Prolonged private equity holding periods
European evidence

Finance

Master's thesis

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Abstract

OBJECTIVES OF THE STUDY

Private equity firms' average portfolio company holding periods have significantly lengthened over the last years, especially after the financial crisis of 2008. Recent studies on private equity exits have mainly focused on exit strategies and exit route decisions, and shed only some light on the exit timing decisions. I focus on the determinants of the private equity holding periods and provide evidence on the potential reasons behind the foregoing change. To my best knowledge, this study is the first one to address the lack of understanding behind the determinants of the prolonged private equity holding periods.

DATA AND METHODOLOGY

The sample used in this thesis is collected from VentureXpert, Zephyr and Orbis and covers the years from 2000 to 2015. I obtain data on 2,328 European private equity buyout deals of which 1,585 (68%) are identified as deals with a known exit date and 743 (32%) as current holdings. Univariate analysis is used to study the length of the private equity holding periods. To analyze the potential determinants of the prolonged private equity holding periods, I utilize a logistic regression model and Cox's proportional hazard model which is able to handle time-varying covariates. Multinomial logistic regressions and OLS are used as a robustness check.

KEY FINDINGS

I find strong evidence that the private equity holding periods have significantly lengthened from the pre-crisis average of 4.7 years to 5.8 years after the financial crisis, despite the exit route. Additionally, only 42% of the post-crisis exits were made in less than five years, compared to 61% for the pre-crisis period. I find a time-varying combination of the operational development, private equity firm's experience and capital market conditions to be the main determinants of the exit timing decisions. Strong revenue growth increases the likelihood of an exit within five years from the initial investment. Holding periods are likely to be longer when more new buyout funds are raised, and new buyout market entrants have on average around 3 to 6 months longer holding periods. Furthermore, a one standard deviation tightening in the availability of credit decreases the likelihood of an exit within five years by 7.5% to 12.6%, and a 100 bps increase in BAA yield spread post-crisis results to a 7 to 10 months longer holding period on average. When IPO markets turn from "cold" to "hot" the likelihood of an exit within five years from the initial investment increases by around 31.5 percentage points, translating to around 5 to 10 months shorter holding periods on average.

Keywords private equity, buyout, holding period, exit decision, exit timing, portfolio company

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TUTKIELMAN TAVOITTEET

Pääomasijoitusten keskimääräiset pitoajat ovat merkittävästi pidentyneet viime vuosina, erityisesti vuoden 2008 finanssikriisin jälkeen. Viimeaikaiset tutkimukset ovat keskittyneet pääomasijoittajien irtautumisstrategioihin ja -reitteihin, mutta irtautumisten ajoituspäätöksiä on tutkittu ainoastaan kapea-alaisesti. Tässä tutkielmassa tavoitteenani on tutkia tekijöitä, jotka vaikuttavat pääomasijoitusten pitoaikaan. Parhaan tietämykseni mukaan tämä on ensimmäinen tutkimus, joka keskittyy tutkimaan niitä tekijöitä jotka ovat mahdollisesti vaikuttaneet pääomasijoitusten pidentyneisiin pitoaikoihin.

LÄHDEAINEISTO JA MENETELMÄT

Aineisto on kerätty VentureXpert, Zephyr ja Orbis -tietokannoista ja koostuu eurooppalaisista pääomasijoittajien tekemistä buyout-sijoituksista aikaväliltä 2000-2015. Aineisto kattaa yhteensä 2328 ensivaiheen buyout-sijoituksen tiedot, jakautuen 1585:een (68%) irtautumiseen ja 743:ään (32%) nykyiseen salkkuyritykseen. Tutkiessani pidentyneisiin pääomasijoitusten pitoaikoihin vaikuttavia tekijöitä hyödynnän logistista regressiota ja Coxin suhteellisten riskien mallia, johon on mahdollista sisällyttää ajan kuluessa muuttuvia selittäviä tekijöitä. Tulosten luotettavuutta arvioidaan myös multinominaalisten logististen regressioiden ja lineaaristen regressioiden avulla.

KESKEISET TULOKSET

Tulokset osoittavat, että pääomasijoitusten keskimääräinen pitoaika on pidentynyt merkittävästi finanssikriisiä edeltävältä 4,7 vuoden tasolta finanssikriisin jälkeiselle 5,8 vuoden tasolle. Lisäksi 61% ennen finanssikriisiä tehdyistä irtautumisista tehtiin viiden vuoden kuluessa ensisijoituksesta; vastaava suhdeluku on 42% finanssikriisin jälkeiselle ajalle. Kokonaisuudessaan irtautumispäätöksen ajoitukseen vaikuttavat paitsi salkkuyrityksen operatiivinen kehittyminen, myös pääomasijoittajan kokemus ja erityisesti pääomamarkkinoiden tilanne. Vahva liikevaihdon kasvu kasvattaa irtautumisen todennäköisyyttä viiden vuoden kuluessa ensisijoituksesta ja pitoajat ovat todennäköisesti pidempiä silloin, kun useita uusia pääomasijoitusrahastoja on kerätty. Uusien pääomasijoitusrahastojen keskimääräiset pitoajat ovat noin 3 - 6 kuukautta pidempiä. Markkinakorkoluottojen noustessa yhden keskihajonnan verran todennäköisyys irtautumiselle laskee 12,6% ja yhden prosenttiyksikön nousu markkinaluottokoroissa pidentää salkkuyrityksen pitoaikaa keskimäärin seitsemästä kymmeneen kuukautta. Listautumismarkkinan ollessa "kuuma" todennäköisyys irtautumiselle kasvaa 31,5:llä prosenttiyksiköllä verrattuna "kylmään" listautumismarkkinaan ja salkkuyritysten pitoajat ovat keskimäärin 5 - 10 kuukautta lyhempiä.

Avainsanat pääomasijoittaminen, pitoaika, irtautumispäätös, yrityskauppa

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1. INTRODUCTION

1.1. Background and motivation

> *"PE funds have little incentive to sell an asset until they have at least doubled the equity they invested. Thus, simple mathematics suggest that holding periods of five years or more look to be the new norm."* – (Bain & Company, Global Private Equity Report 2015)

Private equity (PE) has grown as an increasingly important asset class over the last decades. Globally, the private equity industry reached a new record in June 2014 by having a total of $3.8tn of assets under management, over five times more than at the end of 2000 (Preqin 2015a).[1] Private equity markets have also become more a complement for the public equity markets in recent years, rather than being a substitute for them (Strömberg 2008). For example, private equity firms are often involved in the M&A market as financial buyers (and sellers) together with the strategic buyers (Vild & Zeisberger 2014).

While private equity activity has recently increased almost to the same level as before the financial crisis, private equity firms seem to have had difficulties in finding suitable exit opportunities for their portfolio companies. First, secondary buyout deals (SBOs), in which a private equity firm sells a portfolio company to another private equity firm, have become increasingly common over the years (see, e.g., Kaplan & Strömberg (2009); Degeorge et al. (2015); Jenkinson & Sousa (2015)). Second, there are more partial exits or so called leveraged recapitalizations, in which a private equity firm is able to extract cash from the business without selling it; Preqin (2015b) reports that partial exits accounted for 33% of all exits in 2014, compared to 19% in 2008. In addition, holding periods of private equity backed portfolio companies have lengthened remarkably. According to Preqin (2015b), European buyout deals had the longest average holding period of 6.2 years for deals exited in 2014, compared to less than 4.5 years for deals exited between 2006 and 2009. Most notably, 36% of the exited portfolio companies in 2014 had been in PE firms' portfolios for longer than 7 years, while the same figure was around 15% for years 2006-2009.

Typically, private equity firms keep the portfolio companies in their funds from three to seven years. Within this time period the private equity firm focuses on increasing the value of the portfolio company through

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[1] Unrealized value of the portfolio companies accounted for $2.6tn and uncalled capital commitments (so called "dry powder") for $1.2tn of the total. To provide a comparative figure, the US stock market value totaled around ($15tn) $26tn at the end of (2000) 2014, so that the global private equity industry's share of the total US stock market value has increased from around 5% to 14%.

operational improvements (e.g. increasing sales and improving profitability), by improving the company's market position and corporate governance structures (e.g. strategic improvements which typically increase the exit multiple, *ceteris paribus*) and by using leverage to increase the return on equity capital. Target is to sell the portfolio company at a profit at the time of exit, typically 3 to 7 years after the initial investment. The proceeds are then distributed to the investors of the private equity fund (limited partners), who in turn can invest the funds back in new private equity funds or other asset classes. This way, the lengthened private equity holding periods can have a prolonging effect also on the general private equity cycle.

The longer it takes to exit a portfolio company, the stronger the potential adverse impact on the private equity firm. For example, a longer average holding period naturally leads to a lower average investment performance, Valkama et al. (2013) report a negative correlation of -0.44 between the equity IRR (internal rate of return) and holding period. The portfolio companies do not usually pay dividends, and thus the general partner as well as the limited partners realize a bulk of their compensation only after the exit. Thus, the general partner has every incentive for a timely exit when the set investment targets have been met. A profitable exit within the typical 3 to 7 year time frame is also a strong signal of the PE firm's abilities. The general partner typically seeks to raise a new fund every two to five years (Phalippou 2009) and prolonged holding periods may not be positive signals about the general partner's ability to add value for the funds' investors. The ability to make a profitable exit within a reasonable time period can thus have a significant impact on the general partners' ability to raise follow-on funds.

Overall, given the size and importance of the private equity market, it is important to gain a better understanding of the potential drivers behind the prolonged private equity holding periods. The lengthened holding periods also have implications on the portfolio companies' management, investors of the PE funds as well as the PE firms themselves, these too are reviewed in the literature part of this thesis.

1.2. Research objective

This thesis aims to (i) identify the potential determinants of the private equity holding periods and (ii) address the lack of understanding behind the prolonged private equity holding periods, evident especially in the time period after the financial crisis. I start by reviewing the theory and literature on private equity, with a focus on the special features of the private equity model that are linked to the holding periods of portfolio companies. I continue by identifying various portfolio company and transaction characteristics, private equity firm and

private equity fund characteristics as well as capital market characteristics that possibly influence the PE firm's exit timing decision and/or drive the holding periods of portfolio companies over the customary 3-7 years prevailing in the PE industry. These characteristics are identified based on the existing theory and empirical evidence. Finally, I study the private equity firms' holding periods with a focus on exits made before and after the financial crisis. The analysis on the potential drivers behind the prolonged holding periods is done in various ways. I start with univariate analyses and continue by conducting logit regressions to study the likelihood of exiting a portfolio company successfully within five years from the initial investment. Cox's proportional hazard model allows me to include time-varying explanatory variables in the regressions and is thus used to further shed light on the potential determinants of the prolonged private equity holding periods. Finally, I conduct robustness checks by running multinomial logit regressions to analyze the exit timing decisions within a specific time frame, and by using ordinary least squares.

Motivated by the notion on the prolonged private equity holding periods especially in case of the exits made after the financial crisis, and by the recent surge on the literature studying the exit strategies as well as exit route decisions, I aim to provide answers to the following questions:

1. Have the private equity firms' portfolio company holding periods lengthened?
2. What are the potential the key drivers behind the prolonged private equity holdings periods?

1.3. Contribution to the existing literature

This thesis has two key contributions to the existing private equity research. First, to my best knowledge, this paper is the first academic one to show that the private equity firms' average portfolio company holding periods have significantly lengthened after the financial crisis of 2008. Earlier studies report that private equity firms' portfolio company holding periods are on average around four to five years. For example, Ljungqvist & Richardson (2003) report an average holding period of 3.6 years and Jenkinson & Sousa (2015) find that portfolio companies are exited in a bit over 4 years. Based on the report by PE data provider Preqin (2015b), the more recent private equity exits have been made on average six years after the initial investment. Thus, I am able to update the findings of the earlier studies by using a more recent dataset, especially when taking into account that the private equity buyout funds raised in the boom years before the financial crisis are now close to the end of their lifetime and have probably exited most of their portfolio companies.

Second, I have found no previous papers providing evidence on the potential determinants behind the above-mentioned change, as recent studies on private equity exits have mainly focused on exit strategies and exit route decisions. For example, Schmidt et al. (2010) study the buyout exit strategies in Europe and the United States and Jenkinson & Sousa (2015) focus mainly on exit route decisions. While the latter paper and an earlier one by Ljungqvist & Richardson (2003) shed some light on the exit timing decisions, the potential reasons and drivers behind the *prolonged* private equity holding periods are not assessed. I aim to fill this research gap by using an extensive and recent set of data on European private equity deals from 2000 to 2015, by using a variety of advanced research methods and, most importantly, by studying the exits made both before and after the financial crisis.[2]

As a whole, the previous literature on private equity exit timing decisions is somewhat scarce. Cumming & Johan (2010) study how different characteristics influence the exit timing decisions in venture capital investments in the US and Canada, whereas the focus of this thesis is on European private equity buyout deals. Academics have recently paid more attention on the increased importance of SBOs as an exit route and a number of authors touch the subject of holding periods in their studies (see, e.g., Strömberg (2008); Wang (2012); Arcot et al. (2015); Degeorge et al. (2015) in addition to the papers already mentioned), but there seems to be no in-depth study on the determinants of the exit timing decisions, especially in the case of the prolonged private equity holding periods. I believe that this thesis provides a thorough analysis of the potential factors influencing the PE firms' exit timing decisions.

1.4. Limitations of the study

This thesis focuses on European private equity buyout deals and studies the potential factors behind the prolonged private equity holding periods, especially in the case of exits made before and after the financial crisis. Even though I have aggregated an extensive dataset and considered an array of factors potentially influencing the exit timing decisions, there are certain limitations that need to be considered when interpreting the findings of the study.

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[2] The dataset in the working paper of Ljungqvist & Richardson (2003) covers the time period from 1981 to 2001 and focuses on the European and US venture capital and buyout funds with around 3,800 observations. The sample is somewhat skewed to larger funds and holding periods shorter than in Strömberg (2008). Jenkinson & Sousa (2015) study the European PE exits from 2000 to 2014 and also use Cox's proportional hazard model but do not include time-varying covariates to their regressions. The sample includes only deals with a transaction value of over $50 million, liquidations, buy-backs and recapitalizations are dropped. In addition, the authors do not distinguish between the exits made before and after the financial crisis, and the authors' set of explanatory variables is somewhat limited.

First and foremost, a major limitation of this study is the availability of high-quality research data due to the private nature of the private equity industry. For example, I am able collect data on PE firms' current portfolio companies and realized investments, but unable to identify write-offs and bankruptcies, which can potentially lead to a selection bias and thus to a misinterpretation of the results. My research setting is thus somewhat similar to Jenkinson & Sousa (2015), who exclude liquidations, buybacks and recapitalizations from their data. I aim to control for the possible selection bias primarily by using Cox's proportional hazard model which takes into account the characteristics of the deals which are not yet exited, and could thus end up in a bankruptcy in a later stage. Strömberg (2008) shows that a non-trivial fraction of buyouts ends up in bankruptcy or reorganization, and reports an annual default rate of 1.2% per year. Strömberg (2008) also notes that distressed deals are more likely to end up in financial distress again, and thus I have excluded PE funds which focus on distressed deals from my data.

I aim to deal with the inherent data availability limitation by combining data from different databases, namely SDC Platinum's VentureXpert (VE), Bureau van Dijk's (BvD) Zephyr and Orbis. As financial and accounting information on private companies is better available for European companies, I focus on this geographical area. From VE, I am able to get data on private equity buyout deals and initial investments since 1980. Zephyr's historical coverage dates back to 1997 and the information is limited for the years before 2000 which limits the sample period of this thesis. Furthermore, deal level valuation data is available only for a small number of deals and I am not able to access PE firm or PE fund level performance data; thus I am unable to perform analyses from these perspectives.

Second, the inherent endogeneity issue should be considered when assessing the results. For example, it would be natural to say that weaker sales growth and profitability are likely to result to a longer holding period. However, a longer private equity holding period could have been predicted already before the company entered into the PE firm's portfolio, if, for example, the company had problems with sales or operational performance already before the buyout. Thus, it is possible that these unobservable pre-deal characteristics may have influenced both the entry decision (i.e. the choice or possibility of entering into private equity ownership) and the exit timing decision (i.e. the PE firm knew from the beginning that the holding period will be above the typical three to five year interval).

In addition, the results might be influenced by other unobserved variables, as I do not have information on e.g. the PE firms' decision making criteria when making the investments. For example, I am unable to collect information on the entry and exit valuation, entry and exit multiples, targeted returns and the strategies that the PE firms' are using. The determinants of both entry and exit decisions naturally vary across portfolio companies and PE firms. A potential concern is, for example, that some PE funds have a preference for turnaround deals or for longer holding periods, and that there are omitted variables which could lead to a misinterpretation of the results. Especially the portfolio company's valuation at entry can be thought to have an effect on the ultimate holding period. For example, if the entry is made with a high valuation multiple and the operational environment of the portfolio company suddenly deteriorates due to external shocks as in the case of the financial crisis, the holding period presumably lengthens when the PE firm needs to wait for the industry valuations to return for their "normal" level.

I cannot rule out the scenario that the possible selection or endogeneity issues drive the results, but I believe that my research setting addresses many of the concerns. First, I use a large number of control variables capturing a wide array of portfolio company level, deal, PE firm and PE fund level as well as market level characteristics. Second, I perform the analyses by using a variety of methods to control for e.g. right-censoring and to check for the robustness of the results. Specifically, I use logit regressions to identify the potential factors which can have an impact on the likelihood of exiting the portfolio company within five years from the initial investment. I also employ Cox's proportional hazard model which allows me to control for right-censoring (selection bias) and allows the use of time-varying explanatory variables (e.g. exit market conditions are likely to change alongside business cycles which can affect the results). Robustness checks are performed using multinomial logits and ordinary least squares. As a whole, the results from the various analyses point to similar conclusions.

1.5. Main results

Regarding my first research question, I find strong evidence that the private equity firms' portfolio company holding periods have significantly lengthened in the time period after the financial crisis. For the full sample period from 2000 to 2015, the average holding period has been 4.9 years. While the exits were made on average 4.7 years after the initial investment in the pre-crisis period, holding periods have lengthened to an average of 5.8 years post-crisis. The results are robust despite of the exit route and the size of the company.

In addition, I find that only 42% of the post-crisis exits were made in less than five years from the initial investment, compared to 61% for the pre-crisis period.

The main research objective of this thesis is to identify the key determinants of the private equity holding periods and to address the lack of understanding behind the potential drivers of the prolonged private equity holding periods. I investigate various factors including (i) portfolio company level characteristics, (ii) deal, PE firm and PE firm level characteristics and (iii) market level conditions which are likely to interact and together have an impact on the exit timing decision.

I find that portfolio companies with strong revenue growth are more likely to be exited faster. For example, the likelihood of exiting a portfolio company within five years from the initial investment increases by about 6.5% when there is a positive shock of one standard deviation on the compound annual growth rate of revenue, translating to 17.3% increase relative to the unconditional mean of exiting the portfolio company in five years. Strong revenue growth also increases the likelihood of an exit in less than three years (relative to an exit after seven years) from the initial investment, and exits are accelerated by around 7 to 15 months on average for the fast growing portfolio companies with an annual compound revenue growth rate of 100%. In addition, larger portfolio companies (by revenue) are more likely to be exited faster, whereas the holding periods are more likely to be longer for the asset heavy portfolio companies.

