

Keep taking the private equity medicine?

How operating performance differs between secondary deals and companies
that return to public markets*

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Abstract

Although the number of secondary buy-out deals has increased noticeable in the last few years, firms exited through a secondary buy-out (secondary firms) clearly underperform firms turned public (IPO firms) in the first three full years after the exit. Evidence suggests that this underperformance can be partially explained by a longer holding period in the previous deal and by the lack of experience of the purchasing private equity investor but also shows that secondary firms invest much less than IPO firms after the exit. Given the overall results of this paper it seems premature to conclude that the increase in secondary buy-out deals and so the increase in the ultimate holding periods of firms undergoing private equity medicine is a sign that Private Equity is a superior long-term organizational form.

Key words: Secondary buy-out, IPO, private equity, operational performance

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1. Introduction

The selling of a portfolio company (firm) by the private equity investor is a critical moment faced by both the private equity investor and the firm. For private equity investors, the choice and timing of a good exit strategy allows them to extract more value from the firm, not only in determining the actual achieved return on investment but also in contributing to the investor's good track record of successful exits which facilitates the raising of additional funds. For the firms being exited the choice of exit implies a new reality, which could include different shareholders, possibly new management, different management incentives and different agency conflicts.

Going public through an initial public offering (IPO) or a sale to a corporate acquirer (trade sale) historically have been the most important channels used by private equity investors to exit their investments. However, IPOs and trade sales are not the only routes used by private equity investors to exit their investments and in the last decade were no longer the most used. In recent years the use of secondary buy-outs as an exit route has increased noticeably. Progressively more private equity investors are selling to one another as an exit strategy. In June 2007 the Financial Times stated that one of the key features of the private equity industry in the first half of 2007 was that "rather than exiting investments through the traditional route of initial public offerings, buy-out groups are turning increasingly to sales to trade buyers or even rival financial sponsors". Consistent with these findings, Strömberg (2008) shows that secondary buy-outs became the second most common route during the period between 1970 and 2007, accounting for 24% of all exits¹ and "have increased in importance over the last decade". More recently, in November 2011, unquote.com, an Incisive Media online service covering Europe's private equity markets, recorded a significant hike in secondary buy-outs activity in 2011, representing "as much as two thirds of market value in the UK and France".

The substantial body of both empirical and theoretical evidence previously gathered regarding the impact of private equity ownership on a firm only studied and measured this impact when the firm made the transition either from public to private ownership² in what is

¹ Trade sales are the most common exit route accounting for 38% of all exits.

² See for instances Kaplan (1989).

known as a Public-to-Private³ transaction or from private to public ownership⁴ through an IPO. The use of a secondary buy-out as an exit strategy poses different challenges to both the private equity investors and the firms being exited and raises a new set of question that hasn't been addressed so far.

First, it raises questions regarding the economic value-added activities of private equity investors since, in a second private equity deal, the main sources of operating improvements suggested in previous studies that largely motivate private equity deals (agency related costs in the case of former public companies, and investment constraints and lack of management skills in the case of former private companies) are unlikely to exist in a secondary buy-out deal. In this situation, what it left to be done by the new private equity investor to improve the firm's operating performance that could not have been done by the previous owner? Whether the capacity to improve the operating performance of a secondary firm exists or not in a private equity investment is of extreme importance as the absence of this capacity reduces the ability by private equity investors to obtain returns to tax benefits and changes in valuation multiples (Guo et al., 2009). To make things more difficult, according to Jenkinson and Stucke (2011), tax benefits are normally included in premiums paid to the previous owner, and returns based on changes in valuation multiples cannot persist forever and are even harder to achieve under the less favorable credit and general market conditions that we live with today.⁵

Second, the study of secondary buy-out exits helps in understanding the post-exit behavior of private equity-backed firms since it allows comparison between two alternative exit routes (IPO and secondary buy-outs). Empirical evidence of the long-term post-exit (financial and operational) performance of private equity-backed firms is not conclusive and focuses only on firms exited through a public offering.

Some authors argue that private equity-backed firms achieve positive and significant financial performance after the public offering (Levis, 2010; Cao and Lerner, 2009) and relatively superior post-exit operating performance compared to non-private equity-backed firms (Jain and Kini, 1995). However, Holthausen and Larcker (1996) argue that there is no

³ Recently Chung (2009) studied the impact and motives of a leverage buy-out on a privately held firm, although excluding secondary deals.

⁴ See, for instances, Jain and Kini (1994), Degeorge and Zeckhauser (1993).

⁵ Consistent with this idea, in November 2011, Preqin, a supplier of data and analysis to the alternative assets industry, stated in their monthly newsletter that “[S]econdary buyouts remain one of the most polarizing elements of private equity - are they positive or negative for investors?”

evidence of poor operating or financial performance for private equity-backed firms after a public offering, in comparison with their peers, though they found weak evidence of a decline in performance. Similarly, although Murray et al. (2006) have found that private equity-backed firms experience a marked decline in operating performance in the five years after the IPO they have found no significant difference between private equity-backed and non-private equity-backed firms. They have found however a difference in performance between firms backed by prestigious and non-prestigious private equity firms. Jelic et al. (2005) found no evidence of either significant financial underperformance or that private equity-backed firms performed better than their non-private equity-backed counterparts in the long run. Brav and Gompers (1997) found that private equity-backed firms (financial) outperformed non-private-equity-backed firms in the five years after the public offering on the basis of equally-weighted returns but that the difference was significantly reduced on the basis of value-weighted returns.

On the other hand, other authors found a decline in post-exit operating performance of firms exited through a public offering and suggested that this could be explained by models of asymmetric information between owners and the market (Degeorge and Zeckhauser, 1993), worsened management incentives, and other agency costs related to a more disperse ownership (Jain and Kini, 1994⁶). Therefore, the actual literature may suggest that firms exited through a secondary buy-out may have a better operating performance than those firms exited through an IPO, since the asymmetric information between buyers and sellers is lower and management incentives and ownership dispersion tend to remain relatively constant after a secondary buy-out.

Finally, the study of the post-exit operating performance of secondary firms will help to clarify Strömberg (2008)'s suggestion that the increased importance of secondary buy-outs and so the increase in the ultimate holding period⁷ of firms undergoing a Leveraged Buy-Out (LBO) / Private Equity (PE) organizational structure implies that the PE organizational firm is becoming more permanent as Jensen (1989) predicted due the fact that it is a superior long-term governance structure. However, as also pointed out by Strömberg, Rappaport (1990) considered the PE organizational structure to be short term "shock therapy", to improve

⁶ Although in this study all firms that made a public offering are taken into account and not only PE-backed firms.

⁷ Defined as the time between the initial LBO/PE transaction and the transaction terminating the LBO/PE ownership status.

inefficient and badly operating performance firms in order to return the firms to the market after a few years and thus concluded that the PE organizational structure cannot sustain their advantage over other governance structures for a long time.

Although it is commonly accepted⁸ that private equity firms create value in leveraged buy-out transactions through improvement of the operating performance⁹, if the PE organizational structure is a superior long-term governance structure and not merely a short term “shock therapy” structure, firms exited through a secondary buy-out should be able to out-perform firms exited through an IPO, in order to compensate investors for both the huge transaction fees paid to third parties in a secondary buy-out transaction and the illiquid nature of the private equity investment when compared to a public equity market.

By presenting evidence regarding the operating performance change of 308 firms exited by private equity investors through either a secondary buy-out or an IPO between January 2000 and June 2007, this study seeks to fill lacunae in the existing literature and help to answer all of these questions.

This study’s findings show that firms exited through either an initial public offering (IPO firms) or a secondary buyout (secondary firms) experience significance increases in total sales, capital expenditures (CAPEX)¹⁰ and earnings before interest, taxes, depreciation and amortization (EBITDA) in the first three full years after the exit compared to the last full year *before* the exit. However, contrary to expectations, IPO firms clearly out-perform secondary firms. For instance, the median increase in EBITDA for IPO firms during the first three full years after the exit is equal to 55.6% while in secondary firms the median increase, over the same period, is just 29.3%. IPO firms and secondary firms still experience a positive change in operating performance after adjustment for industry changes. Although the difference between IPO firms and secondary firms is not very substantial after being adjusted by industry changes, IPO firms still present a median increase on EBITDA during the first three full years after the exit, a significant 4.7 percentage points (pp.) higher than secondary

⁸ See for instance Kaplan (1989), Cao and Lerner (2009) and Guo et al. (2009).

⁹ As a consequence of better incentives to the management team and better governance (better monitoring and control).

¹⁰ Capital expenditures, in the context of this paper, should be read as any funds spent/received in the acquisition, sale or upgrade of any fixed asset, including the acquisition of additional companies or the sale of a major part of the firm and is estimated to be equal to the increase/decrease in fixed assets (net of accumulated depreciations and amortizations) plus the year depreciation and amortization

firms. However, these changes in EBITDA do not control for new investment/disinvestment made after the exit by IPO firms, secondary firms and comparable firms.

In order to control for those investments/disinvestments, EBITDA is related to the end of the year total assets. Although the ratio EBITDA/Total Assets declines during the first three full years after the exit for both IPO firms and secondary firms, this decline is much more severe for secondary firms (with a median of -9.4%) than for IPO firms (-1.2%). Moreover, once adjusted by industry changes, the median increase in the EBITDA/Total Assets ratio is positive for IPO firms and negative for secondary firms.

Despite the fact that secondary firms underperform IPO firms (in terms of EBITDA), they manage to increase their net cash flow (EBITDA minus CAPEX) substantially more than IPO firms. This increase is even more noticeable in the third full year after the exit and is even more significant once adjusted by industry changes. This is only possible due to the huge difference in CAPEX between secondary firms and IPO firms. While the median increase in CAPEX by IPO firms is 88.1% (60.7% industry adjusted), during the first three full years after the exit, the median increase by the secondary firms is just 14.6% (17.7%), during the same period.

Finally, the difference in the operating performance between IPO firms and secondary firms persists (and is even more significant) after controlling for pre-exit firm characteristics, for previous deal characteristics, and endogeneity in the exit route choice.

There are a number of potential explanations for the operating underperformance of secondary firms that have been tested. The first explanation is related to the length of time the firm has been managed by the previous private equity investor (holding period). As the deals exited through a secondary buy-out tends to be kept longer than the deals exited through a public offering, this could mean that fewer operating inefficiencies remain to be improved by the new private equity investor. A second explanation is associated with the purchasing private equity firm's (i.e. the one buying in a secondary buy-out) lack of experience when compared with the selling private equity firm since, according to Jelic et al. (2005), the presence of a more reputable/experienced private equity firm has a positive influence on the firm's performance.

A third explanation for under-performance amid secondary firms could be linked to the financial constraints imposed by the new leveraged deal on the investment capacity of the secondary firm. The increase of firm debt that occurs when the new leveraged buy-out deal is established, not only increases the pressure on the firm management to generate enough cash-flow to face debt-service payments but also increases the financial constraints faced by the

firm in terms of raising new debt if good investment opportunities arise. If secondary firms cannot internally generate enough cash-flow to repay their massive debt, remunerate their shareholders and invest in new projects, the firm will have to cut into their capital expenditures (even value-increasing projects) in order to generate the (net) cash-flow needed. This reduction in CAPEX could have an impact on the future operating performance of secondary firms.

The results of this paper suggest that secondary firm operating underperformance relative to IPO firms could indeed be explained, at least partially, by the secondary firm's longer holding period on the previous deal and by the lack of experience of the purchasing private equity firms. However, the results also suggest that secondary firms compensate for operating underperformance by reducing their CAPEX, i.e., by cutting (or postponing) investments, in order to fulfill their high debt related payments. This, together with the fact that secondary firms underperform IPO firms in the first three years after the exit, indicates that it may be premature (as suggested by Strömberg (2008)) to conclude that the increase in secondary buy-out deals, and thus the increase in ultimate holding periods of firms undergoing LBO organizational structure implies that the LBO organizational firm is a superior long-term governance structure as predicted by Jensen (1989).

This paper proceeds as follows. The next chapter describes the sample and the methodology of the research. Chapter 3 presents evidence of how IPO firms and secondary firms perform after the exit. Chapter 4 deals with the possibility that the results are driven by pre-exit conditions and endogeneity in the exit route choice. Chapter 5 examines potential explanations for secondary firm operating underperformance and Chapter 6 concludes.

2. The sample and methodology

2.1 Sample description and data sources

The dataset used in this paper was self-collected from Capital IQ and Private Equity Insight databases in a multi-step and complex process and consists of all European firms exited by private equity investors either through initial public offerings or secondary buy-outs, between 2000 and June 2007, with a transaction (exit) value that exceeded \$50 million (£25 million)¹¹.

