# Yönetim Satınalmalarında Faaliyet Performansı: PTP Harici Satınalmalar Boyutu[1]

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### Öz

Bu çalışma 412 özel şirket yönetim satınalmasında değer yaratılmasını incelemektedir. Satınalmaların performansı vekalet çatışmalarının satınalma ile hafifletilmesini öngören Jensen'in vekalet teorisi çerçevesinde test edilmiştir. Sonuçlar son on yıldaki yönetim satınalmalarının düşük kaldıraç, yüksek büyüme ve ortalama bir karlılık ile karakterize edildiğini göstermektedir. Satınalma sonrası performans diğer şirketlere nazaran yüksek olmakla birlikte, performanstaki iyileşme satınalma öncesinde başlamaktadır ve işlem sonrası performans iyileşmeleri minimaldir. Düşük olmasına rağmen kaldıraç performansın anlamlı bir belirleyicisidir ve özel sermaye sponsorlarının seçilim yargısı düzeltilmesinden sonra düşük düzeyde değer yarattıkları görülmektedir.

**Anahtar kelimeler:** Yönetim satınalması, PTP harici satınalmalar, özel sermaye.

**JEL Sınıflandırması:** G14, G24, G34.

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## Operating Performance of Management Buyouts: Non-PTP Dimension of Acquisitions

### Abstract

This paper investigates value creation in a unique sample of 412 private firm and divestment management buyouts. Performance of buyouts is tested within Jensen's agency framework, which posits mitigation of agency conflicts through buyout. Results indicate that last decade management buyouts are characterised by low leverage, high growth and moderate profitability. Post-transaction performance is superior to comparable non-buyouts, however buyouts begin to outperform control firms prior to acquisition and pre-to-post transaction performance improvements are minimal. Leverage is a significant driver of performance despite being low and private equity sponsors generate little additional value after controlling for selection bias.

**Keywords:** Management buyout, non-PTP buyouts, divestment, private equity.

**JEL Classification**: G14, G24, G34.

### 1. Introduction

This study examines management buyouts (MBO) of private firms and divestments in the UK market. The European Union and UK regulations allow access to private firm financial statements which are not publicly available in the United States (US). For this reason, US market research is mostly restricted to public to private (PTP) transactions, and within the PTP it is restricted to buyouts issuing public debt during the private period. However, results obtained from subsamples of debt issuing buyouts are likely to be biased (Cohn et al., 2014). The UK choice enhances sample representation and mitigates the selection bias. Moreover, the UK is the largest buyout market in Europe, enabling us to utilise a larger and more representative sample than other European markets. The study aims to shed light on the performance of MBOs of non-listed firms. Stromberg (2008) reports that private firm and divisional buyouts account for 78% of all buyouts while in 6.7% of the cases a public firm becomes the target of buyout. More effort needs to be dedicated to explain the motives and consequences of the non-PTP buyouts given their large share in the buyout market. Our sample comprises 412 hand-collected UK MBOs completed between 2000 and 2009, of which 308 are private-to-private and 104 are divestment buyouts. This study adds to the growing

performance studies of non-PTP buyouts, namely Meuleman et al. (2009), Boucly et al. (2011), Jelic and Wright (2011).

Jensen (1986) predicts that the solution to the agency problems in large companies lies in the acquisition of the company by the incumbent management team in leveraged deals, creating a concentrated ownership structure with disciplinary effects of debt repayments, and typically with a private equity (PE) investor as a guiding and monitoring shareholder. Called leveraged buyout (LBO) or management buyout (MBO), the new form of company is touted as a superior performer than traditional public company (Jensen, 1989). An extensive range of studies examines performance of buyouts with mixed results, varying based on the study period, market and type of buyout. Studies on the first buyout wave (Kaplan, 1989; Smith, 1990; Opler, 1992) find large improvements in the operating performance following buyout, while more recent studies show that improvements are small or non-existent (Guo et al., 2011; Jelic & Wright, 2011; Weir et al., 2015). These differences in results are mostly attributable to the changing market conditions and sample composition of studies. The evolution of buyout market in the last decade, increasing investor risk-aversion, demise of initial public offerings (Gao et al., 2013)[3] and difficulty in organising successful exits has given rise to the secondary buyouts, while primary buyouts decline.

Private firms have a different set of agency costs and they generally do not bear the costs of dispersed ownership. Absent free cash flow and dispersed ownership costs the buyout is supposed to mitigate, they are the largest source for buyout deals. Many private firms are family businesses that seek a successor to family in the absence of a suitable family member (Howorth et al., 2004). Others are entrepreneurial firms whose owners might have their unique motivations for buyout. Managers of divisions are, on the other hand, likely to undertake a buyout to remove parental restrictions on growth (Wright et al., 1994). Neglected by the early literature, the recent studies increasingly recognise heterogeneity of buyouts; acknowledging that type and source of buyouts (LBO, MBO, management buy-in, public firm, private firm, divestment) have different characteristics and implications for the subsequent trajectory of the company. Studies using mixed samples of private and public firms often report small performance improvements following acquisition (Desbrieres & Schatt, 2002; Jelic & Wright, 2011). An interesting question that arises is how

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[3]   The UK buyout market recorded only 1 IPO exit in 2008 and 2009. The number of MBOs hit a record low and receiverships accounted for 157 of 245 buyout exits in 2009, making it the worst exit environment in the UK (CMBOR, 2010).

non-listed MBOs can improve performance considering the limitations of Jensen theory with regards to private firms and divestments.

The results suggest improvements in industry adjusted profitability and growth following buyout. The main focus of the post-buyout company is on growth rather than improved profitability and efficiency. We find no evidence that changes in performance are associated with the MBO transaction. PE-backed buyouts and buyouts in general have an increasing trend of profitability prior to acquisition, where profitability peaks at year -1 and reverts to year -3 levels several years after buyout, which may indicate practice of earnings management or selective PE investment prior to buyout. When this selection effect is controlled, the performance improvements disappear. Divisional and private firm buyouts do not show significant differences. Regressions of performance changes on a set of firm characteristics confirm that PE-backing is not associated with performance changes, the PE variable is only significant when selection effect is not controlled. Leverage; however, significantly impacts profitability, efficiency and growth despite being low.

The rest of the paper is organised as follows: Section 2 discusses motives of buyout transactions and develops hypotheses. Section 3 describes data. Section 4 presents results and Section 5 concludes.

## 2. Literature and hypothesis development

### 2.1. Sources of buyouts

Jensen (2010) states that managers of public corporations tend to destroy a large part of the firm value. The dispersed ownership structure makes it harder to monitor managers who invest in negative net present value projects, wasting free cash flow. The resultant deviation from shareholder value maximisation creates agency conflicts between managers and shareholders. Going private in leveraged buyout transactions removes this issue, creating a better form of governance. When forced to allocate future cash flows to debt payments, managers are unable to squander available funds (Jensen 1986). In addition, they need to create extra value to assure financiers of their capital and going private creates a concentrated ownership structure with most of the equity shared between managers and PE investors, limiting managerial discretion through increasing monitoring activities and providing managers more incentives to meet company targets.

However, buyouts of private firms already have a concentrated ownership structure prior to buyout which makes agency motives mostly invalid. Instead, the rationale for buyout could be such that private companies

might be having financial issues that could be resolved by additional equity or debt capital. Being unable to stage an IPO or lacking consistent lender relationships, managers of private companies may think of a third alternative source of capital: private equity. The support of PE would relax the financial constraints and facilitate the implementation of new projects. In fact, the evidence from French market shows that private-to-private transactions have the strongest post-buyout growth among buyouts (Boucly et al., 2011). Then managers of private companies who seek further growth and removal of investment constraints would be better off by taking over the company with the backing of PE funds. Succession issues in private firms (Meuleman et al., 2009), and private family firms (Howorth et al., 2004) can also form the basis for undertaking an MBO. Following the buyout, latent growth opportunities can be realised in cases where the managers have been extremely risk-averse.