The results on the deal, PE firm and PE fund level characteristics suggest that the private equity holding periods are more likely to be longer when there are more new entrants in the buyout market. Specifically, I find that the likelihood for an exit in less than five years from the initial investment decreases by 11.5 percentage points when the fund is a newly established one. Controlling for industry, country and time effects suggests that holding periods are around 3 to 6 months longer for new entrants. Both the statistical and economic significance of the result varies somewhat across different models and specifications but as a whole, the results point to similar conclusions. Interestingly, I find evidence that the new buyout market entrants were more likely to hold the companies longer in their portfolios in the time period before the financial crisis, and have accelerated their exits post crisis. The pre-crisis vintage funds have performed on a similar level or slightly worse than the public markets (see, e.g., Harris et al. (2014); Preqin (2015a)) and my results suggest that it has potentially been the first time funds which have been underperforming due to their prolonged portfolio company holding periods.

I also find that the exit timing dynamics differ for the pre-crisis and post-crisis periods when the deal has a strong management participation and when the PE fund making the investment is older. As these governance related areas are outside of the scope of this thesis, further research could shed light on whether the private equity firm and the management have differing incentives at the times of market turbulence or when the fund is close to the end of its investment period and/or lifetime.

Finally, I find that the market level conditions are in an important role in exit timing decisions. Especially the availability of credit drives private equity exit activity: for the full sample period from 2000 to 2015 a one standard deviation increase in BAA yield spread decreases the likelihood of an exit within five years from the initial investment by about 7.5% to 12.6%, which is a 20.7% to 33.3% decrease relative to the unconditional mean. Furthermore, the prolonged private equity holding periods in the post-crisis period seem to have been driven mainly by the tightening availability of credit as the economic effect is stronger for the post-crisis period. A 100 bps increase in BAA yield spread in the post-crisis period decreases the hazard rate of exit by 4.2% relative to the baseline hazard, and holding periods are likely to be around 7 to 10 months longer on average. Credit availability has continued to be tight in Europe (Kerola 2014), and my findings suggests that thus the European private equity holding periods are likely remain somewhat longer than historically, which also affects the fund returns and the fundraising cycle in the long run.

Active IPO markets are likely to result to shorter holding periods. I find that when the number of IPOs doubles, the hazard rate of an exit increases by 6.1% relative to the baseline hazard. Furthermore, when IPO markets turn from "cold" to "hot" the likelihood of an exit within five years from the initial investment increases by 31.5 percentage points and the exits are more likely to be made in less than three years (rather than after seven years). Hot IPO markets accelerate private equity exits by around 5 to 10 months on average. The results also suggest that the IPO market activity significantly slowed down after the financial crisis, which seems to have lengthened the private equity holding periods. I also find evidence that the PE firms' increasing activity in the M&A markets (Hammer et al. 2014) has potentially resulted to prolonged holding periods.

1.6. Structure

The remainder of the paper is organized as follows. Section 2 provides a general description of the private equity model. Literature and theoretical background on private equity is discussed in in Section 3, and the

relevant empirical evidence is presented in Section 4. Section 5 introduces the hypotheses. Section 6 describes the data collection process, defines the variables used in the study, and provides descriptive statistics as well as the univariate analyses. Methodology and the econometric models are presented in Section 7. Section 8 reports the empirical results on the potential determinants of the prolonged private equity holding periods. Discussion of the main results is provided in Section 9, and Section 10 concludes.

2. PRIVATE EQUITY

This section provides a general description of the private equity model based on both academic literature and typical industry standards. The theoretical background and empirical evidence on private equity are covered in Sections 3 and 4, respectively.

2.1. Definitions

Private equity (PE) is a common term for an asset class consisting of equity investments in companies not quoted on a public exchange. In general, private equity investments are classified by the stage of investment to venture capital transactions (seed, start-up and later stage venture transactions) and to transactions in which capital is provided for more mature companies (growth capital, rescue / turnaround, replacement capital, buyout investments).[3] Using this classification criteria, venture capital (VC) is a sub-category of private equity. Furthermore, using a private equity fund's strategic profile / stage focus as a classification criteria, EVCA classifies PE funds to early stage funds, later stage venture funds, balanced funds, growth funds, buyout funds, generalist funds and mezzanine funds.

In this thesis, I focus on buyout deals. In a typical buyout transaction, a majority of a target company is acquired and debt is used in addition to equity to leverage the size of the investment and to increase potential returns on invested equity capital. The buyout category includes management buy-ins (MBIs), management buyouts (MBOs), leveraged buyouts (LBOs), public-to-private (PTP) transactions and other types of buyout transactions. Buyout funds are typically classified by size to small buyout funds ($\leq$ \$250m), mid-market buyout funds (\$250m $<$ x $\leq$ \$500m), large buyout funds (\$500m $<$ x $\leq$ \$1000m) and mega buyout funds ($>$ \$1000m).[4] Throughout the thesis, I refer to these type of private equity firms, funds and transactions as "private equity" or "buyout", using the terms interchangeably.

2.2. Private equity model

In a general private equity model, a private equity firm (general partner, GP) manages private equity funds, which make equity investments in companies not quoted on a public exchange. As Kaplan & Strömberg (2009) note, many of the leveraged buyout (LBO) firms of the 1980s are today referred to as private equity firms. The change from a LBO firm to a PE firm may seem subtle, but is supported by recent research. First,

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[3] This classification criteria is used by European Private Equity & Venture Capital Association (EVCA).
[4] Classification by Thomson Financial (SDC Platinum).

the buyouts from 1990 to 2006 have been less levered and not as aggressively priced as in the first LBO wave in the 1980s (Guo et al. 2011). Second, in a survey to the 79 largest PE firms globally, Gompers et al. (2015) report that growth in the value of the underlying business is ranked as the most important return driver by the PE managers, operational improvements as second. Use of leverage and industry-level multiple arbitrage are also important drivers of PE investor returns, but ranked behind growth and operational improvements. Considering these changes, the subtle change from a LBO firm to a PE firm is justified.

The private equity model has several stages, starting from raising capital for the fund and finally ending with returning the raised funds and realized returns to the investors (limited partners, LPs) of the fund. A typical private equity fund is organized as a limited partnership and has a lifetime of ten years, with a possibility to extend the life of the fund by up to three years, one year at a time with a mutual agreement between the general partner and the limited partners. In the first stage the fund is being established and funds are raised from the limited partners. The fundraising period typically lasts from 6 to 12 months and a new fund is raised every 3 to 6 years. In Europe, the largest investors in buyout funds according to EVCA (2015) include pension funds (29% of total raised capital), funds of funds (11%), insurance companies (9%) and sovereign wealth funds (8%).[5] The year at which the fund begins investing by making its first investment is called the vintage year of the fund. The general partner typically commits around 1-3% of the capital to the fund. The general partner acts as an advisor to the fund by making investment and exit proposals, and develops the portfolio companies during the investment period by e.g. being actively involved in the boards and decision making processes of the portfolio companies.

The second stage, investment period, typically lasts from 3 to 5 years (Ljungqvist & Richardson 2003). Based on the fund's investment strategy[6] and criteria the general partner sources for potential investment targets through e.g. own proprietary network and contacts and placement agents (investment banks and other advisors). In some cases, the GP is directly approached by the owners or the management team of a company, seeking to raise capital or taking the business private. The GP then evaluates each target in accordance with the required return criteria and value adding potential. In evaluating PE investments, a typical forecast horizon is five years (Gompers et al. 2015). After identifying a potential investment target, a

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[5] Other typical private equity investors include, for example, endowments and foundations, government agencies, banks and high net-worth individuals.

[6] A typical investment strategy includes a thorough definition of e.g. the size, industry, lifecycle, and geographical area of the potential target companies.

detailed due diligence on the target is performed, assessing the company's financial, operational and legal aspects. Financing negotiations with banks are initiated at this stage to ensure the financing for the transaction. Finally, the transaction materializes, provided that bank financing is available and no deal breakers are found in the due diligence or negotiation process. Jenkinson & Sousa (2015) report that on average a private equity fund makes most of its initial investments in about two years into the life of the fund. Capital is called from the limited partners when investments to the portfolio companies are made, and the uncalled capital commitments are typically called as dry powder. Ljungqvist et al. (2008) report that on average a buyout fund draws down only 66% of the committed capital and the speed at which capital is drawn down varies a lot between different vintage year funds.[7]

After the investment is made, the third stage involves developing and monitoring the portfolio company in order the create value for both the portfolio company and the fund's investors. In addition to providing capital for the buyout target, the general partner acts as an active owner, providing support for the portfolio company and its management in the form of e.g. operational, governance and acquisition experience, often by holding a seat in the portfolio company's board or by introducing external advisors with significant industry expertise to the board. Exit timing, potential exit routes and strategies are also outlined early on, typically already before the initial investment is made. Naturally, a variety of factors influence the timing, type and route of the exit, such as the market conditions, achieving the initially set operational performance targets and the management's view on the preferred buyer.

Private equity investments are medium to long-term commitments, characterized by the fact that the private equity firm is only a temporary owner as the fund's lifetime is limited and the portfolio companies need to be exited within the fund's lifetime. A typical holding period for the portfolio company is around five years (Gompers et al. 2015), during which the necessary value adding actions are taken and the company is developed and prepared for an exit. The usual exit routes include a listing through initial public offering (IPO), trade sale to e.g. an industrial buyer, sale to the management group or a secondary sale (secondary buyout, SBO) to another private equity firm. In addition, a fraction of the companies being bought out end up in bankruptcy or reorganization; Kaplan & Strömberg (2009) report a 6% default rate for their sample over the period of 1970 to 2007. As a whole, the fund's lifecycle from years six to ten can be defined as a

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[7] The authors note that this number understates the draw down rates as the more recent funds in their sample from 1981 to 2000 are not yet fully invested and report an average draw down rate of 94% for vintage funds 1981 to 1993.

harvesting period, where the companies are being developed and sold, which allows returning capital and the realized returns to the investors. During this period the general partner also begins the preparations for raising a subsequent fund.

2.3. Characteristics of the private equity industry

While private equity includes a variety of strategies such as venture capital, mezzanine, growth capital, real estate, and investments to distressed companies, leveraged buyouts (or simply buyouts) have remained at the core many PE firms' investment strategy. According to data provided by EVCA (2015), a total of €44.6bn of new European private equity capital was raised in 2014 into 298 funds of which buyout funds' share was 78% (89 new buyout funds).

In 2014 alone, a total of 2,938 private equity-backed buyout deals were announced in Europe and North America, with a total deal value of $275bn (Preqin 2015a). Globally, North America continued to account for a bulk of the total with a 55% (55%) share of the number of deals (value of deals), followed by Europe with a 30% (28%) share, respectively. PE firms have recently become an increasingly important competitor for strategic buyers. Even though the latter have an obvious advantage because of the potential synergy benefits, PE firms are often the preferred buyers in many deals and have the benefit of having strong financial discipline, focus, flexibility as well as proper incentive structures in place (Vild & Zeisberger 2014).

3. LITERATURE REVIEW

This section presents a theoretical background for the existence of private equity. To provide an extensive background for this study, I also discuss the distinguishing features of the private equity model such as the capital structure choices of private equity backed firms, private equity performance and other special features of the private equity model including the financial and compensation structure of private equity funds. As a whole, the features of the private equity model have implications on both the entry and exit decisions, of which the latter are studied in this thesis. Empirical research on private equity is presented on Section 4.

Previous research on private equity has focused on three broad categories. First, there is abundant evidence on the agency related issues, for example the impact of private equity ownership on portfolio companies' operational performance and governance structure is studied by several authors, as summarized by Strömberg (2009). Related to this stream of research, buyout funds' performance and returns to limited partners have received extensive attention, of which Harris et al. (2014) provide a review with updated data. Second, the implications of favorable debt market conditions on the pricing and capital structure choices of private equity backed companies have received attention from the academics (Axelson et al. 2013). The authors also discuss the potential agency conflicts between the general partner and the limited partners. Third, the more special features of the private equity model, such as the financial structure of the buyout funds (Axelson et al. 2009) and the GPs' compensation model have been studied extensively (see, e.g., Chung et al. (2012); Metrick & Yasuda (2010)).

3.1. Agency theory

> *"The publicly held corporation has outlived its usefulness in many sectors of the economy. New organizations are emerging. Takeovers, leveraged buyouts, and other going-private transactions are manifestations of this change."*- Jensen (1997)[8]

The agency theory postulates that the separation of ownership and control creates conflicts of interest between the principals (owners) and the agents (managers) of a company (Jensen & Meckling 1976).[9] In this setting, the principal and the agent have partly differing incentives and there exists uncertainty that the agent cannot control, and the principal lacks information that the agent has. This results to agency costs,

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[8] 1997 refers to a revised version, the paper was originally published in Harvard Business Review in 1989.
[9] The theory also posits conflicts of interest between shareholders and bondholders, but for the purpose of this thesis, I focus on the separation of ownership and control.

meaning that the value of the firm is different from the hypothetical firm value which would exist if the management and shareholder incentives would be perfectly aligned. Agency problems arise in different forms. For example, in the case of monitoring, the minority shareholders lack economic incentives to monitor their manager agents and an atomistic shareholder structure can lead to a classic free-rider problem as described by Grossman & Hart (1980). The lack of monitoring on the behalf of the owners can materialize in the form of e.g. the firm size being suboptimal (i.e. free cash flow problem), as suggested by Jensen (1986). A large blockowner also creates agency problems in the form of e.g. self-dealing transactions (Bratton 2008).

Leveraged buyouts can help to overcome many of these problems as famously suggested by Jensen (1997). Since the publication his classic article, a privately held corporation form is often considered superior to a publicly listed one in mitigating agency problems. LBOs and their later counterparts, private equity backed buyouts, have been viewed as a form of "medicine" for fixing badly performing public firms with various agency related problems (Rappaport 1989). During the first wave of LBOs, namely the public-to-private buyouts of the 1980s, the motivation behind an LBO was strongly related to these agency-related issues. However, Strömberg (2008) reports that LBOs have been occurring in a wide range of industries at all times. The author further notes that this organizational form has become quite permanent, as 69% of all firms entering in LBO status over 1980-2007 were still in LBO form at the time of the study. Additionally, the number of LBO-backed firms has risen from less than 2,000 in the mid-1990s to around 14,000 at the beginning of 2007.

In a typical private equity transaction agency issues are mitigated through stronger monitoring and by providing aligned incentives for the owners and the management. The monitoring problem is mitigated as the ownership is concentrated to the buyout firm, who is an active owner and also exercises stronger corporate governance by having (typically) a board seat in the portfolio company. However, similar problems as in the case of a one large blockowner are not created, as the buyout structure has a limited lifetime and the general partner is liable to generate the promised returns to the limited partners. A variety of tools is used to better align the incentives of the owner and the manager in private equity buyouts. Leslie & Oyer (2008) document that the top managers of private equity owned companies have a higher equity ownership, lower salaries and a higher variable pay than the managers in the public counterpart firms, resulting to high-powered and aligned incentives structures. The buyout firm also closely monitors the

performance and sets performance targets according the value creation plan, and is ready to take more aggressive corrective actions when necessary. For example, PE sponsored LBOs are accompanied with a 51% CEO turnover rate within two years of the LBO announcement (Gong & Wu 2011). Furthermore, the additional leverage accompanying the private equity buyout works as a disciplinary device, mitigating the free cash flow problem.

3.2. Capital structure of private equity backed portfolio companies

The traditional theories explaining the capital structure of a publicly listed company can be broadly divided into theories on the company level, e.g. the trade-off theory, pecking order theory and free cash flow theory (Myers 2001).[10] Baker & Wurgler (2002) suggest an equity market timing theory, where the managers take advantage of the market imperfections, issuing more equity when the equity market overvalues their stock and repurchasing shares at low prices.

In the private equity setting, agency theory implies that company specific characteristics should drive the buyout activity and the capital structure choices of buyout backed companies. A company with a high level of free cash flow probably has a suboptimal capital structure which is corrected in the buyout transaction, i.e. debt reduces the agency costs of free cash flow. The trade-off theory implies that there is a relation between the capital structures of a buyout backed company and a comparable public company. However, Axelson et al. (2013) find no such relation, so that the capital structure decision of a private equity backed company and a comparable public company is driven by different factors. Specifically, credit market conditions such as price and availability of debt financing drive the capital structure of buyout backed companies, suggesting a market timing theory.

The results of Axelson et al. (2013) suggest that capital market conditions are a main constraint for private equity firms for carrying out any particular deal. Interestingly, during hot markets and while credit markets are loose the higher leverage may not be in the interest of the limited partners, suggesting agency conflicts between the general partner and the limited partners. As more cheap debt is available, it is easier for the general partner to overleverage the portfolio company, and this higher leverage should lead to lower fund returns on average. A recent study by Harris et al. (2014) confirms that buyout funds which started making investments just before the global financial crisis have lower IRRs and investment return multiples than

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[10] In addition, the classic Modigliani-Miller theorem states that the capital structure of a firm does not affect the value of the firm or the cost or availability of capital under perfect and frictionless capital markets.

buyout funds for vintage years from the mid-1990s to the early 2000s. The authors use Burgiss data as of March 2011, and thus their performance figures for the more recent vintage funds are only suggestive as the funds were still in the investment and/or value creation phase at the time of the study. Even though, recent data from Preqin (2015a) shows that the 2005-2009 vintage year funds have lower median IRRs and PME ratios[11] than the earlier vintages. The variation in the vintage year performance of buyout funds seems to be in line with the predictions of Axelson et al. (2013). Arguably the credit market conditions were highly favorable for the vintage funds raised before the financial crisis, and these funds have performed on a similar level or slightly worse than the public markets. Still, an average buyout fund has outperformed the public markets by at least 3.7% per year, net of fees and carried interest, throughout decades (Harris et al. 2014).

3.3. Private equity performance

The performance of private equity in comparison to other asset classes has been studied extensively over the years. Even though previous research on the performance of PE funds measured by the returns delivered to the LPs in generally mixed, a recent study by Harris et al. (2014) confirms a better buyout fund performance than previously documented. The authors compare the performance figures of different data providers for buyout funds with vintages from 1984 to 2008, providing more comprehensive and reliable results for the performance of buyout funds compared to earlier studies. The buyout funds' outperformance compared to the S&P500 averages from 20% to 27% over the lifetime of the fund, resulting to outperformance of at least 3.7% per year.

The operational performance of the private equity backed companies has also been studied in depth. In general, there is strong evidence supporting the economic and social value creation of private equity of which Strömberg (2009) provides a summary at the European level. As a whole, private equity has had a positive impact on economic growth through increasing productivity, efficiency and innovation. Private equity managers put considerable effort in assisting the portfolio companies to grow and to develop their operations by providing operational and strategic support in addition to capital. Furthermore, private equity backed companies have more robust governance practices compared to other firms. Private equity also has a beneficial effect on the economy as a whole during downturns and when the access to capital is limited, as the PE firms have a strong incentive to invest in these periods.

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[11] PME refers to Public Market Equivalent ratio, which is used as a performance measure for benchmarking and comparing private equity funds' returns to public market returns (typically S&P500). PME value <1 indicates that a PE fund has underperformed the public market. See, e.g., Kaplan & Schoar (2005).

