

The impact of corporate governance mechanisms on value increase in leveraged buyouts[☆]

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Abstract

Using a novel, hand-collected dataset, comprising 321 exited buyouts in the UK in the period 1995 to 2004, this study examines the realized value increase in exited leveraged buyouts. Testing the free cash flow theory, we show that value increase and return characteristics of LBOs are to some extent related to the corporate governance mechanisms resulting from a leveraged buyout, especially managerial equity holdings. We show that return characteristics and the probability of a positive return are mainly related to size of the buyout target and acquisitions carried out during the holding period. Furthermore, we find that the return characteristics between insider driven buyouts and outsider driven buyins are different.

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1. Introduction

Leveraged buyouts have received a substantial amount of attention within the financial research literature (see [Jensen, 1993](#); [Thompson and Wright, 1995](#) for reviews). While there is an extensive evidence of gains in productivity and operating performance, there is a notable lack of research concerning the value increase of buyout targets and returns realized from buyouts at the investment level. Resulting mainly from accessibility of reliable and usually confidential

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transaction data, studies on buyout returns have focused either on limited samples relating to IPOs among the largest transactions rather than across the range of realization options for the buyout market as a whole (see, e.g., Kaplan, 1989) or on fund level measures (see, e.g., Kaplan and Schoar, 2005; Ljungqvist and Richardson, 2003; Cumming and Walz, 2004). This emphasis also parallels research on realizations in the venture capital market which has also tended to consider IPOs (Barry et al., 1990; Das et al., 2003), although an exception is Cumming and MacIntosh (2003). Much existing research has also focused on US studies, primarily covering the first wave of buyouts in the 1980s, yet there may be important legal differences between private equity markets that influence the nature of exit from investments (Cumming et al., 2006). Buyout markets have developed more recently outside the US, notably in the UK and Europe, where contextual conditions have meant that buyout deals have covered a wide size spectrum and that realizations have relied less on IPOs (CMBOR, 2005). Moreover, while there is some recognition that buyouts are heterogeneous with respect to whether they are driven by insiders or outsiders (Lichtenberg and Siegel, 1990; Robbie and Wright, 1995), and with respect to whether they involve the purchase of full firms or divisions (Muscarella and Vetsuypens, 1990), the implications of these differences have not been incorporated into previous studies of value creation and returns. Studies analyzing the factors that impact realized buyout returns at the target company level using a comprehensive sample of different types of buyouts across the full size range and incorporating strategic sales to a third party, secondary buyouts and failures in addition to IPOs can add to the existing literature on leverage buyouts.

According to Jensen's (1986, 1989) free cash flow theory, leveraged buyouts result in corporate governance mechanisms that reduce agency costs and increase firm value through improved operating efficiency. Central elements of this governance structure are debt, ownership of equity and the presence of active investors. Agency costs of free cash flow arise if generated free cash flow is not invested in profitable development and maintenance of the business or distributed to shareholders. Debt can reduce these costs and serve as a substitute for dividends because it creates an obligation to service periodic interest costs. The inability to service these payments and repay the principal will ultimately cause the company to be liquidated. As leverage in buyouts tends to be high, a significant proportion of free cash flow is likely to be committed to servicing the debt. The threat of bankruptcy created by the failure to pay interest motivates organizations to become more efficient. Intensive use of debt to finance a buyout reduces the share of equity in the financing structure, allowing private equity investors and managers to control the majority of stock which they would otherwise be unable or unwilling to undertake. Concentrated ownership provides private equity investors with the ability to monitor and control the strategy of the buyout target firm through an active presence on the board of directors. The need for monitoring management is partially offset by the effective self-monitoring resulting from managerial equity ownership.

Mixed support for Jensen's free cash flow theory has been documented. Lehn and Poulsen (1989), Kaplan (1989), Smith (1990), Muscarella and Vetsuypens (1990), Cotter and Peck (2001) and Bruton et al. (2002) find that increased leverage and realignment of incentives have positive effects on the operating performance of leveraged buyout companies. Additionally, Bull (1989), Hall (1990), Lichtenberg and Siegel (1990), Opler (1992), Long and Ravenscraft (1993), Ofek (1994), Desbrières and Schatt (2002) and Harris et al. (2005) provide evidence of cost cutting and improved margins and efficiency after buyout. Easterwood et al. (1989), Singh (1990), Smith (1990), Long and Ravenscraft (1993) and Holthausen and Larcker (1996) show reductions in capital requirements after a buyout. Halpern et al. (1999), Opler and Titman (1993) for the US and Weir et al. (2005) and Renneboog et al. (2007-this issue) for the UK, however, do not find support for the free cash flow argument as a driver of public to private buyouts.

Operating performance, as well as efficient use of available funding and resources, are fundamental elements of firm value. However, changes in various measures of operating efficiency only serve as proxies, not direct measures of value. Furthermore, changes in operating characteristics can be short-term in nature and may have a negative effect on the future prospects of a company.

Private equity companies (or any other party investing equity, such as management) want to maximize the value of their investments (see, e.g., [Jensen, 1989](#)). The returns generated by a buyout fund and avoidance of the liquidation of any investments, is crucial for fund income and reputation ([Barry et al., 1990](#); [Cumming and MacIntosh, 2003](#); [Das et al., 2003](#)). The returns earned by a fund are the main factors in ensuring that future funds can be raised. Returns can ultimately be measured only when the investment is realized through an exit by IPO, sale to a third party or other means. The value increase (or decrease) and any conclusions about the factors affecting this change must be based on measures comparing the value difference (return) between the time of entry (leverage buyout) and the time of exit (investment realization). This allows for measuring both the success of buyouts and the relative importance of factors affecting the degree of success. While there is evidence relating to the longevity of buyouts ([Kaplan, 1991](#); [Wright et al., 1995](#)), evidence relating to the performance of exited buyouts is limited to consideration of those that have exited by IPO in terms of accounting and stock market returns ([Holthausen and Larcker, 1996](#); [Jelic et al., 2005](#)).

[Wright et al. \(1995\)](#) indicate that size of buyout is positively related to a short holding period and a high exit probability. [Kaplan \(1991\)](#) finds similar evidence, but his study focused only on larger buyouts. This suggests that the size of the buyout may be influential in determining returns. Private equity funds invest in a number of buyouts and each of these investments contributes to the overall return of the fund. Financial sponsors may wish to invest in sizeable investments that can be expected to provide high absolute returns that will increase the return of fund. Additionally, private equity investors wish to be able to focus their efforts on the boards of those companies that can provide high income, instead of on small companies that require significant efforts in the board of directors and which contribute only marginally to overall fund return even if the percentage return on each individual investment is high. Further, smaller companies may be more difficult to exit due to lack of interest from large industrial buyers and because they do not meet the scale required for a public listing.

In this paper, we present evidence concerning investor returns from exited buyouts and their determinants. Empirical evidence is presented that value increase and return characteristics are related to corporate governance mechanisms associated with a leveraged buyout. We use a unique hand-collected dataset to examine the internal rate of return (IRR) on enterprise value and invested equity in 321 exited buyouts in the UK in the period 1995 to 2004. These include 52 IPOs, 92 trade sales, 57 secondary buyouts and 121 receiverships (bankruptcies).

This study makes three contributions. First, this paper adds to limited previous research on investor returns in buyouts. [Kaplan's \(1989\)](#) study that reports investor returns in buyouts is extended by providing measures of actual (realized) internal rate of return of enterprise value (EV) and of invested equity. We find that the mean index-adjusted EV IRR is 22.2% and the average equity IRR is 70.5% for the whole sample. IPO (median EV IRR 44%, equity IRR 99%) exits outperform trade sale (median EV IRR 7%, equity IRR 43%) and secondary buyout (median EV IRR 3%, equity IRR 21%) exits. Second, this paper extends the studies of [Kaplan \(1991\)](#), [Wright et al. \(1994\)](#), [Wright et al. \(1995\)](#) and [Wright et al. \(1996\)](#) on the staying power and survival of buyouts by providing empirical evidence concerning the relation between the governance structure of a buyout and likelihood of a positive return at investment realization.

Prior studies (see, e.g., Wright et al., 1996) have aimed at understanding the reasons for receivership exits (failure) without measuring the relative performance and returns between other exit types. We find that governance mechanisms resulting from a leveraged buyout are not the main drivers of value increase. However, returns are driven by size of buyout and acquisitions done before exit. Third, this paper adds to studies on buyout success by providing evidence that returns characteristics are different between buyouts and buyins. Buyout returns are driven by acquisitions during the holding time. Our results indicate that buyout equity returns are negatively impacted by divestments while the opposite is true for buyins. This implies that private equity companies that initiate institutional buyins are able to drive their returns through streamlining of target company operations.

The remainder of this paper is organized as follows. The next section describes the data, sample selection process, tested variables as well as discusses about methodological issues. Thereafter the empirical results are reported and potential biases of the sample are discussed. The final section concludes the study.

