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What determines the exit decision for leveraged buyouts? ☆

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ABSTRACT

How and when to exit portfolio company investments are critical choices facing private equity funds. In this paper we analyze 1022 European private equity exits, using information on fund and portfolio company characteristics, and on conditions in capital markets. For over 43% of the exits, private equity funds sold to each other and we analyze why such secondary buyouts have gained in popularity relative to IPOs and sales to corporate acquirers. We find that the exit route depends on various portfolio company characteristics, and that conditions in the debt and equity markets have a strong influence on exit choice. The existing literature has tended to portray the IPO is the "preferred" exit route. However, our analysis suggests this is mistaken: private equity funds take advantage of 'windows of opportunity', and the exit route that maximizes value varies with market conditions.

1. Introduction

Exiting portfolio company investments is one of the most critical choices faced by private equity funds. Yet little is known about the timing of exit decisions or the choice of the exit route – which are broadly IPO, sale to another company ("trade sale") or sale to another private equity fund ("secondary exit"). The aim of this paper is to fill this gap and provide insights into the timing of private equity exits, and the choices made by private equity firms.

Previous research has tended to focus on the IPO as an exit route (Lerner, 1994; Murray, 1994; Barry et al., 1990; Giot and Schwienbacher, 2007). However, IPOs are relatively uncommon, with the vast majority of private equity exits being trade or secondary sales. Furthermore, the recent growth of secondary buy-outs has generated considerable controversy. As we show, around 43% of all exits were secondary sales in recent years. Some commentators refer to these as "pass the parcel" deals, implying that the ultimate value of the company – once the music stops and the true value is revealed by a sale to someone other than another private equity fund – is very uncertain. Investors (the Limited Partners in the fund, or LPs) often complain about such deals. In particular, when an LP is an investor in both the selling and acquiring fund, they continue to hold a stake in the company, but have paid often significant transactions fees and, in some cases, will have crystalized a profit share (or "carried interest", which is typically 20% of the profits) for the exiting private equity manager (the General Partner, or GP).

Given the way private equity funds are incentivized, in particular the fact that they earn carried interest provided the fund beats a hurdle rate expressed in terms of the whole fund internal rate of return (IRR), the timing of the exit cannot be divorced from the route chosen. A rapid exit will boost the IRR, and so private equity funds will, to some extent, trade off the immediacy, and certainty, of an exit route with maximizing value. An important contribution of this paper is to analyze the time-to-exit dynamics, using a hazard function framework. Although much of the literature asserts that IPOs are associated with "successful" exits, they do not result in quick, or certain, proceeds for private equity funds, given the requirement for their stakes to be locked-up for at least 6 months, and the difficulty of disposing of significant stakes.[1] Secondary sales are relatively quick, the proceeds are certain and, unlike trade

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[1] The financial performance of LBOs that return to public markets relative to conventional IPOs has been studied by Cao and Lerner (2009) and Cao (2011). The latter paper provides evidence that private equity funds sell-down their stakes in companies they take back to public markets surprisingly slowly. This confirms that an IPO is only, in itself, a partial exit, and the achievement of full exit can take several years in practice.

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sales where competitors often emerge as the most likely purchasers, they seldom involve regulatory issues. Consequently, secondary sales are often welcomed by LPs. The controversy regarding secondary transactions is, therefore, mainly focused on the *purchasing* GP. Why are they buying a company that has already been worked on actively by another GP for several years?[2]

To analyze these issues, the paper focuses on exits of European private equity leveraged buyouts (LBOs) between January 2000 and December 2014 using a very large (self-collected) sample of 1022 portfolio companies.[3] Previous studies as Sudarsanam (2005) studied the exit choice for 104 UK LBOs investments and found that operating performance, firm size, length of holding period and whether the firm belonged to the 'high-tech' industry were all significant determinants of the exit strategy. Wang (2012) also studies UK secondary exits. As Wang only has data on a relatively small number of companies she does not differentiate between IPOs and trade sales as alternative exit routes.[4] Using our much larger pan-European dataset we are able to identify the main factors that influence whether private equity funds choose to exit via IPO, trade sale, or a sale to another financial buyer. Cumming and MacIntosh (2003b), focus mainly on the determinants of a partial exit, as opposed to a full exit, within the full range of exit vehicles and found that the greater the degree of information asymmetry between the private equity firm and the buyer, the greater the likelihood of a partial exit and suggested that partial exits were used as a signal of a portfolio company's quality.

This paper considers three sets of factors – which are likely to interact – that could influence the timing of exit and the choice of exit route.

First, we investigate the impact of market conditions. Private equity firms want to achieve the best exit price possible and capital market conditions may create different 'windows of opportunity'. For instance, higher availability of funds in the loan market, a "cold" IPO market or large amounts of capital committed but not yet invested in the private equity industry may make secondary buy-outs the most profitable exit route. Consistent with this hypothesis, Axelson et al. (2013) find that a higher availability of debt (measured by leverage multiples – Total Debt/EBITDA[5] – used in leverage buyouts) has a strong impact on the prices of deals as private equity firms borrow as much as they can for each deal. Shivdasani and Wang (2011) also document the important impact of credit markets and securitization, and show that the LBO boom in the years before the financial crisis was largely fuelled by cheap debt with few covenants.[6] Therefore favorable debt market conditions may increase the likelihood of a secondary buy-out transaction.

On the equity side, the well-documented cycles in the number of initial public offerings (and in the initial returns of such IPOs) also suggest the existence of windows of opportunity in the public equity markets.[7] For instance, whilst relatively few private equity exits to public markets were observed in the years following the financial crisis, there was a flurry of private equity-backed IPOs during 2014.

The second set of factors we consider relate to the private equity fund structure. As noted earlier, private equity investing is generally carried out through partnerships/funds that have a contractually finite life, normally ten years, which can be extended only with the consent of the LPs. Moreover, private equity firms set up new funds approximately every three to five years and a good track record for timely exits as well as past performance are crucial to enhancing a firm's reputation and future fundraising (Phalippou (2008)). Therefore, when a private equity fund is near the end of its contractual life, the GP faces pressure to realize investments.[8] Consistent with this observation, Masulis and Nahata (2009) found in the case of trade sales that the returns of the purchasing company are, on average, higher when the selling private equity fund is closer to maturity. Cumming and MacIntosh (2003a) conjecture that as the fund approaches its maturity, there may be portfolio companies that are not yet ready for a public offering or a strategic sale, which may make a secondary sale attractive, insofar as it can avoid having to request an extension on the life fund.