3.4. Special features of the private equity model

The private equity model has several interesting features which distinguish it from other types of corporate ownership models. For example, the private equity funds are organized as limited partnerships with a finite life and the capital is raised to the fund before any investments are made (or possibly even before the investments targets are discovered). The general partner is also restricted to invest only a certain amount of the total capital of the fund to a single target company and needs to borrow the rest from banks. In this subsection, I discuss the financial structure and compensation structure of the private equity funds. Taken together, these features have several implications on different stakeholders participating in the private equity market. As the scope of the thesis is to focus on the drivers of the prolonged private equity holding periods, I discuss the features mainly from this point of view.

3.4.1. Financial structure of private equity funds

Axelson et al. (2009) provide a theory for the financial structure of private equity funds, which minimizes the potential agency conflicts between the fund managers and the investors of the fund. In their model, credit market conditions are in a critical role for the financing of private equity investments, resulting to a situation where there is overinvestment in good economic times and underinvestment in bad economic times. Subsequently, investments made in bad times outperform investments made in good times resulting to a countercyclical investment performance of buyout funds. The private equity investment pattern is procyclical, and deal activity highly correlated with the credit market (and public equity market) conditions.

A common observation about the PE industry is that the market is highly cyclical and there is substantial co-movement with the public markets (Robinson & Sensoy 2015). The model of Axelson et al. (2009) implies several interesting features of the private equity model and also provides an explanation for the cyclicality of the PE market. When the PE fund has excess dry powder and is close to the end of its investment period, there is a strong incentive to invest more than would be optimal. In other words, also bad deals get accepted and financed during economic good times when bank financing is available even for the "mediocre" deals. The ability to get bank financing even for good deals is more difficult in bad economic times, leading to underinvestment. However, on average the deals that are made in bad economic times are actually better than the average deal made in good times.

As the PE market is strongly dependent on the movements of the public capital markets and the credit market conditions, these conditions can also be expected to have an impact on the holding periods of private equity investments. At times of favorable IPO markets, or when there is an abundant amount of M&A opportunities and bank financing easily available, exit opportunities can be expected to be more readily available.

3.4.2. *Compensation structure of private equity funds*

In a typical buyout fund the compensation components include, most importantly, a fixed management fee and a variable performance-based carried interest (see, e.g., Phalippou (2009); Metrick & Yasuda (2010); Chung et al. (2012); Robinson & Sensoy (2013)). Some general partners also charge portfolio company and monitoring fees (Phalippou (2009); Metrick & Yasuda (2010)). Of the most typical compensation components, the management fee is paid annually and is typically 1-2% of the committed capital during the investment period (usually five years) and tied to the amount of invested capital thereafter. Carried interest ("carry") represents an incentive fee for the general partner and is based on the returns earned by the fund. Typically, carry level equals to 20% and hurdle rate to 8%, meaning that 100% of the profits go to the limited partners until they have received an 8% annual return. After that, 100% of the additional returns go to the private equity firm until they have reached the carry level of 20% ("catch-up provision"). Finally, the subsequent profits are split so that limited partners receive 80% and the private equity firm 20% of the returns.

A general partner's lifetime income is not only dependent on the current fund's performance, but largely on the ability to raise follow-on funds (Chung et al. 2012). Current fund's performance has a significant effect on the general partner's ability to raise follow-on funds: Chung et al. (2012) estimate that the indirect pay-for-performance component is of the same size as the direct component from the carried interest. Both the likelihood of raising a subsequent fund and the size of that fund are strongly positively related to the current fund's performance. In addition, the indirect pay-for-performance component is especially important for buyout firms and new partnerships which have not yet build any reputational capital.

The compensation structure can also be expected to have an impact on the holding periods of portfolio companies. Naturally, an optimal timing for an exit to take place would be when the maximum payoff for the investment can be achieved. However, compensation of the general partner is not only dependent on a

single deal but also on the deal's effect on the GP's ability to raise follow-on funds. Thus, there can be an incentive to exit a successful investment quickly in order to signal the GP's abilities to the investors (building reputational capital) and to boost a fund's return figures (IRR) in order to start fundraising quickly. Phalippou (2009) highlights potential agency problems related to a typical buyout fund's compensation structure. For example, a general partner may have an incentive to time the cash flows so that the good investments are exited early and the poor investments delayed as much as possible. This way the GP would receive the carried interest early, even if some proportion of the carry is returned back to the limited partners ("clawback provision"). Furthermore, exiting portfolio companies early on not only inflates the IRR of the fund and adds to the reputational capital, but also increases the fund's assets under management (and this way the fees) if the contract allows for the reinvestment of capital for shortly-held investments.

Robinson & Sensoy (2013) provide evidence on the private equity fund managers' contract terms and fund performance. Their findings suggest that the typical contract terms reflect the skills and productivity of the GP as well as the agency problems that the limited partners face, so that GPs are neither extracting excessive compensation nor having poor incentives which would result to poor returns for the limited partners. In particular, compensation is more tied to the fixed component (i.e. management fees) during strong fundraising periods, but the authors do not find evidence that the funds with higher fees would underperform on a net-of-fee basis. In other words, this suggests that GPs that receive higher compensation also deliver higher gross performance. Interestingly, the authors also note that when the GP receives fees on the invested capital there is a tendency to exit investments more slowly, so that the fee basis is slowly lowered. Furthermore, exits are accelerated immediately after the GP starts to receive carried interest.

4. EMPIRICAL EVIDENCE

In this section, I present an overview of the empirical evidence in connection to the investment behavior of the buyout funds. To find the key determinants which might have had an effect on the prolonged holding periods of portfolio companies, I discuss the evidence regarding the holding periods of the portfolio companies, the entry and exit routes and the research on the increased number of secondary buyouts.

4.1. Investment behavior of buyout funds

The private equity firms' entry and exit decisions are major strategic decisions and in many ways at the core of a successful investment performance both at the portfolio company and PE fund level. For example, underperforming investments resulting to bad exits arguably make general partner's future fundraising more difficult as the limited partners can be expected to place a high emphasis on the GP's track record in the fundraising phase.

In order to empirically study the entry and exit decisions, investment activity, investment returns and risk-taking behavior of buyout funds, Ljungqvist et al. (2008) develop a framework for the buyout funds' investment behavior. In their model, demand for private equity capital varies over time and the supply of private equity capital is "sticky" in the short run. In the imperfectly competitive private equity market, economic variables such as the availability of investment opportunities, competition among the private equity market participants and the availability of credit drive the investment behavior of buyout funds. The authors' empirical findings are consistent with the implications of their theoretical model on the buyout funds' investment behavior. The timing of investment decisions is linked to buyout funds' risk-taking behavior, the universe of available investment opportunities and the competition among participants in the buyout market. The need to build reputational capital (i.e. establishing a track record) results to first-time and younger funds being more aggressive in their investment behavior compared to established buyout funds. In particular, inexperienced buyout fund managers make larger investments, are thus less diversified, and are also making investments independently of the market conditions.

The need to quickly establish a reputation as a successful fund manager is originally developed by Gompers (1996), whose grandstanding hypothesis suggests that reputational concerns affect the exit decisions (especially IPO timing) of young VC fund managers. The author argues that novice VC fund managers are

more willing to take risks at the beginning of the fund's lifetime which leads to faster reputation building, and finds evidence that VC fund managers prefer early exits which receive high attention.

Giot et al. (2014) study the risk taking behavior of newly established PE firms, but find contradicting evidence on their excessive risk-taking hypothesis which is based on the work of Gompers (1996) and Ljungqvist et al. (2008). As a whole, the results of Giot et al. (2014) on the investment behavior of inexperienced funds are consistent with expertise-based explanations, but do not support the reputation-building motives. The authors find that novice funds tend to be slower in investing capital, and the size of the novice funds' investments is larger compared to experienced funds. Interestingly, the results of Giot et al. (2014) suggest that novice funds underperform compared to experienced funds particularly in case of the larger investments, and have less successful exits early on. The authors conclude that a potential explanation for their results is that the novice funds lack expertise, or do not have access to the best investment opportunities.

The value created by the private equity firm is realized at the time of exit, and recent research has paid increasingly attention to the motivations and determinants of buyout exit decisions (e.g. the strategies and routes of exit). Schmidt et al. (2010) study the exit strategies of European and US buyout investments by focusing on the motivation and factors influencing the choice of an exit route. They find strong support for the signaling effect in private equity, i.e. private equity firms quickly write-off investments that do not meet the initially set performance targets, so that there are no "living-dead investments" left in their portfolios. Market conditions and sentiment are also found to be important determinants of exit decisions, as implied by the cyclicality of private equity investment activity (Axelson et al. 2009).

Both the timing of the exit and the chosen exit route are critical factors in driving private equity fund returns. Jenkinson & Sousa (2015) study the effects of fund level characteristics, portfolio company characteristics and capital market conditions on the exit decisions. The authors find that debt and capital market conditions are the most important determinants of the chosen exit route. For example, the loose capital market conditions in 2006 and 2007 led to an increase in the number of SBOs as private equity firms to were willing to pay more for portfolio companies compared to strategic buyers. Portfolio company level characteristics were also found to be important in determining the best possible exit route. In line with the free cash flow hypothesis, companies with high free cash flow were more often exited through SBO, as they are able to

bear more debt. This also suggests that the value creation in SBOs is more driven by financial engineering than by operational improvements. The authors also find evidence that SBOs can work as an efficient way to drawdown committed capital, as they happen later into the life of the fund than primary deals and, furthermore, experienced private equity firms sell more often to the less experienced firms.

4.2. Holding periods of portfolio companies

In this subsection, I provide a summary of the empirical evidence considering the length of the private equity holding periods. A common view on the private equity model is that the private equity firm is only a temporary owner, so that private equity is only a temporary governance structure (see, e.g., Rappaport (1989); Kaplan (1991); Jensen (1997); Strömberg (2008)). In line with this argument, earlier research concludes that the average holding periods of individual private equity transactions have been around four to five years. However, it takes significantly longer before a company entering into LBO status returns to public ownership (Kaplan (1991); Strömberg (2008); Kaplan & Strömberg (2009)). This suggests that a private equity backed organizational form is even more suitable for the longer term than often thought.

First, considering the holding periods of individual private equity deals, Strömberg (2008) reports an average (median) holding period of 4.1 (3.5) years for exited buyout deals.[12] The dataset of Strömberg (2008) includes more than 21,000 LBO transactions worldwide from 1970 to 2008, and comprises of current portfolio companies, successfully exited deals, bankruptcies and reorganizations. However, the computation method for the length of the holding period is undisclosed, and thus it is not clear whether the portfolio firms entering into financial distress bias the holding period figures. Strömberg (2008) also notes that only 42% (16%) of the PE sponsored buyouts (pure MBO deals) are exited within five years from the initial transaction, and continues by studying the exit success determinants by controlling for exit types, PE firm characteristics, geographical areas and time period of the entry. The analysis on the exit determinants suggests that, as a whole, larger deals (by imputed enterprise value) are more likely to be exited successfully, but the public-to-private deals are exited slower among the larger deals. Pure management buyouts are exited slower than deals by PE funds, and the latter are somewhat more likely to end in financial distress. Deals undertaken by more experienced PE funds, by funds which are not publicly traded, and syndicated deals are also more successfully exited. Overall, the analysis of Strömberg (2008) focuses mostly on the

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[12] The same dataset is used both in the papers by Kaplan & Strömberg (2009) and Strömberg (2008).

general deal characteristics, whereas this thesis provides a more nuanced picture of the potential determinants having an effect on the exit success and timing of exits.

Of the earlier studies around the same topic as this thesis, Ljungqvist & Richardson (2003) study the time period from 1981 to 2001, and report an average (median) holding period of 3.6 (3.0) years for a sample of around 3,800 portfolio companies worldwide. The holding periods are measured taking into account that the failed deals are never exited and that the more recent funds are right-censored. The authors' sample is derived from the private records of a large institutional investor and is somewhat skewed to larger funds with an average fund size of $502.8M. In addition, the average holding period length in the authors' sample seems somewhat short especially when comparing to the statistics of Strömberg (2008), which show that the average holding periods for exited deals in the years prior to 2000 have been over four years.

Schmidt et al. (2010) study the exit strategies for a sample of 672 buyout deals from 1990 to 2005, and report an average holding period of 4.1 years. The authors' sample consists mostly of US data (538 deals), whereas the number of European deals is limited to 134. Furthermore, MBOs present 87% of the deals and the share of LBOs is only 13%. Schmidt et al. (2010) report that 75% of the deals in their sample have been exited within 5.5 years from the initial investment, whereas Strömberg (2008) reports a notably lower exit success rate especially for pure MBO deals. The sample of Schmidt et al. (2010) includes only liquidated investments where the type of exit is available, and write-offs (which are not necessarily bankruptcies) account for around 15% of the deals, which could skew the results.

For a more recent sample of 1,022 European private equity exits between 2000 and 2014, Jenkinson & Sousa (2015) report an average holding period of a bit over 4 years (51.2 months), and that exits happen on average after around six years into the life of the fund. The holding periods for portfolio companies exited through SBO are on average 4.4 years, compared with 3.7 years for deals exited through an IPO. Furthermore, exits through SBOs occur later in the life of the fund (6.5 years into the life of the fund) than exits through IPOs (5.8 years). The authors also note that holding periods have lengthened notably after the financial crisis of 2008, but do not assess the potential factors behind the prolonged holding periods. The sample of Jenkinson & Sousa (2015) includes only exits via IPOs, SBOs and trade sales with a transaction value of over $50 million; liquidations, buy-backs and recapitalizations are not considered. The authors'

main focus is on exit route decisions and the exit timing decision are only briefly discussed, whereas this thesis provides a thorough analysis of the latter topic.

Several other papers have also reported the average private equity holding periods to be around four to five years, even though these papers do not consider the potential determinants of exit timing and exit success. As a summary, Valkama et al. (2013) report an average holding period of 3.6 years for a sample of 321 UK buyouts from 1995 to 2004, and also a negative correlation coefficient of -0.44 between equity IRR and holding period length. Studying the add-on acquisitions of private equity backed portfolio firms worldwide, Hammer et al. (2014) report an average (median) holding period of 3.9 (3.6) years for exited buyouts between 1997 and 2010. Achleitner & Figge (2014) report an average holding period of 4.5 (3.1) years for 1,301 realized (1,155 unrealized) buyout transactions in the US and Europe between 1990 and 2010, and also note that the average holding periods are significantly shorter for financial buyouts compared to other types of buyouts. Finally, Degeorge et al. (2015) find an average holding period of around 4.4 years for both primary and secondary buyouts in their sample of 5,382 (467) primary (secondary) buyouts which are liquidated between 1986 and 2007.

Second, considering the argument on private equity being only a temporary ownership model, it is interesting to note that that (i) the earlier research suggests buyouts being in fact a more long-term organizational form than often thought and that (ii) the average PE holding periods seem to have lengthened after the financial crisis of 2008. On the former topic on the longevity of private equity deals, Kaplan (1991) studies the first buyout wave from 1979 to 1986, and concludes that a company taken private through an LBO stayed private for a median time of 6.8 years, before returning to public ownership. Furthermore, Strömberg (2008) shows that the median time period a company is in private equity ownership is around nine years. [13] The focus of this thesis is on the individual private equity transactions, but considering the increased number of SBOs in recent years (see, e.g., Degeorge et al. (2015)), and the lengthened PE holding periods, the longevity of private equity governance structure seems like a fruitful area for future research.

On the latter argument, a recent report by Preqin (2015b), an alternative assets industry's data provider, shows that the PE holding periods have lengthened from around 4.5 years (for exits between 2006 and 2009) to over six years for exits made in 2014. For the European exits in 2013 and 2014, the average holding

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[13] Both Kaplan (1991) and Strömberg (2008) take secondary buyouts into account.

periods were 6.1 and 6.2 years, respectively, and around 36% of the exited portfolio companies in 2014 were held for longer than seven years in the PE firms' portfolios.[14] While the holding period figures are still within the typically targeted industry standard of three to seven years, there seems to have been significant lengthening in the average PE holding periods after the financial crisis; especially when compared to the figures in the earlier research. To my best knowledge there exists no literature on the potential drivers behind this change, and this thesis aims to fill this research gap.

4.3. Entry and exit routes

Companies end up to private equity firms' portfolios in a variety of ways. For a worldwide sample between 1970 and 2007, Strömberg (2008) reports that 52.2% of the LBO transactions were private-to-private transactions, 26.1% divisional buyouts, 13.5% deals from financial vendor and only 5.8% public-to-private transactions. Distressed deals accounted for 2.3% of the total. For the period 2001-2007, the author reports an increase in the number of divisional buyouts (36.3% of total number of deal types), whereas the number of private-to-private deals had decreased to 36.9%.

The sample of Strömberg (2008) shows that the relative importance of buyout exit routes has varied historically. While the importance of IPOs as an exit route has decreased in importance over time, SBOs have become increasingly common. Typically, exit is carried out through a sale to strategic buyer (i.e. trade sales, 38% of the exits), sale to a financial buyer (SBOs, 24%) or by taking the company public through an IPO (14%). Of the total number of exits, 6% end up in bankruptcy, 5% are sold to another LBO-backed firm and 1% sold to management.

4.4. Secondary buyouts

Recently, academics have paid increasingly attention on secondary buyouts from multiple points of view. First, given that the primary buyout was successful in creating value by e.g. reducing agency costs and by improving the target's financial and operational performance, selling the company to another private equity firm seems somewhat puzzling. Wang (2012) studies the motivations for SBOs for a UK sample between 1997 and 2008. The author focuses on three potential explanations for the increased number of SBOs: efficiency gains, liquidity-based market timing and collusion. Overall, she finds mixed evidence on the operational performance argument; companies acquired through SBO improve their operating cash flows

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[14] The same figure was on average around 15% for the exits in between 2006 and 2009.

but do not show efficiency improvements. The results support the liquidity-based marketing timing explanation, where buyout firms exit through SBOs when equity markets are cold and when debt market conditions are favorable. SBOs are also priced higher than first round buyouts and the premium is driven by favorable debt market conditions. As a whole, the author concludes that SBOs seem to have no real benefit for the target companies but only serve the needs of private equity firms which are under certain constraints. The author also touches the subject of this thesis, namely, the effect of a longer holding period and increasing liquidity needs on the choice of the exit route. She finds that when the private equity firm has liquidity needs, this affects the chosen exit route. For example, if a PE firm is raising a new fund, it has an incentive to build reputational capital by generating returns. In this setting, SBO is more likely to be the chosen exit route. A longer holding period of a portfolio company naturally increases the need for an exit as the fund matures, and the author finds that the longer the target has been in PE firm's portfolio, the more likely SBOs are as an exit route.

Second, SBOs operational performance and value creation potential compared to a peer group has been studied by several authors. Overall, the results seem to point to a direction that, on average, SBOs have lower operational performance gains than other types of buyouts. However, the results are mixed and it is still not clear whether private equity as an organization form is superior to a publicly listed company as suggested by Jensen (1997).

Jenkinson & Sousa (2013) study the operational performance of companies that are exited through SBO in comparison to companies that go public through IPO for a European sample between 2000 and 2007. They find that despite an increasing number of SBO deals, firms exited through SBO clearly underperform firms that were taken public through IPO in their operating performance in the first three full years after the exit. A longer holding period in the previous buyout deal has a negative effect on the operating performance of the company being acquired in a SBO, and the lack of experience from the PE firm's side in a SBO also negatively affects a company's performance in comparison to IPO companies. Interestingly, the authors find that SBO firms invest notably less than IPO firms after the exit in order to compensate for the operating underperformance. Even though net cash flow (EBITDA minus CAPEX) improves in SBO companies compared to IPO companies, the reduction in CAPEX by cutting or postponing investments has a negative effect in the long run. In other words, the SBO and IPO companies have clearly different investment strategies, and SBO companies are likely to increase CAPEX relatively little compared to IPO companies,

so that they use the cash flow to repay debt. This again suggests that the value creation in SBOs is more driven by financial engineering, rather than through operational improvements.

