Exit Through Exitus in Private Equity Buyouts*

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Abstract

We study the impact of PE firm and buyout characteristics on default probability employing a Cox proportional hazards model to a global sample of 5,093 PE buyouts between 1997 and 2012. Our results indicate that generalists have lower default probability, however, industry specialization of PE firms reduces default probability if stated focus and target industry match. Investments of captive PE firms and secondary buyouts are more likely to end up in default, while the opposite holds true for syndicates. In sum, our findings indicate that increasing heterogeneity within a maturing PE market goes along with increasing heterogeneity in default probabilities.

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1 Introduction

Concerns about excessive risk-taking behavior of private equity (PE) firms have existed ever since the emergence of leveraged buyouts. The majority of these concerns relate to the overwhelming use of debt (Kaplan & Stein, 1993) and potentially misleading incentive schemes (Axelson, Strömberg, & Weisbach, 2009). To address these concerns, existing research has predominantly focused on the comparison of default probabilities between PE-backed and non PE-backed firms but could not find a significantly higher default probability of PE portfolio companies (e.g. Hotchkiss, Smith, & Strömberg, 2014; Tykvová & Borell, 2012).

While the comparison between PE and non-PE-backed firms is well observed, few is known about the impact of heterogeneity within the PE market upon default probability. Exploring intra-PE heterogeneity seems important though given the increasing differentiation and segmentation in a maturing PE market. At least four trends have shaped the PE market in recent years: re-organization of PE firms around specialized industry-teams, the spinoff of many bank-captive funds in the aftermath of the Global Financial Crisis, the growth of the secondary buyout segment, and the rise of M&A activity during the holding period. These trends suggest that leverage and incentive schemes alone do not tell the whole story any more.

We study a sample of 5,093 global PE buyouts completed between 1997 and 2012 to explore the impact of these market shifts upon default[1] probability. A particular aim of our study is to disentangle PE firm and buyout heterogeneity. We therefore hand-collect data on the business model of more than 1,600 PE firms allowing us to measure the degree of specialization into specific industries, investment stages, deal size classes and world-regions and to unravel the impact of different institutional affiliations. Methodologically, we employ a Cox proportional hazards model and provide fully parametric estimations as well as random effect "frailty" models in the robustness section, too.

[1] Our definition of default covers any situation in which a PE firm is forced to surrender its equity stake to a receiver or administrator that decides on continuation or liquidation of the business. This definition is consistent with Bureau van Dijk's transaction database Zephyr. In the following, we use the terms default, receivership, insolvency and bankruptcy interchangeably.

Our results show that a higher degree of overall specialization increases default probability while a match between a PE firm's focus and the actual buyout characteristics reduces it. We also explore the particular effect of industry focus and find that industry-specialized PE firms can only reduce default probability when conducting deals in a targeted industry, but have higher default probability than generalist PE firms otherwise. The mediating effect of an industry match is even more pronounced in boom years when competition for buyouts forces specialized firms to conduct deals outside their focus industries.

We document that default probabilities vary across institutional affiliations of PE firms, too. Portfolio firms of captive PE firms have higher default probability than those of independent PE firms, most likely because lack of fundraising pressure tempts captive PE firms to conduct riskier deals. An industry match can alleviate but not reverse this effect. Breaking down the institutional affiliation, we find pension fund-, diversified financial services-, and corporate/conglomerate-affiliated PE firms to have significantly higher default rates.

This study furthermore shows that several buyout characteristics affect default probability of PE portfolio companies. We find secondary (and later stage) buyouts to be more likely to default than primary buyouts, independent of the PE firm variables, interactions, and economic conditions we control for. Similarly persistent is the effect of an increasing syndicate size, which reduces default probability, too. Depending on the specification and research design, we also find lower default probabilities for buyouts with add-on acquisitions during the holding period. We cannot find a significant relationship with intermediate divestures, though.

Our work is most related to three studies. Hotchkiss et al. (2014) employ a sample of 2,151 PE and non-PE owned companies borrowing in the leveraged loan market between 1997 and 2010. They find that PE owned companies exhibit higher default rates than non-PE owned firms—once controlling for leverage, this effect disappears and even reverts at high debt levels. Furthermore, they show that firms with past PE ownership have a significantly lower bankruptcy likelihood than non-PE owned firms. The results do not indicate that dividend recapitalizations increase default probability. The study finally shows that a recent buyout entry (proxy for dry powder) and fundraising success are associated with lower default probability.

Tykvová and Borell (2012) employ a sample of 1,842 European buyouts conducted between 2000 and 2008 and a matched control group of non-buyout companies. They document that PE firms select targets which are less likely to get financially distressed. However, financial distress risk is found to get back to levels of non-buyout companies until three years post-LBO. Tykvová and Borell (2012) furthermore show that buyout targets do not exhibit higher bankruptcy rates than non-buyout companies—this even holds true in times of favourable financing conditions at entry. They find experienced PE sponsors to significantly reduce default probability.

The work of Strömberg (2008) is partly related to our study, too. Strömberg (2008) touches upon the topic of PE default probability when investigating a sample of more than 21,000 LBOs between 1970 and 2007. The results indicate that distressed investments, deals completed by listed PE funds as well as US and UK buyouts exhibit a significantly higher default likelihood, while divisional buyouts are significantly less likely to go bankrupt.

In contrast to these existing studies, we focus on the impact of heterogeneity within the PE market and not on differences between PE and non-PE default probabilities. This allows us to disentangle the average PE default probabilities that existing research has measured so far. Our results clearly indicate that competitive forces and changes in the PE business model lead to a great variety in PE default probabilities. Knowing about this variety is important for portfolio companies, investors and the general public when judging about the impact of PE financing. The biggest contribution of our study is therefore the change in perspective: away from the question of whether PE ownership in general increases or decreases default probability (which is well examined meanwhile) towards the question of what particular PE owner does so.

We proceed as follows: In section 2, we discuss theory related to our main variables. We continue with an introduction to our data set and the discussion of descriptive and univariate statistics in section 3. In section 4, we discuss the model and multivariate findings. Section 5 contains several robustness checks. Section 6 concludes.

2 Theory

2.1 Impact of PE Firm Characteristics

2.1.1 Specialist vs. Generalist PE Firms

We classify private equity firms into two categories depending on the narrowness of their investment focus: (1) specialized PE firms, which dedicate their attention to smaller investment niches, and (2) generalist PE firms, which tend to look at most available investment opportunities in the market. Important dimensions of a PE firm's investment focus are, for example, stage, industry, geography, or size.

Existing literature mainly provides empirical evidence on positive aspects of investment firm specialization. Several studies show that focused PE firms are able to build up specific expertise, which helps them in selecting high-quality targets and effectively monitoring them (e.g., Manigart et al., 2002; Norton & Tenenbaum, 1993; Scellato & Ughetto, 2013). Industry specialization reduces information asymmetries between PE firms on the one hand and target companies and their stakeholders on the other hand, resulting in higher post-buyout operating profitability (Cressy, Munari, & Malipiero, 2007). Gompers, Kovner, Lerner, and Scharfstein (2008) show that industry specialization of Venture Capital (VC) firms is also positively related to the funds' responsiveness to favourable investment market conditions. Gompers, Kovner, and Lerner (2009) find that generalist funds, in contrast to specialists, are inefficient at allocating capital across industries and weak in picking good targets within industries. Fulghieri and Sevilir (2009) theoretically show that it is optimal for VC firms to build a large portfolio and focus on related technologies under conditions of high uncertainty (i.e. higher likelihood of failure). Accordingly, we might observe lower default rates for specialized investors.[2]

At times, however, attractive target companies might not be available in certain industries or regions. A non-diversified PE firm might therefore be forced to pursue unfavourable oppor-

[2] Note, however, that the positive effects of specialization could also apply to large generalist PE firms which employ specialized industry and/or regional teams (Gompers et al., 2009, p. 821). One prominent example of such a PE firm is KKR, which maintains, for example, a dedicated healthcare, industrials and consumer industry practice group in several world regions. We explore the particular effect of generalists with such operational teams in section 5.

tunities within its focus area or reach out to non-familiar sectors or investment size classes. Closely related to this is what we define as *match* between the investment focus area of a PE firm and deal characteristics of a specific transaction.[3] The lower the conformity between both, the higher is the likelihood of a PE firm operating outside of its "comfort zone". In short, generalist PE firms can be expected to show lower default rates versus specialized firms.

2.1.2 PE Firm Affiliation

Apart from the classical independent partnership model (e.g. Permira), PE firms are organized as listed companies (e.g. Blackstone), funds captive to banks (e.g. Goldman Sachs Capital Partners), corporations (e.g. GE Capital), or public institutions/governments (e.g. Temasek).[4]

Independent PE firms are subject to the so-called "grandstanding phenomenon" (Gompers, 1996), which forces them to build up an investment track record and reputational capital for future fundraisings (Manigart et al., 2002). In contrast to that, captive PE firms can rely on financing from their parents, which often act as exclusive supplier of capital (Barry, 1994). Bottazzi, Da Rin, and Hellmann (2008) show that independent PE firms are more involved in their portfolio companies than their captive or government-affiliated counterparts. Cotter and Peck (2001) find that the involvement of "buyout specialists"[5] leads to significantly lower leverage levels and subsequently a lower default likelihood. Bank-affiliation is associated with competing arguments regarding default risk: while the aim to establish future lending relationships might benefit target companies in terms of attractive pricing conditions (Hellmann, Lindsey, & Puri, 2008), equity investments are also shown to be pro-cyclical and thus more

[3] Cf. Cumming, Fleming, and Schwienbacher (2009) who phrase the concept of "style drifts" in PE investing, which are defined as deviations from stated investment stage preferences. Although generally unappreciated by limited partners, style drifts are found to be more common for experienced investors (lower reputational costs in case of failure compared to younger funds) and even increase the likelihood of a successful exit as they are only conducted if targets have higher expected returns.

[4] Non-exhaustive list; further affiliations may include other financial services companies like insurances or pension funds, family offices, endowment funds, etc.

[5] In the context of the paper defined as classical PE firms, which are marked off against other buyout investors like managements, corporations, or insurance companies.

prone to end up in financial distress (Fang, Ivashina, & Lerner, 2013). Instead of focusing on financial returns, corporate-captive PE firms look for strategic overlaps between parent and target business (Gompers, 2002; Siegel, Siegel, & MacMillan, 1988). Pension- or insurance-captive PE firms might favour stable, later-stage investments (Mayer, Schoors, & Yafeh, 2005), while government-captive PE firms might presumably try to promote employment (Leleux & Surlemont, 2003). Having these variations in objectives, capabilities, financial and reputational capital in mind, one might expect differences in default rates across categories of PE firm affiliations. We expect independent and listed PE firms to perform best in consequence of the scrutiny of limited partners and public markets.

2.2 Impact of Buyout Characteristics

2.2.1 Secondary Buyouts

Strömberg (2008) analyzes the impact of different entry channels on bankruptcy likelihood and reports a positive, yet insignificant coefficient for secondary buyouts.[6] Secondary buyouts are driven by the availability of debt financing (Wang, 2012), and hence often have relatively high levels of leverage, which can lead to enhanced entry valuations and overpayment (Achleitner & Figge, 2014; Axelson, Jenkinson, Strömberg, & Weisbach, 2013). Bonini (in press) argues that there is no operating value creation in SBOs, but increased default risk because of financial engineering and higher dividend payouts. Arcot, Fluck, Gaspar, and Hege (in press) show that exit and investment pressure of selling and buying PE firms lead to increased secondary buyout activity. Pressured buyers are found to invest at higher valuations, syndicate less likely and finance their deals with less debt. These findings suggests that PE firms intend to deploy equity capital rather than maximizing returns.

Degeorge, Martin, and Phalippou (2014) also find that SBOs underperform when entered under pressure—else, SBO performance is similar or even better (in case seller and buyer have

[6] The bankruptcy likelihood of distressed (divisional) buyouts is found to be significantly higher (lower).

complementary skills). Adding to the strand of literature with positive findings, Alperovych, Amess, and Wright (2013) show that there are efficiency improvements in secondary buyouts, however less than in private and divisional buyouts. Achleitner and Figge (2014) only find little or no evidence that returns and operating value creation are worse in higher round buyouts.

Although existing literature reveals a multi-layered and partly contradicting picture of the attractiveness of these deals, we conjecture SBOs and higher round buyouts to more likely end up in default than primary buyouts due to increased leverage, potentially lower operating value creation and/or the selection of less attractive targets arising from investment pressure.

2.2.2 Syndication

Syndicated buyouts put different requirements on co-investors and target companies than stand-alone investments. A priori, the directional impact of syndication on default exits is ambiguous.

Positive aspects of syndication include the exchange of opinions and mutual control between co-investors (Casamatta & Haritchabalet, 2007; Cumming & Walz, 2010), which can have a positive impact on target selection and post-investment value creation. Furthermore, complementary skills and information can lead to more effective monitoring of the target company and therefore investment success (Brander, Amit, & Antweiler, 2002). Tykvová and Borell (2012) argue that syndicate members might be more willing and capable to inject further capital into distressed portfolio companies than stand-alone investors. Strömberg (2008) shows that syndication has a positive impact on the likelihood of an IPO exit or sale to a strategic or financial buyer, while there is no significant relation with bankruptcy outcomes. In brief, syndicated buyouts could have lower default rates than non-syndicated buyouts.

Negative aspects of syndication include the free-riding problem, which leads to a reduction in the activity level of (non-lead) syndicate members (Bottazzi et al., 2008). Meuleman, Wright, Manigart, and Lockett (2009) and Wright and Lockett (2003), for example, outline that asymmetric information inherent to syndication leads to complications in cooperation as well as delayed decision-making and thus higher transaction costs. Moreover, the aim to diversify risk could lead to adverse target selection of syndicates (Filatotchev, Wright, & Arberk, 2006;

Lerner, 1994). Following these arguments, syndicates could be less able to avoid default than stand-alone investors.

2.2.3 Intermediate Add-On and Divestiture Activity

Add-on acquisitions represent an important inorganic value creation lever for PE investments (Nikoskelainen & Wright, 2007). Acharya, Gottschalg, Hahn, and Kehoe (2013), for example, show that deals with M&A activity during the holding period exhibit above-average margin improvement. Such profitability improvement is likely to translate into lower default probability.

By way of contrast, add-on acquisitions could also cause increased debt levels, problems in post-merger integration and distract management attention as result of a too aggressively pursued buy-and-build strategy. Consequently, add-on activity might lead to higher default rates.

Two competing views apply to the impact of divestitures on default, too. On the one hand, the "corporate raider" line of thought suggests that divestitures serve as a means of refocusing a firm on its core activities by selling unproductive assets (Easterwood, Seth, & Singer, 1989; Seth & Easterwood, 1993). Furthermore, divestitures might increase liquidity and solvency for distressed companies. Asquith, Gertner, and Scharfstein (1994), for example, show that asset sales can help in avoiding default for companies undergoing a restructuring in case financial distress is non-systematic. On the basis of that, divestiture activity could be expected to decrease default rates.

On the other hand, Guo, Hotchkiss, and Song (2011) find that asset sales have a significantly negative impact on value creation. This effect can be even more pronounced when core assets are involved (Easterwood, 1998), severely weakening a portfolio company's ability to survive on a stand-alone basis. According to the study, firms undergoing a restructuring process might furthermore conduct divestitures under pressure (so-called "fire sales") and therefore not realize fair prices. By implication, divestiture activity should increase default rates.