More benignly, GPs have different specializations. Some are focused on earlier stages of investment and others on expansion or late-stage investments, and so the recent wave of secondary buy-outs may have occurred because portfolio companies matured and grew and so were sold to other private equity firms that focus on such companies.[9] In this case we might expect the two private equity firms involved in a secondary transaction should differ in terms of their experience, specialization, etc. Therefore, these various characteristics such as the holding period of the investment, how close the fund is to maturity, and the experience or specialization of the private equity fund may influence exit choice.

The final set of factors we consider relate to the portfolio company. It may be that some companies are more suited to particular exit routes. For instance, companies which can operate with high levels of debt – due to stable cash-flows or low investment needs – may be particularly suitable for continued private equity ownership, and so more likely to realize a secondary exit. And, emphasizing the point that these sets of factors can interact, the probability of a secondary exit for such a company would be expected to increase further when debt market conditions are favorable. Or it could be that firms have different monitoring needs, as suggested by Bienz and Leite (2008). In their model highly profitable companies – which require less monitoring – are more likely to be exited through an IPO whereas less profitable companies are exited via a trade sale. We explore whether such firm characteristics can explain exit choices.

Our main results are as follows. First, our analysis suggests that capital market conditions are the most important determinant of the exit route. Private equity funds exploit the windows of opportunity that open at different times. For instance, in 2006–07 the extraordinary conditions in the credit market made possible the use of higher levels of debt in European buy-outs. Furthermore, the huge amount of capital that was committed to private equity before the financial crisis led to a shift in demand. Together these factors made private equity firms willing to pay more for portfolio companies, which increased their bargaining power relative to corporate acquirers, and resulted in a high proportion of secondary sales.

Second, we find an important role for portfolio company characteristics. In particular, as would be expected, secondary buy-outs are more likely when the portfolio company's characteristics

[2] Achleitner and Figge (2014) and Bonini (2015) have analyzed the sources of value creation for secondary buyouts. Guo et al. (2011) and Harford and Kolasinski (2013) study value creation in buyouts more generally, irrespective of the chosen exit route. A summary of evidence regarding financial performance of buyouts in general can be found in Cumming et al. (2007).

[3] We focus on buyouts as entry and exit are much easier to observe compared with venture capital deals where there can be multiple rounds of investing and divesting.

[4] Wang (2012) only identifies 5 IPOs in her UK sample; we have 142 in our broader European sample.

[5] EBITDA – Earnings Before Interest, Taxes, Depreciation and Amortization.

[6] Also, as noted by Groh and Gottschalg (2011), buyout transactions tend to happen in lower risk industries, and so the availability of leverage becomes important to generate higher returns (even if not on a risk-adjusted basis).

[7] See for instance Ibbotson and Jaffe (1975), Ritter (1984) and Lowry and Schwert (2002).

[8] Arcot et al. (2015) use an exit in year 9 or 10 of the life of the private equity fund as a sign that the GP is "under pressure".

[9] "If you have different funds with different strategies, it's natural that firms will want to buy and sell to each other" says Ross Marshall of Dunedin Capital Partners in September 2001 and "[P]rivate equity bosses say secondary buy-outs can be a way to take a company to a new level" in Financial Times (4th November 2010).

(higher cash flow and lower capital expenditures needs) make the company more able to bear significant amounts of debt in their capital structure.

Third, regarding fund characteristics we find evidence that experienced private equity firms tend to sell to the less experienced, and that that secondary deals tend to happen at a later point in the life of the purchasing fund than primary deals. This suggests that secondary purchases might be a quick way of using up committed capital towards the end of the fund investment period. We also find evidence that IPOs are used as an early exit route, which is consistent with the view that IPOs can be attractive as marketing devices for raising a subsequent fund. However, the data also suggests that, if private equity firms cannot perform a public offering within a short period after the initial investment, they may prefer to exit through a secondary buy-out to keep their investment periods short, so as to realize high IRRs and facilitate fundraising. These results suggest that exit choices are, to some extent, driven by the private equity firms' desire to raise their next fund, which may conflict with the interest of their investors.

The remainder of the paper is structured as follows. Section 2 explains how the sample is constructed, summarizes the data, and analyzes the time-to-exit decision using a survival analysis framework. A multivariate econometric model for exit route choice is presented in section 3. Section 4 compares the characteristics of the private equity firms that participate as vendors or purchasers in secondary buy-outs. Section 5 concludes.

2. Data construction and sample characteristics

2.1. Sample construction

One of the main issues concerning private equity research is the availability of data. Because private equity-backed companies are not publicly traded they do not have the same obligations regarding the disclosure of information as publicly traded companies. This is particularly problematic for U.S. companies (except those that have issued public bonds). However, European companies are still required to file accounting statements in the public domain. In this paper, therefore, we focus on European portfolio companies, as defined by the country of their headquarters; we make no restrictions on the country of origin of the private equity fund.

The dataset used in this paper is assembled from several sources and databases in a complex and multi-step process.[10] The initial universe consists of all European private equity investments[11] that exited through a public offering, a trade sale or a secondary buy-out between January 2000 and December 2014.[12] We are limited in going back before 2000 as it is very difficult to get accounting statements before that date. We then restrict the sample to those investments where it is possible to (i) identify the private equity firm(s) and fund(s) involved, (ii) identify the entry deal (merger/acquisition or a private placement) date, and (iii) obtain accounting data for the year before the exit.

The first step in building the database is to identify private equity exits. For this two databases are used, S&P Capital IQ and Private Equity Insight. These databases complement each other and so combining them provides a broad and representative sample of private equity exits. Using these databases, it is possible to identify 1023 secondary buy-outs, 1231 trade sales and 313 initial public offerings, in a total of 2567 private equity exits, occurring between January 2000 and December 2014.

The second step involves gathering detailed transaction/exit data. Thomson Venture Expert (TVE) and S&P Capital IQ are used to identify the selling private equity firms and funds involved in each transaction and their characteristics, such as the year the private equity was founded, the fund vintage year and the fund size. When more than one private equity firm is identified in the same transaction, if one of the private equity firms led the transaction (retained a higher percentage of shares on the deal) only the information about the leader and their fund is used. If none of the private equity firms receive more shares than the other(s) or no information about that aspect is available, information on all private equity firms and funds data is obtained and the data on firm and fund characteristics is averaged.

