Correlation matrix for all buyouts

All LBOs (163)	MadjSize_ABN_TAAC$_{t-1}$	MadjSize_ABN_OCF$_{t-1}$	MadjSize_ABN_PROD$_{t-1}$
MadjSize_ABN_TAAC$_{t-1}$	1		
MadjSize_ABN_OCF$_{t-1}$	-0.49***	1	
MadjSize_ABN_PROD$_{t-1}$	-0.05	-0.18*	1

Panel B. Correlation matrix for all MBO

MBOs (108)	MadjSize_ABN_TAAC$_{t-1}$	MadjSize_ABN_OCF$_{t-1}$	MadjSize_ABN_PROD$_{t-1}$
MadjSize_ABN_TAAC$_{t-1}$	1		
MadjSize_ABN_OCF$_{t-1}$	-0.53***	1	
MadjSize_ABN_PROD$_{t-1}$	-0.06	-0.18*	1

Panel C. Correlation matrix for all LBOs

LBOs (55)	MadjSize_ABN_TAAC$_{t-1}$	MadjSize_ABN_OCF$_{t-1}$	MadjSize_ABN_PROD$_{t-1}$
MadjSize_ABN_TAAC$_{t-1}$	1		
MadjSize_ABN_OCF$_{t-1}$	-0.42**	1	
MadjSize_ABN_PROD$_{t-1}$	-0.07	-0.18	1

Table 7: Asset Revaluation

The raw abnormal asset revaluation ($RAW\_ABN\_REVALUE_{t-1}$) in the manipulation year is measured as the change in asset revaluation reserves scaled by current total assets. We then subtract the industry average of the revaluation amount from the raw asset revaluation in order to obtain the industry mean-adjusted abnormal revaluation ($Madj\_ABN\_REVALUE_{t-1}$). Industry-size mean adjusted abnormal asset revaluation ($MadjSize\_ABN\_REVALUE_{t-1}$) is calculated by subtracting the mean asset revaluation of the control firms (falling in the same industry-size group) from the raw asset revaluation. ROA-matched asset revaluation ($ABN\_REVALUE_{t-1}$) is measured as the difference in asset revaluation between sample and control firms. The control firms are non-buyout companies with the same two-digit SIC code and the $ROA_{i,t}$ (considered in the same year as the sample firm) that is closest to the buyout target. In Panel B, "No change" signifies that the asset revaluation reserves remain the same in both the manipulation year and one year before. "Upward revaluation" indicates that there is an increase in revaluation activities from one year before the manipulation year to the next, while "Downward revaluation" captures the opposite case. "Transfer" reflects that the change in revaluation reserves are arising from transferring in or transferring out between revaluation reserves account and other reserves accounts. ***, ** and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

Panel A. Abnormal revaluation

Abnormal revaluation	Total	MBO	LBO	Diff
$RAW\_ABN\_REVALUE_{t-1}$	0.001	-0.001	0.006**	-0.007**
$Madj\_ABN\_REVALUE_{t-1}$	0.002	-0.000	0.008**	-0.008*
$MadjSize\_ABN\_REVALUE_{t-1}$	0.004*	0.001	0.010*	-0.009
$ABN\_REVALUE_{t-1}$	0.005**	0.004	0.010*	-0.006
Nr. of observations	156	103	53	

Panel B. Detailed information on the asset revaluation reserves

Abnormal revaluation	Total	MBO	LBO
No change (%)	69.28	70.30	67.31
Upward revaluation (%)	20.26	3.96	5.77
Downward revaluation (%)	4.58	3.96	9.62
Transfer (%)	5.88	21.78	17.31
Nr. of observations	153	101	52

Table 8: Earnings manipulation by subperiod

This table assesses the impact of the enactment of the revised UK Coporate Governance Code of 2003 on the reduction of accounting manipulation. We divide the sample period into two subperiods: 1997-2003 and 2004-2007. Abnormal accruals, abnormal operation cash flows (OCF), abnormal production costs (PROD), abnormal assets revaluations are calculated similarly as in table 3, 4, 5 and 7, with variables lagged by two years. ***, ** and * stand for statistical significance at the 1%, 5% and 10% level.