3 Data

3.1 Sample Selection

We start by using Bureau van Dijk's (BvD) transaction database Zephyr[7] to construct our worldwide buyout sample consisting of 5,093 completed deals (thereof 497 ending up in default) entered between 1997 and 2010 and exited until 2012. We include all institutional buyouts (IBOs), management buyouts (MBOs), management buy-ins (MBIs), and buy-in management buyouts (BIMBOs) with deal financing marked as "leveraged buyout" or "private equity". Acquisitions of minority stakes are excluded. We only include deals for which we can identify an exit transaction in Zephyr or manually by researching press releases or other public sources in order to exclusively account for realized investments with known exit date and exit channel. Moreover, we identify intermediate add-on and divestiture transactions of the portfolio company through Zephyr.[8]

Next, we pull yearly accounting data on size, capital structure and profitability of portfolio companies from Orbis, BvD's global database on company financials, spanning the time period from 1997 to 2012. Given the private nature of the PE business, coverage is only modest though: we obtain data for around 20% of the sample. At least, this allows us to explore accounting data in the univariate analyses. We exclude accounting variables from the multivariate analyses, however, to not reduce the sample size materially and avoid selection bias to the results.

Last, we extract 1,642 distinct PE firms, which acted as stand-alone investors or part of a syndicate, from our transaction database. One of the main issues we face in the data collection are the relatively frequent name changes over time.[9] We therefore check all PE firm names manually for correctness at the respective transaction point of time and incorporate any udpates into our database if applicable. Excluding PE firms with missing or insufficient information

[7] As of October 2014, Zephyr covered more than one million transactions and rumours. Recently, the database has enjoyed increasing popularity among PE researchers, e.g., Tykvová and Borell (2012) and Wang (2012).
[8] Indirect acquisitions by the financial sponsors are checked manually on the PE firms' webpages if possible.
[9] E.g., due to takeovers by other firms, organizational changes or plain renamings.

leaves us with a final count of 1,443 individual financial sponsors in our sample. We hand-collect information on the respective foundation year, institutional affiliation as well as the stated investment focus from Bloomberg Businessweek or sponsor websites. The investment focus refers to targeted investment stages[10], industries[11], world regions, and investment sizes.[12] As to affiliation, we differentiate between independent[13], listed and several forms of captive PE firms in unprecedented detail. The latter can, for example, be grouped into bank- or insurance-captive financial sponsors, corporate- or government-affiliated PE firms. We aim at identifying the ultimate parent, which determines the respective affiliation category for captive PE firms rather than any intermediate company. The obtained data also allow us to construct more advanced variables like the PE firms' degree of specialization with regards to investment stages, industries, world-regions and investment sizes, or the aforementioned match between buyout characteristics and sponsor focus areas, which are entirely new to literature.[14]

3.2 Descriptive and Univariate Statistics

In Table 2 we provide selected descriptive statistics for the total data sample comprising 5,093 buyouts as well as the default (497 buyouts) and non-default (4,596 buyouts) sub-samples separately.

Insert Table 2 about here.

The majority of buyouts (58%) in our sample was entered in the hot phase of private equity investing from 2003 to 2007 with a sharp decline thereafter. This development is mirrored in the number of exit transactions, which are especially high in 2006 and 2007 and gain again momentum after the global financial crisis.

Insert Figure 1 about here.

[10] Venture capital, growth capital, buyouts, or distressed investments.
[11] In line with Fama and French's 17-industries standard classification scheme (FF 17).
[12] Ranging from "small" to "mega" transaction values, in accordance with the categorization of the EVCA.
[13] Classical independent partnership model with general partners (GPs) and limited partners (LPs).
[14] See Table 1 for detailed variable definitions.

As Figure 1 shows, the share of buyouts ending up in default (measured as percentage of total buyouts) is large in boom years, as to entry transactions (e.g. 1997 to 1999 and 2006 to 2008), and in crisis years, as to exit transactions (in particular 2001 and 2009).[15] This indicates that buyouts ending up in default might be subject to overpaying and distressed selling.

Insert Figure 2 about here.

Interestingly, the indexed maximum of default entries lags the indexed maximum of non-default entries, as Figure 2 reveals. From this lagged peak, we conclude that default entries culminate at a very late stage of the pre-crisis bull market. The indexed development of buyouts over time further shows that exits of non-default buyouts are less prevalent in crisis years (most obviously in 2009) which is in stark contrast to buyouts ending up in default. The median (mean) holding period in our sample is 3.58 years (3.89 years)[16]—default buyouts exhibit a significantly shorter holding period of 3.26 years (3.74 years) compared to non-default buyouts with 3.61 years (3.90 years). With regards to entry channels, there is a concentration on private-to-private (40%), divisional (33%) and financial (i.e. secondary or higher round transactions, 18%) buyouts.[17] The distributions for the default and non-default sub-sample are different with the latter having a lower share of portfolio companies bought out of bankruptcy (2% vs. 4%) and PE ownership (18% vs. 22%), while having a higher share of divisional buyouts (34% vs. 26%). 10% of total buyouts end up in default[18] while all other buyouts taken together are exited through trade sales (52%), sales to other financial sponsors (40%) and IPOs (8%). As expected, IBOs represent the largest portion of all buyouts (81%) followed by MBOs (17%). MBIs and BIMBOs play a minor role in our dataset with a 2% and 1% share of all buyouts, respectively. The default and non-default sub-sample exhibit very similar deal type distributions, although

[15] In line with Hotchkiss et al. (2014, p. 41).

[16] In accordance with the median holding periods of 42 months and 4.1 years reported by Strömberg (2008, p. 20) and Achleitner, Braun, and Engel (2011, p. 150), respectively.

[17] Similar to Strömberg (2008, p. 15).

[18] Compared to e.g. 5% reported by Hotchkiss et al. (2014, p. 41), 6% reported by Strömberg (2008, p. 4), 9% reported by Achleitner et al. (2011, p. 150) and 15% reported by Lopez-de Silanes, Phalippou, and Gottschalg (in press). These differences may exist due to differing definitions of the default status in the respective data sources.

MBIs seem to be more common for buyouts ending up in default. In terms of geography, the total sample is focused on the US (31%), Western Europe (25%) and UK (24%), which represent the world's largest buyout markets. Rather surprisingly, 39% of defaults were conducted in the UK.[19]

Insert Table 3 about here.

According to Table 3, the sample seems to be well-distributed across industries. The top 5 industries for the total sample include business services (18%), retail, machinery, wholesale, and construction materials (each 5-7%), which together make up approximately 41% of all transactions. While the non-default sub-sample shows a very similar industry distribution, buyouts ending up in default seem to be particularly present in the retail sector (16%) which might be explained by industry maturity. The median (mean) entry deal value in our sample[20] amounts to USD 96 million (USD 393 million) with no significant differences between defaults and non-defaults.

We present selected univariate findings about PE firm and buyout characteristics in the context of portfolio firm default. In Table 4, those characteristics represented by quantitative variables are compared between the default and non-default buyout group and tested for significant differences in means and medians.

Insert Table 4 about here.

Table 5 includes all other characteristics represented by categorical variables and relates them to the binary default exit status. This allows us to infer actual default rates and test for significant differences in the proportion of buyouts ending up in default between variable categories.

Insert Table 5 about here.

[19] Strömberg (2008, p. 23) finds that default rates in the US and UK are significantly higher than in other world regions, however the relative share of defaults is higher for the US vs. UK.

[20] Available for 51% of all buyouts in BvD Zephyr.

Moreover, we investigate individual PE firm and buyout characteristics with respect to portfolio firm quality and leverage at entry by employing two types of accounting variables.[21]

3.2.1 Impact of PE Firm Characteristics

We find that the average overall specialization of the invested PE firm(s) is significantly higher for defaults compared to non-defaults (at the 1% level). The same holds true for the sub-variables investment stage (significant difference at the 10% level), industry, world-region, and investment size specialization (significant difference at the 5% level). Specialist PE firms (degree of specialization at least 75%) also exhibit a significantly higher default rate than generalist PE firms (for overall and investment size specialists at the 10% and 5% level, respectively). Specialized PE firms select targets with lower EBITDA margins (relationship significantly negative depending on variable and testing method, at least 10% level). Our univariate findings thus lend support to the negative aspects of PE firm specialization. In line with the results about PE firm specialization, buyouts ending up in bankruptcy exhibit a significantly lower match between buyout characteristics and PE firm focus (at the 1% level for overall, industry, and world-region match variable).

As hypothesized with regards to PE firm captivity, there is a highly significant overall relationship between institutional affiliation and default outcome (at the 1% level).[22] Independent, listed and insurance-affiliated PE firms show below-average default rates, the difference to other categories being significant only for independent PE firms (at the 10% level after adjusting significance levels for multiple comparisons). All other PE firms show above-average default rates, whereas differences are only significant for pension fund-, diversified financial services-, and corporate/conglomerate-affiliated PE firms (all at the 1% level). There are no significant differences across affiliation categories with regards to asset quality at entry.

[21] Results available upon request. We use EBITDA margin as asset quality proxy and the gearing ratio to account for debt levels. All data are industry-standardized and winsorized at the 1%-level.

[22] Note that the default rate analysis of our affiliation variable is only conducted for non-syndicated buyouts and syndicated buyouts in which all co-invested PE firms exhibit the same affiliation to ensure mutually exclusive observations.

PE sponsors of buyouts ending up in default show significantly higher distress focus compared to non-default buyouts (at the 1% level). Analogously, distress focused PE firms exhibit significantly higher default rates than non-distress focused PE firms (at the 1% level). Distress focused PE firms select targets with significantly lower EBITDA margins at entry (at the 10% level). Differentiating between companies bought out of bankruptcy and buyouts with other entry channels does not change the results for the distress focus variable.

As expected, PE firm experience, measured as median (mean) sponsor age at transaction entry, is significantly larger (at the 1% level) for non-defaults with 12.0 years (13.3 years) compared to defaults with 10.0 years (11.8 years). Our alternative experience variables provide a less clear picture—industry and entry channel experience do not show major differences, whereas country experience is also significantly larger for the non-default buyout group (at the 1% level). Industry-, entry channel-, and country-experienced PE firms invest in targets with significantly higher EBITDA margins at entry (all at the 5% level).

While PE firm size (proxied by membership of the PEI Top 50 Index) does not have a substantial effect on the bankruptcy outcome, it seems logical that default rates for well-performing PE firms (proxied by membership of HEC-DowJones Ranking) are significantly lower compared to less successful sponsors (at the 1% level). Both PEI 50- and HEC-DowJones-affiliated PE firms choose targets with significantly higher EBITDA margins at entry (at the 1% and 5% level, respectively).

3.2.2 Impact of Buyout Characteristics

With regards to the buyout round variable[23], we find a significantly lower default rate for primary buyouts (PBOs) compared to secondary and higher round buyouts. PBOs also feature the lowest gearing ratio at entry compared to secondary or higher round buyouts (at the 1% level), implying that leverage is more important when a portfolio company already went through

[23] Note that the sum of secondary and higher round buyouts exactly matches the number of buyouts with financial entry channel, i.e. the buyout round and entry channel variable can be used interchangeably in this context.

PE ownership before, which might also increase the likelihood of going bankrupt.

Buyouts ending up in default are executed by a significantly lower number of investors compared to non-default buyouts (at the 5% level). Furthermore, syndicated buyouts (i.e. with at least two co-investors) show a significantly lower default rate than non-syndicated buyouts (at the 10% level). There is a highly significant positive relationship between the number of investors and the EBITDA margin at entry of the respective target (at the 1% level). Our univariate observations underline the theoretical advantages of syndication in buyout transactions.

The average number of intermediate add-on acquisitions is 0.4 for defaults and 0.6 for non-defaults (with the difference being significant at the 1% level). Add-on active buyouts (with at least one add-on acquisition) also exhibit a significantly lower default rate than buyouts without any add-on acquisition (at the 1% level). Therefore, the benefits of add-on activity seem to outweigh potential drawbacks. The level of divestiture activity does not have a significant impact on the default outcome.

4 Methodology and Results

4.1 Model Specification

We employ a proportional hazards model to formally address the impact of buyout and PE firm characteristics upon portfolio firm default. Hazard models have proven to be accurate in default prediction (Shumway, 2001) and take into account differences in duration, contrary to regression models with a binary dependent variable. While hazard models have been frequently used in the economics literature (e.g. Kiefer, 1988), they have entered the private equity (e.g. Hotchkiss et al., 2014; Mehran & Peristiani, 2010) and venture capital (e.g. Hellmann & Puri, 2000, 2002) literature in recent years, too.

Estimating the multiplicative impact of a vector of time-invariant covariates, we can specify the proportional hazards model as follows:

$$\lambda(t, X_i) = \lambda_0(t) exp(\beta' X_i). \tag{4.1}$$

Cox (1972) suggests a partial likelihood estimator of the form

$$L(\beta) = \prod_{i=1}^{k} \left[\frac{exp(\beta' X_i)}{\sum_{j \in R_i} exp(\beta' X_j)} \right] \tag{4.2}$$

with k ordered failure times. This can be thought of as a conditional probability of portfolio firm i leaving the risk-pool R_i at time t_i conditional on having survived up to this time. The model leaves the baseline hazard $\lambda_0(t)$ unspecified and is thus semi-parametric. The major advantage of this semi-parametric nature rests on its flexibility as it does not require ex ante assumptions about the functional form of the baseline hazard.

For selecting model variables, we conduct a number of non-parametric and semi-parametric tests in advance. We test for equality of survival distributions applying log-rank and Wilcoxon tests to all categorical variables.[24] In case of quantitative variables, we run a single-predictor Cox regression. We include variables with p-values below 0.1.[25] Other variables are only included if important for control purposes.

We are mainly interested in the impact of six variables: PE firm specific variables indicating whether the PE firm is an *Overall Specialist* or *Industry Specialist*, whether the PE firm's focus matches the actual buyout characteristic (*Overall Match* or *Industry Match*) and whether the PE firm is *Captive* in terms of its affiliation; we are also interested in buyout specific variables including a secondary (and higher round) buyout indicator (*Financial Entry Channel*), as well as variables measuring the degree of M&A activity (*No. of Add-Ons* or *No. of Divestitures*) and syndicate size (*No. of Investors*).[26]

We add selected control variables that are consistent with existing literature. In terms of PE Firm characteristics, we control for the PE firm's reputation, proxied by the PE firm's capital under management (*PEI 50 Sponsor*), prior deal performance (*HEC DJ Sponsor*), deal

[24] To ensure that the proportionality assumption of the model holds, we also look upon Kaplan-Meier survival curves stratified by categorical variables. By this, we can informally check that survivor functions are parallel across sample subgroups.
[25] Results available upon request.
[26] See Table 1 for exact definitions.

experience (*Industry Experience*) and *Distress Focus* similar to Tykvová and Borell (2012) and Hotchkiss et al. (2014). For all specifications we include the *Log Deal Value* to control for the portfolio firm's size (Nikoskelainen & Wright, 2007). In terms of economic factors, we follow Axelson et al. (2013) and include a high yield spread measure (*OAS*) from BofA Merrill Lynch to account for debt market conditions at entry. Our model contains controls for overall market performance (*MSCI Growth*), *Industry Sales Growth*, and *Tobin's Q* similar to Hotchkiss et al. (2014). All economic control variables are measured with respect to the entry date of the buyout. In all specifications, we model heterogeneity by including industry and country fixed effects.[27] All models base on a robust measure of variance following Lin and Wei (1989).[28]

4.2 Results and Discussion

4.2.1 Impact of PE Firm Characteristics

Table 6 reports ten different model specifications with controls selectively added to the model. At first, we are interested in the variables *Specialist* and *Match*, both being analyzed in the context of PE defaults for the first time. To use as much information as possible, we initially insert them to the model in the *Overall* version of *Specialist* and *Match* that takes into account investment stage, industry, world-region, and investment size. We later on relax this approach and insert these variables as *Industry Specialist* and *Industry Match*.