S&P Capital IQ, TVE and Zephyr[13] are used to obtain information about the entry deal date. Accounting data is collected from FAME, AMADEUS and ORBIS,[14] and occasionally from S&P Capital IQ. Only the deals for which accounting data regarding the portfolio company is available for at least the year before the exit are retained. Information about the portfolio company's founding year is collected from S&P Capital IQ, TVE or the Internet.

From the 2567 private equity exits identified in the first step we are able to collect the data required for 446 secondary buy-outs, 434 trade sales (to either publicly-listed or private companies) and 142 public offerings, producing a total of 1022 private equity exits. Fig. 1 shows the exit route distribution by year. These exits represent our sample for the remainder of the paper. Table 1 reports the nationality (Panel A) and the industry (Panel B) of the sample portfolio companies and Table 2 shows the (selling) private equity firms involved. 28 European countries and more than 300 private equity firms are represented in this sample, with the UK accounting for almost one-half of the portfolio companies. We believe this to be the most comprehensive sample of European private equity exits yet collected.

Information about the local stock market return index is collected from the relevant stock exchange websites. Capital committed to private equity funds and not yet invested is obtained from Preqin. Finally, three different measures of debt market conditions are collected. The *FED tightening Index*[15] is collected from the Board of Governors of the Federal Reserve System website and represents the net percentage of domestic banks that have tightened standards for Commercial and Industrial (C&I) Loans in a quarter. Finally, monthly interest margins on leveraged loans and leverage multiples in European buy-outs are obtained from S&P Capital IQ's Leveraged Commentary and Data (LCD).

2.2. Summary statistics

Table 3 provides summary information for the 1022 deals. The average holding period of all deals is just over 4 years. This is slightly longer than the 3.7 years found by Schwienbacher (2008a) and in the middle of the 3–5 year interval suggested by Fenn et al. (1997). On average, private equity funds make their investments about two years into the life of the fund (25.0 months) and exit their investments after around six years (76.2 months). Not surprisingly, holding periods increased noticeably after the

[10] A more detailed explanation of this process is available upon request.

[11] The definition of private equity investments, in the study, excludes venture capital investments.

[12] Liquidations were dropped because, in order to exclude venture capital investments the sample only includes exits with transaction (exit) value higher than $50 m (£25 m) and the low (or even zero) value of a liquidation would mean that none of these transactions would have made the cut off. Buy-backs were dropped because they either are used as a subsequent exit (after an initial public offering) or in small, venture capital type investments. And finally, dividend recapitalizations were dropped because they are not an exit *per se*, but combine a cash distribution with a balance sheet restructuring.

[13] Zephyr contains information on deals, such as merger and acquisitions and IPOs.

[14] FAME, AMADEUS and ORBIS contain information on public and private companies for the UK & Ireland, Europe and the rest of the world (respectively). FAME, AMADEUS, ORBIS and Zephyr are managed by Bureau van Dijk.

[15] *Senior Loan Officer Opinion Survey on Bank Lending Practices*. For more information on this survey, see www.federalreserve.gov/boarddocs/snloansurvey.

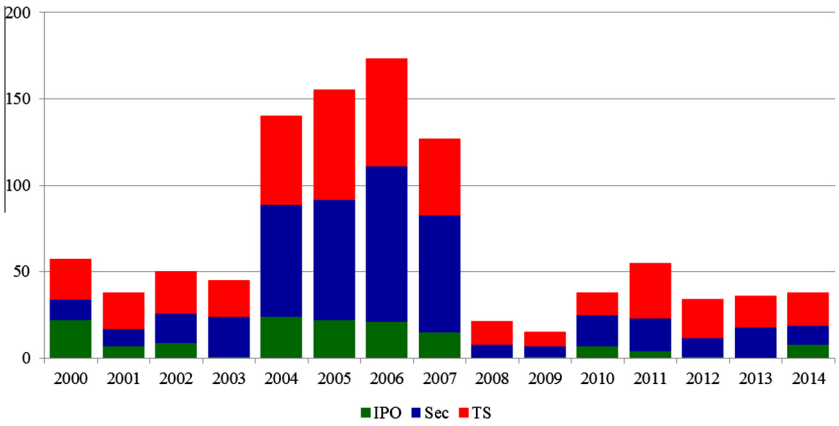

Fig. 1. Exits distribution by route and year. This figure shows our sample of 1022 private equity exits by route and year.

Table 1
Sample description. This table gives details about the 1022 exits of European companies, which occurred between January 2000 and December 2014. Panel A sorts the sample by portfolio company nationality (according to the location of their headquarters) and according to whether their exit route was an initial public offering (IPO), secondary sale to another private equity fund (Sec) or a trade sale to a corporate acquirer (TS). Nationality means the country where the portfolio company has its headquarters. Panel B sorts the sample by broad industrial classification and by exit route.

Country	Exit route			
	IPO	Sec	TS	Total
Panel A: Nationality of portfolio companies and exit routes				
United Kingdom	64	198	182	444
France	13	84	53	150
Sweden	11	23	36	70
Germany	12	28	27	67
Italy	4	34	27	65
Spain	3	14	19	36
Netherlands	3	15	16	34
Norway	8	13	12	33
Finland	2	8	16	26
Denmark	2	10	7	19
Belgium	2	5	8	15
Ireland	5	1	4	10
Austria	4	2	2	8
Other 15	9	11	25	45

Industry	IPO	Sec	TS	Total
Panel B: Industrial classification of portfolio companies				
Agriculture and Mining	4	6	12	22
Construction	2	8	9	19
Manufacturing	55	182	178	415
Transportation and Communication	10	33	51	94
Retail and Wholesale Trade	22	67	47	136
Financial and Other services	49	150	137	336

Table 2
Sample description: Exits by selling private equity firm. This table reports the selling private equity firm and exit routes used in the 1022 exits of European companies which occurred between January 2000 and December 2014. If more than one private equity firm was involved and none was the leader (got a higher percentage of shares on the deal) all private equity firms were considered.

Private equity firm	Exit route			
	IPO	Sec	TS	Total
3i Group	15	34	41	90
Bridgepoint Capital	2	20	18	40
Apax Partners	11	11	15	37
Barclays Private Equity	1	18	8	27
EQT Partners	9	9	9	27
CVC Capital Partners	6	9	9	24
Cinven	3	10	8	21
Industri Kapital	2	9	9	20
Nordic Capital	4	7	8	19
Carlyle Group	3	9	7	19
Candover Investments	2	8	7	17
Permira	3	9	5	17
Other 297	87	340	317	744

Table 3
Summary Statistics for the entire sample. This table reports the summary statistics for deal holding period, characteristics of private equity investors and funds involved, target portfolio company's age, size and operating performance, at the time of exit, for 1022 deals exited between January 2000 and December 2014 (dollars in millions).

