

# Corporate governance of SMBOs: Is it really different?

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## **Abstract**

Based on a unique, hand-collected dataset of 262 UK SMBO deals, we analyze the relationships between changes in board composition and SMBO performance. We find that board size and the appointment of PE directors are positively associated with pre SMBO performance, especially growth. However, we find no evidence that the likelihood of top management change increases in buyouts with poor pre-SMBO performance. We also find that the presence of new PE directors can improve profitability in our full sample. Directors' skills are positively related to improvements in growth, but mainly in the PE-backed sample. Larger board size benefits to profitability in PE backed subsample and employment growth in non PE based subsample. The results are robust to sample selection bias.

**Keywords:** Corporate Governance, SMBO, Private Equity, Board of Directors, Performance

**JEL classification:** *G24, G32, G34*

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## 1. Introduction

Corporate governance engineering is viewed as an important element of the success of private equity (PE) backed buyouts in the last decade. Literature suggests that buyouts enhance corporate governance in two ways. First, via changes of board of directors (e.g. changing CEO/CFO, reducing boards' size, participation of PE firms on the boards, and more active involvement of boards in strategy (e.g. Acharya et al., 2010; Gong and Wu, 2011; Christian and Marc, 2011; Cornelli and Karakas, 2011)). Second, via alignments of managerial and shareholders incentives thus reducing agency costs (Jensen, 1989; Kaplan, 1989; Guo et al., 2011). Recently, the market has been marked by an increase in secondary buyouts (SMBOs) (CMBOR, 2012). The managerial and governance processes in generating gains in SMBOs appear to introduce major challenges compared to traditional buyouts that normally involve one-off investments (Siegel et al., 2011). Despite the increasing popularity of SMBOs there is paucity of research on their corporate governance processes.

SMBOs represent both an exit route from primary buyout structures and a new buyout form often backed by new PE investors and/or management. The recent popularity of SMBOs, and inevitable increase in longevity of buyout form, contradicts views suggesting that buyouts represent only a temporary governance model. For example, Rappaport (1990) argues that buyouts represent a shock therapy associated with one-step change in the governance. The effects of the changes are expected to be exhausted in the primary buyout stage (Wright et al., 2009). From this perspective, SMBOs are, therefore, not likely to achieve performance improvements based on the changes in corporate governance. On the other hand, SMBOs raise the need to reassess the way in which buyouts may be viewed as a long term organizational form as they suggest that the nature of the buyout form may need to change to ensure longevity and along with it the board expertise to deliver future performance (Achleitner et al., 2012; Cumming et al., 2007).

Recent literature, however, provides mixed evidence on post SMBO performance. For instance, Wang (2011) and Achleitner and Figge (2012) provide evidence that SMBOs have value creation potentials. By contrast, Zhou et al. (2013) find SMBOs performance worsen in terms of profitability, efficiency, and growth. Both Jenkinson and Sousa (2012) and Nikoskelainen and Wright (2007) report SMBOs' underperformance relative to buyouts exited via IPOs. Possible reasons for the improvements in the SMBOs performance may be

associated with the strategic entrepreneurship perspective (rather than agency perspective) that emphasizes managers and PE firms strong motivation to employ their idiosyncratic knowledge, skills, experience, and capabilities to exploit growth opportunities (Wright et al., 2000b; Meuleman et al., 2009; Cumming et al., 2008). PE firms, for example, may replace existing management to introduce more entrepreneurial managers and the change in financing structure on SMBO may enable management to obtain an increased equity stake that not only provides a greater incentive but also enables more discretion in implementing entrepreneurial decisions. Alternatively, SMBOs may provide opportunity to bring in new PEs with skills to take it to the next level due to the various PE firms' skills in various lifecycle phases of a company (Meuleman et al., 2009). The improvements in the performance may not be reflected initially in profitability but they may later be reflected in company's value.

None of the previous SMBO studies examine effects of specific corporate governance changes on the performance of SMBOs. We therefore, examine the relationship between SMBOs' corporate governance changes and SMBO performance. In particular we focus on the board of directors (i.e. board's size, changes in top management, the presence of new PE directors, and insider directors' skills). More specifically, we first examine the determinants of the post-SMBO board structure to investigate whether the structure tends to enhance the enterprising and service function. Then, we investigate whether the enhanced enterprising and service function can improve post-SMBO performance. Given the nature of SMBOs, they are private companies where the agency issues do not dominate (Uhlener et al., 2007). Moreover, SMBOs are originated from buyouts where, albeit existing, agency costs have already been reduced. Therefore, boards' enterprising and service function tends to be more important than their monitoring function.<sup>1</sup>

Our results show strong positive relationships between post-SMBO board size and the appointments of new PE directors with pre-SMBO growth. SMBOs with growth potential, therefore, require more directors with various idiosyncratic knowledge and skills, required to exploit the growth opportunities. We also document benefits of having a larger board size for

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<sup>1</sup> We do not include the proportion of independent outsiders which is a popular variable of corporate governance research, as it is hard to comprehensively collect this kind of data for UK private companies. Moreover, corporate governance literature does not support a direct relationship between the portion of outsiders and company performance. The most importance is that, according to Cornelli and Karakas (2011), buyouts reduce the proportion of outsiders dramatically. Especially, MBOs rarely employ outsiders in their board.

profitability (in the PE-backed subsample) and employment (in the non PE-backed subsample). More skilled inside directors can improve sales growth (in the full and PE-backed sample) and labour productivity (in the non PE backed subsample). The above results lend support to our hypotheses that boards' enterprising and service functions can improve post-SMBO performance.

Our findings extend the current literature in three key ways. First, we provide evidence for changes in SMBOs board structure and their effect on performance. Second, our findings contribute to the literature on longevity of buyout corporate form. Third, we contribute to the corporate governance literature on buyout organization. The studies on buyouts board are almost all from public-to-private LBOs. However, public-to-private LBOs only account for small proportion of buyout transaction, while most of them are private-to-private buyouts (including SMBOs). Even though public-to-private LBOs may share the same ownership structure as SMBOs, the board may be different due to their function focus. In public-to-private LBOs, PE firms mainly engage in board to eliminate free cash flow issues, while in SMBOs, directors' entrepreneur skills could become more crucial. Fourth, we further the understanding of director skills. The ownership transition in SMBOs leads to the board changing blood greatly, providing an opportunity to view the effects of changes in director skills.

The rest of this paper is structured as follows. Section two motivates hypotheses. This is followed by section three that describes data and univariate analysis. Section four presents results of multivariate analysis. In section five, we check for robustness of our results. Section six is conclusion.

## **2. Literature and hypotheses development**

### **2.1 Theory background**

It is recognized that corporate governance is not only about monitoring management that minimizing downside risk of shareholders, but also about enabling management to exercise enterprise in order to assure that shareholders benefit from the upside potential of companies

(Filatochev and Wright, 2005; Zahra et al., 2009). Correspondingly, corporate governance literature advocates that monitoring and advising are two most important functions of the board of directors (e.g. Raheja, 2005). The monitoring function stems from agency theory that suggests company and shareholders endowing directors, especially outsiders, right and responsibility to monitor, discipline, and remove ineffective managers, to ensure the shareholders' wealth maximization (Jensen and Meckling, 1976; Fama, 1980). The advisory function (or enterprising and service function as discussed in Uhlaner et al. (2007)) involves the directors (both insider and outsiders) bring valuable expertise and resources (Fama and Jensen, 1983; Guest, 2009). However, in the previous corporate governance literature, discussion on quality of board function mainly emphasizes on monitoring function from outsiders due to the manifest agency issues in public companies. Differing from public companies, private companies have less agency issues. The focus of board, therefore, should be shifted to its enterprising and service function. For example, Uhlaner et al. (2007) argue that the scope of corporate governance in privately-held companies should go beyond the traditional agency theory focusing on large publicly-listed companies.