Insert Table 6 about here.

[27] The latter is especially important to control for default schemes in different legal systems. Model designs with industry and country fixed effects have been used by several other studies before, for example by Axelson et al. (2013).

[28] We ensure the validity of all presented models by a number of diagnostics. We perform a link test for model specification (Pregibon, 1980) looking for an insignificant coefficient of a squared linear covariate added to the model. To address the key assumption of a proportional impact of the covariates upon the hazard function, we regress the scaled Schoenfeld residuals on time (Grambsch & Therneau, 1994). The slope coefficient of this line should not be significantly different from zero if the proportionality assumption holds. Respective p-values are reported in the regression tables; all specifications pass the diagnostics. We finally assess the model's goodness-of-fit using estimates of the Cox-Snell residuals. If the model fits the data well, the cumulative hazard of these residuals should roughly equal a 45°-line. The test results suggest a good model fit (see Figure 3 for an exemplary model fit of specification 1 of Table 6).

The results draw a nuanced picture: while the *Overall Match* variable suggests a significantly reduced default probability, the opposite holds true for the *Overall Specialist* indicator. Of these two, the sign and magnitude of the *Overall Match* coefficient is intuitive right away. It seems plausible that a PE firm can exert its expertise best the more its stated focus matches the portfolio firm's characteristics and that such a match translates into a significantly lower default probability. The persistence of this finding across all specifications also suggests that more of a match is always better, e.g. even holding a PE firm's experience or capital under management constant, a higher match still reduces default probability.

More surprising, at least at first glance, is the sign and coefficient of the *Overall Specialist* indicator since existing literature associates the degree of specialization with mostly positive aspects (e.g., Cressy et al., 2007; Gompers et al., 2008). Our results show that specialization on a stand-alone basis leads to higher default probability. We believe that this finding is less surprising than it may seem, however, when taking into account that specialization comes at the expense of a smaller market for suitable targets. In other words, the more specialized a PE firm is, the tougher it may be to find a match to the focus areas. We therefore suspect that the *Match* variable mediates the relationship between specialization and default probability and is thus crucial for how specialization takes effect.

To explore the mediating effect of the *Match* variable, we interact it with *Specialist*. We do so on both the *Overall* and *Industry* level, but can only find a significant relationship for the interaction between *Industry Match* and *Industry Specialist* (see Table 7). The selective existence of a mediating effect on the industry level suggests that *Match* itself is not equally important to all of our chosen areas of specialization (investment stage, industry, world-region, and investment size). For *Industry Specialization* it statistically matters though: the coefficient of the interaction term *Industry Specialist* x *Industry Match* is negative and significant while the single *Industry Specialist* indicator is positive and significant. These results show that a PE firm's specialization can indeed reduce default probability, but only if the PE firm finds suitable targets in one of its preferred industries.

Insert Table 7 about here.

A priori, we expect the mediating effect of an *Industry Match* to be stronger in periods in which it is more difficult to find suitable targets in the preferred industry, especially because most PE firms focus on the same few mature industries. We therefore re-run the regressions of Table 7 for the "boom" period 2005-2007 (not reported) and indeed find that the coefficient of the interaction term is even more negative and statistically more significant. The stronger effect in liquid years suggests that the "money chasing deals phenomenon" (Gompers & Lerner, 2000) puts very specialized firms at a disadvantage.

Table 7 reports related effects for the third variable of interest, the *Captive* dummy. The positive and significant coefficient of the stand-alone *Captive* indicator suggests that portfolio firms of captive PE firms are more likely to default than those of independent ones in case the sponsoring PE firm does not focus on the portfolio firm's industry. In contrast to the previous effects for specialization, interacting *Captive* with *Industry Match* can alleviate but not reverse this effect, e.g. even in case the sponsoring PE firm focuses on the portfolio firm's industry, investments of captive PE firms have still slightly higher default probability.[29] We believe the lack of a "grandstanding phenomenon" (Gompers, 1996) is the most likely explanation for a higher default probability of captive PE firms in case of a missing *Industry Match*. Downside protection through a parent's financial resources may tempt captive PE firms to conduct riskier deals than independent PE firms that strongly rely on financing from the next fundraising cycle. A missing *Industry Match* may fuel this effect as investments outside the focused industry connote investments outside the expertise that GPs market to LPs. Since such deals most likely have an adverse effect on future fundraising in case of failure, independent PE firms may want to make sure that deals in non-focused industries are "home runs" without unreasonable risk; a concern, that captive PE firms do not have to bother about.

Finally, Table 7 reveals that an *Industry Match* also mediates the relationship between *Distress Focus* and default probability. This finding indicates that focus on distressed assets is

[29] Note that Table 7 reports the regression coefficients but not the hazard ratios. The difference in default probabilities is apparent from the exponential expression of the coefficients, e.g. exp(0.924-0.888) yields a hazard ratio of 1.04 which coincides with a 4% higher default probability of captive PE firms in case of a 100% *Industry Match*.

more effective if it is accompanied by an *Industry Match*, while it cannot significantly reduce default probability alone.

4.2.2 Impact of Buyout Characteristics

Examining the impact of buyout characteristics on default probability, we are firstly interested in the effect of the *Financial Entry Channel* indicator. For all of the ten model specifications in Table 6, the coefficient is statistically significant and positive indicating a higher default probability for higher round buyouts. The persistence of this finding suggests that none of the PE firm characteristics we selectively control for can alleviate this effect, e.g. not even the size or performance of the sponsoring PE firm. While our study is the first to reveal that SBOs increase default probability, this result is indeed not surprising. Our univariate results show that higher round buyouts use higher amounts of leverage, consistent with the findings of Wang (2012), Axelson et al. (2013) and Achleitner and Figge (2014). This higher leverage seems to translate into a higher default probability.

To detect any mediating PE firm characteristics, we also interact *Financial Entry Channel* with *PEI 50 Sponsor*, *HEC DJ Sponsor*, *No. of Investors*, *Captive* and both the *Industry* and *Overall Specialist* and *Match* variables (not reported). We cannot find any statistically significant interaction though, while the *Financial Entry Channel* variable itself remains similar in magnitude and significance. Thus, the results rather suggest a generally higher default probability for SBOs.

Another persistent effect in our results is the significantly reduced default probability of syndicated buyouts. This lends support to the prevalence of positive aspects of syndication, such as informational advantages (Casamatta & Haritchabalet, 2007), the increased skill set (Brander et al., 2002) and the availability of additional resources (Tykvová & Borell, 2012). Note that the syndication variable did not enter the regression as a plain dummy but as a quantitative variable that measures the *No. of Investors*. This allows us to explicitly address the concern that transaction costs and free-riding incentives reduce the effectiveness of syndicates. Since both transaction costs and free-riding incentives should, all else equal, increase with the

number of investors, we would expect the default probability to increase with the number of investors, too. Our results suggest the opposite effect though. We hereby add to the findings of Tykvová and Borell (2012), who could not find such a relationship in a multivariate setting for a European sample. Due to our model design with country-fixed effects, however, we can ensure that our results are not simply driven by non-European buyouts or other country-effects but hold true across different buyout markets.

We finally investigate the impact of holding period M&A activity on default probability. Depending on the specification, buyouts with add-on acquisitions exhibit lower default probability, which is in line with the operating synergy motive for buy-and-build strategies. We cannot find evidence for a systematic relationship between default probability and divestitures. In any case, our findings rule out concerns about a persistent weakening of portfolio companies through M&A activity.

4.2.3 Impact of Control Variables

We control for macro-economic and industry-specific factors in some specifications of our main models. In Tables 6 and 7, we find a higher option-adjusted high yield spread to reduce default probability. The effect is significant at the 1% level over all model specifications. As Axelson et al. (2013) shows, the availability of cheap debt is a major driver for the leverage chosen in PE transactions. Hence, the straightforward interpretation of our results is that low risk premia on corporate debt increase PE-owned firm's bankruptcy exposure via higher leverage ratios at entry. We also find portfolio firms in growing industries to have reduced default probability. Growing industries are unusual for classic LBOs but might attract PE firms seeking for operational improvement and buy-and-build strategies. Financial engineering and the use of high debt amounts might therefore play a minor role in these industries, which is likely to translate into lower default probabilities.

5 Robustness

5.1 Baseline Hazard Restriction

The semi-parametric nature of the Cox proportional hazards model is advantageous and disadvantageous at the same time. While it avoids misleading assumptions about the shape of the baseline hazard, the use of a partial likelihood estimator comes at the expense of lost efficiency compared to a parametric model with full maximum likelihood estimation. We therefore re-estimate our main models in Table 8 using a Weibull, and Gompertz specification. Our results remain similar and are thus robust to a restriction of the baseline hazard.

Insert Table 8 about here.

5.2 Right Truncation

As most PE studies, our data is subject to right truncation. That is, we only add deals to the sample where we observe the PE exit up to the year 2012, potentially causing bias towards short durations of those deals entered immediately before 2012. We re-estimate our main models for the sample period 1997 to 2004 in Table 9 to address this concern. For this sample period, we observe exits for 87 percent of all entries available in BvD Zephyr so that bias towards short durations should be comparatively small. Our main findings remain similar. The only coefficient that is sensitive to this robustness check is *Overall Specialist*. A negative coefficient of this variable for the years 1997 to 2004, which exclude the "boom" years 2005-2007, indicates that specialization itself might not always lead to higher default probability. It complements the findings from section 4 by showing that the competition for suitable targets in boom years most likely drives the significantly positive relationship between *Overall Specialist* and default probability for the overall sample.

Insert Table 9 about here.

5.3 Modelling Unobserved Heterogeneity

In chapter 4, we modelled heterogeneity by including industry and country fixed effects, e.g. we assumed that all firms in the sample share the same baseline hazard while covariate effects are heterogenous across industries and countries. An alternative way of modelling heterogeneity is to assume that the baseline hazard itself varies across industries and countries by introducing a random parameter to the baseline hazard. This group specific random effect is also called shared frailty. In Table 10, we model shared frailty for different Fama and French industry classifications and country levels. Our results turn out to be insensitive to a random effect estimation.

Insert Table 10 about here.

5.4 Missing Values

While the data set contains in total 5,093 buyouts, our research design reduces the number of observations to less than half of the sample size mainly due to the inclusion of *Log Deal Value* and a listwise deletion procedure. The reduction of the sample size through missing values of *Log Deal Value* might reduce efficiency and raise concerns about biased estimates. We are able to explore this concern through an imputation of *Log Deal Value* and re-estimation of our main models on the imputed data set. The single imputation of *Log Deal Value* allows us to increase the number of observations to around 80 percent of the total sample.[30]

The effectiveness of a deal value imputation depends on the reason for missing values. Existing research has mostly assumed that deal values are not missing at random (MNAR), e.g. that they depend on unobserved values of the deal value itself (e.g. Arcot et al., in press; Strömberg, 2008). In this case, a selection model works best for imputation. Arcot et al. (in press) and Strömberg (2008) therefore run a Heckman (1979) model where the first stage selection equation estimates the probability for deal value observation and the second stage equation regresses

[30] Estimating our main models for the total sample of 5,093 buyouts would require imputation of several PE firm variables, too. We are therefore only imputing *Log Deal Value* here.

the deal value on a set of explanatory variables controlling for the obtained probabilities. The parameter estimates can then be used to predict the deal values for missing cases.

A second missing data mechanism may apply, too, if deal values are said to be missing at random (MAR), e.g. if explanatory variables in the data set can explain deal value missingness. This might be a fairly reasonable assumption for our sample since the size, focus and reputation of a PE firm are likely to determine whether deal values are disclosed or can be accessed by database providers. For example, deal values might be more frequently observed for global, large and reputable PE firms due to the public and industry attention they receive. In case of MAR, a simulation-based multiple imputation treatment is more appropriate (see Kofman and Sharpe (2003) and Rubin (1996) for a more detailed discussion). Multiple imputation uses an imputation model to create several complete-case data sets, for which parameter estimates are individually obtained and then pooled.

In Table 11, we present re-estimations of our main models for both imputation methods where specifications 1-3 contain *Log Deal Values* imputed on the basis of linear multiple imputation inference and specifications 4-6 on the basis of a Heckman (1979) selection model. The variables we use for the imputation and selection model are mostly similar to Arcot et al. (in press) and Strömberg (2008). To explore whether our data set contains additional auxiliary variables that explain deal value missingness, we construct a missing deal value indicator and correlate this indicator with all PE firm variables in the sample.[31] We find that generalist PE firms, as well as reputable and multinational PE firms exhibit comparatively high correlation with deal value observability and therefore add these variables to the imputation and selection model.[32]

Insert Table 11 about here.

Table 11 shows that, independent of the imputation method we use, our main results remain similar and mostly gain in efficiency. Thus, missing values might increase standard errors in

[31] Results available upon request.

[32] For the imputation model, we also add a failure indicator and the Nelson-Aalen estimates of the cumulative hazard function following White and Royston (2009).

our main models but do not cause bias. The largest efficiency gain is obvious for *No. of Add-Ons*, which is now strongly significant across all specifications. The sign and magnitude of the coefficient is fairly similar though, as for all other variables, too.

5.5 Alternative Explanations

To explore whether there are alternative explanations for our results, we provide two additional robustness checks in this section. A first concern might relate to bias through deals that are distressed already at entry, since we only control for secondary buyouts in our main models but not for other entry channels. We therefore exclude all buyouts from the sample where a PE sponsor acquires the portfolio firm out of bankruptcy or liquidation and re-estimate our main models. However, our results are not sensitive to these exclusions.[33]

A second concern might relate to the way we distinguish between generalist and specialist PE firms. Our definition bases on the number of industries, world regions, deal size classes and stages a PE firm focuses on. This definition might fail to capture that some large generalists perhaps have similar degree of specialization than very focused PE firms due to specialized industry or market teams. This might especially apply to the biggest multinational firms, that sometimes employ more experts in a specific industry or segment than specialist PE firms. We cannot precisely measure how many distinct experts a PE firm has, but at least we are able to collect information on the existence of so-called in-house "operations teams"[34] for the 120 most active PE firms in our sample. It is reasonable to assume that generalists with such "operations teams" have a similar or even higher degree of specialization than focused PE firms. We therefore exclude deals sponsored by such generalists and re-estimate our results. Although this costs us about 26 percent of our sample size, the results are virtually the same,[35] which suggests that a stricter measurement of degree of specialization does not change our results.

[33] Results available upon request.

[34] "Operations teams" consist of professionals with strong experience or expertise in a particular sector or PE segment. We obtain this data from the official homepages of the PE firms and from expert opinions.

[35] Results available upon request.

6 Conclusion

Several existing studies have shown that public concerns about higher default probabilities of PE investments might be exaggerated (e.g. Hotchkiss et al., 2014; Tykvová & Borell, 2012). This study takes the next step, disentangling the average PE effect on default probability to account for the increasing segmentation and maturity of the PE industry. Our findings suggest that this step is important because competitive forces and heterogeneity in the PE business model lead to great variety in default probabilities of portfolio companies.

We analyze the impact of PE firm-specific factors, such as specialization and affiliation, as well as deal related factors, like secondary investing, syndicate size and intermediate M&A activity on PE default rates. Drawing upon 497 defaults within a global sample of 5,093 PE deals, we derive the following results: First, we find that investments of generalist PE firms exhibit lower default probability. However, industry specialization can lead to reduced bankruptcy likelihood as long as there is a match between the PE firm's stated sector focus and the portfolio firm's industry. This finding is especially relevant for specialized PE firms, which might be forced to operate outside their "comfort zone" in boom phases with stiff competition for targets. Captive PE firms show significantly higher default rates compared to independent firms. Second, with respect to deal related factors, we find secondary buyouts to have higher default rates, while syndicated deals show a lower likelihood of ending up in bankruptcy. Deals in growing industries and employing add-on acquisitions during the holding period turn out to have lower likelihood of bankruptcy, too. Finally, our results suggest that investments entered in "boom" phases with cheap debt financing available (measured by high yield spread) generally face significantly higher default rates. Our findings are robust to parametric and random-effect estimation, as well as to right truncation and several alternative explanations.