Variables	Average	Median	Std. deviation	*N*
Panel A: Deal and PE investor				
Holding period (months)	51.2	48.1	25.8	1022
Fund maturity (months)	76.2	72.9	31.5	979
Fund size	$938.0	$455.7	$1,360.4	981
PE age at exit (years)	20.3	20.0	9.7	1022
Panel B: Portfolio company				
Age at exit (years)	37.8	21.5	41.6	1022
Total assets	$328.0	$97.4	$846.5	1022
Turnover	$320.2	$108.7	$819.1	1019
EBIT	$25.5	$9.3	$81.7	1022
EBIT margin	8.94%	13.29%	12.33%	1017
Asset turnover ratio	1.51	1.23	1.29	1019
CAPEX	$23.4	$5.1	$151.2	942
CAPEX/Total assets	9.48%	6.92%	12.01%	941

2008 financial crisis. The average (median) fund size is $938 million ($456 million) while the private equity firms have on average, at the time of the exit, around 20 years of experience.[16]

Regarding the target portfolio companies, in the year before the exit they have average (median) book assets of $328 million ($97 million), sales of $320 million ($109 million) and EBIT of $25 million ($9.3 million).

In Table 4 we differentiate between exit routes. Panel A shows that investments exited through a secondary buy-out are held for an average (median) of 52.7 months (49.5 months), compared with 51.8 months (48.5) and 44.7 months (42.2) for trade sales and IPOs respectively. The holding period differences between the sub-sample of deals exited through an IPO and the sub-sample of deals exited through a secondary buyout are statistically significant at the 1% level. Panel A also reports the maturity of the private equity fund at the point of exit. Secondary buy-outs are exited later in the fund life (78 months) than investments exited through a trade sale (76.5 months) or through an IPO (70 months). The difference between IPOs and secondary buy-outs is statistically

[16] If the private equity firm was founded before 1970, we use 1970 as the founding year, as little activity existed in the European private equity industry before that date.

Table 4
Summary Statistics for each exit subsample. This table reports descriptive statistics and the macroeconomics variables at the time of the exit for the 446 deals exited through a secondary buy-out, the 434 deals exited through a trade sale and the 142 deals exited through a public offering, between January 2000 and December 2014 involving European companies. In the last two cases, the table also reports the differences to the sub-sample of deals exited through a secondary buyout, using the two-sample Wilcoxon rank-sum (Mann–Whitney) test. *, **, *** indicate that the two sub-samples are significantly different at the 10%, 5% and 1% level, respectively. The accounting data in Panel B relates to the last full-year accounts prior to the exit. All reported dollar values are in millions.

Variables	Secondary buy-out		Trade sale			IPO		
	Average	Median	Average	Median	*z*	Average	Median	*z*
Panel A: Deal and PE investor								
Holding period (months)	52.7	49.5	51.8	48.5	−1.16	44.7	42.2	−3.82***
Fund maturity (months)	78.1	74.2	76.5	72.7	−1.10	69.8	68.2	−2.73***
Fund size	$920.0	$458.7	$880.8	$416.0	−1.21	$1,168.5	$608.0	2.09**
PE age at exit (years)	20.0	20.0	20.6	20.0	0.76	20.2	20.0	0.15
Panel B: Portfolio company								
Age at exit (years)	40.2	25.0	34.7	18.0	−3.05***	39.6	17.5	−1.70*
Total assets	$290.4	$113.0	$262.7	$72.2	−4.42***	$645.9	$122.3	−0.42
Turnover	$292.7	$135.6	$263.8	$81.9	−4.79***	$582.1	$149.8	−0.37
EBIT	$24.3	$12.5	$18.4	$6.5	−6.10***	$51.1	$9.4	−1.52
EBIT margin	10.7%	14.2%	8.3%	12.7%	−2.88***	5.4%	12.4%	−3.53***
Asset turnover ratio	1.5	1.2	1.6	1.3	0.77	1.4	1.1	−1.48
CAPEX	$20.6	$5.9	$18.5	$3.8	−2.62***	$48.0	$11.9	2.41***
CAPEX/Total assets	8.5%	6.0%	8.6%	6.9%	0.20	15.4%	11.6%	4.83***
Panel C: Macroeconomics								
Local stock market return	2.5%	3.3%	2.2%	2.8%	−0.89	4.5%	3.7%	1.67*
Capital commitment index return	3.1%	4.0%	2.5%	2.7%	−2.74***	2.6%	3.0%	−2.20**
Margins on BB loans	2.36p.p.	2.03p.p.	2.55p.p.	2.31p.p.	4.03***	2.47p.p.	2.27p.p.	2.16**
Fed tightening index	−4.5%	−8.8%	−1.4%	−8.8%	1.10	1.0%	−8.8%	1.93*
Leverage multiple	5.01	4.98	4.92	4.79	−2.27**	4.88	4.82	−2.39**

Table 5
Exit distribution along the private equity fund life. This table reports the distribution of the different exits (secondary buy-out, trade sale and public offering) along the fund's life.

Years since the vintage year	Exit		
	Secondary buy-out	Trade sale	IPO
1–2	0.04	0.05	0.08
3–4	0.19	0.20	0.25
5–6	0.34	0.34	0.31
7–8	0.25	0.22	0.26
9–10	0.12	0.11	0.07
+10	0.06	0.07	0.03

significant. IPOs tend to be used more by larger funds (more than $1 billion), but the experience of private equity firms is not related to the choice of exit route.

Table 4 Panel B provides summary information on specific characteristics of portfolio companies. Companies that exit through a secondary buy-out are significantly older (40.2 years) than those using a trade sale (34.7 years) or an IPO (39.6 years). Consistent with the finding of Sudarsanam (2005), companies using secondary exits are, in the year before the exit, also more profitable – having an average (median) EBIT margin (EBIT/Turnover) equal to 10.7% (14.2%). By contrast, those portfolio companies that exit through an IPO tend to be larger, to invest the highest proportion of total assets (15.4%) and have the lowest profitability in terms of EBIT margin.

These results suggest that exit via a secondary buy-out is more likely to be used for mature portfolio companies with higher capacity to generate cash-flow and earnings (to support significant levels of debt) and for companies that require less investment.