This dual aspect of governance is especially important for SMBOs. According to agency theory, the superior of buyout organization, to a great extent, roots in the enhanced managerial incentive and PE firm's governance monitoring and intervene (e.g. Acharya et al., 2010; Gong and Wu, 2011; Christian and Marc, 2011; Cornelli and Karakas, 2011; Cornelli and Kominek, 2012; Jensen, 1989; Kaplan, 1989; Guo et al., 2011). Via primary buyout phase, the benefits from eliminating agency issues have already be achieved by the first round investors (Wright et al., 2009), especially the first 2-3 years (Wiersema and Liebeskind, 1995). SMBOs continue the buyout organizational form, implying that eliminating agency issues should not be the main way in which the investors can achieve the performance improvement. The improved monitoring function of board, albeit demanded, may be not as important as primaries. Moreover, the management entrenchment issues and loosened of PE firms control caused by increasing managerial ownership may lead to worse post-SMBO performance. However, the current mixed evidence in post-SMBO performance, especially the outperformance evidence (Wang, 2011; Achleitner and Figge, 2012), reveals the drawbacks of agency theory.

The strategic entrepreneurship perspective, as suggested by Meuleman et al. (2009), may be more useful approach in SMBOs, which can also support the enterprising and service function of board. Strategic entrepreneurship perspective, known as the resource-based view, is a complementary to the limitation of agency theory (Makadok, 2003), by involving opportunity- and advantage- seeking behaviours (Ireland et al., 2003). This perspective assumes that opportunity- and advantage- seeking behaviours based on resources heterogeneity and immobility create the competitive advantage (Priem and Butler, 2001), so that they can lead to the performance generation by exploiting growth opportunities (Ireland et al., 2003). As argued by Meuleman et al. (2009), in buyout context, resources heterogeneity and immobility are related to the idiosyncratic knowledge, skills, experience, and capabilities of existing managers, PE firms, and the specialist expertise of PE firms. Not only do buyouts use strong governance to motivate management to utilize these resources (Wright et al., 2009), but also employ the heterogeneous sources from PE firms and their experts.

Given the achievement of optimal monitoring function of board and management incentive in primary buyout, the breakthrough for SMBOs may be the enhancement of the enterprising and service function of board. There are two reasons. First, most of SMBOs are small-medium companies which may be in the expansion phases. The role of board, thus, may change as SMBOs develop over their life-cycle, as suggested by Filatochev and Wright (2005). Second, as the nature of SMBOs, the main difference between SMBOs and primary buyouts in corporate governance may be the board of directors. The transition in ownership could result in substantial changes in directors. According to strategic entrepreneurship perspective, there is heterogeneity of directors' knowledge, skills, experience, capabilities, and resources. The investors could replace inefficient directors with directors who possess knowledge, skills, experience, and capabilities that are more suitable to the SMBO phases to facilitate improving performance through pursuit of growth opportunities. The resources and capabilities required by SMBOs may be from PE directors (Dimov and Shepherd, 2005; Meuleman et al, 2009), new top management, and/or motivated inside employees, especially influential inside directors (Meuleman et al, 2009).

## **2.2 Board of directors in SMBOs**

### *2.2.1 Board size*

Board size attracts much attention when investigate the efficiency of board of directors. Although more outsiders can improve the monitoring and advisory functions of board, Jensen (1993) and Lorsch (1992) suggest that small boards could be more effective than large boards. They argue that large boards could cause agency problems such as director free-riding within the board and the board becoming more symbolic and less a part of the management processes. Consistent with this view, the existing empirical evidence demonstrates negative relationship between board size and companies' performance (Yermack, 1996; Eisenberg et al., 1998; O'Connell and Cramer, 2010). Jensen (1993) and Lipton and Lorsch (1992) suggest the optimal board size of seven to nine directors. Although buyouts tend to have smaller boards both when firms go private (Cornelli and Karakas, 2011) or when they revert to public (Gertner and Kaplan, 1996), consistent with a move towards better corporate governance, the decreases is at expenses of replacing outsiders with insiders or reducing them to zero, especially in MBOs (Cornelli and Karakas, 2011). As a consequence, the monitoring and enterprising and service functions may be weakened, due to the positive relationship between company performance and percentage of outsiders (e.g. Cadbury, 1992; O'Connell and Cramer, 2010). SMBOs may adjust the board size to some extent to achieve the optimal board size to improve the company performance. When the company is at expansion phases, the investors (e.g. PE firms) could employ outsiders to help growth, the board size will increase. Thus, we expect,

*Hypothesis 1a: The board size is significantly associated to company's previous growth performance.*

*Hypothesis 1b: Board size of SMBO is significantly positive to post-SMBO abnormal performance.*

### *2.2.2 PE specialists on board*

Studies of board in PE backed buyouts have indicated that PE firms would appoint specialists to sit on the board (PE directors) (Rosenstein, 1988; Lerner, 1995; Fried et al, 1998; Gabriellsson and Huse, 2005). The presence of PE specialists on board may effectively

monitor the company's executives to focus their efforts (e.g. Fried et al, 1998; Jenter and Kanaan, 2010) or provide valuable resources from their previous experience and network to complement the lack of inside managers (e.g. Politis and Landstrom, 2002). When the target companies more need their expertise, the presence of PE specialists on board will increase (Lerner, 1995; Christian and Marc, 2011; Cornelli and Karakas, 2011). Via the impact of PE specialists, the board is more efficient and the company's performance can obtain improvement (Cornelli and Karakas, 2011).

With respect to SMBOs, on the one hand, if the company performs worse (profitability) in the primaries, in order to ensure that exit targets are met, new PE firms in SMBOs may replace current PE directors with new PE specialists to enhance the monitoring function. On the other hand, the growth of SMBOs may require more growth opportunities. Under this circumstance, new PE specialists with new resources or increased PE directors' percentage may be more suitable to the development of SMBOs, especially, when the primary PE firms exits because their effort could not create value any more (Cumming and MacIntosh, 2003). Hence,

*Hypothesis 2a: SMBOs with poor previous profitability or better growth performance are more likely to appoint new PE directors.*

*Hypothesis 2b: The presence of new PE directors<sup>2</sup> can significantly improve post-SMBO performance.*

### *2.2.3. Changing top management*

One of the most important tasks of the board is to monitor and choose the CEO (Mac, 1986). This is because CEO's ability, preferences, and decisions impact company performance (Bertrand, 2009; Bertrand and Schoar, 2003). If a CEO performs poorly, for instance entrenching he in his positions, the company would underperform (Bebchuk et al., 2008).

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<sup>2</sup> We also conduct the regression by using percentage of PED and changes in percentage of PED, the results are all insignificant, suggesting that monitoring management would not be a driver of abnormal performance in SMBO phase.



Studies find companies with poor performance tend to replacing CEO (Hermalin and Weisbach, 2003). After changing CEO, the performance is generally improved because of the strategic changes and right decisions (e.g. Weisbach 1995; Denis and Denis, 1995).