¹¹ The intention of this size criterion is to restrict the sample to larger, more fully disclosed transactions. This criterion also excludes venture capitalist exits. Venture capitalist investments normally imply several rounds of

638 firms exited through a secondary buy-out and 243 firms exited through an IPO satisfied these conditions. The sample was then reduced to 345 secondary buy-outs and 117 IPOs in order to include only the firms for which i) the private equity firm(s) and fund(s) involved are clearly identified; ii) the start date of the previous deal is known; and iii) financial data is available in the last full year prior to the exit. More details on this process are presented in Sousa (2010).

Finally, post-exit financial data for at least two financial exercises is only available for 194 firms exited through a secondary buy-out and 114 firms exited through an IPO, for a total of 308 exits. Financial statements were obtained from the Bureau Van Dijk (BVD), databases (Orbis and Fame) in the case of secondary buy-out exits and from Capital IQ in the case of IPO exits¹². Table 1 summarizes the distribution of these exits over time. The number of IPOs drops off dramatically after 2000 and just recovers in 2004. This is consistent with the end of the 2000-bubble. On the other hand the use of secondary buy-outs as an exit route rose steadily after 2000 and remarkably after 2004 to reach its peak in 2006 and in the first half of 2007.

For each firm/exit, information was gathered regarding the length of the first deal (holding period), private equity firm(s) and fund(s) involved, country of origin and firm age from the Thomson Venture Expert database and occasionally from the Internet and from Capital IQ and BVD databases. Table 2, Panel A shows that although more than half of the firms had their headquarters in the United Kingdom and that those firms together with French, German and Swedish firms represent more than 80% of the sample, twenty countries are represented in our sample. Table 2, Panel B also presents the private equity firms involved in each exit and although only seven investors are responsible for half of the deals, more than 100 investors are represented in our sample.

Table 3 provides descriptive statistics on all 308 exits/firms (114 IPO firms and 194 secondary firms) that meet all criteria used to select our final sample. Table 3 also presents, in parenthesis, the same statistics for the 345 secondary firms for which accounting data is

financing by several investors that used, very often, more than one fund and exiting at different moments in time. This would make it very difficult to precisely define the beginning and the exiting of a deal.

¹² Although IPO firms' accounting data is also available on Bureau Van Dijk (BVD) databases, when generating comparable companies needed for industry-adjusted changes, BVD databases don't allow including only public companies in the "Peer group". This is only possible in the Capital IQ database. On the other hand, to gather all financial data from Capital IQ database is not possible as accounting data for private firms is not available on Capital IQ.

available before the exit but not necessarily after the exit and it shows there is no significant difference between both samples of secondary firms.

Table 3, Panel A, reports specific firm's characteristics. It can be seen that the median¹³ age of all exited firms is 20.5 years. Secondary firms have a median age of 23 years while IPO firms just 17 years, when they are exited by the private equity investor. This result contradicts several previous papers¹⁴ which found that older companies are more likely to go public because they face less uncertainty and so face less indirect costs, e.g., underpricing, etc.. In the last full year before the exit, all firms in the sample have a median book asset value of \$116.9 million (average of \$384.9 million), which compares with \$284.0 million (\$525.8 million) of Private-to-Public firms in the Kaplan (1989) sample. IPO firms are larger firms than secondary firms and have, on average, higher values of sales and EBITDA in the last year before the exit. However, the median total sales and EBITDA values are larger in secondary firms than in IPO firms. This skewedness in total sales and EBITDA data is caused by the presence in the sample of the very large firms exited through an IPO, such as the Smurfit Kappa Group in Ireland and the Yell Group and Debenhams in the United Kingdom. Finally, secondary firms had, in the last full year before the exit, a lower level of CAPEX (median and average) than IPO firms and were able to generate more net (operating) cash flow than IPO firms, during the same period.

Table 3, Panel B, reports (previous) private equity deal characteristics, such as data on private equity funds and firms involved and length of time the private equity investor had held the firm before the exit (holding period). The average (median) holding period for all firms in the sample is 48.1 months (44.6 months), in line with the 3.7 years reported by Schwiendbacher (2002) and the 3 to 5 year period suggested by Fenn et al. (1997). Secondary firms were held on average (median) 51.7 months (47.0 months), 10 months (7 months) longer than IPO firms. The private equity funds involved in the deals have an average size of \$868.1 million. However, this average is dominated by some large funds, such as Blackstone Capital Partners IV and Apax Europe VI, and so the median fund size is just \$557.2 million. The average (median) size of private equity funds that chose an IPO as an exit route is \$1 billion (\$608 million) while secondary buy-out exits are chosen by smaller funds with an average (median) size of \$759.3 million (\$525 million).

¹³ Median is preferable and used as the measure of central tendency throughout the paper rather than means to control for outliers that dominate the means and make the distribution very skewed

¹⁴ Pagano et al. (1998), Gompers (1995), Cumming and Macintosh (2003) and Schwiendbacher (2004)

Private equity firms had, at the time of the exit, an average (median) of 20.6 years (20.5 years) of experience¹⁵ with no significant difference between exit routes. This last result, however is inconsistent with both the “grandstanding hypothesis”, suggested by Gompers (1996), which says that younger private equity firms benefit more from a successful initial public offering since it enables them to signal their quality to potential investors for their next funds and the “reputation hypothesis” suggested by Barry et al. (1990) who found that more reputable private equity firms were more likely to use an IPO to exit their investments because they would incur in less indirect costs due to less asymmetric information, such as underpricing.

2.2 Methodology

In order to examine the 308 firms’ operating performance during the first three full years after the exit, changes in total sales, CAPEX and two cash-flow variables to control for changes in operating performance are calculated. The first cash-flow variable is EBITDA which measures the cash generated from the company’s activity (before interest and taxes). The second cash-flow variable is net (operating) cash-flow¹⁶, which equals EBITDA minus CAPEX. Net cash-flow measures the (net) cash generated from the company’s activity that is available for debt-service payments and to remunerate equity. It is a useful measure of operating performance since it is the primary component in a net-present-value analysis used to value a firm since it takes into account investments the firm needs to make in order to achieve future cash flows. Each cash-flow variable, as in Kaplan (1989), is computed in levels, as a fraction of end-of-period total assets, and as a fraction of total sales in order to partially control for divestitures and acquisitions after the exit.

All these variables are measured before taxes. This is very important because it allows differentiating changes that occurred in the firm due to managerial operating decisions from

¹⁵ If the private equity firm was founded before 1970, I assumed 1970 as the first year of activity in the private equity industry because it would be very hard to have any experience in the private equity industry before that as the private equity industry really started to arise in the 70’s.

¹⁶ These two variables do not include changes in working capital, and so two alternatives measures would be EBITDA minus the change in working capital and Net Cash Flow minus the change in working capital. However working capital data are not available for the majority of firms and although this could be approximately calculated from financial statements they would be difficult to interpret in the presence of acquisitions/sales of assets (Kaplan, 1989).

the changes due to taxes or financial decisions. According to Guo et al. (2009) both changes, together with increases on market valuation multiples, economically explain returns to capital.

In accordance with several studies, the change in operating variables is measured as the median¹⁷ change from the last full year before the exit (t-1) to the first three full fiscal years after the exit (t+1, t+2 and t+3), i.e., the median value of $[(X_i^{t+j}/X_i^{t-1}) - 1]$, where *i* represents the firm, *t* the fiscal year of the exit, and *j* represents the fiscal year after the exit. The three year (after the exit) average value for each variable is also computed (3y av.) and the median changes, from the last fiscal year before the exit, are also calculated. These medians measure the change in the operating variables during the three year period after the exit, regardless of the year of change. Results for the fiscal year that include after and before exit data are not considered in the analysis, because it is very difficult (if not impossible) to separate pre- and post-exit operating performance.

To adjust for economy and/or industry effects, the change on operating variables net of industry-adjusted changes is also measured. The industry-adjusted operating performance of a firm equals the change in the variable for the exited firm minus the median change of all comparable firms. The selection process of comparable firms is detailed in the Appendix.

3. How does operating performance change after exit?

Tables 4, 5, 6 and 7 summarize the secondary firms and IPO firms (raw and industry-adjusted) changes in total sales, CAPEX, EBITDA and net cash-flow, respectively. The medians changes from the last fiscal year before the exit (-1) to each of the first three full years after the exit (+1, +2 and +3) and to the first three full year average (3y) are presented. Changes in EBITDA and net cash-flow are also measured in levels (Panel A), as a fraction of end-of-year total assets (Panel B) and as fraction of total sales (Panel C). In addition to the median changes for each group of firms, the differences between both groups' medians are also presented. The reported significance tests for median changes are based on the Wilcoxon signed-rank test, while the reported significance tests for the differences on median changes

¹⁷ Several earlier studies by Kaplan (1989), Jain and Kini (1994 and 1995) and Guo et al. (2009) also use the median instead of the average to measure change on operating performance in order to control for outliers that dominate the average in some accounting variables and ratios.

between secondary firms and IPO firms are based on a two-sample Wilcoxon rank-sum (Mann-Whitney) test.

3.1 Total sales

Table 4 shows a median positive and significant change in total sales, for both secondary firms and IPO firms, in each of the first three full years after the exit. Secondary firms increase their total sales by 20.6%, 23.7% and 36.2%, respectively in year +1, +2, +3 relative to the last year before the exit, while IPO firms increase their total sales by 41.9%, 77.1% and 88.1%, over the same period. The median increase for the average total sales over the three year period after the exit is equal to 24.2% in secondary firms and to 62.6% in IPO firms. All the median changes are significant at 1% significance level. Although the industry-adjusted median changes on total sales are smaller, the changes are still positive and very significant for all periods and so the increase on total sales of both secondary firms and IPO firms can only be partially attributed to industry/economy effects. Finally, the total sales median increase is higher in IPO firms than in secondary firms in every year after the exit. The differences between both groups' median changes are substantial and significant over the entire period for raw and industry-adjusted changes.

3.2 CAPEX

Table 5 shows a positive and significant median change in CAPEX in both secondary firms (14.6%) and IPO firms (88.1%), from the last full year before the exit to the average CAPEX level in the first three years after the exit. The industry-adjusted figures show a similar pattern as the CAPEX net of industry changes increased 60.7% in IPO firms while increasing 17.7% in secondary firms during the same period. These results suggest that the increase in CAPEX cannot be attributed to industry tendencies.

Moreover, in the case of IPO firms, although the median increase in CAPEX is positive and significant in all three years after the IPO, the increase is clearly more substantial in the second and third years after the IPO. On the contrary, in the case of secondary firms the median increase is only positive and significant in the first two years after the secondary buy-out and negative (although not significantly so) in the third year. In net of industry changes the median increase in CAPEX in both secondary firms and IPO firms follows the same

pattern although the median increases are smaller (or the decrease higher in the third year in secondary firms).

Comparing the median increase/decrease in CAPEX between secondary firms and IPO firms during the first three full years after the exit, it is possible to conclude that in IPO firms the increase in CAPEX is 73.5 pp. higher (43.0 pp. if industry-adjusted) than secondary firms and these differences are statistically significant, at least, at 10% significance level. However, the differences (raw and industry-adjusted) are even more substantial if just the second and third years after the exit are considered.

3.3 Operating income (net of depreciation and amortization) – EBITDA

Table 6, Panel A, shows that the median change in EBITDA is positive and significant in both secondary firms and IPO firms in the first three full years after the exit. The median increase in EBITDA average in secondary firms during the same period, relative to the last full year before the exit, is equal to 29.3% (26.7%, 32.0%, 39.4% in years +1, +2 and +3 after the exit, respectively) while in IPO firms the median increase is equal to 55.6% over the same period (34.5%, 58.1% and 101.7% in years +1, +2 and +3). The industry-adjusted median changes, although smaller – 10.6% in secondary firms and 15.3% in IPO firms for the three year average – are still positive and significant and once again the increase in EBITDA can only be partially attributed to industry/economy effects. These results mean that, after the exit, IPO firms manage to increase their EBITDA 26.3 pp. more than secondary firms. This difference is statistically significant at 1% significance level. Another important fact to retain is that the difference in median changes in EBITDA between IPO firms and secondary firms become larger with time, from 7.9 pp. in the first full year after the exit, to 26.1 pp. in the second year, and 62.2 pp. in the third year after the exit. All these differences are statistically significant. Measured net of industry changes, the differences in median changes in EBITDA between IPO firms and secondary firms becomes smaller but is still significant for the three year average change and for the third year change.

However, these changes in EBITDA don't take into account divestitures and acquisitions or other investments/disinvestments in fixed assets made by IPO firms, secondary firms and control firms during the period in analysis. In order to control for these factors, the median change in EBITDA as a fraction of total assets is presented in Panel B of Table 6. This variable – also known as the return on assets (ROA) – can be interpreted as a measure of efficiency of a given amount of assets (Kaplan, 1989). The median change in this

variable is negative and statistically significant in both secondary firms and IPO firms in the three year period after the exit. However, the decrease in ROA is much more substantial in secondary firms (-9.4%) than in IPO firms (1.2%) and, the net of industry change is positive in IPO firms while remaining negative in secondary firms (although if industry-adjusted the changes are not statistically significant). There are other important points to retain such as the fact that the decrease in ROA becomes larger for both the IPO firms and secondary firms with time and that the decrease in ROA is larger in secondary firms than in IPO firms in each of the first three full years after the exit (12.2 pp., 12pp. and 7pp., in the first, second and third year, respectively). This pattern is similar for industry-adjusted changes.