2. Data

The sample utilized in this study consists of 321 exited buyouts in the UK between 1995 and 2004. These include 52 IPOs, 91 trade sales to strategic or industrial buyers, 57 secondary buyouts involving sale to another private equity investor who acquires the company through a leveraged buyout transaction and 121 receivership exits where the buyouts have filed for either bankruptcy or bankruptcy protection. The initial sample is constructed by using the Centre for Management Buyout Research (CMBOR) database that provides comprehensive statistics of the population of UK buyout transactions and their private equity and debt financiers. The CMBOR database is compiled from a wide range of sources including twice yearly surveys of private equity and debt providers to buyouts¹, press releases by these financiers, the financial press, stock exchange circulars issued by companies and companies' annual reports. The database has no lower size cut-off.

The database consists of 1485 exited leveraged buyouts in the UK since year 1994. Data retrieved include entry time enterprise value (value of buyout), amount of debt and equity invested in the buyout, revenue and operating profit of the target prior to the buyout, management ownership of invested equity, number of participants in equity syndicate, the number of acquisitions and divestments made by the buyout during the holding period, the cumulative amount of capital the investor (institution) has committed to investments at the time a specific LBO is announced and the cumulative number of investments the investor has completed at that time. Detailed initial transaction structure (buyout financing) data is available for 635 of these transactions (48 IPOs, 332 trade sales, 134 secondary buyouts and 121 receiverships). For IPOs, all other information required for calculating test variables is retrieved from the prospectuses these companies have filed prior to their listing. For four companies, the prospectus was not available and required information was retrieved from the latest annual report prior to the exit date. In addition, sufficient transaction structure details were found from prospectuses and press releases for four additional transactions not included in the CMBOR detailed transaction structure data. This brought the size of IPO exit group to 52 transactions (40

¹ These surveys generally obtain a 100% response rate from all the financiers active in the buyout market as they receive a free copy of a quarterly review of aggregate market trends based on the data they supply which is recognized as the leading source of information in the market.

full listings, eight AIM² listings or OTC transactions, two listings on the US market and two reverse-in transactions). Prospectuses (and annual reports for four companies) provide annual data reported less than six months before the exit. Therefore, the accuracy of this data in reflecting the financial and operating status of sample companies at the time of exit can be regarded as high.

In the UK private companies are obliged to report their financial accounts to the Companies House. The filed accounts are public information and therefore available. For the 332 trade sale and 134 secondary buyout exits, the data required for the calculation of operating and equity value variables is retrieved from the Amadeus database that provides financial information on European private companies. Necessary criteria for adding a company to the sample is that the Amadeus database must contain annual financial data for the period prior to exit, and the time gap between the latest reporting period end and the exit date cannot exceed 11 months. This ensures that this financial information provides sufficient accuracy about the operating performance and financial condition of the company at the time of exit. In addition, revenue, operating profit (EBIT) data must be available as well as data for net debt calculation. The Amadeus database does not provide information on buyouts in receivership exits, because these companies no longer exist.

2.1. Internal rate of return

We measure the return on enterprise value and on equity investment by an index-adjusted internal rate of return (IRR) discount rate that equates the present value of a series of cash flows (positive and negative) to zero. IRR is the most commonly used measure of the return on private equity investments (see, e.g., Kaplan and Schoar, 2005; Ljungqvist and Richardson, 2003). Enterprise value is used because leveraged buyouts can make use of multiple types of capital to finance the buyout transaction. In general, finance can include senior and junior debt like credit facilities, bank debt, mezzanine or high yield. Financial sponsors investing equity may also invest other instruments in the form of strip-financing (Jensen, 1986). Hence, in these cases financial sponsors focus on the return earned on all types of capital they have invested. Furthermore, the distinction between return on enterprise value (EV) and equity return allows for a comparison between value increase and equity return. The literature on buyouts often refers to value creation without addressing how it relates to equity value. Private equity investors participating in buyout transactions are interested in earning a return on their investment. This does not necessarily mean an increase in EV if they only invest equity, but rather operating improvements and repayment of debt (and possibly other financing) combined with a favorable exit. Therefore, an exited buyout may provide a significant return on the invested equity without increasing EV. The correlation matrix presented in appendix 1 supports this argument. For the sample used in this study, the correlation between index-adjusted EV IRR and index-adjusted equity (EQ) IRR is 0.62. The correlation is significant (at one percent level) and shows how much variation there is between these two return measures.

Adjusting the exit time value for index movement during the holding period (index increase or decrease between entry and exit dates) allows value creation to be analyzed by isolating market movement effects from the value change. This is important, as favorable market conditions (index movement upward) can generate increased value from the investment without any changes in the fundamentals of target companies. Additionally, this will adjust for pure warehousing of companies, that is, when opportunistic buyout investments are made by assuming returns are

² AIM is the Alternative Investment Market, a secondary tier stock market with less stringent entry requirements than the main market.

based solely on improving market conditions. Index-adjustment does not completely eliminate the market effect, because it is not possible to reliably eliminate favorable exit market conditions (high mergers and acquisitions activity) resulting from improving equity markets. The index used for adjusting the values is the FTSE 100 index of the London Stock Exchange (Monthly data). This general index, which comprises the 100 most highly capitalized blue chip companies, reflects the general economic climate both from valuation and from mergers and acquisitions perspectives. In favorable economic conditions there are more favorable exit opportunities because both IPO and M&A markets are active. Moreover, during high volume M&A markets more assets are put on sale, which also results in a higher deal flow to private equity investors. Using the FTSE 100 index instead of other UK indexes ensures that index adjustments made reflect the general market development in the UK. On the other hand other UK indices that might better reflect the size composition of our sample that consists mainly of smaller companies are highly correlated with the FTSE 100 index, which represents approximately 80% of the capitalization of UK markets. Other suitable indices, such as the FTSE All Share Index, incorporate the companies in the FTSE 100 index. In summary, as we want the index adjustment to eliminate any purely market related impacts on the returns, the FTSE 100 will ensure a reasonably accurate adjustment for LBO returns in our sample over different time frames both for cases when the index has increased or decreased during the holding time of the LBO.

Equity values at the time of entry and exit must be defined for the calculation of IRR. Equity value at entry is the total equity invested at the time of buyout. This includes all types of equity, including ordinary and preferred shares³. For IPOs, equity value at exit is defined as the market value of the company at the beginning of the first day of trading. For trade sale and secondary buyouts exits, equity value at exit is calculated by subtracting net debt (interest bearing debt minus cash and equivalents) from the exit transaction value (enterprise value). Using the book value of debt may bias the equity value calculation but given the difficulty in valuing non-market traded debt, which is typically the case in UK buyouts⁴, the book value of debt is used.

Receivership exits are assumed to have zero value at exit. The main assumption is that equity investors receive nothing at bankruptcy. Additionally, we assume that enterprise value is zero at exit, because otherwise receiverships would provide high returns whenever there has been a low equity ratio in the initial capital structure. For the whole sample we assume that no dividends are paid to equity holders during the holding time. Enterprise value at exit is adjusted for additional financings (refinancing, including all capital types) in 36 cases. Equity value at exit (for the whole sample) is adjusted for additional equity investments during the holding period in 12 cases for which the CMBOR database provides this information.⁵ Both entry and exit time equity values are calculated for 100% of shares. The percentage of shares acquired at entry and sold at exit is obtained from the SDC Platinum transactions database. For most of the sample buyouts, both entry (five companies less than 100%) and exit transactions (one company less than 100%) included all shares of the company (100%). This procedure is not done for receivership exits, since for these companies value at exit is assumed to be zero.

³ Note that in buyouts, preferred instruments may include preferred ordinary shares as well as preference shares.

⁴ Unlike the US, publicly quoted debt is restricted to a very few very large buyouts in the UK (CMBOR, 2005).

⁵ This figure is low compared to venture capital investments where multi-round finance is a more common feature.

2.2. Variables for corporate governance mechanisms

The structure of buyout transactions provides two important variables for measuring the effects of governance mechanisms. Gearing (leverage) shows how much debt is invested in the entity in proportion to equity. It is an important variable to test because the less equity is invested the more debt is required to finance the entire transaction (not taking into consideration other forms of financing). Secondly, the less equity is invested, the greater equity ownership the management usually receives because management is provided with an affordable option to have stronger incentives. Following Kaplan (1989), Thompson and Wright (1991) and Wright et al. (1995), the management ownership variable is the management's share of equity.