For a European sample from 1998 to 2008, Bonini (2015) finds that SBOs operating performance does not differ from the peer group, so that there is a significant change in operating performance during the first buyout but similar change is not present under the second buyout round. Returns for investors are positive but significantly lower in SBOs than in first round deals. The author also notes that SBOs represented around 60% of all buyout activity in 2012.

Third, academics have recently focused on SBOs' investment performance in detail. As a whole, SBOs do generate value for the investors if they are made under no pressure to invest the excess capital (dry powder) when a PE fund is close to the end of its investment period. SBOs also outperform other types of buyouts in a setting where the selling PE firm and buying PE firm have complementary skill sets.

Value creation profile and investment performance of SBOs in comparison to primary buyouts is studied by Achleitner & Figge (2014). For a sample of both North American and European buyouts between 1990 and 2010, the authors find that SBOs do generate similar equity returns as first round buyouts and operational value creation potential in SBOs is not fundamentally different from the first round deals. However, value creation in SBOs is more driven by increased use of leverage in comparison to primary buyouts and SBOs are also more expensive than other buyouts. This premium is driven by more favorable debt market conditions, and similar results were reported by Wang (2012).

In addition, Degeorge et al. (2015) study the investment performance of SBOs in detail. They find that if the PE firm on the buy side of the SBO is under pressure to invest more capital, SBOs underperform and destroy value for the investors, and less capital is allocated to the PE firm in the future so that their follow-on funds are smaller. However, if SBOs are made by a PE firm early in the investment period so that there is no pressure to invest, then SBOs perform similarly to other types of buyouts. To further clarify the picture, the authors study the value creation potential in SBOs and find that SBOs outperform in a setting where the buyer and the seller have complementary skill sets. If there are no complementary skills between the PE firms participating in the SBO transaction, then no value is generated for the investors.

Also Arcot et al. (2015) study the investment performance of SBOs together with the determinants of increased SBO activity for a sample of completed U.S. and European LBO transactions between 1980 and 2010. By constructing buy and sell pressure indexes, the authors find that if a PE firm is under buying pressure, they engage more in buying through SBOs and pay more for the deals. Furthermore, there is less syndication in these deals. If a PE firm is under selling pressure, then SBO is more likely to be the exit route and valuations are also lower. Similarly to Degeorge et al. (2015), they find that SBOs in which PE firms enter to under buying pressure have worse investment performance.

5. HYPOTHESES

This section develops the hypotheses based on the literature review and empirical evidence discussed in the previous sections. As my objective is to study the existence of prolonged holding periods as well as the possible drivers behind them, the hypotheses are formed correspondingly.

My first hypothesis builds on the notion that the private equity data providers as well as other PE industry participants have reported that the average holding periods of portfolio companies have lengthened notably in case of exits made after the financial crisis which erupted in September 2008 (Ivashina & Scharfstein 2010). As this paper is one of the first ones to study the existence and prevalence of the prolonged private equity holding periods, my first hypothesis is as follows.

H_1: *Private equity firms' average portfolio company holding periods have significantly lengthened after the financial crisis.*

Based on the previous literature it is feasible to say that the time period for which the company stays in the private equity firm's portfolio is determined by several factors. Agency theory suggests that firm specific characteristics drive buyout activity and thus the holding periods of the portfolio companies. In this setting, portfolio company and deal level factors at the time of entry and exit (e.g. entry and exit year, deal size, size and profitability of the portfolio firm, use of syndication) are likely to have an effect on the ultimate holding period. For example, buyouts of large companies presumably receive more attention from the managers due to their importance for the performance of the fund as a whole, and are more likely to be exited faster than small or medium sized company buyouts. Ljungqvist & Richardson (2003) report that larger investments are exited significantly faster and a one-standard-deviation increase in investment size accelerates the exit decision by 2.5 quarters.

A natural explanation for the lengthened private equity holding periods after the financial crisis would be that the operational performance of the portfolio companies has fell short of the set targets. Gompers et al. (2015) report that achieving the operational performance targets is the most important factor when a PE firm considers the timing of exit. Thus, it is not feasible for the PE firm to make an exit before the operational performance targets have been met and the future outlook of the portfolio company improved. In order to

shed light on the operational performance of exited portfolio companies before and after the financial crisis I form the following hypotheses:

H_2: *Weaker sales growth is likely to result to a longer holding period.*

    $H_{2.1}$: *Portfolio companies' compound annual growth rate (CAGR) of revenue has been on average significantly lower for exits after the financial crisis.*

    $H_{2.2}$: *Portfolio companies' EBITDA margins have been on average significantly lower for exits after the financial crisis.*

Theory on the financial structure of PE funds suggests that during good economic times and when there is an abundant amount of dry powder, more deals are made and even bad deals get financed. Moreover, Lopez de Silanes et al. (2013) find that private equity investments which are made during a period involving a large number of simultaneous investments underperform. Cumming et al. (2009) present a theory and evidence on both the style and stage drift in private equity. They find that more experienced GPs are more likely to stage drift and that market conditions have a significant effect on the likelihood of style drifting in private equity. Motivated by these notions, I expect that there has been an increasing number of buyout deals involving small and medium sized companies (SMEs). For these types of buyouts value creation takes presumably more time and if, for example, large buyout funds have stage drifted by making more investments into SMEs, this might have led to prolonged holding periods at the same time.

H_3: *Holding periods are more likely to be longer when there has been a larger number of buyouts involving small and medium sized companies.*

Theories related to market timing suggest that market level characteristics (e.g. the number of investment opportunities available, equity and credit market conditions) drive private equity activity. PE firms also consider the capital market conditions as the second most important factor when deciding on the timing of the exit (Gompers et al. 2015). For example, when the M&A and IPO markets are hot and credit market conditions are loose, it can be assumed that holding periods are shorter as private equity firms take advantage of these windows of opportunity by exiting their portfolio companies faster. On the contrary, if the exit market conditions[15] deteriorate as a result of e.g. external shocks, the general partner might not be able to exit the company with a high enough return multiple in order to meet the PE fund level return targets, even if the

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[15] In this thesis the exit market conditions are proxied with M&A and IPO market activity as well as with the availability of credit.

portfolio firm has met or even exceeded the initially set operational performance targets. For example, potential buyers may not have been able to get bank financing for the deals during and after the financial crisis as the availability of credit suddenly tightened (Ivashina & Scharfstein 2010). Furthermore, following the financial crisis and the European debt crisis, bank lending standards to non-financial corporations have continued to be tight in Europe (Kerola 2014) which might have been an additional factor for the prolonged private equity holding periods especially in Europe. In addition, equity market conditions have been reported to be the most important factor for firms in the decision to go public (Ritter & Welch 2002). Thus, when M&A and IPO market are "cold", the holding periods of buyout backed portfolio companies can be expected to lengthen. Taking into account the tightened availability of credit, the European debt crisis and the importance of equity market conditions for IPO decisions, I expect to find that these factors have had a significant prolonging effect on the holding periods in exits made after the financial crisis. Following this reasoning, I form my hypotheses regarding to the deterioration of the exit market conditions as follows.

H_4: *Holding periods are likely to be longer when the credit availability is tight.*
H_5: *Holding periods are likely to be longer when the there is a lower number of M&As and IPOs.*

The market timing theories also suggest that competition for deals drives private equity activity. PE firms also consider the competitive situation in exit timing as reported by Gompers et al. (2015). For example, when competition for the deals is stronger due to e.g. loose credit market conditions and a high amount of dry powder, there are presumably more entries made with higher valuation multiples and in some cases the winning bidder may end up paying too much for the target, creating a classic winner's curse phenomenon (Thaler 1988). Following this reasoning, value creation takes more time especially when taking into account the deterioration of the operational environment of many companies during the financial crisis. In addition, grandstanding theory (Gompers 1996) and a theory of agency conflicts between the general partner and the limited partners suggest that PE firm level (e.g. PE firm age, fundraising status, capital under management) as well as PE fund level characteristics (e.g. size of the fund, fund sequence, fund age at entry) drive the investment activity and behavior of private equity firms. Considering that there are more new entrants to the private equity market after periods of strong stock market performance (Kaplan & Schoar 2005), I hypothesize that this also leads to an increased number of bad deals and thus to prolonged holding periods.

H_6: *Holding periods are more likely to be longer when there are more new buyout funds raised.*

6. DATA

The availability of high-quality data is important especially in private equity research. For example, the quality of buyout funds' performance data in Venture Economics is found to be lower than in Burgiss, Cambridge Associates and Preqin, resulting to significant differences in the buyout funds' performance figures when compared to public market returns (Harris et al. 2014). In this study, I am limited to use SDC Platinum's VentureXpert (VE) database, provided by Thomson Financial. I focus on the European private equity deals, since availability of company specific financial information is better for European deals through Zephyr and Orbis databases. A more detailed description of the data collection process is provided in the section below. Table 1 provides a summary of the sample characteristics by portfolio company nation and industry, and by the private equity firms.

6.1. Sample collection

The dataset used in this study is collected from several sources through a multistep process. In the first step, the initial sample of all first round buyout deals between January 1980 and September 2015 is obtained from VE. As my focus in on European buyout deals, I restrict the initial sample to include buyout backed companies in the European OECD countries which have a high enough number of observations.[16] From VE, I am able to collect various round, transaction, private equity firm and private equity fund level data.

After obtaining the initial sample from VE, the second step includes using Zephyr database to obtain all M&A / PE transactions, and to complement the VE data with the information on exit dates. While Zephyr data dates back to January 1997, information on transactions made prior 2002 is somewhat limited, which limits the size of the final sample. As I have only a small number of observations for the years prior to 2000, I limit the study period from January 2000 to September 2015. After combining the VE and Zephyr data, the final sample includes 2,328 deals with identified entry and exit date data. I am able to identify an exit date for 1,585 (68%) deals, and 743 (32%) of the deals are current holdings. I also perform manual web searches on the major private equity firms' sites to identify possible gaps and to verify the quality of the data. A potential drawback of the data is that I am unable to identify write-offs and bankruptcies, which could potentially lead to a selection bias. I aim to control for this by using Cox's proportional hazard model which takes into account the characteristics of the deals that are not yet exited. My sample is thus similar to Jenkinson &

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[16] I.e. the target company nation is in European OECD country. There are 18 countries included in the sample, namely, Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Sousa (2015), who also exclude liquidations, buybacks and recapitalizations from their data. However, I do not set any restriction on the deal size, as I do not have access to deal level valuation data.

In the third step of the data collection process, Orbis is used to gather financial information on the buyout backed portfolio companies. I use Bureau van Dijk's ID number to match the data. Even though data coverage in Orbis is fairly good, I am unable to gather information on the exact financial figures used when making the entry or exit. For example, my sample includes 235 deals in which the entry has been made prior to 2000, and the Orbis data is very limited for these deals. I am able to complement the financial information data from Zephyr records but even though, the operational data at the time of entry and exit is inevitably indicative, at best. Primarily, I use the financial records in the year before making the initial investment or exit, secondarily the records in the year when the entry or exit was made and finally, the records on the year after entry or exit. Full financial information including the revenue at the time of entry and exit, EBITDA at the time of entry and total assets at the time of entry is available for 903 portfolio companies.

Lastly, I obtain data on the market conditions from various sources. The database of Federal Reserve Bank of St. Louis (FRED) is used to obtain data on the credit market conditions. Data on the quarterly number of completed M&A transactions and IPOs is collected from Zephyr. VE is used to obtain data on the number of buyout funds raised. After combining all these data, I have full information on the portfolio company financials, deal, PE firm, PE fund and deal characteristics, and market level conditions for a total of 395 deals.

6.2. Sample characteristics

A summary of the sample characteristics is presented in Table 1. Panel A presents the sample by portfolio company nation. A total of 18 European countries are represented in the sample and the portfolio companies in the UK account for approximately one-third of the observations. This is a notably lower share than in the sample of Jenkinson & Sousa (2015), in which the UK accounts for almost one-half of the sample. Other large European economies are also well presented in my sample. Average country-specific holding periods of both current and exited portfolio companies are around five years with no significant variation. As a whole, around 50% of the country-specific exits have been made in less than five years from the initial investment, even though some variation is present in the countries with less observations. Also, around 42% (40%) of the exits of Danish (Norwegian) portfolio companies have been made within five years which is somewhat lower than the overall average.

Table 1 – Sample characteristics

This table presents the sample of 2,328 European private equity deals over the sample period from January 2000 to September 2015. Table reports the number of exits, the number of current holdings, total number of observations, the average holding period for both the exited and current portfolio companies and the share of exits within five years from the initial investment. Panel A ranks the sample by the number of observations per country (i.e. the portfolio company nation), Panel B by the industry of the portfolio company (based on NACE Rev. 2 classification) and Panel C by the private equity firm.

	Exits	Current holdings	Total	% of total	Avg. holding period	% exits in < 5 years
Panel A. Portfolio company nation						
United Kingdom	458	225	683	29.3 %	4.7	50.9 %
Germany	195	84	279	12.0 %	4.9	50.8 %
France	193	71	264	11.3 %	5.1	50.3 %
Sweden	137	54	191	8.2 %	5.3	47.4 %
Italy	118	45	163	7.0 %	4.9	48.3 %
Netherlands	95	57	152	6.5 %	5.2	50.5 %
Denmark	76	42	118	5.1 %	5.1	42.1 %
Finland	79	33	112	4.8 %	5.3	46.8 %
Spain	58	48	106	4.6 %	4.5	53.4 %
Switzerland	56	16	72	3.1 %	4.8	55.4 %
Norway	40	28	68	2.9 %	4.9	40.0 %
Belgium	22	13	35	1.5 %	4.4	54.5 %
Czech Republic	12	13	25	1.1 %	4.7	58.3 %
Austria	19	3	22	0.9 %	5.1	68.4 %
Poland	11	6	17	0.7 %	5.0	54.5 %
Ireland	6	3	9	0.4 %	4.9	33.3 %
Luxembourg	7	2	9	0.4 %	5.4	28.6 %
Portugal	3	0	3	0.1 %	5.3	33.3 %
Grand total	1585	743	2328	100.0 %	4.9	49.8 %
Panel B. Industry classification of portfolio companies						
Manufacturing	529	252	781	33.5 %	5.2	44.8 %
Wholesale, retail trade	240	104	344	14.8 %	4.8	52.9 %
Professional, scientific, technical activities	213	81	294	12.6 %	5.1	46.5 %
Information and communication	174	68	242	10.4 %	4.6	54.0 %
Financial and insurance activities	119	60	179	7.7 %	4.7	53.8 %
Administrative and support services	114	59	173	7.4 %	4.7	55.3 %
Construction	32	21	53	2.3 %	5.0	56.3 %
Human health and social work activities	27	17	44	1.9 %	4.7	55.6 %
Transportation and storage	30	14	44	1.9 %	4.8	46.7 %
Accommodation, food services	25	11	36	1.5 %	4.7	44.0 %
Real estate activities	16	10	26	1.1 %	4.7	56.3 %
Arts, entertainment and recreation	14	11	25	1.1 %	4.7	50.0 %
Other service activities	16	9	25	1.1 %	5.0	37.5 %
Education	9	13	22	0.9 %	4.5	55.6 %
Water supply; sewerage, waste mgmt	7	8	15	0.6 %	4.9	57.1 %
Mining and quarrying	10	1	11	0.5 %	4.2	70.0 %
Electricity, gas, steam and air conditioning	6	4	10	0.4 %	2.7	100.0 %
Agriculture, forestry and fishing	2	0	2	0.1 %	5.7	50.0 %
Public admin; defence; social security	2	0	2	0.1 %	3.9	100.0 %
Grand total	1585	743	2328	100.0 %	4.9	49.8 %

Table 1 *(continued)*

	Exits	Current holdings	Total	% of total	Avg. holding period	% exits in < 5 years
Panel C. Private equity firms						
3i Group	93	4	97	4.2 %	5.5	49.5 %
CapMan	30	7	37	1.6 %	5.5	46.7 %
Bridgepoint	27	5	32	1.4 %	5.7	33.3 %
Equistone	29	3	32	1.4 %	4.4	62.1 %
Lloyds Development Capital	28	4	32	1.4 %	5.4	50.0 %
EQT Partners	23	6	29	1.2 %	5.4	39.1 %
CVC Capital Partners	18	8	26	1.1 %	6.0	44.4 %
Nordic Capital	16	4	20	0.9 %	5.1	25.0 %
Ratos	13	7	20	0.9 %	6.9	30.8 %
Industri Kapital	16	3	19	0.8 %	4.7	56.3 %
Gilde Buy Out Partners	14	4	18	0.8 %	4.8	57.1 %
Norvestor Equity	7	11	18	0.8 %	4.6	85.7 %
Permira	16	1	17	0.7 %	4.2	75.0 %
AAC Capital Partners	14	2	16	0.7 %	5.1	71.4 %
Axcel	11	4	15	0.6 %	7.4	9.1 %
Montagu Private Equity	14	1	15	0.6 %	4.3	71.4 %
Carlyle	8	6	14	0.6 %	4.2	50.0 %
Undisclosed	306	199	505	21.7 %	4.7	47.1 %
Other (455 PE firms)	902	464	1366	58.7 %	4.9	50.9 %
Grand total	1585	743	2328	100.0 %	4.9	49.8 %

Panel B presents the distribution of portfolio companies across industries. Manufacturing is the largest industry sector representing one-third of the total, followed by wholesale and retail trade (14.8%), professional, scientific and technical activities (12.6%), and information and communication sector (10.4%). The remaining 15 industries constitute 28.7% of the sample. Again, the average holding periods of both current and exited portfolio companies are around five years with no significant differences across industries. Around 45% of the exits in the manufacturing industry have been made in less than five years from the initial investment, while the same figure is around 55% for the typical service industries.

Finally, Panel C presents the sample portfolio companies by private equity firm. The sample includes portfolio companies from a total of 473 PE firms, and the most active PE firms are mostly the same as in the sample of Jenkinson & Sousa (2015). Across the PE firms, some differences arise in both the average holding period portfolio companies and the share of exits which have been made in less than five years. For example, Equistone's average holding period for both current and exited portfolio companies has been 4.4 years and Ratos' 6.9 years; and only 25% of Nordic Capital's exits included in the sample are made within five years from the initial investment. These differences are most likely to be attributed to the small sample size, and the PE firm specific figures are, at best, indicative only and should thus be interpreted with care.

6.3. Variables

This section presents the variables used in this study and provides a detailed description of the choices made in case of the key variables. Following the categorization of Jenkinson & Sousa (2015) and Ljungqvist & Richardson (2003), I divide the explanatory variables to market level; deal, PE firm and PE fund level; and portfolio company level variables. Table 2 provides a summary of the key variables, variable definitions and data sources.

6.3.1. *Dependent variables*

Exit success. Based on earlier research, private equity firms have kept buyout investments in their portfolios around four to five years on average, conditional on an exit (see, e.g., Strömberg (2008)). For European buyout deals exited between 2000 and 2014, Jenkinson & Sousa (2015) report an average holding period of a bit over four years. In addition, a great majority of PE firms use a five-year forecasting period in evaluating investments (Gompers et al. 2015), and a visit on various private equity firms' web sites indicates that the typical target is to exit the investment after 3 to 7 years from the initial investment. Based on these justifications, I form a binary dummy variable *Exit success* which takes a value of 1 if a portfolio company has been exited within 5 years from the initial investment. *Exit success* is used as the dependent variable in the logit regressions to study the likelihood of a successful exit (i.e. exit is observed within 5 years from the initial investment) and to analyze the potential drivers behind the prolonged private equity holding periods.