Axelson et al. (2013) show that the macro economy is an important determinant of exit route. We summarize macroeconomic conditions at the time of exit in Table 4 Panel C. IPOs tend to be used after periods of strong returns: markets increase, on average, by 4.5% during the 3–6 month period before the public offering.[17] This is consistent with the existence of IPO windows of opportunity when shareholders take advantage of "hot" IPO markets. Secondary buy-outs are most frequent during periods when private equity fund have raised (but not yet spent) large amounts of capital, and when credit is cheap and lending conditions are loose. This tends to suggest the existence of secondary buy-out 'windows of opportunity' during which the secondary exit route leads to higher returns.

Table 5 summarizes how exit routes vary over the fund life. Masulis and Nahata (2009) conclude that private equity investors face a liquidity pressure as their funds approach maturity. In our sample 64% of IPO exits happen during the first six years of a fund, 26% during the seventh and eighth years, and only 10% happen after the eight year. In the case of secondary buyouts and trade sales, the majority of exits also happen between the fifth and the eighth years of the fund's life, but 6% occur after the tenth year.

2.3. Hazard functions

In order to understand exit dynamics during the life of the fund, we next analyze the time-to-exit using a survival analysis framework, similar to that employed by Giot and Schwienbacher (2007).[18] The hazard function gives the conditional instantaneous probability of exit given that the deal has not been exited at that specific time (the hazard rate)[19]

$$\lambda(t) = \lim_{\Delta t \to 0}\left(\frac{\Pr(t \leqslant T < t + \Delta t | T \geqslant t)}{\Delta t}\right) = \frac{f(t)}{S(t)} = -\frac{S'(t)}{S(t)} \quad (1)$$

Where

$S(t) = \Pr(T > t) = 1 - F(t)$ (survivor function)
$F(t) = \Pr(T \leqslant t)$ (exit time distribution function)
$f(t) = dF(t)/dt$ (density function of exit time distribution)

[17] All macroeconomics variables are recorded in the quarter before the exit because such decisions are made some time before the transaction closes.

[18] Contrary to their model, the holding period variable is not right-censored since all deals have been exited at the time of data collection. For more detail on survival analysis and/or hazard models see Giot and Schwienbacher (2007) and Cameron and Trivedi (2005).

[19] Also called the intensity function, the conditional failure rate or the inverse Mills ratio, "is the instantaneous rate of failure" (Cleves et al., 2010).

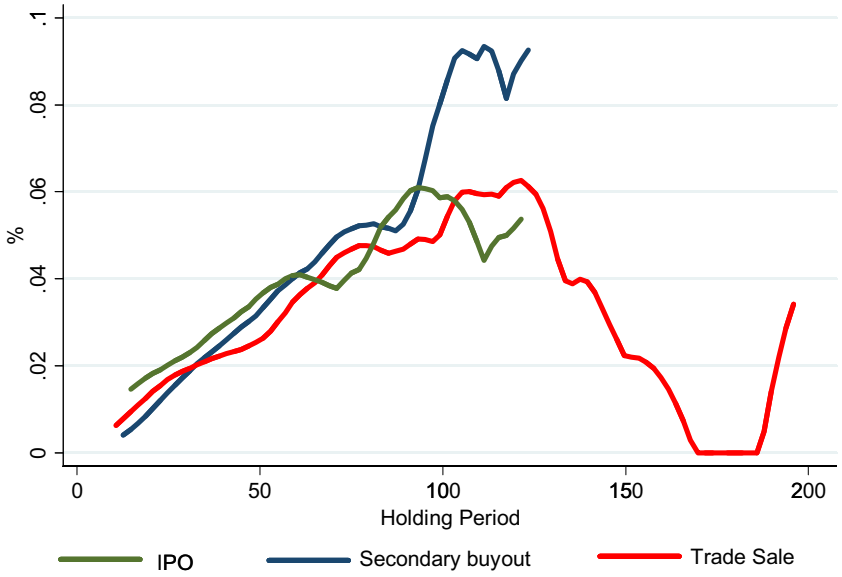

Fig. 2. Hazard functions by exit. This figure shows the hazard functions for the IPO, secondary buy-outs and trade sale exits. The hazard function gives the conditional instantaneous probability of exit given that the deal has not been exited at that specific time.

Table 6
Cox model. This table reports the estimated coefficients of a Cox proportional hazard model for all and each of the exits (secondary buy-out, trade sale and public offering). The explain variable is the investment time-to-exit (holding period) and the private equity firm experience (proxy by the firm's age at beginning of the deal), the private equity fund size, fund maturity when the deal was initiated, the portfolio company's size (proxy by the total book value of assets in the last year before the deal was initiated), the portfolio company's age at beginning of the deal are used as explicative variables. Country, exit year and industry fixed effects are included. Standard errors are reported under the coefficients in parenthesis and *, **, *** indicate levels that are significantly different from zero at the 10%, 5% and 1%, respectively.

Variables	Exit			
	All	Secondary buy-out	Trade sale	IPO
ln (PE firm age at entry)	−0.058	−0.077	0.000	−0.146
	(0.048)	(0.073)	(0.088)	(0.184)
ln (fund maturity at entry)	0.172***	0.141**	0.164***	0.544***
	(0.038)	(0.061)	(0.059)	(0.167)
ln (fund size)	0.143***	0.094*	0.193**	0.351**
	(0.033)	(0.049)	(0.055)	(0.144)
ln (portfolio company age at entry)	0.054**	0.071*	−0.027	0.204**
	(0.024)	(0.039)	(0.041)	(0.082)
ln (portfolio company total assets)	−0.071***	−0.022	−0.106**	−0.178**
	(0.026)	(0.043)	(0.046)	(0.073)
Country and exit year fixed effects	Included	Included	Included	Included
Industry fixed effects	Included	Included	Included	Included
Observations	882	386	369	127
LR Chi^2	150.45***	55.26*	82.44***	105.95**

"Other sectors" is the base industry dummy.

The hazard functions for each exit route are shown in Fig. 2, and provide some interesting evidence on the dynamics of the exit process. First, the exit probabilities are broadly similar for the first 90 months of the fund, although trade sales are generally less likely during this initial period. Second, thereafter the probability of conducting an IPO drops off sharply, with secondary buyouts becoming by far the most likely exit route. Third, as funds head towards final liquidation, the remaining companies are sold to trade purchasers, with no instances of IPOs or secondary sales after the 10-year point.

