Buying Performance? The Impact of Multiple Arbitrage in B&B Strategies

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Abstract

B&B strategies are increasingly popular, with past studies showing them to achieve superior returns. The question of how exactly B&B strategies create value is, however, still a "black box". Relying on a unique and proprietary sample of 161 B&B buyouts with valuation details on related add-on acquisitions, this study is, to the best of our knowledge, the first to decompose EBITDA growth as value driver into the organic, inorganic and the "sourcing" component. The "add-on sourcing effect" thereby considers the reduction of the average entry multiple caused by acquiring smaller firms in add-on transactions at multiples lower than the entry multiple for the platform company and labels the corresponding multiple uplift following the revaluation of add-on acquisitions post-closing. We find this effect to be a significant component of B&B buyout performance, contributing roughly 8% to the equity value CAGR. When eliminating it from the performance measurement, we find B&B outperformance to decrease significantly to the levels of their non-B&B peers. Finally, we find preliminary evidence that potential buyers of the buyout company do not seem to differentiate between the different sources of EBITDA growth.

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1. Introduction

"The whole is more than the sum of their parts."

– Aristoteles

Increasing competition among private equity (PE) firms has turned traditional levers for value creation, e.g. deleveraging, into commodities. To differentiate, an increasing number of PE firms has stepped into so-called buy-and-build (B&B) strategies. Pursuing such a strategy, the PE firm first acquires a portfolio company serving as a "platform" and then performs several smaller "add-on acquisitions", thus "building" a larger entity. There is empirical evidence that B&B strategies positively impact the operating and deal performance of buyouts (Acharya et al., 2013; Brigl et al., 2016; Nikoskelainen & Wright, 2007; Valkama et al., 2013, and most recently, Bansraj et al., 2020).

However, the question of how exactly B&B strategies create value is still a "black box". Shedding light on the different layers of performance and value creation via B&B is important for several reasons:

- B&B strategies generally allow the portfolio firm to grow inorganically by buying growth of operating key performance indicators, such as sales and EBITDA. By contrast, operating growth may be established organically by creating "true" synergies without transactions, e.g. by cost reductions or joint operations. As the organic part of operating improvement is presumably harder to achieve and more persistent, PE firms and potential buyers at exit may value the two sorts of operating improvement differently.
- B&B allows the portfolio firm to pursue a strategy labelled as "multiple arbitrage": Buying smaller companies in add-on transactions may be possible at lower transaction multiples than the multiple paid for the platform company. This allows to reduce the average entry multiple of all companies acquired in a B&B strategy; thus, even when exiting the investment in the portfolio firm at the entry multiple of the platform company, it benefits from the "add-on sourcing effect" of lower entry multiples for the add-on acquisitions. As the label "arbitrage" suggests, the benefits of this strategy are not persistent and do not belong into the operating sphere of value creation and thus may be perceived differently by PE firms than "true" operating improvements.

- In the standard analysis of PE performance, organic and inorganic growth and the add-on sourcing effect of multiple arbitrage are part of the EBITDA growth during the holding period. Thus, B&B strategies may allow PE firms to "disguise" acquired growth and cheap sourcing of add-ons as "true" operating improvements. Unless being able to separate these three sources of operating improvements, it is unclear how PE firms and the potential buyer of the portfolio firm at exit value the different strategies.

There is a simple reason for this important question still being a "black box" for PE-related research: the detailed data necessary to analyse this question, i.e. EBITDAs, enterprise values (EVs) and thus entry EV/EBITDA multiples of all add-on transactions during the holding period, have not been available to researchers yet. Bansraj et al. (2020) try to cope with this problem by turning the analysis upside down: lacking the data necessary to track add-on acquisitions for the PE-backed portfolio firms, they mimic their B&B strategy by performing a "placebo" strategy that starts with the benchmark company and artificially adds comparable add-on acquisitions to it.

To the best of our knowledge, this study is the first to collect and use the specific information on all add-on acquisitions of B&B strategies performed by PE-backed portfolio firms, such as EBITDA, EV and entry EV/EBITDA multiple. Using a sample of 161 platform companies with overall 971 add-on acquisitions, we are able to split the operating performance of B&B buyouts into the three components organic and inorganic EBITDA growth and the add-on sourcing effect as a result of the difference in EV/EBITDA entry multiples between platform company and related add-on acquisitions. Based on this unique and proprietary data set, we derive the following results:

- Isolating the add-on sourcing effect, we find it to significantly contribute to the performance of B&B buyouts. 21.2% of the EBITDA CAGR for all buyouts (21.0% respectively for realised buyouts) in our sample is attributed to the effect of decreasing the average entry EV/EBITDA multiples by lower EV/EBITDA multiples of add-ons. At the same time, the contribution to the overall equity value CAGR amounts to 8.2% for all buyouts (7.5% respectively for realised buyouts).
- Further splitting the EBITDA CAGR into an organic and inorganic growth component, we find 71.1% of the EBITDA CAGR for all buyouts (64.0% respectively for realised buyouts) to be inorganic compared to 7.7% (15.0% respectively) organic.
- Even before the adjustment for the add-on sourcing effect, we find the EV/EBITDA multiple CAGR to be an important source of value creation in B&B buyouts: it contributes

around 27.3% for all buyouts (23.4% respectively for realised buyouts) to the equity value CAGR. Adjusting for the add-on sourcing effect increases the total performance contribution of multiple conversion to 35.5% for all buyouts (30.9% respectively for realised buyouts). Our results also confirm that the equity share CAGR, which considers the extent of deleveraging, has a significantly lower performance contribution in B&B buyouts as it only contributes 14.6% for all buyouts (19,8% respectively for realised buyouts) to the equity value CAGR. The financing of the add-on acquisitions with additional debt limits the portfolio firms' ability to pay down debt.

- Comparing B&B performance against a sample of matched buyouts without B&B, we find evidence for significant outperformance of buyouts with B&B strategies; thus, our findings support the results of Acharya et al. (2013) and Valkama et al. (2013).
- We further find the add-on sourcing effect to be a decisive factor of B&B outperformance; eliminating the effect from the performance measurement, we find only little to no evidence for a significant outperformance against non-B&B buyouts.
- Investigating the determinants of the add-on sourcing effect, we find a dedicated sourcing team at PE firms to have a significantly positive impact on it.
- Finally, our (preliminary) results do not support the initial hypothesis that the composition of the operating improvement into organic, inorganic, and "sourcing" related EBITDA growth impacts the exit EV/EBITDA multiple when selling the combined entity at exit. The distinction between the different sorts of operating growth does not seem to be important for the potential buyers of the portfolio firm.

In sum, the results of our study allow for a deeper analysis of the sources of B&B related value creation and contribute to a better understanding of the perception of the different layers by market participants, especially by the potential buyers at exit.

This study makes several contributions to the literature:

- Most importantly, we contribute to the growing literature on B&B strategies in PE (e.g. Acharya et al., 2013; Bansraj et al., 2020; Hammer et al., 2017; Nikoskelainen & Wright, 2007; Valkama et al., 2013). By decomposing the operating performance into three different layers, our results give insights into the different ways to create operating growth. Thus, they add to the discussion on whether PE firms are creating "real" value by synergies and organic growth, or whether a significant part of this growth is generated by "buying

growth" at low entry prices. Our findings also allow for a first indication on how market participants differentiate between these components when buying a B&B company at exit from a PE owner. We further support the hypothesis of B&B outperformance by comparing its performance against peers from the PE universe without B&B.

- We also contribute to the literature strand comparing strategic bidders competing against financial bidders (e.g. Bargeron et al., 2008; Fidrmuc et al., 2012; Gorbenko & Malenko, 2014; Hammer, Janssen, et al., 2021). As B&B strategies also allow PE-backed portfolio firms to combine two or more existing operating businesses, financial bidders may be able to create similar benefits to strategic bidders. Our results add to this discussion and support Bansraj et al. (2020) by showing that the organic part of the operating value creation is significantly contributing to overall deal performance.
- Our findings further add to the literature on "serial acquirers" by pointing out differences between corporate and financial serial acquirers (e.g. Hammer, Hinrichs, et al., 2021; Humphery-Jenner et al., 2017; Smit, 2001). Our results indicate that due to time restrictions caused by the limited holding period, inorganic growth is of higher importance for financial serial acquirers than corporate ones.

The remainder of this paper proceeds as follows: Section 2 discusses the theoretical background and related literature. In section 3, we explain the sample selection and present summary statistics. Section 4 explains the calculation and mechanics of the add-on sourcing effect. Section 5 is devoted to B&B performance and the impact of the add-on sourcing effect on it. In Section 6, we review the impact of the operating growth composition on exit pricing. Section 7 shows robustness tests for the results of sections 5 and 6. Section 8 concludes.

2. Value creation in private equity

2.1. Decomposing buyout performance

PE firms rely on a broad range of tools for value creation within their portfolio firms. In general, literature mainly differentiates between three overarching value creation drivers in the well-known equity value creation bridge: (i) operating improvement measured by the increase of EBITDA over the holding period, (ii) EV/EBITDA multiple improvement as the difference between entry and exit EV/EBITDA multiples, (iii) deleveraging as the change in net debt between entry and exit which is reflected in the change of equity value shares (Achleitner et al., 2011; Guo et al., 2011; Kaplan & Strömberg, 2009).

Operating improvement: PE firms can reduce costs at portfolio firms, expand the geographical footprint or product offering, or strengthen sales forces, to increase the operating performance and generate superior equity returns.

Deleveraging: Usually, the PE fund as equity holder does not receive and not make any intermediate payments from or to the portfolio company; all cashflow generated is used for debt service. High levels of debt generate tax savings and benefit the owners via the disciplinary impact of debt financing by reducing overinvestment (Axelson et al., 2009; Guo et al., 2011).

EV/EBITDA multiple improvement: If the PE owner can sell the portfolio firm at a higher EV/EBITDA multiple at exit than it paid when acquiring the firm at the entry, a positive multiple conversion contributes to the deal performance. While favourable market conditions may contribute as a random component to this effect, recent studies have shown that multiple conversion may also be seen as a systematic component of buyout performance connected to a special skill set of the PE partners (Dickenbrok et al., 2020).

Research in PE has noticed a significant shift in the weights of these three components with respect to their contribution to overall buyout performance. Puche et al. (2015), for example, find a decline in the contribution of the leverage effect and multiple improvement; at the same time, operating improvements increased in importance.[1]

2.2. B&B as a value creation strategy

Following the commoditization of traditional value creation levers resulting from an increased professionalization of PE firms and a booming secondary buyout (SBO) market (e.g. Bonini, 2015; Strömberg, 2008), PE firms are increasingly pursuing different value creation strategies to create value for their portfolio firms.

B&B strategies are argued to combine the deal structure of leveraged buyouts and the synergy focus of serial acquisitions of strategic buyers (Bansraj et al., 2020). By doing so, they seem to support the long-term trend of increasing importance of factors attributed to the "operating" sphere of value creation in private equity performance (Puche et al., 2015).

Empirical evidence suggests that B&B strategies, in general, are coupled with superior performance: Nikoskelainen & Wright (2007) analyse the deal performance of buyouts and find a

[1] Puche et al. (2015) use a proprietary sample of 2,029 global (i.e. North America, Europe, and Asia) buyouts, spanning a time frame from 1984 to 2013 which is split into the three time periods: (i) 1987 to 2000, (ii) 2001 to 2008, and (iii) 2009 to 2013. They find that ~31% of the total value creation was attributable to deleveraging; operating improvement accounted for ~48% and only ~15% came from multiple improvement. When decomposing the EBITDA growth, they find sales growth to be the main driver (~71%) and EBITDA margin improvement to only account for ~29%.

dummy variable indicating an add-on acquisition to significantly positively impact EV and equity value related returns. Acharya et al. (2013) also analyse buyout performance; when splitting their sample into B&B and non-B&B buyouts, they find the earlier to yield a higher sales growth, but no difference in other operating value drivers. Further, Valkama et al. (2013) find a dummy variable indicating the existence of add-on acquisitions to display a significantly positive coefficient estimate. Finally, Brigl et al. (2016) compare buyout performance between B&B and non-B&B buyouts and investigate buyout performance composition. Without testing for statistical significance, they find B&B buyouts to have higher equity returns and the performance of B&B buyouts to be driven to a higher degree by multiple conversion compared to non-B&B buyouts.

The study closest to ours is Bansraj et al. (2020): Analysing the impact of B&B strategies on operating deal performance, they are the first to consider the number and size of add-on transactions. As the authors lack access to the data on EBITDA, EV and entry EV/EBITDA multiple of the add-ons, they are constructing "placebo" peer companies tracing and mimicking the add-ons of the buyout's B&B strategy. By comparing operating value drivers of the placebo strategy against the corresponding figures of the B&B buyouts, they find the return on assets and return on sales of the latter to be significantly higher. While relying on the quality of the matching procedure when composing the "placebo" company, the results of the study shed the first light on the relationship between organic and inorganic growth in B&B buyouts: the positive outperformance of B&B buyouts against the "placebo" peer group with matched inorganic growth indicates that B&B at buyout level is creating significant additional organic growth beyond the acquired EBITDA and sales figures. Beyond the progress of explicitly including the number and size of the add-ons, the study still leaves room for further research: Concentrating on operating figures does not allow to analyse the impact on deal performance measured by the EV or equity value CAGR. Furthermore, the lack of detailed information on add-on acquisitions does not allow to investigate the size of the "multiple arbitrage" related add-on sourcing effect and its performance impact.

3. Data

3.1. Sample description

For our analysis, we use a novel dataset supplied by a German-headquartered PE fund-of-funds. These data were recorded during regular market screening and due diligence processes of the Limited Partners (LPs). Several past studies in PE use proprietary data sets from LPs (e.g.

Achleitner et al., 2011; Ljungqvist & Richardson, 2003; Robinson & Sensoy, 2011) as they provide several advantages over commercial data sets. First and most importantly, we can collect detailed information on platform companies and related add-on acquisitions. Second, the quality of data is extremely high as for the fundraising of subsequent funds, PE firms are incentivised to provide outright and verifiable data to potential LPs. While we recognise the potential bias to report inflated net asset values for the not yet exited investments induced by this situation, we provide our results separately for all buyouts and the ones already exited. Thirdly, we can rely on an up-to-date sample compared to previous studies (Acharya et al., 2013; Hammer, Janssen, et al., 2021; Puche et al., 2015) with 43% of platform transactions and 55% of add-on acquisitions post-2014.

Our B&B sample includes 161 hand-collected platform transactions with detailed information on 971 add-ons, which have been acquired during the holding period, spanning a time frame from 2002 to 2020. The sample construction process is as follows.

We apply a top-down approach and start with an initial sample of 3,485 (realised and unrealised) buyouts from 395 fund vehicles of 160 different PE firms between 1986 and 2020, which was made available to us. We select all buyouts with available EV and EBITDA figures at entry and exit and the indication whether the portfolio firm engaged in add-on acquisition activities during the holding period. This leaves us with 775 buyouts, thereof 297 B&B buyouts (i.e. buyouts where the portfolio firm engaged in add-on acquisition activities) and 478 non-B&B buyouts.

For the 297 B&B buyouts, we identify 1,427 related add-on acquisitions in total. As a next step, we exclude all B&B buyouts where:

- valuation figures (EV, EBITDA and EV/EBITDA multiple) for the add-on acquisitions at buyout level are incomplete, i.e. neither valuation figures for each add-on acquisition nor summary statistics for all add-on acquisitions are available,
- exit type is marked as receiverships[2],
- the EBITDA figure at entry or exit is negative, or
- the holding period is shorter than one year.

In total, we count 161 B&B buyouts with 971 add-on acquisitions from 22 different PE firms. For each B&B buyout, we have the valuation figures (EV, EBITDA and EV/EBITDA multiple) of the platform company at entry, the ones for either each add-on acquisition or all add-on acquisitions

[2] We find receivership rates (i.e. money multiples smaller than 0.25) of 7% to 10% in our data sets, which is comparable to past studies (e.g. Achleitner & Figge, 2014; Bonini, 2015; Hammer et al., 2015; Strömberg, 2008).

and the one at exit. We further indicate if at least one add-on acquisition was a cross-border or industry-diversifying transaction. We also collect several platform company characteristics (e.g. industry, sales) and characteristics of the PE firm (e.g. fund size, vintage, team setup).