When judging the overall attractiveness of PE investments, it is important to note that default rates do not reveal the complete picture. It is still possible that higher default probabilities are accompanied by higher returns. Future research should therefore address the impact of intra-PE heterogeneity on deal and fund returns. This is important to explore risk and return efficiency of different PE segments and sponsor types.

Table 1: Variable Definitions and Sources

Dependent Variable	**Definition**
Default Status	Dummy variable set to one if buyout ends up in default, zero otherwise. Source: BvD Zephyr
Independent Variables	**Definition**
PE Firm Variables	
Overall Specialization	Average of investment stage, industry, world-region and investment size specialization (see below). Variable only calculated if at least two sub-specialization variables available. Source: Bloomberg, Reuters
Overall Specialist	Dummy variable set to one if above specialization score is equal to or larger than 75% (Specialist), zero otherwise (Generalist). Source: Bloomberg, Reuters
Investment Stage Specialization	Variable indicating the degree of investment stage specialization (ranging from 0% to 100%) of the invested PE firm(s). Calculated as follows: (1 - (# stated investment stage concentrations/# total investment stage concentrations))/((# total investment stage concentrations - 1)/# total investment stage concentrations). Average calculation applied to syndicates. Source: Bloomberg, Reuters
Investment Stage Specialist	Dummy variable set to one if above specialization score is equal to or larger than 75% (Specialist), zero otherwise (Generalist). Source: Bloomberg, Reuters
Industry Specialization	Variable indicating the degree of industry specialization (ranging from 0% to 100%) of the invested PE firm(s). Calculated as follows: (1 - (# stated industry concentrations/# total industry concentrations))/((# total industry concentrations - 1)/# total industry concentrations). Average calculation applied to syndicates. Source: Bloomberg, Reuters
Industry Specialist	Dummy variable set to one if above specialization score is equal to or larger than 75% (Specialist), zero otherwise (Generalist). Source: Bloomberg, Reuters
World-Region Specialization	Variable indicating the degree of world-region specialization (ranging from 0% to 100%) of the invested PE firm(s). Calculated as follows: (1 - (# stated world-region concentrations/# total world-region concentrations))/((# total world-region concentrations - 1)/# total world-region concentrations). Average calculation applied to syndicates. Source: Bloomberg, Reuters
World-Region Specialist	Dummy variable set to one if above specialization score is equal to or larger than 75% (Specialist), zero otherwise (Generalist). Source: Bloomberg, Reuters
Investment Size Specialization	Variable indicating the degree of investment size specialization (ranging from 0% to 100%) of the invested PE firm(s). Calculated as follows: (1 - (# stated investment size concentrations/# total investment size concentrations))/((# total investment size concentrations - 1)/# total investment size concentrations). Average calculation applied to syndicates. Source: Bloomberg, Reuters
Investment Size Specialist	Dummy variable set to one if above specialization score is equal to or larger than 75% (Specialist), zero otherwise (Generalist). Source: Bloomberg, Reuters
Overall Match	Average of industry, world-region and investment size match (see below). Variable only calculated if at least two sub-match variables available. Source: BvD Zephyr, Bloomberg, Reuters

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Independent Variables	Definition
Overall Matched	Dummy variable set to one if above match score is equal to or larger than 50%, zero otherwise. Source: BvD Zephyr, Bloomberg, Reuters
Industry Match	Variable indicating the match between target firm industry and stated industry focus of PE firm(s). Set to 100% if there is a match, 0% otherwise. Average calculation applied to syndicates. Source: BvD Zephyr, Bloomberg, Reuters
Industry Matched	Dummy variable set to one if Industry Match is 100% for non-syndicated buyouts or if at least one PE firm in a syndicated buyout has an Industry Match of 100%, zero otherwise. Source: BvD Zephyr, Bloomberg, Reuters
World-Region Match	Variable indicating the match between target firm world-region and stated world-region focus of PE firm(s). Set to 100% if there is a match, 0% otherwise. Average calculation applied to syndicates. Source: BvD Zephyr, Bloomberg, Reuters
World-Region Matched	Dummy variable set to one if World-Region Match is 100% for non-syndicated buyouts or if at least one PE firm in a syndicated buyout has a World-Region Match of 100%, zero otherwise. Source: BvD Zephyr, Bloomberg, Reuters
Investment Size Match	Variable indicating the match between deal size and stated investment size focus of PE firm(s). Set to 100% if there is a match, 0% otherwise. Average calculation applied to syndicates. Source: BvD Zephyr, Bloomberg, Reuters
Investment Size Matched	Dummy variable set to one if Investment Size Match is 100% for non-syndicated buyouts or if at least one PE firm in a syndicated buyout has an Investment Size Match of 100%, zero otherwise. Source: BvD Zephyr, Bloomberg, Reuters
Institutional Affiliation	Categorical variable indicating institutional affiliation of invested PE firm(s) (independent, listed, bank, insurance, pension fund, diversified financial services, government/public, family office, corporate/conglomerate). Only used for non-syndicated buyouts and syndicated buyouts with consistent institutional affiliation category of all invested PE firms. Source: Bloomberg, Reuters
Captive	Dummy variable set to one if institutional affiliation of invested PE firm(s) is not categorized as independent or listed, zero otherwise. Only used for non-syndicated buyouts and syndicated buyouts with consistent dummy outcome for all invested PE firms. Source: Bloomberg, Reuters
PE Firm Age	Number of years between foundation date of PE firm and transaction entry date. Average calculation applied to syndicates. Source: BvD Zephyr, Bloomberg, Reuters
Overall Experience	Number of deals conducted by invested PE firm(s) before buyout date divided by total number of deals in sample before buyout date. Source: BvD Zephyr
Industry Experience	Number of deals in same FF17 industry conducted by invested PE firm(s) before buyout date divided by total number of deals in same FF17 in sample before buyout date. Source: BvD Zephyr
Entry Channel Experience	Number of deals with same entry channel conducted by invested PE firm(s) before buyout date divided by total number of deals with same entry channel in sample before buyout date. Source: BvD Zephyr
Country Experience	Number of deals in same country conducted by invested PE firm(s) before buyout date divided by total number of deals in same country in sample before buyout date. Source: BvD Zephyr
Distress Focus	Indicating the percentage of invested PE firm(s) with distressed investing focus. Source: Bloomberg, Reuters

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Independent Variables	Definition
Distress Focused	Dummy variable set to one if at least one PE firm has a distressed investing focus. Source: Bloomberg, Reuters
PEI 50 Sponsor	Dummy variable set to one if at least one PE firm is ranked within the Private Equity International (PEI) Top 50 Index in the buyout year, zero otherwise. The PEI 50 Index lists the world's 50 largest PE firms (based on capital raised). Source: BvD Zephyr, Private Equity International
HEC-DJ Sponsor	Dummy variable set to one if at least one PE firm is ranked within the HEC-DowJones Ranking, zero otherwise. The HEC-DowJones Ranking lists the world's 20 most successful PE firms (based on performance from 1998-2007). Source: BvD Zephyr, HEC-DowJones
Buyout Variables	
Holding Period	Holding period (measured in years) equal to time period between buyout entry and exit date. Source: BvD Zephyr
Entry Channel	Categorical variable indicating entry channel of respective buyout transaction (Private-to-Private, Divisional, Financial, Public-to-Private, Receivership, Privatization). Source: BvD Zephyr
Financial Entry Channel	Dummy variable set to one if entry channel of respective buyout categorized as financial (i.e. secondary or higher round buyout), zero otherwise. Source: BvD Zephyr
World-Region	Categorical variable indicating world-region of respective buyout transaction (Asia, Oceania, Africa & Middle East, Western Europe, Eastern Europe, UK, North America [excl. US], US, Latin America). Source: BvD Zephyr
Deal Value	Deal Value in USDm. Source: BvD Zephyr
Log Deal Value	Natural logarithm of Deal Value. Source: BvD Zephyr
Buyout Round	Categorical variable indicating round of respective buyout transaction (Primary Buyout [PBO], Secondary Buyout [SBO], Tertiary Buyout [TBO], Quaternary Buyout [QBO]). Source: BvD Zephyr
Deal Type	Categorical variable indicating deal type of respective buyout transaction (Institutional Buyout [IBO], Management Buyout [MBO], Management Buy-In [MBI], Buy-In Management Buyout [BIMBO]). Source: BvD Zephyr
No. of Investors	Number of co-investing PE firms. Source: BvD Zephyr
Syndicated	Dummy variable set to one if number of investors is at least 2, zero otherwise. Source: BvD Zephyr
No. of Add-Ons	Number of add-ons conducted during holding period. Source: BvD Zephyr
Add-On Active	Dummy variable set to one if number of add-ons conducted during holding period is at least one, zero otherwise. Source: BvD Zephyr
No. of Divestitures	Number of divestitures conducted during holding period. Source: BvD Zephyr
Divestiture Active	Dummy variable set to one if number of divestitures conducted during holding period is at least one, zero otherwise. Source: BvD Zephyr

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Independent Variables	Definition
Target Firm Accounting Variables	
EBITDA Margin	EBITDA/operating revenue. Industry-standardized and winsorized at the 1%-level. Source: BvD Orbis
Gearing	(Non-current liabilities + loans)/sharerholders' funds. Industry-standardized and winsorized at the 1%-level. Source: BvD Orbis
Economic Control Variables	
OAS	Option-adjusted high yield spread at buyout entry (monthly basis) indicating overall debt market condition. Source: BofA Merrill Lynch Global Research, used with permission
MSCI Growth	Growth of MSCI World index at buyout entry (yearly basis). Source: Datastream
Industry Sales Growth	Sales growth in buyout year for respective target firm industry. Source: Datastream
Tobin's Q	Tobin's Q (Asset Market Value/Asset Replacement Costs) at buyout entry (yearly basis) for respective target firm industry. Source: Datastream

This table presents the definitions and sources of the dependent and independent variables used within the univariate and multivariate analyses.

Table 2: Sample Distribution Along Various Dimensions

PANEL A: Distribution of Buyouts by Entry and Exit Year

Total Sample						Defaults						Non-Defaults					
Entry Year	**N**	**%**	**Exit Year**	**N**	**%**	**Entry Year**	**N**	**%**	**Exit Year**	**N**	**%**	**Entry Year**	**N**	**%**	**Exit Year**	**N**	**%**
1997	127	2.5%	1997	-	-	1997	17	3.4%	1997	-	-	1997	110	2.4%	1997	-	-
1998	236	4.6%	1998	7	0.1%	1998	29	5.8%	1998	-	-	1998	207	4.5%	1998	7	0.2%
1999	333	6.5%	1999	43	0.8%	1999	38	7.6%	1999	2	0.4%	1999	295	6.4%	1999	41	0.9%
2000	354	7.0%	2000	86	1.7%	2000	22	4.4%	2000	6	1.2%	2000	332	7.2%	2000	80	1.7%
2001	337	6.6%	2001	104	2.0%	2001	19	3.8%	2001	24	4.8%	2001	318	6.9%	2001	80	1.7%
2002	338	6.6%	2002	125	2.5%	2002	17	3.4%	2002	15	3.0%	2002	321	7.0%	2002	110	2.4%
2003	494	9.7%	2003	179	3.5%	2003	27	5.4%	2003	20	4.0%	2003	467	10.2%	2003	159	3.5%
2004	594	11.7%	2004	322	6.3%	2004	45	9.1%	2004	15	3.0%	2004	549	11.9%	2004	307	6.7%
2005	691	13.6%	2005	457	9.0%	2005	65	13.1%	2005	19	3.8%	2005	626	13.6%	2005	438	9.5%
2006	638	12.5%	2006	572	11.2%	2006	65	13.1%	2006	16	3.2%	2006	573	12.5%	2006	556	12.1%
2007	555	10.9%	2007	697	13.7%	2007	101	20.3%	2007	36	7.2%	2007	454	9.9%	2007	661	14.4%
2008	231	4.5%	2008	501	9.8%	2008	39	7.8%	2008	65	13.1%	2008	192	4.2%	2008	436	9.5%
2009	110	2.2%	2009	358	7.0%	2009	7	1.4%	2009	125	25.2%	2009	103	2.2%	2009	233	5.1%
2010	55	1.1%	2010	521	10.2%	2010	6	1.2%	2010	72	14.5%	2010	49	1.1%	2010	449	9.8%
2011	-	-	2011	610	12.0%	2011	-	-	2011	58	11.7%	2011	-	-	2011	552	12.0%
2012	-	-	2012	511	10.0%	2012	-	-	2012	24	4.8%	2012	-	-	2012	487	10.6%
Total	**5,093**	**100.0%**		**5,093**	**100.0%**	**Total**	**497**	**100.0%**		**497**	**100.0%**	**Total**	**4,596**	**100.0%**		**4,596**	**100.0%**

PANEL B: Distribution of Buyouts by Entry and Exit Channel

Total Sample						Defaults						Non-Defaults					
Entry Channel	**N**	**%**	**Exit Channel**	**N**	**%**	**Entry Channel**	**N**	**%**	**Exit Channel**	**N**	**%**	**Entry Channel**	**N**	**%**	**Exit Channel**	**N**	**%**
Private-to-private	2,013	39.5%	Trade Sale	2,386	46.8%	Private-to-private	199	40.0%	Default	497	100.0%	Private-to-private	1,814	39.5%	Trade Sale	2,386	51.9%
Divisional	1,686	33.1%	Financial	1,830	35.9%	Divisional	131	26.4%				Divisional	1,555	33.8%	Financial	1,830	39.8%
Financial	926	18.2%	Default	497	9.8%	Financial	110	22.1%				Financial	816	17.8%	IPO	380	8.3%
Public-to-private	338	6.6%	IPO	380	7.5%	Public-to-private	33	6.6%				Public-to-private	305	6.6%			
Default	112	2.2%				Default	22	4.4%				Default	90	2.0%			
Privatization	18	0.4%				Privatization	2	0.4%				Privatization	16	0.3%			
Total	**5,093**	**100.0%**		**5,093**	**100.0%**	**Total**	**497**	**100.0%**		**497**	**100.0%**	**Total**	**4,596**	**100.0%**		**4,596**	**100.0%**

PANEL C: Distribution of Buyouts by Deal Type and World-Region

Total Sample						Defaults						Non-Defaults					
Deal Type	**N**	**%**	**Top 5 World-Regions**	**N**	**%**	**Deal Type**	**N**	**%**	**Top 5 World-Regions**	**N**	**%**	**Deal Type**	**N**	**%**	**Top 5 World-Regions**	**N**	**%**
IBO	4,113	80.8%	US	1,586	31.1%	IBO	389	78.3%	UK	192	38.6%	IBO	3,724	81.0%	US	1,445	31.4%
MBO	848	16.7%	Western Europe	1,295	25.4%	MBO	78	15.7%	US	141	28.4%	MBO	770	16.8%	Western Europe	1,183	25.7%
MBI	108	2.1%	UK	1,240	24.3%	MBI	25	5.0%	Western Europe	112	22.5%	MBI	83	1.8%	UK	1,048	22.8%
BIMBO	24	0.5%	Northern Europe	317	6.2%	BIMBO	5	1.0%	Northern Europe	19	3.8%	BIMBO	19	0.4%	Northern Europe	298	6.5%
			Southern Europe	265	5.2%				Southern Europe	12	2.4%				Southern Europe	253	5.5%
			RoW	390	7.7%				RoW	21	4.2%				RoW	369	8.0%
Total	**5,093**	**100.0%**		**5,093**	**100.0%**	**Total**	**497**	**100.0%**		**497**	**100.0%**	**Total**	**4,596**	**100.0%**		**4,596**	**100.0%**

This table presents the distribution of the total buyout sample as well as the default and non-default sub-sample by entry and exit year (PANEL A), entry and exit channel (PANEL B) as well as by deal type and world-region (PANEL C).