Recent studies tend to take into account different forms of buyouts and acknowledge their effect on the performance properties. Desbrieres and Schatt (2002) for example, acknowledge that their sample of French buyouts do not show large performance improvements similar to those in the US and UK since their sample consists mostly of private family originated buyouts and divestments while most US and UK studies are conducted on samples of publicly listed companies. Cohn et al. (2014) document that different performance results are obtained when the sample is restricted to buyouts issuing public debt, and when full sample performance is measured. With the exception of Cohn et al. (2014), all US studies are restricted to public debt issuing buyouts in their performance analysis since private company data are not available in the US unless they issue public debt. Another important point of difference is to distinguish between PTP and private-to-private buyouts. Public and private companies have substantial differences and motivations to undertake a buyout, which are also reflected in their post-buyout performance. Concentrated pre-buyout ownership, low leverage utilisation compared to PTP buyouts (Desbrieres & Schatt, 2002) and frequent occurrence of MBO due to family succession issues (Howorth et al., 2004) are three key distinct characteristics of private firms. Of these, low utilisation of leverage reduces the pressure on managers to perform well since there is less debt to be repaid. Concentrated pre-buyout ownership removes one of the pillars of buyout superiority argument, since it proposes that conversion of pre-buyout firm from dispersed ownership to concentrated ownership will mitigate agency problems and improve performance. In most private firms, the ownership structure does not undergo such transformation during buyout, hence the advantages will be limited since there is little agency problem caused by ownership structure

which can be solved through a buyout. As far as buyouts originating from family businesses concerned, they are likely to be undertaking a buyout since there is no viable successor among family members. The effect of these differences can be observed in studies that employ private firms or mixed samples in the research (Desbrieres & Schatt, 2002; Boucly et al., 2011; Jelic & Wright, 2011). Performance improvements in these studies are substantially lower than studies that exclusively use public firm samples (Kaplan, 1989; Smith, 1990; Opler, 1992). Although the large improvements in listed firm samples can be partly attributed to upward biased estimates of performance in those studies since they are confined to subsamples of public debt issuers which are likely to bias performance upwards (Cohn et al., 2014), the role of above-mentioned differences between private and public companies in the trajectory of post-buyout firm cannot be overstated.

On the other hand, divisional MBOs have substantial agency issues prior to buyout. However these issues are related to internal decision systems and bureaucracy of the parent company unlike the classic agency problems between managers and shareholders. Fama and Jensen (1983) note that the complex systems of the large diversified corporations may create agency problems in the absence of an efficient internal control and monitoring mechanism. Additionally, the divisions of large companies might be restricted in their ability to implement new projects due to central policies of the parent company (Wright et al., 1994). Thus, the over-diversification of the parent company may result in the destruction of value that creates an opportunity for division managers to seize. These companies are expected to grow fast when parental constraints disappear and they focus on the core business independently. Managers that realise the growth potential in the division would seek to acquire the company in an MBO transaction. The evidence on divisional buyouts is scarce. Meuleman et al. (2009) study the changes in profitability and growth potential of 238 PE-backed buyouts between 1993 and 2003. Their results suggest that divisional buyouts do not cause significant changes in profitability; however, they result in improvements in efficiency and employment growth.

In brief, divisional buyouts might benefit from the reduction of agency costs and create more value following the buyout transactions with the assistance of PE investor. Private companies do not suffer from high agency costs since they largely have a familial ownership structure; however an MBO can be used to solve family succession issues and a buyout might provide private companies an opportunity to clear financial constraints. Accordingly we develop following hypotheses:

H1: Management buyouts show improvements in performance following buyout.

H2: Private-to-private and divisional buyouts do not have significant differences in performance.

### 2.2. The role of private equity

PE funds hold significant portions of equity, they actively participate in the decision-making process and appoint board members to ensure that the portfolio firms create value and progress in the right direction (Gompers, 1996; Cotter & Peck, 2001). In addition, they have strong incentives to get actively involved in the implementation of strategies due to the fact that they are obliged to deliver a return to their investors in a limited time period (Cressy et al., 2007). There is limited evidence on the operating performance of PE-backed buyouts partly due to difficulties of collecting data during private status. The existing literature largely suggests that PE investors add value through specialisation (Cressy et al., 2007) and early PE-backed buyouts outperform non-buyout counterparts (Kaplan, 1989; Smith, 1990; Opler, 1992; Weir et al., 2015). Jelic and Wright (2011) find that PE-backed buyouts do not perform better than non-backed buyouts.

PE firms are known to be temporary investors. Most buyout specialists invest through closed-end funds which provide them a limited time to extract returns. Fenn et al. (1997) note that most investors commit capital to PE funds for "strictly financial reasons"; meaning that they expect to earn above-market return on their capital. Thus ability of PE firms to raise additional funds is dependent on delivering superior returns to their investors within a limited time period. To convince their limited partners that their funds are worthy of new capital commitments, PE firms need to produce a higher return than the average market return. Therefore they seek to maximise buyout performance and value. Literature show that markets view buyouts as promising transactions. A buyout announcement leads to increases in the stock price of takeover targets (Renneboog et al., 2007), and buyout firms perform better than their non-buyout counterparts (Holthausen & Larcker, 1996). The discussion produces the hypothesis below:

H3: Private equity backed buyouts perform better than non-backed buyouts.

### 3. Data and methodology

### 3.1. Data and sample selection

We benefit from two databases and various internet sources to collect data. A three-step procedure is followed to construct the sample. First, MBO transactions from 2000 to 2009 are obtained from Thomson One Banker (TOB). The choice to cease sample at 2009 is to have enough post-buyout years for performance investigation. Using merger and acquisitions module, the search results in 2,607 UK MBOs. This list contains information about deal date, deal value, target industry and deal synopsis. To identify our sample companies, we search each company on TOB and drop those that have missing information on PE backing status, past and future acquisitions on company information files, ending up with 601 transactions. For these 601 firms, we collect deal origin and PE sponsor information from deal synopsis. Separately, we obtain the list of secondary buyouts and PTP buyouts from TOB, cross check the samples and drop 46 matching PTP deals and 29 secondary buyouts.

Necessary financial data to examine operating performance is collected from FAME. To be included in the post-buyout performance sample, we require companies to have at least one year of data –excluding the deal year– after buyout. More generally, we collect data in a (-3, +5) event window which corresponds to maximum 9 calendar years around the deal. In many cases accounting items are inconsistently reported; repetitive figures in several consecutive years are common. We discard these years to ensure consistency of data. At the end, we drop 114 deals that lack data on FAME, leaving a final sample of 412 MBOs. The data is unbalanced panel, e.g. the number of observations is not equal across different years and variables. The number of observations changes for three reasons. First, buyouts originating from divestment of a parent company rarely report separate financial statements in pre-buyout years. More commonly, the parent's consolidated statements absorb their performance. Second, FAME provides access to accounting data of UK companies in the last 10 accounting years. This leads to a loss of pre-event data for early decade deals. Third, data attrition is high in the sample. In many cases, accounting items are intermittently reported across years. To illustrate these three issues, we report figures from operating income (EBIT). In our sample of 412 MBOs, EBIT is absent through three pre-buyout years in 119 deals (29%). An extreme example of missing data would be the cash flow statement. Cash flow from operations is missing through the entire event window in 217 (53%) of the companies, while EBIT is fully missing in 20 cases (5%) only.

Finally, we remove buyouts from the analysis in the years following their exit, if the exit occurs during (+1, +5) event window. We identify exit status, exit dates and routes through PE sponsor websites, www.unquote.com and www.angelnews.co.uk. We also check exit status via TOB merger and acquisitions, and London Stock Exchange new IPO admissions. Lastly, we collect acquisition data from information files downloaded from TOB. A total of 183 exits are identified through these sources.