The debt ratio (percentage of debt in the initial transaction structure) is not tested separately because it is partially complementary to leverage and the disciplinary effect of debt is measured by debt coverage. Debt coverage is defined as the amount of debt (including all forms of interest bearing debt such as high yield, senior debt and loan notes) in the initial capital structure of the buyout divided by operating profit prior to buyout. This measure shows how many years worth of current operating profit would be required for repayment of all outstanding debt. Debt coverage used here serves as a proxy for the controlling effect of debt. Cash flow (EBITDA) would be a better measure for debt coverage, but given that EBITDA prior to entry was available only for 30 sample companies (from Amadeus), we decided to use EBIT instead. Seven sample companies had a negative debt coverage ratio and six companies had a ratio of over 100. Therefore, the debt coverage variable is truncated at the 99th and 1st percentiles. Buyouts with negative debt coverage are given the 99th percentile debt coverage value. Availability of debt, debt terms and costs change over time (Fig. 1). Transaction structure related variables have the weakness of being exposed to economic cycles and availability of funding. In our sample, the year 2002 has the

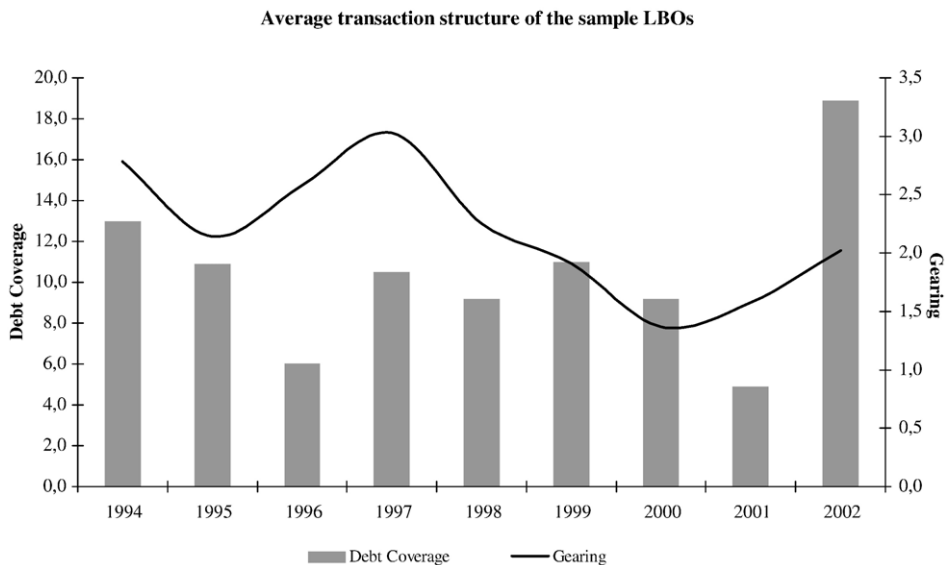


Fig. 1. Sample average transaction structure and debt coverage. Graph presents the samples average gearing, amount of debt in initial entry transaction structure divided by amount of equity in initial entry transaction structure and average debt coverage, the amount of debt in the initial entry transaction structure divided by operating profit (EBIT) for the previous fiscal year.

highest average debt coverage and 2001 the lowest. The sample average gearing level is highest for LBOs announced in 1997 and lowest in 2000. Our sample capital structure and debt coverage largely follow the averages for the whole industry. Various sources report similar patterns where the proportion of invested equity (in proportion to debt) in LBOs increase from the early 1990s to 2000 and started to decrease again after 2000 (CMBOR, 2005).

Often there is more than one private equity investor involved in a buyout transaction. These investors form an equity syndicate whose members agree among themselves the terms under which they, within the syndicate, invest equity. Buyout investors usually have an institutional requirement for a seat on the board of the buyout company or the right to nominate the chairman of the board (Thompson and Wright, 1991; Wright et al., 1995). All participants in the equity syndicate become shareholders in the company. Following Wright et al. (1995), the size of the equity syndicate is measured by the number of participating institutions. Our data do not include the ownership (investment) distribution of the participating institutions and therefore a more accurate measure of each participant's influence cannot be constructed. The number of institutions does however serve as a proxy for the size and attractiveness of the investment. According to Wright et al. (1995), monitoring is more difficult in large boards and therefore

Table 1
Descriptive statistics

Variable	Whole sample		Exit type							
			Stock exchange		Trade sale		Secondary buyout		Receivership	
	Average	Media	Average	Media	Average	Media	Average	Media	Average	Media
<i>Return</i>										
Index Adj. IRR (EV) ^a	22.2%	−5.3%	136.9%	44.2%	23.0%	7.3%	10.4%	2.9%	−21.5%	−14.1%
Index Adj. IRR (Equity) ^b	70.5%	−17.8%	423.5%	99.0%	128.6%	43.3%	20.3%	21.0%	NM	NM
<i>Governance variables</i>										
Gearing	3.4×	1.4×	2.8×	1.3×	4.8×	1.5×	5.3×	1.5×	1.6×	1.4×
Debt Coverage ^c	NM	4.2×	NM	4.1×	NM	5.4×	NM	4.3×	NM	3.6×
Institutions	2	1	2	1	2	1	2	2	1	1
Mngt Equity	37.6%	35.0%	30.9%	24.6%	31.4%	30.0%	32.6%	22.7%	47.1%	49.9%
<i>Control variables</i>										
Size (GBP millions) ^d	55.0	14.7	141.0	23.7	56.7	25.0	52.1	26.5	18.4	6.3
Divestments ^e	39		6		11		16		6	
Acquisitions ^f	62		21		13		23		5	
Type: Buyouts ^g	178		28		58		35		57	
Type: Buyins ^g	143		24		33		22		64	
Source: whole company ^g	165		23		45		28		69	
Source: divestment ^g	156		29		46		29		52	
Investor investments cumulative value	330	59	316	49	385	64	255	52	NM	NM
Investor investments cumulative amount	2034	1215	1875	1506	2295	1498	1761	859	NM	NM
<i>Other</i>										
Holding time	3.5	3.3	2.6	2.3	3.1	2.8	4.3	4.1	3.9	3.6
Observations	321	321	52	52	91	91	57	57	121	121

buyouts with large syndicates exit sooner. Board members who are nominated by private equity investors act as non-executive directors. As the sample companies were private we have not been able to gather data on the board compositions after the buyout transaction. Hence, we are not able to test board variables, although we acknowledge their importance in corporate governance studies (e.g. Cotter and Peck, 2001; Peck, 2004).

2.3. Control variables

A number of factors need to be controlled for when the success of LBOs is tested. Descriptive statistics, presented in Table 1 show a size-related pattern between the four exit types. IPO exits are largest in average size and provide the highest returns. Simultaneously, other governance variables reflect the size characteristics of exit types. Management equity is largest in small companies leading to high managerial ownership in receivership exits. Likewise, high management stakes and small size are associated with a small number of participants in the equity syndicate for this group. The obvious effect of size is the result of the fundamental characteristics of leveraged buyouts.

Financial sponsors frequently seek to invest in buyouts where they can obtain majority ownership. This allows them to control the target's strategy and to take advantage of opportunities that may emerge. Individual managers investing equity seek to maximize their ownership with the capital they can invest. This capital is constrained by the individual's personal wealth and risk profile. Therefore, with a given level of capital invested, management equity ownership in a buyout depends greatly on the target's size. Hence, in small buyouts management may be able to afford to acquire a majority of the equity whereas in large buyouts management usually owns only a small fraction of the equity (CMBOR, 2005).

Note(s) to Table 1:

This table presents descriptive statistics for the sample of 321 exited buyouts grouped by type of exit. The variables are: Index Adj. IRR (EV), internal rate of return (IRR) for the holding time using enterprise value (transaction value) at time of buyout (entry) and enterprise value (transaction value) at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Index Adj. IRR (Eq), IRR for the holding time using total equity invested at entry and equity value at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Gearing, amount of debt in initial entry transaction structure divided by amount of equity in initial entry transaction structure; Debt Coverage, the amount of debt in the initial entry transaction structure divided by operating profit (EBIT) for the previous fiscal year; Institutions, number of institutional (private equity) investors participating in the equity syndicate; Mngt Ownership, percentage of common equity held by management after entry transaction; Board Size, number of directors in board; Non-Exec. Board Members, percentage of non-executive (outside) board members; Revenue Growth, cumulative annual growth in revenue during holding time; EBIT Margin Improvement, cumulative annual growth in EBIT margin during holding time; Holding time, the time between entry transaction and exit transaction dates in years; Divestments, number of companies that have made divestments during holding time; Acquisitions, number of companies that have made acquisitions during holding time; Size, enterprise value of buyout in GBP million; Buyout/Buyin, the type of buyout as either buyout or buyin; Divest/Whole, the source of buyout defined as either whole company or divestment; Investor Inv. Cum. Value, the cumulative value of the committed capital of the investing institution at the time of buyout; Inv. Inv. Amount., the cumulative number of investments the investor has done at the time of buyout.

^a Adjusted for refinancing (all capital types) in 36 cases.

^b Adjusted for additional equity investments (refinancing) in 12 cases.

^c Buyouts with negative or exceptionally high debt coverage (marginally above zero EBIT) are given 99th percentile value (59.3).

^d Enterprise (transaction) value at entry. Used as natural logarithm in statistical tests.

^e Number of companies that have done divestments during holding time. Used as dummy in statistical.

^f Number of companies that have done acquisitions during holding time. Used as dummy in statistical tests.

^g Denotes number of observations in the sample.

Size of buyout impacts the availability of different capital types. Providers of debt require collateral for borrowed funds and the amount they are willing to provide depends not only on the assets of the target but also on its operating history and the risks associated with cash flows. Sources of debt finance and capital structure vary with firm size and age (see, e.g., [Berger and Udell, 1998](#)). Large companies with steady cash flows and long operating history can choose between different types of debt, pay lower interest and can therefore have higher leverage. The capital structures of large buyout targets can be optimized with for example senior debt, high yield and mezzanine financing ([CMBOR, 2005](#)). We control for size using the logarithm of the entry time enterprise value of the buyout target.