For the 478 non-B&B buyouts, we add another 106 non-B&B buyouts from Zephyr, Preqin and MergerMarket where EV figures are available, and EBITDA figures can be sourced from Orbis and CapitalIQ. The complemented non-B&B sample thus counts 584 buyouts.[3]

3.2. Sample distribution

Table 1 provides statistics on the distribution of our B&B buyout sample.

— Insert Table 1 about here —

We find 103 realised buyouts and 58 unrealised buyouts[4] with an average holding period of 5.1 years and 4.0 years, respectively (median of 4.7 years and 3.6 years, respectively). The holding period is slightly longer than the long-term average holding period of 4.2 years calculated by Kaplan & Strömberg (2009). This results from the general trend towards a prolonged holding period and the nature of B&B buyouts enforcing longer holding periods due to the need of integrating the acquired add-ons (Hammer et al., 2017).[5] Further, data from Invest Europe suggests an average holding period for buyouts of 6.0 years for buyouts between 2016 and 2020. Despite the size of 161 B&B buyouts, our sample is well distributed by time, industry and country if we compare it to data from Invest Europe.[6]

Table 1 Panel A presents the distribution by deal entry (exit) year for all B&B buyouts. Our sample clearly reflects the European private equity market development over the last decade. We count a limited number of buyouts in the early 2000s, followed by an increase before the financial crisis in 2008 and a sharp drop in 2009 (Guo et al., 2011; Kaplan & Strömberg, 2009). We also see a return to a pre-financial-crisis level between 2010 and 2013 and the buyout boom since 2014. From 2017 onwards, the number of buyouts in our sample gradually decreases as PE firms limit the access to useful information for active funds or unrealised buyouts.

[3] See Table A2 for a distribution of the non-B&B sample.
[4] For buyouts not yet exited we use the most recent reported net asset values as a proxy for the exit value.
[5] See "Global private equity report 2021" from Bain & Company.
[6] See "Investing in Europe: Private Equity Activity 2020" from Invest Europe.

Table 1 Panel B provides the distribution by ff10 industry sector. We find 67.7% of the B&B buyouts to be categorised as businesses in Healthcare (14.9%), Manufacturing (14.9%), and Other (37.9%).[7]

By country (see Table 1 Panel C), our sample matches the European PE landscape, headed by the UK and Ireland (26.7%) and the Nordics (23.6%) and followed by France and Benelux (18.0%) and DACH (18%).[8] The distribution by country slightly differs from the one reported by Achleitner et al. (2011) but includes all relevant PE markets in Europe.

3.3. Summary statistics

Table 2 reports summary statistics for the relevant variables by status (i.e. realised vs. unrealised buyouts).

— Insert Table 2 about here —

Our sample pictures the European PE small- and mid-market with a mean entry equity value of 68 Mio € (median of 31 Mio €) and entry EV of 129 Mio € (median of 60 Mio €).[9] According to Invest Europe, the small- and mid-market PE market (mean entry equity value between 0 and 150 Mio €) represents 94% of all buyouts since 2016.[10] Dickenbrok et al. (2020) count 82% of the buyouts in their sample in the small-and mid-market (EV between 0 and 500 € Mio), and Hammer et al. (2020) display a comparable distribution with 86% of all buyouts executed in the small- and mid-market (EV between 0 and 600 Mio $). The mean entry EV/EBITDA multiple for the sample amounts to 8.1x (median of 6.4x), which is slightly higher than the EV/EBITDA multiple of 6.8x and 7.6x reported by Acharya et al. (2013) and Achleitner et al. (2011), respectively, but lower than the 9.9x reported by Hammer et al. (2021). This result is consistent with the increase in transaction multiples since 2010.[11] On average, we record an increase in net debt from 63.3 Mio € at entry to 95.3 Mio € at exit, which suggests that add-on transactions are primarily financed with debt rather than equity. It is worth noting that the net debt/EBITDA multiple decreases on average from 4.0x to 3.2x, i.e. net debt increases less pronounced than EBITDA over the holding period.

[7] Other mainly consists of Business Services (31.7%). The remaining share (6.3%) includes the sub-sectors Education, Packaging, Logistics, Construction, and Transportation.
[8] The Nordics include the countries Denmark, Finland, Norway, and Sweden.
[9] The Nordics include the countries Denmark, Finland, Norway, and Sweden.
[10] See "Investing in Europe: Private Equity Activity 2020" from Invest Europe.
[11] See "Global private equity report 2021" from Bain & Company.

With on average 5.0 add-on acquisitions per platform company (median of 2.0), add-on acquisition activity in our B&B sample is above the average of 1.7 add-on acquisitions reported by Bansraj et al. (2020). This may result from a lower coverage of smaller transactions in commercial databases.

4. Disentangling operating and deal performance of B&B buyouts

4.1. Insulating the add-on sourcing effect of multiple arbitrage

The "add-on sourcing effect" labels the contribution of multiple arbitrage to the increase of EBITDA and overall deal performance by acquiring smaller firms in add-on transactions at multiples lower than the entry multiple for the platform company. This effect is to be attributed to the transactional sphere of the deal performance; knowing the EBITDA figures and EV/EBITDA multiples of the specific add-on acquisitions allows to calculate the cumulated average entry EV/EBITDA multiple for the platform company and related add-on acquisitions. Formally the adjusted (average) entry multiple including the add on transactions is

$$M^{\emptyset} = \frac{EV^{Pl} + \sum_{i=1}^{n} EV_i^{Add}}{EBITDA^{Pl} + \sum_{i=1}^{n} EBITDA_i^{Add}} \quad (1)$$

with

EV^{Pl}: Enterprise value platform company

EV_i^{Add}: Enterprise value it[h] add on transaction

$EBITDA^{Pl}$: EBITDA platform acquisition

$EBITDA_i^{Add}$: EBITDA i[th] add on acquisition

Reducing the average entry EV/EBITDA multiple increases the (positive) difference between the platform company's entry and (a given) exit multiplier; thus, if a positive add-on sourcing effect exists, it increases the contribution of the EV/EBITDA multiple conversion to the overall deal performance. As the total deal performance measured by the equity value CAGR is unaffected by this adjustment, there must be a second, corresponding downwards adjustment of the EBITDA growth as the operating component of the performance: We adjust the EBITDA growth by calculating the "price adjusted" EBITDA the firm would have received if the add-on acquisition would have been valued at the platform company's entry EV/EBITDA multiple. The adjusted acquired EBITDA of the add on acquisition i, $EBITDA_i^{Acqu}$ is

$$EBITDA_i^{Acqu} = \frac{EV_i^{Add}}{M^{Pl}} \quad (2)$$

with

M^{Pl}: Entry EV/EBITDA multiple platform company

For all add on transactions we receive

$$EBITDA^{Acqu} = \sum_{i=1}^{n} \frac{EV_i^{Add}}{M^{Pl}} \quad (2')$$

The difference between the EBITDA figure acquired and the "price adjusted" one based on the platform company's entry EV/EBITDA multiple, labelled as "sourced" EBITDA is defined as the EBITDA gain from the add-on sourcing effect. In other words, it relates to the additional EBITDA acquired "on top for free" in the add-on transaction by paying a lower EV/EBITDA multiple.[12] For the add on transaction i $EBITDA_i^{Sourced}$ is

$$EBITDA_i^{sourced} = \frac{EV_i^{Add}(M^{Pl} - M_i^{Add})}{M_i^{Add} \cdot M^{Pl}} \quad (3)$$

with

M_i^{Add} : Entry EV/EBITDA multiple ith add on transaction

For all add on transactions we receive

$$EBITDA^{Sourced} = \sum_{i=1}^{n} \frac{EV_i^{Add}(M^{Pl} - M_i^{Add})}{M_i^{Add} \cdot M^{Pl}} \quad (3')$$

A simple example shall highlight the adjustment mechanism. Relevant data is shown in Table 3. The example shows the adjustment of multiple and EBITDA growth and also the impact of the adjustment on the “performance bridge” of private equity deals. Finally, the impact of the sourcing effect on the overall deal performance is demonstrated.

— Insert Table 3 about here —

[12] See Panel B ("multiple adjustment") and Panel C ("EBITDA adjustment") in Table 3.

Panel A displays the basic data of the example; the buyout data reveals a significant difference between the EV/EBITDA multiples of the platform company at entry (7.5), the ones for add-on acquisitions (mean of 4.8), and the one at exit (9.0). Panel B of Table 3 shows the (straightforward) adjustment of the combined EV/EBITDA multiple ("multiple adjustment"): the weighted average entry EV/EBITDA multiple of platform company and add-on acquisitions amounts to 6.0, representing a 20% decline to the entry EV/EBITDA multiple of the platform company (or a 25% uplift based on the combined EV/EBITDA multiple, labelled as add-on sourcing effect on the entry multiple). Figure 1 and Panel B in Table 3 illustrate the "multiple adjustment" of the combined entry EV/EBITDA multiple.

— Insert Figure 1 about here —

Panel C highlights the adjustment of the EBITDA ("EBITDA adjustment"): applying the platform company's EV/EBITDA multiple of 7.5 on the EVs of related add-on acquisitions, the PE firm would just have acquired 16 units as additional (inorganic) EBITDA. The difference to the actually acquired EBITDA figure of 25 units amounts to 9 units, attributed to the add-on sourcing effect on the EBITDA growth. Panel C also shows the decomposition of the absolute EBITDA growth between (platform company) entry and exit EBITDA of 30 units into the three components of "true" inorganic EBITDA growth (16 units), add-on sourcing effect (9 units) and the remaining "true" organic EBITDA growth (5 units).

The example uses the equity value CAGR as a buyout performance measure; Panel D shows its calculation for the example (33,8%). Following existing literature (e.g. Berg & Gottschalg, 2005), we first split the performance into operating improvements, based on the (unadjusted) EBITDA CAGR, the "deleveraging" part based on the CAGR of the equity fraction of EV. Finally, the "multiple conversion" part is derived from the CAGR of the (unadjusted) EV/EBITDA multiple. The second and third columns of panel D show the respective values and the (unadjusted) contributions to the equity value CAGR of the three components: 63.0%, 12.5% and 24.5%. Columns 4 and 5 highlight the decomposition of the EBITDA CAGR and the contribution of EBITDA components to the equity value CAGR. The CAGRs of the three EBITDA components are derived by their marginal contributions to the absolute increase of EBITDA.[13] Column five of

[13] The logic of the sequential incremental adjustment steps follows the timeline of the occurrence of their effects: the inorganic EBITDA CAGR is split into the "true" inorganic EBITDA CAGR (CAGR from 20 to 36 units) and the add-on sourcing effect (CAGR from 36 to 45 units); finally, the "true" EBITDA CAGR (CAGR from 45 to 50 units) caused

Panel D shows that the 63.0% contribution of the overall EBITDA CAGR can be split into 40.4% "true" inorganic, 15.3% add-on sourcing effect related and 7.2% "true" organic growth. This further decomposition allows a deeper insight into the sources of value creation; reallocating the add-on sourcing effect in the example by adding it to the EV/EBITDA multiple CAGR, the weight of the adjusted EV/EBITDA multiple CAGR amounts to 27.8% (i.e. the sum of contributions of the unadjusted EV/EBITDA multiple CAGR of 12.5% and the add-on sourcing effect of 15.3%), which is closer to the one of the (adjusted) EBITDA CAGR of 47.6% (i.e. the sum of contributions of the "true" inorganic and organic EBITDA CAGR of 40.4% and 7.2%, respectively).

As the example shows, the adjustment moves the performance contribution from the operating part (EBITDA CAGR) to the transactional part (EV/EBITDA multiple CAGR) of the performance. Thus, it sheds light on how value in B&B buyouts is created; additionally, it allows deeper insights into how these different sources of performance are valued by the potential buyers of the buyout company.

Finally, Panel E of Table 3 tackles the question: "What would be the overall performance of the buyout without add-on sourcing?" To answer it, we calculate the (fictitious) EBITDA at exit, excluding the add-on sourcing effect related EBITDA of 9 units and re-calculate the corresponding exit EV, equity value and the equity value CAGR. The adjusted buyout performance in the example amounts to 25.6%; thus, it is by 8.2 ppts lower than the actual buyout performance that includes the add-on sourcing effect.

4.2. The impact of the add-on sourcing effect on buyout performance – empirical evidence

In this section, we apply the procedure described in the previous section on our sample data. We start by taking a closer look at two specific factors driving the size of the add-on sourcing effect: the relative size and EV/EBITDA multiple of add-on acquisitions:

— Insert Figure 2 about here —

The larger the add-ons (with smaller EV/EBITDA multiples) are in relation to the platform company, the stronger is the impact of a different EV/EBITDA multiple on the add-on sourcing effect. Figure 2 shows the distribution of the relative size of the add-ons in our sample in relation to the platform company (both measured in EV). In general, add-ons are significantly smaller than

by synergies is based on the total inorganic EBITDA, as their occurrence requires first add-on acquisitions to have happened.

the platform company; the mean value and median are 22.1% and 9.6%, respectively. We only find five add-ons to have a higher EV than their corresponding platform company.

— Insert Figure 3 about here —

The greater the difference in EV/EBITDA multiples between add-on acquisition and platform company at entry, the stronger the impact on the add-on sourcing effect. Figure 3 highlights the ratio of EV/EBITDA multiples of add-on acquisitions to the one of the platform company at entry. We find significantly lower EV/EBITDA multiples for add-on acquisitions: they are on average just 92.4% of the platform company's entry EV/EBITDA multiples (the median ratio is 75.0%). On the other hand, we also find 30% of the add-ons to have higher EV/EBITDA multiples than the platform company, i.e. yielding a negative add-on sourcing effect.

In the next step, we combine the two factors and look at the complete sourcing effect measured by its contribution to the EBITDA growth rate for our sample; Figure 4 shows the distribution of the add-on sourcing effect CAGR:

— Insert Figure 4 about here —

Again, due to higher add-on EV/EBITDA multiples, we see some negative values of the add-on sourcing effect CAGR. However, the mean value of the add-on sourcing effect CAGR of 2.3% is clearly positive. To check for statistical significance, we perform a paired t-test for equality of means and a non-parametric Wilcoxon signed-rank test for equality of medians against the null hypothesis: "add-on sourcing effect equals zero"; Table 4 shows the results:

— Insert Table 4 about here —

The null hypothesis is to be rejected; the add-on sourcing effect is positive and significant at a confidence level of 1%.

Figure 5 splits the overall EBITDA growth rate into the three components, inorganic (acquired) and organic growth and the growth attributed to the add-on sourcing effect:

— Insert Figure 5 about here —

We find the add-on sourcing effect to contribute significantly to the EBITDA growth of the B&B buyouts in our sample: It accounts for 21.2% (21.0% respectively for the realised buyouts)

of the overall EBITDA CAGR. As the comparison between mean and median values suggest, there are some significant positive outliers. "True" inorganic growth via acquisition is the largest part of the operating improvement: more than 71.0% of the EBITDA CAGR (64.0% respectively for the realised buyouts) is generated by acquiring EBITDA of other companies. Finally, our results suggest that there is also some contribution of "true" organic growth: 7.7% of the EBITDA CAGR (15.0% respectively for the realised buyouts) are to be attributed to "true" synergies, i.e. additional EBITDA growth created beyond the acquired inorganic EBITDA growth. The EBITDA growth caused by "true" organic growth in our sample is smaller than the add-on sourcing effect. This might be explained by the limited time of PE ownership at the buyout company; as in the early months after an add-on acquisition, there may be additional costs for integrating the target, the limited holding period of the PE fund may not allow to fully exploit all benefits of the combined entity until the exit. The fact that the fraction of organic growth as a contribution is higher for already realised buyouts in our sample supports this argument.