Table 3: Sample Distribution by Industry

	Total Sample		Defaults		Non-Defaults	
Fama French 48 Industries	**N**	**%**	**N**	**%**	**N**	**%**
Agriculture	20	0.4%	1	0.2%	19	0.4%
Food Products	177	3.5%	14	2.8%	163	3.5%
Candy & Soda	44	0.9%	-	-	44	1.0%
Beer & Liquor	17	0.3%	1	0.2%	16	0.3%
Tobacco Products	-	-	-	-	-	-
Recreation	63	1.2%	15	3.0%	48	1.0%
Entertainment	89	1.7%	10	2.0%	79	1.7%
Printing and Publishing	98	1.9%	12	2.4%	86	1.9%
Consumer Goods	160	3.1%	25	5.0%	135	2.9%
Apparel	71	1.4%	9	1.8%	62	1.3%
Healthcare	109	2.1%	8	1.6%	101	2.2%
Medical Equipment	67	1.3%	1	0.2%	66	1.4%
Pharmaceutical Products	56	1.1%	2	0.4%	54	1.2%
Chemicals	142	2.8%	6	1.2%	136	3.0%
Rubber and Plastic Products	139	2.7%	19	3.8%	120	2.6%
Textiles	37	0.7%	8	1.6%	29	0.6%
Construction Materials	258	5.1%	30	6.0%	228	5.0%
Construction	81	1.6%	14	2.8%	67	1.5%
Steel Works Etc	65	1.3%	9	1.8%	56	1.2%
Fabricated Products	25	0.5%	6	1.2%	19	0.4%
Machinery	315	6.2%	19	3.8%	296	6.4%
Electrical Equipment	90	1.8%	2	0.4%	88	1.9%
Automobiles and Trucks	146	2.9%	29	5.8%	117	2.5%
Aircraft	37	0.7%	4	0.8%	33	0.7%
Shipbuilding, Railroad Equipment	14	0.3%	1	0.2%	13	0.3%
Defense	3	0.1%	-	-	3	0.1%
Precious Metals	-	-	-	-	-	-
Non-Metallic and Industrial Metal Mining	6	0.1%	-	-	6	0.1%
Coal	3	0.1%	-	-	3	0.1%
Petroleum and Natural Gas	43	0.8%	2	0.4%	41	0.9%
Utilities	42	0.8%	-	-	42	0.9%
Communication	123	2.4%	7	1.4%	116	2.5%
Personal Services	165	3.2%	10	2.0%	155	3.4%
Business Services	911	17.9%	59	11.9%	852	18.5%
Computers	43	0.8%	3	0.6%	40	0.9%
Electronic Equipment	108	2.1%	5	1.0%	103	2.2%
Measuring and Control Equipment	69	1.4%	2	0.4%	67	1.5%
Business Supplies	87	1.7%	14	2.8%	73	1.6%
Shipping Containers	20	0.4%	-	-	20	0.4%
Transportation	179	3.5%	17	3.4%	162	3.5%
Wholesale	291	5.7%	24	4.8%	267	5.8%
Retail	332	6.5%	78	15.7%	254	5.5%
Restaurants, Hotels, Motels	118	2.3%	17	3.4%	101	2.2%
Banking	55	1.1%	6	1.2%	49	1.1%
Insurance	54	1.1%	-	-	54	1.2%
Real Estate	24	0.5%	3	0.6%	21	0.5%
Trading	52	1.0%	1	0.2%	51	1.1%
Almost Nothing	45	0.9%	4	0.8%	41	0.9%
Total	**5,093**	**100.0%**	**497**	**100.0%**	**4,596**	**100.0%**

This table presents the industry distribution (Fama and French's 48-industries standard classification scheme, FF 48) of the total buyout sample as well as the default and non-default sub-sample.

Table 4: Quantitative Variables for Default and Non-Default Sub-Sample

	Defaults						Non-Defaults						T-Test (Unequal Var.)			Rank-Sum Test		
	N	MIN	MEAN	MEDIAN	MAX	SD	N	MIN	MEAN	MEDIAN	MAX	SD	T	(P-Val.)	Sig.	Z	(P-Val.)	Sig.
PANEL A: PE Firm Variables																		
Overall Specialization	444	1.60%	60.70%	61.80%	100.00%	0.17	4,357	0.00%	58.30%	59.90%	100.00%	0.19	-2.7416	(0.0063)	***	-2.1730	(0.0298)	**
Invest. Stage Specialization	447	0.00%	62.30%	66.70%	100.00%	0.26	4,342	0.00%	60.10%	66.70%	100.00%	0.27	-1.6967	(0.0903)	*	-1.6040	(0.1088)	
Industry Specialization	423	0.00%	42.60%	43.80%	100.00%	0.28	4,226	0.00%	40.40%	43.80%	100.00%	0.29	-1.5471	(0.1225)		-1.7290	(0.0839)	*
World-Region Specialization	431	0.00%	73.60%	87.50%	100.00%	0.28	4,221	0.00%	71.80%	87.50%	100.00%	0.29	-1.2447	(0.2138)		-0.9570	(0.3388)	
Invest. Size Specialization	382	0.00%	63.10%	66.70%	100.00%	0.28	4,020	0.00%	59.40%	66.70%	100.00%	0.27	-2.5335	(0.0116)	**	-2.7230	(0.0065)	***
Overall Match	416	0.00%	84.00%	100.00%	100.00%	0.26	4,149	0.00%	90.00%	100.00%	100.00%	0.19	4.7180	(0.0000)	***	4.5730	(0.0000)	***
Industry Match	423	0.00%	74.90%	100.00%	100.00%	0.42	4,226	0.00%	84.00%	100.00%	100.00%	0.35	4.2622	(0.0000)	***	4.6300	(0.0000)	***
World-Region Match	431	0.00%	92.30%	100.00%	100.00%	0.26	4,221	0.00%	95.90%	100.00%	100.00%	0.19	2.8137	(0.0051)	***	2.8640	(0.0042)	***
Invest. Size Match	202	0.00%	91.30%	100.00%	100.00%	0.27	2,052	0.00%	90.50%	100.00%	100.00%	0.28	-0.3978	(0.6911)		-0.6840	(0.4938)	
Distress Focus	447	0.00%	36.00%	0.00%	100.00%	0.47	4,342	0.00%	28.10%	0.00%	100.00%	0.43	-3.3994	(0.0007)	***	-3.3190	(0.0009)	***
Distress Focus (Rec. Entries)	16	100.00%	100.00%	100.00%	100.00%	0.00	85	0.00%	56.30%	100.00%	100.00%	0.49	-8.1717	(0.0000)	***	-3.3510	(0.0008)	***
Distress Focus (Non-Rec. Entries)	431	0.00%	33.60%	0.00%	100.00%	0.46	4,257	0.00%	27.60%	0.00%	100.00%	0.43	-2.6132	(0.0092)	***	-2.4730	(0.0134)	**
PE Firm Age	432	0.00	11.82	10.00	46.00	8.45	4,165	0.00	13.27	12.00	60.00	8.90	3.3566	(0.0008)	***	3.4900	(0.0005)	***
Overall Experience	494	0.00%	1.60%	0.20%	100.00%	0.07	4,578	0.00%	1.20%	0.20%	100.00%	0.04	-1.0797	(0.2808)		2.7000	(0.0069)	***
Industry Experience	494	0.00%	3.50%	0.70%	100.00%	0.12	4,578	0.00%	2.90%	0.80%	100.00%	0.08	-1.1513	(0.2501)		1.4490	(0.1474)	
Entry Channel Experience	494	0.00%	2.50%	0.40%	100.00%	0.10	4,578	0.00%	1.80%	0.40%	100.00%	0.05	-1.6495	(0.0996)	*	1.0090	(0.3130)	
Country Experience	494	0.00%	3.90%	1.00%	100.00%	0.10	4,578	0.00%	6.30%	1.50%	100.00%	0.15	4.6183	(0.0000)	***	5.6320	(0.0000)	***
PANEL B: Buyout Variables																		
Holding Period	497	0.08	3.74	3.26	13.55	2.22	4,596	0.05	3.90	3.61	13.00	2.01	1.5480	(0.1222)		2.7220	(0.0065)	***
Deal Value	259	0.18	349.18	100.00	4,750.96	632.42	2,340	0.01	397.99	95.06	33,000.00	1,485.98	0.9784	(0.3282)		-0.3110	(0.7554)	
No. of Investors	494	1.00	1.19	1.00	5.00	0.52	4,578	1.00	1.25	1.00	8.00	0.63	2.5316	(0.0116)	**	2.0140	(0.0440)	**
No. of Add-Ons	497	0.00	0.37	0.00	7.00	0.92	4,596	0.00	0.55	0.00	14.00	1.20	4.0480	(0.0001)	***	3.6770	(0.0002)	***
No. of Divestitures	497	0.00	0.11	0.00	5.00	0.43	4,596	0.00	0.11	0.00	8.00	0.49	0.2014	(0.8405)		-0.3920	(0.6947)	

This table provides summary statistics for PE firm variables (PANEL A) and buyout variables (PANEL B). The transaction sample is split into the default and non-default sub-sample. Significance tests for the equality of means (two-tailed t-test allowing for unequal variances) and equality of distributions (two-tailed Wilcoxon rank-sum test) of the two buyout groups are reported at the right-hand side. Statistical significance is represented at the 10% (*), 5% (**), and 1% (***) level.

Table 5: Categorical Variables and Default Rate

	Defaults		Non-Defaults			Pearson's Chi-Square Test			
	N	%	N	%	Total	Comparison	χ^2	(P-Val.)	Sig./Adj.
PANEL A: PE Firm Variables									
Overall Specialist									
Specialist	89	10.8%	737	89.2%	826				
Generalist	355	8.9%	3,620	91.1%	3,975				
Total	444	9.2%	4,357	90.8%	4,801	Overall	2.7708	(0.0960)	*
Investment Stage Specialist									
Specialist	95	10.4%	816	89.6%	911				
Generalist	352	9.1%	3,526	90.9%	3,878				
Total	447	9.3%	4,342	90.7%	4,789	Overall	1.5917	(0.2070)	
Industry Stage Specialist									
Specialist	71	9.7%	661	90.3%	732				
Generalist	352	9.0%	3,565	91.0%	3,917				
Total	423	9.1%	4,226	90.9%	4,649	Overall	0.3791	(0.5380)	
Word-Region Specialist									
Specialist	273	9.1%	2,741	90.9%	3,014				
Generalist	158	9.6%	1,480	90.4%	1,638				
Total	431	9.3%	4,221	90.7%	4,652	Overall	0.4367	(0.5090)	
Investment Size Specialist									
Specialist	84	11.0%	683	89.0%	767				
Generalist	298	8.2%	3,377	91.8%	3,635				
Total	382	8.7%	4,020	91.3%	4,402	Overall	6.0602	(0.0140)	**
Overall Matched									
Matched	398	8.9%	4,092	91.1%	4,490				
Not matched	18	24.0%	57	76.0%	75				
Total	416	9.1%	4,149	90.9%	4,565	Overall	20.4045	(0.0000)	***
Industry Matched									
Matched	327	8.2%	3,639	91.8%	3,966				
Not matched	96	14.1%	587	85.9%	683				
Total	423	9.1%	4,226	90.9%	4,649	Overall	23.7847	(0.0000)	***

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	Defaults		Non-Defaults			Pearson's Chi-Square Test			
	N	**%**	**N**	**%**	**Total**	**Comparison**	χ^2	**(P-Val.)**	**Sig./adj.**
World-Region Matched									
Matched	400	8.9%	4,085	91.1%	4,485				
Not matched	31	18.6%	136	81.4%	167				
Total	431	9.3%	4,221	90.7%	4,652	Overall	17.8141	(0.0000)	***
Investment Size Matched									
Matched	187	9.0%	1,896	91.0%	2,083				
Not matched	15	8.8%	156	91.2%	171				
Total	202	9.0%	2,052	91.0%	2,254	Overall	0.0082	(0.9280)	
Institutional Affiliation									
[1] Independent	300	9.0%	3,021	91.0%	3,321	[1] vs. all other	7.6349	(0.0060)	***/*
[2] Listed	43	8.5%	461	91.5%	504	[2] vs. all other	0.9557	(0.3280)	
[3] Bank	42	11.0%	339	89.0%	381	[3] vs. all other	0.7710	(0.3800)	
[4] Insurance	5	9.3%	49	90.7%	54	[4] vs. all other	0.0148	(0.9030)	
[5] Pension Fund	5	35.7%	9	64.3%	14	[5] vs. all other	10.7636	(0.0010)	***/***
[6] Div. Fin. Services	4	50.0%	4	50.0%	8	[6] vs. all other	14.7599	(0.0000)	***/***
[7] Government/Public	5	14.7%	29	85.3%	34	[7] vs. all other	0.9573	(0.3280)	
[8] Family Office	5	10.9%	41	89.1%	46	[8] vs. all other	0.0665	(0.7970)	
[9] Corporate/Congl.	24	30.0%	56	70.0%	80	[9] vs. all other	37.9803	(0.0000)	***/***
Total	433	9.7%	4,009	90.3%	4,442	Overall	67.2685	(0.0000)	***
Distress Focused									
Distress focused	171	11.1%	1,373	88.9%	1,544				
Non-distress focused	276	8.5%	2,969	91.5%	3,245				
Total	447	9.3%	4,342	90.7%	4,789	Overall	8.1637	(0.0040)	***
Distress Focused (Default Entries)									
Distress focused	16	24.6%	49	75.4%	65				
Non-distress focused	0	0.00%	36	100.0%	36				
Total	16	15.8%	85	84.2%	101	Overall	10.5296	(0.0010)	***
Distress Focused (Non-Default Entries)									
Distress focused	155	10.5%	1,324	89.5%	1,479				
Non-distress focused	276	8.6%	2,933	91.4%	3,209				
Total	431	9.2%	4,257	90.8%	4,688	Overall	4.2826	(0.0390)	**

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	Defaults		Non-Defaults			Pearson's Chi-Square Test			
	N	%	N	%	Total	Comparison	χ^2	(P-Val.)	Sig./adj.
PEI 50 Sponsor									
PEI 50 Sponsor	113	8.7%	1,184	91.3%	1,297				
No PEI 50 Sponsor	381	10.1%	3,394	89.9%	3,775				
Total	494	9.7%	4,578	90.3%	5,072	Overall	2.0921	(0.1480)	
HEC-DJ Sponsor									
HEC-DJ Sponsor	24	5.7%	398	94.3%	422				
No HEC-DJ Sponsor	470	10.1%	4,180	89.9%	4,650				
Total	494	9.7%	4,578	90.3%	5,072	Overall	8.5990	(0.0030)***	
PANEL B: Buyout Variables									
Syndicated									
Syndicated	72	8.0%	826	92.0%	898				
Non-syndicated	422	10.1%	3,752	89.9%	4,174				
Total	494	9.7%	4,578	90.3%	5,072	Overall	3.6804	(0.0550)*	
Add-On Active									
$\geq$ 1 add-on	104	7.4%	1,309	92.6%	1,413				
0 add-ons	393	10.7%	3,287	89.3%	3,680				
Total	497	9.8%	4,596	90.2%	5,093	Overall	12.7724	(0.0000)***	
Divestiture Active									
$\geq$ 1 divestiture	38	10.4%	328	89.6%	366				
0 divestitures	459	9.7%	4,268	90.3%	4,727				
Total	497	9.8%	4,596	90.2%	5,093	Overall	0.1744	(0.6760)	
Buyout Round									
[1] PBO	387	9.3%	3,780	90.7%	4,167	[1] vs. all other	5.8418	(0.0160)**/**	
[2] SBO	94	11.2%	748	88.8%	842	[2] vs. all other	2.3023	(0.1290)	
[3] Higher Rounds	16	19.0%	68	81.0%	84	[3] vs. all other	8.3688	(0.0040)***/**	
Total	497	9.8%	4,596	90.2%	5,093	Overall	11.2138	(0.0040)***	

This table provides summary statistics for PE firm variables (PANEL A) and buyout variables (PANEL B) through contingency tables. The transaction sample is split into the default and non-default sub-sample. Pearson's chi-square tests of independence for the respective categorical variables and default rates are reported at the right-hand side. In case of multiple comparisons, unadjusted and Bonferroni-adjusted levels of significance are shown. Fisher's Exact test is computed as robustness check if contingency table contains cell(s) with less than 5 observations (not shown, all results stay the same). Statistical significance is represented at the 10% (*), 5% (**), and 1% (***) level.