In this study, we control for the actions of the buyout companies with two dummy variables: acquisitions and divestments. Given that acquisitions and divestments by buyout firms can have significant effects on both operating performance measures, it is important to control for whether changes in operating performance are of an organic or transactional nature. Controlling for divestments is also important because highly leveraged firms experiencing financial distress may try to improve their operating prospects by selling business lines or assets. Empirical evidence surrounding buyout company divestments is mixed. According to [Easterwood \(1998\)](#) divestments can have significant effects on the value of a divesting buyout company whereas both [Smith \(1990\)](#) and [Liebeskind et al. \(1992\)](#) show that improvements recorded in the performance of buyout firms are more the result of improved management rather than the realignment and streamlining of core businesses through divestments of non-core assets. The CMBOR database provides information for divestments and acquisitions. However, for most of these deals, the transaction value is not available and therefore these are measured as dummies.⁶ This does not provide information about their relative effects in terms of size, but allows for a satisfactory amount of control for our analysis. Controlling for divestments and acquisitions measures whether there have been efforts to streamline the buyout targets' businesses or to grow through acquisitions. Because the size of these transactions is not measured, using a count variable could bias results if sample companies have made a large number of small transactions. The acquisitions variable is given a value of one if a company has made acquisitions during the holding period, otherwise it is given a value of zero. The divestment variable is given a value of minus one if a company has divested one or more parts of its business, otherwise it is given a value of zero.

The type of buyout can impact buyout performance. Buyouts by definition are transactions initiated and led by the incumbent management team of the target whereas buyins are leveraged buyout transactions initiated and led by private equity investors together with partially or completely new management team ([CMBOR, 2005](#)). As such there are likely to be informational asymmetry differences between the two types of buyout. Buyins are particularly likely to experience such problems as they involve outsiders, with potential consequences for performance ([Robbie and Wright, 1995](#)). In this study, type of buyout is a dummy that is given a value of one if the buyout type is buyin and zero otherwise.

Source of buyout has attracted research attention. ([Hite and Vetsuypens, 1989](#); [Muscarella and Vetsuypens, 1990](#); [Singh, 1990](#)). Divisional buyouts involve a lack of an observable pre-divestment market value and management may possess private information about their unit that parent management may not. As a result, divisional management may be better able to negotiate a favorable price than are managers taking whole public firms private ([Hite and Vetsuypens, 1989](#)).

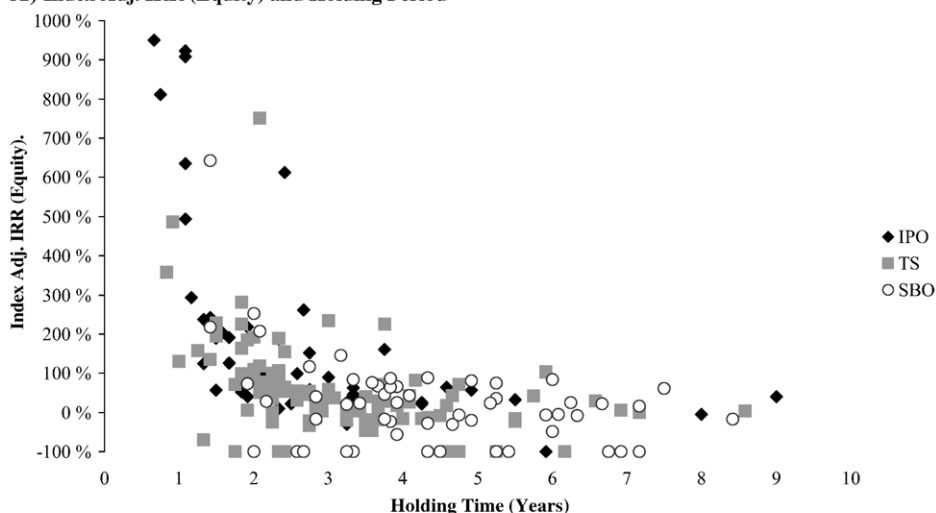
⁶ This is a well-known problem with divestment data (see e.g. [Haynes et al., 2000](#)).

Both Muscarella and Vetsuypens (1990) and Singh (1990) find that divisional buyouts going public generate larger operational performance improvements than whole firm reverse buyouts, while Muscarella and Vetsuypens (1990) find that divisional reverse buyouts generate greater returns on equity than whole firm reverse buyouts. Bae and Hoje (2002) find that operating performance characteristics are different between whole company and divisional (part of company carved out) leveraged buyouts. In our study, source of buyout is a dummy with a value of one if the buyout was a division of a larger company (or otherwise a part of a larger corporation) and zero if the buyout comprised a whole company.

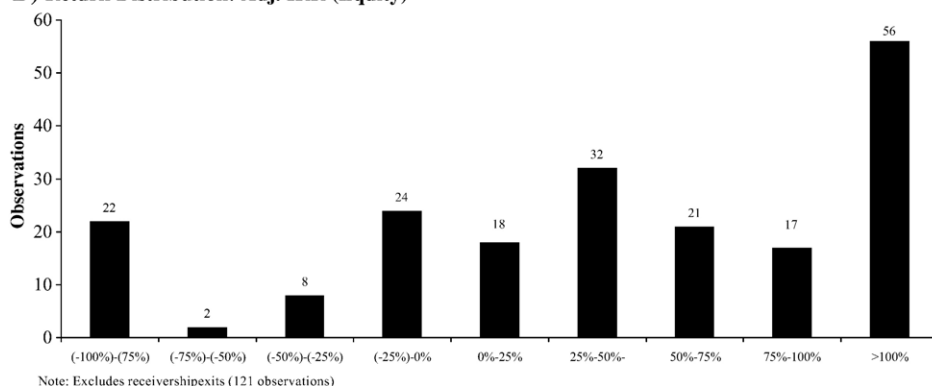
Numerous studies have examined the link between private equity investment performance and private equity investor experience (e.g., Barry et al., 1990; Lerner, 1994; Gompers, 1996; Jelic et al., 2005). Additionally, Cotter and Peck (2001) show that buyout specialists impact structuring of LBO transactions and that when buyout specialists control the majority of the post-LBO equity, the LBO transaction is likely to be financed with less short-term and/or senior debt and less likely to experience financial distress. Building on Jelic et al. (2005) in the specific context of experienced private equity investors funding buyouts in the UK, we control for the degree of experience (specialization) with two variables: the cumulative amount of capital the investor (institution) has committed to investments up to the time the specific LBO in our sample is announced and the cumulative number of investments the investor has completed at that time. These variables are preferred to a simple private equity firm age variable or a (relative) size of private equity firm measure (e.g., Barry et al., 1990; Lerner, 1994) as experience is built up more directly through deal doing. In addition, in the context of UK buyouts, these variables are preferred to a categorization based on exclusive focus on buyouts or not (Kaplan, 1991) as they convey more information about the experience of the private equity firm prior to each deal and there are few pure buyout specialists in the UK market. Similarly, this measure is preferred to a measure of the number of IPOs prior to the focal deal as there are few realizations by this mode per firm in the UK during the period of our study (CMBOR, 2005).

The final sample represents the whole population of UK buyouts in terms of size and exits. We do not limit the sample in any way, other than sufficient data must be available for a buyout to be included in the sample. Some private equity related studies suffer from sample selection bias and have created methodologies to overcome these problems. For example, Cochrane (2005) adjusts return variables of venture investments as some of his sample firms may not have received the additional funding needed for the company to reach a trade sale or IPO exit.

In order to model the determinants of rates of return we need to address the potential selection problem relating to non-exited investments (Cochrane, 2005). Hence, we employ the Heckman two-stage selection model (Greene, 2000: 926–37) which provides a test for sample selectivity (or non-random) bias. From the CMBOR database, we identify the population of 1723 non-exited buyouts completed during the same period as our sample of 321 exited buyouts. In step 1, we estimate the reduced form selection model for the combined population of exited and non-exited buyouts (2044 deals) using a probit and obtain maximum likelihood estimates for whether a buyout has exited or not. In this selection equation, we include variables relating to whether the investment was a buyout or buyin, whether the investment involved a whole company investment or a divestment, the size of the deal and log of the year in which the investment took place. Buyouts arising on divestment and larger buyouts may be more likely to exit (Wright et al., 1994). Buyouts and buy-ins have different exit rates (Wright et al., 1995). Older firms may also be more likely to exit and at an increasing rate (CMBOR, 2005; Wright et al., 1995). In step 2, we apply OLS to the determinants of rates of return, conditional on an exit having taken place.

A) Index Adj. IRR (Equity) and Holding Period

Note: 8 IPO exits and 3 trade sale exits are cut off from the graph as these have above 1000% index adj. IRR (Equity)

B) Return Distribution: Adj. IRR (Equity)

Note: Excludes receivership exits (121 observations)

Fig. 2. Return characteristics and distribution. Graphs illustrate the return characteristics of the sample, presented by the adjusted equity IRR, IRR for the holding time using total equity invested at entry and equity value at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates. A) presents the relation between holding time and LBO return for each exit type. B) shows the return distribution of the sample. Both graphs exclude receivership exits, because of the return assumptions applied to this exit type.