The decrease in ROA in both secondary firms and IPO firms is indicative that the EBITDA growth is achieved by sacrificing asset efficiency and, in the case of IPO firms, is consistent with Jain and Kini (1994) who found evidence that IPO firms increase their assets faster than their total sales and EBITDA. However, Jain and Kini's explanation that this decrease in ROA is related to the change in "incentive structure resulting from reduced managerial ownership in the post-IPO firm" is inconsistent with the results shown in this paper. The evidence presented in this study counters that the decrease in secondary firms is even more substantial than in IPO firms and, although information on management ownership after the secondary buy-out is not available, typically in a secondary buy-out only the shares owned by the private equity investor are sold which means that the management keeps the same level of shares they had before the secondary buy-out. Finally, it is important to mention that in the last full year before the exit the ROA in secondary firms and IPO firms was, respectively, 15.3% and 13.0% – 5.4 pp. and 4.5 pp. higher than the median of comparable firms – and that even after the decrease in ROA after the exit, secondary firms and IPO firms achieved in the third year after the exit a median ROA equal to 12.9% and 10.4%, respectively – 2.9 pp. and 3.0 pp. higher than the median of comparable firms.

Finally, Panel C of Table 6 reports the median change in EBITDA as a fraction of total sales. This variable measures return on sales (ROS) and can be interpreted as a measure of firm profitability and an increase here could lead to an increase in firm value (and so to a higher return to investors) even if the change on the productivity of their assets is not significant or is even negative (Guo et al., 2009). The median changes in ROS are very small and not significant. However, the median change in ROS is positive in the first three full years after the exit for both secondary firms (2.2%) and IPO firms (2.6%). The difference in median changes between secondary firms and IPO firms are also almost unnoticeable and not significant. The industry-adjusted changes follow a similar pattern.

Overall, the median changes in EBITDA variables suggest that IPO firms out-perform secondary firms during the first three full years after the exit. Although, when related to total assets the difference in the median changes between both groups of firms are not statistically significant, the median (raw and industry-adjusted) change in IPO firms is always more positive (or less negative) than the median (raw and industry-adjusted) change in secondary firms.

3.4 Net cash-flow

Net cash-flow changes after the exit are presented in Table 7. Net cash flow measures the operational cash flow generated by the firm after capital expenditures and so represents the cash-flow available to remunerate (or reduce) the firm's capital (debt and equity). The median changes in net cash-flow in the first three full years after the exit are positive in both IPO firms and secondary firms. However, as shown in Table 7, Panel A, the increase in net cash-flow by secondary firms is higher (3.9%, and 17.4% if industry-adjusted) than by IPO firms (0.5% and 2.6%). The difference is even more significant in the second and third years after the exit, a period when the median net cash-flow change (raw and industry-adjusted) is positive in secondary firms while negative in IPO firms.

If measured as a fraction of end-of-year assets (Panel B) or as a fraction of total sales (Panel C), the median changes in net cash flow are mainly negative and significant in both secondary firms and IPO firms in the three-year period after the exit. However, the industry-adjusted median change, although not significant, is mainly positive in secondary firms and negative in IPO firms. In a year-by-year analysis it is possible to realize that the median changes of net cash flow, measured as a fraction of end-of-year assets or as a fraction of total sales, becomes more positive (or less negative) in the third full year after the exit in secondary firms while it becomes (significantly) more negative in the second and third years after the exit in IPO firms. Comparing the median increase/decrease in net cash-flow between secondary and IPO firms, it is possible to observe that the median increase is more substantial (or the decrease less substantial) in secondary firms than in IPO firms, particularly in the second and third year after the exit, when the median differences (raw and industry-adjusted) are statistically significant.

3.5 Summary

The results on operating performance change after the exit show that IPO firms outperform secondary firms in terms of total sales and, more importantly, in terms of EBITDA. The results on EBITDA are important because it symbolizes the fact that IPO firms manage to increase their operational cash-flow more than secondary firms, even taking into account investments/disinvestments in fixed assets made by IPO firms, secondary firms and control firms, during the period under analysis. However, despite secondary firms not improving their operating performance as much as the IPO firms, they manage to increase their net cash flow (EBITDA minus CAPEX) considerably more than IPO firms, particularly in the second and third year after the exit. Obviously this is due to different investment strategies between secondary firms and IPO firms after the exit. While IPO firms increase CAPEX by 88.1% during the three year period after the exit, compared with the last full year before the exit, secondary firms just increase CAPEX by 14.6%, during the same period. This difference is even more dramatic in the second and third years after the exit. In the third year after the exit, secondary firms even decrease CAPEX when compared with the last full year before the exit.

4. Pre-exit conditions and exit-route choice endogeneity

4.1 OLS Model

The differences in operating performance changes after the exit between IPO firms and secondary firms can be motivated by the firm's pre-exit characteristics or even by characteristics of the previous deal, such as the duration of the deal or private equity firm(s) involved.

In order to control for a firm's pre-exit characteristics and for previous deal characteristics the following equation is estimated:

$$y_i = \beta D_i + \mathbf{x}'_i \boldsymbol{\alpha} + e_i \quad (1)$$

where

- D is a dummy variable that is equal to 1 if the firm is exited through an IPO (IPO firm) and equal to 0 if the firm is exited through a secondary buy-out (secondary firm).
- \mathbf{x} are the control (exogenous) variables.
- y is the three year average change in the operating variable.

Control (exogenous) variables (\mathbf{x}) consist of the total book assets value, return on assets (EBITDA/Total Assets), asset turnover ratio (Total Sales/Total Assets), CAPEX as a fraction of total assets (CAPEX/Total Assets) and total asset growth – all in the last full year before the exit. Other control variables are the age of the portfolio company and the age of the selling private equity firm at the date of exit, together with the deal holding period. Finally, exit-year and industry fixed effects are included as also as a UK dummy variable to control the fact that more than half of the firms in the sample have their headquarters in UK and dummy variables to control for the number of the years that accounting data is available after the exit.

The variable (\mathbf{y}) is used to control for changes in operating performance after the exit. As in the previous chapter, total sales, CAPEX, EBITDA and net cash-flow are used as operating measures. In the case of cash-flow variables (EBITDA and net cash-flow), not only the percentage change in levels is calculated but also the percentage change of both variable as a fraction of end-of-year total assets and as a fraction of total sales.

4.2 Treatment Effect Model

One problem with this direct (OLS) approach is that the correlation between firms exited through an IPO and a better post-exit operating performance (when compared to firms exited through a secondary buy-out) may suffer from a severe endogeneity problem because the (better) post-exit operating performance could have been predicted before the exit (based on pre-exit characteristics and previous deal characteristics), thus it may be possible that these characteristics may have motivated the choice of the exit route in first place.

In order to control for such potential endogeneity problem, the standard approach is to include a source of exogenous variation in the exit route through a two stage instrumental variable (IV) methodology. In this paper, instead of a basic two stage methodology we opt, as suggested by Cameron and Trivedi (2005), for an alternative approach – the Treatment Effect Model – since it explicitly account for the binary nature of the endogenous variable:

$$y_i = \beta D_i + \mathbf{x}'_i \boldsymbol{\alpha} + e_i \quad (2.1)$$

$$D_i^* = \mathbf{x}'_i \boldsymbol{\theta}_1 + \mathbf{z}'_i \boldsymbol{\theta}_2 + u_i \quad (2.2)$$

Where, z is the instrumental variable and D_i^* is an unobserved latent variable that determines whether D_i is equal to 1 or 0:

$$D_i = \begin{cases} 1 & \text{if } D_i^* > 0 \\ 0 & \text{if } D_i^* \leq 0 \end{cases}$$

As instrumental variable (z) we used the ‘FED tightening index’¹⁸ in the quarter before the exit¹⁹. When the value of the index is high, private equity investors tend to choose an IPO as exit route, as seen in Jenkinson and Sousa (2011). However, since it’s not clear that when the banks tighten their constraints in a specific quarter this will affect the companies’ operating performance in the following years and even if has any impact on the economic environment it will be a negative impact, the effect of a high FED tightened index on post-exit performance of IPO firms is likely to be small or even negative.

4.3 Durbin–Wu–Hausman test

In order to assess the endogeneity of the exit route, variable (D), the Durbin–Wu–Hausman test is implemented. First, a probit equation (2.2) is estimated and then the residuals are added as an exogenous variable in the equation (2.1).

Table 8, reports the coefficients and p-values of this last equation, estimated by the ordinary-least-square (OLS) method, for each operating variable change (total sales, CAPEX, EBITDA and net cash-flow). Analysing the statistical significance of the coefficients associated with the first regression residuals it can be seen that only in the case of EBITDA is the endogeneity of the exit route variable confirmed (p-value equal to 0.04) since in the other cases the hypothesis that the first regression residuals are zero cannot be rejected. Therefore, in the case of total sales, CAPEX and net cash-flow variables, given the nonexistence of endogeneity, the OLS estimation produces a consistent and more efficient estimator than the two-stage IV (instrumental variable) estimator (Cameron and Trivedi, 2005) and so it is chosen.

¹⁸ *Senior Loan Officer Opinion Survey on Bank Lending Practices* (Board of Governors of the Federal Reserve System website)

¹⁹ The period considered (quarter before exit) is used because it is normally during that period that a decision regarding the exit route is made

4.4 Results

Sales and CAPEX

In Table 9, the OLS estimation results for change in total sales and CAPEX are reported. The estimated equations confirm that the increase in total sales and CAPEX after the exit is much more substantial in IPO firms than in secondary firms as the coefficients associated to the exit route variable are positive and significant.

The estimation results also show that, according to the coefficients associated with the control variables, younger and smaller firms (in terms of asset book values) increase total sales and CAPEX more than older and larger firms after the exit. Moreover, firms with a relatively higher EBITDA (controlled by total assets) in the last full year before the exit have a bigger increase in CAPEX after the exit (which is a consequence of a higher cash-flow availability) while firms that invest relatively more (controlled by total assets) in the last full year before exit have a lower increase in CAPEX after the exit. On the other hand, firms that experienced a higher increase in their total assets in the last full year before the exit consistently have a higher increase in their total sales during the first three years after the exit. Finally, firms held for a longer period or owned by an older (more experience) private equity firm have a lower increase in total sales and CAPEX after the exit. These last results, i.e., the (negative) effect of the previous deal holding-period and the experience of the exiting private equity firm in the post-exit operating performance will be further investigated in the next chapter.

EBITDA

Table 10 reports the maximum likelihood estimation of the Treatment Effects Model for change in EBITDA variables. First, the results confirm that in all regressions the errors of both equations are not independent and so the hypothesis of the exit-route dummy variable being endogenous is confirmed. Second, the coefficients associated with both instrumental variables in the model first equation (Panel B) are, as expected, positive and significant in all regressions. Third, the estimation results for the model's second equation confirm that the IPO firms' overperformance (when compared to secondary firms), in terms of EBITDA, in the first three full years after the exit persists, and is even more significant after controlling for pre-exit conditions and endogeneity, as the coefficients associated with the exit-route dummy variable are all positive and significant – with the exception of the coefficient

associated with the exit-route dummy variable of the EBITDA/Total Sales regression (3) which has a p-value of just 0.11.

Net cash-flow

Table 11 shows the OLS results for the regression on raw change in net cash-flow variables. All coefficients are now negative, which indicates that even controlling for pre-exit conditions secondary firms manage to achieve a higher increase in net cash-flow than IPO firms in the first three full years after the exit in spite that during the same period those firms clearly underperform IPOs firms in terms of EBITDA. This is only possible due to a much smaller increase in CAPEX by secondary firms, after the exit, when compared to a huge increase in CAPEX by IPO firms. This massive difference on CAPEX levels, after the exit, between secondary firms and IPO firms will be also further investigated in the next chapter.

Summary

Overall, the differences in the operating performance measures between IPO firms and secondary firms persist and are even more substantial after controlling for pre-exit characteristics of the firms, seller private equity experience, the holding period of the previous deal and endogeneity (when presented). Therefore, the results suggest that the operating under-performance in secondary firms cannot be explained by pre-exit conditions and endogeneity in the exit route choice.

5. Why secondary firms underperform IPO firms?

5.1 Holding period and secondary firms post-exit performance

Secondary firms are held by private equity investors an average of 51.7 months (median of 47.0) before the exit, in line with the three to five year period suggested by Fenn et al. (1997) and in accordance with Strömberg (2008) who states “the average private equity deal lasts between four and five years, conditional on exit.” However, secondary firms are held by private equity investors almost 10 months more than IPO firms and the holding period range is also very large, from a minimum of 11 months to a maximum of 124 months.