## 3.2. Methodology

We construct two performance benchmarks following Barber and Lyon (1996). The first model of expected performance is a buyout firm's past performance. The second model employs industry adjusted performance. For the first model, we compute 3-year pre-buyout median for each ratio in order to use in performance benchmark. For the second model, we identify matching industry firms based on 2-digit SIC code, compute relevant ratios for each firm and industry. To construct industry control groups, we use the population of active and inactive private companies with available accounting data. Active and inactive samples are merged since benchmarking on active companies alone would overestimate industry performance, and vice versa. Table 1 shows definitions for the employed set of profitability, efficiency and growth variables to measure performance. The variables are constructed as follows: Profitability (ROA) = Earnings before interest and tax divided by total assets, profitability (ROS) = earnings before interest and tax divided by sales, leverage (LEV) = short term debt and overdrafts plus long term liabilities divided by total assets, sales efficiency (SEFF) = sales divided by total assets, employee efficiency (SEMP) = inflation adjusted sales divided by number of employees, asset growth (AGRO) = difference between total assets and 3-year median assets prior to buyout divided by their average, sales growth (SGRO) = difference between sales and 3-year median sales prior to buyout divided by their average, employment growth (EGRO) = difference between number of employees and 3-year median prior to buyout divided by their average. For industry adjusted performance models, growth ratios (AGRO, SGRO, EGRO) are computed as the difference between year t and t-1, divided by their average value following Boucly et al., (2011). This is due to differences between the two models; industry adjusted performance considers a cross-section of time while adjusting on pre-buyout performance involves time series.

**Table 1**. Variable definitions

| Variable | Source | Definition |
|---|---|---|
| MBO | TOB | A buyout acquisition led by members of incumbent management team as stated in deal synopsis provided by Thomson One Banker. |
| ROA | FAME | Earnings before interest and taxes in t divided by total assets in t. (F12/F70) |
| ROS | FAME | Earnings before interest and taxes in t divided by sales in t. (F12/F1) |
| LEV | FAME | Short term debt and overdrafts plus long term liabilities, divided by total assets. [(F52+F85)/F70] |
| SEFF | FAME | Sales in year t divided by total assets in year t. (F1/F70) |
| SEMP | TOB+FAME | Inflation adjusted sales in year t divided by number of employees in year t. |
| AGRO | FAME | The difference between total assets in t and 3-year median assets prior to buyout, divided by their average. |
| SGRO | FAME | The difference between sales in t and 3-year median sales prior to buyout, divided by their average. |
| EGRO | FAME | The difference between number of employees in year t and 3-year median prior to buyout, divided by their average. |
| AGRO, SGRO, EGRO (Industry adjusted perf) | FAME | For industry adjusted performance models, growth in assets, sales, profit and employment is computed as the difference between year t and t-1, divided by their average value. |
| Age | FAME | Natural logarithm of company age at the time of buyout |
| Size | FAME | Natural logarithm of inflation adjusted total assets prior to buyout. |
| ΔLEV | FAME | The difference in leverage between year -1 and year of buyout. |
| PE | TOB | A dummy variable that equals 1 if the transaction is PE-backed and 0 otherwise. |
| PreROA | FAME | Industry adjusted return on assets in the year prior to buyout transaction. |
| Divest | TOB | A dummy variable that equals 1 if the MBO is previously subsidiary of a parent company and 0 otherwise. |
| Crisis | TOB | A dummy variable that equals 1 for buyouts completed in 2008 and 2009, 0 otherwise. |
| Services | TOB | A dummy variable that equals 1 if the MBO company is in Business Services industry, 0 otherwise. |
| Lambda | Probit reg. | The probability of receiving PE-backing calculated from the first stage probit regression as inverse Mills ratio. |
| h1 | TOB | A dummy variable that equals 1 if the MBO is in Internet and Computers industry, 0 otherwise. Based on Gompers et al., (2008). |
| h2 | TOB | A dummy variable that equals 1 if the MBO is in Biotech and Healthcare industry, 0 otherwise. Based on Gompers et al., (2008). |
| h3 | TOB | A dummy variable that equals 1 if the MBO is in Communications and Electronics industry, 0 otherwise. Based on Gompers et al. (2008). |

## 4. Results

### 4.1. Descriptive statistics

Table 2 displays the number of MBOs across years and statistics for sample representation. We report Kolmogorov-Smirnov (K-S) test for sample representation and separately test equality of deal values for potential size bias. The population tends to have a higher number of MBOs in the early

years and the numbers tend to decrease towards the end of the decade[4]. The K-S statistic on yearly number of MBOs suggests significant difference between population and final sample (p=0.000). There are also differences regarding information disclosure between population and final sample. 43.7% of the population firms report deal values while this ratio is 51.7% in the final sample. However the difference in disclosure distributions is not significant (p= 0.152). The disclosure rates across years also suggest that PE firms are becoming more secretive about deals, reflected by a sharp decline from 55% disclosure rate in 2000 to 21% in 2009. The mean (median) buyout size, measured by enterprise value, is $88 ($16) million for population and $71 ($28) million for final sample. The sample median is considerably smaller than £30 million reported by Jelic and Wright (2011). PE-backed buyouts tend to be larger than non-PE-backed buyouts; however the differences in means and medians are not significant. The tests also suggest significant differences between the industrial distributions of population and final sample.

**Table 2.** Sample selection and distribution of deals across years

| Panel A | Number of deals | | | Transaction size | | | |
|---|---|---|---|---|---|---|---|
| | | | | % disclosure | | Total value | |
| Year | Population N | Final S. n | % of population | Population % | Final S. % | Population ($ millions) | Final S. ($ millions) |
| 2009 | 111 | 23 | 21 | 20.7 | 21.7 | 712.12 | 215.31 |
| 2008 | 173 | 23 | 13 | 30.0 | 39.0 | 2,713.42 | 518.94 |
| 2007 | 245 | 53 | 22 | 33.1 | 37.7 | 32,346.43 | 2,296.92 |
| 2006 | 253 | 61 | 24 | 32.4 | 42.6 | 8,253.97 | 1,562.58 |
| 2005 | 237 | 57 | 24 | 42.6 | 56.1 | 9,962.86 | 2,494.36 |
| 2004 | 280 | 50 | 18 | 47.9 | 64.0 | 14,760.86 | 2,386.63 |
| 2003 | 333 | 41 | 12 | 50.8 | 53.7 | 6,219.38 | 1,119.95 |
| 2002 | 287 | 38 | 13 | 46.0 | 60.5 | 5,635.63 | 1,719.45 |
| 2001 | 335 | 25 | 7 | 52.5 | 64.0 | 11,743.65 | 1,381.59 |
| 2000 | 353 | 41 | 12 | 55.4 | 68.3 | 8,283.09 | 1,321.91 |
| Sample | 2,607 | 412 | 16 | 43.7 | 51.7 | 100,631.4 | 15,017.6 |
| Panel B | K-S Test: Population vs. Final Sample | | | | | T test | MW Test |
| | All MBOs across years | Information disclosure across years | | By industry | | Mean | Median |
| Tests for equality | 0.000 | 0.152 | | 0.006 | | 0.420 | 0.000 |

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[4]　The decrease in deal numbers is in line with the UK trends reported by CMBOR (2010), which shows a declining trend in the number of deals starting with 536 MBOs in 2003 and ending with 262 MBOs in 2009.

Table 3 reports the exits and the distribution of exit routes across PE backing and source of buyouts. There are 253 PE-backed MBOs versus 159 non-backed MBOs in the sample. Full MBOs outnumber divestments, with 308 and 104 deals being buyouts of private firms and divestments respectively. Trade sales and secondary buyouts are the most popular exit routes, while the number of receivership and IPO exits is considerably smaller. PE-backed buyouts account for 80% of the all exits while non-PE-backed MBOs constitute 20% of exits. Interestingly, PE-backed buyouts stay in the original buyout form for longer periods. Unreported statistics show that median holding period is 48 months for PE-backed buyouts while it is 37.5 months in non-PE-backed buyouts. This finding contrasts with Jelic (2011) who reports that PE-backed buyouts tend to exit faster. IPO and receivership are the fastest and slowest exit routes respectively. Trade sale and secondary buyout exits occur around 4 years after the initial buyout transaction. 70% of all exits occur within five years after buyout transaction, 51% occur within four years, 37% within three years and 5% within one year. The median holding period for all exits is 47 months, which is longer than 36 months reported by Jelic (2011) and 42 months reported by Stromberg (2008). This pattern is expected due to characteristics of the period of interest in this study that exhibits an increasing trend for longer holding periods (Stromberg, 2008) and since arranging a successful exit has recently become more difficult (Bonini, 2015). In line with this scenario, the IPO route, which involves shorter holding periods relative to secondary buyout exits (Jelic, 2011) and often includes quick flips (Stromberg, 2008; Jelic 2011), is less frequently used in the recent UK buyout market (CMBOR, 2010). Only a fraction of total exits in our sample are going public buyouts while IPO exits constitute a larger portion in the past studies. For example, 42% of total exits are comprised of IPO in Jelic and Wright (2011) while in our study 4% of buyouts exit via IPO route. In sum, different sample and exit characteristics result in longer holding period for our sample MBOs.