Finally, we analyse the impact of the add-on sourcing effect on the composition of the buyout performance measured by the equity value CAGR. Figure 6 shows the results:

— Insert Figure 6 about here —

We find a moderate, but still significant contribution of the add-on sourcing effect CAGR of 8.2% (7.5% respectively for the realised buyouts) to the equity value CAGR; now the contribution of the "true" organic EBITDA CAGR (9.5% and 18.2%, respectively) is higher than the one of the add-on sourcing effect.[14] The reason for this difference is a negative correlation between the two variables in our sample.[15] Figure 7 illustrates the contribution effects.

— Insert Figure 7 about here —

The contribution of "true" organic EBITDA growth is higher in those deals, where the contribution of the operating part to overall buyout performance is high. By contrast, the contribution of the add-on sourcing effect CAGR is higher in those cases, where the fraction of total EBITDA growth on overall buyout performance is low.

[14] Our results are thus in line with Bansraj et al. (2020) who showed a significant operating outperformance of B&B buyouts.
[15] Correlation coefficient of add-on sourcing effect CAGR and "true" organic EBITDA CAGR amounts to -0.196.

The "true" inorganic EBITDA growth has the highest weight of the three EBITDA components: it contributes 40.4% (31.0% respectively for the realised buyouts) to the equity value CAGR. The combined (unadjusted) operating improvement as total EBITDA CAGR has the highest contribution to the overall buyout performance (58.1% and 56,7%, respectively), followed by EV/EBITDA multiple CAGR (27.3% and 23.4%, respectively) and equity share CAGR (14.6% and 19.8%, respectively). In contrast to the findings of Brigl et al. (2016), we observe EBITDA growth to be the most important contributor to the equity value CAGR. On the other hand, in line with the results of this study, we find a high contribution of the EV/EBITDA multiple CAGR even before the adjustment for the add-on sourcing effect. The explanation for this result is the additional untapped value creation potential in B&B buyouts from "leftover" integration and optimisation potential, which is rewarded by higher exit EV/EBITDA multiples.

The contribution of the equity share CAGR is the smallest of the three components. The reason for this is that obviously the largest part of the add-ons´ acquisition cost is financed by taking on additional debt. Thus there is less room for the redemption of debt during the PE firm's holding period. In general add-ons can be financed by (i) follow-on equity contributions of the fund vehicle, (ii) free cash from the platform company, or (iii) new/additional debt, which subsequently increases the firm's net debt. We are well aware that the decomposition of the equity CAGR shown here rests on the assumption that there are no intermediate cash flows between fund and portfolio company during the holding period and that this implies a 100% debt/internal financing of all add on acquisitions during the holding period. As we lack detailed information on how the acquisitions in our sample are exactly financed we have set this assumption. The development of the debt level over the holding period described above supports this assumption and shows that additional equity contributions by the fund are only of minor importance. [16]

After adjusting the performance components by reallocating the add-on sourcing effect from the operating sphere to the transactional sphere, the distribution of the contributions changes: operating improvement as EBITDA CAGR decreases from 58.1% to 49.9%, (from 56,7% to 49,2% respectively for the realised buyouts); at the same time multiple conversion as EV/EBITDA multiple CAGR increases from 27.3% to 35.5% (from 23.4% to 30.9% respectively for the realised buyouts).

[16] We are also aware about the potential bias of this assumption with respect to the IRR of the deal. In case of an equity contribution and financing of the acquisition the deal IRR would be lower than the one derived under the debt financing assumption.

5. The impact of the add-on sourcing effect on B&B outperformance

5.1. Measuring B&B outperformance

Next, we review the impact of the add-on sourcing effect on B&B outperformance. While past studies find evidence for an outperformance of B&B buyouts, they do not differentiate between the different sources of operating growth (see Acharya et al., 2013; Nikoskelainen & Wright, 2007; Valkama et al., 2013).[17] In this section, we, therefore, address the following questions: Is there an outperformance of B&B buyouts over non-B&B buyouts? If so, is the add-on sourcing effect the reason for the outperformance?

For measuring B&B performance, we follow Boucly et al. (2011) and apply a nearest neighbour matching to find comparable non-B&B buyouts as control peers. A control peer thereby meets the following criteria:

i. Entry deal EV is in the ±50% bracket of the entry deal EV of the B&B buyout
ii. Entry EBITDA is in the ±50% bracket of the entry EBITDA of the B&B buyout
iii. Holding period is in the ±50% bracket of the holding period of the B&B buyout but no longer or shorter than two years.[18]

We refer to this matching procedure as "size matching". We additionally construct a "size-year matching", which further requires

iv. same entry years of both buyouts.

If there are more than five control peers, we just keep the five neighbours nearest to the target and define the distance between two buyouts as

$$Y_{j,t} = \sqrt{\sum_{i=1}^{n} \left(\frac{x_{i,j} - x_{i,t}}{\max x_i - \min x_i} \right)^2} \quad (1)$$

[17] There are some limitations of past studies on B&B outperformance. First, their samples seem to be less representative for investigating B&B related aspects. Nikoskelainen & Wright (2007) and Valkama et al. (2013) include buyouts only until 2004, Acharya et al. (2013) until 2008, where B&B buyouts were still a rarity. Acharya et al. (2013) further report a share of receiverships exceeding 1/3, which is considerably higher than actually observed in the PE space (e.g. Wright et al., 2009). Second and most importantly, they do not differentiate between the different sources of operating growth (sales growth vs. EBITDA margin change)

[18] The ±50% bracket follows past literature in this field (see Bonini, 2015; Boucly et al., 2011; Guo et al., 2011; Hammer et al., 2020) and represents a trade-off between matching accuracy, i.e. receiving control peers that are almost identical, and the need to get a control peer for as many B&B buyouts as possible.

where $Y_{j,t}$ is the scaled Euclidian distance between buyout j and t, $x_{i,j}$ the value of indicator i of buyout j, $x_{i,t}$ the value of indicator i of buyout t, max x_i the maximum value of indicator i, and min x_i the minimum value of indicator i.[19]

We further follow Barber & Lyon (1996) and consider the performance of the nearest as well as median of the five nearest non-B&B control peers. Excess performance is defined as

$$Y_{i,j} = x_{i,j} - p_{i,j} \quad (2)$$

where $Y_{i,j}$ represents the excess value of indicator i and buyout j, $x_{i,j}$ the value of indicator i and buyout j, and $p_{i,j}$ the (median) value of indicator i and the control group of buyout j.[20]

We compare the performance between B&B buyouts and their non-B&B peers along the value creation bridge and further consider the different sources of operating growth (Morris & Phalippou, 2019).

5.2. Impact of the add-on sourcing effect on B&B outperformance – univariate analysis

We perform paired t-tests for equality of means and non-parametric Wilcoxon signed-rank tests for equality of medians to check if any differences in the performance between B&B and matched non-B&B buyouts exist. We further consider the impact from extracting the add-on sourcing effect of the operating sphere and re-allocating it into the transactional sphere. We compare each B&B buyout with the nearest and the median of the five nearest control peers (Barber & Lyon (1996)). Table 5 displays the results of the mean and median difference tests.

— Insert Table 5 about here —

EV/EBITDA multiple CAGR (Panel A): Our results for the unadjusted EV/EBITDA multiple CAGR provide a mixed picture as they differ by matching approach. While the results of the "size-matching" peer group confirm the B&B outperformance of previous studies (Dickenbrok et al., 2020; Kaplan & Schoar, 2005), we do not find it to be superior against the "size-year matching" peer group. However, if we consider the adjustment for the add-on sourcing effect, the EV/EBITDA multiple CAGR contribution increases, and B&B buyouts achieve statistically

[19] We calculate the scaled Euclidian distance between the buyout of interest and each control peer and select those five peers with the shortest distances. The squared difference between the maximum and minimum value of an indicator is used as weight. As a note, we receive similar non-B&B control peers if we apply other measures, such as standardised Euclidian distances or propensity scores (see Table 11).

[20] As excess values can turn negative, a log-scaled ratio as dependent variable is not advisable.

significantly higher EV/EBITDA multiple CAGRs than their non-B&B peers for both matching procedures.

EBITDA CAGR (Panel B): We find B&B buyouts to significantly outperform their non-B&B peers even after the adjustment for the add-on sourcing effect. The obvious reason for this result is that B&B buyouts, in contrast to non-B&B buyouts, can still create EBITDA growth inorganically by acquisitions.

Sales CAGR and EBITDA margin CAGR (Panel C and D, respectively): Our results suggest that B&B buyouts display a significantly higher sales CAGR than their matched peers, whereas there are no significant differences in the EBITDA margin improvement.[21] Obviously, the short time of ownership does not allow the PE owners of the portfolio firm to fully exploit the existing synergy potential.

EV CAGR (Panel E): Following the results of Panel A and B, we find statistically significantly higher EV CAGRs of B&B buyouts against their non-B&B peers. As add-on acquisitions strongly drive the EV during the holding period, it is not surprising that the EV CAGR is higher for B&B buyouts. Without knowing the change in net debt, it is less meaningful to draw a conclusion on deal performance.[22]

Equity share CAGR (Panel F): We find equity share CAGRs of B&B buyouts to be significantly lower than their "size matching" peer group if we run the comparison on the full sample. Statistical significance disappears for the sample of realised buyouts, although equity share CAGRs of B&B buyouts are still slightly lower. This also holds for our "size-year matching" peer group. The difference in the results between the samples (i.e. realised vs. unrealised buyouts) again suggests that B&B portfolio firms may use the remaining holding period for further paying down debt and increasing the equity fraction of EV.

Equity value CAGR (Panel G): Finally, we review whether equity value CAGRs differ between B&B and matched non-B&B buyouts. Our results confirm the "B&B outperformance hypothesis" of past studies (see Acharya et al., 2013; Nikoskelainen & Wright, 2007; Valkama et al., 2013) as we find statistically significantly higher equity value CAGRs for B&B buyouts.

[21] As we lack the necessary data for add-ons, we are not able to extract the add-on sourcing effect out of the two growth rates; thus there is only an unadjusted comparison between B&B and non-B&B buyouts.

[22] As the add-on sourcing effect only affects the composition of the EV CAGR but not the level of the EV CAGR, there is no need to adjust for it.

Next, we analyse the contribution of the add-on sourcing effect to overall buyout performance by eliminating the add-on sourcing effect out of the equity value CAGR calculation. As described above, we deduct the "sourced" part of the EBITDA increase (i.e. we only take the "price-adjusted" EBITDA of add-on acquisitions) and re-calculate EV, equity value and equity value CAGR. Table 6 provides the results.

— Insert Table 6 about here —

We find the add-on sourcing effect to be the driving factor for B&B outperformance; removing it from the performance measure reduces outperformance drastically, in many cases even to insignificance: comparing the full sample against the "size matching" peer group, we do not find any significant difference in the performance. There is a positive outperformance for the sample of the realised buyouts only for the median of the five nearest peers as a matched benchmark. Finally, the difference in equity value CAGRs between B&B buyouts and their "size-year matching" peer group is insignificant as well. We conclude from this results that the add-on sourcing effect is an important driver of B&B outperformance.

5.3. Impact of the add-on sourcing effect on B&B outperformance – multivariate analysis

For our multivariate analysis, we use linear ordinary least squares (OLS) regressions with the excess equity value CAGR as dependent variable and the excess EBITDA CAGR (adjusted for the add-on sourcing effect), add-on sourcing effect CAGR, excess equity share CAGR and excess EV/EBITDA multiple CAGR as independent variables. Fixed effects include the platform company's country and ff10 industry sector and the buyout entry year. PE sponsor effects include the PE inception year as a proxy for a PE firm's experience and philosophy, as well as indicator variables for buyout size (i.e. small-cap, lower mid-cap and upper mid-cap), cross-border office (as a proxy for a PE firm's regional coverage) and a late buyout dummy. The choice of control variables thereby follows previous literature (e.g. Arcot et al., 2015; Bonini, 2015; Degeorge et al., 2016; Hammer et al., 2017).

Table 7 presents the regression results.

— Insert Table 7 about here —

We find all independent variables to have a positive and statistically significant impact on B&B outperformance. The add-on sourcing effect CAGR with the highest coefficient estimate shows the

strongest impact on outperformance as this value creation lever is only available to B&B buyouts. We find the impact of the excess EBITDA CAGR on outperformance to be significantly positive even after the adjustment for the add-on sourcing effect; the reason for this result is the ability of B&B buyouts to create EBITDA growth inorganically by acquisitions. Obviously, the company's buyer at exit is honouring this growth via the exit price as it contributes to a positive outperformance. The estimate for the excess equity share CAGR requires some further explanation. First, the coefficient is significantly positive; considering that B&B buyouts have an inferior equity share CAGR than their non-B&B peers due to the financing needs for add-on acquisitions, the excess equity share CAGR of B&B buyouts is negative. Thus, the positive coefficient estimate points towards the expected result: the unfavourable difference in net debt for most B&B buyouts negatively impacts B&B outperformance and thus works against the positive impact of the other variables.

5.4. Determinants of the add-on sourcing effect

Our results so far indicate that the add-on sourcing effect positively impacts B&B outperformance. In this section, we investigate factors potentially influencing the capability of the buyout company to successfully make use of the add-on sourcing effect. We focus on three sets of factors: sponsor specifics, deal complexity, and deal execution. Table 8 presents summary statistics of the dependent and independent variables.

— Insert Table 8 about here —

Sponsor specifics: Following the increase in the number of buyouts and amount of raised capital in the last decades, PE firms increasingly face competition intensity, which subsequently results in increasing transaction multiples, yielding a situation labelled as "money chasing deals" (Braun et al., 2016; Brown et al., 2020; Gompers & Lerner, 1999; Sensoy et al., 2013). To further professionalise the search for good add-on targets, some PE firms implemented dedicated sourcing teams within their organisation to generate constant deal flow and source portfolio firms at lower multiples. In the case of B&B buyouts, these sourcing teams also support portfolio firms in identifying and acquiring add-ons, preferably at lower transaction multiples. We thus expect that the existence of a dedicated sourcing team has a positive impact on the add-on sourcing effect. We construct a measure that indicates if the PE firm in the buyout operates a dedicated sourcing team,

in addition to an investment or operations team. Only 2 out of the 23 PE firms in our sample operate a dedicated sourcing team (or 9 out of 161 buyouts indicate the existence of a sourcing team).

Deal complexity: We define add-on acquisitions as "complex" if they are cross-border or industry-diversifying (see Hammer, 2018 for a definition of complexity as part of B&B buyouts). The impact of deal complexity on the add-on sourcing effect is an open question. On the one hand, acquisitions in other countries and/or industries than the platform company may be coupled with higher entry multiples due to less experience in these regions/industries. These higher acquisition prices for add-ons may yield a lower add-on sourcing effect. On the other hand, searching for add-on targets in other countries/industries may offer the opportunity to find "cheaper" targets, resulting in a higher add-on sourcing effect. We construct an indicator variable for industry-diversifying buyouts that equals one if at least one add-on acquisition does not have the same industry classification code (Fama and French 10 as in Table 1) as the platform company, and zero otherwise. Similarly, we construct an indicator variable for cross-border buyouts that equals one if at least one add-on acquisition does not have the same country as origin as the platform company, and zero otherwise. As a result, 11% and 46% of all buyouts in our sample are industry-diversifying and cross-border buyouts, respectively.[23]

Deal execution: We expect that the higher the amount of inorganic EBITDA in relation to the platform company's entry EBITDA, the stronger the add-on sourcing effect resulting from a greater contribution of lower-priced add-ons on the combined entry valuation. We further expect a positive impact from a high add-on acquisition frequency for two reasons. First, it reflects a portfolio firm's ambition to be a serial acquirer and thus suggests that the portfolio firm is experienced in identifying and acquiring add-ons. Second, it serves as a proxy for a fragmented underlying market where add-ons are widely available. In such markets, portfolio firms may be in a position to select rather low-priced add-on targets. For the annual inorganic EBITDA effect, we construct a measure that indicates the annual size increase of the platform company through add-on acquisitions, measured by the acquired EBITDA from add-ons, divided by the platform company's EBITDA at entry, divided by the holding period in years. The annual inorganic EBITDA effect amounts to 29%, i.e. platform companies increase their size on average by almost 1/3 annually through the

[23] The difference in the share of industry-diversifying add-on acquisitions to Hammer et al. (2017)'s sample originates from the difference in classifications codes (extended version of Fama and French 30 as of Hammer et al. (2017) vs. Fama and French 10).

acquisition of add-ons. We divide the number of add-on acquisitions per buyout by the holding period in years for the add-on acquisition frequency. Accordingly, portfolio firms acquire 1.22 add-ons per year on average. The add-on acquisition frequency, however, depends on the envisaged B&B strategy. If the rationale for conducting a B&B strategy is on industry consolidation, the frequency can easily increase to up to ten add-on acquisitions per year.