The survival analysis can be extended using a Cox proportional hazard model[20] where hazard rates depend on a set of covariates that can be viewed as explanatory variables:

$$\lambda(t) = \lambda_0(t) \cdot e^{(\beta_0+\beta_1 X_1+\beta_2 X_2+\ldots+\beta_k X_k)} \quad (2)$$

The explanatory variables we include are the private equity firm experience, the fund size and maturity when the deal was initiated, the portfolio company's size (proxied by the total book value of assets), and the portfolio company's age at beginning of the deal. Industry, exit year and country fixed effect are also included.

The estimation results are shown in Table 6. The model shows – as expected, given the limited life of a fund – that investments initiated later in the life of the fund take less time to be exited. Larger funds tend to exit their investments more quickly. Regarding portfolio company characteristics, older companies tend to be exited more quickly, and larger portfolio companies exited more slowly. We find no evidence that the experience of the GP has a significant effect on the speed of exit.

This section has looked in detail at the timing of the exit decision, for each exit route. In the next section we switch focus to the exit decision itself.

[20] This model is a semi-parametric model that makes no assumptions about the form of the baseline hazard function, $\lambda_0(t)$, which does not have to be specified. This fact makes the Cox model considerably flexible and widely used.

Table 7
Trinomial Logistic Model. This table reports the maximum-likelihood trinomial logistic regression results for the full sample of 1022 exits. The dependent variable is the exit route and the secondary buy-out exit is the base (comparing) group. Exogenous variables are defined in Appendix. Standard errors are reported under the coefficients in parenthesis. *, **, *** indicate significance level at 10%, 5% and 1%, respectively. '+' indicates a winsorized variable at 0.05 and 0.95 percentiles.

Variables		Model 1		Model 2		Model 3		Model 4	
		TS	IPO	TS	IPO	TS	IPO	TS	IPO
Deal an PE variables	ln (fund maturity)	−0.353**	−0.538**					0.039	−0.017
		(0.165)	(0.228)					(0.182)	(0.273)
	ln (fund size)	−0.140**	0.124					−0.011	0.277***
		(0.058)	(0.087)					(0.065)	(0.103)
	ln (pe age)	0.371***	−0.032					0.227	0.010
		(0.141)	(0.198)					(0.147)	(0.224)
PC variables	ln (pc age)			−0.112	−0.018			−0.081	−0.030
				(0.079)	(0.118)			(0.080)	(0.117)
	ln (total assets)			−0.166***	0.022			−0.148**	−0.022
				(0.057)	(0.081)			(0.060)	(0.085)
	EBIT margin+			−0.019***	−0.033***			−0.021***	−0.033***
				(0.007)	(0.009)			(0.007)	(0.010)
	Asset turnover ratio+			−0.034	−0.090			−0.016	−0.026
				(0.091)	(0.134)			(0.092)	(0.133)
	CAPEX/Total Assets+			−0.004	0.038***			−0.005	0.035***
				(0.007)	(0.009)			(0.007)	(0.010)
	Turnover growth+			0.004	0.007**			0.005*	0.009***
				(0.003)	(0.003)			(0.003)	(0.004)
Macroeconomics var.	Local stock index return					0.008	0.055***	0.009	0.049***
						(0.010)	(0.014)	(0.011)	(0.016)
	Capital commitment index return					−0.086***	−0.093**	−0.102***	−0.089*
						(0.031)	(0.045)	(0.034)	(0.050)
	Fed Tightening Index					0.004	0.012**	0.003	0.013**
						(0.004)	(0.005)	(0.004)	(0.006)
	Country fixed effects	Included		Included		Not included		Not included	
	Industry fixed effects	Included		Included		Included		Included	
Observations		972		936		1008		876	
LR Chi^2		193.25***		224.96***		184.16***		205.8***	

3. Regression results

We hypothesize that the choice of exit route depends on three groups of factors relating to the investor, the portfolio company and the market environment. In this section we use a discrete choice Trinomial Logistic Model to analyze the exit route decision.

3.1. Trinomial Logistic Model and variables

The exit route probability model is based on a trinomial logistic regression using the exit routes as the dependent variable, which assumes the value 0 if the exit route is a secondary buy-out, 1 if it is a trade sale, and 2 if it is an IPO. Deal and private equity investor characteristics (**x**), portfolio company characteristics (**w**) and macroeconomic environment factors (**z**) are used as independent variables to explain the choice of exit route:

$$y_i = \mathbf{x}_i'\boldsymbol{\beta}_i + \mathbf{w}_i'\boldsymbol{\lambda}_i + \mathbf{z}_i'\boldsymbol{\delta}_i + u_i \quad (3)$$

The **x** variables include the fund maturity, represented by the number of months (at exit) since the vintage year[21], the fund size, and the age of the private equity firm at the exit date. The **w** variables include company size (represented by total assets), company age, the EBIT margin (as a measure of profitability), the turnover-assets ratio (as a measure of capital intensity), the CAPEX-assets ratio (as a measure of investment intensity), and the growth rate of turnover. All these accounting variables are measured in the last year before the exit.

Previous work has suggested how these variables may impact on the exit decision. Pagano et al. (1998) show that the "larger companies are more likely to go public", mostly because they face less direct (administrative) and indirect (underpricing) costs. Gompers (1995), Cumming and Macintosh (2003a) and Schwienbacher (2008b) have shown that, due to fixed costs, only companies above a threshold dimension should be expected to be exiting through a public offering. Ritter (1991) found a significant inverse relationship between underpricing and the age of the company in a public offering, which is consistent with Chemmanur and Fulghieri (1999) who showed that, in equilibrium, firms go public only when a sufficient amount of information about them has accumulated in the public domain.

Finally, regarding the macroeconomic environment at the time of the exit (**z**), the return on the local stock market index[22] is included as a proxy for the state of the IPO market. The Fed tightening index is used as proxy for the availability of capital in the credit market. Finally, the amount of capital available to private equity investors, sometimes referred to as "dry-powder", is included to proxy the competitive state of the private equity market.

Dummies variables that control for industry fixed effects and country fixed effects (in the models without macro country-level variables) are also included. The existence of outliers made some distributions relatively skewed and could lead to a distortion of statistical tests. As a result some variables are measured in natural logarithms or are winsorized.[23]

3.2. Empirical results

Table 7 shows the results for the trinomial model. The secondary buy-out exit is the comparison class. Separate equations

[21] As the exact date of the fund close is unknown, we use July 1 for all funds. Detailed descriptions of all variables and definitions are presented in the Appendix.

[22] Although, it is possible for a portfolio company to be floated on overseas stock exchanges, the local stock exchange is normally the first choice because it is where potential investors have more information about the company and so it is easier to market the initial public offering.