Holding period. When analyzing the potential drivers behind the prolonged private equity holding periods using Cox's proportional hazard model and OLS, holding period (or more generally, investment duration) is used as the dependent variable. Holding period is defined as the time period between the entry and exit dates (i.e. time-to-exit). The variable is right-censored[17] similarly to Ljungqvist & Richardson (2003), Wang & Wang (2012) and Jenkinson & Sousa (2015).

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[17] For example, in medical studies right-censoring occurs when a subject leaves the study before an event occurs, or the study period ends before the event has occurred. In the case of private equity exits, a portfolio company might leave the sample before an actual exit (e.g. goes bankruptcy) or the sample period ends before the exit has been made (i.e. current holdings).

6.3.2. Independent variables

Credit market conditions. In prior literature, Axelson et al. (2013) use the high yield bond spread over LIBOR to proxy for debt market conditions and find the proxy to be statistically significant in their specifications. Arcot et al. (2015) use high yield spread as a proxy for the debt market conditions and find that when the credit spreads widen, it is more difficult to exit through SBO. Ljungqvist & Richardson (2003) use time-varying BAA corporate bond yield to proxy for the cost of capital and find the proxy to be a strongly significant factor in determining the holding period of a portfolio company. In their later paper, Ljungqvist et al. (2008) use BAA corporate bond yield spread over the risk free rate as a proxy for credit availability, so that a low yield spread implies loose credit market conditions. Jenkinson & Sousa (2015) use the Fed tightening index to proxy for the availability of credit and find that credit market conditions have a significant impact on the chosen exit route. Since the absolute level of credit spread does not indicate whether the availability of credit has eased or tightened, I use the quarterly change in BAA corporate bond yield spread over the risk free rate in the quarter before exit to proxy for the availability of credit. For robustness purposes and since my study focuses on Europe, I also obtain European Central Bank's survey data on banks' applied credit standards to proxy for the tightening and easing of credit standards.[18] I use the survey data on credit standards applied to the approval of long-term loans.

M&A and IPO market conditions. A variety of proxies is used in previous literature to proxy for the M&A and IPO market conditions. Ljungqvist & Richardson (2003) use (i) the quarterly Nasdaq index return, (ii) per-industry number of PE backed M&A deals and (iii) per-industry number of PE backed IPOs as time-varying variables for proxying the M&A and IPO exit market conditions, but find only the quarterly per-industry number of PE backed IPOs to be a statistically significant determinant for the length of the holding period. Wang & Wang (2012) use similar proxies for IPO and M&A market conditions. Jenkinson & Sousa (2015) use local stock market return between six and three months before exit as a proxy for the market conditions, and find the proxy to be strongly significant for PE firms choosing an IPO as an exit route. I use the log of the quarterly number of M&A deals and IPOs to proxy for the exit market conditions in the Cox model. Completed M&A transactions and IPOs in the European countries used in the sample are obtained

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[18]The data is available from Q1/2003 onwards and the net percentage in the context of credit standards is defined by ECB as "the difference between the sum of the percentages of banks responding "tightened considerably" and "tightened somewhat", and the sum of the percentages of banks responding "eased considerably" and "eased somewhat."" A positive (negative) net percentage indicates that a larger proportion of banks has tightened (eased) credit standards. The variable is used only for the purpose of doing robustness checks.

from Zephyr. In the Cox model, these proxy variables are time-varying. For the logit regressions, I identify the time periods in which the M&A and IPO markets have been favorable for an exit to take place so that the M&A and/or IPO market has been "hot". I construct a binary dummy variable equal to 1 if the time period in question is in the top third of the most active M&A and IPO periods, similarly to Harford (2005).

Competitive situation. In prior literature, Jenkinson & Sousa (2015) use Preqin's capital commitment index return to proxy for the capital which has been committed to PE funds but not invested yet, and find the proxy to be strongly significant in predicting the choice of the exit route. Wang & Wang (2012) control for the effect of competition with aggregate fund inflows at the time of the entry. Ljungqvist & Richardson (2003) use a variety of variables to proxy for the degree of competition faced by buyout funds. Their first proxy is for the committed capital into buyout funds in the vintage year of the fund. Second, they proxy for the competition for individual deals with aggregate capital invested per-industry at the time of entry and third, use a trend variable to proxy for the development of competition in the private equity market. The authors find all these proxies to be significant determinants of holding periods.

Optimally, I would use the capital which has been committed to buyout funds but not invested yet (dry powder) as a proxy for the competitive situation. The intuition is that when there are more uncalled capital commitments, the more there is competition for deals among private equity firms. Due to data constraints[19], I am limited to use the capital raised into buyout funds at entry year as a proxy for the level of competition the private equity firm faces. Gompers & Lerner (2000) show that the amount of fund inflows has a substantial positive impact on the pricing (valuation) of private equity investments, and that when there is a large amount of fund inflows, venture capitalists' funding standards are lowered. Furthermore, Jenkinson & Sousa (2015) find that SBOs are a more likely exit route when the capital committed to private equity industry is higher, but buyout investments exited through SBOs are also held longer on average. In addition, I use the number of buyout funds raised at the entry year to study H_6 and also construct a dummy variable equal to 1 if the fund is the first or the sole fund raised by the PE firm. Data on the number of buyout funds raised in the sample countries is obtained from VE. To study H_3, I construct a variable on the number

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[19] I am able to obtain data on the estimated amount of dry powder in European PE funds from Preqin until 2003, but not for the earlier time periods.

buyouts involving small and medium sized enterprises at the entry year. I define SME buyout as a buyout where the target's revenue has been less than €50 million at the time of entry.[20]

PE firm and PE fund level characteristics. Ljungqvist & Richardson (2003) use PE fund size, investment cost and the fund year in which the investment was made as control variables, but find only the investment cost to be a significant determinant of buyout holding periods. In studying the determinants of buyout exit routes, Jenkinson & Sousa (2015) use PE fund and PE firm age at entry as well as PE fund size as control variables. The significance of these factors differs across their specifications; fund maturity at the time of entry and fund size seem to be related to the chosen exit route but PE firm age at entry not. I include PE firm age, PE fund age and PE fund size as control variables.

Portfolio firm and deal level characteristics. Due to limited availability of the financial data at the portfolio company level, the number of observations is somewhat limited in the regressions in which the portfolio firm level variables are included. I use a portfolio firm's compound annual growth rate (CAGR) of revenue from entry to exit to study H_2, and total assets as well as EBITDA margin at the time of entry as control variables. Jenkinson & Sousa (2015) find that portfolio company age at entry is a significant determinant of the chosen exit route, however, the results are somewhat dependent on the methods used. Thus, I also include portfolio company age at entry as a control variable. Of the deal level characteristics, I collect information from VE and Zephyr on whether the management was involved in the deal at the time of entry (i.e. the transaction was MBO / MBI related or management was indicated as the buyer), and construct a dummy variable equal to 1 if management was the involved at entry. A similar method is used by Arcot et al. (2015). I also construct a dummy variable equal to 1 if the deal had more than one investor at entry, since the use of syndication is found to be positively related to deal size and to deals with management participation (Arcot et al. 2015). Cumming & Johan (2010) study the use of syndication in VC deals, but do not find support for their hypothesis that syndicated VC deals are exited faster. In private equity, syndication might still have an effect on the ultimate holding period, as exit decision is dependent on the lifecycle of the participating PE fund (Jenkinson & Sousa 2015).

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[20] The criteria for defining the size of a company differs between countries. The €50 million revenue criteria is used by the European Commission.

Table 2 – Summary of variable definitions and sources

This table presents the definitions and data sources of the dependent variables and the independent variables. Panel A presents the dependent variables and Panel B the independent variables. [1] indicates a winsorized variable at 0.05 and 0.95 percentiles.

Variable	Definition	Source
Panel A. Dependent variables		
Exit success dummy	Dummy variable equal to 1 if a portfolio company was exited within 5 years, 0 otherwise.	VE, Zephyr
Holding period	A natural logarithm of the time (in quarters) between the entry and exit dates.	VE, Zephyr
Panel B. Independent variables		
Portfolio firm and deal level variables		
Revenue (€m) [1]	Log of revenue.	Orbis, Zephyr
Revenue CAGR [1]	Compound annual growth rate of revenue from the time of entry until the time of exit.	Orbis, Zephyr
EBITDA (€m) [1]	Log of earnings before interest, taxes, depreciation and amortization.	Orbis, Zephyr
EBITDA margin [1]	Ratio of EBITDA to revenue.	Orbis, Zephyr
Total assets (€m) [1]	Log of the book value of total assets.	Orbis, Zephyr
Target age	Log of portfolio company's age (in years).	VE, Zephyr, Orbis
Mgmt participation	Dummy variable equal to 1 if management was involved at entry (i.e. MBO / MBI type of deal).	Zephyr
Syndication	Dummy variable equal to 1 if the deal had more than one investor at entry.	VE
PE firm and PE fund level variables		
PE fund size	Log of capital raised into a given buyout fund.	VE
PE fund age [1]	Log of the buyout fund's age (in years) at the time when the entry was made.	VE
PE firm age	Log of the private equity firm's age (in years) at the time of entry.	VE
New entrant	Dummy variable equal to 1 if the fund making the investment was the 1st or the sole fund raised by the general partner.	VE
Market level variables		
Credit market conditions	Δ *BAA yield spread:* Quarterly change in Moody's Seasoned BAA Corporate Bond Yield spread over the risk free rate in the quarter before exit. Time-varying in the Cox model.	FED database
M&A market conditions	*Ln number of M&As:* Log of the quarterly number of M&A deals in the quarter before the exit; time-varying in the Cox model.	Zephyr
	Hot M&A market: a dummy variable equal to 1 if the M&A market was "hot" in the quarter before the exit; used in the logit regressions.	Zephyr
IPO market conditions	*Ln number of IPOs:* Log of the quarterly number of IPOs in the quarter before the exit; time-varying in the Cox model.	Zephyr
	Hot IPO market: a dummy variable equal to 1 if the IPO market was "hot" in the quarter before the exit; used in the logit regressions.	Zephyr
Competitive situation	*Ln capital raised into BO funds:* Log of the total capital raised into buyout funds (in €bn). Time-varying in the Cox model.	VE
	Ln number of BO funds raised: Number of buyout funds raised in the entry year; time-varying in the Cox regression.	VE
	Ln number of SME buyouts: Number of SME buyouts in the entry year; time-varying in the Cox regression.	Zephyr, Orbis

6.4. Descriptive statistics

This section presents the summary statistics relevant to the study. Table 3 presents summary statistics for the full sample including both exited and current portfolio companies. The average holding period for the exited (both current and exited) portfolio companies has been 5.3 (4.9) years.[21] This is notably longer than the 4.2 year holding period found by Jenkinson & Sousa (2015) but in line with the data from Preqin (2015b). There has been on average 1.7 investors participating in a given deal and management has been referred to as an equity investor in 15% of the deals (i.e. MBO and MBI type of entries).

The summary statistics on the portfolio company characteristics show that target companies have been existing on average 27.4 years before entering into private equity ownership. The financial data on the portfolio companies indicates that on average the sample firms are smaller than in previous studies focusing on buyouts. At the time of entry, a typical portfolio company's revenue has been on average (median) €71.4 million (€24.6 million), EBITDA €6.9 million (€2.3 million) and total assets €84.2 million (€17.8 million). For example, in the sample of Jenkinson & Sousa (2015), an average (median) company has sales of over $320 million ($108 million) at the time of exit. These figures are not comparable, but in unreported results I find that in my sample an average company has sales of €104.1 million at the time of exit. A potential explanation for the difference is that the Orbis and Zephyr databases, which I use for obtaining the exit dates and financial data on portfolio companies, have a more extensive coverage especially on small and medium sized private companies.[22] Furthermore, Jenkinson & Sousa (2015) use S&P Capital IQ and Private Equity Insight to construct their sample of private equity exits which can also explain the difference in both the size of the sample companies and the average holding period of exited portfolio companies.

Regarding the operational development of the private equity backed portfolio companies, a typical portfolio company's compound annual growth rate (CAGR) of revenue has been on average (median) 10.5% (4.8%) and total assets have grown on average 9.3% (5.3%) per annum. EBITDA has improved on average €2.5 million while a median firm's EBITDA improvement has been only €0.3 million.

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[21] See Figure 1 for the development of average holding period of exited portfolio companies.
[22] As observed by Kalemli-Ozcan et al. (2015), the drawback of the more commonly used databases such as Worldscope and Compustat Global is that these databases mainly cover large firms. The authors also note that data constructed from Orbis-Amadeus database has a good match with the official size distribution of firms compared to statistics from Eurostat and that in selected European countries the data covers around 75-80% of the economic activity.

Table 3 – Summary statistics

This table reports the summary statistics for the full sample including both the exited and current portfolio companies. Panel A reports deal characteristics of which syndication and management participation are reported at the time of entry. Panel B reports portfolio firm characteristics of which age, revenue, EBITDA, EBITDA margin and total assets are measured at the time of entry and revenue CAGR, EBITDA change and total assets CAGR from entry to exit. Panel C reports PE firm and PE fund level characteristics, PE firm age and PE fund age are reported at the time of entry. Panel D reports market characteristics, number of buyout funds raised, capital raised into buyout funds and the number of SME and large buyouts are reported at the entry year. Dry powder is reported at exit (current holding) year. BAA corporate bond yield spread over the risk-free rate, European banks' applied credit standards on long-term loan approvals and the number of M&As and IPOs are reported in the quarter before the exit.

Variable	N	Avg	Std.dev.	Min	Median	Max
Panel A. Deal characteristics						
Holding period (years)	2328	4.9	2.7	0.1	4.6	17.6
Holding period (months)	2328	59.9	32.3	1.2	55.9	214.2
Syndication (# of investors)	2237	1.7	1.0	1	1	9
Management participation	2169	0.15	0.36	0	0	1
Panel B. Portfolio firm characteristics						
Age (years)	2304	27.4	32.1	0.0	17.0	250.0
Revenue (€m) [1]	1356	71.4	132.7	0.2	24.6	668.1
EBITDA (€m) [1]	1319	6.9	15.1	-6.0	2.3	77.7
EBITDA margin (%) [1]	1241	8.0 %	22.9 %	-92.4 %	10.1 %	49.4 %
Total assets (€m) [1]	1516	84.2	183.2	0.6	17.8	921.9
Revenue CAGR [1]	989	10.5 %	26.7 %	-43.4 %	4.8 %	119.5 %
EBITDA change (€m) [1]	983	2.5	10.3	-17.0	0.3	46.3
Total assets CAGR [1]	1150	9.3 %	19.1 %	-25.5 %	5.3 %	76.8 %
Panel C. PE firm and fund characteristics						
PE firm age (years)	1818	17.6	16.7	0.0	13.0	159.0
Fund age (years) [1]	1436	3.3	2.4	0.1	2.7	9.5
Fund size (€m)	1195	708.6	1155.8	0.2	290.4	10576.2
Fund sequence	1595	4.8	7.5	1.0	2.0	82.0
Panel D. Market characteristics						
BAA corporate bond yield spread	2328	2.7 %	0.6 %	1.6 %	2.9 %	5.6 %
Applied credit standards	2247	5.0 %	15.7 %	-10.0 %	-2.1 %	69.6 %
Number of new BO entrants	2328	16.7	7.7	4	16	33
Number of BO funds raised	2328	91.5	34.2	20	82	151
Capital raised into BO funds (€bn)	2328	33.2	18.5	1.5	33.5	62.1
Dry powder (€bn)	2328	214.3	66.6	68.4	198.8	287.0
Number of M&As	2328	2860	319	1931	2755	3764
Number of IPOs	2328	87	57	17	69	299
Number of SME buyouts	2320	58	31	1	66	99
Number of large buyouts	2320	25	16	0	25	54

[1] indicates a winsorized variable at 0.05 and 0.95 percentiles

Turning to PE firm and PE fund characteristics, PE firms have on average (median) 17.6 years (13.0 years) of experience at the time of making the initial investment. Entries are typically made 3.3 years (2.7 years) into the life of the fund. Average (median) fund size is €708.6 million (€290.4 million) and a typical PE firm has raised 4.8 (2.0) funds. These figures are largely in line with ones reported by Jenkinson & Sousa (2015), even though some differences arise. Mainly, I seem to have a better coverage of small buyout funds and the entries are made somewhat later in my sample. Jenkinson & Sousa (2015) report a median fund size of $455.7 million and that the entries are made on average about two years into the life of the fund.

Regarding the market characteristics, in a typical year there are 16 new entrants raising their first buyout fund in Europe, while the total number of raised funds is on average 92. On average €33.2 billion of capital is raised into European buyout funds on a yearly basis. These figures are in line with the data from EVCA (2015). European buyout funds have on average €214 billion of unused capital commitments. Furthermore, on average there has been 2,860 M&A transactions and 87 IPOs in the sample countries in a given quarter. Number of SME buyouts and large buyouts is estimated based on the collected final sample data. On a yearly basis there has been on average (median) 58 (66) SME buyouts and 25 (25) large buyouts. These figures seem quite low especially when compared to the figures from EVCA (2015), which show that there were 945 buyouts carried out in Europe in 2014. Even though misspecified data might result to a measurement error in the empirical analyses, I am limited to use the data collected from Zephyr and Orbis.

Figure 1 presents the average holding period by exit year for the portfolio companies with a known exit date. The average holding period of exited portfolio companies has steadily lengthened from 2.6 years in 2000 to 5.9 years in September 2015. Over the sample period the average holding period has been 5.3 years (4.9 years) for exited (both current and exited) portfolio companies. Most notably, the average holding period has been 5.8 years for exits after the financial crisis, whereas portfolio companies were exited on average in 4.7 years in the time period before the financial crisis.

Figure 1 – Average holding period of exited portfolio companies by exit year

This figure presents the average holding period of exited portfolio companies by exit year. The sample includes a total of 2,328 observations of which 1,585 (68 %) are deals with a known exit date and presented in this figure.
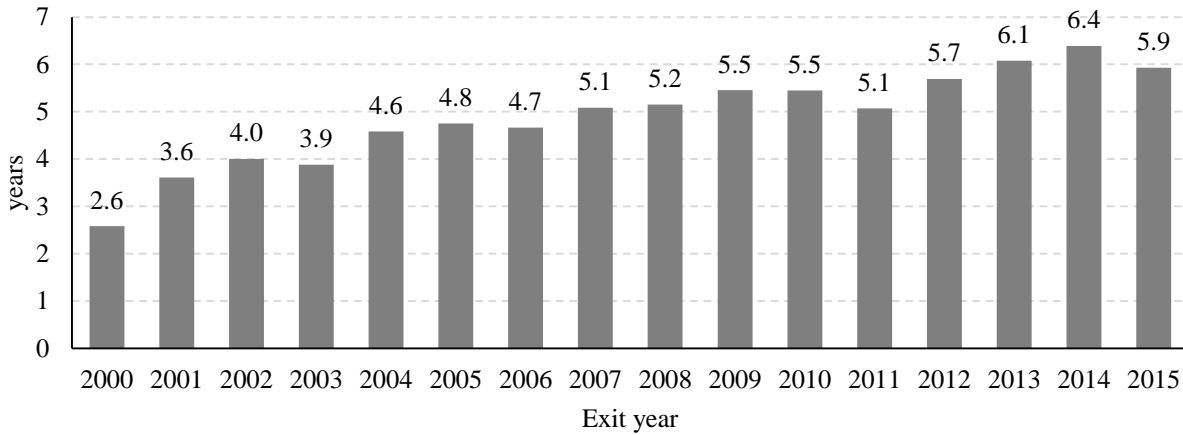
Panel A of Figure 2 shows that the number of exits has varied greatly over time and that there has been two exit waves in the 21st century, the first one from 2004 to 2007 and the second one starting from 2010. Interestingly, Panel B of Figure 2 indicates that since 2011, over 50 % of the exited portfolio companies had been in the private equity firm's portfolio for longer than five years. Furthermore, 44 % (37 %) of the exited portfolio companies in 2014 (2015) had stayed in the PE firm's portfolio for longer than 7 years.