We use linear OLS regressions to determine the factors driving the add-on sourcing effect. Our dependent variable is the add-on sourcing effect CAGR. Table 8 depicts summary statistics for the dependent and independent variables used in our regressions (see Table A4 for a detailed definition of all variables).

Table 9 presents the results of our analysis.

— Insert Table 9 about here —

In specification (1), we investigate if the existence of a dedicated sourcing team at PE firms has a positive impact on the add-on sourcing effect CAGR. Our results are statistically significant at the 1% confidence level and display a positive coefficient, confirming our hypothesis that sourcing teams increase the firm's ability to acquire add-ons at lower transaction multiples than their platform company.[24]

In specification (2), we review if industry-diversifying and cross-border buyouts affect the add-on sourcing effect CAGR. Our results indicate that industry-diversifying buyouts positively impact the add-on sourcing effect CAGR, which provides evidence that industries with lower transaction multiples are intentionally selected for a diversification strategy. Cross-border buyouts do not seem to impact the add-on sourcing effect CAGR, i.e. information disadvantages of the portfolio firm in non-active regions may be offset by the PE firm (if local teams exist or other portfolio firms are active therein).

In specifications (3) and (4), we analyse the impact of execution specifics on the add-on sourcing effect CAGR. Not surprisingly, we find that both annual inorganic EBITDA effect and add-on acquisition frequency positively impact the add-on sourcing effect CAGR, as with an increase in inorganic EBITDA, add-on valuations carry a greater weight in the combined valuation. We further

[24] The statistical insignificance of the factor in the realized sample (see Table 3 Panel B) results from a very low number of buyouts where the PE firm operates a dedicated sourcing team. As a note, PE firms with a dedicated sourcing team further source platform companies at comparably low transaction multiples.

find the level of the platform company's entry multiple to have a positive and the holding period to have a negative effect on the add-on sourcing effect CAGR. The first influence stems from the effect of higher entry multiples for the platform company as given add-on multiples yield a higher reduction. The negative impact of the holding period may be explained by a lack of resources allocated to further add-on acquisitions at the end of the holding period. When preparing for the exit transactions, there are no capacities left for organising further add-on acquisitions simultaneously.

In specifications (5) and (6), we include all factors in our regressions (except for deal execution; see correlation coefficients of both deal execution factors as of Table A3). Our results indicate that the existence of a sourcing team has a remarkable impact on the add-on sourcing effect CAGR with a coefficient of 0.063 (i.e. if the PE firm operates a dedicated sourcing team, the add-on sourcing effect CAGR increases by roughly 6.3 ppts, which is almost three times the mean value of the add-on sourcing effect CAGR). Further, our factors are still statistically significant as in the dedicated regression models.

6. EBITDA growth and buyout exit pricing

As our previous results suggest, the add-on sourcing effect positively impacts the deal performance of the buyout measured by the equity value CAGR. As the latter is heavily affected by the exit multiple achieved when selling the company, this result triggers a further question of interest: Does the buyer of the buyout company at exit attribute a different valuation towards the different sources of EBITDA growth? Or, put differently: is a 1% increase in EBITDA having a different exit valuation depending on whether it is created by the add-on sourcing effect, inorganically by the "price-adjusted" EBITDA from add-on acquisitions or organically? One potential reason for a different perceived valuation might be that value drivers from the "true" operating sphere, i.e. organic EBITDA growth, are closely tied to the operating skills of the PE partners. In contrast, value drivers from the transactional sphere may be more easily copied by competitors and are thus higher exposed to the risk of getting "commoditised". Some critics also argue that EBITDA growth created from the add-on sourcing effect represents pure multiple arbitrage without any improvements on neither the platform nor the add-ons and may thus be downgraded by the subsequent buyer. For the perception of inorganic EBITDA growth, there are contradicting arguments. On the one hand, a high share of inorganic EBITDA proves the feasibility of conducting a B&B strategy with the portfolio firm and market, resulting in a higher exit

valuation. On the other hand, acquiring add-ons without properly integrating them may not lead to an improvement of the platform company. It is questionable whether the subsequent buyer would pay any premium for a set of unintegrated entities. Therefore, the question of interest is whether the composition of the EBITDA growth in B&B buyouts impacts the EV/EBITDA multiple realised at the exit.

We use linear OLS regressions with the exit EV/EBITDA multiple and excess exit EV/EBITDA multiple as dependent variables. Our independent variables of interest are the contributions of the growth rates of the three components inorganic, organic and add-on sourcing effect EBITDA. In addition to the control variables defined in section 5.3, we include channel effects (i.e. entry/exit channel). Table 10 reports the regression results.

— Insert Table 10 about here —

We find that the composition of EBITDA growth does not have any significant impact on the exit price. In other words, subsequent buyers do not seem to differentiate between the different ways to increase EBITDA. This holds for all variations of the dependent variables in our model. There are several potential explanations for this result: First, the potential buyer at exit may not have the information about the platform company and related add-on acquisitions necessary to distinguish between the different sources of EBITDA growth.[25] Second, the distinction between the different types of operating growth may be of different importance for different types of buyers, e.g. another financial buyer at exit may want to continue the B&B strategy of the current owner and thus put not much weight on this differentiation. However, additionally including terms interacting the value creation levers with indicator variables marking different exit channels leave the results unchanged (see specifications (2), (4) and (6) in Panel B). We are well-aware about the limited predictive power of our results in table (10) and identified multicollinearity of our data as one reason for this: the models presented in table (10) display VIF well above ten. Specifically, year and industry fixed effects significantly reduce the number of degrees of freedom in our regressions, but represent important control variables in the context of transaction multiples. Therefore, our results here need to be viewed under the outlined limitations and are to be interpreted as preliminary once our sample is extended in size going forward.

[25] However, our conversations with industry experts revealed that in practice the buyer at exit typically requests (and receives) all information about add-on transactions prior to or during the due diligence phase of the exit transaction.

7. Robustness analysis

The novelty of our results may raise some reliability concerns. We thus already provide several robustness tests in each section by

- applying different matching procedures ("size matching" and "size-year matching"),
- performing our analyses on a larger sample that includes unrealised buyouts, in addition to our realised only sample,
- including several control variables in our regression models and providing a variation of control variables in different specifications.

We further use different calculation methodologies for measuring the add-on sourcing effect. In the previous analyses, we define the add-on sourcing effect as the annualised growth rate between the combined EV/EBITDA multiple of platform company and add-on acquisitions and the platform company's EV/EBITDA multiple at entry. Our results remain unchanged if we calculate the add-on sourcing effect differently as an annualised difference in percentage points or annual EV/EBITDA multiple conversion.

Finally, we test the robustness of our matching procedure by using propensity scores as distance measures. We receive propensity scores by running a probit regression with an indicator variable for the implementation of a B&B strategy, the treatment effect, as a dependent variable, and the entry size, i.e. entry EBITDA and entry EV, holding period, entry year, ff10 industry sector and country characteristics as independent variables. We then match B&B buyouts with similar observations, i.e. non-B&B buyouts with similar propensity scores, to check if any significant treatment effect, calculated as the mean difference in the performance along the value creation bridge between B&B and matched non-B&B buyouts, is evident. Table 11 presents the average treatment effects on the treated (ATET) using robust Abadie-Imbens standard errors and varying numbers of matches per observation.

— Insert Table 11 about here —

The results confirm our findings of the univariate mean and median difference tests as of section 5.2. The coefficient estimates suggest that B&B buyouts generate a 10-15 ppts higher equity value CAGR than their non-B&B peers (8-12 ppts in the univariate mean difference tests). If we deduct the "sourced" part of the EBITDA increase and only take the "price-adjusted" inorganic EBITDA, equity value CAGRs drop by 5-8 ppts (7-8 ppts in the univariate mean difference tests). As a result,

these "price-adjusted" equity value CAGRs of B&B buyouts are only 5-7 ppts higher than those of the non-B&B peers, and coefficient estimates are statistically insignificant (0-5 ppts in the univariate mean difference tests). This again indicates that the add-on sourcing effect significantly contributes to B&B outperformance.

8. Conclusion

Recent studies on B&B strategies in buyouts show them to generate superior investor returns (Acharya et al., 2013; Nikoskelainen & Wright, 2007; Valkama et al., 2013). The question of how value is created is, however, still a "black box". Bansraj et al. (2020) analyse the existence of organic operational improvements; Acharya et al. (2013) investigate the impact of operating performance changes, i.e. changes in sales, EBITDA margin, and EV/EBITDA multiple between entry and exit, on B&B performance on an aggregate level. However, the lack of micro data on the companies acquired along with the B&B strategy, such as EBITDA, EV and entry EV/EBITDA multiples, has not allowed to differentiate between different ways to create EBITDA growth. Especially the magnitude and contribution of the add-on sourcing effect by a "multiple arbitrage" strategy was unknown so far.

Relying on a unique and proprietary dataset with detailed information on the add-on acquisitions of B&B buyouts, this study is, to the best of our knowledge, the first to decompose EBITDA growth into the organic, inorganic and the "sourcing" component. We find the add-on sourcing effect a significant component of B&B buyout performance, contributing roughly 8% to the equity value CAGR. Our results also support earlier studies suggesting B&B strategies to outperform non-B&B buyouts and, additionally show that the add-on sourcing effect is the major source of this outperformance: When eliminating its effect from the performance measurement, we find the outperformance of B&B buyouts to decrease significantly; in the majority of models we do not find the equity value CAGR of B&B buyouts to be significantly higher than the one of non-B&B buyouts. Analysing the factors influencing the magnitude of the add-on sourcing effect, we find the existence of a dedicated sourcing team to have a significant positive impact. We further find that industry-diversifying add-ons are typically sourced in industries with lower transaction multiples than their platform company.

Our study has several important implications. First, our findings add insights to the current discussion on how operating performance is created in B&B buyouts. Second, this study provides a simple way to extract the add-on sourcing effect of the operating sphere and re-allocate it into the

transactional sphere by adding it to the EV/EBITDA multiple conversion. By doing so, it allows deeper insights into the value generation strategies of PE firms.

We also have to address potential limitations of our study. As discussed in section 4.2 due to a lack of detailed data on the financing of the add-on acquisitions, we have assumed that all add- on acquisitions are financed by additional debt. While our data on the debt development on deal level strongly supports this assumption, in some cases actually equity may have been used as a funding source, thus yielding a slight over-estimation of the equity related performance of this B&B deals. We found the predictive power of our analysis on the composition of EBITDA growth and its impact on exit pricing to be limited due to the presence of multicollinearity. However, as the analysis represents a key topic for investors in the context of B&B strategies, the results derived here may still serve as an initial orientation. Finally addressing potential concerns about a selection bias of our data, we note that the fund-of-funds providing our data was only invested in 6.3% (i.e. 4 out of 64) of the overall fund vehicles of our study, which reflects a stake of the limited partners in only 5.4% (16 out of 297) of the final buyout sample.

Finally, some results of this study provide grounds for further research. Especially the surprising result that potential buyers of the buyout company do not seem to differentiate between the different sources of operating growth will spark further research on the different types of buyers and their further strategies with the portfolio firm post-exit. Further research may also consider the net debt and equity contribution of add-on acquisitions to overall deal performance. The dataset at hand allows for deeper insights on the nature of add-ons (e.g. size and sequence) and their impact on overall performance and different B&B strategies (e.g. consolidation, transformation, or opportunistic motives).

Lastly, we consider the risk for an adverse selection bias to be negligible. Specifically, the fund-of-funds was only invested in 6.3% (i.e. 4 out of 64) of the overall fund vehicles, which reflects a stake of the limited partner in only 5.4% (16 out of 297) of the final buyout sample.

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Figure 1: The add-on sourcing effect: An example

The figure presents an example of how we calculate the add-on sourcing effect. See Table A4 for a definition.

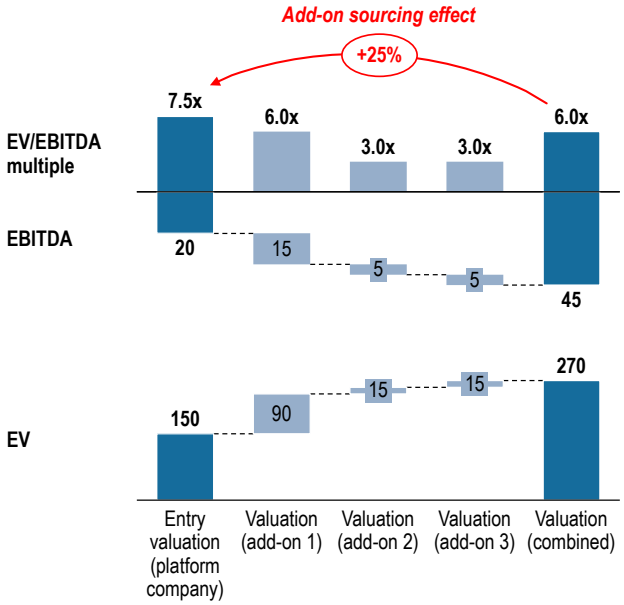

Figure 2: Add-on to platform company size relation (EV)

The figure presents the EV ratio of add-on acquisitions to the respective platform company (at entry). N = 226 add-on acquisitions from 104 (realised and unrealised) B&B buyouts. As a note, the number of add-on acquisitions is greater than in Table A1 as we have no acquisition dates for 12 add-ons.

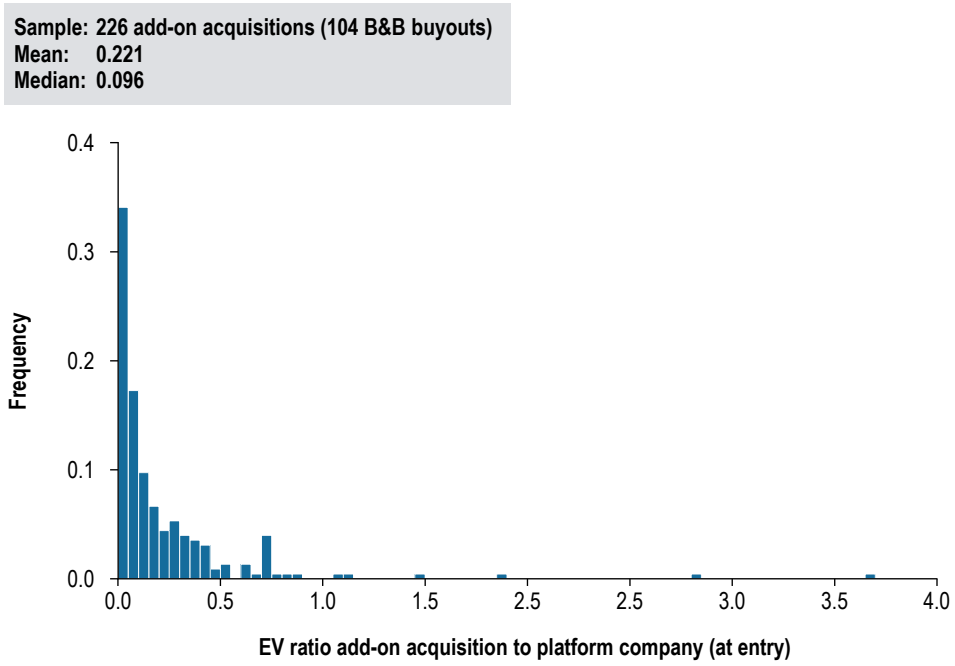

Figure 3: Add-on to platform company size relation (EV/EBITDA multiple)

The figure presents the EV/EBITDA multiple ratio of add-on acquisitions to the respective platform company (at entry). N = 210 add-on acquisitions from 99 (realised and unrealised) B&B buyouts. As a note, the number of add-on acquisitions is smaller than in Figure 1 as 16 add-ons report losses (i.e. no calculation of EV/EBITDAs possible).