Changing top management (CEO and/or CFO) is also a crucial tool often used by PE firms after investment (Wright, et al., 2009). New boards especially with representation of PE firms are in better position to change the CEO and/or CFO especially if buyouts are facing difficulties (e.g. Kaplan and Minton, 2008; Christian and Marc, 2011; Cornelli and Karakas, 2011; Acharya et al., 2010; Gong and Wu, 2011). SMBOs are still PE owned so that the same kind of model may be applied. When SMBOs underperform before transaction, the ineffective CEO and/or CFO may be replaced with more experienced CEO and/or CFO who can execute the performance improvement plan. Therefore,

*Hypotheses 3a: SMBOs with poor previous performance are more likely to change CEO and/or CFO.*

*Hypotheses 3b: Changing CEO/CFO can significantly improve post-SMBO performance.*

#### *2.2.4 Inside directors<sup>3</sup>, skills*

Given the majority of inside directors on the board in SMBOs and the importance of enterprise function of the board, it seems reasonable to examine the impact of changes in inside director skills from primary buyouts to SMBOs, as inside directors are heterogeneous in their effects on performance (Ronald et al., 2011). Following Ronald et al. (2011), we use independent outside directorships as a proxy for inside director skills to identify potentially important differences among inside directors. Recent research finds evidence that supports the importance of the labour market for directors in identifying highly skilled managers (Brickley et al., 1999; Fich, 2005; Fich and Shivdasani, 2007; Ronald et al., 2011). To retain their competitive advantage in labour market, directors with outside appointments must continue to demonstrate their strong decision management skills, increasing their

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<sup>3</sup> Inside directors are defined as employees of the company.

attractiveness to their own board (Fame, 1980; Yermack, 2004; Ronald et al., 2011). The effort will result in company performance improvement. For instance, Ronald et al. (2011) find that board with inside directors that have outside directorships are more effective, resulting in better firm operating performance. On the other hand, the outside directorship of these inside directors enhances their experience on operating company and enables them to access more resources via expanding their network (Walsh, 1995). Outside directorship provide inside director a vehicle for learning both from their experience and other directors (Useem, 1982; Davis, 1991; Carpenter and Westphal, 2001). As a consequence, their enhanced skills are likely to increase the company's performance and the possibility of exploiting growth opportunity of their home companies. Hence,

*Hypotheses 4: SMBO with insider directors with independent outside directorship is significantly positively associated to the post-SMBO abnormal performance.*

### **3. Sample selection and data description**

#### **3.1 Data collection**

Using CMBOR, Thomson One Banker, and Zyphyr databases, we identify 612 UK SMBOs from 2000 to 2007, including entry and exit dates and PE backing. There are two reasons to use UK data. First, UK PE market is the second dynamic in the world, following United States. Second, all the UK companies are required to offer accounting reports and details of board of directors and shareholders every year. We stop in 2007 in order to have enough years to observe after event performance of the SMBO. We collect the accounting information for SMBOs from Fame database. We exclude companies from finance sector due to the different accounting report.

We then collect information for board of directors and managerial ownership. Buyout organizations have a complex ownership structure, with several layers of companies. For instance, in some cases, the target company which was originally taken private in both primary and secondary buyouts is wholly owned by a new company which is usually created as 'empty shell' company at the time of buyouts. The management and PE firms therefore

hold the shares of the ‘empty shell’ company. In other cases, there are several layers of new created companies at the transactions time or in the following years, causing that the ownership structures are changing over time. The management and PE firms therefore also hold the shares of the ultimate holding company. Thus, we establish the ownership structure of target companies from -3 year prior to 3 years post SMBO using approach from Cornelli and Karakas (2011), by using Fame and annual returns<sup>4</sup>.

We manually collect data on the information of boards, according the ownership structure, from <https://www.duedil.com/>, annual returns, annual accounts, Amadeus, and Nexis UK.<sup>5</sup> We compare the boards of target companies and the boards of their holding companies. This is because the board of the target company may be very small (1 or 2 directors as a symbolic), while all the important decisions are made by the relevant board in the wholly holding companies or the ultimate holding company. Indeed, there is overlap between these boards. Specially, in some cases all the directors of target companies take seats in the board of the holding company where PE specialists and other affiliated outside directors (e.g. lawyer and consultant) also sit on. If the board of holding company includes outside directors or directors related to PE sponsors, we identify this board as the relevant board. In other cases, boards of target companies are larger than boards of holding company and including all the directors of them. For these cases, we identify the board of the target company as relevant board.

To identify the board composition, we conduct the following process. First, we identify the directors whose function in the board is venture capitalists or private equity specialists, or who are also directors or employees of PE firms or directors (function as fund manager, investment banker, or consultant) of companies backed by the same PE firms as directors from PE firms. Second, we classify the directors whose function in the board is investment banker, chartered accountants, solicitor, lawyers; businessman, consultant, non-executive director, and non-executive chairman, directors of invest companies, and directors who are executive directors of other companies as outside directors. However, we cannot classify all the directors into insider and outside groups due to the lack of data on private companies.

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<sup>4</sup> UK companies are required to offer details of board of directors and shareholders in annual returns every year.

<sup>5</sup> Amadeus offers current and previous directors, management, and staff information. Nexis UK provides part biography information of directors and individuals.

Thus, we exclude the cases with unknown directors related to the independent variables in our regressions. Third, we define inside directors as CEO, executive chairman, president, vice president, CFO, COO, managing director, finance director, sales director, operating director, manager, marketing director, general managers, company secretary, executive directors of subsidiaries, and other executive directors. We then collect information on changes in top management in the transaction years. There are some cases that do not have CEO and CFOs. For these cases we identify executive chairman and managing director as top management. For some cases that do not have any of these directors, we view them as cases that do not change top management. Finally, we extract the independent outside directorship of insiders from Keynotes, <https://www.duedil.com/> and <http://company-director-check.co.uk/>. We can collect data on independent outside directorship for some inside directors. Independent outside directorship is defined as holding seat in the board of unaffiliated companies. For the rest, we classify the companies of which none of the directors in inside director's home board are block holders, which are not in the same corporate group as inside director's home company, and which do not have other observable relationship with directors or the home company as unaffiliated companies.

For to the managerial ownership, we use Amadeus and Nexis to cross-check senior management's ownership stakes. We check ownership stakes of the senior managers' family members. The family members' stakes are included in the stakes of respective senior managers. Some managers use their trustee to invest, so include these investments when calculating their ownership stakes. After combining these different data sources, we obtain a sample of 262 UK SMBOs with 172 PE backed SMBOs and 90 non PE backed SMBOs.

Panel A in Table 1 presents the distributions of the sample SMBOs from 2000 to 2010, by entry, exit, and PE backing. This panel demonstrates that although there is a small decrease from 2002 to 2003, the number of entry SMBOs increased from 2000 (except from non-PE backed SMBOs), consistent with other worldwide (e.g. Sousa, 2010; Bonini, 2011) and UK (Jelic, 2011; Zhou et al., 2013) studies. This Panel also demonstrates an increasing trend in the number of exits from SMBOs from 2002 to 2007. During 2007 to 2009, the number of exits from SMBOs decreased sharply but returned to pre-crisis levels more recently.

*(Insert Table 1 here)*

The results of our sample industry distribution by PE backing are reported in Panel B of Table 1. We classify our sample buyouts into 9 broad industries, in line with the technology and management expertise in venture capital industry (Gompers et al., 2008): Internet and Computers, Communications and Electronics, Business and Industrial, Consumer, Energy, Biotech and Healthcare, Financial Service, Business Service, and all others.<sup>6</sup> Business Services (38.93%) is the largest industry group in our sample, followed by Consumer (24.05%) and Business and Industrial (22.90%). PE backed SMBOs tend to be more popular in consumer while less popular in Business and Industrial. The results of a Kolmogorov-Smirnov (K-S) test, however, suggest same industry distribution of sample SMBOs.