**Table 3.** Exit routes across private equity backing and sources of buyout

| Type of exit | PE status | | Source of buyout | | All | % | TIMEX | |
|---|---|---|---|---|---|---|---|---|
| | PE | Non-PE | Full MBO | Divest. | | | Mean | Median |
| Trade sale | 62 | 21 | 57 | 26 | 83 | 2 | 48.5 | 50 |
| Secondary | 63 | 6 | 56 | 13 | 69 | 17 | 48.8 | 45 |
| IPO | 7 | 1 | 3 | 5 | 8 | 2 | 23.6 | 20.5 |
| Receivership | 14 | 9 | 18 | 5 | 23 | 6 | 52.2 | 51.5 |
| All exits | 146 | 37 | 134 | 49 | 183 | 44 | 48 | 47 |
| Non-exit | 107 | 122 | 174 | 55 | 229 | 56 | - | - |
| All | 253 | 159 | 308 | 104 | 412 | 100 | - | - |

TIMEX: Time-to-exit, measured as number of months in buyout form until exit.

### 4.2. Performance of management buyouts

Table 4 presents abnormal performance for the entire sample. In the first model only post-buyout performance can be measured since the performance is benchmarked on pre-buyout period. The results for industry adjusted performance are presented for (-3, +5) window. Our findings provide little evidence of improvements in profitability. Changes in return on assets are insignificant while positive changes in return on sales are small ($H_1$). Buyouts outperform industry firms in every year; however better-than-industry performance is not limited to post-buyout period. There is a tendency for improvements in profitability in the years leading to buyout, peaking at one year before the transaction, which could imply practice of earnings management prior to buyout. This result contrasts with Boucly et al. (2011), who find low pre-buyout profitability followed by 4% increase subsequent to transaction for a sample of French private-to-private LBOs. This pattern may also suggest that profitability plays a role in selecting the buyout target. Although this study does not distinguish between these two explanations, the evidence shows that post-buyout profitability remains superior in the long run. The findings on employee efficiency suggest slight improvements and consistently better utilisation of employees in both pre- and post-buyout periods than industry firms. There is a sharp deterioration in sales efficiency after buyout; which is attributable to the faster asset growth rate. The sample buyouts exhibit substantial growth following the transaction. The median buyout has 60% more assets and 40% more sales by the end of fifth year. The increase in assets is consistently significant in 5 years while sales growth stops after 3rd year. Similarly, buyouts exhibit significantly higher growth rates than industry for 3 subsequent years following the deal. In particular, employment increases by 24% in the first 3 post-buyout years and slightly declines afterwards. The median buyout displays approximately 4% higher employment growth than comparable firms in the first 3 years following buyout. The employment growth prior to buyout is small and insignificant, suggesting adoption of more growth-focused strategies subsequent to buyout.

Results partly support H1. Buyouts show positive performance changes in terms of return on sales, employee efficiency, and growth rates. However the magnitude of improvements appears to be smaller than first wave buyouts. In line with Boucly et al. (2011), the results suggest that post-buyout strategies are more growth oriented and put less focus on profitability and efficiency improvements. The results are also consistent with Jelic and Wright (2011) who find weak efficiency accompanied by high growth in sales and employment in UK buyouts. The results demonstrate that some of the changes in

performance are not unique to post-buyout period. Specifically, the increasing pattern of profitability prior to MBO indicates that buyout transaction alone cannot explain performance. In this regard, other potentially influential factors such as earnings management, mean reversion and PE-backing should be considered. Below we examine the performance of PE-backed MBOs in Table 5.

PE-backed buyouts do not improve profitability; yet they maintain superior profitability over comparable industry firms. The first three years have the highest abnormal performance, and profitability reverts to pre-buyout levels after fourth year. Both models suggest considerable deterioration in efficiency following buyout. Improvements in employee utilisation are not significant while sales efficiency drops below pre-buyout levels immediately after the deal. There is strong evidence of high growth in assets and sales; however these changes are limited to the first three post- buyout years. The table also reports Mann-Whitney p-values for the performance differences between PE-backed and non-backed MBOs in the third row of each variable. PE-backed buyouts have higher profitability starting from two years prior to buyout and persisting until the fourth post-buyout year. This finding implies that PE funds assess the prospects of their targets relative to their industries and tend to select those with promising potential. Overall, PE-backed buyouts consistently have higher profitability and growth ratios, but lower efficiency than pure MBOs. The results for profitability and growth are consistent with Cressy et al. (2007), but different from Jelic and Wright (2011) who find that PE-backed buyouts perform better only in terms of changes in employment. We find significant differences in profitability, efficiency and growth rates between PE-backed and pure MBOs. Therefore, H3 cannot be rejected. It is important to note that these differences are observed only in terms of industry adjusted performance, which does not measure performance changes or value added by PE funds. More importantly, differences in both profitability and efficiency are observed starting from up to three years prior to buyout. Hence it cannot be inferred that the observed differences are a result of PE-sponsorship.

## Table 4. Performance of management buyouts

|  |  | T-3 | T-2 | T-1 | T1 | T2 | T3 | T4 | T5 |
|---|---|---|---|---|---|---|---|---|---|
| ROA | PBA | - | - | - | 0.003 | -0.018 | -0.013 | 0.002 | -0.016 |
|  |  |  |  |  | (-.824) | (-1.437) | (-1.437) | (-.878) | (-1.415) |
|  | IndA | 0.048*** | 0.027*** | 0.066*** | 0.063*** | 0.058*** | 0.053*** | 0.050*** | 0.055*** |
|  |  | (3.657) | (3.91) | (8.01) | (7.828) | (7.116) | (7.253) | (6.552) | (5.282) |
| ROS | PBA | - | - | - | 0.009** | 0.006** | 0.005 | 0.009*** | 0.001 |
|  |  |  |  |  | (1.967) | (2.011) | (1.556) | (2.351) | (.657) |
|  | IndA | 0.018*** | 0.022*** | 0.036*** | 0.039*** | 0.034*** | 0.033*** | 0.030*** | 0.022*** |
|  |  | (3.225) | (3.412) | (7.154) | (6.628) | (6.561) | (6.785) | (6.098) | (3.909) |
| LEV | PBA | - | - | - | -0.014 | -0.04 | -0.048 | -0.042 | 0.003 |
|  |  |  |  |  | (-1.351) | (-1.583) | (-1.598) | (-1.431) | (.689) |
|  | IndA | -0.01 | -0.04 | -0.071* | -0.066 | -0.032 | -0.034 | -0.061 | -0.024 |
|  |  | (-.041) | (-.626) | (-1.67) | (-.582) | (-.034) | (-.087) | (-.903) | (.168) |
| SEMP | PBA | - | - | - | 6.14*** | 7.59*** | 8.66*** | 9.51*** | 11.39*** |
|  |  |  |  |  | (4.716) | (4.713) | (4.438) | (4.04) | (4.24) |
|  | IndA | 67.58*** | 85.11*** | 56.66*** | 46.75*** | 51.16*** | 57.32*** | 51.76*** | 50.91*** |
|  |  | (5.11) | (6.136) | (6.358) | (6.905) | (7.051) | (6.838) | (5.897) | (4.714) |
| SEFF | PBA | - | - | - | -0.06** | -0.17*** | -0.17*** | -0.11*** | -0.257** |
|  |  |  |  |  | (-2.023) | (-2.894) | (-2.569) | (-2.603) | (-1.91) |
|  | IndA | 0.264** | 0.236*** | 0.289*** | 0.168*** | 0.134*** | 0.147*** | 0.137*** | 0.459*** |
|  |  | (2.312) | (3.448) | (3.865) | (3.318) | (2.865) | (3.514) | (3.04) | (4.149) |
| AGRO | PBA | - | - | - | 0.266*** | 0.340*** | 0.434*** | 0.497*** | 0.591*** |
|  |  |  |  |  | (8.27) | (8.632) | (8.497) | (8.052) | (6.792) |
|  | IndA |  | 0.017* | 0.050*** | 0.028*** | 0.054*** | 0.044*** | 0.012 | 0.037 |
|  |  |  | (1.906) | (2.82) | (2.952) | (4.306) | (3.031) | (.925) | (.997) |
| SGRO | PBA | - |  | - | 0.264*** | 0.326*** | 0.424*** | 0.376*** | 0.404*** |
|  |  |  |  |  | (7.05) | (7.34) | (7.231) | (6.408) | (5.726) |
|  | IndA |  | 0.047*** | 0.021 | 0.044*** | 0.030** | 0.088*** | -0.001 | 0.043** |
|  |  |  | (2.688) | (1.486) | (3.118) | (2.027) | (4.377) | (-1.317) | (2.238) |
| EGRO | PBA | - |  | - | 0.108*** | 0.164*** | 0.239*** | 0.188*** | 0.230*** |
|  |  |  |  |  | (5.168) | (4.826) | (5.188) | (4.125) | (3.747) |
|  | IndA |  | 0.018* | 0.017 | 0.037*** | 0.033** | 0.047*** | -0.002 | 0.013 |
|  |  |  | (1.651) | (1.224) | (3.581) | (2.341) | (4.82) | (-.281) | (.578) |