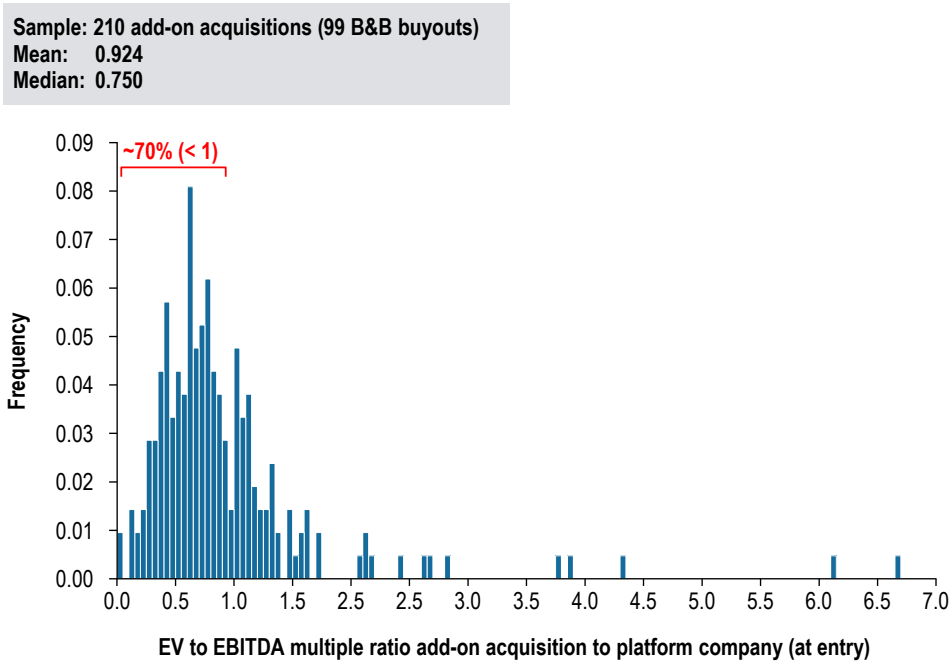

Figure 4: Add-on sourcing effect CAGR distribution

The figure presents the distribution of the add-on sourcing effect CAGR. N = 161 (i.e. realised and unrealised B&B buyouts).

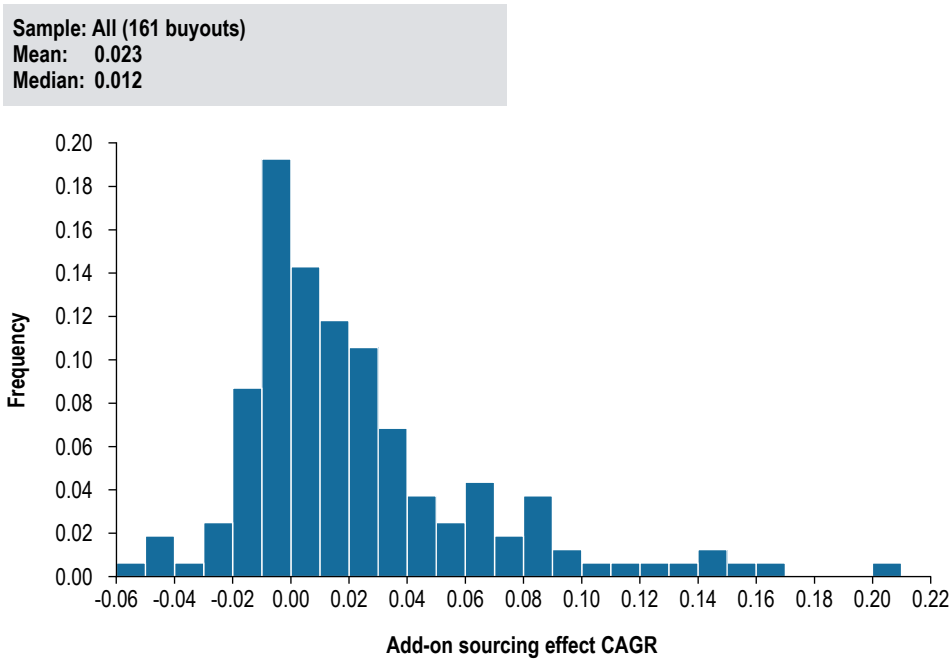

Figure 5: EBITDA CAGR composition

The figure presents the operating growth composition. Operating growth levers are the add-on sourcing effect CAGR, "true" inorganic EBITDA CAGR, and "true" organic EBITDA CAGR. We present mean and median values. N = 144 buyouts (all) and 97 buyouts (realised only).

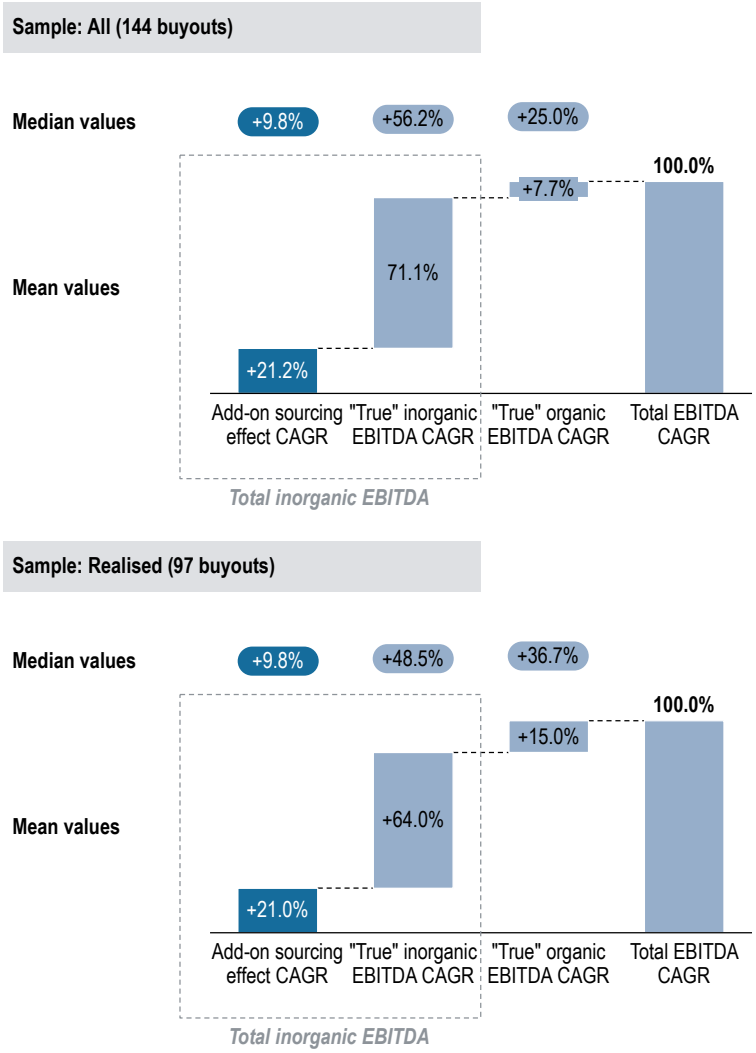

Figure 6: Equity CAGR composition

The figure presents the total value creation composition. Value levers are the add-on sourcing effect CAGR, "true" inorganic EBITDA CAGR, "true" organic EBITDA CAGR, equity share CAGR and EV/EBITDA multiple CAGR (platform). We present mean and median values. N = 145 buyouts (all) and 96 buyouts (realised only).

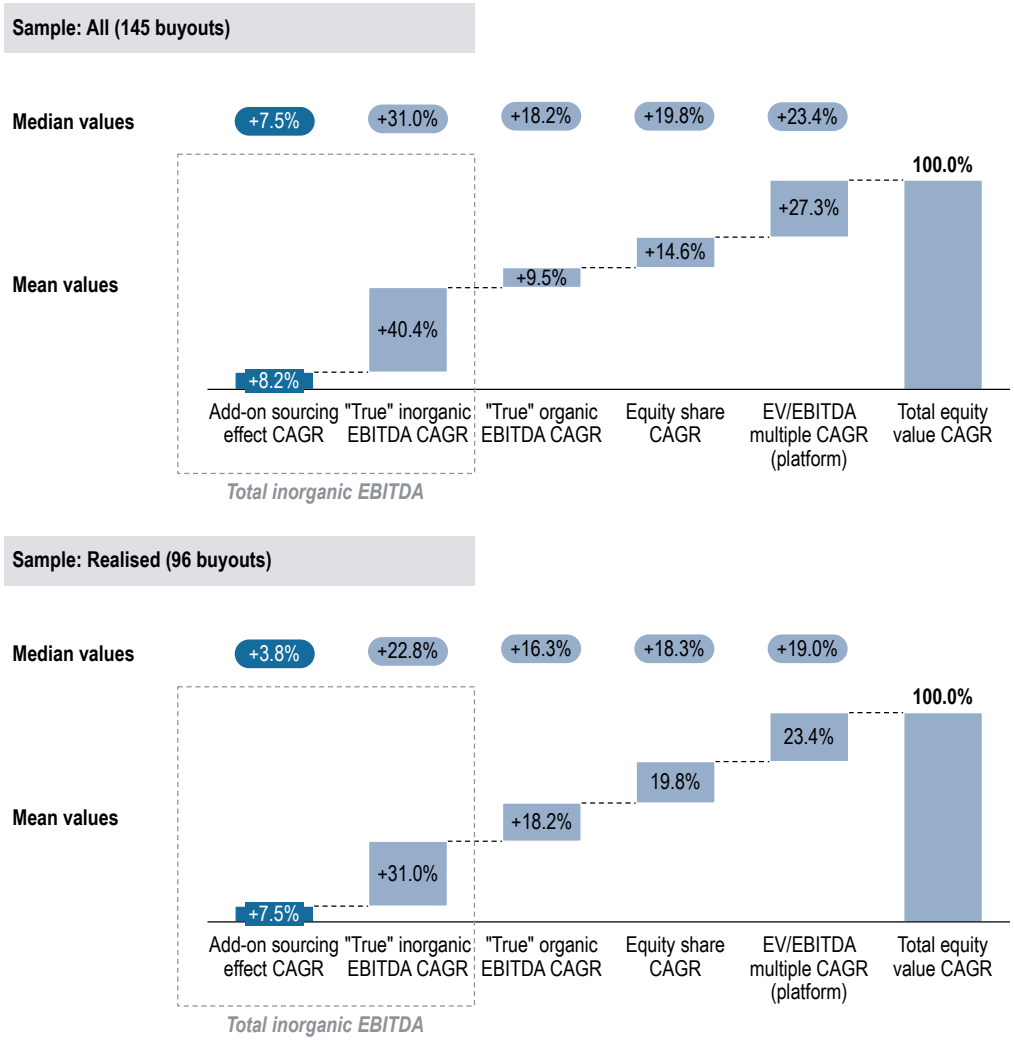

Figure 7: Contribution effects: Add-on sourcing effect vs. "true" organic EBITDA CAGR

The figure scatter plots on the contribution of the add-on sourcing effect as well as "true" organic EBITDA CAGR on the EBITDA CAGR vs. the contribution of the EBITDA CAGR on the equity value CAGR.

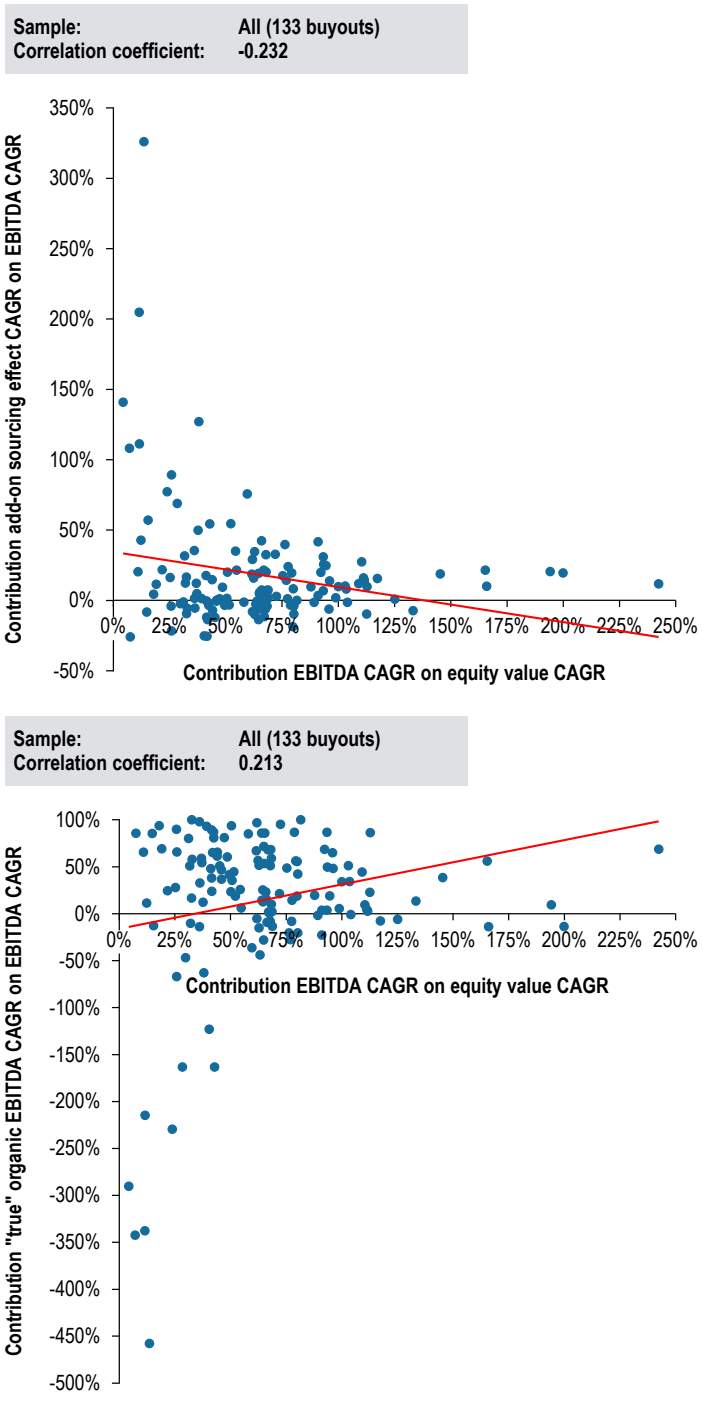

Table 1: B&B sample distribution

The table presents distributions of B&B buyouts by status (realised vs. unrealised) as well as by entry (exit) year (Panel A), ff10 industry (Panel B) and country (Panel C). As a note, for unrealised deals the exit year in Panel A refers to the year of the firm's latest valuation.