Table 6: Cox Proportional Hazards Model—Determinants of Default Likelihood (Base Model)

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)	
PE Firm Variables																				
Overall Specialist	0.455	**	0.522	**	0.421	*	0.350		0.344		0.455	**	0.522	**	0.413	*	0.351		0.343	
	(0.22)		(0.23)		(0.23)		(0.24)		(0.24)		(0.22)		(0.23)		(0.23)		(0.24)		(0.24)	
Overall Match	-0.916	**	-0.766	**	-0.947	**	-0.810	**	-0.815	**	-0.942	**	-0.799	**	-0.968	***	-0.829	**	-0.840	**
	(0.37)		(0.38)		(0.37)		(0.38)		(0.38)		(0.37)		(0.37)		(0.37)		(0.38)		(0.37)	
Captive	0.371	**	0.430	**	0.387	**	0.353	*	0.343	*	0.361	*	0.417	**	0.367	**	0.337	*	0.323	*
	(0.19)		(0.19)		(0.19)		(0.20)		(0.19)		(0.18)		(0.19)		(0.19)		(0.19)		(0.19)	
Distress Focused			0.156				0.092		0.049				0.161				0.106		0.058	
			(0.18)				(0.18)		(0.18)				(0.18)				(0.18)		(0.18)	
Industry Experience							-4.572		-5.672	*							-4.379		-5.457	
							(3.79)		(3.44)								(3.71)		(3.35)	
PEI 50 Sponsor							-0.155										-0.149			
							(0.21)										(0.21)			
HEC DJ Sponsor									-0.375										-0.407	
									(0.34)										(0.34)	
Buyout Variables																				
Financial Entry Channel	0.480	***	0.504	***	0.442	***	0.430	**	0.418	**	0.451	***	0.474	***	0.418	**	0.403	**	0.393	**
	(0.17)		(0.17)		(0.17)		(0.17)		(0.17)		(0.17)		(0.17)		(0.17)		(0.17)		(0.17)	
No. of Investors	-0.477	**	-0.502	**	-0.431	**	-0.471	**	-0.443	**	-0.459	**	-0.484	**	-0.412	*	-0.453	**	-0.424	*
	(0.21)		(0.22)		(0.21)		(0.22)		(0.22)		(0.21)		(0.22)		(0.21)		(0.22)		(0.22)	
No. of Add-Ons	-0.091		-0.099		-0.100		-0.114	*	-0.109	*										
	(0.06)		(0.06)		(0.06)		(0.06)		(0.06)											
No. of Divestitures											-0.134		-0.135		-0.110		-0.112		-0.115	
											(0.11)		(0.11)		(0.10)		(0.10)		(0.10)	
Log Deal Value	0.071		0.067		0.069		0.069		0.063		0.076		0.071		0.067		0.066		0.063	
	(0.06)		(0.06)		(0.06)		(0.07)		(0.06)		(0.06)		(0.06)		(0.06)		(0.07)		(0.06)	
Economic Control Variables																				
OAS	-0.003	***	-0.003	***	-0.002	***	-0.002	***	-0.002	***	-0.003	***	-0.003	***	-0.002	***	-0.002	***	-0.002	***
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
MSCI Growth					0.512		1.125		1.031						0.902		1.526		1.392	
					(2.21)		(2.22)		(2.23)						(2.23)		(2.24)		(2.25)	
Industry Sales Growth					-2.162	**	-2.028	**	-2.026	**					-2.061	**	-1.918	**	-1.917	**
					(0.99)		(0.98)		(0.98)						(0.99)		(0.98)		(0.97)	
Tobin's Q					0.177		0.211	*	0.211	*					0.166		0.199		0.201	
					(0.13)		(0.13)		(0.13)						(0.13)		(0.13)		(0.13)	
Industry Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
p-Value Hatsq Linktest	0.801		0.793		0.898		0.269		0.310		0.700		0.747		0.691		0.935		0.956	
p-Value Global PH Test	0.130		0.154		0.234		0.330		0.402		0.141		0.139		0.203		0.283		0.326	
Log pseudolikelihood	-1,169		-1,149		-1,165		-1,143		-1,142		-1,169		-1,149		-1,166		-1,144		-1,143	
Defaults	188		185		188		185		185		188		185		188		185		185	
N	2,084		2,064		2,084		2,064		2,064		2,084		2,064		2,084		2,064		2,064	

This table presents the results of a Cox proportional hazards model with time invariant covariates. Variables are defined in Table 1. H_0 of the Linktest sets a squared linear covariate added to the model equal to 0. H_0 of the Global Proportional Hazards test sets the slope coefficient of a regression of the scaled Schoenfeld residuals on time equal to 0. All standard errors are clustered using a robust variance estimator. Statistical significance is represented at the 10% (*), 5% (**), and 1% (***) level. Standard errors are shown in parentheses.

Table 7: Augmented Cox Proportional Hazards Model

	(1)	(2)	(3)	(4)
PE Firm Variables				
Industry Specialist	0.106	0.591*	0.093	0.083
	(0.22)	(0.33)	(0.22)	(0.22)
Industry Match	-0.313*	-0.107	-0.101	-0.079
	(0.18)	(0.23)	(0.22)	(0.24)
Captive	0.339*	0.324	0.924***	0.325
	(0.20)	(0.20)	(0.33)	(0.20)
Distress Focused	0.107	0.094	0.095	0.575*
	(0.17)	(0.17)	(0.17)	(0.31)
Industry Specialist * Industry Match		-0.883*		
		(0.46)		
Captive * Industry Match			-0.888**	
			(0.41)	
Distressed Focused * Industry Match				-0.642*
				(0.38)
PEI 50 Sponsor	-0.360*	-0.384**	-0.396**	-0.381**
	(0.19)	(0.19)	(0.19)	(0.19)
Buyout Variables				
Financial Entry Channel	0.476***	0.502***	0.495***	0.469***
	(0.16)	(0.16)	(0.16)	(0.16)
No. of Investors	-0.459**	-0.460**	-0.427*	-0.444**
	(0.22)	(0.22)	(0.22)	(0.22)
No. of Divestitures	-0.098	-0.103	-0.089	-0.094
	(0.09)	(0.09)	(0.10)	(0.09)
Log Deal Value	0.095	0.093	0.099	0.101
	(0.07)	(0.07)	(0.07)	(0.07)
Economic Control Variables				
OAS	-0.002***	-0.002***	-0.002***	-0.002***
	(0.00)	(0.00)	(0.00)	(0.00)
Industry Fixed Effects	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
p-Value Hatsq Linktest	0.140	0.115	0.496	0.106
p-Value Global PH Test	0.264	0.242	0.241	0.361
Log pseudolikelihood	-1,127	-1,125	-1,125	-1,125
Defaults	182	182	182	182
N	2,053	2,053	2,053	2,053

This table presents the results of a Cox proportional hazards model with time invariant covariates. Variables are defined in Table 1. H_0 of the Linktest sets a squared linear covariate added to the model equal to 0. H_0 of the Global Proportional Hazards test sets the slope coefficient of a regression of the scaled Schoenfeld residuals on time equal to 0. All standard errors are clustered using a robust variance estimator. Statistical significance is represented at the 10% (*), 5% (**), and 1% (***) level. Standard errors are shown in parentheses.

Table 8: Proportional Hazards Model with Parametric Estimation

	Weibull						Gompertz					
	Base Model			Augmented Model			Base Model			Augmented Model		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
PE Firm Variables												
Overall Specialist	0.460 **	0.423 **	0.339				0.495 **	0.457 **	0.367			
	(0.21)	(0.21)	(0.23)				(0.21)	(0.21)	(0.23)			
Overall Match	-0.905 **	-0.932 **	-0.798 **				-0.928 **	-0.957 ***	-0.807 **			
	(0.36)	(0.36)	(0.38)				(0.37)	(0.36)	(0.38)			
Industry Specialist				0.585 *	0.083	0.077				0.652 **	0.139	0.134
				(0.33)	(0.23)	(0.23)				(0.33)	(0.23)	(0.23)
Industry Match				-0.110	-0.098	-0.091				-0.098	-0.083	-0.080
				(0.23)	(0.23)	(0.25)				(0.24)	(0.23)	(0.25)
Captive	0.383 *	0.396 **	0.348 *	0.332	0.956 ***	0.334	0.410 **	0.427 **	0.378 *	0.358 *	1.005 ***	0.360 *
	(0.20)	(0.20)	(0.21)	(0.21)	(0.34)	(0.21)	(0.20)	(0.20)	(0.21)	(0.21)	(0.34)	(0.21)
Distress Focused			0.032	0.075	0.076	0.539 *			0.051	0.098	0.099	0.574 *
			(0.18)	(0.17)	(0.17)	(0.32)			(0.18)	(0.17)	(0.17)	(0.33)
Industry Experience			-5.772 **						-6.568 **			
			(2.88)						(2.94)			
PEI 50 Sponsor				-0.366 **	-0.379 **	-0.362 **				-0.390 **	-0.406 **	-0.387 **
				(0.18)	(0.18)	(0.18)				(0.18)	(0.18)	(0.18)
HEC DJ Sponsor			-0.302						-0.287			
			(0.32)						(0.32)			
Industry Specialist * Industry Match				-0.883 *						-0.896 *		
				(0.46)						(0.47)		
Captive * Industry Match					-0.919 **						-0.948 **	
					(0.44)						(0.44)	
Distressed Focused * Industry Match						-0.620						-0.633 *
						(0.38)						(0.38)
Buyout Variables												
Financial Entry Channel	0.471 ***	0.436 ***	0.411 **	0.490 ***	0.484 ***	0.458 ***	0.479 ***	0.444 ***	0.417 **	0.502 ***	0.498 ***	0.472 ***
	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)
No. of Investors	-0.431 *	-0.385 *	-0.397 *	-0.405 *	-0.370	-0.386 *	-0.441 **	-0.396 *	-0.414 *	-0.415 *	-0.381	-0.397 *
	(0.22)	(0.22)	(0.23)	(0.23)	(0.23)	(0.23)	(0.22)	(0.22)	(0.23)	(0.23)	(0.23)	(0.23)
No. of Add-Ons	-0.092	-0.100	-0.111 *				-0.085	-0.094	-0.106			
	(0.06)	(0.06)	(0.07)				(0.06)	(0.06)	(0.07)			
No. of Divestitures				-0.090	-0.075	-0.081				-0.090	-0.075	-0.080
				(0.12)	(0.12)	(0.12)				(0.12)	(0.12)	(0.12)
Log Deal Value	0.075	0.072	0.063	0.094	0.100	0.101	0.088	0.085	0.074	0.110 *	0.118 *	0.118 *
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)

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Economic Control Variables																							
OAS	-0.003	***	-0.002	***	-0.002	***	-0.002	***	-0.002	***	-0.002	***	-0.003	***	-0.002	***	-0.002	***	-0.003	***	-0.003	***	-0.002	***
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
MSCI Growth			0.594		1.169										0.529		1.232						
			(2.12)		(2.14)										(2.12)		(2.14)						
Industry Sales Growth			-2.061	**	-1.925	**									-2.142	**	-2.029	**					
			(0.91)		(0.91)										(0.91)		(0.92)						
Tobin's Q			0.159		0.190										0.187		0.228	*					
			(0.13)		(0.14)										(0.13)		(0.13)						
Distribution Parameters																							
Log Alpha	0.802	***	0.814	***	0.821	***	0.810	***	0.811	***	0.811	***											
	(0.06)		(0.06)		(0.06)		(0.06)		(0.06)		(0.06)												
Gamma													0.349	***	0.358	***	0.370	***	0.357	***	0.358	***	0.358	***
													(0.03)		(0.03)		(0.03)		(0.03)		(0.03)		(0.03)	
Industry Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Constant	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
p-Value Hatsq Linktest	0.946		0.916		0.286		0.228		0.225		0.539		0.969		0.895		0.266		0.278		0.239		0.521	
Log pseudolikelihood	-523		-520		-512		-508		-509		-508		-538		-535		-525		-522		-522		-521	
Defaults	188		188		185		182		182		182		188		188		185		182		182		182	
N	2,084		2,084		2,064		2,053		2,053		2,053		2,084		2,084		2,064		2,053		2,053		2,053	

This table presents ML estimations of selected proportional hazard models imposing Weibull and Gompertz distributions to the baseline hazard. Log Alpha and Gamma denote the respective shape parameters. Variables are defined in Table 1. Statistical significance is represented at the 10% (*), 5% (**), and 1% (***) level. Standard errors are shown in parentheses.

Table 9: Re-Estimation of Results for Sample Period 1997-2004

	Base Model			Augmented Model		
	(1)	(2)	(3)	(4)	(5)	(6)
PE Firm Variables						
Overall Specialist	-0.385	-0.453	-0.388			
	(0.49)	(0.50)	(0.53)			
Overall Match	-1.378***	-1.348**	-1.136**			
	(0.53)	(0.53)	(0.54)			
Industry Specialist				-0.025	-0.235	-0.245
				(0.53)	(0.40)	(0.40)
Industry Match				-0.597*	-0.501	-0.488
				(0.31)	(0.34)	(0.38)
Captive	0.687**	0.678**	0.723**	0.727**	1.139**	0.727**
	(0.28)	(0.30)	(0.32)	(0.32)	(0.50)	(0.32)
Distress Focused			0.254	0.332	0.338	0.624
			(0.29)	(0.27)	(0.27)	(0.44)
Industry Experience			-0.393			
			(3.59)			
PEI 50 Sponsor				-0.129	-0.147	-0.139
				(0.27)	(0.27)	(0.27)
HEC DJ Sponsor			-0.947			
			(0.72)			
Industry Specialist * Industry Match				-0.396		
				(0.86)		
Captive * Industry Match					-0.607	
					(0.62)	
Distressed Focused * Industry Match						-0.417
						(0.57)
Buyout Variables						
Financial Entry Channel	0.658***	0.649**	0.706***	0.678***	0.677***	0.664***
	(0.25)	(0.25)	(0.25)	(0.25)	(0.25)	(0.25)
No. of Investors	-0.595	-0.586	-0.636	-0.677	-0.657	-0.655
	(0.43)	(0.44)	(0.49)	(0.45)	(0.45)	(0.44)
No. of Add-Ons	-0.176	-0.156	-0.231*			
	(0.12)	(0.12)	(0.14)			
No. of Divestitures				0.049	0.055	0.048
				(0.10)	(0.10)	(0.10)
Log Deal Value	-0.024	-0.037	-0.011	-0.039	-0.034	-0.031
	(0.09)	(0.09)	(0.10)	(0.11)	(0.11)	(0.11)

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Economic Control Variables						
OAS	-0.002***	-0.001	-0.001	-0.002**	-0.002**	-0.002**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
MSCI Growth		3.398	3.780			
		(3.27)	(3.31)			
Industry Sales Growth		-1.438	-1.410			
		(1.52)	(1.57)			
Tobin's Q		0.060	0.075			
		(0.16)	(0.16)			
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
p-Value Hatsq Linktest	0.020	0.057	0.006	0.003	0.004	0.003
p-Value Global PH Test	0.235	0.343	0.016	0.365	0.392	0.345
Log pseudolikelihood	-460	-459	-444	-435	-435	-435
Defaults	85	85	83	81	81	81
N	1,279	1,279	1,268	1,262	1,262	1,262

This table presents the results of a Cox proportional hazards model with time invariant covariates for all deals entered between 1997 and 2004. Variables are defined in Table 1. All standard errors are clustered using a robust variance estimator. Statistical significance is represented at the 10% (*), 5% (**), and 1% (***) level. Standard errors are shown in parentheses.