*** p value <0.01; ** p value <0.05; * p value <0.10. z values in parentheses.

**Table 5.** Performance of PE-backed management buyouts

| | | T-3 | T-2 | T-1 | T1 | T2 | T3 | T4 | T5 |
|---|---|---|---|---|---|---|---|---|---|
| ROA | PBA | - | - | - | -0.015 | -0.023 | -0.023* | -0.002 | -0.027 |
| | | | | | (-1.606) | (-1.425) | (-1.789) | (-1.167) | (-1.597) |
| | | - | - | - | <[0.11] | <[0.45] | <[0.15] | <[0.35] | <[0.32] |
| | IndA | 0.054*** | 0.054*** | 0.090*** | 0.079*** | 0.078*** | 0.063*** | 0.061*** | 0.054*** |
| | | -3.737 | -4.273 | -6.896 | -6.276 | -6.594 | -6.305 | -5.506 | -4.663 |
| | | >[0.10] | >[0.00] | >[0.00] | >[0.04] | >[0.00] | >[0.10] | >[0.09] | <[0.90] |
| ROS | PBA | - | - | - | 0.012 | 0.008 | 0.007 | 0.013* | 0.005 |
| | | | | | -1.276 | (1.54) | -1.194 | -1.859 | (0.88) |
| | IndA | 0.036*** | 0.040*** | 0.055*** | 0.061*** | 0.052*** | 0.039*** | 0.047*** | 0.029*** |
| | | - | - | - | >[0.83] | >[0.99] | >[0.93] | >[0.88] | >[0.66] |
| | | -3.364 | (4.36) | (6.04) | -5.839 | -6.421 | -6.122 | -5.576 | -3.883 |
| | | >[0.07] | >[0.00] | >[0.00] | >[0.00] | >[0.00] | >[0.02] | >[0.02] | >[0.12] |
| LEV | PBA | - | - | - | -0.022 | -0.045 | -0.064** | -0.052* | -0.026 |
| | | | | | (-1.62) | (-1.456) | (-2.002) | (-1.913) | (-.502) |
| | | - | - | - | <[0.29] | <[0.51] | <[0.16] | <[0.19] | <[0.10] |
| | IndA | -0.006 | -0.071 | -0.073 | -0.021 | 0.003 | 0.003 | -0.060 | -0.021 |
| | | (.435) | (-.463) | (-.994) | (.532) | (.972) | (.535) | (-.698) | (.176) |
| | | >[0.63] | <[0.82] | <[0.67] | >[0.17] | >[0.21] | >[0.43] | >[0.90] | >[0.90] |
| SEMP | PBA | - | - | - | 4.62*** | 6.10*** | 8.12*** | 4.99*** | 10.62*** |
| | | | | | -3.508 | -3.256 | (2.73) | -2.653 | -3.251 |
| | | - | - | - | <[0.55] | <[0.05] | <[0.22] | <[0.32] | <[0.38] |
| | IndA | 38.47** | 33.02*** | 43.22*** | 25.24*** | 25.05*** | 35.42*** | 27.16*** | 25.65*** |
| | | (2.41) | -2.991 | -3.323 | (4.01) | -4.125 | -4.216 | -3.606 | -2.826 |
| | | <[0.02] | <[0.00] | <[0.00] | <[0.00] | <[0.00] | <[0.00] | <[0.02] | <[0.08] |
| SEFF | PBA | - | - | - | -0.061** | -0.18*** | -0.22*** | -0.12*** | -0.257** |
| | | | | | (-1.941) | (-2.458) | (-2.789) | (-2.683) | (-2.263) |
| | | - | - | - | <[0.55] | <[0.47] | <[0.27] | <[0.28] | <[0.32] |
| | IndA | 0.238* | 0.327*** | 0.30*** | 0.127** | 0.075 | 0.066** | 0.045 | 0.277** |
| | | -1.907 | (2.68) | -3.168 | -2.111 | -1.584 | -1.983 | -1.543 | -2.506 |
| | | <[0.48] | >[0.63] | >[0.64] | <[0.33] | <[0.34] | <[0.09] | <[0.11] | <[0.02] |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| AGRO | PBA | - | - | - | 0.303*** | 0.369*** | 0.484*** | 0.540*** | 0.599*** |
| | | | | | -7.248 | -7.242 | -6.941 | -6.531 | -5.907 |
| | | - | - | - | >[0.14] | >[0.24] | >[0.21] | >[0.15] | >[0.17] |
| | IndA | | 0.060*** | 0.086** | 0.045*** | 0.059*** | 0.058*** | 0.021 | 0.044 |
| | | | -2.604 | -2.506 | -3.123 | -3.692 | -3.474 | -1.443 | -1.539 |
| | | | >[0.05] | >[0.85] | >[0.09] | >[0.38] | >[0.03] | >[0.21] | >[0.24] |
| SGRO | PBA | - | - | - | 0.281*** | 0.358*** | 0.444*** | 0.442*** | 0.394*** |
| | | | | | -6.087 | -6.099 | -5.416 | -4.908 | -4.382 |
| | | - | - | - | >[0.15] | >[0.22] | >[0.64] | >[0.48] | <[0.82] |
| | IndA | | 0.042** | 0.030 | 0.047*** | 0.032 | 0.103*** | 0.016 | 0.021* |
| | | | -2.457 | -1.564 | -2.866 | -1.401 | -3.907 | (-.096) | -1.807 |
| | | | <[0.30] | >[0.48] | >[0.58] | >[0.90] | >[0.47] | >[0.08] | <[0.64] |
| EGRO | PBA | - | - | - | 0.129*** | 0.210*** | 0.234*** | 0.26*** | 0.23*** |
| | | | | | -4.852 | (4.25) | -3.825 | -3.357 | -2.634 |
| | | - | - | - | >[0.08] | >[0.19] | <[0.74] | >[0.37] | <[0.72] |
| | IndA | | 0.004 | 0.029** | 0.038*** | 0.018 | 0.047*** | 0.006 | 0.009 |
| | | | (.874) | -2.043 | -2.922 | -1.141 | -3.532 | (.809) | (.496) |
| | | | <[0.72] | >[0.08] | >[0.95] | <[0.33] | >[0.88] | >[0.09] | <[0.95] |

*** p-value <0.01; ** p-value <0.05; * p-value <0.10. z-values in parentheses. M-W p-values for the equality of PE-backed and non-backed samples are in brackets. ">" and "<" indicate superior and inferior performance of PE-backed buyouts.