## **3.2 Variables<sup>7</sup>**

### *3.2.1 Dependent variables*

As mentioned above, the performance improvement after SMBOs will be not only based on agency theory but also strategic entrepreneurship perspective. Agency theory focuses on profit maximization that can not explain all sources of performance improvement, while strategic entrepreneurship perspective focuses on the growth opportunity that complements to profit maximization. Therefore, we use several measures of performance. Profitability, as an important element of value creation (Acharya et al., 2010), may increase due to the improved governance efficiency. To measure profitability, we use return on assets (ROA) and returns on sales (ROS). Though profitability is crucial, it cannot capture all behaviour aspects motivated from agency and strategic entrepreneurship. We, hence, employ labour productivity (SALEMP) and growth ratios. Following Meuleman et al. (2009), this study adopts sales growth (SALG) and employment growth (EMPG) as the variables for companies' growth. Sales growth captures growth in additional revenue creation while employment growth captures the growth in labour resources. We use changes of these measures from pre- to post- transaction period (abnormal performance) as our dependent variables. All the measures are industry adjusted in order to control for industry-wide factors.

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<sup>6</sup> For more details, please see Zhou et al. (2013).

<sup>7</sup> Definitions of all variables are presented in Table 2.

### 3.2.2 Control variables

We include several control variables related to companies' performance in our regression analysis. We control for other two important governance mechanisms following buyouts: managerial ownership and leverage (gearing), since our study emphasizes on the impact of board. We also control for busy directors (MOD), as too many independent outside directorships (more than three) may decrease their attractiveness to their own board (Fich and Shivdasani, 2006). According to Achleitner et al. (2012), SMBOs may reinforce management incentive via increased managerial ownership, resulting in performance improvement (MGTSHARE). Studies have shown 'hot' credit market condition is one of the main motivations of SMBOs. High leverage of SMBOs is inevitable to become an incentive factor to improve performance (GEAR). Companies' size (SIZE) is taken into control for the scale effect. Larger companies may be profitable than smaller ones, while smaller ones may have more opportunities to grow. Our period for performance covers the recent financial crisis period. To take this into account, we include a dummy variable for crisis years. The pre-SMBO underperforming companies may have greater improving in performance after SMBOs. Hence, we control for the previous performance ratios (ROAt-1). Duration (DURATION) measures the holding period in SMBOs, controlling for the longevity of buyout effect. The longer the holding period, the less the performance can be improved. All results are based on winsorized data<sup>8</sup>.

### 3.3 Descriptive statistics and univariate analysis

Table 3 presents descriptive statistics and univariate analysis of variables on board of directors. From Panel A, we can see that the board size does not change significantly after SMBO for both full sample and PE backed subsample. The number of directors significantly decreases by 1 person from 5 persons in non PE backed subsample. PE backed SMBOs seem to decrease the percentage of directors who hold the company shares, while non PE backed SMBOs are opposite. This is consistent with the results of managerial ownership<sup>9</sup>. It should be noticed that there are more directors employed by PE firms in SMBO phase, after

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<sup>8</sup> The winsorizing is performed by setting the observations below the first and above the 99th percentile to the values at the first and 99th percentile.

<sup>9</sup> The results are available from the author.

controlling for board size. Meanwhile, the percentages of non PE outside directors decrease significantly. We can also infer that the inside directors account for the majority, no matter including or excluding unknown directors. Panel B also shows no significant difference between pre- and post- proportions of SMBOs with inside directors who have at least three or at least one independent outside directorships. However, when excluding the unknown directors from inside director group, we can observe that the proportion of SMBOs with inside directors who have at least one independent outside directorships increase significantly. This suggests that inside directors in SMBO phase may have more experience or better entrepreneur skills than those in primary buyout phase. Panel C reports that 113 SMBOs (43.12% of full sample and 66.08% of PE subsample) appoint new PE directors into the board. There are 121 (46.18%) SMBOs change top management in transaction years. PE backed SMBOs are more likely to change top management, compared to non PE backed SMBOs.

*(Insert Table 3 here)*

Table 4 shows the abnormal performance of SMBOs up to three years after transaction. As suggested by previous studies (Jain and Kini, 1994; Jelic and Wright, 2011), we adopt the median performance in the 3 years before transaction as a measure of the pre-SMBO performance.<sup>10</sup> We compare the performance in each year post event with the pre-SMBO performance, for a period up to three years.<sup>11</sup> Our expected performance model is based on both the ‘level’ and ‘change’ models suggested by Barber and Lyon (1996). The ‘level’ model uses a company’s 3-year median pre-SMBO performance as expected performance. The ‘change’ model uses the industry’s 3-year pre-SMO median performance as the benchmark. The results from ‘level’ model demonstrate significantly decreases in performance, except from labour productivity, after transaction. Nevertheless, when we control for industry-wide factor, SMBOs underperform in labour productivity, while the significant underperformance in sales growth disappears. These results strength the reason why we use industry adjusted abnormal performance ratios for regressions. Finally, the results show a decrease trend in all the performance measures, suggesting the SMBOs perform worse over years after transaction.

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<sup>10</sup> We exclude the event year 0, as it includes both pre-and post- event operations which are difficult to distinguish.

<sup>11</sup> T is taking values for 1 to 3.

(Insert Table 4 here)

Table 5 presents descriptive statistics and univariate analysis of other company characteristics. There are several notable things. First, the managerial ownership accounts for about 60% on average (59% in median) in full sample, suggesting high managerial ownership in SMBOs. Second, we observe significant differences between PE backed and non PE backed subsamples for all variables. PE backed SMBOs have lower managerial ownership while higher leverage than non PE backed SMBOs. Also, PE backed SMBOs perform better in profitability and sales growth before transaction. PE backed SMBOs seem to larger while stay shorter, compared to non PE backed SMBOs.

(Insert Table 5 here)

## 4. Main results

### 4.1 Determinants of board structure

To examine the factors influencing SMBO's choice of the board structure, we use the following two regressions:

$$LNBS_{t+1,t+3} = \alpha + \beta_1 SALG_{t-1,t-3} + \beta_2 ROA_{t-1,t-3} + \beta_3 SIZE + \beta_4 GEAR_{t+1,t+3} + \beta_5 MGTSHAR_{t+1,t+3} + \varepsilon_{it} \quad (1)$$

$$New\ PED\ (MGTCHAN) = \alpha + \beta_1 SALG_{t-1,t-3} + \beta_2 ROA_{t-1,t-3} + \beta_3 SIZE + \beta_4 GEAR_{t+1,t+3} + \beta_5 MGTSHAR_{t+1,t+3} + \varepsilon_{it} \quad (2)$$

Equation (1) is OLS regression while equation (2) is probit regression<sup>12</sup>.  $SALG_{t-1,t-3}$  and  $ROA_{t-1,t-3}$  are independent variables to indicate the company's pre-SMBO growth and profitability performance. Following prior board structure studies (e.g. Coles et al., 2008; Wintoki et al., 2012; Gong and Wu, 2011), we use company size and median leverage 3 years after SMBOs as control variables. We introduce one more control variable: median managerial ownership 3 years after SMBOs. First, high level of managerial ownership is a

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<sup>12</sup> Both probit and logit regressions are suitable to our dataset, according to Hosmer-Lemeshow goodness of fit test. The results of logit regressions are quite similar to those from probit regression.



special characteristic of SMBOs. Second, high level of managerial ownership may prevent from large board size, adding new PE directors, and changing top management (Cornelli and Karakas, 2011).