Table 10: Proportional Hazards Model with Random Effects Estimation (Frailty Model)

PANEL A: Base Model

	FF5 Frailty			FF17 Frailty			FF38 Frailty			Country Frailty		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
PE Firm Variables												
Overall Specialist	0.458 **	0.422 **	0.345	0.467 **	0.435 **	0.354	0.483 **	0.451 **	0.383 *	0.426 **	0.399 *	0.350
	(0.21)	(0.21)	(0.23)	(0.21)	(0.21)	(0.23)	(0.22)	(0.22)	(0.23)	(0.21)	(0.21)	(0.22)
Overall Match	-0.947 ***	-0.969 ***	-0.830 **	-0.910 **	-0.923 **	-0.787 **	-0.953 ***	-0.960 ***	-0.815 **	-0.888 **	-0.919 **	-0.765 **
	(0.36)	(0.36)	(0.38)	(0.37)	(0.37)	(0.38)	(0.37)	(0.37)	(0.38)	(0.37)	(0.37)	(0.38)
Captive	0.381 *	0.399 **	0.359 *	0.361 *	0.382 *	0.345 *	0.318	0.339 *	0.312	0.345 *	0.359 *	0.333
	(0.20)	(0.20)	(0.21)	(0.20)	(0.20)	(0.21)	(0.20)	(0.20)	(0.21)	(0.20)	(0.20)	(0.20)
Distress Focused			0.051			0.030			0.052			0.102
			(0.18)			(0.18)			(0.18)			(0.18)
Industry Experience			-5.778 *			-5.911 **			-5.919 **			-5.088 *
			(2.96)			(3.00)			(2.96)			(2.91)
HEC DJ Sponsor			-0.360			-0.334			-0.223			-0.298
			(0.33)			(0.33)			(0.33)			0.32
Buyout Variables												
Financial Entry Channel	0.486 ***	0.454 ***	0.429 **	0.508 ***	0.478 ***	0.447 ***	0.516 ***	0.492 ***	0.462 ***	0.499 ***	0.464 ***	0.451 ***
	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)
No. of Investors	-0.486 **	-0.436 *	-0.450 *	-0.452 *	-0.395 *	-0.403 *	-0.479 **	-0.420 *	-0.444 *	-0.456 **	-0.417 *	-0.444 *
	(0.23)	(0.23)	(0.24)	(0.24)	(0.24)	(0.24)	(0.23)	(0.23)	(0.24)	(0.23)	(0.23)	(0.24)
No. of Add-Ons	-0.094	-0.101	-0.111	-0.064	-0.070	-0.079	-0.061	-0.066	-0.077	-0.091	-0.098	-0.106
	(0.06)	(0.07)	(0.07)	(0.06)	(0.06)	(0.07)	(0.07)	(0.07)	(0.07)	(0.06)	(0.07)	(0.07)
No. of Divestitures												
Log Deal Value	0.076	0.071	0.066	0.069	0.065	0.061	0.059	0.055	0.047	0.061	0.060	0.052
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Economic Control Variables												
OAS	-0.003 ***	-0.002 ***	-0.002 ***	-0.002 ***	-0.002 ***	-0.002 ***	-0.003 ***	-0.002 ***	-0.002 ***	-0.002 ***	-0.002 ***	-0.002 ***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
MSCI Growth		0.849	1.364		1.038	1.597		1.142	1.785		0.622	1.067
		(2.11)	(2.12)		(2.11)	(2.13)		(2.13)	(2.15)		(2.09)	(2.11)
Industry Sales Growth		-2.202 **	-2.066 **		-2.319 **	-2.216 **		-1.998 **	-1.915 **		-1.912 **	-1.757 *
		(0.91)	(0.91)		(0.91)	(0.91)		(0.91)	(0.91)		(0.90)	(0.91)
Tobin's Q		0.104	0.138		0.112	0.151		0.053	0.094		0.167	0.198
		(0.13)	(0.13)		(0.14)	(0.14)		(0.15)	(0.15)		(0.13)	(0.13)

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Distribution Parameter																			
Theta	0.103	***	0.095	***	0.097	***	0.167	***	0.158	***	0.162	***	0.227	***	0.208	***	0.212	***	0.239	***	0.263	***	0.251	***
	(0.09)		(0.09)		(0.09)		(0.10)		(0.10)		(0.11)		(0.11)		(0.11)		(0.11)		(0.21)		(0.23)		(0.22)	
Industry Fixed Effects	No		No		No		No		No		No		No		No		No		Yes		Yes		Yes	
Country Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		No		No		No	
p-Value Hatsq Linktest	0.576		0.384		0.373		0.870		0.364		0.272		0.943		0.939		0.901		0.762		0.531		0.250	
p-Value Global PH Test	0.070		0.126		0.230		0.993		0.148		0.259		0.138		0.190		0.312		0.024		0.042		0.117	
Log pseudolikelihood	-1,175		-1,171		-1,148		-1,172		-1,168		-1,145		-1,168		-1,165		-1,143		-1,191		-1,188		-1,165	
Defaults	188		188		185		188		188		185		188		188		185		188		188		185	
N	2,084		2,084		2,064		2,084		2,084		2,064		2,084		2,084		2,064		2,084		2,084		2,064	

PANEL B: Augmented Model

	FF5 Frailty						FF17 Frailty						FF38 Frailty						Country Frailty					
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)	
PE Firm Variables																								
Industry Specialist	0.583	*	0.069		0.057		0.519		0.080		0.061		0.511		0.040		0.027		0.592	*	0.105		0.095	
	(0.33)		(0.23)		(0.23)		(0.34)		(0.23)		(0.23)		(0.34)		(0.23)		(0.23)		(0.33)		(0.22)		(0.22)	
Industry Match	-0.143		-0.142		-0.122		-0.196		-0.193		-0.153		-0.236		-0.249		-0.203		-0.086		-0.102		-0.044	
	(0.23)		(0.23)		(0.25)		(0.25)		(0.24)		(0.26)		(0.24)		(0.24)		(0.26)		(0.23)		(0.23)		(0.25)	
Captive	0.326		0.927	***	0.328		0.296		0.835	**	0.294		0.233		0.760	**	0.236		0.312		0.838	**	0.314	
	(0.21)		(0.34)		(0.21)		(0.21)		(0.35)		(0.21)		(0.21)		(0.35)		(0.21)		(0.21)		(0.34)		(0.21)	
Distress Focused	0.093		0.097		0.573	*	0.058		0.067		0.532		0.060		0.071		0.531		0.152		0.150		0.651	**
	(0.17)		(0.17)		(0.33)		(0.17)		(0.17)		(0.33)		(0.18)		(0.17)		(0.33)		(0.17)		(0.17)		(0.32)	
PEI 50 Sponsor	-0.392	**	-0.402	**	-0.387	**	-0.395	**	-0.401	**	-0.389	**	-0.397	**	-0.399	**	-0.387	**	-0.364	**	-0.370	**	-0.356	**
	(0.18)		(0.18)		(0.18)		(0.19)		(0.19)		(0.19)		(0.19)		(0.19)		(0.19)		(0.18)		(0.18)		(0.18)	
Industry Specialist * Industry Match	-0.913	**					-0.793	*					-0.840	*					-0.865	*				
	(0.46)						(0.47)						(0.47)						(0.46)					
Captive * Industry Match			-0.888	**					-0.799	*					-0.777	*					-0.782	*		
			(0.44)						(0.44)						(0.45)						(0.43)			
Distressed Focused * Industry Match					-0.639	*					-0.626						-0.621						-0.665	*
					(0.38)						(0.39)						(0.39)						(0.38)	
Buyout Variables																								
Financial Entry Channel	0.509	***	0.501	***	0.475	***	0.521	***	0.523	***	0.497	***	0.527	***	0.523	***	0.498	***	0.520	***	0.511	***	0.491	***
	(0.17)		(0.17)		(0.17)		(0.17)		(0.17)		(0.17)		(0.17)		(0.17)		(0.17)		(0.17)		(0.17)		(0.17)	
No. of Investors	-0.464	*	-0.434	*	-0.448	*	-0.438	*	-0.410	*	-0.420	*	-0.455	*	-0.421	*	-0.433	*	-0.452	*	-0.414	*	-0.432	*
	(0.24)		(0.24)		(0.24)		(0.25)		(0.25)		(0.25)		(0.24)		(0.24)		(0.24)		(0.24)		(0.24)		(0.24)	
No. of Divestitures	-0.102		-0.088		-0.094		-0.068		-0.051		-0.062		-0.096		-0.079		-0.092		-0.076		-0.063		-0.066	
	(0.12)		(0.12)		(0.12)		(0.12)		(0.12)		(0.12)		(0.13)		(0.13)		(0.13)		(0.12)		(0.12)		(0.12)	
Log Deal Value	0.096		0.102		0.104	*	0.087		0.091		0.090		0.080		0.082		0.082		0.082		0.083		0.086	
	(0.06)		(0.06)		(0.06)		(0.06)		(0.06)		(0.06)		(0.06)		(0.06)		(0.06)		(0.06)		(0.06)		(0.06)	

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Economic Control Variables																									
OAS	-0.002	***	-0.002	***	-0.002	***	-0.002	***	-0.002	***	-0.002	***	-0.002	***	-0.002	***	-0.002	***	-0.002	***	-0.002	***	-0.002	***	-0.002	***
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Distribution Parameter																									
Theta	0.106	***	0.112	***	0.114	***	0.222	***	0.220	***	0.236	***	0.277	***	0.275	***	0.287	***	0.240	***	0.250	***	0.211	***		
	(0.09)		(0.09)		(0.09)		(0.14)		(0.14)		(0.14)		(0.14)		(0.14)		(0.14)		(0.21)		(0.22)		(0.19)			
Industry Fixed Effects	No		No		No		No		No		No		No		No		No		Yes		Yes		Yes		
Country Fixed Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		No		No		No		
p-Value Hatsq Linktest	0.151		0.198		0.177		0.081		0.125		0.114		0.130		0.199		0.194		0.720		0.674		0.445		
p-Value Global PH Test	0.145		0.122		0.166		0.165		0.129		0.178		0.203		0.159		0.212		0.120		0.085		0.119		
Log pseudolikelihood	-1,131		-1,131		-1,131		-1,128		-1,127		-1,128		-1,123		-1,124		-1,124		-1,147		-1,147		-1,147		
Defaults	182		182		182		182		182		182		182		182		182		182		182		182		
N	2,053		2,053		2,053		2,053		2,053		2,053		2,053		2,053		2,053		2,053		2,053		2,053		

This table presents random effect estimations for selected proportional hazard models where a multiplicative random parameter to the baseline hazard is shared among FF5, FF17, FF38 industry groups as well as countries for the base model (PANEL A) and the augmented model (PANEL B). This parameter theta is assumed to be normally distributed. Variables are defined in Table 1. Statistical significance is represented at the 10% (*), 5% (**), and 1% (***) level. Standard errors are shown in parentheses.

Table 11: Re-Estimation with Imputed Deal Values

PANEL A: Base Model

	DVs Based on Multiple Imputation			DVs Based on Selection Model		
	(1)	(2)	(3)	(4)	(5)	(6)
PE Firm Variables						
Overall Specialist	0.324**	0.318**	0.417**	0.354**	0.348**	0.450***
	(0.15)	(0.15)	(0.16)	(0.15)	(0.15)	(0.16)
Overall Match	-0.926***	-0.911***	-0.695***	-0.895***	-0.881***	-0.670***
	(0.24)	(0.24)	(0.24)	(0.24)	(0.24)	(0.24)
Captive	0.439***	0.443***	0.445***	0.445***	0.448***	0.448***
	(0.13)	(0.14)	(0.14)	(0.13)	(0.13)	(0.14)
Distress Focused			0.504***			0.503***
			(0.13)			(0.13)
Industry Experience			-7.681**			-7.501**
			(3.07)			(3.08)
HEC DJ Sponsor			-0.390			-0.425*
			(0.25)			(0.25)
Buyout Variables						
Financial Entry Channel	0.283**	0.273**	0.269**	0.249*	0.238*	0.234*
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
No. of Investors	-0.329**	-0.322**	-0.438***	-0.359**	-0.354**	-0.467***
	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.17)
No. of Add-Ons	-0.303***	-0.307***	-0.312***	-0.314***	-0.318***	-0.322***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Log Deal Value Imputed	0.095*	0.095*	0.088*	0.173***	0.173***	0.166***
	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)
Economic Control Variables						
OAS	-0.001***	-0.001***	-0.001**	-0.001***	-0.001***	-0.001**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
MSCI Growth		-1.523	-0.775		-1.585	-0.841
		(1.55)	(1.54)		(1.54)	(1.54)
Industry Sales Growth		-0.315	-0.103		-0.281	-0.068
		(0.64)	(0.64)		(0.64)	(0.63)
Tobin's Q		-0.029	-0.012		-0.026	-0.009
		(0.10)	(0.10)		(0.09)	(0.10)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Defaults	366	366	363	366	366	363
N	4,011	4,011	3,975	4,011	4,011	3,975

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PANEL B: Augmented Model

	DVs Based on Multiple Imputation			DVs Based on Selection Model		
	(1)	(2)	(3)	(4)	(5)	(6)
PE Firm Variables						
Industry Specialist	0.409*	0.086	0.103	0.423*	0.104	0.124
	(0.22)	(0.15)	(0.15)	(0.22)	(0.15)	(0.15)
Industry Match	-0.194	-0.186	-0.189	-0.192	-0.176	-0.182
	(0.16)	(0.16)	(0.18)	(0.16)	(0.16)	(0.18)
Captive	0.490***	0.921***	0.487***	0.483***	0.932***	0.479***
	(0.14)	(0.24)	(0.14)	(0.14)	(0.24)	(0.14)
Distress Focused	0.558***	0.539***	0.812***	0.553***	0.531***	0.812***
	(0.11)	(0.11)	(0.22)	(0.11)	(0.11)	(0.22)
Industry Specialist * Industry Match	-0.559*			-0.547*		
	(0.31)			(0.31)		
Captive * Industry Match		-0.637**			-0.662**	
		(0.29)			(0.29)	
Distressed Focused * Industry Match			-0.338			-0.343
			(0.26)			(0.26)
PEI 50 Sponsor	-0.301**	-0.321**	-0.290**	-0.350**	-0.376***	-0.340**
	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
Buyout Variables						
Financial Entry Channel	0.298**	0.305**	0.289**	0.254*	0.261**	0.246*
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
No. of Investors	-0.375**	-0.347**	-0.365**	-0.403**	-0.376**	-0.393**
	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)
No. of Divestitures	-0.174	-0.169	-0.166	-0.209*	-0.208*	-0.202*
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Log Deal Value Imputed	0.091	0.094	0.094	0.180***	0.187***	0.184***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Economic Control Variables						
OAS	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Defaults	360	360	360	360	360	360
N	3,964	3,964	3,964	3,964	3,964	3,964

This table presents Cox proportional hazard re-estimations of the base and augmented models with imputed deal values. Specifications 1-3 include deal values imputed on the basis of multiple imputation inference where an imputation model is used to create several complete-case date sets, for which parameter estimates are individually obtained and then pooled. Specifications 4-6 include deal values imputed on the basis of a Heckman (1979) selection model. The variables used for the imputation and selection model are similar to Arcot et al. (in press) and Strömberg (2008) and additionally contain the following auxiliary variables: *PEI 50 Sponsor*, *Industry Specialist* and *World Region Specialist*. Statistical significance is represented at the 10% (*), 5% (**), and 1% (***) level. Standard errors are shown in parentheses.