Panel A. Abnormal accruals

Abnormal accruals	Total	1997-2003	2004-2007	Diff
$RAW\_ABN\_TAAC_{t-1}$	-0.03**	-0.03***	-0.03***	0.00
$Madj\_ABN\_TAAC_{t-1}$	-0.12***	-0.14***	-0.04**	-0.11***
$MadjSize\_ABN\_TAAC_{t-1}$	-0.12***	-0.15***	-0.02	-0.14***
ABN_TAAC_{t-1}	-0.06***	-0.08***	-0.00	-0.07***
Nr. of observations	163	122	41	

Panel B. Abnormal operating cash flows

Abnormal operating CF	Total	1997-2003	2004-2007	Diff
$RAW\_ABN\_OCF_{t-1}$	0.03***	0.02**	0.04**	-0.02
$Madj\_ABN\_OCF_{t-1}$	0.02***	0.01**	0.03**	-0.02
$MadjSize\_ABN\_OCF_{t-1}$	0.02***	0.02**	0.03**	-0.02
ABN_OCF_{t-1}	0.02***	0.02**	0.01	0.01
Nr. of observations	163	122	41	

Panel C. Abnormal production costs

Abnormal production costs	Total	1997-2003	2004-2007	Diff
$RAW\_ABN\_PROD_{t-1}$	-0.06**	-0.02	-0.14**	-0.11**
$Madj\_ABN\_PROD_{t-1}$	-0.03*	-0.00	-0.10**	-0.09**
$MadjSize\_ABN\_PROD_{t-1}$	-0.03	-0.00	-0.09**	-0.08**
ABN_PROD_{t-1}	-0.06	-0.05	-0.05*	0.00
Nr. of observations	159	118	41	

Panel D. Abnormal revaluation

Abnormal revaluation	Total	1997-2003	2004-2007	Diff
$RAW\_ABN\_REVALUE_{t-1}$	0.001	-0.001***	0.007**	-0.008*
$Madj\_ABN\_REVALUE_{t-1}$	0.002	-0.001	0.011**	-0.012**
$MadjSize\_ABN\_REVALUE_{t-1}$	0.004*	-0.001	0.019**	-0.020**
$ABN\_REVALUE_{t-1}$	0.005**	0.003	0.014*	-0.013*
Nr. of observations	156	116	40	

Table 9: Analysis of the Incentives Affecting Earnings Manipulation (2SLS approach)

The first stage dependent variable is *Dum_MBO*, which indicates whether the buyout is a MBO (Dum_MBO=1) or a LBO (Dum_MBO=0). The IVs are *Management Own* (equity share owned by managers in pre-buyout target), *Non-Executive Own* (equity share held by non-executive directors) and *Size* (log. of total assets). The second stage dependent variable is *Industry-size mean adjusted abnormal accruals (MadjSize_ABN_TAAC$_{t-1}$) /operating cash flow (MadjSize_ABN_OCF$_{t-1}$) /production costs (MadjSize_ABN_PROD$_{t-1}$)*. *Pred_Dum_MBO*, is the predicted type of buyouts (from stage 1). *Dum_ External Financing* equals one when targets raise external funds during the buyouts. *SPPE* is the property, plant and equipment (*PPE*) scaled by total assets. For accrual management, the internal manipulation capacity is captured by the net operating assets (*NOA*) position (sum of equity minus cash and marketable securities, plus total debt, standardized by total sales). The level of the stock of inventories and receivables (*INVREC*) captures the flexibility of managers to manipulate real activities. ***, ** and * stand for statistical significance at the 1%, 5% and 10% level, respectively.

Panel A: First stage: The Buyout Type

Dep.Var. Dum_MBO	Model 1: First stage
Management Own $_{i, t-2}$	0.506***
	(0.189)
Non-Executive Own $_{i, t-2}$	-0.937***
	(0.356)
Size $_{i, t-2}$	-0.105***
	(0.029)
Year Fixed effects	Yes
Industry Fixed effects	Yes
Adjusted R^2	0.192
Tests of endogeneity (p value)	0.004
Test of overidentifying restrictions (p value)	0.255
Robust F	18.443