[23] Logs were used for fund maturity, fund size, private equity firm age, portfolio company age and total assets. Winsorization (at the 5% and 95% points) was used only for variables expressed in percentage points, such as EBIT margin, asset turnover ratio, CAPEX over total assets, and turnover growth.

Table 8
Secondary buy-out – sellers and buyers descriptive statistics. This table compares characteristics of the selling private equity firm and funds and the purchasing private equity firm and funds involved in secondary buy-outs. The average and median difference is calculated only for the observations in which both selling and purchasing private equity firm/fund data is available. Significance levels of average difference are based on two-tailed Student *t*-tests, while significance levels of median differences are based on a one-sample Wilcoxon sign-rank tests. *, **, *** indicate levels that are significantly different from zero at the 10%, 5% and 1%, respectively.

Variables	Selling PE			Purchasing PE			Difference		
	N	Average	Median	*N*	Average	Median	*N*	Average	Median
Panel A: Private Equity Firm									
PE age at exit/entry (years)	446	20.0	20.0	438	18.7	19.0	438	1.3**	2.0**
Total funds	404	12.6	7	391	11.0	6	356	1.6*	1.0
BO funds	403	6.4	5	368	5.4	4	356	1.2***	1.0***
Total amount	404	$8,003	$2,838	391	$7,986	$2,134	332	−$227	$5
Total BO funds amount	403	$5,603	$2,127	387	$5,262	$1,066	352	$268	$179*
Panel B: Private Equity Fund									
Fund maturity at entry (months)	420	25.7	22.3	295	31.9	26.9	274	−6.5***	−9.1***
Fund size	425	$920	$459	277	$1,735	$696	261	−$1,001***	−$311***

relate the probability of a trade sale to the probability of a secondary buy-out and the probability of an IPO to the probability of a secondary buy-out.[24] Industry fixed effects are included in each model, and country fixed effects are included in Models 1 and 2, in which macroeconomic variables do not appear.

We start by including each set of explanatory variables separately. These models (1–3) suggest that trade sales are more likely to be used (relative to secondary sales) by more experienced private equity firms, by smaller funds, at an earlier stage in the fund life, and for smaller portfolio companies with lower margins.[25] The probability of an IPO is higher earlier in the life of the fund, and for portfolio companies with higher CAPEX intensity and turnover growth. We also find that the probability of an IPO decreases with portfolio company profitability (as measured by EBIT margins), which contradicts the 'monitoring hypothesis'. These results suggest that the attractiveness of a secondary sale increases for companies with high margins and lower capital requirements – both of which would support the higher debt levels that would be used by secondary buyers.

Macroeconomic conditions are also found to be significant: the probability of choosing an IPO, over a secondary sale, is higher when the stock market has been increasing, when credit conditions have been getting tighter and when capital committed to private equity decreases.[26] Secondary sales are more likely to be chosen over trade sales when capital committed to private equity is higher, as would be expected.

The three sets of explanatory variables are combined in Model 4, and most of the conclusions of the earlier models are confirmed. The main difference is that the fund characteristics generally become less significant. On the other hand, controlling for the portfolio company and macroeconomic variables increases the significance of fund size for the choice between IPOs and secondary sales: larger funds are more likely to choose IPOs.

In summary, our results suggest that market conditions, which provide various windows of opportunity for GPs, are consistently important across all the specifications. Loosening credit conditions increase the probability of secondary sales, and periods of strong stock market performance and smaller commitments to private equity increase the probability of IPOs. Such effects are particularly pronounced for portfolio companies with a high debt capacity. Axelson et al. (2013) found such macroeconomic factors were critical determinants of the pricing and capital structure of LBOs; our results show that they also have a significant impact on the way deals are exited.

4. Selling versus purchasing private equity firm and fund characteristics

To this point we have focused on the exit choice for all LBOs in our sample. However, in this section we focus on the secondary buyouts and compare the characteristics of the selling and buying private equity firms, and the point the primary and secondary transactions took place in the life of the purchasing fund. For both the selling and purchasing private equity firms we gather data from Thomson One on firm age, the total number of private equity funds set up and the total amount raised, up to the date of each transaction. We further distinguish between private equity funds in general (including venture capital) and buyout funds.

Table 8, Panel A compares the private equity firms on each side of the secondary transactions. The results show that the selling private equity firm is, on average, 1.3 years older than the purchasing firm, and this difference is significant at the 5% level. In terms of fund formation, the selling firm had set up an average of 12.6 private equity funds – 1.6 more than the purchasing firm. Focusing only on the buyout funds the difference is slightly higher and statistically significant. Regarding the amounts raised, the total for all fund types is very similar. There is, nonetheless, some evidence that selling private equity firms tend to be somewhat more experienced than purchasing firms.

We also consider, in Table 8 Panel B, whether sellers and purchasers differ in terms of the point in the fund life at which they buy the given firms. We find that the initial purchases occur, on average, two years after the vintage year. Interestingly, the secondary purchases happen, on average, significantly later at two and a half year after the vintage year. We also compare the size

[24] Although the exact value of the coefficient associated with any variable cannot be directly interpreted, a positive coefficient in the first (second) equation means that as the independent (exogenous) variable increases the ratio "probability of a trade sale (public offering)/probability of a secondary buy-out" increase, i.e., the probability of a trade sale (public offering) increases related with the probability of a secondary buy-out. By contrast, a negative coefficient associated to any variable means that the probability of a secondary buy-out related to the probability of a trade sale (public offering) increases as the independent (exogenous) variable increases.

[25] One additional year of experience of the private equity firm (around the mean of 20.3 years) increases the ratio "probability of a trade sale /probability of a secondary buy-out" by around 1.84%. An increase of private equity fund size by $1 million (around the mean of $938 million) decreases the ratio "probability of a trade sale /probability of a secondary buy-out" by around 0.015%. To exit the investment one month later in the fund life (around the mean of 76.2 months) decreases the ratio "probability of a trade sale /probability of a secondary buy-out" by around 0.46%. An increase of portfolio company EBIT margin by 1 percentage point decreases the ratio "probability of a trade sale/probability of a secondary buy-out" by around 1.88%.