The results are presented in Table 6. F test and Wald test indicate the independent and control variables in all three models are jointly significant and R-squared indicates that the models reasonably fit to the data. In model with dependent variable of board size, there is significantly positive relationship between pre-SMBO growth performance and board size, supporting our hypothesis 1a. The results also show that pre-SMBO profitability, company size, and leverage have significant positive impact on board size, consistent with previous studies on board size (Coles et al., 2008; Guest, 2009; Wintoki et al., 2012). These results suggest that SMBOs with better previous profitability may be larger after transaction, resulting in larger board size as suggested by Fama and Jensen (1983). The higher leverage which indicates the higher leverage suggests more outside directors employed by creditors.

In model with new PE directors, the results also show significantly positive relationship between pre-SMBO growth performance and the likelihood of the presence of new PE directors, supporting hypothesis 2a. The finding supports our conjecture that PE firms appoint PE specialists as directors when the SMBOs are at expansion phase. Moreover, the results show managerial ownership has a significantly negative influence on the likelihood of adding new PE directors, suggesting that the more managerial ownership, the less like PE firms appoint PE specialists as directors.

Interestingly, in model with top management change, the results show positive impact of previous profitability performance, indicating that SMBOs with better previous performance are more likely to replace the top management. This result is inconsistent with our hypothesis 3a and previous results (Gong and Wu, 2011). One interpretation may be that some top managers are replaced for bad luck. The alternative interpretation may be that the increase managerial ownership provides more vote power for non-CEO insiders who may replace CEOs on behalf of their own benefit, despite of the previous performance of CEOs.

(Insert Table 6 here)

Overall, SMBOs previous performance, especially the growth performance, drives the post-SMBO board structure. Board structures in SMBOs phase seem to enhance the enterprising and service function to improve the SMBOs' performance.

#### 4.2 The influence of board structure on post-SMBO abnormal performance

To test our hypotheses on the influence of board structure on post-SMBO abnormal performance, we use random effects GLS regression. Our preference for the panel method over standard OLS is due to the fact that the panel method utilizes data from the entire post event (i.e. SMBO) period while OLS relies on data from only one post event year. In addition, the panel data method takes into account the effects of estimation error due to the correlation of the residuals across firms (Fama and French, 2001)<sup>13</sup>. In order to correct for heteroskedasticity of standard errors, z-statistics are based on robust standard errors. We also omit variables that cause multicollinearity problems.

$$Ratios_{it} = \alpha + \beta_1 LNBS_{it} + \beta_2 MGTCHAN_{it} + \beta_3 New\ PED_i + \beta_4 OD_{it}^{14} + \beta_5 MGTSHAR_{it} + \beta_9 PE_i + \beta_{10} SIZE_i + \beta_{11} Crisis_{it} + \beta_{12} DURATION_i + \beta_{13} GEAR_{it} + \beta_{14} ROA_{it-1} + \beta_{15} MOD_{it} + \varepsilon_{it} \quad (3)$$

The results are presented in Table 7. R-squared of models varies from 7% (estimates for *AROS* and *ASALG*) to 9% (estimates for *ASALG*). Wald Chi2 is statistically significant in models for all performance proxies except for *AROS*. Our results demonstrate that SMBOs with new PE directors have better performance in AROA model. Similarly, more skilled inside directors can help improve the growth performance in the *ASALG* models. These two results are consistent with our hypotheses (H2b and H4). In contrast, we find changing top managers will result in worse post-SMBO performance in the *ASALEMP* model. This may be caused by our previous finding that SMBOs with better previous performance is more likely to change top managers. One explanation could be that these managers in fact have good

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<sup>13</sup> Both Breusch and Pagan Lagrangian multiplier test and Hausman test suggest random effects GLS regression is superior to pooled regression and fixed effects regression.

<sup>14</sup> When we conduct regression, we drop the cases that have unknown directors with independent outside directorships.

ability to improve performance. However, they are replaced by certain reason unrelated to their well performance. We do not find any evidence on the relationship between board size and post-SMBO abnormal performance.

*(Insert Table 7 here)*

With regard to control variables, busy directors will negatively impact the labor productivity. Increasing managerial ownership can improve labor productivity, while worsen the employment growth. High leverage loses the advantage of driving performance improvement in SMBO period. Our results demonstrate that the longer the holding period, the less the performance can be improved in labour productivity and sales growth. Companies with better pre-SMBO profitability (*AROA*) tend to perform worse in the post SMBO period. In addition, the financial crisis is negatively associated with profitability (*AROA*) and growth (*AEMPG*).

In sum, we evidence that enhanced enterprise and service function of board, for instance, the presence of new PE directors and more skilled insiders can lead to better post-SMBO performance.

#### **4.3 The influence of board structure on post-SMBO abnormal performance, by PE backing**

We conduct regressions using PE backed and non PE backed subsamples to view more details. Table 8 reports the results of both PE backed and non PE backed subsample. With respect to PE backed subsample, we find board size has positive relationship with profitability (*AROS*), suggesting that PE backed SMBOs requires more directors to advise the improvement of performance. This result supports our hypothesis 1b. Similarly, changing top management worsen the profitability, while more skilled inside directors can improve the sales growth. Nevertheless, adding new PE directors do not have any influence on the post-SMBO performance. As to non PE backed subsample, we also find board size positively associated with employment growth, suggesting more directors can bring more growth opportunity. Our results show more skilled inside directors can improve labour productivity.

(Insert Table 8 here)

## 5. Robustness test

As a test of robustness for determinants of board structure, we run equation (1) using non log value of board size and changes in PE director percentage. We also run equation (1) and (2) using employment growth as indicators. The unreported results are similar as our findings<sup>15</sup>.

Our sample descriptive statistics show that PE-backed SMBOs tend to be different from non-PE backed SMBOs in terms of size and pre-event performance. These differences suggest that PE firms do not randomly choose companies in which to invest but conduct due diligence to select companies with a greater probability of success after SMBOs. Hence, the selection biases may exist when we run our regression. To address selection bias, we employ a Heckman two-step estimation procedure as a robustness test (see Jelic and Wright, 2011). The two steps regressions are follows:

$$PE_i = \alpha + \beta_1 BSERVICES_i + \beta_2 \ln SIZE_i + \beta_3 PreROA_i + \varepsilon_i \quad (4)$$

$$Ratios_{it} = \alpha + \beta_1 LNBS_{it} + \beta_2 MGTCHAN_{it} + \beta_3 New PED_i + \beta_4 OD_{it} + \beta_5 MGTSHAR_{it} + \beta_9 PE_i + \beta_{10} SIZE_i + \beta_{11} Crisis_{it} + \beta_{12} DURATION_i + \beta_{13} GEAR_{it} + \beta_{14} ROA_{it-1} + \beta_{15} MOD_{it} + \beta_{16} Lambda_i + \varepsilon_{it} \quad (5)$$

In the first step, we estimate a probit regression<sup>16</sup> with a PE dummy equal to 1 if PE-backed and 0 otherwise. This step allows us to estimate the probability of receiving PE backing (*Lambda*). We hypothesize that choice of PE backing is associated with size (as in Brau et al., 2003 and Stromberg, 2008), pre-event performance (as in Bienz, 2004 and Sudarsanam, 2005), and industry (as in Berger et al., 1999 and Bayar and Chemmanur, 2006). The second step is similar as equation (3) with the fitted probability of receiving PE backing (*Lambda*). The results are presented in Table 9. We find after correcting for selection bias, the results are still similar to our main findings.