2.4. Descriptive statistics

Table 1 reports selected descriptive statistics for the sample. The average index-adjusted EV IRR is 22.2% and the average equity IRR is 70.5% for the whole sample. The differences in mean adjusted equity IRRs are significant between all of the groups when tested against each other. The *t*-test statistics are significant at the 1% level between IPOs versus trade sales and IPOs versus secondary buyouts and at the 5% level between trade sales versus secondary buyouts. In both EV and equity IRR terms, IPO exits have outperformed trade sale and secondary buyout exits. The

average holding time for the sample is 3.5 years and IPO exits have the shortest average holding time (2.6 years). The correlation matrix in appendix 1 shows a significant negative correlation between the holding period and IRR variables (at the 1% level). This relationship is also apparent in Fig. 2A. We assume that this reflects the nature of buyout investments as it indicates that the owners (private equity investors) are taking advantage of favorable exit opportunities even if the holding period is short and planned operating improvements have not been fully executed. Furthermore, prior studies show that larger buyouts tend to exit sooner (Wright et al., 1995). Fig. 2B illustrates the return distribution of the sample excluding receivership exits, because of the return assumption applied to this exit type. The sample returns are non-normal as are the distributions of the returns between exit types. This can impact the reliability of our results, as our sample distribution violates the assumption of normally distributed returns. The average values for transaction structures show that trade sale exits had the highest leverage and receiverships the lowest. Management ownership and the number of institutions participating in the equity syndicate, do not vary significantly between the three positive exit types, but in receivership exits management's equity stake is noticeably higher.

3. Empirical results

Table 2 presents regression statistics with both index-adjusted IRR for enterprise and equity value for our sample. Col (0) for each dependent variable reports the results of the Heckman procedure using the full sample of 2044 exited and non-exited buyouts. The Mills Lambda is significant for the enterprise value (EV) equation but not for the equity value (EQ) equation, suggesting that selection bias may be a problem only for the former. However, the Heckman procedure results are closely consistent with those for the OLS regressions presented in cols (1) and (2) for each dependent variable.

For the index-adjusted IRR of enterprise value (EV) there are significant differences if the investor experience variables are included. Without them debt coverage, management equity, size, and acquisitions are significant for both methods. Type of buyout is significant only in the OLS equation without the investor experience variable. Once investor experience variables are included only gearing and management equity are significant. With index-adjusted IRR of equity value (EQ) as the dependent variable, the size of the buy-out and whether acquisition were made post buyout are significant in both the Heckman and the OLS regressions. When the investor experience variables are introduced, the amount invested by the investor is significant and negatively associated with EQ but size of the buyout and whether acquisitions were made, as well as the buyout/buyin variable, cease to be significant. However, management equity becomes significant in this latter case. One of the explanations for these results may be related to the size variables. We only have data for the investor variables for 195 of the 321 cases, and these are likely to involve active investors who seek to make this data available as part of their PR. Hence, there may be hidden reasons why investor variables lead to sample selection bias.

To overcome the problem of absence of an exit value for the receivership cases, we undertook logistic regression analysis where both return variables are given a value of one if the index-adjusted realized return was positive and zero otherwise. The assumption of a zero return for receivership exits is alleviated because we argue that the return to private equity firms on receivership exits does not exceed zero, but no assumption of the actual exit time value is required. This allows for analysis of the factors affecting the probability of a positive return. Additionally, this will automatically truncate return variables to a comparable level. The return earned on a buyout investment at exit depends to a large extent on exit type. Exit decision and exit

type depend, among other factors, on the need for investment realization and capital market situations. Therefore, to test the likelihood of success, defined as a positive IRR, buyouts within different exit groups must be comparable.

Table 3 presents the results of the logistic regression analysis. For both probabilities, positive IRR of enterprise value and equity return, size and acquisitions are significant. Furthermore, the type of buyout variable is significant when investor experience variables are not present. Moreover, with leverage, the number of institutions (syndication) and management equity variables show signs of statistical significance between 5–10%.

Table 2
Regression analysis of the whole sample

Dependent variable	Adj. IRR (EV)			Adj. IRR (EQ)		
	(0)	(1)	(2)	(0)	(3)	(4)
Gearing	−0.003 (0.03)	−0.003 (−1.01)	−0.006 (1.74) *	0.018 (0.10) *	0.017 (−1.53)	0.001 −0.08
Debt coverage	0.003 (0.01) *	0.003 (1.69) *	0.001 (0.41)	0.000 (0.00)	0.000 (0.02)	−0.012 (1.50)
Institutions	−0.004 (0.02)	−0.013 (0.59)	−0.005 (0.16)	−0.010 (0.81)	−0.037 (0.47)	−0.058 (0.56)
Mngt Equity	0.212 (0.12) *	0.232 (1.88) *	0.537 (2.87) ***	0.322 (0.42)	0.362 (0.83)	1.118 (1.72) *
Size	0.105 (0.03) ***	0.070 (3.53) ***	−0.013 (0.39)	0.403 (0.09) ***	0.328 (4.71) ***	0.082 (0.70)
Divestments	−0.018 (0.08)	−0.034 (0.42)	−0.013 (0.13)	0.302 (0.28)	0.270 (0.96)	0.524 (1.55)
Acquisitions	0.162 (0.07) **	0.185 (2.65) ***	0.104 (1.25)	0.564 (0.24) **	0.613 (2.48) **	0.237 (0.82)
Buyout/Buyin	0.026 (0.08)	−0.106 (2.21) **	−0.003 (0.04)	−0.097 (0.27)	−0.373 (2.21) **	−0.032 (0.12)
Divest./Whole company	0.037 (0.05)	0.015 (0.31)	0.064 (0.95)	−0.007 (0.17)	−0.052 (0.31)	−0.089 (0.38)
Investor Inv. Cum. Value			0.039 (0.50)			0.357 (1.30)
Investor Inv. Amount			−0.123 (1.55)			−0.559 (2.03) **
Buyout/Buyin	0.442 (0.07) ***			0.442 (0.72) ***		
Divest./Whole company	0.060 (0.07)			0.060 (0.07)		
Size	0.144 (0.02) ***			0.144 (0.22) ***		
Year	−2.834 (0.05) ***			−2.834 (0.05) ***		
Constant	−0.964 (0.37) ***	−0.189 (1.79) *	0.189 (1.07)	−2.366 (1.24) *	−0.749 (2.02) **	0.526 (0.86)
Observations	2044	321	195	2044	321	195
R ²		0.09	0.11		0.12	0.08
Mills Lambda	0.408 (0.186) **			0.852 (0.63)		
Wald chi ²	32.53			43.53		
Prob>chi ²	0.002		0.000			

As there is some evidence that the type of buyout/buyin variable is significant as reported in Tables 2 and 3, the sample is divided by type of buyout. There are 178 management buyouts in the sample and 143 buyins, where either part or whole of the incumbent management team is replaced with new individuals. As reported in Tables 4 and 5, there are differences between the two types. For buyouts, size and acquisitions are important drivers of returns. Larger buyouts that have done acquisitions have higher returns and higher likelihood of positive IRRs. There is also evidence that buyins have been more successful in making divestments that have increased returns. On the other hand, for buyouts divestments have led to both lower returns and lower probability of positive return.

3.1. Robustness tests

This study makes the assumption that receivership exits have zero value at exit as discussed in Section 2.1. This assumption may bias the presented results because in reality receivership exits usually have an exit time value above zero. Citron et al. (2003) find that secured debt providers typically receive an average of 62% of their loan back in cases of receivership and a significant proportion are sold as going concerns. Therefore we test our sample by excluding receivership exits and analyze only other exit types (successful buyouts). Appendices A and B report the results for 200 successful buyouts using the same models as in the tables reported earlier. The observation that receivership exit buyouts are small and management has on average a higher equity proportion in these buyouts explains the results reported for this restricted sample. For IRR regressions, management equity is significant across the board. Moreover, investor experience measured as number of investments is significant with a negative sign for IRR equity. This

Note(s) to Table 2:

Standard errors in parentheses.

(0) Refers to two step Heckman test. Uncensored observations=321.

This table presents Heckman regressions for the combined sample of 321 exited buyouts and 1,723 non-exited buyouts (col 0), together with OLS regressions for the exited buyouts (cols 1 and 2) for each dependent variable. In col (0) variables in italics (buyout/buyin; divest/whole company; size; year) represent the selection equation in the Heckman procedure. The variables are: Index Adj. IRR (EV), internal rate of return (IRR) for the holding time using enterprise value (transaction value) at time of buyout (entry) and enterprise value (transaction value) at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Index Adj. IRR (Eq), IRR for the holding time using total equity invested at entry and equity value at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Gearing, amount of debt in initial entry transaction structure divided by amount of equity in initial entry transaction structure; Debt Coverage, the amount of debt in the initial entry transaction structure divided by operating profit (EBIT) for the previous fiscal year; Institutions, number of institutional (private equity) investors participating in the equity syndicate; Mngt Ownership, percentage of common equity held by management after entry transaction; Size, natural logarithm of entry time enterprise value; Divestments, dummy variable that equals minus one if the company has made divestments during the holding time and zero otherwise; Acquisitions, dummy variable that equals one if the company has made acquisitions during the holding time and zero otherwise; Buyout/Buyin, a dummy that is given a value of one if the type of buyout is buyin and zero otherwise; Divest/Whole, a dummy that is given a value of one if the source of buyout is a divestment (not whole company) and zero otherwise; LnYear, the log of a time trend; Investor Inv. Cum. Value, natural logarithm of the cumulative value of the committed capital of the investing institution at the time of buyout; Inv. Inv. Amount., natural logarithm of the cumulative number of investments the investor has done at the time of buyout.