Panel A: B&B buyout distribution by deal entry (exit) year

	Total		Realised		Unrealised	
Year	N	%	N	%	N	%
2002	2 (0)	1.2 (0.0)	2 (0)	1.9 (0.0)	0 (0)	0.0 (0.0)
2003	0 (0)	0.0 (0.0)	0 (0)	0.0 (0.0)	0 (0)	0.0 (0.0)
2004	3 (0)	1.8 (0.0)	3 (0)	2.9 (0.0)	0 (0)	0.0 (0.0)
2005	2 (0)	1.2 (0.0)	2 (0)	1.9 (0.0)	0 (0)	0.0 (0.0)
2006	10 (0)	6.2 (0.0)	10 (0)	9.7 (0.0)	0 (0)	0.0 (0.0)
2007	9 (3)	5.5 (1.8)	9 (3)	8.7 (2.9)	0 (0)	0.0 (0.0)
2008	12 (3)	7.4 (1.8)	12 (3)	11.6 (2.9)	0 (0)	0.0 (0.0)
2009	2 (1)	1.2 (0.6)	2 (1)	1.9 (0.9)	0 (0)	0.0 (0.0)
2010	13 (0)	8.0 (0.0)	10 (0)	9.7 (0.0)	3 (0)	5.1 (0.0)
2011	14 (9)	8.6 (5.5)	12 (9)	11.6 (8.7)	2 (0)	3.4 (0.0)
2012	16 (5)	9.9 (3.1)	12 (5)	11.6 (4.8)	4 (0)	6.8 (0.0)
2013	9 (4)	5.5 (2.4)	6 (4)	5.8 (3.8)	3 (0)	5.1 (0.0)
2014	17 (10)	10.5 (6.2)	11 (10)	10.6 (9.7)	6 (0)	10.3 (0.0)
2015	19 (15)	11.8 (9.3)	5 (12)	4.8 (11.6)	14 (3)	24.1 (5.1)
2016	19 (13)	11.8 (8.0)	7 (13)	6.7 (12.6)	12 (0)	20.6 (0.0)
2017	9 (19)	5.5 (11.8)	0 (16)	0.0 (15.5)	9 (3)	15.5 (5.1)
2018	3 (30)	1.8 (18.6)	0 (10)	0.0 (9.7)	3 (20)	5.1 (34.4)
2019	2 (22)	1.2 (13.6)	0 (13)	0.0 (12.6)	2 (9)	3.4 (15.5)
2020	0 (27)	0.0 (16.7)	0 (4)	0.0 (3.8)	0 (23)	0.0 (39.6)
Total	161	100.0	103	100.0	58	100.0

Panel B: B&B buyout distribution by ff10 industry

	Total		Realised		Unrealised	
	N	%	N	%	N	%
1 NoDur	10	6.2	8	7.8	2	3.4
2 Durbl	8	5.0	4	3.9	4	6.9
3 Manuf	24	14.9	19	18.4	5	8.6
4 Enrgy	8	5.0	2	1.9	6	10.3
5 HiTec	11	6.8	10	9.7	1	1.7
6 Telcm	12	7.5	8	7.8	4	6.9
7 Shops	3	1.9	1	1.0	2	3.4
8 Hlth	24	14.9	13	12.6	11	19.0
9 Utils	0	0.0	0	0.0	0	0.0
10 Other	61	37.9	38	36.9	23	39.7
Total	161	100.0	103	100.0	58	100.0

Table 1: B&B sample distribution (continued)

Panel C: B&B buyout distribution by country						
	Total		Realised		Unrealised	
	N	%	N	%	N	%
UK	39	24.2	24	23.3	15	25.9
France	27	16.8	18	17.5	9	15.5
Germany	23	14.3	14	13.6	9	15.5
Italy	22	13.7	18	17.5	4	6.9
Norway	19	11.8	9	8.7	10	17.2
Sweden	17	10.6	11	10.7	6	10.3
Switzerland	5	3.1	2	1.9	3	5.2
Ireland	4	2.5	4	3.9	0	0.0
Finland	2	1.2	1	1.0	1	1.7
Benelux	2	1.2	2	1.9	0	0.0
USA	1	0.6	0	0.0	1	1.7
Total	161	100.0	103	100.0	58	100.0

Table 2: Summary statistics

The table presents summary statistics for portfolio firm specifics.

	Total				Realised				Unrealised			
	N	Mean	SD	Median	N	Mean	SD	Median	N	Mean	SD	Median
Entry sales (in Mio €)	159	128.5	239.3	52.8	102	152.4	283.0	55.8	57	85.7	119.3	48.7
Exit sales (in Mio €)	154	219.0	369.5	96.3	99	260.8	435.3	115.1	55	143.6	184.0	63.7
Entry EBITDA (in Mio €)	161	15.8	22.6	9.2	103	17.4	23.7	10.4	58	12.8	20.5	6.0
Exit EBITDA (in Mio €)	161	29.6	45.9	16.0	103	33.2	52.1	20.0	58	23.2	31.6	11.9
Entry deal EV (in Mio €)	161	129.0	210.4	59.3	103	139.0	220.2	67.8	58	111.1	192.2	33.6
Exit deal EV (in Mio €)	161	295.7	503.7	150.0	103	323.1	566.1	175.1	58	247.1	367.3	105.6
Entry EV/EBITDA multiple	161	7.3	2.3	7.0	103	7.1	2.2	7.0	58	7.6	2.5	7.6
Exit EV/EBITDA multiple	161	9.6	2.9	9.3	103	9.4	2.9	9.0	58	10.2	2.8	10.0
Entry net debt (in Mio €)	159	63.3	130.9	20.5	102	61.5	121.4	25.2	57	66.5	147.6	12.0
Exit net debt (in Mio €)	159	95.3	165.6	43.2	102	93.7	153.6	46.1	57	98.2	186.6	41.8
Entry equity value (in Mio €)	154	68.4	142.2	31.3	99	77.8	167.7	32.6	55	51.4	76.2	30.7
Exit equity value (in Mio €)	154	197.3	444.2	102.4	99	238.3	539.6	121.4	55	123.6	148.1	61.6
Holding period (in years)	161	4.7	2.3	4.3	103	5.1	2.3	4.7	58	4.0	2.3	3.6
Number of add-on acquisitions	161	5.0	9.3	2.0	103	5.7	11.0	3.0	58	3.6	5.3	2.0

Table 3: Value creation bridge calculation: An example

The table presents assumptions and the calculation of value creation effects for a fictional buyout transaction. In Panel A, we show assumptions for deal structure and company profile at entry and exit of the buyout and the relevant figures during the holding period for platform company and add-on acquisitions. . In Panel B and C, we present the calculation of the add-on sourcing effect (as "simple" growth rate) based on the "multiple adjustment" and "EBITDA adjustment", respectively. In Panel D, we show the CAGRs of the different value creation levers and their contribution. In Panel E, we show the calculation of the "price adjusted" exit valuation and the ensuing CAGRs of the different value creation levers.

Panel A: Actual values				
No. Position	Entry (in Mio €)	During holding period (in Mio €)	Exit (in Mio €)	Calculation
Platform company				
(01) EBITDA	20		50	
(02) EV	150		450	
(03) EV/EBITDA multiple	7.5x		9.0x	(02) / (01)
(04) Net debt	80		150	
(05) Equity value	70		300	(02) – (04)
(06) Equity share	~46.7%		~66.7%	(05) / (02)
Add-on acquisitions				
(07) EBITDA		25		
(08) EV		120		
(09) EV/EBITDA multiple		4.8x		(08) / (07)
(10) Holding period (in years)		5.0		

Panel B: Add-on sourcing effect ("multiple adjustment")			
	Adjusted entry (in Mio €)	During holding period (in Mio €)	Calculation
(11) EV/EBITDA multiple (comb – "multiple adjustment")	6.0x		[(02) at entry + (08)] / [(01) at entry + (07)]
(12) Add-on sourcing effect (growth rate)	25.0%		(03) at entry / (11) – 1

Panel C: Add-on sourcing effect ("EBITDA adjustment")			
	Entry (in Mio €)	During holding period (in Mio €)	Calculation
EBITDA composition			
(13) "True" organic EBITDA		5	(01) at exit – (01) at entry – (07)
(14) "True" inorganic EBITDA		16	(08) / (03) at entry
(15) Add-on sourcing effect EBITDA		9	(07) – (14)
(16) Add-on sourcing effect (growth rate)	25.0%		[(01) at entry + (14) + (15)] / [(01) at entry + (14)] – 1

Table 3: Value creation bridge calculation: An example (continued)

Panel D: Value creation composition				
	Value (CAGR)	Share (in % of (26))	Share (in % of (26))	Calculation
(17) EBITDA CAGR (w/o adjustment for the add-on sourcing effect)	~20.1%	~63.0%		[(01) at exit / (01) at entry] ^ [1 / (10)] – 1
(18) thereof "true" inorganic EBITDA CAGR	~12.5%		~40.4 %	{[1 + [(14) / (01) at entry]} ^ [1 / (10)] – 1
(19) thereof add-on sourcing effect CAGR	~4.6%		~15.3%	[1 + (16)] ^ [1 / (10)] – 1
(20) thereof "true" organic EBITDA CAGR	~2.1%		~7.2%	{(01) at exit / [(01) at entry + (07)]} ^ [1 / (10)] – 1
(21) EBITDA CAGR (w/ adjustment for the add-on sourcing effect)	~15.4%			{[(01) at entry + (13) + (14)] / (01) at entry} ^ [1 / (10)] – 1
(22) EV/EBITDA multiple CAGR (w/o adjustment for the add-on sourcing effect	~3.7%	~12.5%		[(03) at exit / (03) at entry] ^ [1 / (10)] – 1
(23) EV/EBITDA multiple CAGR (w/ adjustment for the add-on sourcing effect)	~8.4%			[(03) at exit / (11)] ^ [1 / (10)] – 1
(24) EV CAGR	~24.6%			[(02) at exit / (02) at entry] ^ [1 / (10)] – 1
(25) Equity share CAGR	~7.4%	~24.5%		[(06) at exit / (06) at entry] ^ [1 / (10)] – 1
(26) Equity value CAGR	~33.8%			[(05) at exit / (05) at entry] ^ [1 / (10)] – 1

Panel E: Exit valuation and value creation composition (based on "price adjusted" EBITDA)			
	Value (CAGR)	Exit (in Mio €)	Calculation
Exit valuation (based on "price adjusted" EBITDA)			
(27) EBITDA adjusted		41	(01) at entry + (13) + (14)
(28) EV adjusted		369	(27) * (03) at exit
(29) Equity value adjusted		219	(28) – (04) at exit
(30) Equity share adjusted		~59.3%	(29) / (28)
Value creation composition (based on "price adjusted" EBITDA)			
(31) EV CAGR adjusted	~19.7%		[(28) / (02) at entry] ^ [1 / (10)] – 1
(32) Equity share CAGR adjusted	~4.9%		[(30) / (06) at entry] ^ [1 / (10)] – 1
(33) Equity value CAGR adjusted	~25.6%		[(29) / (05) at entry] ^ [1 / (10)] – 1

Table 4: Existence and direction of add-on sourcing effect

The table provides summary statistics for the existence and direction of the add-on sourcing effect, measured as EV/EBITDA multiple CAGR from buyout entry to exit. We report mean and median significance tests. The difference in means is estimated by a paired t-test (t) for means. The difference in medians is estimated by a nonparametric Wilcoxon signed-rank test (z) for unreported medians. We report t-values for the difference in mean tests and z-values for the differences in median tests. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Non-B&B	B&B	Difference test
	(1)	(2)	(2)-(1)
Realised and unrealised (all) buyouts			
Mean	0.000	0.023	6.798 ***
Median	0.000	0.012	6.169 ***
N	161	161	
Realised (r) buyouts			
Mean	0.000	0.022	5.163 ***
Median	0.000	0.012	4.835 ***
N	103	103	

Table 5: Difference tests B&B vs. non-B&B

The table provides summary statistics for the performance of B&B vs. matched non-B&B buyouts. The Panels A to G describe differences in EV/EBITDA multiple CAGRs, EBITDA CAGRs, sales CAGRs, EBITDA margin CAGRs, EV CAGRs, equity share CAGRs and equity value CAGRs. Note that we show the performance of B&B buyouts w/o and w/ adjustment for the add-on sourcing effect (Panel A and B). We report mean and median significance tests. The difference in means is estimated by a paired t-test (t) for means, the difference in medians by a nonparametric Wilcoxon signed-rank test (z) for unreported medians. We report t-values for the difference in mean tests and z-values for the differences in median tests. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: EV/EBITDA multiple CAGR								
	Non-B&B (nearest peer)	Non-B&B (median of five nearest peers)	B&B (w/o adj. for the add-on sourcing effect)	B&B (w/ adj. for the add-on sourcing effect)	Difference tests			
	(1)	(2)	(3)	(4)	(3)-(1)	(3)-(2)	(4)-(1)	(4)-(2)
Realised and unrealised (all) buyouts, size matching								
Mean	0.445	0.424	0.664	0.824	2.557 **	3.493 ***	4.302 ***	5.713 ***
Median	0.408	0.335	0.493	0.648	2.537 **	2.983 ***	4.780 ***	5.956 ***
N	160	160	160	160				
Realised (r) buyouts, size matching								
Mean	0.387	0.368	0.608	0. 752	2.150 ***	2.987 **	3.384 ***	4.450 ***
Median	0.421	0.317	0.437	0.535	2.065 **	1.527	3.256 ***	4.498 ***
N	102	102	102	102				
Realised and unrealised (all) buyouts, size-year matching								
Mean	0.627	0.633	0.664	0.824	0.403	0.389	2.128 **	2.368 ***
Median	0.497	0.540	0.499	0.649	0.876	0.621	2.671 **	2.750 ***
N	127	127	127	127				
Panel B: EBITDA CAGR								
	Non-B&B (nearest peer)	Non-B&B (median of five nearest peers)	B&B (w/o adj. for the add-on sourcing effect)	B&B (w/ adj. for the add-on sourcing effect)	Difference tests			
	(1)	(2)	(3)	(4)	(3)-(1)	(3)-(2)	(4)-(1)	(4)-(2)
Realised and unrealised (all) buyouts, size matching								
Mean	0.135	0.116	0.223	0.189	4.122 ***	4.789 ***	2.284 **	3.159 ***
Median	0.092	0.091	0.155	0.127	4.176 ***	5.024 ***	2.642 ***	3.307 ***
N	160	160	160	160				
Realised (r) buyouts, size matching								
Mean	0.110	0.096	0.185	0.150	3.964 ***	5.079 ***	1.709 *	2.651 ***
Median	0.081	0.082	0.132	0.117	3.854 ***	4.638 ***	2.696 ***	3.186 ***
N	102	102	102	102				
Realised and unrealised (all) buyouts, size-year matching								
Mean	0.109	0.118	0.226	0.197	4.690 ***	4.332 ***	3.626 ***	3.300 ***
Median	0.080	0.099	0.163	0.131	5.022 ***	4.290 ***	3.838 ***	2.988 ***
N	127	127	127	127				

Table 5: Difference tests B&B vs. non-B&B (continued)

Panel C: Sales CAGR					
	Non-B&B (nearest peer)	Non-B&B (median of five nearest peers)	B&B	Difference tests	
	(1)	(2)	(3)	(3)-(1)	(3)-(2)
Realised and unrealised (all) buyouts, size matching					
Mean	0.112	0.101	0.205	4.245 ***	4.874 ***
Median	0.095	0.086	0.138	4.731 ***	5.682 ***
N	152	152	152		
Realised (r) buyouts, size matching					
Mean	0.097	0.088	0.165	3.898 ***	4.967 ***
Median	0.086	0.078	0.127	3.854 ***	4.616 ***
N	98	98	98		
Mean	0.094	0.103	0.202	4.768 ***	4.440 ***
Median	0.077	0.084	0.134	4.900 ***	4.572 ***
N	118	118	118		
Panel D: EBITDA margin CAGR					
	Non-B&B (nearest peer)	Non-B&B (median of five nearest peers)	B&B	Difference tests	
	(1)	(2)	(3)	(3)-(1)	(3)-(2)
Realised and unrealised (all) buyouts, size matching					
Mean	0.002	0.001	0.001	-0.478	-0.168
Median	0.000	0.000	0.000	-1.111	-0.949
N	152	152	152		
Realised (r) buyouts, size matching					
Mean	0.001	0.001	0.002	0.308	0.396
Median	0.000	0.000	0.000	-0.516	-0.360
N	98	98	98		
Realised and unrealised (all) buyouts, size-year matching					
Mean	-0.002	-0.001	0.002	1.645	1.411
Median	-0.002	-0.001	0.000	0.718	0.616
N	118	118	118		