As discussed before, Rappaport (1990) views the private equity organizational structure as a short term “shock therapy” to improve inefficient and badly operating performance firms and then return the firms to the market after a few years. However,

according to Strömberg (2008), “the limited life of private partnerships shortens the holding periods” and so in some cases the secondary firms may have been exited prematurely from the previous deal. If Rappaport’s prediction is correct, firms exited earlier (later) in a private equity deal should have a better (worse) operating performance after the secondary buy-out as more should be left on the table – in terms of post-operating performance improvements – by the selling private equity investor.

In order to test this prediction, the relationship between the holding period of the previous deal and the post-exit operating performance of the secondary firms has been analyzed here. The sample of secondary firms was split into four groups in accordance with the holding period of the previous deal based on the percentile values. The first group is the ‘under percentile 0.1’ subsample and includes all secondary firms with a holding period in the previous deal lower than 24.6 months. The second group includes all secondary firms with a holding period in the previous deal higher than 24.6 months (percentile 0.1) and below 47 months (the median). The third group includes all secondary firms with a holding period in the previous deal higher than the median and below 82.5 months (percentile 0.9). And finally, the fourth group, the ‘above percentile 0.9’ subsample includes all secondary firms with a holding period in the previous deal higher than 82.5 months.

At this point, the first group and fourth groups are dropped. The deals in the first group are known as “quick flips”²⁰ and this type of deal is characterized by a quick turnaround of the operating performance of the firms in order to sell them after a short period of time to reduce the investment period and provide an extreme, higher IRR to the investors. However, little is known about this type of deal other than that the conclusions for this type of deal are usually opposite from other “normal” private equity investments²¹. The fourth group, also dropped, contains an extreme type of deal which has been kept in the fund portfolio more than 7 years. Typically a private equity fund has a limited life of ten years and the investment phase occurs, on average, around the second and third years after the vintage year. Therefore, deals with a holding period higher than 7 years are deals that private equity investors have a strong incentive to (strategically) exit as the private equity fund nears its maturity even if the operating performance of the firm has not been entirely restored.

²⁰ i.e. “exits within 24 months of investment by private equity fund” (Kaplan and Strömberg (2008)).

²¹ For instances, Lerner and Cao (2009) found that, contrary other reserve leverage buy-outs, “quick flips” underperform the S&P 500 index after an IPO.

The remaining two subsamples containing the second (0.1 to 0.5 percentiles) and third (0.5 to 0.9 percentiles) groups of secondary firms are compared using several variables observable before, at, and after the secondary buy-out and the results are presented in Table 12. While neither the average nor the median of any variable observable before or at the secondary buy-out is significantly different between either group (with the exception of the average selling private equity firm mean age), the shorter holding period group has, significantly, outperformed the longer holding period group during the first three full years after the secondary buy-out, in terms of total sales, EBITDA, EBITDA/Total Assets and EBITDA/Total Sales. The industry-adjusted operating performance difference is even more significant as the average and median EBITDA, EBITDA/Total Assets and EBITDA/Total Sales changes are positive for the shorter holding period group while negative (with the exception of the average EBITDA change) for the longer holding period group. The changes in net cash-flow and CAPEX are also not significantly different between both groups.

These results clearly indicate that those firms that have been held for a shorter time by the private equity investor in the previous deal have a better operating performance after the secondary buy-out than those firms that had been held for a longer period. This is consistent with Rappaport's point of view that the private equity organizational structure is a temporary "shock therapy" structure, as it becomes very difficult for a new private equity investor to add value through an increase in the firms' operating performance in the case of firms held by private equity investors for more than four years.

Therefore, this result indicates that it seems premature to conclude (as suggested by Strömberg) that the increase in number of secondary buyouts deals and so the increase in the ultimate holding periods of firms undergoing private equity organizational structure implies that the private equity organizational firm is a superior long-term governance structure as predicted by Jensen (1989) since not only do secondary firms underperform IPO firms during the first three full years after the exit but also firms held for longer periods in a previous private equity deal tend to do much worse in terms of operating performance improvements after a secondary buy-out than those held for shorter periods.

Finally, the fact that IPO firms are held, on average, almost 10 months less than secondary firms during the previous deal can partly explain the different operating performance by IPO firms and secondary firms during the first three full years after the exit.

5.2 *Selling vs. purchasing private equity investor*

As demonstrated in Sousa (2010), on average, the selling private equity investor (selling PE) is more than two years older, and so more experienced, than the purchasing private equity investor (purchasing PE) in a secondary buy-out. This section studies whether the fact that a less experienced private equity investor is buying from a more experienced private equity seller in a secondary buy-out accounts for the underperformance of secondary firms after the secondary buy-out. It could be the case that a more experienced (selling) private equity investor could have improved more efficiently the badly operating firms in the previous deal and so less is available to be improved by the new private equity investor after the secondary buy-out, or, that the less experienced (purchasing) private equity firms lack the skills needed to efficiently continue to improve the operating performance of the firms in the follow up deal.

In order to study whether relative private equity experience explains the underperformance of secondary firms, other than merely relying on the age of both private equity investors, data on the total number of private equity funds set up and the total amount raised by both private equity investors up to the secondary buy-out deal was collected from the Thompson VentureXpert (TVE) database, in order to have alternative proxies for private equity experience. In addition to total figures, data (number of funds and amount raised) on buy-out funds only was also collected.

Table 13 presents the average and median age and four other variables²² that proxy for experience for both groups of private equity investors involved in a secondary buy-out. The results confirm that the selling PE is not only, on average, 4.5 years (age median difference is equal to 4 years) older than the purchasing PE, but also has much more experience. Before the secondary buy-out, the selling PE had set up an average of 11.8 (median of 8.0) private equity funds – 2 more than the purchasing PE. Although only some of these funds were classified as buy-out funds (on average 6.3), the difference in the buy-out funds set up by the purchasing PE is the same. Regarding the amount raised, the selling PE raised on average \$6.7 billion (median \$4.6 billion), \$0.1 billion more than the purchasing PE (median difference equal to \$0.6 billion). The same pattern is observable if we take into account only the amount raised for funds classified by TVE as “buy-out funds”. All median and average differences are significant, at least, at 10% significance level.

²² Total number of private equity funds set up, total amount raised in all private equity funds set up, number of “buy-out” funds set up and total amount raised in “buy-out” private equity funds set up.

Table 14 reports the multivariate regressions results for post-exit operating performance change for the subsample of secondary firms. In each regression, a variable which proxies for the selling PE investor experience is added as an exogenous variable. Panel A (Panel B) measures the selling PE experience effect in the secondary firms' raw (industry-adjusted) post-exit EBITDA change and all coefficients associated to all variables that proxy for PE experience (used individually in each regression in conjunction with the control variables used before) are mostly positive in raw changes and negative in industry-adjusted changes. Moreover, none of the coefficients is significant in explaining the change in operating performance with the exception of the coefficient associated with the selling PE's age in the raw EBITDA/Total Asset change regression. These results suggest that the experience of the private equity investor on the previous deal doesn't appear to affect the post-exit operating performance of secondary firms.

However, the results are distinct when measuring the impact of the purchasing PE's experience in the post-exit operating performance of secondary firms. In Table 15 are presented the multivariate regressions results for post-exit operating performance change for the subsample of secondary firms. Once again, in each regression there is included, as an exogenous variable, a variable that proxies for the experience of the purchasing PE investor. The results clearly indicate that the level of purchasing PE experience has a significant impact on the post-exit operating performance of secondary firms since all coefficients associated with variables that proxy for purchasing PE experience are positive and most of them are statistically significant. The results follow the same pattern when industry-adjusted operating performance measures are used (Panel B) and the impact is more significant when only the buy-out funds (number and amount raised) instead of the total funds are considered. For instance, keeping everything constant, if a purchasing PE investor would have set up one more buy-out fund before the secondary buy-out, he would have been able to increase, in the first three full years after the secondary buy-out, the firm's EBITDA and the EBITDA/Total Sales ratio by, respectively, 3.5 pp. and 1.4 pp. more, than if he didn't. Given the difference in median change in those variables between secondary firms and IPO firms (26 pp. and 8 pp., respectively) and the fact that purchasing PE firms had set up on average almost 2 fewer buy-out funds than the seller PE firms up to the secondary buy-out, this difference in private equity experience can effectively explain, at least partially, the underperformance of secondary firms relative to IPO firms. This effect is even more substantial in the industry-adjusted changes.

5.3 Capital expenditures by secondary firms

Despite the fact that during the first three full years after the exit secondary firms achieve a worse operating performance (measure by EBITDA ratios) than IPO firms, they manage to increase net cash flow (EBITDA minus CAPEX) substantially and significantly more than IPO firms. This increase is even more substantial in the second and third years after the exit and is only possible due to the smaller increase in CAPEX by secondary firms and a huge increase in CAPEX by IPO firms²³.

The high levels of CAPEX by IPO firms compared to the levels by secondary firms is consistent with both the *overinvestment hypothesis* – that the ownership structure changes experienced by IPO firms after the IPO result in increased agency costs and a tendency for overinvestment in negative NPV projects – and with the hypothesis that firms held by private equity investors are financially constrained due to high debt levels and consequent debt-service payments imposed by a second leveraged buy-out transaction. While this prevents secondary firms from investing in negative NPV projects, it also makes them fail to invest (or postpone investing) in positive NPV projects (*underinvestment hypothesis*).

While there is little consensus in the literature regarding the effect that financing constraints have in relationship to cash-flow and investment, the major disagreement is on which criterion should to be used to identify whether a firm is experiencing financing constraints. While Fazzari et al. (1988) identify firms with low dividends as "financially constrained" (and so more investment cash-flow sensitive) and firms with high dividends as "less financially constrained", Kaplan and Zingales (1997) disagree. Surprisingly, Kaplan and Zingales found that in the 49 low-dividend firms that Fazzari et al. identify as "financially constrained" (according to their investment-cash flow criterion), a great majority could have increased their investment – substantially in many cases – if they had so chosen. Moyen (2004) tries reconciling the conflicting empirical evidence and concludes that "results depend crucially on the criterion used to identify whether a firm experiences financing constraints" and that "it is hard to identify firms with financing constraints".

Although data on dividends paid by secondary firms is not available, it is commonly recognized that secondary firms face a high level of debt-service payments due to the debt issued in the secondary (and eventually previous) leveraged buy-out deal and also face very strict rules on how, when, and in which conditions they can realize new investments.

²³ Jain and Kini (1994) also found a substantial increase (over 100%) in capital expenditure by private equity-backed IPO firms.

Therefore, the lower increase in CAPEX by secondary firms which result in an excess net cash-flow over IPO firms could simply be driven by financial constraints and not by lack of positive NPV projects.

Whether the lower increase in CAPEX by secondary firms, compared to IPO firms, is driven by not having taken up either value-increasing investments or value-decreasing investments (*underinvestment hypothesis*) is very difficult to determine for two reasons: firstly, the investments were not made and so there is no information regarding the investments themselves; secondly, the market values for secondary firms are not observable. However, as market values are available for IPO firms and the investments were effectively realized it is possible to conclude whether high levels of CAPEX by IPO firms are due to an overinvestment in NPV negative projects after the IPO (*overinvestment hypothesis*), or the consequence of good, available investment opportunities that IPO firms could take advantage of due to being less financially constrained.

In order to test the *overinvestment hypothesis*, issue prices and market prices for 110 IPO firms²⁴ were gathered from the Capital IQ database. Local stock market indexes were also gathered from the Capital IQ database and average industry betas based on European companies collected from an INSEAD study²⁵. On average, the first day return is equal to 10.9% (median 6.4%) and is positive in all years, with a maximum average of 31.4% for 17 IPOs in 2000 and a minimum average of 0.1% for 7 IPOs in 2001. These results are consistent with Levis (2010) who found an average first day return of 9% (median 6.3%) for PE-backed IPOs in the UK during 1992 and 2004.

To test if IPO firms create or destroy value after the IPO, an event-study methodology is employed, using the IPO as the event. The shares are lined up in event time, and the returns over the 48-month period following the first trading day are analyzed²⁶. Cumulative and buy-and-hold return measures are used in order to reinforce the results.

Table 16 reports the cumulative returns and cumulative abnormal returns²⁷ (CARs) during the 12, 24, 36 and 48 months following the IPO. It can be seen that IPO firms perform

²⁴ The four remain IPO firms were exited in 2000 and the issue price and market prices after the IPO are not available in Capital IQ or any other known database, such as Datastream or Bloomberg.

²⁵ www.scribd.com/doc/17890631/Betas-Per-Industry-Based-on-EUROPEAN-COMPANIES

²⁶ The first trading day close price is used as a starting value and not the issue price as the former represents the first market valuation of the firm.