Panel B: Second stage: Determinants of earnings manipulation

	$MadjSize\_ABN\_TAAC_{t-1}$ (1)	$MadjSize\_ABN\_OCF_{t-1}$ (2)	$MadjSize\_ABN\_PROD_{t-1}$ (3)
$Pred\_Dum\_MBO_{i,t}$	-0.184**	0.090**	0.046
	(0.057)	(0.038)	(0.116)
$Dum\_External\ Financing_{i,t}$	0.062	0.048	-0.053
	(0.062)	(0.042)	(0.121)
$SPPE_{i,t-2}$	0.031	0.111**	0.152
	(0.061)	(0.042)	(0.131)
$Dum\_External\ Financing_{i,t}*SPPE_{i,t-2}$	-0.096	-0.093	-0.069
	(0.098)	(0.068)	(0.176)
$MTB_{i,t-2}$	0.012	-0.005	-0.018
	(0.008)	(0.005)	(0.017)
$NOA_{i,t-2}$	0.050		
	(0.061)		
$INVREC_{i,t-2}$		-0.076*	0.114
		(0.045)	(0.148)
Constant	-0.073	-0.041	-0.153
	(0.124)	(0.077)	(0.219)
Year Fixed effects	Yes	Yes	Yes
Industry Fixed effect	Yes	Yes	Yes
Observations	158	158	156

Table 10: Robustness tests on the determinants of earnings manipulation

This table provides the robustness tests for second stage regressions of Panel B, Table 9. The dependent variable in Model (1) is *ROA matched abnormal accruals* (ABN_TAAC_{t-1}). The dependent variable in Model (2) is *raw adjusted abnormal operating cash flows* ($RAW\_ABN\_OCF_{t-1}$). For definitions of the other dependent and independent variables, see Table 1. Model (4) conducts the second stage by means of a GMM approach. Models (5) and (6) further investigates the change in accrual management behavior after the enactment of the revised UK Corporate Governance Code (*Code*) in 2003. The first stage IVs are *Management Own*, *Non-Executive Own* and *Size*. *Pred_Dum_MBO*, is the predicted type of buyouts. YearCode equals one if the buyout took place after 2003, zero otherwise. The other variables are the same as in Table 9. ***, ** and * stand for statistical significance at the 1%, 5% and 10% level.

Second stage: Incentives affecting accounting manipulation discretion

	ABN_TAAC_{t-1} (1)	$RAW\_ABN\_OCF_{t-1}$ (2)	$MadjSize\_ABN\_TAAC_{t-1}$ (Probit) (3)	$MadjSize\_ABN\_TAAC_{t-1}$ (GMM) (4)	$MadjSize\_ABN\_TAAC_{t-1}$(Code) (5)	$MadjSize\_ABN\_OCF_{t-1}$(Code) (6)
$Pred\_Dum\_MBO_{i,\,t-2}$	-0.151**	0.077**	-0.134**	-0.186***	-0.245**	0.118**
	(0.054)	(0.036)	(0.050)	(0.057)	(0.080)	(0.051)
YearCode					-0.075	0.104*
					(0.081)	(0.058)
$Pred\_Dum\_MBO_{i,\,t-2}$					0.241**	-0.111**
*YearCode					(0.087)	(0.056)
$Dum\_External\ Financing_{i,\,t}$	-0.013	0.057	0.060	0.041	0.058	0.051
	(0.074)	(0.041)	(0.063)	(0.061)	(0.064)	(0.041)
$SPPE_{i,\,t-2}$	0.044	0.109**	0.040	0.017	0.070	0.091**
	(0.075)	(0.043)	(0.062)	(0.059)	(0.069)	(0.037)
$Dum\_External\ Financing_{i,t}$	-0.053	-0.106	-0.111	-0.062	-0.107	-0.090
$*SPPE_{i,\,t-2}$	(0.114)	(0.067)	(0.101)	(0.095)	(0.100)	(0.064)
$NOA_{\,i,\,t-2}$	-0.063		0.068	0.0412	0.0405	
	(0.077)		(0.063)	(0.061)	(0.060)	
$INVREC_{\,i,\,t-2}$		-0.069				-0.061
		(0.042)				(0.045)
Constants	0.092	-0.035	-0.124	0.006	0.055	-0.055
	(0.147)	(0.072)	(0.127)	(0.009)	(0.132)	(0.079)
Year Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	158	158	158	158	158	158

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