Table 5: Difference tests B&B vs. non-B&B (continued)

Panel E: EV CAGR					
	Non-B&B (nearest peer)	Non-B&B (median of five nearest peers)	B&B	Difference tests	
	(1)	(2)	(3)	(3)-(1)	(3)-(2)
Realised and unrealised (all) buyouts, size matching					
Mean	0.198	0.202	0.344	4.487 ***	4.449 ***
Median	0.149	0.153	0.242	4.806 ***	4.511 ***
N	160	160	160		
Realised (r) buyouts, size matching					
Mean	0.170	0.171	0.286	4.593 ***	4.975 ***
Median	0.146	0.145	0.193	4.134 ***	4.188 ***
N	102	102	102		
Realised and unrealised (all) buyouts, size-year matching					
Mean	0.120	0.214	0.340	4.283 ***	3.992 ***
Median	0.137	0.151	0.280	4.882 ***	4.004 ***
N	127	127	127		
Panel F: Equity share CAGR					
	Non-B&B (nearest peer)	Non-B&B (median of five nearest peers)	B&B	Difference tests	
	(1)	(2)	(3)	(3)-(1)	(3)-(2)
Realised and unrealised (all) buyouts, size matching					
Mean	0.117	0.083	0.065	-2.872 ***	-1.262
Median	0.090	0.072	0.038	-3.740 ***	-2.937 ***
N	150	150	150		
Realised (r) buyouts, size matching					
Mean	0.121	0.079	0.092	-1.320	0.727
Median	0.098	0.068	0.053	-2.383 **	-1.162
N	96	96	96		
Realised and unrealised (all) buyouts, size-year matching					
Mean	0.117	0.083	0.028	-1.019	-0.685
Median	0.063	0.062	0.048	-1.430	-1.066
N	116	116	116		

Table 5: Difference tests B&B vs. non-B&B (continued)

Panel G: Equity value CAGR					
	Non-B&B (nearest peer)	Non-B&B (median of five nearest peers)	B&B	Difference tests	
	(1)	(2)	(3)	(3)-(1)	(3)-(2)
Realised and unrealised (all) buyouts, size matching					
Mean	0.334	0.326	0.411	2.492 **	3.014 ***
Median	0.236	0.249	0.295	2.494 **	2.453 **
N	150	150	150		
Realised (r) buyouts, size matching					
Mean	0.309	0.270	0.410	2.975 ***	4.505 ***
Median	0.233	0.228	0.295	3.033 ***	4.239 ***
N	96	96	96		
Realised and unrealised (all) buyouts, size-year matching					
Mean	0.300	0.303	0.421	3.720 ***	3.194 ***
Median	0.204	0.211	0.321	3.675 ***	3.518 ***
N	116	116	116		

Table 6: Difference tests B&B ("price adjusted" EBITDA) vs. non-B&B

The table provides summary statistics for the performance of B&B buyouts ("price adjusted" EBITDA) vs. their non-B&B control peers. Panel A to C describe differences in EV CAGRs, equity share CAGRs and equity value CAGRs. We report mean and median significance tests. The difference in means is estimated by a paired t-test (t) for means, the difference in medians by a nonparametric Wilcoxon signed-rank test (z) for unreported medians. We report t-values for the difference in mean tests and z-values for the differences in median tests. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: EV CAGR					
	Non-B&B (nearest peer)	Non-B&B (median of five nearest peers)	B&B adjusted	Difference tests	
	(1)	(2)	(3)	(3)-(1)	(3)-(2)
Realised and unrealised (all) buyouts, size matching					
Mean	0.198	0.202	0.309	3.181 ***	3.130 ***
Median	0.149	0.153	0.204	3.443 ***	2.850 ***
N	160	160	160		
Realised (r) buyouts, size matching					
Mean	0.170	0.171	0.248	2.791 ***	3.003 ***
Median	0.146	0.145	0.181	3.166 ***	2.969 ***
N	102	102	102		
Realised and unrealised (all) buyouts, size-year matching					
Mean	0.120	0.214	0.309	3.340 ***	3.152 ***
Median	0.137	0.151	0.228	3.390 ***	3.027 ***
N	127	127	127		
Panel B: Equity share CAGR					
	Non-B&B (nearest peer)	Non-B&B (median of five nearest peers)	B&B adjusted	Difference tests	
	(1)	(2)	(3)	(3)-(1)	(3)-(2)
Realised and unrealised (all) buyouts, size matching					
Mean	0.117	0.083	0.028	-4.429 ***	-3.517 ***
Median	0.090	0.072	0.015	-4.868 ***	-4.408 ***
N	150	150	150		
Realised (r) buyouts, size matching					
Mean	0.121	0.079	0.055	-2.778 ***	-1.358
Median	0.098	0.068	0.037	-3.439 ***	-2.759 ***
N	96	96	96		
Realised and unrealised (all) buyouts, size-year matching					
Mean	0.117	0.083	0.031	-2.532 **	-2.486 **
Median	0.063	0.062	0.029	-2.477 **	-2.422 **
N	116	116	116		

Table 6: Difference tests B&B ("price adjusted" EBITDA) vs. non-B&B (continued)

Panel C: Equity value CAGR					
	Non-B&B (nearest peer)	Non-B&B (median of five nearest peers)	B&B adjusted	Difference tests	
	(1)	(2)	(3)	(3)-(1)	(3)-(2)
Realised and unrealised (all) buyouts, size matching					
Mean	0.334	0.326	0.335	0.014	0.392
Median	0.236	0.249	0.276	0.213	0.080
N	150	150	150		
Realised (r) buyouts, size matching					
Mean	0.309	0.270	0.336	0.751	2.187 **
Median	0.233	0.228	0.273	1.235	2.375 **
N	96	96	96		
Realised and unrealised (all) buyouts, size-year matching					
Mean	0.300	0.303	0.349	1.327	1.463
Median	0.204	0.211	0.284	2.006 **	1.529
N	116	116	116		

Table 7: Regression analysis on add-on sourcing effect and B&B outperformance

The table presents results of linear OLS regressions. The dependent variable is the excess equity value CAGR (w/o adjustment for the add-on sourcing effect), calculated as the difference in equity value CAGRs between B&B and the median of matched non-B&B peers. Fixed effects include the platform's country and ff10 industry, as well as the transaction year. Sponsor effects include the PE inception year, which acts as a proxy for a PE firm's experience and philosophy, and indicator variables for buyout size (i.e. small-cap, lower mid-cap and upper mid-cap), cross-border office, which acts as a proxy for a PE firm's regional coverage, and a late buyout dummy. Standard errors are clustered at the portfolio firm level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Size matching			
	Dependent variable: Excess equity value CAGR		
	(1)	(2)	(3)
Excess EBITDA CAGR (w/ adjustment for the add-on sourcing effect)	1.192 ***	1.301 ***	1.154 ***
	(0.170)	(0.221)	(0.206)
Add-on sourcing effect CAGR	1.785 ***	1.845 ***	2.217 ***
	(0.441)	(0.556)	(0.599)
Excess EV/EBITDA multiple CAGR (w/o adjustment for the add-on sourcing effect)	1.028 ***	0.880 ***	1.042 ***
	(0.066)	(0.148)	(0.151)
Excess equity share CAGR	1.333 ***	1.085 ***	1.292 ***
	(0.132)	(0.190)	(0.145)
All fixed effects included?	Yes	Yes	No
All sponsor effects included?	Yes	Yes	No
Constant	Yes	Yes	No
Buyout sample	All	R	R
Pseudo R-square	0.91	0.93	0.81
N	150	96	96

Panel B: Size-year matching			
	Dependent variable: Excess equity value CAGR		
	(1)	(2)	(3)
Excess EBITDA CAGR (w/ adjustment for the add-on sourcing effect)	1.237 ***	1.062 ***	1.088 ***
	(0.149)	(0.154)	(0.091)
Add-on sourcing effect CAGR	1.503 ***	2.000 ***	1.767 ***
	(0.272)	(0.204)	(0.225)
Excess EV/EBITDA multiple CAGR (w/o adjustment for the add-on sourcing effect)	1.004 ***	1.019 ***	1.133 ***
	(0.068)	(0.079)	(0.054)
Excess equity share CAGR	1.184 ***	1.349 ***	1.307 ***
	(0.126)	(0.112)	(0.076)
All fixed effects included?	Yes	Yes	No
All sponsor effects included?	Yes	Yes	No
Constant	Yes	Yes	No
Buyout sample	All	R	R
Pseudo R-square	0.96	0.99	0.94
N	116	77	77

Table 8: Summary statistics of regression determinants

The table presents summary statistics. Variables represent dependent and independent variables used in our regression analysis as of Table 9 and are defined in the Appendix (see Table A4).

Panel A: Dependent variables												
	Total				Realised				Unrealised			
	N	Mean	SD	Median	N	Mean	SD	Median	N	Mean	SD	Median
Add-on sourcing effect CAGR	161	0.02	0.04	0.01	103	0.02	0.04	0.01	58	0.02	0.04	0.01
Panel B: Independent variables												
	Total				Realised				Unrealised			
	N	Mean	SD	Median	N	Mean	SD	Median	N	Mean	SD	Median
Sourcing team dummy	161	0.06	0.23	0.00	103	0.03	0.17	0.00	58	0.10	0.31	0.00
Cross-border dummy	161	0.46	0.50	0.00	103	0.49	0.50	0.00	58	0.41	0.50	0.00
Industry diversifying dummy	161	0.11	0.31	0.00	103	0.07	0.25	0.00	58	0.17	0.38	0.00
Annual inorganic EBITDA effect	161	0.29	0.53	0.11	103	0.22	0.43	0.08	58	0.40	0.65	0.18
Add-on acquisition frequency	161	1.22	1.92	0.63	103	1.23	2.03	0.68	58	1.22	1.75	0.53

Table 9: Regression analysis on determinants of the add-on sourcing effect

The table presents results of linear OLS regressions. The dependent variable is the add-on sourcing effect CAGR (see section 4.1 or Table A4 for a definition). Fixed effects include the platform's country and ff10 industry, as well as the transaction year. Sponsor effects include the PE inception year, which acts as a proxy for a PE firm's experience and philosophy, and indicator variables for buyout size (i.e. small-cap, lower mid-cap and upper mid-cap), cross-border office, which acts as a proxy for a PE firm's regional coverage, and a late buyout dummy. Standard errors are clustered at the country level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Realised and unrealised (all) buyouts						
	Dependent variable: Add-on sourcing effect CAGR					
	(1)	(2)	(3)	(4)	(5)	(6)
Sponsor specifics						
Sourcing team dummy	0.072 ***				0.039	0.076 ***
	(0.021)				(0.028)	(0.018)
Deal complexity						
Cross-border dummy		-0.001			-0.003	-0.001
		(0.003)			(0.006)	(0.003)
Industry-diversifying dummy		0.029 ***			0.023 **	0.030 ***
		(0.008)			(0.010)	(0.008)
Deal execution						
LN (annual inorganic EBITDA effect)			0.009 **		0.008 *	
			(0.004)		(0.004)	
Add-on acquisition frequency				0.005 ***		0.005 ***
				(0.001)		(0.001)
LN (holding period)	-0.337 ***	-0.034 ***	-0.032 ***	-0.030 ***	-0.032 ***	-0.030 ***
	(0.007)	(0.007)	(0.007)	(0.006)	(0.007)	(0.005)
LN (entry EV)	-0.016 **	-0.015 *	-0.012	-0.017 **	-0.011	-0.015 **
	(0.006)	(0.007)	(0.008)	(0.006)	(0.009)	(0.007)
LN (entry multiple)	0.068 ***	0.067 ***	0.059 ***	0.068 ***	0.058 ***	0.066 ***
	(0.015)	(0.014)	(0.017)	(0.014)	(0.019)	(0.012)
All fixed effects included?	Yes	Yes	Yes	Yes	Yes	Yes
All sponsor effects included?	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-square	0.51	0.54	0.56	0.54	0.57	0.57
N	161	161	158	161	158	158

Table 9: Regression analysis on determinants of the add-on sourcing effect (continued)

Panel B: Realised (r) buyouts						
	Dependent variable: Add-on sourcing effect CAGR					
	(1)	(2)	(3)	(4)	(5)	(6)
Sponsor specifics						
Sourcing team dummy	0.057				0.030	0.063
	(0.060)				(0.066)	(0.045)
Deal complexity						
Cross-border dummy		0.005			0.001	0.004
		(0.010)			(0.010)	(0.010)
Industry-diversifying dummy		0.035 *			0.027	0.035
		(0.017)			(0.018)	(0.022)
Deal execution						
LN (annual inorganic EBITDA effect)			0.011 ***		0.010 **	
			(0.003)		(0.004)	
Add-on acquisition frequency				0.009 ***		0.010 ***
				(0.002)		(0.002)
LN (holding period)	-0.318 **	-0.035 **	-0.029 ***	-0.019 *	-0.031 ***	-0.022 *
	(0.009)	(0.014)	(0.008)	(0.010)	(0.009)	(0.011)
LN (entry EV)	-0.014 *	-0.012	-0.007 *	-0.013 **	-0.006	-0.011 **
	(0.007)	(0.007)	(0.004)	(0.004)	(0.006)	(0.004)
LN (entry multiple)	0.069 ***	0.064 ***	0.060 **	0.062 ***	0.056 **	0.056 ***
	(0.019)	(0.019)	(0.021)	(0.013)	(0.023)	(0.012)
All fixed effects included?	Yes	Yes	Yes	Yes	Yes	Yes
All sponsor effects included?	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-square	0.59	0.62	0.64	0.67	0.65	0.70
N	103	103	102	103	102	103

Table 10: Regression analysis on operating growth and buyout exit pricing

The table presents results of linear OLS regressions. In Panel A, the dependent variables are the natural logarithm of the exit EV/EBITDA multiple and the platform company's EV/EBITDA multiple CAGR. In Panel B, the dependent variable is the platform company's excess EV/EBITDA multiple CAGR. In Panel A, the omitted variable is the interaction term add-on sourcing effect CAGR x SBO dummy exit. Fixed effects include the platform's country and ff10 industry, as well as the transaction year. Sponsor effects include the PE inception year, which acts as a proxy for a PE firm's experience and philosophy, and indicator variables for buyout size (i.e. small-cap, lower mid-cap and upper mid-cap), cross-border office, which acts as a proxy for a PE firm's regional coverage, and a late buyout dummy. We additionally control for channel effects (entry and exit type). Standard errors are clustered at the country (Panel A) and portfolio firm level (Panel B) . *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: By operating growth lever

	Dependent variable: LN (exit EV/EBITDA multiple)		Dependent variable: Excess exit EV/EBITDA multiple			
			Size matching		Size-year matching	
	(1)	(2)	(3)	(4)	(5)	(6)
Inorganic EBITDA CAGR	0.010	0.097	-0.411	2.103	-0.618	-0.890
	(0.142)	(0.166)	(1.263)	(1.762)	(3.173)	(3.500)
Organic EBITDA CAGR	0.051	0.074	0.130	1.011	0.944	0.721
	(0.086)	(0.068)	(0.965)	(1.141)	(2.142)	(2.326)
Add-on sourcing effect CAGR	0.018	-0.163	0.512	-2.838	3.485	4.216
	(0.149)	(0.173)	(1.130)	(2.516)	(2.672)	(5.960)
SBO dummy entry		0.119		-0.255		0.818
		(0.140)		(1.872)		(2.499)
SBO dummy exit		0.303		4.538		-4.811
		(0.285)		(2.760)		(7.307)
SBO dummy entry x SBO dummy exit		-0.082		0.318		1.587
		(0.175)		(2.289)		(2.640)
Inorganic EBITDA CAGR x SBO dummy exit		-0.374		-5.740		4.497
		(0.402)		(3.703)		(9.444)
Organic EBITDA CAGR x SBO dummy exit		-0.277		-4.588		2.175
		(0.280)		(2.806)		(6.781)
LN (holding period)	0.003	0.094				
	(0.108)	(0.107)				
LN (entry EV)	0.085 *	0.085 **				
	(0.044)	(0.036)				
LN (entry multiple)	0.368	0.381				
	(0.342)	(0.356)				
All fixed effects included?	Yes	Yes	Yes	Yes	Yes	Yes
All sponsor effects included?	Yes	Yes	Yes	Yes	Yes	Yes
All channel effects included?	Yes	No	Yes	No	Yes	No
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-square	0.81	0.80	0.69	0.66	0.69	0.67
N	93	93	92	92	77	77