(Insert Table 9 here)

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<sup>15</sup> These results are available from the author.

<sup>16</sup> The Hosmer-Lemeshow suggests that probit model fits to our data while logit model does not.

## **6. Conclusion**

Using a unique, hand-collected dataset of 262 UK SMBO deals, we mainly investigate whether the new board structures of SMBOs improve the SMBO performance. More specifically, we first examine the determinants of changes in board structure. We find strong evidence that the previous growth performance have positive relationships with post-SMBO board size and the presence of new PE directors. Our results indicate that SMBOs at expansion phase will require more directors or PE directors with various the idiosyncratic knowledge, skills, experience, and capabilities to exploit the growth opportunities. In another word, the SMBOs' boards tend to enhance their enterprising and service function.

We then investigate whether the enhanced enterprising and service function of board can help improve post-SMBO performance. We find larger board size benefits to profitability in PE based subsample and employment growth in non PE based subsample. We also find adding new PE directors can improve profitability in our full sample. More skilled inside directors can improve sales growth in full sample and PE backed subsample and labour productivity in non PE backed subsample. By contrast, we find negative relationship between changing top management and post-SMBO abnormal performance. Overall, our findings support our hypotheses and suggest that the enhanced enterprising and service function of board can improve the post-SMBO performance.

There are several limitations on our research. First, we can not obtain full information on board composition for our sample, especially the classification of executive and non executive directors. Although we try to set dummies (more skilled insiders and busy directors) to resolve this issue, future research with full composition information are required to complement to our results. Second, we cannot obtain information on the changes in top management. This issue prevents us from further investigating the reasons of negative relationship between top management change and post-SMBO abnormal performance.

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**Table 1: Sample distribution across years and industries**

This table shows SMBOs distribution across years and industries by full sample and PE backing. Panel A shows numbers of entry and exited SMBOs across years. Exit is defined as the SMBO which exits by 31<sup>st</sup>, December, 2010. Panel B shows industry distribution of SMBOs. Reported figures are proportion of SMBOs in industry groups. Reported P-values are two samples Kolmogorov Smirnov (K-S) test for difference in industry distributions across exit status and PE backing. Industry grouping is based on Gompers et al. (2008).

Panel A: Sample distribution across years

Year	Full sample		PE backing			
	Entry	Exit	PE		Non PE	
			Entry	Exit	Entry	Exit
2000	6		4		2	
2001	18		12		6	
2002	26		13		13	
2003	16	2	7	2	9	
2004	44	5	28	4	16	1
2005	49	10	28	5	21	5
2006	48	13	37	12	11	1
2007	55	23	43	17	12	6
2008		16		8		8
2009		12		8		4
2010		17		12		5
Total	262	98	172	68	90	30

Panel B: Sample distribution across industries

Industry (%):	Full sample	PE backing	
		PE	Non PE
1. Internet & Computers	2.67	2.91	2.22
2. Communications & Electronics	3.82	3.49	4.44
3. Business & Industrial	22.9	18.02	32.22
4. Consumer	24.05	26.74	18.89
5. Energy	1.15	1.16	1.11
6. Biotech and Healthcare	3.82	5.81	0
7. Business Services	38.93	38.95	38.89
8. All other	2.67	2.91	2.22
Total sample	100	65.65	34.35
P-value of PE vs. Non-PE:			0.133

**Table 2: Definitions of Variables**

<b>Description</b>	<b>Variable</b>	<b>Definition</b>
<i>Performance measurements</i>		
<i>Profitability</i>		
<b>Return on assets</b>	<i>ROA</i>	Earnings before interests and taxes (EBIT) scaled by total assets.
	<i>ROA<sub>t-1,t-3</sub></i>	3-year median ROA before transaction.
<b>Return on sales</b>	<i>ROS</i>	Earnings before interests and taxes (EBIT) scaled by total sales.
<i>Labour productivity</i>		
<b>Sales efficiency</b>	<i>SALEMP</i>	Inflation adjusted sales scaled by the number of employees.
<i>Growth</i>		
<b>Employment growth</b>	<i>EMPG</i>	The difference between the numbers of employee in year t and year t-1 scaled by their average value.
<b>Sales growth</b>	<i>SALG</i>	The difference between sales in year t and year t-1, scaled by average sales in year t and t-1.
	<i>SALG<sub>t-1,t-3</sub></i>	3-year median SALG before transaction.
<i>Board of directors</i>		
<b>Board size</b>	<i>BS</i>	The number of directors on relevant board.
	<i>BS<sub>t+1,t+3</sub></i>	3-year median board size after transaction.
<b>Management changing</b>	<i>MGTCHAN</i>	A dummy variable which equals to 1 if the CEO and/or CFO is replaced in three years after SMBOs, and 0 otherwise.
<b>PE specialists siting on the board</b>	<i>New PED</i>	A dummy variable which equals to 1 if there are new PE directors appointed after SMBOs and 0 otherwise.
	<i>PED</i>	The percentage of outside directors who have observable relationships with PE firms.
<b>Non PE specialists outside directors</b>	<i>nonPED</i>	The percentage of outside directors who do not have observable relationships with PE firms
<b>Inside directors with independent outside directorship</b>	<i>OD</i>	A dummy variable that equals to 1 if the SMBO with inside directors that are employed by at least one unaffiliated companies, and 0 otherwise.
<i>Control variables</i>		
<b>Management share</b>	<i>MGTSHARE</i>	The percentage of target company's common equity contributed by management in year t.
	<i>MGTSHAR<sub>t+1,t+3</sub></i>	3-year median MGTSHAR after transaction.
<b>Leverage</b>	<i>GEAR</i>	The sum of long term and shot term debt divided by the total equity.
	<i>GEAR<sub>t+1,t+3</sub></i>	3-year median gear after transaction.
<b>Busy Directors</b>	<i>MOD</i>	A dummy variable that equals to 1 if SMBOs with inside directors that are employed by at least three unaffiliated companies, and 0 otherwise.
<b>Business service industry</b>	<i>BSERVICES</i>	a dummy variable equal to 1 if the SMBOs is from Business Service industry, and 0 otherwise.
<b>PE backing</b>	<i>PE</i>	a dummy variable equal to 1 if the SMBOs is PE backing, and 0 otherwise.
<b>Companies' size</b>	<i>SIZE</i>	the natural log of deal value (£ million).

<b>Financial crisis effect</b>	<i>Crisis</i>	A dummy variable which equals to 1 for observations from 2008-2010.
<b>Pre-SMBO performance</b>	<i>ROAt-1</i>	Return on assets in one year before SMBOs
<b>The longevity of buyout effect</b>	<i>DURATION</i>	The natural log of the number of months from the SMBO date to the exit date if the SMBO exited or the number of months from the SMBO date to the last date (31/12/2010) if the SMBO did not exit.
<b>Companies' industry</b>	<i>BSERVICES</i>	A dummy variable which equals to 1 if the SMBO is from Business Service industry and 0 otherwise.