Figure 2 – Number of exits by exit year, grouped into holding periods

These figures present the number of exits by exit year. Exits are grouped into five holding period groups. Panel A presents the number of exits by exit year. Panel B presents the distribution of yearly number of exits, grouped by holding period.

Number of exits by exit year, grouped into holding periods

Panel A – Number of exits by exit year   Panel B – Distribution of yearly exits by holding period groups
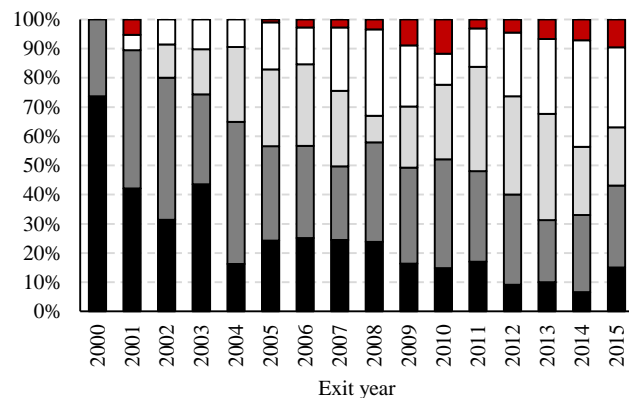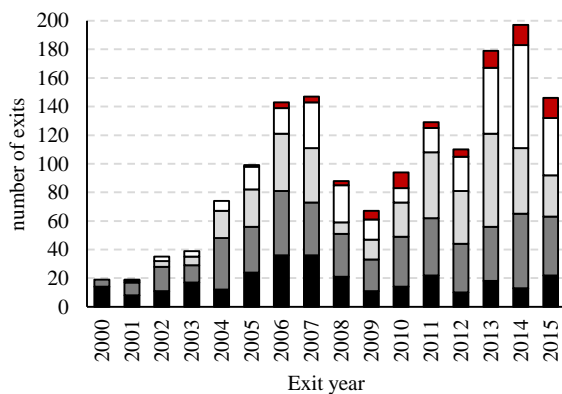
To further shed light on the sample characteristics, Figure 3 presents the number of entries by entry year. In total, the sample includes a total of 2,328 initial investments (entries) of which 789 (34%) have been exited in less than five years and considered as "successful" exits. 796 (34%) portfolio companies have been exited in over five years ("unsuccessful" exits) and 743 (32%) of the portfolio companies are still being held in PE firm's current portfolios. Panel A of Figure 3 shows a substantial peak in PE activity in the three years preceding the financial crisis. Deal activity, measured by the number of entries, was still high in 2008, before dropping significantly in 2009. Panel B of Figure 3 indicates that on average 29% of the investments made by PE firms between 2007 and 2009 have not yet been exited. Over 50% of the entries made between 2000 and 2003 were exited within five years.

Figure 3 – Number of entries by entry year, grouped into exits and current holdings

These figures present the number of entries by entry year. Entries are grouped by holding period to portfolio companies which have been exited in (i) less than 5 years ("exit success"), (ii) over 5 years ("unsuccessful exit") or (iii) not exited yet (current holdings). Panel A presents the number of entries by entry year. Panel B presents the distribution of yearly number of entries grouped into three groups.

Number of entries by entry year, grouped into (un)successful exits and current holdings

Panel A – Number of entries by entry year	Panel B – Distribution of yearly entries
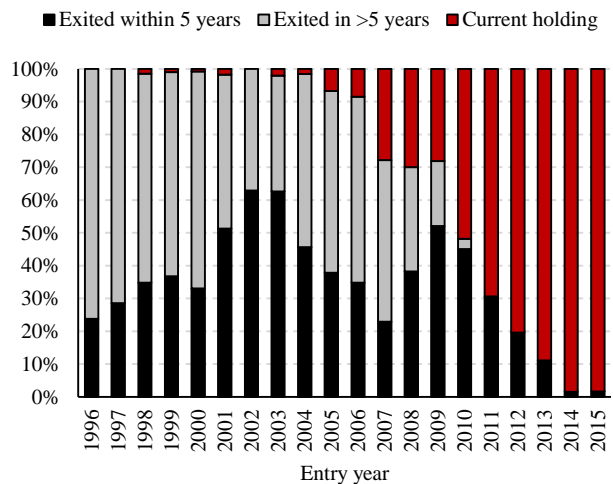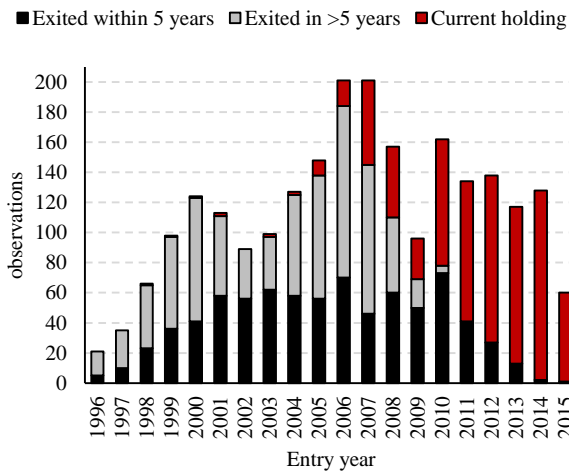
Panel A of Figure 4 presents the number exits by exit route and year. Compared to dataset of Jenkinson & Sousa (2015), my sample also includes exits in which the management has been referred to as one of the buyers. Furthermore, I have a larger amount of observations for years from 2008 to 2014, whereas most of the observations in the paper by Jenkinson & Sousa (2015) are from years 2004 to 2007. Panel B presents the distribution of yearly exits by exit route. As a whole, the share of IPOs as an exit route decreased

substantially between 2009 and 2013. In these years only 3.2% of the exits were made through an IPO. The share of exits to financial buyers has increased steadily and over 40% of the exits were made to financial buyers in 2013 and 2014. At the same time, exits made to non-financial buyers have become less common, indicating that financial buyers such as PE firms may have gained some advantage over non-financial (strategic) buyers in the recent years, as suggested by Vild & Zeisberger (2014).

Figure 4 – Exit routes by exit year

These figures present the number of exits by exit route and year. Exit routes are defined by the type of the buyer (i.e. financial buyers, non-financial buyers, exits to management, IPOs). Panel A presents the number of exits by exit route and year. Panel B presents the distribution of yearly number of exits by exit route.

Number of exits by exit route and year

Panel A – Number of exits by exit route and year	Panel B – Distribution of yearly exits by route
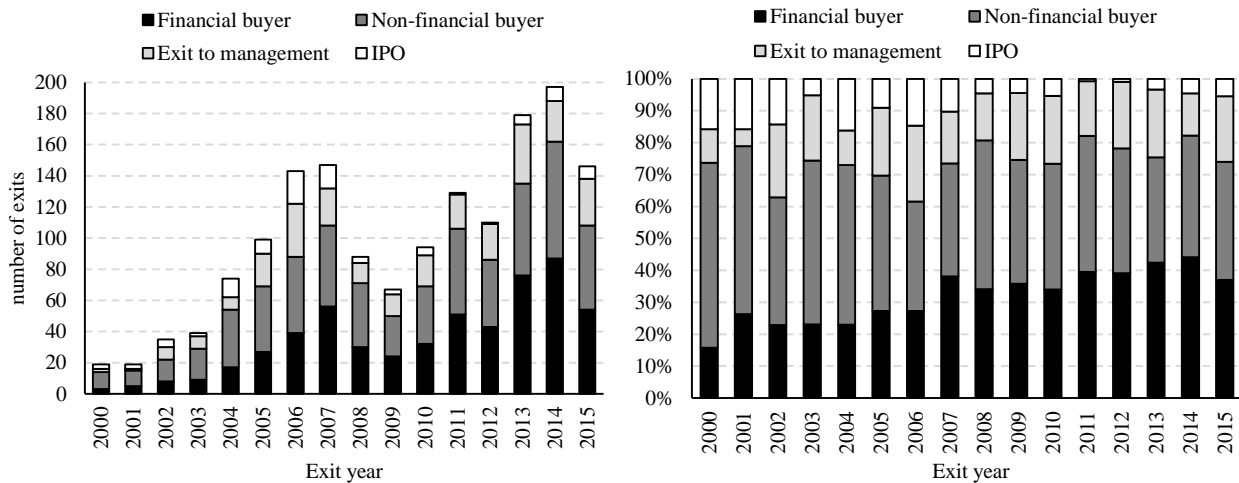
Figure 5 presents statistics on the number of buyouts involving SMEs and large companies. Data on the number of raised buyout funds and the average size of the raised funds in a given year is presented in the figure as well. Interestingly, these simple statistics indicate that the number of SME buyouts compared to the number of large buyouts has been larger especially in the years between 2007 and 2012, potentially due to e.g. tightening availability of credit (Axelson et al. 2013). More buyout funds were also raised in the preceding years from 2005 to 2009. There were also more new entrants in the buyout market in the time period before the financial crisis. On average 21% of the buyout funds raised between years 1996-2008 were new buyout funds, translating into circa 19 new buyout market entrants per year. After the financial crisis, the share of new funds has dropped to a 15% level on average, meaning that there has been circa 10 new entrants per year in the buyout market in the sample countries. While these descriptive statistics do not

provide any evidence on the potential causality between the variables, it still seems plausible to say that in the 21st century (i) buyout funds' focus has shifted from large buyouts to smaller and medium sized buyouts and (ii) there has been less new entrants in the buyout market after the financial crisis.

Figure 5 – Number of buyouts and BO funds raised

This figure presents (i) the number of SME buyouts, (ii) the number of large buyouts and (iii) the number of buyout (BO) funds raised by entry year (left axis). The lines present the number of SME and large buyouts and the bars present the number of buyout funds raised. Average size of the raised buyout funds in millions of euros is presented by the dots (right axis). Data on the number and average size of raised buyout funds is from VentureXpert and includes the buyout funds raised in the sample countries. Data on the number of SME and large buyouts is from Zephyr and Orbis. A buyout is categorized as a SME buyout based on the target's revenue at the time of entry; targets with revenue less than €50M are defined as SMEs (criteria used by the European Commission).
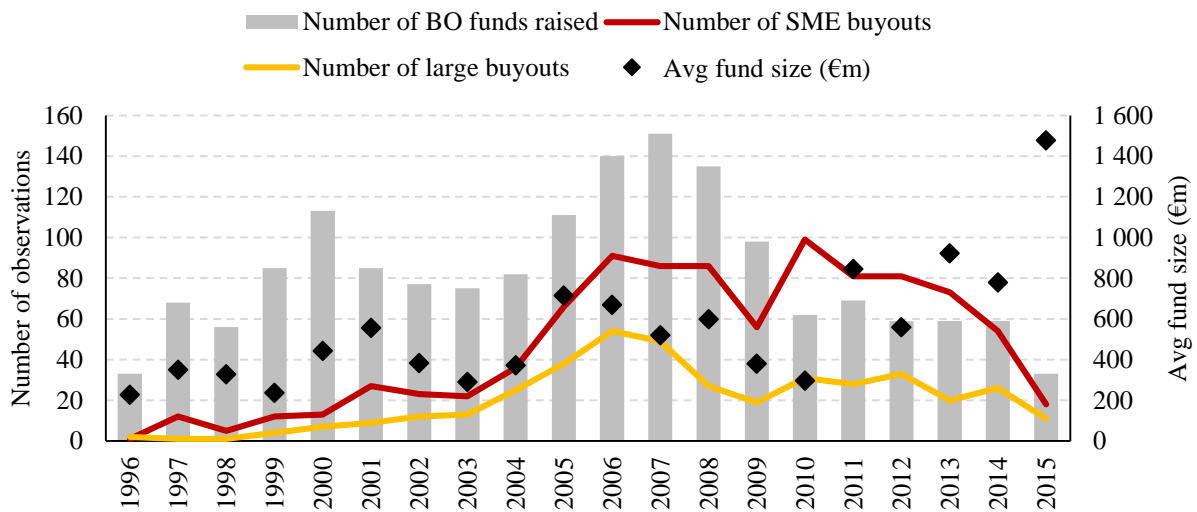
6.5. Univariate analysis

As my objective is to provide evidence on the prolonged private equity holding periods, evident especially in case of exits made after the financial crisis, I divide my sample correspondingly into two subsamples. The global financial crisis erupted in the fall of 2008 (Ivashina & Scharfstein 2010), and I use the bankruptcy date of Lehman Brothers on 15.9.2008 to divide the sample into subsamples including the exits made before and after the financial crisis.

Table 4 presents the results of the univariate tests. Results of Panel A support my first hypothesis, it has taken significantly more time from the private equity firms to exit their portfolio companies after the financial crisis. Holding period differences, measured in multiple ways, between the samples of exits made before and after the financial crisis are all statistically significant at the 1% level. On average, it has taken 4.7 years (5.8 years)

to exit the portfolio company before (after) the financial crisis. Before (after) the financial crisis portfolio companies were exited through IPO in 4.4 years (5.9 years) on average, sold to a financial buyer in 4.7 years (5.6 years), to a non-financial buyer in 4.5 years (5.8 years) and to the management on average in 5.0 years (6.1 years) after the initial investment. Holding periods for SME (large) buyouts have also lengthened from 4.2 years (3.6 years) to 5.2 years (5.3 years). As a robustness check for the univariate results, I also run an OLS regression model with time fixed effects. The results reported later in Section 8.5 are in line with the univariate findings, providing strong evidence that the holding periods have significantly lengthened.

After the financial crisis, private equity firms have also been less successful in exiting their portfolio companies within five years from the initial investment. Pre-crisis (post-crisis) 61% (42%) of the portfolio companies were exited in less than five years, the difference is statistically significant at 1% level. Strömberg (2008) reports that 42% of the private equity buyouts were exited within five years from the initial investment between 1970 and 2008. My figures contribute to these findings by showing that private equity exits were accelerated in the years from 2000 to 2008, whereas the figures for the post-crisis period are in line with the earlier findings.

Results of the tests in Panel B in Table 4 do not support hypotheses $H_{2.1}$ and $H_{2.2}$. The differences in the operational performance metrics of the portfolio companies between the samples of exits made before and after the financial crisis are not statistically significant at the conventional levels. Thus, it seems that the private equity firms have been able to deliver similar results in terms of improving the portfolio companies' operational performance also in the years after the financial crisis, even though the value creation has taken more time as the results of Panel A indicate. Portfolio firms exited after the financial crisis have also been on average significantly older (34.1 years) than those exited before the financial crisis (29.5 years). However, it is important to note that the portfolio firms exited before the crisis have been younger at the time of entry.[23]

Panel C in Table 4 presents the results of the tests of differences on PE firm, PE fund and deal level characteristics in exits made before and after the financial crisis. PE firms which have exited their portfolio firms before (after) the crisis have been operating on average 20.4 years (16.7 years) at the time of making their initial investments, the difference is statistically significant at 1% level. In addition, in exits made before

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[23] In unreported tests I find that in exits made before (after) the financial crisis the portfolio firms' age at entry has been on average 24.9 years (28.3 years), the difference is statistically significant at 1% level.

(after) the crisis the PE firm had raised over five (less than five) funds, a significant difference at the 1% level. Interestingly, these two test results point to a same direction suggesting that the more experienced PE firms made their exits before the crisis, and the less experienced PE firms have been making their exits post-crisis. Thus, it is important to control for these characteristics in my analyses. Regarding other variables in Panel C, there is no observable difference in the funds' age at the time of entry (investments are made on average 3.1 years into the life of the fund in both subsamples) or in the funds' size (on average €696.5 million versus €773.7 million, no statistically significant difference at the conventional levels). There is neither a statistically significant difference in the use of syndication nor in management participation.

Finally, I summarize the exit market conditions (at the time of exit) for exits made before and after the financial crisis in Panel D of Table 4. The tests of difference show that macroeconomic conditions have been different for exits made before versus after the crisis, all variables' differences are statistically significant at the 1% level. Of the variables proxying the credit market conditions in the quarter before exit, BAA corporate bonds' yield spread over the risk free rate has been on average 2.1% (2.8%) for exits made before (after) the financial crisis, and European banks' applied credit standards on long-term loan approvals have tightened 6.5% (10.8%) on average, correspondingly.

In Panel D, the variables proxying the competitive landscape of PE firms show that for exits made before (after) the crisis there has been more (less) new buyout funds raised at the entry year, and the total number of buyout funds raised at the entry year has been on average 86 (109), correspondingly. Furthermore, the difference in the amount of capital raised into buyout funds at the entry year is statistically significant at 1% level (€24.4 billion versus €39.7 billion). Variables proxying the equity market conditions at the time of exit show that for exits made before (after) the crisis there is a statistically significant difference in the amount of dry powder (€140.7 billion versus €208.0 billion at the exit year), number of M&A transactions (2,984 versus 2,991 in the quarter before exit) and number of IPOs (144 versus 82 in the quarter before exit). As all the differences are significant, it is most likely that the interplay of these market level variables together has had some effect on the prolonged holding periods and it is important to control also for the time-variance of these variables.

Table 4 – Univariate comparisons: exits before vs. after the financial crisis

This table presents univariate tests of significance for deals exited before and after the financial crisis. Panel A presents the tests for holding periods. Panel B presents the tests for portfolio firm characteristics; age, revenue, EBITDA, EBITDA margin and total assets are measured at the time of exit, and revenue CAGR, EBITDA change and total assets CAGR from entry to exit. Panel C presents the tests for PE firm, PE fund and deal level characteristics; all variables are measured at the time of entry. Panel D presents the tests for exit market conditions; number of new buyout market entrants, number of buyout funds raised, capital raised into buyout funds and the number of SME and large buyouts are measured at the entry year. Dry powder is measured at exit year. BAA corporate bond yield spread over the risk-free rate, European banks' applied credit standards on long-term loan approvals and the number of M&As and IPOs are reported in the quarter before the exit. The table reports the differences between the samples using the Wilcoxon rank-sum (Mann-Whitney) test. *, **, *** indicate that the samples are significantly different at the 10 %, 5 % and 1 % level, respectively. Variables indicated by a sign [1] are winsorized at the 0.05 and 0.95 percentiles.