Table 6 shows differences in full and divisional MBOs. Unreported tests show that full MBOs perform better than industry in terms of profitability, efficiency and growth with the exception of profit growth. The better performance in profitability and efficiency is maintained until fifth year, while growth ratios begin to decline after third post-buyout year. Notably, the increase in pre-buyout profitability peaks at one year before buyout and similar levels of profitability are preserved following the transaction. Divisional buyouts draw a less clear picture. Their pre-buyout profitability is inconsistent and post-buyout years are accompanied by decreasing profitability levels. Among two efficiency measures, only employee utilisation is significantly positive. There is also weak evidence of better post-buyout growth. The growth in assets and sales are significant in the first two years, while profit and employment growth are not significantly different from industry. This result is inconsistent with the view that divisions will grow fast following the removal of parental restrictions (Wright et al., 1994). Table 6 shows that, in general, full MBOs have better profitability, lower efficiency and higher growth than

divestments. However, the differences in performance are only marginally significant. Consistent with $H_2$, there is little significant difference between full MBO and divestment MBO performance.

**Table 6.** Full vs. divestment management buyouts

|       | T-3    | T-2    | T-1    | T1     | T2     | T3     | T4     | T5     |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| ROA   | <0.68  | >0.12  | <0.53  | >0.45  | >0.10  | >0.11  | >0.20  | >0.74  |
| ROS   | <0.92  | <0.55  | <0.29  | >0.23  | >0.12  | >0.14  | >0.08  | >0.81  |
| LEV   | <0.78  | <0.09  | >0.58  | <0.76  | <0.28  | <0.27  | <0.43  | <0.67  |
| SEMP  | <0.54  | <0.71  | >0.86  | <0.89  | <0.51  | <0.46  | <0.92  | <0.10  |
| SEFF  | <0.99  | >0.18  | >0.04  | >0.45  | >0.74  | <0.46  | >0.35  | >0.28  |
| AGRO  |        | >0.32  | >0.29  | >0.47  | >0.71  | >0.62  | <0.34  | >0.30  |
| SGRO  |        | >0.21  | >0.44  | <0.65  | <0.51  | >0.60  | <0.31  | <0.77  |
| EGRO  |        | >0.16  | >0.31  | >0.33  | >0.56  | >0.24  | <0.48  | >0.63  |

Table reports M-W p-values for the equality of full and divestment MBO samples. ">" and "<" indicate superior and inferior performance of full MBO subsample.

### 4.3 Differences-in-differences

In the prior section we examine MBO performance relative to pre-buyout company and comparable industry firms. Although these two measures of performance provide useful observations regarding pre-to-post buyout changes in performance and how MBOs perform compared to non-buyouts, they do not measure how MBOs perform relative to industry firms through time. To illustrate this point, pre-buyout adjusted performance measures changes through time and ignores how industry performs in the corresponding time period. In the same vein, industry adjusted performance ignores changes in time and measures performance relative to comparable firms at a point of time. In other words, pre-buyout adjustment considers only time-series while industry adjustment confines the analysis to cross-sections. Since our data carries the properties of an unbalanced panel, it is a sensible approach to combine these two dimensions and conduct a differences-in-differences analysis which will enable us to simultaneously measure performance relative to pre-buyout firm and industry.

Table 7 presents the differences-in-differences analysis for full sample MBOs. The performance is measured for post-buyout years only since the post-buyout performance is benchmarked on pre-buyout performance. Consistent with previous results, we find no significant improvement while there is evidence of deterioration in performance. While most measures show negative changes, the performance deterioration is most visibly manifested in the proxies for profitability (ROA), which is negative and significant in all

years except year 4, and sales efficiency (SEFF). In highly levered deals, the decrease in profitability can be attributed to debt repayments, which would have been represented by higher leverage in early years and lower leverage in later years. However, we do not observe this pattern in our firms. On the contrary leverage remains flat and low through most of the post-buyout period. Similarly, asset growth (AGRO) and sales growth (SGRO) are mostly negative and insignificant. The results suggest that non-listed buyouts are characterised by low leverage and growth. While they outperform the industry firms following buyout transaction, this result is not associated with performance improvements or the perception of buyout superiority (Jensen, 1989), rather they are mostly attributable to pre-buyout firm performance characteristics and when they are accounted for, significant drops in performance are observed.

**Table 7.** Differences in differences: full sample

|      | n   | T1        | T2        | T3        | T4        | T5         |
|------|-----|-----------|-----------|-----------|-----------|------------|
| ROA  | 173 | -0.011*   | -0.024**  | -0.033**  | -0.017    | -0.084***  |
|      |     | (-1.753)  | (-2.065)  | (-2.128)  | (-1.547)  | (-2.672)   |
| ROS  | 152 | 0.011     | -0.002    | 0.003     | 0.011     | -0.014     |
|      |     | (-0.344)  | (0.05)    | (-0.024)  | (0.966)   | (-1.27)    |
| LEV  | 138 | -0.011    | -0.035*   | -0.025    | -0.032**  | 0.025      |
|      |     | (-1.276)  | (-1.681)  | (-1.524)  | (-2.245)  | (0.823)    |
| SEMP | 142 | -5.061    | -9.684    | -5.449    | -10.089   | -3.741     |
|      |     | (-0.125)  | (-1.133)  | (-0.65)   | (-0.283)  | (0.566)    |
| SEFF | 152 | -0.068    | -0.177*   | -0.121*   | -0.167*** | -0.081     |
|      |     | (-0.903)  | (-1.942)  | (-1.822)  | (-2.746)  | (-0.949)   |
| AGRO | 169 | -0.003    | 0.01      | -0.033    | -0.045*   | -0.011     |
|      |     | (-0.418)  | (-0.425)  | (-1.095)  | (-1.603)  | (-1.07)    |
| SGRO | 113 | -0.026*   | -0.052*   | 0.013     | -0.029    | 0.084*     |
|      |     | (-1.932)  | (-1.68)   | (0.556)   | (-1.138)  | (1.874)    |
| EGRO | 105 | 0.001     | -0.042**  | 0.006     | 0.001     | -0.054*    |
|      |     | (-0.519)  | (-2.539)  | (-1.14)   | (-0.667)  | (-1.758)   |

*** p-value <0.01; ** p-value <0.05; * p-value <0.10.

The results for the subsample of MBOs with PE sponsors are presented in Table 8. Results of two sample tests for the equality of PE-backed and non-PE backed MBOs is also presented in the third row of each variable. Contrary to expectations, PE sponsors add little or no value to their portfolio firms. PE-backed MBOs show negative levels of profitability in all post-buyout years up to five years and significant differences are observed between PE-backed and non-backed MBOs in terms of ROA and employee efficiency, where the former underperforms the latter in both measures of performance. Note that

this result is observed despite the fact that PE-backed companies outperform both comparable non-buyout firms and non-backed MBOs in industry adjusted performance measures. The findings are consistent with evidence from Weir et al. (2015) and Guo et al. (2011) who find that value generation has become harder for recent buyouts. The results related to PE-backing are consistent with Jelic and Wright (2011) who show that PE firms do not improve profit and efficiency margins.