* Statistically significant at 10% confidence level.

** Statistically significant at 5% confidence level.

*** Statistically significant at 1% confidence level.

Table 3
Logit analysis of the whole sample

Dependent variable	Probability for Positive Adj. IRR (EV)		Probability for Positive Adj. IRR (EQ)	
	(5)	(6)	(7)	(8)
Gearing	–0.013 –0.82	–0.034 (1.90) *	0.001 (0.06)	–0.03 (1.56)
Debt coverage	0.009 –1.11	0.004 –0.36	0.003 (0.35)	–0.011 (0.91)
Institutions	–0.1 –0.84	–0.121 –0.81	–0.205 (1.66) *	–0.322 (2.03) **
Mngt Equity	–0.02 –0.03	1.735 (1.69) *	–0.222 (0.31)	0.233 (0.23)
Size	0.588 (4.96) ***	0.154 –0.84	0.773 (5.97) ***	0.534 (2.66) ***
Divestments	–0.357 –0.81	–0.276 –0.51	0.074 (0.16)	0.736 (1.39)
Acquisitions	1.289 (3.26) ***	0.818 (1.70) *	1.465 (3.48) ***	1.167 (2.21) **
Buyout/Buyin	–0.575 (2.16) **	0.243 –0.63	–0.798 (2.88) ***	–0.438 (1.10)
Divest./whole company	0.115 –0.45	0.251 –0.74	–0.212 (0.79)	–0.397 (1.12)
Investor Inv. Cum. Value		0.13 –0.29		0.226 (0.48)
Investor Inv. Amount		–0.586 –1.37		–0.736 (1.61)
Constant	–1.845 (3.12) ***	0.464 –0.5	–1.748 (2.85) ***	1.038 (1.07)
Observations	321	195	321	195
LR χ^2 (4)	63.810	18.730	86.010	26.590
Prob > χ^2	0.000	0.066	0.000	0.005
Pseudo R^2	0.145	0.077	0.195	0.113

Absolute value of z statistics in parentheses.

This table presents logistic regressions for the sample of 321 exited buyouts. The variables are: Index Adj. IRR (EV), internal rate of return (IRR) for the holding time using enterprise value (transaction value) at time of buyout (entry) and enterprise value (transaction value) at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Index Adj. IRR (Eq), IRR for the holding time using total equity invested at entry and equity value at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Gearing, amount of debt in initial entry transaction structure divided by amount of equity in initial entry transaction structure; Debt Coverage, the amount of debt in the initial entry transaction structure divided by operating profit (EBIT) for the previous fiscal year; Institutions, number of institutional (private equity) investors participating in the equity syndicate; Mngt Ownership, percentage of common equity held by management after entry transaction; Size, natural logarithm of entry time enterprise value; Divestments, dummy variable that equals minus one if the company has made divestments during the holding time and zero otherwise; Acquisitions, dummy variable that equals one if the company has made acquisitions during the holding time and zero otherwise; Buyout/Buyin, a dummy that is given a value of one if the type of buyout is buyin and zero otherwise; Divest/Whole, a dummy that is given a value of one if the source of buyout is a divestment (not whole company) and zero otherwise; Investor Inv. Cum. Value, natural logarithm of the cumulative value of the committed capital of the investing institution at the time of buyout; Inv. Inv. Amount., natural logarithm of the cumulative number of investments the investor has done at the time of buyout.

* Statistically significant at 10% confidence level.

** Statistically significant at 5% confidence level.

*** Statistically significant at 1% confidence level.

Table 4
Regression comparison between buyouts and buyins

Dependent Variable	Adj. IRR (EV)	Adj. IRR (EQ)	Adj. IRR (EV)	Adj. IRR (EQ)
Group	Buyout		Buyin	
	(9)	(10)	(11)	(12)
Gearing	0.002 –0.44	0.027 (1.81) *	–0.01 (2.22) **	0.008 –0.46
Debt Coverage	0.002 –0.68	–0.009 –1.19	0.002 –0.96	0.006 –0.79
Institutions	0.006 –0.17	–0.015 –0.14	–0.027 (0.93)	–0.054 (0.47)
Mngt Equity	0.443 (2.67) ***	0.724 –1.31	–0.130 (0.70)	–0.140 (0.19)
Size	0.086 (2.86) ***	0.404 (4.02) ***	0.040 (1.50)	0.266 (2.53) **
Divestments	0.082 –0.7	0.679 (1.76) *	–0.177 (1.67) *	–0.193 (0.46)
Acquisitions	0.281 (2.71) ***	0.821 (2.37) **	0.066 (0.73)	0.345 (0.97)
Divest./Whole company	0.031 –0.46	0.024 –0.11	–0.003 (0.05)	–0.127 (0.48)
Constant	–0.368 (2.55) **	–1.104 (2.30) **	–0.023 (0.16)	–0.754 (1.35)
Observations	178	178	143	143
R ²	0.11	0.15	0.12	0.11

Standard errors in parentheses.

This table presents regressions for the sample of 321 exited buyouts divided into two groups by type of buyout. The variables are: Index Adj. IRR (EV), internal rate of return (IRR) for the holding time using enterprise value (transaction value) at time of buyout (entry) and enterprise value (transaction value) at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Index Adj. IRR (Eq), IRR for the holding time using total equity invested at entry and equity value at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Gearing, amount of debt in initial entry transaction structure divided by amount of equity in initial entry transaction structure; Debt Coverage, the amount of debt in the initial entry transaction structure divided by operating profit (EBIT) for the previous fiscal year; Institutions, number of institutional (private equity) investors participating in the equity syndicate; Mngt Ownership, percentage of common equity held by management after entry transaction; Size, natural logarithm of entry time enterprise value; Divestments, dummy variable that equals minus one if the company has made divestments during the holding time and zero otherwise; Acquisitions, dummy variable that equals one if the company has made acquisitions during the holding time and zero otherwise; Buyout/Buyin, a dummy that is given a value of one if the type of buyout is buyin and zero otherwise; Divest/Whole, a dummy that is given a value of one if the source of buyout is a divestment (not whole company) and zero otherwise.

* Statistically significant at 10% confidence level.

** Statistically significant at 5% confidence level.

*** Statistically significant at 1% confidence level.

indicates that private equity investors who invest in a large number of small LBOs (likely with small committed capital) often invest in buyouts that go bankrupt. Additionally, the results indicate that overleveraging of the target companies leads to lower returns.

Additional robustness tests exclude small buyouts. Reflecting the overall population, the sample for this study is somewhat weighted towards small buyouts. Therefore, we perform additional tests with a restricted sample that excludes buyout with enterprise value less than GBP

Table 5

Logit comparison between buyouts and buyins

Dependent variable	Probability for Positive Adj. IRR (EV)	Probability for Positive Adj. IRR (EQ)	Probability for Positive Adj. IRR (EV)	Probability for Positive Adj. IRR (EQ)
Group	Buyout		Buyin	
	(13)	(14)	(15)	(16)
Gearing	0.031 –1.28	0.021 –0.88	–0.105 (2.30) **	–0.017 (0.68)
Debt Coverage	0.001 –0.06	–0.009 –0.7	0.009 (0.71)	0.011 (0.86)
Institutions	–0.013 –0.08	–0.105 –0.6	–0.137 (0.73)	–0.295 (1.54)
Mngt Equity	0.917 –1.08	0.013 –0.01	–2.057 (1.51)	–0.608 (0.47)
Size	0.55 (3.33) ***	0.8 (4.44) ***	0.535 (2.80) ***	0.779 (3.69) ***
Divestments	0.358 –0.58	1.152 (1.73) *	–1.504 (1.94) *	–1.130 (1.58)
Acquisitions	1.928 (3.17) ***	1.867 (2.95) ***	0.617 (1.04)	0.994 (1.64)
Divest./Whole company	–0.169	–0.406	0.559	0.041
Constant	–0.5 –2.193 (2.83) ***	–1.16 –1.889 (2.37) **	(1.29) –1.499 (1.55)	(0.10) –2.469 (2.49) **
Observations	178	178	143	143
LR $\chi^2(4)$	32.03	44.75	51.94	49.02
Prob > χ^2	0.001	0.000	0.000	0.000
Pseudo R^2	0.130	0.181	0.270	0.253

Absolute value of z statistics in parentheses.

This table presents logistic regressions for the sample of 321 exited buyouts divided into two groups by type of buyout. The variables are: Index Adj. IRR (EV), internal rate of return (IRR) for the holding time using enterprise value (transaction value) at time of buyout (entry) and enterprise value (transaction value) at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Index Adj. IRR (Eq), IRR for the holding time using total equity invested at entry and equity value at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Gearing, amount of debt in initial entry transaction structure divided by amount of equity in initial entry transaction structure; Debt Coverage, the amount of debt in the initial entry transaction structure divided by operating profit (EBIT) for the previous fiscal year; Institutions, number of institutional (private equity) investors participating in the equity syndicate; Mngt Ownership, percentage of common equity held by management after entry transaction; Size, natural logarithm of entry time enterprise value; Divestments, dummy variable that equals minus one if the company has made divestments during the holding time and zero otherwise; Acquisitions, dummy variable that equals one if the company has made acquisitions during the holding time and zero otherwise; Buyout/Buyin, a dummy that is given a value of one if the type of buyout is buyin and zero otherwise; Divest/Whole, a dummy that is given a value of one if the source of buyout is a divestment (not whole company) and zero otherwise.