Table 10: Regression analysis on operating growth and buyout exit pricing (continued)

Panel B: By operating growth lever and equity share CAGR (assuming constant multiples at entry and exit)						
	Dependent variable: LN (exit EV/EBITDA multiple)		Dependent variable: Excess exit EV/EBITDA multiple			
			Size matching		Size-year matching	
	(1)	(2)	(3)	(4)	(5)	(6)
Inorganic EBITDA CAGR	0.008	0.022	0.020	0.161	-1.783	-1.019
	(0.118)	(0.065)	(0.895)	(1.280)	(1.343)	(2.301)
Organic EBITDA CAGR	0.010	0.002	0.184	-0.075	-0.512	0.791
	(0.114)	(0.047)	(0.961)	(1.447)	(1.869)	(2.262)
Add-on sourcing effect CAGR	-0.201	-0.162	-1.365	-0.719	1.799	5.587 *
	(0.285)	(0.169)	(1.418)	(2.073)	(3.379)	(3.140)
Equity share CAGR	-0.047	-0.022	-0.192	-0.114	-1.225	-0.404
	(0.099)	(0.036)	(0.833)	(1.17)5	(1.349)	(2.223)
SBO dummy entry		0.097		-0.306		1.377
		(0.099)		(2.024)		(2.627)
SBO dummy exit		-0.079		0.561		-0.832
		(0.311)		(2.574)		(8.355)
SBO dummy entry x SBO dummy exit		-0.065		-0.022		2.554
		(0.173)		(2.683)		(3.500)
Inorganic EBITDA CAGR x SBO dummy exit		0.059		-0.096		-0.299
		(0.275)		(2.758)		(9.726)
Organic EBITDA CAGR x SBO dummy exit		0.057		-0.657		-2.543
		(0.188)		(2.435)		(7.007)
Add-on sourcing effect CAGR x SBO dummy exit		0.355		1.879		-3.526
		(0.432)		(3.503)		(8.452)
Equity share CAGR x SBO dummy exit		0.010		0.076		-0.160
		(0.162)		(1.628)		(6.158)
LN (holding period)	-0.052	0.082				
	(0.115)	(0.107)				
LN (entry EV)	0.063	0.096				
	(0.076)	(0.062)				
LN (entry multiple)	0.493	0.354				
	(0.417)	(0.426)				
All fixed effects included?	Yes	Yes	Yes	Yes	Yes	Yes
All sponsor effects included?	Yes	Yes	Yes	Yes	Yes	Yes
All channel effects included?	Yes	No	Yes	No	Yes	No
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-square	0.83	0.80	0.69	0.64	0.70	0.69
N	91	91	90	90	76	76

Table 11: Estimators (robustness)

The table presents the average treatment effect on the treated (ATET) for propensity score matching (PSM) estimators. We use varying numbers of nearest neighbours (NN) based on a sample of 745 buyouts, thereof 161 B&B buyouts and 584 non-B&B buyouts (or 495 non-B&B buyouts with details on relevant matching variables). The dependent variables are EBITDA CAGR, EV/EBITDA multiple CAGR, EV CAGR, equity share CAGR, and equity value CAGR. Robust Abadie-Imbens standard errors are reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Panel A: w/o adjustment for the add-on sourcing effect					
	Dependent variable: EBITDA CAGR	Dependent variable: EV/EBITDA mutiple CAGR	Dependent variable: EV CAGR	Dependent variable: Equity share CAGR	Dependent variable: Equity value CAGR
	(1)	(2)	(3)	(4)	(5)
ATET with NN = 1	0.086 **	0.012	0.129 ***	-0.027	0.048
	(0.035)	(0.019)	(0.043)	(0.024)	(0.074)
ATET with NN = 2	0.095 ***	0.016	0.137 ***	-0.023	0.095 *
	(0.029)	(0.014)	(0.039)	(0.019)	(0.052)
ATET with NN = 3	0.098 ***	0.017	0.140 ***	-0.015	0.125 ***
	(0.028)	(0.013)	(0.038)	(0.017)	(0.045)
ATET with NN = 4	0.105 ***	0.023 *	0.155 ***	-0.017	0.136 ***
	(0.027)	(0.012)	(0.037)	(0.017)	(0.041)
ATET with NN = 5	0.110 ***	0.020	0.156 ***	-0.018	0.136 ***
	(0.027)	(0.012)	(0.037)	(0.017)	(0.041)
ATET with NN = 10	0.104 ***	0.024 **	0.157 ***	-0.013	0.146 ***
	(0.026)	(0.011)	(0.036)	(0.016)	(0.038)
ATET with NN = 15	0.102 ***	0.029 ***	0.159 ***	-0.013	0.141 ***
	(0.028)	(0.011)	(0.037)	(0.016)	(0.039)
ATET with NN = 25	0.096 ***	0.030 ***	0.154 ***	-0.016	0.135 ***
	(0.029)	(0.010)	(0.037)	(0.016)	(0.038)

Table 11: Estimators (robustness) (continued)

Panel B: w/ adjustment for the add-on sourcing effect		
	Dependent variable: EBITDA CAGR (w/ adjustment for the add-on sourcing effect)	Dependent variable: EV/EBITDA mutiple CAGR (w/ adjustment for the add-on sourcing effect)
	(1)	(2)
ATET with NN = 1	0.052	0.036 *
	(0.035)	(0.019)
ATET with NN = 2	0.061 **	0.040 ***
	(0.029)	(0.014)
ATET with NN = 3	0.064 **	0.041 ***
	(0.029)	(0.013)
ATET with NN = 4	0.072 **	0.047 ***
	(0.028)	(0.012)
ATET with NN = 5	0.076 ***	0.043 ***
	(0.027)	(0.012)
ATET with NN = 10	0.070 ***	0.048 ***
	(0.027)	(0.01)1
ATET with NN = 15	0.068 **	0.052 ***
	(0.028)	(0.011)
ATET with NN = 25	0.062 **	0.054 ***
	(0.030)	(0.010)

Table 11: Estimators (robustness) (continued)

Panel C: Based on "price adjusted" EBITDA			
	Dependent variable: EV CAGR adjusted	Dependent variable: Equity share CAGR adjusted	Dependent variable: Equity value CAGR adjusted
	(1)	(2)	(3)
ATET with NN = 1	0.093 **	-0.047 *	0.053
	(0.044	(0.026)	(0.068)
ATET with NN = 2	0.102 **	-0.064 ***	0.029
	(0.040)	(0.02)5	(0.067)
ATET with NN = 3	0.105 ***	-0.057 **	0.044
	(0.039)	(0.023)	(0.056)
ATET with NN = 4	0.120 ***	-0.052 **	0.051
	(0.038)	(0.021)	(0.050)
ATET with NN = 5	0.121 ***	-0.043 **	0.072
	(0.038)	(0.020)	(0.046)
ATET with NN = 10	0.121 ***	-0.047 **	0.072
	(0.037)	(0.019)	(0.044)
ATET with NN = 15	0.124 ***	-0.047 **	0.069
	(0.038)	(0.018)	(0.043)
ATET with NN = 25	0.119 ***	-0.051 ***	0.068 *
	(0.039)	(0.018)	(0.041)

Appendix A

Table A1: Add-on acquisition sample distribution

The table presents distributions of add-on acquisitions by status (realised vs. unrealised) as well as by entry (exit) year. For 104 (101) B&B buyouts, we have valuation figures (acquisition dates) per add-on, and for the remaining 57 (61) B&B buyouts only summary statistics. As a note, for unrealised deals the exit year refers to the year of the firm's latest valuation.

	Total		Realised		Unrealised	
Year	N	%	N	%	N	%
2002	1	0.5	1	0.6	0	0.0
2003	1	0.5	1	0.6	0	0.0
2004	1	0.5	1	0.6	0	0.0
2005	2	0.9	2	1.3	0	0.0
2006	9	4.2	9	5.7	0	0.0
2007	4	1.9	4	2.5	0	0.0
2008	7	3.3	7	4.5	0	0.0
2009	9	4.2	9	5.7	0	0.0
2010	9	4.2	9	5.7	0	0.0
2011	20	9.3	19	12.1	1	1.8
2012	17	7.9	14	8.9	3	5.3
2013	15	7.0	15	9.6	0	0.0
2014	24	11.2	19	12.1	5	8.8
2015	30	14.0	19	12.1	11	19.3
2016	25	11.7	14	8.9	11	19.3
2017	25	11.7	11	7.0	14	24.6
2018	9	4.2	2	1.3	7	12.3
2019	5	2.3	1	0.6	4	7.0
2020	1	0.5	0	0.0	1	1.8
Total	214	100.0	157	100.0	57	100.0

Table A2: Non-B&B sample distribution

The table presents distributions of non-B&B buyouts by status (realised vs. unrealised) as well as by entry (exit) year. As a note, for unrealised deals the exit year refers to the year of the firm's latest valuation.

	Total		Realised		Unrealised	
Year	N	%	N	%	N	%
1997	4 (0)	0.6 (0.0)	4 (0)	0.8 (0.0)	0 (0)	0.0 (0.0)
1998	13 (0)	2.2 (0.0)	13 (0)	2.8 (0.0)	0 (0)	0.0 (0.0)
1999	10 (1)	1.7 (0.1)	10 (1)	2.2 (0.2)	0 (0)	0.0 (0.0)
2000	19 (5)	3.2 (0.8)	19 (5)	4.2 (1.1)	0 (0)	0.0 (0.0)
2001	19 (4)	3.2 (0.6)	19 (4)	4.2 (0.8)	0 (0)	0.0 (0.0)
2002	26 (8)	4.4 (1.3)	26 (8)	5.7 (1.7)	0 (0)	0.0 (0.0)
2003	32 (7)	5.4 (1.1)	32 (7)	7.1 (1.5)	0 (0)	0.0 (0.0)
2004	37 (25)	6.3 (4.2)	37 (25)	8.2 (5.5)	0 (0)	0.0 (0.0)
2005	29 (20)	4.9 (3.4)	29 (20)	6.4 (4.4)	0 (0)	0.0 (0.0)
2006	40 (42)	6.8 (7.1)	39 (42)	8.6 (9.3)	1 (0)	0.7 (0.0)
2007	47 (38)	8.0 (6.5)	45 (38)	10.0 (8.4)	2 (0)	1.4 (0.0)
2008	40 (15)	6.8 (2.5)	37 (15)	8.2 (3.3)	3 (0)	2.2 (0.0)
2009	12 (10)	2.0 (1.7)	12 (10)	2.6 (2.2)	0 (0)	0.0 (0.0)
2010	32 (23)	5.4 (3.9)	28 (23)	6.2 (5.1)	4 (0)	2.9 (0.0)
2011	34 (29)	5.8 (4.9)	24 (29)	5.3 (6.4)	10 (0)	7.4 (0.0)
2012	41 (27)	7.0 (4.6)	25 (27)	5.5 (6.0)	16 (0)	11.8 (0.0)
2013	25 (33)	4.2 (5.6)	14 (32)	3.1 (7.1)	11 (1)	8.1 (0.7)
2014	28 (62)	4.7 (10.6)	14 (38)	3.1 (8.4)	14 (24)	10.3 (17.7)
2015	27 (36)	4.6 (6.1)	10 (34)	2.2 (7.5)	17 (2)	12.5 (1.4)
2016	30 (41)	5.1 (7.0)	8 (35)	1.7 (7.7)	22 (6)	16.2 (4.4)
2017	20 (44)	3.4 (7.5)	3 (23)	0.6 (5.1)	17 (21)	12.5 (15.5)
2018	19 (36)	3.2 (6.1)	1 (18)	0.2 (4.0)	18 (18)	13.3 (13.3)
2019	0 (72)	0.0 (12.3)	0 (14)	0.0 (3.1)	0 (58)	0.0 (42.9)
2020	0 (6)	0.0 (1.0)	0 (1)	0.0 (0.2)	0 (5)	0.0 (3.7)
Total	584	100.0	449	100.0	135	100.0

Table A3: Correlation matrix

The table presents correlation statistics for all independent variables used in this paper. N (buyouts) = 161 (Panel A) and 103 (Panel B).

Panel A: Realised and unrealised (all) buyouts					
	(1)	(2)	(3)	(4)	(5)
(1) Sourcing team dummy	1.000				
(2) Cross-border dummy	-0.007	1.000			
(3) Industry-diversifying dummy	-0.084	0.170	1.000		
(4) LN (annual inorganic EBITDA effect)	0.250	-0.052	0.062	1.000	
(5) Add-on acquisition frequency	0.227	-0.038	-0.077	0.480	1.000
Panel B: Realised and unrealised (all) buyouts					
	(1)	(2)	(3)	(4)	(5)
(1) Sourcing team dummy	1.000				
(2) Cross-border dummy	-0.053	1.000			
(3) Industry-diversifying dummy	-0.047	0.124	1.000		
(4) LN (annual inorganic EBITDA effect)	0.002	-0.131	0.000	1.000	
(5) Add-on acquisition frequency	-0.012	-0.109	-0.046	0.514	1.000

Table A4: Variable definitions

The table describes construction details of the variables used in our regression analysis as of Table 9.

Panel A: Dependent variables	
Variable	Definition
Add-on sourcing effect CAGR	The combined (entry) multiple of platform company and add-on acquisitions is calculated as the sum of the platform company's entry EV and the sum of EVs from add-on acquisitions, divided by the sum of the platform company's entry EBITDA and the sum of EBITDAs from add-on acquisitions. The add-on sourcing effect CAGR is then calculated as the annualised growth rate from the combined (entry) multiple to the platform company's entry multiple (i.e. uplift of the EV/EBITDA multiple following the revaluation of add-on acquisitions post-closing).
Panel B: Independent variables	
Variable	Definition
Sourcing team dummy	Indicator variable equal to one if the PE firm engages a dedicated team that supports portfolio firms in sourcing add-ons, and zero otherwise.
Cross-border dummy	Indicator variable equal to one if at least one add-on acquisition does not have the same country as origin as the platform company, and zero otherwise.
Industry-diversifying dummy	Indicator variable equal to one if at least one add-on acquisition does not have the same industry classification code (Fama and French 10 as in Table 1) as the platform company, and zero otherwise.
Annual inorganic EBITDA effect	Variable indicates the annual size increase of the platform company through add-on acquisitions (i.e. inorganic EBITDA), measured by the sum of EBITDAs from add-on acquisitions, divided by the platform company's entry EBITDA, divided by the holding period in years.
Add-on acquisition frequency	Number of add-ons per buyout, divided by the holding period in years.
Panel C: Sponsor effects variables	
Variable	Definition
PE inception year	Variables indicates the inception year of the PE firm.
Small cap	Indicator variable equal to one if the entry EV is less than 50 million Euro, and zero otherwise.
Lower mid cap	Indicator variable equal to one if the entry EV is equal to or larger than 50 million Euro and less than 200 million Euro, and zero otherwise.
Upper mid cap	Indicator variable equal to one if the entry EV is equal to or larger than 200 million Euro, and zero otherwise.
Cross-border office dummy	Indicator variable equal to one if the PE firm operates an office outside of its country of origin, and zero otherwise.
Late buyout dummy	Indicator variable equal to one if the portfolio firm is acquired in year four or later of the PE fund's lifetime, and zero otherwise.