²⁷ Abnormal returns subtract the expected return from the actual return. The expected return is computed using the single-factor CAPM. Local stock market indexes are used as a market index and two options are used for the

relatively poorly during the first 24 months after the IPO (-13.7%) but the cumulative return during the 48 months after the IPO is equal to 9.5%, although statistically not significant. However, the cumulative returns don't take into account general market movements and almost half of the IPO took place during the years 2000 to 2006 and the first semester of 2007, years that were followed by a big fall in market prices. Given that, it is not surprising that IPO firms present better CARs than raw cumulative returns. The IPO firms produced an essentially flat performance for the first 2 years after the IPO while they produced positive and significant CARs 36 and 48 months after the IPO. After 48 months, IPO firms produce an average CAR of 15.9% and 18.9%, when betas are assumed to be equal to unity or estimated using industry averages, respectively.

Finally, Table 17 presents the results for buy-and-hold returns and buy-and-hold abnormal returns (BHARs) which, as it can be seen, are even more expressive. While raw buy-and-hold returns, though positive, are not significant, BHARs are all positive and significant 24, 36 and 48 months after the IPO. After 48 months, IPO firms produce an average BHAR of 24.4% and 27.3%, when betas are assumed to be equal to unity or estimated using industry averages, respectively²⁸. Although larger, the abnormal buy-and-hold returns presented are in line with the 5.76%, 14.62%, 23.08% evidenced by Levis (2010) for the 12, 24, and 36 month periods after the IPO. These results confirm that after the IPO, while CAPEX increases substantially, IPO firms clearly increase their market value.

Although IPO firms on average (substantially and significantly) outperform the market that doesn't mean that they invested in more value-increasing projects than value-

β parameter estimation. First, a simple market model is used with all betas equal to 1 and, alternatively, industry betas based on the IPO firm sector are used.

²⁸ As the financial data for the entire period of 48 months after the IPO is only available for 67 firms, different variables were calculated in order to reassure these results. Of the 43 firms for which financial data is not available for the entire period, 15 were taken private (again) during the 48 month period for several reasons (for instances a new private equity deal, bankruptcy, M&A, etc...) and 38 were taken public after the 31st of March 2006. In order to test whether the results had not been driven by 'survival bias', two additional variables were computed. First the last value available for the firms taken private was kept constant until the end of the 48 month period. Second, the same was done for all firms, including the firms which went public in the last 48 months. Additionally, as the average BHAR could be affected by the presence of outliers (normally a small number of firms with a huge buy-and-hold return), the abnormal returns were winsorized before estimating a statistic test. First the abnormal returns were constrained in a three standard deviation interval and finally in the 0.05 and 0.95 percentiles. None of these additional variables presented different results in terms of the statistical significance of the returns.

decreasing projects but only, at most, that IPO firms invested in better projects than was expected. However, it doesn't seem plausible that IPO firms could have achieved the huge abnormal return reported while making a majority of investments in value-decreasing investments (*overinvestment hypothesis*).

In order to assess if any link can be established between the change in CAPEX by IPO firms after the IPO and value creation, the 67 IPO firms for which 48 months of financial data is available are split between those which produced a positive CAR²⁹ and those which produced a negative CAR, after 48 months³⁰.

In table 18, the two subsamples of IPO firms are compared using several variables before, at, and after the IPO. The 'positive CAR' group has a better return on assets (EBITDA/Total Assets) and return on sales (EBITDA/Total Sales) in the last full year before the exit than the 'negative CAR' group, although they have a relatively lower level of CAPEX. After the IPO, as expected, the 'positive CAR' group accomplishes a better operating performance than the 'negative CAR' group, in terms of EBITDA, EBITDA/Total Assets and EBITDA/Total Sales. The median and average differences between both subsamples, for raw and industry-adjusted EBITDA changes, are mostly statistically significant. These results are important since they reinforce the link between operating performance and financial/market performance. Finally, the increase in CAPEX in the 'positive CAR' group is more substantial than the increase in the 'negative CAR' group. The median increase in CAPEX (both raw and industry-adjusted) is even negative in the 'negative CAR' group while substantially positive in the 'positive CAR' group. However, the difference of medians is only statistically significant if adjusted by total assets.

Overall, direct evidence of whether the low level of CAPEX by secondary firms is accomplished by not having taken up value-increasing investments cannot be established. Indirect evidence on IPO firms may suggest that secondary firms compensate for operating underperformance by reducing (or postponing) value-increasing investments in order to fulfill their high debt-related payments. However, it must be emphasized that this conclusion needs further research in order to clarify this important issue in post-operating performance of exited firms.

²⁹ When betas are estimated using industry averages

³⁰ The sample was also split based on positive and negative BHARs after 48 months and the results were pretty much the same.

6. Conclusions

This paper presents evidence on post-exit change in operating performance of 308 private equity-backed firms that were exited either through an initial public offering or a secondary buy-out between 2000 and June 2007. While the majority of previous studies have focused on buy-outs of public firms or more recently in buy-outs of private firms, this paper focuses on buy-outs of private equity-backed firms (secondary buy-outs). These firms, contrary to firms acquired in other leveraged buy-out deals, because they have been already owned by a private equity investor, lack the main opportunities for operating improvements that usually motivate the deals: the opportunity to reduce agency costs by creating a closer alignment between shareholders and management, in the case of previously publicly held firms (Kaplan, 1989) and the opportunity to mitigate target investment constraints by reducing information uncertainty, and provide fresh management skills and industry and regional networks to the target firms, in the case of privately held firms (Chung, 2009).

This paper presents evidence that private equity-backed firms exited through a public offering (IPO firms) outperform, in terms of total sales and EBITDA, firms exited through a secondary buy-out (secondary firms), during the first three full years after the exit. This performance by IPO firms persists even after controlling for post-exit investments or disinvestments by exited firms, for economy and/or industry effects, for firms' pre-exit characteristics, for previous deal characteristics and for endogeneity in the exit route selection.

However, and despite underperforming IPO firms during the first three full years after the exit, secondary firms manage to increase their net cash flow more than IPO firms during the same period. This is only possible because secondary firms increase their CAPEX, after the exit, much less than IPO firms. The median increase by secondary firms in CAPEX from the last full year before the exit to the three full years after exit average CAPEX is equal to 14.6% (17.7% industry-adjusted) while the median increase in CAPEX by IPO firms is equal to 88.1% (60.7%) during the same period.

Three possible explanations for the operating underperformance by secondary firms were then explored. First, analyzing the secondary firms' holding periods it could be seen that the operating performance, after the exit, is significantly better for firms which had remained for only a short period (between 2 and 4 years) in the previous deal than for firms that had remain for a longer period (between 4 and 7 years). This evidence suggests that the private equity investor is only able to improve the operating performance of a firm during a limited

period of time as predicted by Rappaport (1990), who views the private equity structure as short term “shock therapy”, to improve inefficient and badly operating performance firms in order to return the firms to the market after a few years. Additionally, since IPO firms stayed, on average, almost 10 months less than secondary firms in the previous deal, this evidence can also help to explain, at least partially, the underperformance of secondary firms when compared to IPO firms.

Second, this paper shows that in a secondary buy-out deal the purchasing private equity firm is significantly less experienced than the selling private equity firm and, more important, that the presence of a less experienced private equity firm in the second deal has a negative influence on the firm’s operating performance after the secondary buy-out. This fact can also help to explain, at least partially, the underperformance of secondary firms when compared to IPO firms.

Finally, indirect evidence is provided that may suggest that the financial constraints faced by secondary firms as a result of the high debt-service payments imposed by a second leveraged buy-out deal (or even by the previous deal), induce secondary firms to skip (or delay) investment opportunities. However, even though this paper presents evidence that during the first three full years after the exit, while increasing CAPEX much more than secondary firms, IPO firms i) are able to improve their EBITDA margin (EBITDA/Total Sales) more than secondary firms, ii) experience a substantially lower profitability (EBITDA/Total Assets) decrease than secondary firms, and iii) substantially and significantly outperform the market, it is not possible to clearly determine whether the smaller increase in CAPEX by secondary firms (compared to IPO firms) is made by sacrificing (or postponing) value-increasing or value-decreasing investments.

Overall, this paper presents evidence that IPO firms outperform secondary firms after the exit. This operating underperformance by secondary firms can, at least partially, be explained by the secondary firms’ longer holding period on previous deals and by less experienced private equity firms managing the company during the second buy-out. However, the evidence also suggests that secondary firms compensate for this underperformance by cutting (or postponing) investments in order to fulfill their high debt-related payments. Although indirect evidence may suggest that secondary firms are cutting (or postponing) value-increase investments, this conclusion needs further research in order to clarify this important issue in post-operating performance of exited firms.

Although the evidence is not totally conclusive regarding the effects of a secondary buy-out in the overall operating performance of a firm, it seems premature to conclude (as

suggested by Strömberg (2008)) that the increase in secondary buy-out deals, and thus the increase in the ultimate holding periods of firms undergoing an LBO/PE organizational structure implies that the LBO/PE organizational form is a superior long-term governance structure as predicted by Jensen (1989).

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Appendix: Selection process of comparable firms

Comparable firms for secondary firms are selected using the “Peer Report” option of BVD databases and are those twenty firms that, according to BVD databases belonging to the same industry and country, have the nearest total sales in the last full year before the exit. If less than twenty firms satisfied the geographical criterion, the criterion was relaxed first to include firms from the same region of the sample firm and then to allow firms from all over the world. Finally, as the last reference year available on BVD databases is 2004, this year was the reference year in all secondary firms exited before 2004.

Comparable firms for IPO firms are selected using the “Find Similar Companies” option of the Capital IQ database as BVD databases do not control for the public status of the comparable firms and it was required that the comparable firms for IPO firms should have been public for at least one year before the sample firm’s IPO. The same criteria as in secondary firms (industry, country and nearest total sales in the fiscal year before the exit) were used to select the IPO comparable firms. However since the Capital IQ does not allow the specification of a fixed number of comparable firms but only chooses a fixed interval for one specific control variable, for each IPO firm an interval around the total sales in the last full year before the exit was created in order to generate between 15 and 25 comparable public companies. The interval was equal to $[(1-x\%)\text{total sales}_i^{t-1}, (1+x\%)\text{total sales}_i^{t-1}]$, where x is the lowest multiple of 10 (lower than 100) that generated between 15 and 25 comparable public companies. If, once again, not enough firms (15) satisfied the geographical criterion, the criterion was relaxed first to include firms from the same region and then allow firms from all over the world.

Table 1: Sample description: Public offerings and secondary buy-outs by year

This table reports the private equity investments exited through a public offering (IPO) or a secondary buy-out (SBO) of European companies between January 2000 and June 2007. Panel A presents all exits. Panel B presents the exits for which the firm's accounting data is available for at least a full year before the exit. Finally, Panel C presents exits for those firms whose accounting data is available for at least the year before the exit and two years after the exit (Paper Sample).

	Year								Total
	2000	2001	2002	2003	2004	2005	2006	Jun-07	
Panel A: All exits									
SBO	45	34	36	52	110	125	146	90	638
IPO	53	16	13	7	43	46	48	17	243
Total	98	50	49	59	153	171	194	107	881
Panel B: Exits with ex-ante data									
SBO	12	10	17	23	66	70	88	59	345
IPO	22	7	9	1	24	22	21	11	117
Total	34	17	26	24	90	92	109	70	462
Panel C: Exits with ex-ante and ex-post data (Paper Sample)									
SBO	6	8	16	16	44	42	53	9	194
IPO	21	7	9	1	23	22	20	11	114
Total	27	15	25	17	67	64	73	20	308

Table 2: Sample description: Public offerings and secondary buy-outs by country

This table reports the nationality of the European firms (portfolio companies) included in the final sample, exited through a secondary buy-out and a public offering between January 2000 and June 2007 and the selling private equity investor(s) involved. The firm's nationality refers to the country where the company has its headquarter and if more than one private equity investor invested in the deal and none of the private equity firms received more shares than the other(s) (so none is the leader) both private equity firms are included.