* Statistically significant at 10% confidence level.

** Statistically significant at 5% confidence level.

*** Statistically significant at 1% confidence level.

10 million. We addressed size related issues in Section 2.3 where we discussed how and why buyout investors prefer to focus on larger transactions. We present results for a size restricted sample in Appendices C and D. Similar to the results for the sample excluding receivership exits,

management ownership stake is an important driver of returns for larger buyouts. Moreover, this group has the financial muscle to drive value uplift with strategic acquisitions. Furthermore, investors with a large cumulative amount of capital have the experience to drive value up more than private equity companies with a large number of smaller investments.

We undertook further tests of the size effect. First, we divided our sample into three groups by size to reflect practitioners' notions of large, medium and small deal segments of the market (CMBOR, 2005): buyouts over GBP 100 million (35 observations), buyouts between GBP 100 and 10 million (163 observations) and buyouts less than GBP 10 million (123 observations). Following Link et al. (2002, 2005) we first showed with Chow tests that the variances between the three groups are significantly different from each other. We also tried to find structural breakpoints in the data with a cusum test as in Lichtenberg and Siegel (1991) but were unable to find a statistically robust way to divide our sample into size groups. Although not reported in detail here, these results show number of participants in the equity syndicate is positively related to return except in very large buyouts that suffer from syndicates that are too large. Moreover, leverage and debt coverage are positively related to value increase. However, for large buyouts, equity return is negatively related to leverage, the opposite to the expectation that leverage would result in proportionally higher equity returns when enterprise value increases. The proportion of management ownership and the probability of exit through receivership decrease the larger the buyout and managers either cannot afford or are not allowed to acquire majority stakes in large targets. Large buyouts provide higher absolute returns and receive more attention from outside equity investors who may also invest additional funds in large buyouts if needed. Larger buyouts have higher gearing resulting from alternative capital sources and steady cash flows.

4. Conclusions

Using a unique, hand-collected dataset, this study examines the IRR of enterprise value and invested equity in 321 exited buyouts in the UK between years 1995 and 2004. These include 52 IPOs, 92 trade sales, 57 secondary buyouts and 121 receiverships. We find that the mean index-adjusted EV IRR is 22.2% and the average equity IRR is 70.5% for the whole sample. IPO exits outperform trade sale and secondary buyout exits. Our evidence relating to return on enterprise value (EV) and equity (EQ) indicates that buyouts do generate value creation as well as equity value. We find some evidence that managerial equity stake in particular is more strongly associated with the EV based measure than for the EQ based measure.

Our findings do not provide evidence that for all LBOs, the governance mechanisms introduced on buyout are the main drivers of LBO returns. However, our tests on restricted samples suggest that for larger buyouts and among successful buyouts, management's equity stake is a significant factor in determining LBO returns.

The main findings of this study are that size is positively related to value increase, acquisitions during the holding period are one of the main drivers of LBO returns and that there is a difference between the return characteristics of buyouts and buyins.

With respect to size, larger buyouts perform better and provide higher investor returns. One of the main reasons for this is likely to be the higher bankruptcy risk of small LBOs. Small companies are more vulnerable to industry cycles and short-term business disturbance whereas larger corporations likely have better buffers for tougher business environments. Moreover, large enterprises can have more than one business line that can stabilize enterprises performance through cycles. Furthermore, the investing institutions are likely to provide more assistance and

guidance to large companies where they have significant equity investments at risk. This support can also include necessary additional equity injections to keep the company fully operating and to avoid covenant breaches that can result in liquidation decisions from the lenders.

Acquisitions contribute to buyout value increase and especially to the enterprise value uplift. The consistent significance of acquisitions shows that buy-and-build strategies are common among LBO companies. However, acquisitions do not always contribute to equity returns. This finding implies that acquisitions are used mainly as a mechanism to increase scale to ensure lower risks associated with the investments. Moreover, acquisitions can also be a sign of industry consolidation that lower competition and allows to building economies of scale.

With regard to differences between the return characteristics of buyout and buyins, we find that buyout returns are driven by acquisitions during the holding period. There is no evidence that buyin return values would be impacted by acquisitions. Moreover, our results indicate that buyout equity returns are negative impacted by divestments while the opposite is true for buyins. This finding implies that private equity companies that initiate institutional buyins are able to drive their returns through streamlining of target company operations.

Overall, the reported empirical findings and the resulting conclusions add to work that does not explicitly support Jensen's (1986, 1989) theory that the governance mechanisms of buyouts solve agency problems associated with free cash flow and increase equity value. Rather, our evidence contributes to the heterogeneity view of buyouts, particularly with respect to the size of the transaction and whether it is driven by insider or outsider management. The importance of managerial equity ownership and acquisition activity but not divestment actions is consistent with the importance of incentivized and entrepreneurial management seeking to realize growth opportunities rather than focus on downsizing (Wright et al., 2000).

Appendix A. Regression analysis of non-receivership exits

This table presents regressions for the sample of 200 exited non-receivership buyouts. The variables are: Index Adj. IRR (EV), internal rate of return (IRR) for the holding time using enterprise value (transaction value) at time of buyout (entry) and enterprise value (transaction value) at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Index Adj. IRR (Eq), IRR for the holding time using total equity invested at entry and equity value at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Gearing, amount of debt in initial entry transaction structure divided by amount of equity in initial entry transaction structure; Debt Coverage, the amount of debt in the initial entry transaction structure divided by operating profit (EBIT) for the previous fiscal year; Institutions, number of institutional (private equity) investors participating in the equity syndicate; Mngt Ownership, percentage of common equity held by management after entry transaction; Size, natural logarithm of entry time enterprise value; Divestments, dummy variable that equals minus one if the company has made divestments during the holding time and zero otherwise; Acquisitions, dummy variable that equals one if the company has made acquisitions during the holding time and zero otherwise; Buyout/Buyin, a dummy that is given a value of one if the type of buyout is buyin and zero otherwise; Divest/Whole, a dummy that is given a value of one if the source of buyout is a divestment (not whole company) and zero otherwise; Investor Inv. Cum. Value, natural logarithm of the cumulative value of the committed capital of the investing institution at the time of buyout; Inv. Inv. Amount, natural logarithm of the cumulative number of investments the investor has done at the time of buyout.

Dependent variable	Adj. IRR (EV)		Adj. IRR (EQ)	
Group	Non-receiving exits			
	(17)	(18)	(19)	(20)
Gearing	−0.006 (1.82) *	−0.006 (1.74) *	0.006 (0.51) *	0.001 (0.08)
Debt Coverage	0.003 −1.39	0.001 −0.41	−0.004 (0.56)	−0.012 (1.50)
Institution	−0.01 −0.34	−0.005 −0.16	−0.071 (0.69)	−0.058 (0.56)
Mngt equity	0.514 (2.90) ***	0.537 (2.87) ***	1.318 (2.14) **	1.118 (1.72) *
Size	−0.019 −0.66	−0.013 −0.39	0.078 (0.76)	0.082 (0.70)
Divestments	−0.006 −0.06	−0.013 −0.13	0.473 (1.40)	0.524 (1.55)
Acquisitions	0.112 −1.33	0.104 −1.25	0.298 (1.02)	0.237 (0.82)
Buyout/Buyin	0.029 −0.4	−0.003 −0.04	0.169 (0.67)	−0.032 (0.12)
Divest./Whole company	0.077 −1.15	0.064 −0.95	−0.029 (0.12)	−0.089 (0.38)
Investor Inv. Cum. Value		0.039 −0.5		0.357 (1.30)
Investor Inv. Amount		−0.123 −1.55		−0.559 (2.03) **
Constant	0.073 −0.49	0.189 −1.07	0.290 (0.56)	0.526 (0.86)
Observations	200	195	200	195
R2	0.09	0.11	0.12	0.08

Standard errors in parenthesis.

* Statistically significant at 10% confident level.

** Statistically significant at 5% confident level.

*** Statistically significant at 1% confident level.

Appendix B. Logit analysis of non-receivership exits

This table presents logistic regressions for the sample of 200 exited non-receivership buyouts. The variables are: Index Adj. IRR (EV), internal rate of return (IRR) for the holding time using enterprise value (transaction value) at time of buyout (entry) and enterprise value (transaction value) at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Index Adj. IRR (Eq), IRR for the holding time using total equity invested at entry and equity value at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Gearing, amount of debt in initial entry transaction structure divided by amount of equity in initial entry transaction structure; Debt Coverage, the amount of debt in the initial entry transaction structure divided by operating profit (EBIT) for the previous fiscal year; Institutions, number of institutional (private equity) investors participating in the equity syndicate; Mngt Ownership, percentage of common equity held by management after entry transaction; Size, natural logarithm of entry time enterprise value; Divestments, dummy variable that equals minus one if the company has made divestments during the holding time and zero otherwise; Acquisitions, dummy variable that equals one if

the company has made acquisitions during the holding time and zero otherwise; Buyout/Buyin, a dummy that is given a value of one if the type of buyout is buyin and zero otherwise; Divest/Whole, a dummy that is given a value of one if the source of buyout is a divestment (not whole company) and zero otherwise; Investor Inv. Cum. Value, natural logarithm of the cumulative value of the committed capital of the investing institution at the time of buyout; Inv. Inv. Amount., natural logarithm of the cumulative number of investments the investor has done at the time of buyout.