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### **Table 3: Descriptive statistics and univariate analysis of board of directors**

This table presents descriptive statistics of variables on board of directors for both pre and post event. Panel A shows the values of variables on board composition. BS is the board size; DS is the percentage of directors who holds shares; PED is the percentage of outside directors who have observable relationships with PE firms; nonPED1 is the percentage of outside directors who do not have observable relationships with PE firms, with unknown directors; nonPED2 is the percentage of outside directors who do not have observable relationships with PE firms, without unknown directors. Panel B reports the proportion of board with inside directors that are employed by unaffiliated companies in the total population. Figures for MOD1 are the proportion of SMBOs with inside directors that are employed by at least three unaffiliated companies in the total population, with unknown directors; Figures for MOD2 are the proportion of SMBOs with inside directors that are employed by at least three unaffiliated companies in the total population, without unknown directors; Figures for OD1 are the proportion of SMBOs with inside directors that are employed by at least one unaffiliated companies in the total population, with unknown directors; Figures for OD2 are the proportion of SMBOs with inside directors that are employed by at least one unaffiliated companies in the total population, without unknown directors. Panel C presents the numbers and proportions of SMBOs which changes the top management or add new PE directors in the year of transaction. Differences values are differences between pre and post values for Panel A and Panel B, and difference between PE backing and non PE backing for Panel C. We use two-tailed t-test, Wilcoxon signed rank test, and two-sample proportion test of the differences in means, medians, and proportions, respectively. \*, \*\*, \*\*\*, are significant at 10%, 5%, and 1% levels, respectively.

Panel A:	Full sample						PE backing (median)					
	mean			median			PE			Non PE		
	post	pre	difference	post	pre	difference	post	pre	difference	post	pre	difference
BS(N)	5.31	5.2	0.14	5	5	0	5	5	0**	4	5	-1**
DS(%)	71	75	-4	66	69	-3	67	75	-8***	80	75	5***
PED(%)	11	7	4***	0	0	0***	17	0	17***	0	0	0***
nonPED1(%)	15	22	-7***	14	2	-6***	20	24	-4***	0	17	-17***
nonPED2(%)	9	12	-3***	0	5	-5***	0	14	-14**	0	0	0***

Panel B:	Full sample			PE backing					
				PE			Non PE		
	post	pre	difference	post	pre	difference	post	pre	difference
MOD1(%)	5.34	4.96	0.83	5.81	5.23	0.58	4.44	4.44	0
MOD2(%)	3.05	2.29	0.76	3.49	3.49	0	2.22	0	2.22
OD1(%)	19.08	16.79	3.27	23.84	18.6	5.24	10	13.33	-3.33
OD2(%)	14.12	9.16	5.6*	17.44	11.05	6.39*	7.78	5.56	2.22

Panel C:	Full sample		PE backing		
			PE	Non PE	Difference
	New PED	No.	113	113	0
	%	43.12	66.08	0	66.08***
MGTCHAN	No.	121	87	34	
	%	46.18	50.88	37.78	13.1**



**Table 4: Summary results for the post-SMBO abnormal performance**

This table presents median abnormal performance measures for full sample, up to three post-SMBO years (Y 1-3). Abnormal performance ( $AP_{it}$ ) estimated as:  $AP_{it} = P_{it} - E(P_{it})$ .  $P_{it}$  is the actual performance ratio during post-event period and  $E(P_{it})$  is expected performance of the SMBO during post-event period.  $\Delta PI_{it}$  is difference of industry control group's performance in period t and the industry's median pre-SMBO performance. All results are based on winsorized data. We employ the Wilcoxon signed rank test for: median=0, vs. median $\neq$ 0. \*\*\*, \*\*, \*, indicate significance of the test at 1, 5, and 10 percent level respectively. Total number of observations and number of observations with positive values are reported in brackets.

		Y1	Y2	Y3
<b>Profitability ratios</b>				
	<b>Benchmarks</b>			
AROA	$E(P_{it}) = P_{it-1}$	-0.009** (248:115)	-0.015*** (215:85)	-0.025*** (164:60)
	$E(P_{it}) = P_{it-1} + \Delta PI_{it}$	0.002 (188:96)	-0.024*** (161:67)	-0.033*** (118:44)
AROS	$E(P_{it}) = P_{it-1}$	0.008 (200:109)	-0.002 (174:85)	-0.003 (134:61)
	$E(P_{it}) = P_{it-1} + \Delta PI_{it}$	0.011 (154:87)	-0.002 (134:65)	-0.009* (100:40)
<b>Productivity ratios</b>				
ASALEMP	$E(P_{it}) = P_{it-1}$	0.032*** (182:121)	0.028*** (158:101)	0.018** (117:67)
	$E(P_{it}) = P_{it-1} + \Delta PI_{it}$	-0.027*** (144:48)	-0.042*** (124:41)	-0.070*** (92:24)
<b>Growth ratios</b>				
AEMPG	$E(P_{it}) = P_{it-1}$	-0.010 (187:110)	-0.037*** (158:77)	-0.051*** (121:45)
	$E(P_{it}) = P_{it-1} + \Delta PI_{it}$	-0.021 (140:61)	-0.033** (119:49)	-0.063*** (86:26)
ASALG	$E(P_{it}) = P_{it-1}$	-0.027** (173:78)	-0.049*** (151:58)	-0.051*** (115:41)
	$E(P_{it}) = P_{it-1} + \Delta PI_{it}$	0.015 (142:75)	0.003 (125:63)	-0.026 (93:43)

**Table 5: Descriptive statistics and univariate analysis of other company characteristics**

This table presents results for sample SMBOs characteristics. All variables are defined in Table 2. Differences values are median differences in *MGTSHARE*, *GEAR*, *MGTSHARE*, *ROAt-1*, *ROAt-1,t-3*, *SALGt-1*, *SALGt-1,t-3*, *SIZE* and *Duration* between PE backed and non PE backed subsamples. All results are based on winsorized data. Mann Whitney test is used to test the differences. \*\*\*, \*\*, \*, indicate significance of the test at 1, 5, and 10 percent level respectively. Values of *GEAR* and *MGTSHARE* are computed for full sample, up to three years after SMBOs.

	Full sample			PE backing (median)		
	Mean	Median	S.D.	PE	Non PE	Differences
<i>MGTSHARE</i>	0.601	0.589	0.338	0.403	1.000	-0.597***
<i>GEAR</i>	1.491	0.773	1.893	0.824	0.651	0.172**
<i>ROAt-1</i>	0.115	0.100	0.131	0.115	0.085	0.030***
<i>ROAt-1,t-3</i>	0.097	0.093	0.105	0.104	0.069	0.035***
<i>SALGt-1,t-3</i>	0.105	0.069	0.216	0.087	0.049	0.038**
<i>SIZE</i>	1.364	1.415	0.697	1.415	0.656	0.759***
<i>DURATION</i>	1.722	1.732	0.192	1.708	1.823	-0.115***

**Table 6: Determinants of board structure**

This table presents results of regressions for determinants of board size, PE directors, and management changes of SMBOs. All variables are defined in Table 2.  $\text{LNBS}_{t+1,t+3}$  is the natural log of 3-year median board size after transaction. All regressions are controlled for robustness standard errors error and omitted collinear covariates. F statistics is for OLS regression. Wald Chi2 is for probit regression. All results are based on winsorized data. \*\*\*, \*\*, \*, indicate significance of the test at 1, 5, and 10 percent level respectively. N is the number of SMBOs for each regression.