	Exit route		
	SBO	IPO	All
Panel A. Country			
United Kingdom	108	58	166
France	34	12	46
Germany	12	9	21
Sweden	8	7	15
Italy	6	3	9
Netherlands	8		8
Norway	1	6	7
Spain	5	2	7
Finland	4	2	6
Belgium	3	2	5
Austria		4	4
Ireland		4	4
Denmark	3		3
Bulgary	1		1
Estonia		1	1
Iceland		1	1
Luxembourg		1	1
Poland		1	1
Portugal		1	1
Switzerland	1		1
Panel B. Seller Private Equity Firm			
3i Group	22	15	37
Apax Partners	4	9	13
Barclays Private Equity	11	1	12
Bridgepoint Capital	10	2	12
CVC Capital	7	5	12
Cinven	9	2	11
EQT Partners	5	5	10
Candover	6	2	8
HgCapital	2	5	7
Permira	4	3	7
Others 108	124	71	195

Table 3: Descriptive statistics

This table reports the final sample's descriptive statistics. It includes firm variables measured in the last full year before the exit and deal variables. Firm age is the portfolio company age in the exit year. Total assets, total sales, EBITDA (Earnings before interest, taxes, depreciation and amortization), CAPEX (Change on net fixed assets plus year depreciation and amortization) and Net Cash-Flow (EBITDA-CAPEX) are measured in the last full year before the exit. Holding period is the number of months since the deal started up to the exit date. PE age is the number of years since the private equity firm's incorporation up to the exit year. However if the private equity was incorporated before 1970, 1970 is assumed as the first year of activity in the private equity industry as it would be very hard to have had any experience in the private equity industry before that as the private equity industry really did not start to arise until the 70's. Finally, Fund Size is the total amount committed by the investor to the fund at the close date.

Variable	Exit route							
	SBO (all sample)				IPO		All	
	Average		Median		Average	Median	Average	Median
Panel A. Firm characteristics								
Firm age (y)	39.4	(40.3)	23.0	(24.0)	36.8	17.0	38.4	20.5
Total assets (\$ million)	290.2	(288.5)	119.2	(117.6)	565.8	141.5	392.2	121.8
Total sales (\$ million)	238.6	(270.3)	143.4	(141.1)	479.3	133.8	359.7	143.4
EBITDA (\$ million)	35.3	(36.9)	17.9	(18.2)	65.9	15.1	46.7	17.3
CAPEX* (\$ million)	19.4	(21.4)	4.9	(6.6)	71.0	15.3	35.2	6.4
Net Cash Flow (\$ million)	15.7	(15.0)	9.0	(10.0)	14.4	4.3	15.3	8.4
Panel B. Deal characteristics								
Holding period (months)	51.7	(51.2)	47.0	(47.0)	42.0	40.3	48.1	44.6
PE firm age (y)	21.0	(19.6)	22.0	(19.0)	20.0	20.0	20.6	20.5
Fund size (\$ million)	759.3	(747.2)	525.0	(410.2)	1,050.7	608.0	868.1	557.2

*Includes all investments made in Fixed Assets, including acquisitions

Table 4: Total sales change after exit

This table reports the median (raw and industry-adjusted) change in total sales from the last full year before the exit to the first three full years after the exit for secondary buy-out firms (SBO) and IPO firms (IPO). The change is measured from the total sales in the last full year before the exit to the average total sales during the three year period after the exit (3y) and to the total sales in each of the first three full years after the exit (+1, +2 and +3). It also reports the difference in the median change between both subsamples. Significance levels of median change are based on a Wilcoxon signed-rank test, while significance levels of median differences are based on a two-sample Wilcoxon rank-sum (Mann-Whitney) test. *, **, *** indicate levels where median changes for each subsample are significantly different from zero and where both subsample medians are different at the 10%, 5% and 1%, respectively. The number of observations is in parenthesis.

	From -1 to 3y	From -1 to +1	From -1 to +2	From -1 to +3
SBO				
Median change (%)	24.2 *** (194)	20.6 *** (194)	23.7 *** (119)	36.2 *** (72)
Median ind-adj change (%)	6.7 *** (165)	5.7 *** (184)	10.8 *** (107)	6.9 ** (64)
IPO				
Median change (%)	62.6 *** (114)	41.9 *** (114)	77.1 *** (92)	88.3 *** (72)
Median ind-adj change (%)	33.0 *** (112)	20.3 *** (114)	37.8 *** (90)	46.5 *** (70)
Difference				
Median change (%)	-38.4 ***	-21.3 ***	-53.4 ***	-52.2 ***
Median ind-adj change (%)	-26.3 ***	-14.6 ***	-27.0 ***	-39.5 **

Table 5: CAPEX change after exit

This table reports the median (raw and industry-adjusted) change in CAPEX from the last full year before the exit to the first three full years after the exit for secondary buy-out firms (SBO) and IPO firms (IPO). The change is measured from the CAPEX in the last full year before the exit to the average CAPEX during the three year period after the exit (3y) and to the CAPEX in each of the first three full years after the exit (+1, +2 and +3). It also reports the difference in the median change between both subsamples. Significance levels of median change are based on a Wilcoxon signed-rank test, while significance levels of median differences are based on a two-sample Wilcoxon rank-sum (Mann-Whitney) test. *, **, *** indicate levels where median changes for each subsample are significantly different from zero and where both subsample medians are different at the 10%, 5% and 1%, respectively. The number of observations is in parenthesis.

	From -1 to 3y	From -1 to +1	From -1 to +2	From -1 to +3
SBO				
Median change (%)	14.6 *** (157)	12.3 ** (156)	17.4 * (89)	-14.5 (57)
Median ind-adj change (%)	17.7 * (122)	22.6 *** (134)	1.7 * (73)	-22.7 (45)
IPO				
Median change (%)	88.1 *** (74)	5.8 ** (74)	89.6 *** (57)	70.7 ** (44)
Median ind-adj change (%)	60.7 *** (67)	12.9 * (70)	65.7 *** (51)	11.8 * (40)
Difference				
Median change (%)	-73.5 **	6.6	-72.2 **	-85.2
Median ind-adj change (%)	-43.0 *	9.7	-64.0 *	-34.5

Table 6: EBITDA change after exit

This table reports the median (raw and industry-adjusted) change in EBITDA (Panel A), EBITDA/Total Assets (PANEL B) and EBITDA/Total Sales (Panel C) from the last full year before the exit to the first three full years after the exit, for secondary buy-out firms (SBO) and IPO firms (IPO). The change is measured from the variable value in the last full year before the exit to the average value during the three year period after the exit (3y) and to the variable value in each of the first three full years after the exit (+1, +2 and +3). It also reports the difference in the median change between both subsamples. Significance levels of median change are based on a Wilcoxon signed-rank test, while significance levels of median differences are based on a two-sample Wilcoxon rank-sum (Mann-Whitney) test. *, **, *** indicate levels where median changes for each subsample are significantly different from zero and where both subsample medians are different at the 10%, 5% and 1%, respectively. The number of observations is in parenthesis.

Panel A. EBITDA	From -1 to 3y	From -1 to +1	From -1 to +2	From -1 to +3
SBO				
Median change (%)	29.3 *** (180)	26.7 *** (179)	32.0 *** (106)	39.4 *** (64)
Median ind-adj change (%)	10.6 ** (152)	10.4 *** (168)	18.4 *** (95)	7.4 * (56)
IPO				
Median change (%)	55.6 *** (93)	34.5 *** (93)	58.1 *** (71)	101.7 *** (53)
Median ind-adj change (%)	15.3 *** (82)	6.7 * (93)	22.8 *** (63)	41.5 ** (47)
Difference				
Median change (%)	-26.3 ***	-7.9 *	-26.1 ***	-62.2 **
Median ind-adj change (%)	-4.7 *	3.6	-4.4	-34.1 *
Panel B. EBITDA / Total assets				
From -1 to 3y	From -1 to +1	From -1 to +2	From -1 to +3	
SBO				
Median change (%)	-9.4 *** (179)	-5.9 * (179)	-15.1 *** (106)	-22.6 *** (64)
Median ind-adj change (%)	-5.5 (150)	-1.1 (169)	-2.9 (94)	-9.1 (55)
IPO				
Median change (%)	-1.2 * (93)	6.2 (93)	-3.1 (71)	-15.6 ** (53)
Median ind-adj change (%)	1.1 (82)	3.0 (83)	-1.1 (63)	-3.3 (47)
Difference				
Median change (%)	-8.2	-12.2	-12.0 *	-7.0
Median ind-adj change (%)	-6.6	-4.1	-1.8	-5.8
Panel C. EBITDA / Total sales				
From -1 to 3y	From -1 to +1	From -1 to +2	From -1 to +3	
SBO				
Median change (%)	2.2 (179)	3.2 * (179)	-1.2 (106)	-1.0 (64)
Median ind-adj change (%)	1.8 (150)	5.7 ** (169)	5.5 (95)	-0.9 (55)
IPO				
Median change (%)	2.6 (93)	2.6 (93)	5.3 (71)	-1.2 (53)
Median ind-adj change (%)	1.1 (82)	0.5 (83)	4.4 (63)	5.1 (47)
Difference				
Median change (%)	-0.5	0.5	-6.4	0.3
Median ind-adj change (%)	0.8	5.2	1.1	-6.0

Table 7: Net cash-flow change after exit

This table reports the median (raw and industry-adjusted) change in Net Cash-flow (Panel A), Net Cash-flow/Total Assets (PANEL B) and Net Cash-flow/Total Sales (Panel C) from the last full year before the exit to the first three full years after the exit, for secondary buy-out firms (SBO) and IPO firms (IPO). The change is measured from the variable value in the last full year before the exit to the average value during the three year period after the exit (3y) and to the variable value in each of the first three full years after the exit (+1, +2 and +3). It also reports the difference in the median change between both subsamples. Significance levels of median change are based on a Wilcoxon signed-rank test, while significance levels of median differences are based on a two-sample Wilcoxon rank-sum (Mann-Whitney) test. *, **, *** indicate levels where median changes for each subsample are significantly different from zero and where both subsample medians are different at the 10%, 5% and 1%, respectively. The number of observations is in parenthesis.

Panel A. Net cash-flow	From -1 to 3y		From -1 to +1		From -1 to +2		From -1 to +3	
SBO								
Median change (%)	3.9	(143)	-2.0	(142)	6.7	(85)	43.2	** (50)
Median ind-adj change (%)	17.4	(105)	18.1	(119)	17.5	(67)	39.1	* (37)
IPO								
Median change (%)	0.5	(46)	19.4	(46)	-8.9	(38)	-31.4	(28)
Median ind-adj change (%)	2.6	(38)	21.6	(40)	-32.2	* (31)	-6.6	(22)
Difference								
Median change (%)	3.4		-21.4		15.6		74.6	*
Median ind-adj change (%)	14.7		-3.6		49.7	*	45.7	*
Panel B. Net cash-flow / Total assets								
SBO								
Median change (%)	-22.5	*** (142)	-19.8	*** (142)	-20.6	** (85)	-17.4	(50)
Median ind-adj change (%)	7.4	(104)	10.1	(119)	2.8	(67)	30.2	* (37)
IPO								
Median change (%)	-35.1	*** (46)	-5.5	(46)	-30.2	*** (38)	-60.2	*** (28)
Median ind-adj change (%)	-3.0	(38)	6.4	(40)	-31.2	* (31)	-24.7	* (22)
Difference								
Median change (%)	12.6	*	-14.3		9.6		42.9	**
Median ind-adj change (%)	10.5		3.7		34.0	*	55.0	*
Panel C. Net cash-flow / Total sales								
SBO								
Median change (%)	-14.1	*** (142)	-13.3	*** (142)	-9.6	* (85)	4.2	(50)
Median ind-adj change (%)	10.0	(104)	9.2	(119)	21.6	(67)	23.6	* (37)
IPO								
Median change (%)	-34.9	*** (46)	-9.8	(46)	-35.1	*** (38)	-56.2	** (28)
Median ind-adj change (%)	2.0	(38)	7.5	(40)	-25.8	** (31)	-22.6	** (22)
Difference								
Median change (%)	20.8	*	-3.5		25.5	*	60.4	**
Median ind-adj change (%)	8.0		1.7		47.4	**	46.3	**

Table 8: Endogeneity test of the Exit-route variable (Durbin–Wu–Hausman test)

This table reports the ordinary-least-square (OLS) estimation of the second equation from the simultaneous equation model with the first (probit) equation residuals added as an exogenous variable to assess the endogeneity of the exit-route variable (Durbin–Wu–Hausman test). The dependent (explained) variables are the Total Sales change (1), CAPEX change (2), EBITDA change (3), and Net (operating) cash-flow change (4) from the last full year before the exit to the average value during the first three full years after the exit. The ‘exit-dummy’ variable assumes the value of 1 if the firm has been exited through an IPO (IPO firm) and 0 if the firm has been exited through a secondary buy-out (secondary firm). Dummy variables that control for exit-year, for industry fixed effects, for portfolio companies ‘UK-headquarter’ and for the ‘number of years of data after the exit’ are included. ‘Firm age’ and ‘private equity firm age’ represents the number of years since the incorporation of the firms up to the exit year. ‘Holding period’ is the number of months the private equity firm held the firm before the exit and all others exogenous variables are measured in the last full year before the exit. Explained variables are winsorized between 0.05 and 0.95 percentiles as also are the variables signed with ⁺. *, **, *** which indicate statistical significance at the 10%, 5% and 1% levels, respectively (t-test). P-values are in parenthesis.