**Table 8.** Differences in differences: performance of PE-backed MBOs

|          | n  | T1        | T2         | T3         | T4         | T5         |
|----------|-----|-----------|------------|------------|------------|------------|
| ROA      | 98 | -0.051**  | -0.054**   | -0.064***  | -0.054**   | -0.162***  |
|          |    | (-2.302)  | (-2.181)   | (-2.983)   | (-2.144)   | (-2.603)   |
|          |    | <[0.061]  | <[0.088]   | <[0.013]   | <[0.092]   | <[0.020]   |
| ROS      | 86 | -0.001    | -0.008     | -0.014     | 0.002      | -0.041     |
|          |    | (-0.252)  | (-0.525)   | (-1.044)   | (0.187)    | (-1.185)   |
|          |    | <[0.682]  | <[0.298]   | <[0.117]   | <[0.366]   | <[0.350]   |
| LEV      | 80 | -0.022    | -0.058*    | -0.054**   | -0.045**   | 0.021      |
|          |    | (-1.353)  | (-1.601)   | (-2.174)   | (-2.194)   | (0.514)    |
|          |    | <[0.514]  | <[0.492]   | <[0.119]   | <[0.506]   | <[0.862]   |
| SEMP     | 81 | -9.375    | -20.442*** | -20.926    | -11.692    | -8.481     |
|          |    | (-1.448)  | (-2.941)   | (-1.502)   | (-1.401)   | (-0.747)   |
|          |    | <[0.058]  | <[0.005]   | <[0.166]   | <[0.189]   | <[0.086]   |
| SEFF     | 86 | 0.005     | -0.177     | -0.228**   | -0.267***  | -0.318     |
|          |    | (-0.381)  | (-1.285)   | (-2.056)   | (-2.731)   | (-1.412)   |
|          |    | >[0.696]  | >[0.905]   | <[0.264]   | <[0.267]   | <[0.245]   |
| AGRO     | 90 | -0.008    | 0.008      | -0.047     | -0.053     | -0.002     |
|          |    | (-0.424)  | (-0.353)   | (-0.52)    | (-1.305)   | (-0.889)   |
|          |    | >[0.877]  | <[0.895]   | <[0.778]   | <[0.596]   | <[0.787]   |
| SGRO     | 58 | -0.02     | -0.151**   | -0.056     | -0.076     | 0.004      |
|          |    | (-1.312)  | (-2.205)   | (-0.098)   | (-1.286)   | (0.135)    |
|          |    | >[0.876]  | <[0.144]   | <[0.472]   | <[0.470]   | <[0.220]   |
| EGRO     | 58 | -0.001    | -0.055**   | -0.08      | -0.018     | -0.091*    |
|          |    | (-0.554)  | (-2.236)   | (-1.602)   | (-0.48)    | (-1.68)    |
|          |    | <[0.806]  | <[0.489]   | <[0.186]   | <[0.991]   | <[0.599]   |

*** p value <0.01; ** p value <0.05; * p value <0.10. z values in parentheses, M-W p values for the equality of PE-backed and non-backed samples in brackets. ">" and "<" indicate superior and inferior performance of PE-backed subsample.

### 4.5. Determinants of performance

We examine value creation mechanisms by means of two-stage probit-ordinary least squares (OLS) regressions controlling for selection bias. Previously, our performance analysis indicated that PE-backed buyouts are significantly different from non-backed buyouts. Important to this finding is the superior pre-buyout performance of PE targets, which is likely to reflect

a selectivity issue in the sense that PE funds invest in firms with better profitability. To address potential selection bias in the sample, we employ a two-step regression commonly referred as Heckman procedure. The procedure involves estimation of a probit model to explain determinants of PE investment, where a PE dummy is dependent variable. Then the probability of receiving PE investment is calculated from the probit as the inverse Mills ratio and added to the following regressions as explanatory variable. We model PE-backing as a function of buyout origin, industry, age, pre-buyout profitability and size. The industry dummy (Services) is motivated by Stromberg (2008) who reports that buyouts are concentrated in traditional industries. The divestment dummy (Divest) is inspired by Wright et al. (1994) who project a stronger performance for divestments in the wake of the removal of parental restrictions. Pre-buyout performance variable (PreROA) is added due to the fact that PE-backed firms might target firms with superior profitability. Size variable (Size) is motivated by the fact that PE-backed buyouts tend to be larger than non-PE-backed buyouts (Stromberg, 2008). Finally, a company age variable is added to the right hand side since PE firms are more likely to invest in mature, late stage companies (Katz, 2009). All variables are defined in Table 1. This results in the following probit model:

$$PE_i = \alpha + \beta_1 Divest_i + \beta_2 Services_i + \beta_3 \operatorname{Pr}eROA_i + \beta_4 Age_i + \beta_5 Size_i + \varepsilon_i \qquad (1)$$

**Table 9.** Determinants of PE-backing

| Regressor | Coefficient |
| --- | --- |
| Divest | -0.069 |
|  | (-0.31) |
| Services | 0.585** |
|  | (2.34) |
| PreROA | 0.318 |
|  | (1.20) |
| Age | -0.261* |
|  | (-1.83) |
| Size | 0.185*** |
|  | (2.58) |
| Intercept | -0.894 |
|  | (-1.16) |
| Log likelihood | -131.041 |
| N | 204 |
| Wald Chi2 | 16.65*** |
| Pseudo $R^2$ (%) | 6.23 |

*** p value <0.01; ** p value <0.05; * p value <0.10. z values are in parentheses.

In the second stage regression, we model performance changes as a function of PE sponsorship, leverage (LEV), change in leverage (ΔLEV) and buyout origin (Divest). Dependent variables are changes in industry adjusted profitability (ΔROA), sales efficiency (ΔSEFF) and asset growth (ΔAGRO). Changes are measured from year -1 to the relevant post-buyout year (1st, 2nd, 3rd year). As in Guo et al., (2011) we control for pre-buyout ROA in profitability regressions. Following Jelic and Wright (2011) we also control for high growth industries (h1, h2, h3) since they might have different performance properties. Other controls include a size control and a crisis dummy is included to control for changes in recession years. Fitted probability of receiving PE investment (Lambda) is included to control for selection bias. The following model (5) is estimated with robust errors:

$$Perf_{it} = \alpha + \beta_1 \Pr eROA_i + \beta_2 PE_i + \beta_3 LEV_i + \beta_4 \Delta LEV_i + \beta_5 Divest_i + \beta_6 Size_i + \beta_7 Crisis_i + \beta_8 Lambda_i$$
$$+ \beta_9 h1_i + \beta_{10} h2_i + \beta_{11} h3_i + \varepsilon_{it}$$

The results of the probit are reported in Table 9. PE investment is positively associated with the size (LnSize) and industry (Services) of buyouts. The size and industry coefficients are significant at conventional levels while Age coefficient is only marginally significant.

Regressions for determinants of changes in profitability, efficiency and growth for three post-buyout years are presented in Table 11. The variation explained by models ($R^2$) ranges from 13.26% for efficiency regression to 76.19% for profitability regression. All models are significant at 1% level. The first three columns show that changes in profitability are associated with PE dummy, level of leverage and change in leverage. While the univariate tests do not show large and significant increases in leverage, regression results indicate that leverage and change in leverage are positively and significantly related to profitability. The large and positive coefficients on both variables imply that existence of debt exerts a disciplinary pressure on managers to perform better. Consistent with univariate results, PE-backing dummy is negatively associated with changes in profitability after controlling for selection bias. Although the negative coefficients are only marginally significant, they indicate that PE-backed buyout profitability is 14% and 24% less than non-PE-backed buyouts in year 1 and year 3. Buyout origin (Divest) appears unrelated to changes in profitability. The selection control lambda is significant at 1%, highlighting the importance of controlling for selection bias. Pre-buyout profitability and size controls are also significantly associated with changes in profitability. In the efficiency and growth models, only leverage change is significantly associated with performance. The coefficients on ΔLEV variable remain large

in both models; however they carry opposite signs. In the efficiency model, the positive sign of ΔLEV coefficient indicates that increasing debt levels have a positive effect on the sales efficiency. On the contrary, the negative sign of ΔLEV in growth model shows that increasing debt levels have an adverse effect on growth. Both results are consistent with Jensen's agency view of buyouts in the way that higher debt levels apply pressure on managers to create value through improving efficiency and allocation of cash to debt payments delays new investments and hamper further growth. They are also consistent with the results of Guo et al. (2011) and Cohn et al. (2014), who project a similar role for leverage in the post-buyout firm. Contrary to prior literature on divestment buyouts that they are likely to grow fast following buyout transaction (Wright et al., 1994) and improve efficiency (Meuleman et al., 2009), we find no significant relation between divestments, changes in growth and efficiency. Divestments are associated with growth only in the first year following buyout. Selection control lambda is only significant in profitability regressions, indicating that PE firms tend to target firms that have higher profit ratios relative to industry average. However, results do not show a significant role for PE firms in improving efficiency or facilitating company growth.

We repeat the regressions using raw performance changes (pre-buyout adjusted). The economic and statistical interpretation of the results remains the same. Lambda, however, becomes insignificant in the profitability model. This result is expected since PE selection is expected to be associated with relative performance with industry firms, rather than raw performance. We also repeat the tests excluding Heckman correction term Lambda. The results remain the same except for PE dummy which becomes significant at 1% level. This shows the importance of controlling for selection bias not to draw misleading conclusions.