	$\text{LNBS}_{t+1,t+3}$	New PED	MGTCHAN
$\text{SALG}_{t-1,t-3}$	0.309***	2.067***	0.082
$\text{ROA}_{t-1,t-3}$	0.539**	1.601	2.651*
SIZE	0.164***	0.126	0.406*
$\text{GEAR}_{t+1,t+3}$	0.000**	0.001	0.000
$\text{MGTSHAR}_{t+1,t+3}$	-0.002	-0.029***	-0.003
INTERCEPT	1.400***	1.101*	-0.759
F (Wald Chi2)	10.92***	37.67***	11.53**
R-squared	0.29	0.34	0.07
N	132	124	124

**Table 7: The influence of board structure on post-SMBO abnormal performance**

This table reports the results of panel regression for the influence of board structure on post-SMBO abnormal performance, up to three years after SMBO. The dependent variables estimated as industry adjusted abnormal performance. The results are based on winsorized data. All parameters are estimated by a GLS random-effects model with robust standard error and omitted collinear covariates. P-values for the Wald test (Wald Chi<sup>2</sup>) is for profitability > Chi<sup>2</sup>. N reports the number of firm-year observations used in the panel model. \*\*\*, \*\*, \* are significance at the 1%, 5%, and 10 percent level respectively.

	AROA	AROS	ASALEMP	AEMPG	ASALG
LNBS	0.013	0.149	-0.011	0.047	-0.118
New PED	0.054*	-0.023	-0.018	-0.109	-0.148
MGCCHAN	-0.006	-0.115*	-0.078*	0.041	-0.002
OD	0.022	0.022	0.014	0.072	0.163*
MOD	0.040	-0.009	-0.194**	0.125	0.112
MGTSHARE	-0.012	0.005	0.096*	-0.281*	0.137
GEAR	-0.013**	-0.055	0.014	-0.023	0.005
ROAt-1	-0.363*	-0.324	0.183	-0.126	0.267
SIZE	-0.025	-0.014	0.038	-0.034	0.088
DURATION	0.061	0.249*	-0.468*	0.408	-0.502*
Crisis	-0.024*	0.045	-0.010	-0.102**	-0.053
PE	-0.030	0.085	0.084	0.040	0.208
INTERCEPT	-0.040	-0.563**	0.658	-0.533	0.698
Wald Chi2	32.79***	10.82	24.93**	25.02**	86.73***
R-squared	0.08	0.07	0.09	0.08	0.07
Observations	262	217	216	190	215

**Table 8: The influence of board structure on post-SMBO abnormal performance, by PE backing**

This table reports the results of panel regression for the influence of board structure on post-SMBO abnormal performance by PE backing, up to three years after SMBO. The dependent variables estimated as industry adjusted abnormal performance. The results are based on winsorized data. All parameters are estimated by a GLS random-effects model with robust standard error and omitted collinear covariates. ‘-’ means omitted because of the collinearity with other variables. P-values for the Wald test (Wald Chi<sup>2</sup>) is for profitability > Chi<sup>2</sup>. N reports the number of firm-year observations used in the panel model. \*\*\*, \*\*, \* are significance at the 1%, 5%, and 10 percent level respectively.

	PE					Non PE				
	AROA	AROS	ASALEMP	AEMPG	ASALG	AROA	AROS	ASALEMP	AEMPG	ASALG
LNBS	0.043	0.156*	-0.014	0.05	-0.123	0.201	0.276	-0.053	0.353**	0.022
New PED	0.035	-0.013	0.025	-0.12	-0.102	-	-	-	-	-
MGCCHAN	-0.02	-0.142**	-0.026	-0.023	0.08	0.156	0.035	-0.176	0.363	-0.179
OD	0.002	0.019	-0.009	0.058	0.203**	0.084	0.086	0.060*	-0.181***	-0.094
MOD	0.024	-0.01	-0.099	0.014	0.159	-	-	-	-	-
MGTSHARE	0.011	-0.029	0.155**	-0.226	0.366	-0.042	-0.03	0.019	-0.015	-0.225
GEAR	-0.013**	-0.047*	0.020*	-0.032*	0.01	-0.011	-0.159	-0.001	-0.002	-0.043
ROAt-1	-0.478***	-0.468	-0.278	-0.034	-0.221	0.506	0.517**	0.736	0.359	0.906
SIZE	-0.007	-0.015	0.046	0.031	0.145*	-0.161	-0.228	-0.01	-0.623**	-0.208
DURATION	-0.031	0.393**	-0.154	0.032	-0.455	0.464	0.051	-0.967	1.236	-0.182
Crisis	-0.024	-0.009	-0.008	-0.115**	-0.06	-0.036	0.022	-0.027	0.03	-0.007
INTERCEPT	0.037	-0.661**	0.173	0.073	0.622	-0.701	-0.219	1.694	-2.456*	0.563
Wald Chi2	33.73***	17.38*	14.1	22.79**	74.2***	25.32***	50.28***	311.83***	36.15***	5.17
R-squared	0.16	0.09	0.1	0.11	0.11	0.2	0.16	0.33	0.43	0.27
Observations	219	178	177	154	178	43	39	39	36	37

**Table 9: The influence of board structure on post-SMBO abnormal performance-corrected for sample selection bias**

This table reports the results of panel regression corrected for sample selection bias for the influence of board structure on post-SMBO abnormal performance, up to three years after SMBO. Probit regression with robust variance estimate is for the probability of receiving PE backing by the sample SMBOs. Dependent variable: PE (a dummy variable equalling to 1 if the SMBO receive PE backing and 0 otherwise). Independent variables: *BSERVICES* (a dummy variable which equals to 1 if the SMBO target company is from Business Service industry, and 0 otherwise), *SIZE* (the logarithm of SMBO deal's value), *ROAt-1* (the value of return on assets in one year before SMBO). Panel regression is for the influence of board structure on post SMBO abnormal performance. The dependent variables estimated as industry adjusted abnormal performance. All the results are based on winsorized data. All parameters of panel regressions are estimated by a GLS random-effects model with robust standard error and omitted collinear covariates. P-values for the Wald test (Wald Chi<sup>2</sup>) is for profitability > Chi<sup>2</sup>. N reports the number of firm-year observations used in the panel model. \*\*\*, \*\*, \* are significance at the 1%, 5%, and 10% level, respectively.

Probit regression		Panel Regression					
	PE		ARO A	AROS	ASALEMP	AEMPG	ASALG
ROAt-1	0.423	LNBS	0.013	0.149	-0.010	0.050	-0.117
SIZE	1.683***	New PED	0.055*	-0.022	-0.022	-0.107	-0.150
BSERVICES	-0.258*	MGCCHAN	-0.005	-0.116*	-0.071	0.049	0.001
Intercept	-1.068***	OD	0.023	0.020	0.018	0.077	0.164*
Log likelihood	-179.805	MOD	0.035	0.002	-0.242***	0.112	0.097
Pseudo R-squared	0.358	MGTSHARE	-0.012	0.007	0.096*	-0.278*	0.140
Wald Chi2	132.75***	GEAR	-0.014**	-0.054	0.013	-0.024	0.005
		ROAt-1	-0.344*	-0.356	0.342	-0.053	0.317
		SIZE	-0.004	-0.051	0.196**	0.032	0.144
		DURATION	0.055	0.269	-0.560**	0.383	-0.533
		Crisis	-0.025*	0.047	-0.013	-0.104**	-0.056
		PE	-0.024	0.076	0.124	0.055	0.223
		Lambda	0.043	-0.078	0.333	0.138	0.118
		INTERCEPT	-0.081	-0.511*	0.424	-0.665	0.611
		Wald Chi2	35.09***	10.94	24.93**	25.02**	86.73***
		R-sq	0.08	0.07	0.09	0.08	0.07
Observations	531	Observations	262	217	216	190	215