Dependent variable:	(1)	(2)	(3)	(4)
Exogenous variable:	Total sales change	CAPEX change	EBITDA change	NCF change
Exit dummy (IPO=1, SBO=0)	26.81 (0.30)	329.07 (0.13)	90.78 ** (0.02)	-45.84 (0.75)
log (firm age)	-8.87 (0.23)	-141.20 ** (0.03)	-21.09 * (0.06)	85.72 ** (0.03)
log (total assets)	-17.90 *** (0.01)	-38.62 (0.54)	-14.79 (0.22)	-39.36 (0.38)
EBITDA/Assets ⁺	-0.84 *** (0.01)	4.84 * (0.06)	-1.07 (0.12)	0.59 (0.84)
Turnover/Assets ⁺	0.06 (0.25)	-0.35 (0.42)	0.04 (0.61)	0.11 (0.70)
CAPEX/Assets ⁺	0.05 (0.88)	-12.93 *** (0.00)	0.46 (0.41)	0.33 (0.92)
Asset Growth ⁺	0.49 *** (0.00)	-0.30 (0.80)	0.08 (0.72)	-0.49 (0.65)
log (holding period)	-28.14 ** (0.07)	-77.93 (0.56)	9.24 (0.69)	152.30 * (0.06)
log (private equity firm age)	-5.57 (0.65)	-134.51 (0.20)	11.29 (0.56)	170.96 ** (0.02)
I st equation residuals	-1.32 (0.96)	-208.33 (0.36)	-83.01 ** (0.04)	-32.64 (0.83)
Constant	222.11 *** (0.00)	788.57 * (0.08)	8.72 (0.90)	-486.74 * (0.09)
Industry fixed effects	Included	Included	Included	Included
Exit year fixed effects	Included	Included	Included	Included
UK & data availability post-exit dummies	Included	Included	Included	Included
Observations	264	231	245	189
R2	44.35	19.00	20.47	18.00

Table 9: Total Sales and CAPEX change (OLS estimation)

This table reports the multivariate regression for post-exit Total Sales change (1) and CAPEX change (2). The dependent (explained) variables are the change from value in the last full year before the exit to the average value in the first three full years after the exit. The ‘exit-dummy’ variable assumes the value of 1 if the firm has been exited through an IPO (IPO firm) and 0 if the firm has been exited through a secondary buy-out (secondary firm). Other exogenous (control) variables are as defined in Table 8. All regressions are estimated using the OLS method. Explained variables are winsorized between 0.05 and 0.95 percentiles as are also the variables signed with ⁺, *, **, *** which indicate statistical significance at the 10%, 5% and 1% levels, respectively (t-test). P-values are in parenthesis.

Dependent variable:	(1)	(2)
Exogenous variable:	Total sales change	CAPEX change
Exit dummy (IPO=1, SBO=0)	25.61 *** (0.00)	139.59 ** (0.04)
log (firm age)	-8.86 (0.23)	-141.14 ** (0.03)
log (total assets)	-17.70 *** (0.00)	-6.14 (0.91)
EBITDA/Assets ⁺	-0.85 *** (0.00)	3.98 * (0.09)
Turnover/Assets ⁺	0.06 (0.22)	-0.23 (0.58)
CAPEX/Assets ⁺	0.06 (0.87)	-12.43 *** (0.00)
Asset Growth ⁺	0.49 *** (0.00)	-0.03 (0.98)
log (holding period)	-28.36 ** (0.05)	-111.36 (0.39)
log (private equity firm age)	-5.67 (0.64)	-151.29 (0.14)
Constant	125.46 *** (0.00)	993.05 ** (0.01)
Industry fixed effects	Included	Included
Exit year fixed effects	Included	Included
UK & data availability post-exit dummies	Included	Included
Observations	264	231
R2	44.35	18.68

Table 10: EBITDA change (Treatment-effects model estimation)

This table reports the maximum likelihood estimation of the Treatment-effects model for post-exit (1) EBITDA change, (2) EBITDA/Total Assets change and (3) EBITDA/Total Sales change. Panel A reports the results for the second equation of ‘Treatment-effects model’. The dependent (explained) variables are the change from value in the last full year before the exit to the average value in the first three full years after the exit. The ‘exit-dummy’ variable assumes the value of 1 if the firm has been exited through an IPO (IPO firm) and 0 if the firm has been exited through a secondary buy-out (secondary firm). Other exogenous (control) variables are as defined in Table 8. Panel B reports the results for the first equation. The dependent (endogenous) variable is the exit-dummy while the IV (instrument variable) is the ‘FED tightening Index’ in the quarter before the exit. Explained variables are winsorized between 0.05 and 0.95 percentiles as are also the variables signed with ⁺. *, **, *** which indicate statistical significance at the 10%, 5% and 1% levels, respectively (t-test). P-values are in parenthesis.

Panel A. 2 nd equation of the Treatment Effect Model			
Dependent variable:	(1)	(2)	(3)
Exogenous variable:	EBITDA change	EBITDA/assets change	EBITDA/sales change
Exit dummy (IPO=1, SBO=0)	90.34 *** (0.00)	45.54 ** (0.02)	25.81 (0.15)
log (firm age)	-22.09 * (0.06)	-9.38 (0.18)	-11.30 * (0.06)
log (total assets)	-16.81 (0.16)	1.06 (0.89)	3.14 (0.63)
EBITDA/Assets ⁺	-1.34 * (0.06)	-1.83 *** (0.00)	-0.78 ** (0.04)
Turnover/Assets ⁺	0.05 (0.58)	0.07 (0.17)	0.06 (0.18)
CAPEX/Assets ⁺	0.57 (0.33)	0.42 (0.23)	0.15 (0.63)
Asset Growth ⁺	0.03 (0.90)	-0.28 ** (0.05)	-0.17 (0.17)
log (holding period)	8.15 (0.73)	1.00 (0.94)	2.79 (0.82)
log (private equity firm age)	14.31 (0.48)	23.59 ** (0.05)	3.10 (0.77)
Constant	101.61 (0.17)	-9.23 (0.84)	1.36 (0.33)
Industry fixed effects	Included	Included	Included
Exit year fixed effects	Included	Included	Included
UK & data availability post-exit dummies	Included	Included	Included
Observations	245	244	244
Wald test (p-value)	0.00	0.00	0.07
Exogenous regressor test (p-value)	0.02	0.04	0.11

Panel B. 1 st equation of the Treatment Effect Model			
Exogenous variable:	Exit dummy	Exit dummy	Exit dummy
FED tight index quarter before	0.04 *** (0.01)	0.04 *** (0.00)	0.04 *** (0.00)
All control variables	Included	Included	Included

Table 11: Net Cash-flow change (OLS estimation)

This table reports the multivariate regression for post-exit (1) Net cash-flow (NCF) change, (2) Net Cash-flow/Total Assets change and (3) Net Cash-flow/Total Sales change. The dependent (explained) variables are the change from value in the last full year before the exit to the average value in the first three full years after the exit. The ‘exit-dummy’ variable assumes the value of 1 if the firm has been exited through an IPO (IPO firm) and 0 if the firm has been exited through a secondary buy-out (secondary firm). Other exogenous (control) variables are as defined in Table 8. All regressions are estimated using the OLS method. Explained variables are winsorized between 0.05 and 0.95 percentiles as are also the variables signed with ⁺. *, **, *** which indicate statistical significance at the 10%, 5% and 1% levels, respectively (t-test). P-values are in parenthesis.

Dependent variable:	(1)	(2)	(3)
Exogenous variable:	NCF change	NCF/assets change	NCF/sales change
Exit dummy (IPO=1, SBO=0)	-75.47 * (0.09)	-37.70 (0.11)	-48.36 * (0.10)
log (firm age)	86.43 ** (0.03)	48.51 ** (0.03)	57.46 ** (0.03)
log (total assets)	-34.25 (0.37)	-10.86 (0.61)	-15.61 (0.54)
EBITDA/Assets ⁺	0.46 (0.87)	-0.36 (0.81)	0.13 (0.94)
Turnover/Assets ⁺	0.13 (0.63)	0.04 (0.76)	0.06 (0.73)
CAPEX/Assets ⁺	0.34 (0.91)	1.56 (0.37)	0.74 (0.73)
Asset Growth ⁺	-0.43 (0.68)	0.25 (0.66)	0.08 (0.91)
log (holding period)	147.75 * (0.06)	53.07 (0.22)	59.61 (0.26)
log (private equity firm age)	168.06 ** (0.02)	80.80 ** (0.04)	97.97 ** (0.04)
Constant	-456.52 * (0.07)	-263.91 * (0.05)	-290.59 * (0.08)
Industry fixed effects	Included	Included	Included
Exit year fixed effects	Included	Included	Included
UK & data availability post-exit dummies	Included	Included	Included
Observations	189	188	188
R2	17.98	16.13	15.70

Table 12: Impact of previous deal holding period on post-exit performance of Secondary firms

This table reports the average and median differences between groups representing ‘shorter’ and ‘longer’ previous deal holding periods across a wide range of pre- and post-exit variables. The groups are formed from the subsample of secondary firms. ⁺ indicate that the average value is taken from the variable winsorized between 0.05 and 0.95 percentiles. Significance levels of average differences are based in a one-tail t-test while, in the case of median differences, are based on a two-sample Wilcoxon rank-sum (Mann-Whitney) test. *, **, *** indicate levels where medians changes for each subsample are significantly different from zero and where both subsample medians are different at the 10%, 5% and 1% level, respectively.

Variables:	Percentil	10%-50%		50%-90%		Difference between percentils 10-50 and 50-90			
	hp (y)	N	Average	Median	N	Average	Median	Average	Median
HP (mths)		78	37.1	38.2	78	62.4	61.1	-25.3 ***	-22.9 ***
<i>Year before secondary buy-out</i>									
Assets (\$m)		78	268.8	106.6	78	300.8	114.6	-32.0	-8.0
Asset growth (%) ⁺		75	12.6	6.2	75	11.5	6.0	1.0	0.3
Turn/Asset ⁺		74	128.7	109.7	75	125.3	117.6	3.4	-7.9
Ebitda / assets (%) ⁺		75	15.1	14.6	75	15.6	16.0	-0.5	-1.5
Ebitda / sales (%) ⁺		75	15.5	15.0	75	16.2	12.9	-0.6	2.1
Capex / assets (%) ⁺		72	8.4	4.0	75	7.8	4.8	0.6	-0.8
<i>At secondary-buy-out</i>									
PE age seller (y)		78	20.3	21.0	78	20.6	21.0	-0.2	0.0
PE fund size (\$m)		72	756.2	299.2	74	727.3	521.1	28.9	-221.9
PC age (y)		78	36.5	23.0	78	43.4	24.0	-6.9	-1.0
PE age buyer		72	17.3	17.0	72	15.3	11.5	2.0 **	5.5
<i>Change after secondary-buyout</i>									
Total sales (%) ⁺		78	44.9	30.3	78	28.0	17.8	16.9 **	12.5 **
Industry-adjusted (%)		68	23.2	10.2	68	6.6	3.0	16.6 **	7.2
Capital expenditures (%) ⁺		63	175.2	2.5	66	139.0	24.6	36.2	-22.1
Industry-adjusted (%)		50	118.3	15.5	53	134.3	35.8	-16.0	-20.3
Ebitda (%) ⁺		69	42.1	40.3	73	22.5	22.9	19.6 **	17.4 **
Industry-adjusted (%)		60	22.4	21.3	65	3.1	-1.1	19.4 **	22.4 *
Ebitda / assets (%) ⁺		68	-3.6	-7.1	73	-16.5	-17.8	12.9 **	10.8 *
Industry-adjusted (%)		59	4.3	5.3	64	-9.9	-17.7	14.3 **	23.0 *
Ebitda / sales (%) ⁺		68	3.5	2.7	73	-4.0	1.4	7.5 *	1.4
Industry-adjusted (%)		65	6.5	3.9	58	-4.1	-0.1	10.6 *	4.0
Net cash-flow (%) ⁺		54	-32.3	8.0	61	-41.0	1.3	8.7	6.7
Industry-adjusted (%)		40	29.8	35.7	47	-23.3	-13.8	53.1	49.5
Net cash-flow / assets (%) ⁺		53	-34.9	-24.7	61	-36.1	-19.0	1.2	-5.7
Industry-adjusted (%)		39	27.4	26.4	47	-3.7	3.0	31.2	23.4
Net cash-flow / sales (%) ⁺		53	-38.6	-17.2	61	-45.5	-11.6	6.9	-5.6
Industry-adjusted (%)		39	26.3	27.4	47	-18.3	-7.2	44.6 *	34.5

Table 13: Selling Private Equity and Purchasing Private Equity Investors' Experience

This table reports the average and median differences between the 'Selling Private Equity firm' and 'Purchasing Private Equity firm' in a secondary buy-out. Age is the number of years since the incorporation of the private equity firm up to the exit year. However if the private equity was incorporated before 1970, 1970 is assumed as the first year of activity in the private equity industry as it would be very difficult to have any experience in the private equity industry before that as the private equity industry really only started to arise in the 70's. (BO) Funds set up are the number of private equity (buy-outs) funds set up by the private equity firm up to the exit year and the Total Amount Raised (in BO funds) is the total size of all private equity (buy-outs) funds set up to the exit year. When more than one private equity firm is identified in the same transaction, one of two things is done: If one of the private equity firms is the leader of the transaction (i.e., retained a higher percentage of shares on the deal) only the information about the leader is used, if none of the private equity firms received more shares than the other(s) or no information is available, the average value is used. Significance levels of average differences are based on a one-tail t-test, while median differences are based on a two-sample Wilcoxon rank-sum (Mann-Whitney) test. *, **, *** indicate the levels where median changes for each subsample are significantly different from zero and where both subsample medians are different at the 10%, 5% and 1% levels, respectively.