Overall, the regression results are consistent with findings in univariate tests. We find that PE backing is not associated with performance improvements in terms of profitability and efficiency, and it is not significantly associated with growth. The main driver of performance appears to be leverage change which is significant in all regressions. Consistent with previous results, divestment buyouts are not associated with a differential effect on performance. The results related to PE-backing contrast with a major part of the prior literature (Kaplan, 1989; Smith, 1990; Opler, 1992) who find that PE firms improve performance by adding value. The results are more consistent with recent studies that show little or no improvements in performance following buyout (Desbrieres & Schatt, 2002; Guo et al., 2011; Jelic & Wright, 2011; Weir et

al., 2015). As discussed in the previous section, this outcome is attributable to distinct sample and buyout characteristics used in previous studies as well as potential mean reversion and earnings management.

## 5. Discussion and conclusion

This study examines the performance of management buyouts using 412 UK companies from the last decade. In recognition of the heterogeneity of buyouts, the study differentiates between various types of buyouts. The findings of this study are consistent with prior evidence that recent primary buyouts are characterised by less leverage and more moderate performance improvements. Based on the theoretical and empirical evidence, we propose and test three hypotheses. Results show that although buyouts outperform industry, they are not accompanied by performance improvements following MBO. Moreover, better-than-industry performance is not associated with buyout transaction; rather MBO candidates outperform comparable non-buyout firms starting from 2 years prior to buyout. Therefore H1 is rejected. MBO acquisitions are less levered in the last decade; yet leverage is a significant driver of post-buyout performance. The findings lend support to the proposition regarding the differences between divestment and full buyouts. We find that performance differences between full and divestment MBOs are minor and not significant in conventional levels. Hence H2 is supported. The hypothesis related to the contribution of PE funds is given support in terms of industry adjusted performance measures; however it is worth noting that PE-backed firms do not become profitable following MBO. On the contrary, ex-ante more profitable firms tend to be targeted by PE funds and ex-post they remain more profitable than non-backed buyouts even though their profitability levels decline. When this selection effect is controlled, their superiority disappears. Therefore H3, which projects a better performance for PE-backed buyouts, is rejected. The results related to PE-backing and buyout performance in general contrast with the overall tendency in the literature that projects a positive role for buyouts and PE funds (Kaplan, 1989; Opler, 1992). Our results are; however, more consistent with a developing literature that acknowledges buyout heterogeneity and recognises the utilisation of potentially upward biased samples in public-to-private buyouts (Desbrieres & Schatt, 2002; Meuleman et al., 2009; Jelic & Wright, 2011; Cohn et al., 2014).

**Table 10.** Determinants of post-buyout performance

| | ΔROA1 | ΔROA2 | ΔROA3 | ΔSEFF1 | ΔSEFF2 | ΔSEFF3 | ΔAGRO1 | ΔAGRO2 | ΔAGRO3 |
|---|---|---|---|---|---|---|---|---|---|
| PreROA | 1.518*** | 1.85*** | 1.828*** | | | | | | |
| | (3.27) | (3.46) | (4.61) | | | | | | |
| PE | -0.147* | -0.104 | -0.242* | 0.318 | 0.019 | -3.124 | -0.038 | 0.051 | 0.184 |
| | (-1.88) | (-1.28) | (-1.92) | (1.08) | (0.08) | (-1.21) | (-0.36) | (0.45) | (0.96) |
| ΔLEV | 1.38*** | 1.734*** | 1.454*** | 2.217*** | 2.298*** | 7.133* | -9.00*** | -7.62** | -1.26*** |
| | (4.31) | (4.54) | (4.46) | (3.1) | (3.49) | (1.6) | (-3.14) | (-2.49) | (-3.23) |
| LEV | 0.603*** | 0.852*** | 0.623*** | -0.065 | 0.058 | 2.119 | 0.114 | 0.204 | -0.071 |
| | (2.7) | (3.22) | (2.86) | (-0.18) | (0.16) | (1.05) | (0.63) | (1.00) | (-0.28) |
| Divest | -0.103 | -0.011 | 0.063 | -0.251 | -0.237 | -0.715 | 0.269** | 0.078 | -0.069 |
| | (-1.18) | (-0.13) | (0.51) | (-0.98) | (-0.92) | (-0.74) | (2.46) | (0.79) | (-0.38) |
| Lambda | 1.613*** | 1.958*** | 1.842*** | 1.006 | 1.167 | -6.889 | 0.279 | 0.371 | 0.391 |
| | (3.84) | (3.9) | (3.8) | (1.19) | (1.53) | (-0.47) | (0.91) | (1.41) | (0.77) |
| Size | 0.184*** | 0.219*** | 0.224*** | 0.104 | 0.167* | -0.249 | 0.052 | 0.026 | 0.018 |
| | (3.58) | (3.83) | (4.07) | (1.17) | (1.88) | (-0.82) | (0.98) | (0.64) | (0.27) |
| Crisis | 0.191* | 0.101 | | 0.322 | -0.185 | | 0.172 | 0.016 | |
| | (1.87) | (0.65) | | (1.22) | (-0.85) | | (1.26) | (0.12) | |
| h1 | -0.039 | -0.134 | -0.101 | -0.229 | -0.245 | -0.437 | -0.008 | 0.373** | 0.121 |
| | (-0.46) | (-0.91) | (-0.46) | (-0.98) | (-1.06) | (-0.28) | (-0.05) | (2.3) | (0.72) |
| h2 | -0.182 | -0.042 | -0.007 | 0.392 | 0.699 | 0.798 | -0.88*** | -0.45*** | 0.983* |
| | (-0.79) | (-0.31) | (-0.03) | (1.02) | (1.42) | (0.78) | (-3.15) | (-2.68) | (1.73) |
| h3 | 0.038 | 0.116 | 0.051 | 1.35 | 1.457 | -0.576 | -0.164 | -0.256 | -0.074 |
| | (0.25) | (0.67) | (0.24) | (0.79) | (1.09) | (-0.64) | (-1.01) | (-1.28) | (-0.27) |
| Intercept | -3.26*** | -3.99*** | -3.84*** | -1.94 | -2.644* | 9.352 | -0.819 | -0.605 | -0.638 |
| | (-3.84) | (-4.02) | (-4.28) | (-1.32) | (-1.92) | (0.74) | (-1.11) | (-0.98) | (-0.58) |
| N | 120 | 102 | 77 | 108 | 95 | 73 | 95 | 77 | 54 |
| Adj. R$^2$ (%) | 62.65 | 71.95 | 76.19 | 14.42 | 21.57 | 13.26 | 33.43 | 29.45 | 37.74 |

This table presents the results of cross-sectional regressions for determinants of post-buyout performance (equation 5). For dependent variables, changes are measured from year -1 to relevant post-buyout year (1$^{st}$, 2$^{nd}$, 3$^{rd}$ year). Variables are defined in Table 2. All models are estimated via OLS regressions with robust standard errors. *** p-value <0.01; ** p-value <0.05; * p-value <0.10. t-values in parentheses.

Aside from firm and sample characteristics, two other explanations can be provided for the observed performance patterns. One possible explanation is offered by Cohn et al. (2014) who show that performance improvements following buyout might be due to mean reversion in profitability rather than real improvements. In this scenario, lower post-transaction profit levels could be observed for buyouts with high pre-transaction profitability. Since PE funds tend to target more profitable companies before transaction, it is likely that the observed decline in profitability for PE-backed MBOs is due to mean reversion. In addition, accrual reversals could be driving performance changes following acquisition in the presence of earnings management. The literature shows that managers involved in MBO deals engage in earnings management prior to transaction (Perry and Williams, 1994). In either scenario, however, evidence points that last decade buyouts are not superior performers and little credit can be attributed to PE firms for their contributions in improving performance. Future studies can explore earnings management practice prior to private firm acquisitions and shed light on the effect of accrual reversals on performance. This may also help explain the high profitability preceding buyouts and distinguish between PE selection and earnings management scenarios.

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