Variable	Exit before financial crisis				Exit after financial crisis				
	N	Avg	SD	Med	N	Avg	SD	Med	z
Panel A. Holding periods									
Holding period (months)	642	56.6	27.8	52.5	943	70.6	30.9	68.0	9.008***
Holding period (years)	642	4.7	2.3	4.3	943	5.8	2.5	5.6	9.008***
Years-to-exit, IPOs	72	4.4	2.1	4.2	35	5.9	2.3	6.4	3.250***
Years-to-exit, fin. buyer	187	4.7	2.1	4.4	374	5.6	2.5	5.3	4.402***
Years-to-exit, non-fin. buyer	265	4.5	2.3	4.2	360	5.8	2.7	5.7	6.002***
Years-to-exit, sold to mgmt.	118	5.0	2.4	4.8	174	6.1	2.4	5.9	3.770***
Years-to-exit, SME buyouts	140	4.2	2.2	3.6	411	5.2	2.1	5.0	5.276***
Years-to-exit, large buyouts	67	3.6	1.9	3.2	202	5.3	2.2	5.4	5.609***
Exit success dummy	642	0.61	0.49	1.0	943	0.42	0.49	0.0	-7.613***
Panel B. Portfolio firm characteristics									
Age (years)	629	29.5	32.9	16.6	935	34.1	32.4	23.3	5.528***
Revenue (€m) [1]	419	112.3	212.3	31.8	721	99.3	179.2	39.0	1.580
EBITDA (€m) [1]	392	12.0	25.9	2.8	696	11.7	24.7	3.3	1.004
EBITDA margin (%) [1]	372	-0.3%	44.0%	8.9%	666	5.9%	33.8%	9.6%	1.157
Total assets (€m) [1]	468	149.8	296.6	37.2	771	128.5	260.0	35.3	0.122
Revenue CAGR [1]	155	12.7%	32.1%	4.6%	507	10.0%	24.6%	5.7%	0.365
Panel C. PE firm, fund and deal characteristics									
PE firm age (years)	556	20.4	19.8	15.0	711	16.7	16.0	13.0	-2.996***
Fund age (years) [1]	458	3.1	2.4	2.6	563	3.1	2.3	2.3	-0.240
Fund size (€m)	447	696.5	933.5	338.1	448	773.7	1343.6	264.3	-0.925
Fund sequence	522	5.2	5.7	3.0	619	4.7	7.6	2.0	-4.268***
Syndication (# of investors)	631	1.8	1.1	1.0	873	1.7	1.1	1.0	-1.070
Management participation dummy	601	0.12	0.32	0.0	844	0.14	0.34	0.0	1.045
Panel D. Market characteristics									
BAA corporate bond yield spread	642	2.1%	0.6%	1.9%	943	2.8%	0.7%	2.7%	19.919***
Applied credit standards	561	6.5%	17.6%	-0.7%	943	10.8%	17.6%	4.6%	9.512***
Number of new BO entrants	642	18.8	5.4	19.0	943	18.7	7.8	16.0	-3.569***
Number of BO funds raised	642	86.1	25.3	85.0	943	108.7	32.7	111.0	11.413***
Capital raised into BO funds (€bn)	642	24.4	15.3	17.2	943	39.7	20.8	55.6	12.877***
Dry powder (€bn)	642	140.7	46.1	156.8	943	208.0	40.4	198.8	23.992***
Number of M&As	642	2894	362	3047	943	2991	337	2976	2.749***
Number of IPOs	642	144	70	140	943	82	28	75	-18.633***
Number of SME buyouts	642	26	22	22	943	69	27	86	24.759***
Number of large buyouts	642	12	14	7	943	33	16	31	23.029***

7. METHODOLOGY

This section introduces the used methodology. In addition to univariate analyses, I analyze the factors which potentially have an impact on the ultimate holding period of a portfolio company by using logistic regression models, Cox's proportional hazard model (Cox 1972) and multinomial logistic regressions models. Logistic regressions are used to study the factors which potentially have an impact on the likelihood of exiting a portfolio company within five years from the initial investment. Logit regressions and Cox's model are preferred to Ordinary Least Squares (OLS) regression methods since the latter are not able to handle the aspects of survival time data in the best possible way. However, I also perform OLS regressions to check for the robustness of the estimation results. By using the more advanced methods, I aim to control for right-censoring, truncation and possible selection bias in the data. Cox's proportional hazard model is also able to handle time-varying covariates and is thus preferred to a logit model when analyzing the exit timing decisions and holding periods of portfolio companies.

7.1. Univariate analysis

In addition to providing descriptive statistics, Wilcoxon rank-sum (Mann-Whitney) test is used in the univariate analysis section as a non-parametric statistical test to assess whether the variables are significantly different between the subsamples. Wilcoxon's signed-rank test is not used as the data is not paired and the rank-sum test allows for a different amount of observations in the different samples. Similar methods to assess the differences between two or more subsamples are used by e.g. Wang (2012) and Jenkinson & Sousa (2015).

7.2. Logit model

I use a logit model to study the likelihood of a successful exit by the end of the sample period and conduct the analysis also both before and after the financial crisis. In the logistic regression models, *Exit success* dummy is used as the dependent variable. The dummy takes a value of one if the portfolio company was exited within five years from the initial investment and is zero otherwise, and thus measures the "success" of the buyout investment. I would prefer to conduct the analyses using the PE firm's and/or PE fund's performance data (i.e. return multiples or IRRs) as well, but I am not able to access the performance figures due to data availability.

A logit regression model is a binary choice regression which estimates the likelihood of an event occurring. The cumulative logistic distribution function is defined as:

$$F(z) = \frac{e^z}{e^z+1} = \frac{1}{1+e^{-z}} \tag{1}$$

The function z includes the explanatory variables and is to be estimated. The estimated non-linear probability model is defined as:

$$P_i = \frac{1}{1+e^{-(\beta_0+\beta_1 X_1+\beta_2 X_2+\ldots+\beta_k X_k)}} \tag{2}$$

Here, P is the probability that the dependent variable $y_i = 1$, so that the exit has been made "successfully" within 5 years from the initial investment. β_0 is the intercept in the model, β_i are the regression coefficients and x_i are the covariates (explanatory variables).

By using the logit model, I aim to assess how different explanatory variables affect the likelihood of a successful exit to take place during a pre-determined period. The logit regression method models the log odds of the outcome as a linear combination of the explanatory variables. The coefficients of the logit regression give the change in the log odds of the outcome for a unit change in the explanatory variable. A positive (negative) coefficient leads to odds ratio more (less) than one, meaning that a one unit change in a given explanatory variable leads to the event being more (less) likely to occur. In the results section, I will also report the predicted probabilities (i.e. marginal effects) of exiting the portfolio company within five years from the initial investment, holding all the other explanatory variables of the model at their means.

7.3. Cox proportional hazard model

The holding periods[24] of exited portfolio companies over the whole sample period and both before and after the financial crisis are studied by using survival analysis. Specifically, I use Cox's proportional hazard model which I prefer to the logit model since it is possible to include time-varying covariates in the hazard model. Time-varying factors such as quarterly change in BAA yield spread or IPO market activity during the holding period potentially affect the logit regression results as the exit timing decision includes several strategic aspects, and market conditions naturally change during the holding period. Due to the model's flexibility, it is widely used in the academic literature (see, e.g., Giot & Schwienbacher (2007); Cumming & Johan (2010); Wang & Wang (2012); Arcot et al. (2015); Jenkinson & Sousa (2015)).

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[24] I use the term holding period throughout the thesis to refer to the time period between the entry and exit date (time-to-exit). Some papers refer to holding period as the investment duration.

In the Cox proportional hazard model the hazard (probability) rates depend on a set of covariates than can be viewed as explanatory variables:

$$\lambda(t) = \lambda_0(t)e^{(\beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k)} \tag{3}$$

The Cox hazard model is a semi-parametric model in which the baseline hazard function $\lambda_0(t)$ is not dependent on a specific distribution and does not have to be specified. The hazard rate $\lambda_0(t)$ is the probability than an exit occurs at time t, conditional on the information that there was no exit before t.

The model estimates the hazard (probability) that a portfolio company is exited given the initial entry characteristics (explanatory variables) and their evolution over time. The model's explanatory variables can include both static controls (portfolio company and deal characteristics at the time of entry) and time-varying variables (i.e. variables proxying the exit market conditions). The goal is to understand how the explanatory variables of the model impact the baseline hazard rate $\lambda_0(t)$. The hazard rate is an unobserved latent variable which is estimated using the observed holding periods. Thus, I need to create a panel of observations for each investment from the entry quarter until the exit quarter. A single investment in a given portfolio company remains in the panel data set until an observed exit occurs or until the end of the sample period. The latter observations correspond to the right-censored observations and the model allows for right-censored data.[25] Estimating the model so that the right-censored observations are included is important, since the non-exited investments may also contain information about the indirect choices which have an impact on the timing of an exit. The censoring event needs to be independent of the exit events, which is the case in this study.

The interpretation of the Cox's proportional hazard model is made in terms of hazard ratios. A positive (negative) coefficient indicates that a one-unit change in a given explanatory variable increases (decreases) the probability of an exit and shortens (lengthens) the expected holding period (i.e. time-to-exit). In other words, a positive coefficient increases the hazard rate relative to its baseline level. To better understand the results of the model, I also calculate the impact of a one-unit change in a given explanatory variable on the hazard ratio as:

$$\Delta \lambda_0(t) = 100 \times (e^{\beta_i}) \tag{4}$$

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[25] In other words, the sample can include both the current and exited portfolio companies.

7.4. Multinomial logit model

A multinomial logit regression model is used to further analyze the determinants influencing the exit timing decision and to check for the robustness of the estimation results. In the multinomial logit model, the dependent variable assumes the value 1 if the exit was made within three years, 2 if the exit was made between three and seven years, and 3 if the exit was made after 7 years from the initial investment. The last group is used as the base (comparison) group. The grouping is done based primarily on Jenkinson & Sousa (2013) who note that due to the limited lifetime of PE funds, there's a strong incentive to strategically exit deals with a holding period longer than 7 years, and secondarily on the fact that the typically targeted holding period for many private equity firms' is between 3 to 7 years.

The explanatory variables used to explain the exit timing decision are divided into portfolio company variables (x), deal, PE firm and PE fund variables (w) and market level variables (z):

$$y_i = x_i' \beta_i + w_i' \theta_i + z_i' \delta_i + \epsilon_i \qquad (5)$$

The multinomial logit model consists of two equations, where y_i is the logarithm of the appropriate odds (i.e. logits). Denoting the sets of explanatory variables with X, the vector of regression coefficients with β and when P is the estimated probability for the success of the outcome category in question:

$$ln \left(\frac{P(y=1)}{P(y=3)}\right) = X \beta_{1/3} \qquad (6)$$

$$ln \left(\frac{P(y=2)}{P(y=3)}\right) = X \beta_{2/3} \qquad (7)$$

A drawback of the multinomial regression model is that the exact value of the coefficient associated with a given explanatory variable cannot be directly interpreted. The equations 6 and 7 relate to the probability of a holding period of 0-3 years to the probability of a holding period of 7+ years, and the probability of a holding period of 3-7 years to the probability of a holding period of 7+ years, respectively. A positive coefficient in equation 6 (7) means that as the value of the independent variable increases, the ratio "probability of an exit in 0-3 years (3-7 years) / probability of an exit in 7+ years" increases. This means that the probability of an exit in 0-3 years (3-7 years) increases relative to the probability of an exit in 7+ years as the value of the independent variable increases. In other words, the holding period of 0-3 years (3-7 years) is more likely relative to a holding period of 7+ years. By contrast, a negative coefficient of any given explanatory variables indicates that the holding period of 0-3 years (3-7 years) is less likely relative to a holding period of 7+ years as the value of the independent variable increases.

8. EMPIRICAL RESULTS

In this section I present and discuss the results from the empirical analyses. My key research question focuses on analyzing the potential key drivers behind the prolonged holding periods of private equity firms' portfolio companies. As reported in Table 4 in Section 6.5, I find strong evidence that the holding periods of portfolio companies have significantly lengthened after the financial crisis. The methodology described in Section 7 is used to further shed light on the potential drivers behind this change. I begin my analysis by studying the likelihood of a successful exit to take place. Second, I use the Cox's proportional hazard model to include time-varying factors in my analysis to better understand the potential drivers behind the prolonged holding periods. Third, I use a multinomial logit regression model to study the likelihood of a successful exit to take place within a specified time frame. Finally, I also run OLS regressions to check for the robustness of the results.

8.1. Likelihood of a successful exit

Logit regressions are used to study the likelihood of exiting a portfolio company within five years from the initial investment (i.e. the buyout is "successful") and the empirical results are reported in Table 5. A positive (negative) coefficient indicates that the likelihood for an exit in less than five years increases (decreases), meaning that the holding periods in general are more likely to be shorter (longer). I start by including each set of explanatory variables separately to specifications 1-3 and continue by combining each set of explanatory variables with market level control variables. Specification (4) combines the portfolio company and market level variables, specification (5) deal and market level variables and finally specification (6) combines all three sets of explanatory variables. Industry fixed effects are included in all specifications.[26]

Specification (1) includes the portfolio company level variables. The coefficient of *Revenue CAGR* is positive and significant at 1% level, indicating that portfolio companies with a strong revenue growth are exited faster. The coefficient of EBITDA margin at entry is negative and weakly significant at 10% level. In specification (2), I include the deal, PE firm and PE fund level variables into the model. The results suggest that the likelihood of exiting a portfolio company within five years decreases when the target is an established firm (the coefficient of *Ln target age* is negative and significant at 1% level). Furthermore, specification (2) suggests that syndication is likely to result to a shorter holding period, as the coefficient of

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[26] As a robustness check, I also run the logit regressions with country fixed effects. The results stay the same and are thus unreported.

Table 5 – Likelihood of a successful exit

This table presents the results of a logistic regression in which the dependent variable is Exit success dummy. The sample includes all observations (both deals with known exit date and those not yet exited) for the full sample period. All explanatory variables are defined in Table 2. Revenue, EBITDA margin, total assets, target age, syndication dummy, management participation dummy, new entrant dummy, PE fund size, PE fund age and PE firm age are defined and measured at the time of entry. Revenue CAGR is measured from entry to exit. Capital raised into buyout funds, number of buyout funds raised and number of SME buyouts are measured at entry year; Δ BAA yield spread, Hot M&A market dummy and Hot IPO market dummy at the quarter before exit. Heteroscedasticity robust standard errors are reported in parentheses and marginal effects at variable means in square brackets. ***, **, * denote statistical significance at 1%, 5% and 10% level, respectively.

Dependent variable: Exit success dummy						
Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)
Ln revenue	0.023			0.023		0.204**
	(0.066)			(0.072)		(0.108)
	[0.005]			[0.005]		[0.046]
EBITDA margin	-0.549*			-0.280		-0.782
	(0.328)			(0.346)		(0.481)
	[-0.128]			[-0.063]		[-0.178]
Ln total assets	0.020			0.019		-0.105
	(0.059)			(0.063)		(0.091)
	[0.005]			[0.004]		[-0.024]
Revenue CAGR	0.903***			1.088***		1.609***
	(0.317)			(0.342)		(0.598)
	[0.211]			[0.247]		[0.366]
Ln target age		-0.101***			-0.109***	-0.143
		(0.036)			(0.040)	(0.093)
		[-0.023]			[-0.025]	[-0.033]
Syndication		0.326**			0.262*	0.405
		(0.140)			(0.150)	(0.270)
		[0.075]			[0.059]	[0.092]
Mgmt participation		-0.159			-0.067	-0.749
		(0.277)			(0.296)	(0.530)
		[-0.036]			[-0.015]	[-0.170]
New entrant		-0.354*			-0.511***	0.480
		(0.192)			(0.200)	(0.389)
		[-0.081]			[-0.115]	[0.109]
Ln PE fund size		-0.011			-0.007	0.094
		(0.054)			(0.059)	(0.118)
		[-0.003]			[-0.002]	[0.021]
Ln PE fund age		0.105			0.119	-0.141
		(0.075)			(0.077)	(0.146)
		[0.024]			[0.027]	[-0.032]
Ln PE firm age		0.042			0.016	0.284
		(0.087)			(0.091)	(0.184)
		[0.010]			[0.004]	[0.065]
Δ BAA yield spread			-1.274***	-1.821***	-1.051***	-0.898
			(0.272)	(0.547)	(0.370)	(0.715)
			[-0.274]	[-0.413]	[-0.236]	[-0.204]
Hot M&A market			0.171	0.500***	0.039	0.761**
			(0.118)	(0.190)	(0.176)	(0.294)
			[0.037]	[0.114]	[0.009]	[0.173]
Hot IPO market			0.912***	1.071***	0.902***	1.385***
			(0.138)	(0.242)	(0.202)	(0.358)
			[0.196]	[0.243]	[0.203]	[0.315]

Table 5 *(continued)*

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)
Ln capital raised into BO funds			-0.915***	-1.144***	-0.942***	-1.466***
			(0.103)	(0.159)	(0.173)	(0.288)
			[-0.197]	[-0.259]	[-0.212]	[-0.334]
Ln number of BO funds raised			1.196***	0.827**	1.081***	1.154**
			(0.213)	(0.375)	(0.338)	(0.585)
			[0.257]	[0.188]	[0.243]	[0.263]
Ln number of SME buyouts			0.298***	0.280*	0.328***	0.225
			(0.077)	(0.168)	(0.112)	(0.271)
			[0.064]	[0.063]	[0.074]	[0.051]
Constant	0.323	-0.476	-3.825*	-1.374	-3.756***	-4.111*
	(0.925)	(0.719)	(1.997)	(1.858)	(1.339)	(2.394)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	903	1040	2318	902	1036	395
Prob > Chi2	0.058	0.086	0.000	0.000	0.000	0.000
Pseudo *R2*	0.026	0.025	0.112	0.191	0.106	0.236

Dependent variable: Exit success dummy

Syndication dummy is positive and significant at 5% level. I also find weak evidence that first time funds are, on average, less likely to exit a portfolio company within five years from the initial investment, as the coefficient of *New entrant* dummy is negative and significant at 10% level. This is contradicting the grandstanding hypothesis developed by Gompers (1996) which suggests that newly established PE firms are willing to favor early attention-grabbing exits, but in line with my hypothesis H_6 and the findings of Giot et al. (2014) who report that the investment behavior of newly established funds is consistent with expertise-based explanations, not the reputation-building motives.

Specification (3) includes market level variables and the results are in line with my expectations. Namely, likelihood for an exit decreases when Δ *BAA yield spread* increases (the coefficient is negative and significant at 1% level). The coefficient of *Hot IPO market* dummy is positive and highly significant at the 1% level, suggesting that an active IPO market increases the likelihood of exiting a portfolio company within five years from the initial investment. Market level variables proxying the competitive situation in the private equity market show mixed results. The coefficient of *Ln capital raised into BO funds* at entry year is negative and significant at 1% level, whereas the coefficient of *Ln number of BO funds raised* at entry year is positive and significant at 1% level. I would expect a negative coefficient on both variables in line with hypothesis H_6, so that holding periods are more likely to be longer (likelihood for an exit in less than five years decreases) as more buyout funds are raised. The coefficient of *Ln number of SME buyouts* is positive and significant at 1% level, indicating that as the number of SME buyouts increases, the likelihood of an exit

within five years from the initial investment increases (holding periods are likely to be shorter), contradicting hypothesis H_3.

Specifications (4) and (5) confirm most of the conclusions so far. Specification (6), which includes all the three sets of explanatory variables, leads to somewhat unexpected results as there is a loss of significance in case of some key variables of interest.[27] In unreported robustness tests I check for the strength of the interrelationships between the explanatory variables to detect possible multicollinearity issues. The test results do not provide any evidence that the model would be subject to collinearity issues, and a possibly explanation for the unexpected results in specification (6) is that the number of observations drops to 395 and of these observations only 68 (17.2%) are exits which are made before the financial crisis. Thus, I focus on specifications (4) and (5) in the subsequent discussion.