Variable	Selling PE			Purchasing PE			Difference		
	N	Average	Median	N	Average	Median	N	Average	Median
Age (y)	194	21.0	22.0	180	16.5	16.5	180	4.5 ***	4.0 ***
Funds set up (n)	175	11.8	8.0	174	10.0	5.0	159	1.9 *	2.0 ***
Total amount raised (\$m)	175	6,669	4,617	163	6,288	1,507	151	110	627 *
BO funds set up (n)	162	6.3	5.0	165	4.8	4.0	136	1.8 ***	2.0 **
Total amount raised in BO funds (\$m)	162	4,556	3,194	163	3,784	900	134	711	600 **

Table 14: Selling Private Equity Experience impact in post-exit operating performance

This table reports the multivariate regressions results for the impact of the selling PE's experience in post-exit operating performance change for the subsample of secondary firms. Panel A (Panel B) measures the selling PE experience effect on the secondary firms' raw (industry-adjusted) performance. All regressions are estimated using the OLS method. Explained variables are winsorized between 0.05 and 0.95 percentiles as also are the variables signed with ⁺. Control variables are the same as in Tables 9 to 13. *, **, *** indicate the statistical significance at the 10%, 5% and 1% levels, respectively (t-test). P-values are in parenthesis.

Panel A. Raw change															
Exogenous variable:	Endogenous variable: EBITDA					Endogenous variable: EBITDA/Total assets					Endogenous variable: EBITDA/Total sales				
Log (age)	-1.420 (0.95)					24.536 *** (0.07)					3.097 (0.80)				
Log (number of funds set up)	8.493 (0.54)					7.099 (0.44)					0.478 (0.95)				
Log (total amount raised (\$m))	5.792 (0.53)					1.931 (0.75)					0.970 (0.85)				
BO funds set up (n) ⁺	1.062 (0.47)					0.236 (0.81)					-0.340 (0.68)				
Amount raised in BO funds (\$m) ⁺	0.001 (0.43)					0.000 (0.88)					0.000 (0.91)				
Control variables	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
N	175	159	159	148	148	174	158	158	147	147	174	158	158	147	147
R2	11.90	12.44	12.45	12.90	12.97	20.20	21.01	20.72	22.00	21.98	11.51	13.14	13.16	14.29	14.18
Panel B. Industry-adjusted change															
Exogenous variable:	Endogenous variable: EBITDA					Endogenous variable: EBITDA/Total assets					Endogenous variable: EBITDA/Total sales				
Log (age)	-12.859 (0.56)					12.379 (0.45)					-5.995 (0.66)				
Log (number of funds set up)	-5.501 (0.72)					-3.983 (0.73)					-3.029 (0.74)				
Log (total amount raised (\$m))	0.234 (0.98)					-3.955 (0.59)					0.130 (0.98)				
BO funds set up (n) ⁺	1.036 (0.52)					-0.436 (0.72)					-0.121 (0.90)				
Amount raised in BO funds (\$m) ⁺	0.001 (0.50)					-0.000 (0.80)					0.000 (0.67)				
Control variables	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
N	147	132	132	122	122	145	130	130	121	121	145	130	130	120	120
R2	11.20	11.54	11.43	10.57	10.60	22.67	23.64	23.76	24.05	24.00	13.59	16.21	16.12	16.40	16.55

Table 15: Purchasing Private Equity Experience impact in post-exit operating performance

This table reports the multivariate regressions results for the impact of the purchasing PE's experience in post-exit operating performance change for the subsample of secondary firms. Panel A (Panel B) measures the selling PE experience effect on the secondary firms' raw (industry-adjusted) performance. All regressions are estimated using the OLS method. Explained variables are winsorized between 0.05 and 0.95 percentiles as are also the variables signed with ⁺. Control variable are the same as in Tables 9 to 13. *, **, *** indicate statistical significance at the 10%, 5% and 1% levels, respectively (t-test). P-values are in parenthesis.

Panel A. Raw change															
Exogenous variable:	Endogenous variable: EBITDA					Endogenous variable: EBITDA/Total assets					Endogenous variable: EBITDA/Total sales				
Log (age)	13.262 (0.42)					3.546 (0.74)					9.356 (0.32)				
Log (number of funds set up)	27.888 ** (0.01)					7.376 (0.33)					13.750 ** (0.03)				
Log (total amount raised (\$m))	13.149 * (0.09)					5.980 (0.26)					5.864 (0.19)				
BO funds set up (n) ⁺	3.534 *** (0.01)					1.375 (0.12)					1.413 * (0.06)				
Amount raised in BO funds (\$m) ⁺	0.003 *** (0.00)					0.001 * (0.08)					0.002 *** (0.01)				
Control variables	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
N	160	159	147	149	147	160	159	147	149	147	160	159	147	149	147
R2	13.74	19.23	17.52	19.40	19.48	19.54	19.18	16.54	17.11	17.66	14.08	16.58	13.68	14.79	16.44
Panel B. Industry-adjusted change															
Exogenous variable:	Endogenous variable: EBITDA					Endogenous variable: EBITDA/Total assets					Endogenous variable: EBITDA/Total sales				
Log (age)	10.344 (0.56)					-0.878 (0.95)					3.279 (0.76)				
Log (number of funds set up)	17.707 (0.14)					7.018 (0.44)					11.295 (0.12)				
Log (total amount raised (\$m))	11.251 (0.19)					10.924 * (0.08)					7.825 (0.12)				
BO funds set up (n) ⁺	2.880 *** (0.04)					2.065 ** (0.05)					1.572 * (0.06)				
Amount raised in BO funds (\$m) ⁺	0.005 *** (0.00)					0.003 *** (0.00)					0.002 *** (0.00)				
Control variables	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
N	133	131	121	123	121	132	130	120	122	120	132	131	121	123	121
R2	12.24	14.15	14.22	16.50	22.12	23.97	23.17	23.76	24.89	29.37	15.35	17.10	17.20	19.25	23.11

Table 16: Post-IPO financial performance (CARs)

This table reports the cumulative returns and cumulative abnormal returns (CARs) during the 12, 24, 36 and 48 months following the first trading day after the IPO. Abnormal returns subtract the expected return from the actual return. The expected return is computed using the single-factor CAPM model, with betas assumed to be unity or estimated using industry averages. All returns are based on monthly data and are equally-weighted. Standard errors are present in brackets for all variables. *, **, *** indicate statistical significance of the variable at the .10, .05 and .01 level, respectively (t-test).

Months after IPO	N	Cumulative Returns		CAR ($\beta = 1$)		CAR (Industry β)	
		Average	se	Average	se	Average	se
12	110	-4.3%	(0.06)	-1.6%	(0.05)	-0.7%	(0.05)
24	106	-13.7%	(0.09) *	-4.5%	(0.08)	-0.9%	(0.07)
36	90	1.0%	(0.10)	12.6%	(0.09) *	15.8%	(0.08) **
48	67	9.5%	(0.13)	15.9%	(0.12) *	18.9%	(0.11) **

Table 17: Post-IPO financial performance (BHARs)

This table reports the buy-and-hold returns and buy-and-hold abnormal returns (BHARs) during the 12, 24, 36 and 48 months following the first trading day after the IPO. Abnormal returns subtract the expected return to the actual return. The expected return is computed using the single-factor CAPM model, with betas assumed to be unity or estimated using industry averages. All returns are based on monthly data and are equally-weighted. Standard errors are present in brackets for all variables. *, **, *** indicate statistical significance of the variable at the .10, .05 and .01 level, respectively (t-test).

Months after IPO	N	Buy-and-Hold Returns		BHAR ($\beta = 1$)		BHAR (Industry β)	
		Average (%)	se	Average (%)	se	Average (%)	se
12	110	3.5	(0.06)	6.3	(0.06)	6.8	(0.06)
24	106	9.9	(0.12)	15.8	(0.12) *	18.6	(0.12) *
36	90	13.1	(0.11)	21.3	(0.10) **	23.9	(0.09) ***
48	67	16.0	(0.13)	24.4	(0.12) **	27.3	(0.11) ***

Table 18: IPO firms positive CARs vs. negative CARs after the IPO

This table reports the average and median differences between IPO firms with a positive cumulative abnormal return 48 months after the first trading day after the IPO ('Positive CARs' group) and IPO firms with a negative cumulative abnormal return 48 months after the first trading day after the IPO ('Negative CARs' group), across a wide range of pre- and post-exit variables. ⁺ indicate that the average value is taken from the variable winsorized between 0.05 and 0.95 percentiles. Significance levels of average differences are based on a one-tail t-test while median differences are based on a two-sample Wilcoxon rank-sum (Mann-Whitney) test. *, **, *** indicate levels where medians changes for each subsample are significantly different from zero and where both subsamples medians are different at the 10%, 5% and 1% levels, respectively.

Variables:	Positive CAR			Negative CAR			Difference	
	N	Average	Median	N	Average	Median		
CAR ₄₈ (industry beta)	42	71.9	62.5	25	-70.0	-44.4	141.9 ***	106.9 ***
Underpricing (%)	42	7.2	5.0	25	21.2	5.3	-14.0 *	-0.3
HP (mths)	42	40.4	37.9	25	42.1	37.8	-1.8	0.0
<i>Year before secondary buy-out</i>								
Assets (\$m)	42	540.1	173.3	25	306.2	66.6	233.8 *	106.7
Asset growth (%) ⁺	31	29.3	15.5	17	43.3	28.4	-14.1	-13.0
Turn/Asset ⁺	42	123.7	109.9	25	108.9	112.5	14.8	-2.5
EBITDA / assets (%) ⁺	40	10.8	12.9	25	4.7	11.5	6.1 *	1.5
EBITDA / sales (%) ⁺	39	12.7	16.5	28	0.8	6.2	11.9 **	10.3 **
CAPEX / assets (%) ⁺	30	10.1	7.2	17	15.9	13.0	-5.7 *	-5.8
<i>At secondary-buy-out</i>								
PE age seller (y)	42	20.4	20.0	25	21.6	21.0	-1.2	-1.0
PE fund size (\$m)	41	891.9	566.2	23	890.1	525.0	1.8	41.2
PC age (y)	40	41.4	23.5	28	21.5	13.0	19.9 **	10.5 **
<i>Change after secondary-buyout</i>								
CAPEX (%) ⁺	26	362.6	243.3	16	260.3	-0.2	102.3	243.5
Industry-adjusted (%)	23	255.1	149.5	16	238.0	-24.8	17.2	174.3
Capex/ assets (%) ⁺	26	91.7	57.7	16	25.7	-34.9	66.0	92.5 **
Industry-adjusted (%)	23	81.8	52.8	16	26.0	-19.4	55.8	72.2 *
EBITDA (%) ⁺	34	96.7	77.5	18	45.1	40.8	51.6 **	36.8 *
Industry-adjusted (%)	29	49.4	43.0	17	11.0	1.4	38.4 *	41.6
EBITDA / Total assets (%) ⁺	34	-1.2	1.7	18	-29.5	-53.0	28.3 **	54.7 **
Industry-adjusted (%)	29	9.4	6.5	17	-18.0	-3.4	27.4 **	10.0 *
EBITDA / Total sales (%) ⁺	34	5.7	4.9	18	-15.9	-5.4	21.6 **	10.3 *
Industry-adjusted (%)	29	6.5	-0.4	17	-8.5	-6.2	14.9	5.8
Net cash-flow (%) ⁺	21	-148.2	-30.4	7	-139.3	32.3	-8.9	-62.7
Industry-adjusted (%)	16	-57.8	-13.6	6	-158.6	10.8	100.7	-24.4
NCF / Total assets (%) ⁺	21	-96.5	-64.2	7	-77.7	-20.7	-18.8	-43.6
Industry-adjusted (%)	16	-33.7	-12.5	6	-52.3	11.8	18.7	-24.2
NCF / Total sales (%) ⁺	21	-109.4	-48.2	7	-110.2	-23.9	0.7	-24.4
Industry-adjusted (%)	16	-49.3	-10.9	6	-87.6	3.0	38.3	-13.9