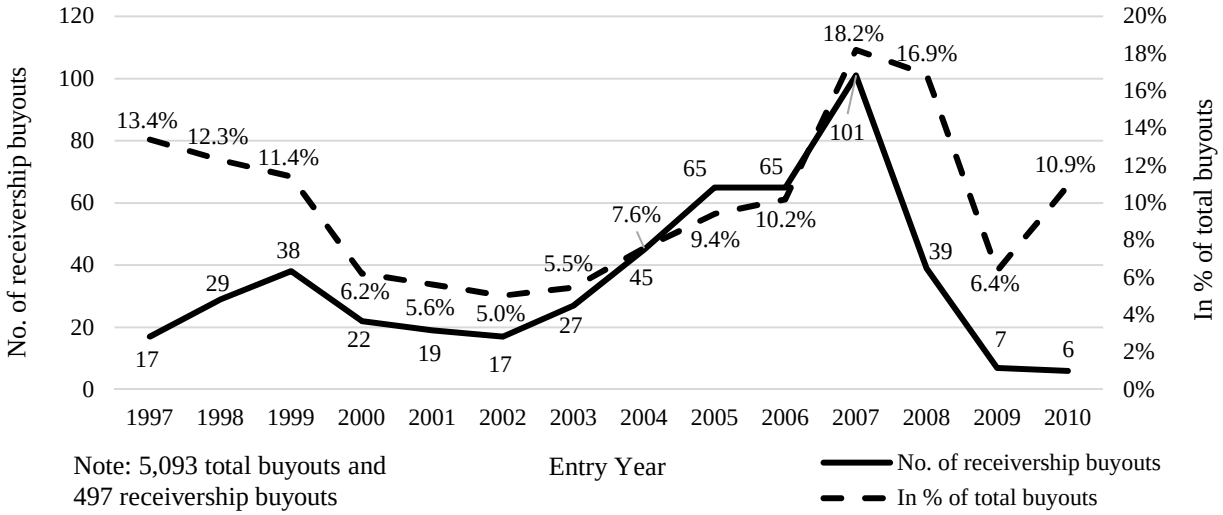
Table 12: Correlation Matrix for Independent Variables Used in Multivariate Analysis

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
[1] Overall Specialist	1.0000																	
[2] Overall Match	-0.1148	1.0000																
[3] Industry Specialist	0.3665	-0.2362	1.0000															
[4] Industry Match	-0.1224	0.7150	-0.2335	1.0000														
[5] Captive	-0.0248	-0.1388	0.0275	-0.1070	1.0000													
[6] Distress Focused	-0.1176	-0.0866	0.0488	-0.0596	-0.0922	1.0000												
[7] Industry Experience	-0.1437	0.1223	-0.1583	0.0943	-0.0866	-0.1885	1.0000											
[8] PEI 50 Sponsor	-0.2145	0.0477	-0.1310	0.0634	-0.1654	0.0300	0.4220	1.0000										
[9] HEC-DJ Sponsor	-0.0562	-0.0487	-0.0519	-0.0207	-0.0762	-0.0573	-0.0422	0.1204	1.0000									
[10] Financial Entry Channel	-0.0358	0.0224	-0.0607	0.0169	0.0230	-0.0186	-0.0775	-0.0015	0.0002	1.0000								
[11] No. Investors	0.0030	-0.0768	0.0457	-0.0213	-0.0079	0.1436	-0.0892	0.0528	0.1176	-0.0256	1.0000							
[12] No. of Add-Ons	-0.0382	0.0052	-0.0051	0.0034	-0.0123	0.0023	-0.0432	0.0538	0.0696	0.0439	0.0179	1.0000						
[13] No. of Divestitures	-0.0323	-0.0227	-0.0249	-0.0183	-0.0187	0.0355	0.0107	0.0999	0.0447	-0.0114	0.0285	0.1391	1.0000					
[14] Log Deal Value	-0.1561	0.0146	-0.0612	-0.0110	-0.0633	0.0732	-0.1076	0.3612	0.1998	0.1937	0.1128	0.1832	0.2128	1.0000				
[15] OAS	-0.0355	-0.0177	-0.0573	-0.0066	-0.0344	0.0091	0.0282	0.0157	0.0010	-0.1382	0.0081	-0.0490	-0.0018	-0.0922	1.0000			
[16] Tobin's Q	0.0097	0.0372	0.0550	0.1243	-0.0120	-0.0314	0.1235	0.0469	-0.0052	0.0152	0.0271	0.0505	-0.0226	-0.0846	-0.2725	1.0000		
[17] Industry Sales Growth	-0.0204	0.0016	-0.0257	0.0360	0.0367	-0.0561	0.2049	0.0782	0.0597	-0.0067	0.0124	0.0077	0.0447	-0.0442	-0.2250	0.4654	1.0000	
[18] MSCI Growth	0.0182	0.0162	0.0273	0.0175	0.0484	-0.0301	0.0668	0.0190	0.0095	0.1035	-0.0180	0.0220	0.0152	0.0581	-0.7718	0.3096	0.4069	1.0000

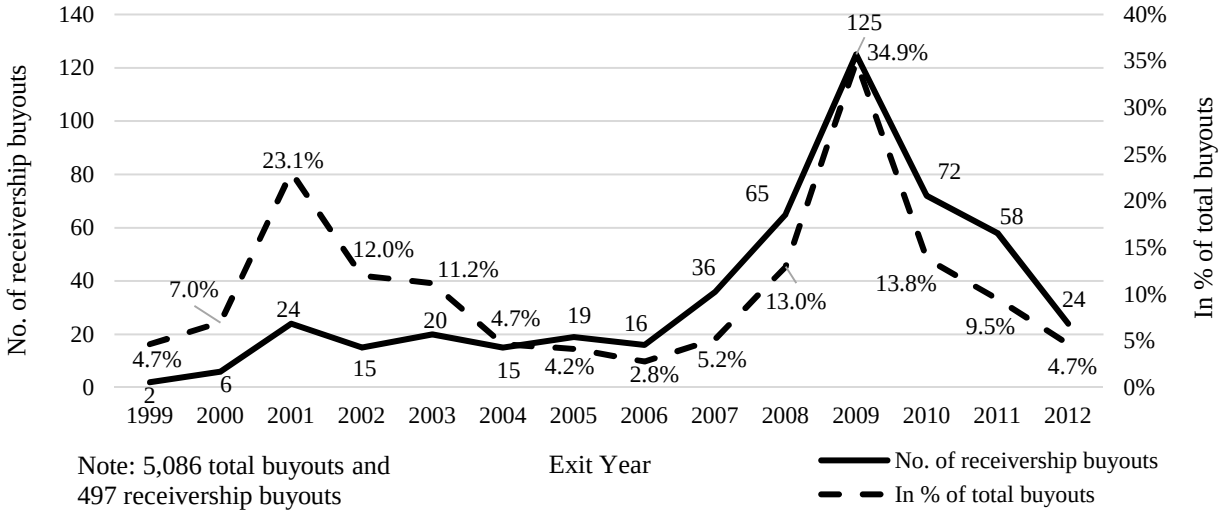
This table presents the Pearson correlations between all independent variables used in the multivariate analysis. Variables are defined in Table 1.

Figure 1: Development of Default Buyouts by Entry and Exit Year

(i) Development of Default Buyouts by Entry Year



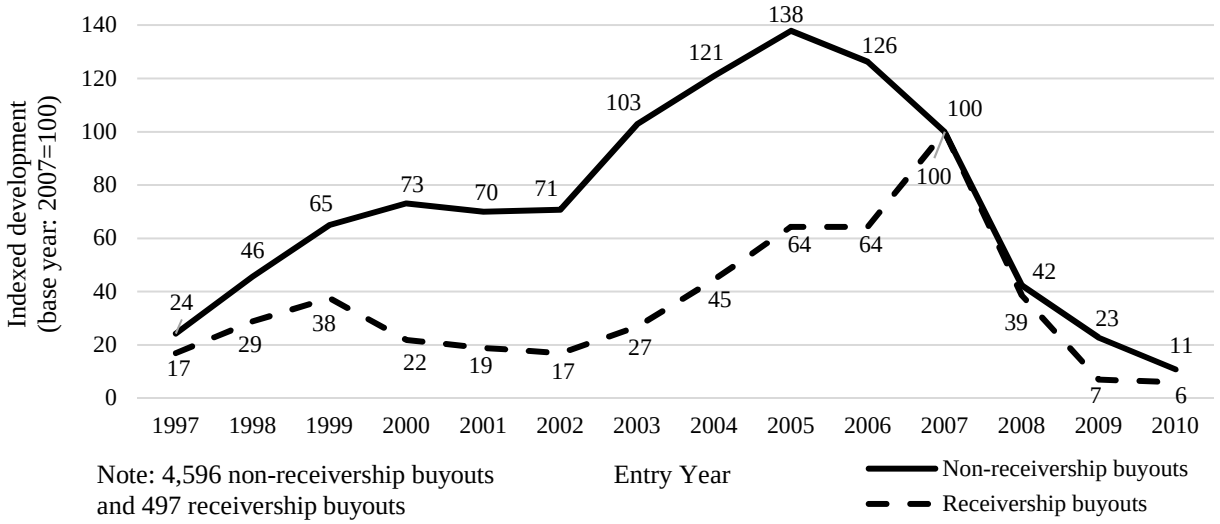
(ii) Development of Default Buyouts by Exit Year



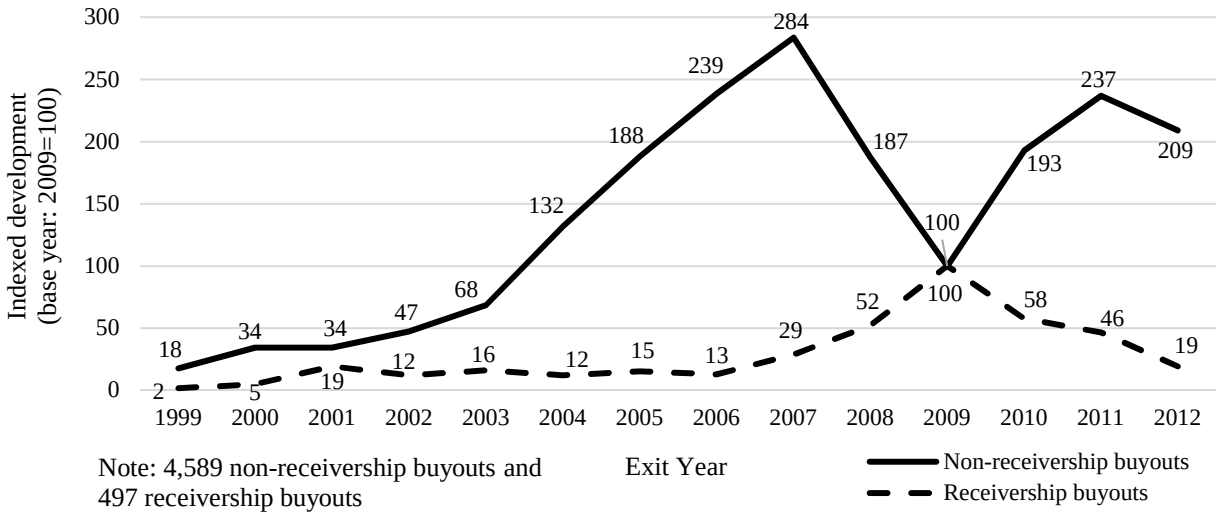
These figures illustrate the absolute and relative development of default buyouts entered between 1997 and 2010 (i) and exited between 1999 and 2012 (ii). The left-hand side y-axis represents the absolute number of default buyouts; the right-hand side y-axis represents the relative number of default buyouts as percentage of total sample buyouts per year.

Figure 2: Indexed Development of Buyouts by Entry and Exit Year

(i) Indexed Development of Buyouts by Entry Year

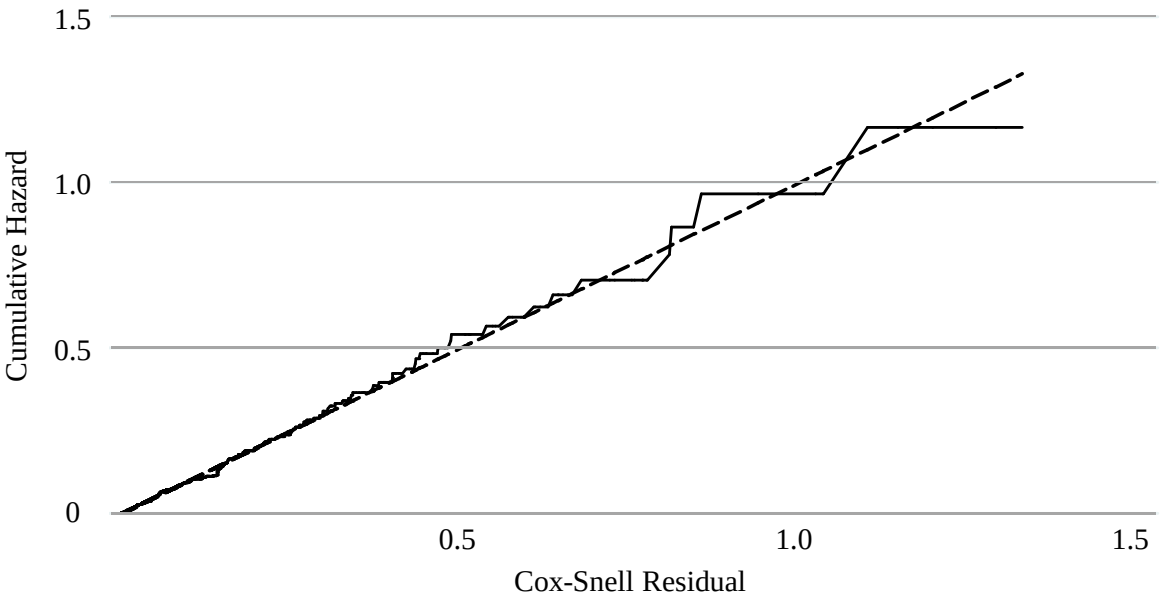


(ii) Indexed Development of Buyouts by Exit Year



These figures illustrate the indexed development of default and non-default buyouts entered between 1997 and 2010 (i) and exited between 1999 and 2012 (ii). The y-axis represents the indexed number of buyouts per year with 2007 and 2009 as base years in (i) and (ii), respectively.

Figure 3: Cox-Snell Residual Test



This figure presents the cumulative hazard of the Cox-Snell residuals for model specification 1 of Table 6. It can be interpreted as goodness-of-fit test analyzing how close the cumulative hazard matches the 45°-line.

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