[26] A stock market return higher in 1 percentage point increases the ratio "probability of a public offering/probability of a secondary buy-out" by around 5.65%. An increase of the net number of commercial banks tightening standards for corporate loans higher in 1 percentage points increases the ratio "probability of a public offering /probability of a secondary buy-out" by around 1.20%. An increase of the capital commitment to private equity higher in 1 percentage point decreases the ratio "probability of a public offering /probability of a secondary buy-out" by around 8.89%.

of the selling and purchasing funds. Purchasing funds are significantly larger than selling funds. However, to some extent this simply reflects the fact that capital committed to the private equity sector and buyout fund sizes were steadily increasing over our sample period.

This comparison of the parties involved in secondary transactions provides some evidence that, across our sample of deals, the experienced private equity firms tend to sell to the less experienced. The previous section provides little evidence to support the view that secondary transactions are more likely for those companies that have grown rapidly and could benefit from a new private equity owner to take them to the next level. If anything, the faster growing companies tended to exit to trade sales and IPOs. Therefore, the choice of secondary exit seems to be driven more by the fund characteristic than portfolio company factors. The fact that secondary deals tend to happen at a later point in the life of the purchasing fund than primary deals is intriguing. Most private equity funds claim that they focus mainly on primary deals, and our findings are consistent with funds turning to secondary transactions when they are unable to source sufficient primary deals. This would suggest, in general, that secondary buyouts should under-perform primary transactions. Although returns are not the focus of this paper, Degeorge et al. (2015) confirm this conjecture. They analyze the performance of secondary buyouts and find that, on average, they under-perform relative to primary deals. This is mainly driven by deals that occur later in the life of the purchasing fund – which they describe as "going for broke".

5. Conclusions

Using a new and comprehensive dataset consisting of all European companies exited by private equity firms between January 2000 and December 2014, this paper analyzes the determinants of exit timing and the exit route. We pay particular attention to the factors that might explain the growth of secondary transactions between private equity funds, which comprise 43% of the exits in our sample.

We find evidence that the choice between IPOs and secondary buyouts depends heavily on the conditions in the debt and equity market. When stock markets have been rising strongly, the use of IPOs, relative to secondary sales, increases. When debt is abundant and cheap, and when private equity firms have a lot of committed capital to deploy, we observe an increase in secondary buyouts. Furthermore, these effects are more pronounced for portfolio companies with a higher capacity to service debt – for instance, companies with higher levels of cash-flow and profitability, and with lower capital expenditure requirements. The choice between secondary buyouts and trade sales is influenced more by portfolio company characteristics, with trade sales being more likely for smaller companies that have experienced stronger growth.

The academic literature has tended to view IPOs as the "successful" exit route, but our results question whether such status is warranted. In contrast, many people view secondary buyouts with suspicion, but from the perspective of the selling private equity funds – and their investors – secondary buyouts have many attractions. The price is arrived at through an auction involving multiple potential purchasers. At closing the purchaser pays the full price, and the selling fund knows exactly what returns will be achieved. Investors receive their money back quickly thereafter. Therefore, to some extent, private equity firms provide liquidity to each other via secondary sales.

Contrast this process with the uncertainties of an IPO. At the start of the IPO process an investment bank gives an indication as to the likely price, but there is uncertainty about the outcome until the day before the bookbuilding closes. Often there are last-minute changes in the issue price, as the investment bank juggles the interests of the vendor and its buy-side clients. This inherent conflict of interest may go some way to explain the systemic underpricing of IPOs (see, for instance, Jenkinson and Jones (2009)), which GPs very much view as 'carried interest left on the table'. At the IPO, the private equity owner is only able to sell a proportion of their holding, and is subject to a lengthy lock-up on the remainder. Selling down the remaining (often large) stakes can take long periods of time. Therefore, proceeds are highly uncertain and investors do not obtain their money for many months or years after the IPO. From the perspective of the GP and their investors, an IPO is not an exit *per se*; it is a *route* to an exit.

Therefore, secondary sales have strong attractions from the viewpoint of the *selling* private equity funds. However, a rather different case needs to be made to justify secondary *purchases*. When we compare the characteristics of the private equity firms involved on both sides of secondary transactions, we find that the more experienced private equity firms tend to sell to the less experienced. We also find that secondary deals tend to happen at a later point in the life of the purchasing fund than the primary deals. This suggests that funds may tend to buy in secondary transactions when they cannot source good primary deals. This is consistent with the finding of Degeorge et al. (2015) that secondary deals bought later in the life of a fund tend to underperform.

In conclusion, our results provide support for the 'window of opportunity' hypothesis, and reinforce the recent work by Axelson et al. (2013) who find similarly strong effects of market conditions on capital structure and pricing of leveraged buyouts. While the use of secondary buyouts varies with capital market conditions, and according to the portfolio and fund characteristics we identify, we expect them to continue to be one of the most commonly observed exit routes in the future. Private equity funds are highly incentivized to sell their portfolio companies for the highest price, with the lowest risk, and with the shortest delay in receiving the proceeds. Selling to another private equity fund often achieves these goals.

Appendix. Variables

Variable	Definition
Holding period (months)	(exit day − entry day)/30
Fund maturity (months)	[(day 1/exit month/exit year) − (day 1/month 7/vintage year)]/30
Fund size ($m)	Closed fund size
Private equity firm age at exit (seller) (years)	(exit year − pe firm founding year + 1)
Portfolio company age at exit (years)	(exit year − pc founding year + 1)
Turnover ($m)	(total sales value in the last profit and loss statement before the exit date) × 12/(number of months in the statement) [annual equivalent]
Total assets ($m)	Total assets value in the last accounting statement before the exit date
EBIT ($m)	(total EBIT value in the last profit and loss statement before the exit date) × 12/(number of months in the statement) [annual equivalent]
EBIT margin (×100)	(annual equivalent EBIT)/Total sales × 100

(*continued on next page*)

Appendix (*continued*)

Variable	Definition
CAPEX ($m)	Total fixed assets value in the last accounting statement before the exit date − total fixed assets value in the second from the last accounting statement before the exit date + depreciation and amortizations value in the last profit and loss statement before the exit date
CAPEX/Total Assets (×100)	CAPEX/Total Assets × 100
Local stock market return (×100)	Local index stock exchange return × 100 between six and three months before the exit
Capital commitment index return (×100)	Preqin capital commitment index return × 100 in the quarter before the exit
Margins on BB loans	"drawn margins on leveraged institutional term loans BB" in the quarter before the exit
Fed index	'net percentage of domestic respondents tightening standards for C&I Loans' × 100 in the quarter before the exit
Leverage multiple	Leverage multiple in the 3rd month before the exit

Note: All values originally not in USD converted at historical exchange rate.

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