Dependent variable	Probability for positive		Probability for positive	
	Adj. IRR (EV)		Adj. IRR (EQ)	
Group	Non-receiving exits			
	(21)	(22)	(23)	(24)
Gearing	−0.032 (1.94) *	−0.034 (1.90) *	0.018 (1.09) *	0.030 (1.56)
Debt Coverage	0.009 (0.75)	0.004 (0.36)	−0.004 (0.32)	−0.011 (0.91)
Institution	−0.146 (0.01)	−0.121 (0.81)	−0.340 (2.25) **	−0.322 (2.03)
Mngt equity	1.337 (1.47)	1.735 (1.69) *	0.710 (0.76)	0.233 (0.23)
Size	0.165 (1.08)	0.154 (0.84)	0.472 (2.83) ***	0.534 (2.66) ***
Divestments	−0.138 (0.27)	−0.276 (0.51)	0.529 (1.05)	0.736 (1.39)
Acquisitions	0.814 (1.71) *	0.818 (1.70) *	1.098 (2.13) **	1.167 (2.21) **
Buyout/Buyin	0.29 (0.8)	0.243 (0.63)	−0.108 (0.29)	−0.438 (1.10)
Divest./Whole company	0.267 (0.8)	0.251 (0.74)	−0.341 (0.98)	−0.397 (1.12)
Investor Inv. Cum. Value		0.130 (0.29)		0.226 (0.48)
Investor Inv. Amount		−0.586 (1.37)		−0.736 (1.61)
Constant	−0.23 (0.31)	0.464 (0.50)	0.081 (0.10)	1.038 (1.07)
Observations	200	195	200	195
LR chi2 (4)	13,142	18,730	17,700	26,590
Prob>chi ²	0.142	0.066	0.038	0.003
Pseudo R2	0.054	0.077	0.074	0.114

Absolute value of z statistics in parentheses.

* Statistically significant at 10% confident level.

** Statistically significant at 5% confident level.

*** Statistically significant at 1% confident level.

Appendix C. Regression analysis of sample excluding under GBP 10 million buyouts

This table presents regressions for the sample of 204 buyouts with enterprise value exceeding GPB 10 million. The variables are: Index Adj. IRR (EV), internal rate of return (IRR) for the holding time using enterprise value (transaction value) at time of buyout (entry) and enterprise value (transaction value) at exit adjusted for FTSE 100 index change between entry transaction

and exit transaction dates; Index Adj. IRR (Eq), IRR for the holding time using total equity invested at entry and equity value at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Gearing, amount of debt in initial entry transaction structure divided by amount of equity in initial entry transaction structure; Debt Coverage, the amount of debt in the initial entry transaction structure divided by operating profit (EBIT) for the previous fiscal year; Institutions, number of institutional (private equity) investors participating in the equity syndicate; Mngt Ownership, percentage of common equity held by management after entry transaction; Size, natural logarithm of entry time enterprise value; Divestments, dummy variable that equals minus one if the company has made divestments during the holding time and zero otherwise; Acquisitions, dummy variable that equals one if the company has made acquisitions during the holding time and zero otherwise; Buyout/Buyin, a dummy that is given a value of one if the type of buyout is buyin and zero otherwise; Divest/Whole, a dummy that is given a value of one if the source of buyout is a divestment (not whole company) and zero otherwise; Investor Inv. Cum. Value, natural logarithm of the cumulative value of the committed capital of the investing institution at the time of buyout; Inv. Inv. Amount., natural logarithm of the cumulative number of investments the investor has done at the time of buyout.

Dependent variable	Adj. IRR (EV)		Adj. IRR (EQ)	
Group	LBOs with enterprise value over GBP 10 million			
	(25)	(26)	(27)	(28)
Gearing	−0.002	−0.006	0.018	−0.003
	−0.73	(1.74) *	(1.46)	(0.20)
Debt Coverage	0.001	0.001	−0.008	−0.011
	−0.6	−0.29	(1.00)	(1.35)
Institutions	−0.016	−0.014	−0.042	−0.036
	−0.63	−0.44	(0.45)	(0.33)
Mngt equity	0.538	0.68	1.890	2.303
	(3.03) ***	(3.13) ***	(2.90) ***	(3.05) ***
Size	0.057	0.002	0.326	0.066
	(1.77) *	−0.06	(2.74) ***	(0.48)
Divestments	−0.033	0.001	0.326	0.475
	−0.35	−0.01	(0.95)	(1.32)
Acquisitions	0.118	0.054	0.351	0.046
	−1.42	−0.6	(1.15)	(0.15)
Buyout/Buyin	−0.046	0.007	−0.190	0.109
	−0.69	−0.08	(0.79)	(0.38)
Divest./Whole company	0.024	0.068	−0.050	−0.001
	−0.39	−0.92	(0.22)	(0.01)
Investor Inv. Cum. Value		0.059		0.555
		−0.69		(1.87) *
Investor Inv. Amount		−0.127		−0.640
		−1.51		(2.20) **
Constant	−0.228	0.069	−1.066	−0.248
	−1.49	−0.31	(1.90) *	(0.32)
Observations	204	162	204	162
R2	0.07	0.11	0.09	0.13

Standard errors in parentheses.

* Statistically significant at 10% confidence level.

** Statistically significant at 5% confidence level.

*** Statistically significant at 1% confidence level.

Appendix D. Logit analysis of sample excluding under GBP 10 million buyouts

This table presents regressions for the sample of 204 buyouts with enterprise value exceeding GBP 10 million. The variables are: Index Adj. IRR (EV), internal rate of return (IRR) for the holding time using enterprise value (transaction value) at time of buyout (entry) and enterprise value (transaction value) at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Index Adj. IRR (Eq), IRR for the holding time using total equity invested at entry and equity value at exit adjusted for FTSE 100 index change between entry transaction and exit transaction dates; Gearing, amount of debt in initial entry transaction structure divided by amount of equity in initial entry transaction structure; Debt Coverage, the amount of debt in the initial entry transaction structure divided by operating profit (EBIT) for the previous fiscal year; Institutions, number of institutional (private equity) investors participating in the equity syndicate; Mngt Ownership, percentage of common equity held by management after entry transaction; Size, natural logarithm of entry time enterprise value; Divestments, dummy variable that equals minus one if the company has made divestments during the holding time and zero otherwise; Acquisitions, dummy variable that equals one if the company has made acquisitions during the holding time and zero otherwise; Buyout/Buyin, a dummy that is given a value of one if the type of buyout is buyin and zero otherwise; Divest/Whole, a dummy that is given a value of one if the source of buyout is a divestment (not whole company) and zero otherwise; Investor Inv. Cum. Value, natural logarithm of the cumulative value of the committed capital of the investing institution at the time of buyout; Inv. Inv. Amount., natural logarithm of the cumulative number of investments the investor has done at the time of buyout.

Dependent variable	Probability for positive Adj. IRR (EV)		Probability for positive Adj. IRR (EQ)	
Group	LBOs with enterprise value over GBP 10 million			
	(29)	(30)	(31)	(32)
Gearing	−0.011	−0.041	−0.001	−0.036
	−0.65	(2.15) **	(0.08)	(1.77) *
Debt Coverage	0.009	0.007	−0.002	−0.010
	−0.88	−0.56	(0.22)	(0.81)
Institutions	−0.122	−0.158	−0.229	−0.370
	−0.95	−1	(1.73) *	(2.14) **
Mngt equity	1.734	2.621	1.221	1.758
	(1.90) *	(2.13) **	(1.29)	(1.32)
Size	0.523	0.26	0.744	0.603
	(2.99) ***	−1.17	(3.93) ***	(1.34) **
Divestments	−0.26	−0.104	0.552	1.064
	−0.54	−0.81	(1.10)	(1.88) *
Acquisitions	1.063	0.674	1.257	0.905
	(2.37) **	−1.33	(2.59) ***	(1.60)
Buyout/Buyin	−0.142	0.265	−0.474	−0.210
	−0.44	−0.63	(1.42)	(0.47)
Divest./Whole company	0.078	0.185	−0.223	−0.363
	−0.26	−0.49	(0.71)	(0.89)
Investor Inv. Cum. Value		0.454		0.396
		−0.97		(0.76)
Investor Inv. Amount		−0.787		−0.874

Appendix D (continued)

Appendix B (continued)

Dependent variable	Probability for positive Adj. IRR (EV)		Probability for positive Adj. IRR (EQ)	
Group	LBOs with enterprise value over GBP 10 million			
	(29)	(30)	(31)	(32)
Constant	−2.204 (2.74)***	(1.72) * 0.636 −0.54	−1.977 (2.37)**	(1.74) * −0.260 (0.20)
Observations	204	162	204	162
LR chi2 (4)	20,020	18,300	27,370	25,550
Prob>chi ²	0.018	0.075	0.001	0.007
Pseudo R ²	0.072	0.090	0.099	0.136

Absolute value of z statistics in parentheses.

* Statistically significant at 10% confidence level.

** Statistically significant at 5% confidence level.

*** Statistically significant at 1% confidence level.

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