Specification (4) includes the portfolio company and market level variables. Again, the coefficient of *Revenue CAGR* is positive and significant at 1% level, supporting hypothesis H_2. The marginal effect is 0.247, implying that an increase of one standard deviation in *Revenue CAGR* represents an increase in the probability of exiting a portfolio company within five years from the initial investment of about 0.247 x 0.265 = 6.54%. This is a 17.3% increase relative to the unconditional mean of the likelihood of a successful exit (which equals to 37.8% in specification (4)).[28]

The signs of the coefficients on the market level variables are in line with the previous results and significant at the 1% level for all other variables expect for the *Ln number of BO funds raised* (significant at the 5% level) and the *Ln number of SME buyouts* (significant at the 10% level). The coefficient of Δ *BAA yield spread*, which proxies for the credit market conditions, is negative and the marginal effect is -0.413. This implies that a one standard deviation change represents a decrease in the probability of a successful exit of about -12.6%.[29] The magnitude of the change is high, as the probability of an exit within five years from the

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[27] Notably, the coefficients of variables *Ln target age,* Δ *BAA yield spread* and *Ln number of SME buyouts* become insignificant, and the coefficient of the dummy variable *New entrant* becomes insignificant and the sign changes from negative to positive.

[28] 902 observations are included in specification (4) and the unreported means and standard deviations of the explanatory variables are obtained after conducting the regression in question. Thus, the mean and standard deviation figures do not exactly match to the ones reported in Table 3.

[29] In unreported results, I replace Δ *BAA yield spread* to another proxy variable Δ *Applied credit standards.* The coefficient of the second proxy has the same sign but becomes insignificant in some specifications. Thus, I use Δ*BAA yield spread* as the main credit market proxy variable in my analyses.

initial investment decreases by 33.3% relative to the unconditional mean. The result supports hypothesis H_4, so that holding periods are likely to be longer when the credit availability tightens.

Of the variables proxying the exit market conditions, both *Hot M&A market* dummy and *Hot IPO market* dummy have a positive coefficient, significant at the 1% level. Marginal effects are 0.114 and 0.243, respectively, indicating that when the M&A (IPO) market is "hot" the likelihood of a successful exit increases by about 11.4 (24.3) percentage points. The result supports hypothesis H_5, holding periods are likely to be shorter when the M&A and IPO markets are active and when the market valuations are arguably higher, and especially hot IPO markets seem to play an important role.

The coefficient of *Ln capital raised into BO funds* is negative (marginal effect -0.259, one standard deviation change represents a -16.7% change in the probability of a successful exit) whereas *Ln number of BO funds raised* has a positive coefficient (marginal effect 0.188, one standard deviation change represents a 7.5% increase in the probability of a successful exit). Even though these variables show contradicting results, there seems to be some support for hypothesis H_6 when taking into account the negative coefficient of *New entrant* dummy in specifications (2) and (5). In later sections, I also test for the robustness of these results using alternative methods and specifications.

Specification (5) includes the deal, PE firm, PE fund and market level variables. The market level variables have the same signs as in specification (4), except that *Hot M&A market* dummy becomes insignificant and *Ln number of SME buyouts* becomes significant at 1% level. The economic magnitude of the results on market level variables in specification (5) is largely in line with the earlier results discussed above, and the overall interpretation remains unchanged. Of the deal, PE firm and PE fund level variables, the coefficient of *Ln target age* is negative and significant at 1% level with a marginal effect of -0.025. This represents a decrease of about -4.7% in the probability of a successful exit given a one standard deviation change in the variable. *Syndication* dummy has a positive and significant coefficient at the 10% level. The coefficient of *New entrant* dummy is negative and significant at 1% level with a marginal effect of -0.115, representing a -11.5 percentage points (relative) change in the probability of a successful exit given that the fund is a newly established one. The result is in line with hypothesis H_6 and the findings of Giot et al. (2014).

8.2. Likelihood of a successful exit in the period after the financial crisis

To further shed light on the potential drivers behind the prolonged private equity holding periods, evident especially in the case of exits made after the financial crisis, I also study the likelihood of a successful exit using the post-2008 data. I am unable to carry out a similar analysis using pre-2008 data, since the number of observations drops significantly and the data would include only a small number of non-exited observations. Table 6 reports the empirical results.

Table 6 – Likelihood of a successful exit in the period after the financial crisis

This table presents the results of a logistic regression in which the dependent variable is Exit success dummy. The sample includes all observations (both deals with known exit date and those not yet exited) for the post-2008 period. All explanatory variables are defined in Table 2. Revenue, EBITDA margin, total assets, target age, syndication dummy, management participation dummy, new entrant dummy, PE fund size, PE fund age and PE firm age are defined and measured at the time of entry. Revenue CAGR is measured from entry to exit. Capital raised into buyout funds, number of buyout funds raised and number of SME buyouts are measured at entry year; Δ BAA yield spread, Hot M&A market dummy and Hot IPO market dummy at the quarter before exit. Heteroscedasticity robust standard errors are reported in parentheses and marginal effects at variable means in square brackets. ***, **, * denote statistical significance at 1%, 5% and 10% level, respectively.

Dependent variable: Exit success dummy			
Explanatory variables	(1)	(2)	(3)
Ln revenue	0.024		0.252*
	(0.086)		(0.140)
	[0.004]		[0.042]
EBITDA margin	-0.075		-0.848
	(0.432)		(0.615)
	[-0.013]		[-0.141]
Ln total assets	-0.003		-0.115
	(0.075)		(0.096)
	[0.000]		[-0.019]
Revenue CAGR	1.376***		1.664**
	(0.417)		(0.718)
	[0.247]		[0.276]
Ln target age		-0.175***	-0.254**
		(0.063)	(0.105)
		[-0.023]	[-0.042]
Syndication		0.138	0.185
		(0.240)	(0.362)
		[0.019]	[0.031]
Mgmt participation		-0.574	-0.443
		(0.512)	(0.607)
		[-0.077]	[-0.073]
New entrant		-0.461	0.337
		(0.303)	(0.451)
		[-0.062]	[0.056]
Ln PE fund size		0.009	0.089
		(0.089)	(0.134)
		[0.001]	[0.015]
Ln PE fund age		0.137	-0.165
		(0.105)	(0.165)
		[0.018]	[-0.027]

Table 6 *(continued)*

Dependent variable: Exit success dummy			
Explanatory variables	(1)	(2)	(3)
Ln PE firm age		-0.193	0.161
		(0.159)	(0.219)
		[-0.026]	[0.027]
Δ BAA yield spread	-3.428***	-2.058***	-2.772**
	(0.837)	(0.607)	(1.249)
	[-0.615]	[-0.277]	[-0.460]
Hot M&A market	1.073***	0.863***	1.146***
	(0.234)	(0.237)	(0.369)
	[0.192]	[0.116]	[0.190]
Hot IPO market	0.116	0.586*	0.426
	(0.330)	(0.328)	(0.495)
	[0.021]	[0.079]	[0.071]
Ln capital raised into BO funds	-0.989***	-1.005***	-1.639***
	(0.199)	(0.278)	(0.384)
	[-0.177]	[-0.135]	[-0.272]
Ln number of BO funds raised	-0.388	0.439	0.337
	(0.525)	(0.603)	(0.846)
	[-0.070]	[0.059]	[0.056]
Ln number of SME buyouts	1.998***	2.467***	2.729***
	(0.397)	(0.432)	(0.751)
	[0.358]	[0.332]	[0.453]
Constant	-3.806**	-9.883***	-9.784**
	(2.316)	(2.732)	(3.819)
Industry fixed effects	Yes	Yes	Yes
Observations	768	667	322
Prob > Chi2	0.000	0.000	0.001
Pseudo $R2$	0.252	0.193	0.277

Overall, most of the results and conclusions of the earlier specifications in Section 8.1 are confirmed, even though a couple of differences arise. First, the coefficient of *Ln target age* is negative and statistically significant at 1% and 5% level in both specifications (2) and (3), respectively. This indicates that holding periods are likely to be longer for older firms, and contradicts the findings of Jenkinson & Sousa (2015), who find somewhat weak evidence that older companies tend to be exited more quickly. In addition, this result partially (although indirectly) contradicts hypothesis H_3, as larger firms tend to be presumably older. Second, the coefficient of *New entrant* dummy is insignificant when using the post-2008 data. A potential explanation is that there has been less new entrants in the buyout market which is supported by the fact that the number of buyout funds raised has dropped in the period after the financial crisis as shown in Figure 5.

Third, I find strong support for hypothesis H_4, as the coefficient of Δ *BAA yield spread* is negative and statistically significant at the 1% level in specifications (1) and (2), and at the 5% level in specification (3).

Notably, the economic magnitude is stronger than in the results reported in the previous section. In specification (3) where all the three sets of explanatory variables are included, the marginal effect of Δ *BAA yield spread* is -0.460. This implies that a one standard deviation change in BAA yield spread decreases the likelihood of exiting a portfolio company within five years from the initial investment by about -0.460 x 0.308 = -14.2%. This represents a 49.0% decrease relative to the unconditional mean of the likelihood of a successful exit (which equals to 28.9% in specification (6)). Axelson et al. (2013) argue that capital market conditions are a main constraint for private equity firms for carrying out any particular deal and my result is in line with their argument. Furthermore, Jenkinson & Sousa (2015) show that the macroeconomic conditions have a significant impact on the chosen exit route and Ljungqvist & Richardson (2003) report that exits are delayed when high-yield debt becomes more expensive. My results contribute to these findings and show that credit market conditions (i.e. availability of credit) have been in an important role especially in the post-2008 period in driving private equity exit activity.

Fourth, the coefficient of *Hot M&A market* dummy is positive and significant at the 1% level across all specifications, whereas the coefficient of *Hot IPO market* dummy is positive but only weakly significant at the 10% level in specification (5). This highlights the fact that the number of IPOs has significantly dropped since year 2000 and again after the 2008 financial crisis as shown by Gao et al. (2013), who also note that in many industries firms are acquired rather than taken public because a small firm is worth more as a part of larger organization than as an independent firm (whether it is public or private).

Fifth, the coefficient of *Ln number of BO funds raised* becomes insignificant is the post-2008 sample. A partial explanation is that the number of buyout funds raised has been lower than in the post-2008 period as shown in Figure 5, but overall the results support hypothesis H_6 as the coefficient of *Ln capital raised into BO funds* is negative and significant at 1% level across all specifications. Finally, the coefficient of *Ln number of SME buyouts* is positive and significant at 1% level in all specifications. The result contradicts hypothesis H_3 and suggests that the likelihood for an exit in less than five years from the initial investment increases when there is more SME buyouts. One explanation is that the PE firms have increasingly acquired smaller companies which are then merged with other portfolio companies, which would seemingly increase the number of SME buyouts and make the holding periods look shorter. However, data availability limits my ability to check for this potential explanation.

8.3. Potential drivers of the prolonged private equity holding periods

Capital market conditions are important determinants of the exit decisions. In this section I analyze the potential drivers behind the prolonged private equity holding periods by using Cox's proportional hazard model which allows me to control for right-censoring and potential selection bias, and also enables the use of time-varying explanatory variables proxying the capital market conditions in the regressions. The empirical results are reported in Table 7. A positive (negative) coefficient indicates that a one unit change in a given explanatory variable increases (decreases) the hazard rate of an exit relative to the baseline level, so that the expected holding period shortens (lengthens). Specifications 1-3 report the results for the full sample period, specifications 4-6 for the period before the financial crisis and specifications 7-9 for the period after the financial crisis. Market level control variables, industry dummies and country dummies are included in all specifications. The first specification for each sample period (i.e. specifications (1), (4) and (7)) includes the portfolio company level variables, the second specification (i.e. (2), (5) and (8)) the deal, PE firm and PE fund level variables, and the third specification (i.e. (3), (6) and (9)) both portfolio company, deal, PE firm and PE fund level variables.

Comparison of the estimation results provides some interesting evidence on the potential drivers of the prolonged holding periods.[30] First, the portfolio company level variables are significant determinants for the probability of an exit in most of the specifications, in contrast to the logit regressions. Specifically, the coefficient of *Ln revenue* is positive and statistically significant across all specifications, indicating that larger portfolio companies (by revenue) are exited faster. The coefficient of *Ln revenue* in specification (3) implies that the hazard rate of an exit increases by 21.2% when revenue doubles. The coefficient of *Revenue CAGR* is positive and significant at the 1% level in specifications (1), and at the 5% level in specifications (4) and (7), but turns insignificant when the deal, PE firm and PE fund level control variables are included in the model. Thus, I conclude that the Cox estimation results provide some support for hypothesis H_2, so that stronger sales growth is likely to result to a shorter holding period. In line with these results, Ljungqvist & Richardson (2003) report that larger holdings (by investment size) are exited significantly faster.

The coefficient of *EBITDA margin* is negative and significant at the conventional levels in most of the specifications. This suggests that the more profitable portfolio companies which are arguably able to carry a

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[30] Specification (6) includes only 68 exits and the statistical significance as well as the interpretation of the results is limited. Thus I exclude specification (6) from the subsequent analysis.

higher debt level are exited slower, which is in line with the argument that financial engineering is in an important role for value creation in buyouts (see, e.g., Acharya et al. (2013); Achleitner & Figge (2014)), and that PE firms quickly write-off investments which are underperforming (Schmidt et al. 2010).

Interestingly, the coefficient of *Ln total assets* is negative and significant at the 1% level in most of the specifications. The estimation results of specification (3), in which all the three sets of explanatory variables and all of the observations for the full sample period are included, imply that the hazard rate of exit decreases by 21.1% relative to the baseline hazard when the assets of the portfolio company double. This means that it takes significantly longer to develop and exit the asset heavy portfolio companies which typically operate in e.g. various industrial sectors. The result is in line with Jenkinson & Sousa (2015) who control for revenue growth and total assets but not for revenue *per se*, and report that larger portfolio companies (by total assets) are exited more slowly.

Second, the estimation results for the deal, PE fund and PE firm level variables differ between the pre-2008 and post-2008 periods. The coefficient of *Ln target age* is negative and significant for the full sample period and for the post-2008 period but opposite results are documented for the pre-2008 period. Thus, the overall interpretation is the same as with the logit regressions; holding periods are likely to be longer for older firms which contrasts the findings of Jenkinson & Sousa (2015).

Syndication dummy has a positive and strongly significant coefficient in specification (5), indicating that the use of syndication has played a role in the pre-2008 period so that syndication has shortened the expected holding periods. Arcot et al. (2015) report that SBOs in which the buyer is under pressure are driven more by the buyer fund's desire to spend equity rather than maximizing the returns to the limited partners. In Section 6.5 - Table 4, the univariate analyses provide no evidence that the use of syndication in exits made before and after the crisis would have differed. Considering that the number of SBOs has increased notably in the post-2008 period (see, e.g., Kaplan & Strömberg (2009); Bonini (2015); Jenkinson & Sousa (2015)), and that SBOs are typically larger than primary buyouts (Arcot et al. 2015), my results suggest that syndication can work as a "disciplinary device" and restrict the buyer fund from engaging in large deals in which the goal is to just spend the unused capital commitments. For the limited partners, the use of syndication would thus be a positive signal, especially if the buyer fund is under pressure to spend equity.

The coefficient of *Mgmt participation* is negative and significant at the 5% level in specifications (3) and (8), providing evidence that deals with strong management participation at entry are likely to stay longer in the PE firm's portfolios. Opposite result is found for the pre-2008 period, the coefficient of *Mgmt participation* is positive and weakly significant at the 10% level in specification (5). In general, management can be thought as a long term owner with no similar restrictions as the PE fund has. A potential explanation for the differing result in the pre-2008 and post-2008 periods is that there might arise conflicts of interest between the management and the PE firm in times of market turbulence. The result is also in line with the Strömberg (2008), who shows that when the deal has a financial sponsor (i.e. a private equity firm), the relative likelihood of an early exit increases by around 4 to 5 percentage points compared to pure MBOs. Strömberg (2008) also shows that only 16% of the pure MBO deals are exited within five years from the initial investment, compared to 42% for the private equity backed buyouts. My results suggest that strong management participation decreases the hazard rate of an exit by around 43% relative to the baseline hazard, and contribute to the findings of Strömberg (2008) by providing evidence on the potential conflicts of interest in case of a strong management ownership. While the corporate governance structures in a private equity setting are outside of the focus of this thesis, management buyouts and buy-ins can offer various avenues for future research. For example, Arcot et al. (2015) find weak evidence that management has an equity participation more often in SBO deals and in their model management participation increases the hazard rate of an exit through SBO. Combining this observation with my results suggests that if a PE firm is making investments late into the fund's investment period, strong management participation can result to a prolonged holding period from the PE fund's point of view as the fund's lifetime is limited to 10 years.

New entrant dummy has a negative and significant coefficient at the 1% level in specification (5), compared to a positive and significant coefficient at the 5% level in specification (8). Interestingly, this suggests that the new buyout funds were more likely to hold the companies longer in their portfolios in the period before the financial crisis, and have accelerated their exits in the post-2008 period. The coefficient of *New entrant* dummy in specification (5) implies that the hazard rate of an exit decreases by 43.4% relative to the baseline hazard when the fund is a new one, so that the more experienced PE firms were exiting their portfolio companies in a shorter time period prior to the financial crisis. The result is in line with the logit estimation results and hypothesis H_6. In contrary, the hazard rate of an exit increases by around 38.8% relative to the baseline hazard for the new buyout funds in the post-2008 period. Furthermore, as Figure 5 demonstrates, there was a record number of new buyout funds raised in years 2006, 2007 and 2008, and these funds have

Table 7 – Hazard rate of an exit

This table presents the results of a Cox proportional hazard model in which the dependent variable is the hazard rate of an exit. The sample includes both deals with known exit date and those not yet exited at the end of the sample period. Specifications 1-3 report the results for the full sample period, specifications 4-6 for the period before the financial crisis and specifications 7-9 for the period after the financial crisis. All explanatory variables are defined in Table 2. Revenue, EBITDA margin, total assets, target age, syndication dummy, management participation dummy, new entrant dummy, PE fund size, PE fund age and PE firm age are defined and measured at the time of entry. Revenue CAGR is measured from entry to exit. Time-varying explanatory variables Δ BAA yield spread, number of M&As, number of IPOs are measured quarterly and lagged by one quarter; capital raised into buyout funds, number of buyout funds raised and number of SME buyouts are measured yearly. Heteroscedasticity robust standard errors are reported under the coefficients in parentheses. ***, **, * denote statistical significance at 1%, 5% and 10% level, respectively.

Explanatory variables	Full sample period			Pre-2008 period			Post-2008 period		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ln revenue	0.147***		0.192**	0.437***		0.047	0.126**		0.209*
	(0.046)		(0.089)	(0.127)		(0.253)	(0.054)		(0.113)
EBITDA margin	-0.566**		-0.877**	-1.674***		-0.569	-0.322		-1.134**
	(0.244)		(0.356)	(0.502)		(0.853)	(0.252)		(0.498)
Ln total assets	-0.183***		-0.237***	-0.184*		0.077	-0.163***		-0.232***
	(0.034)		(0.047)	(0.096)		(0.189)	(0.041)		(0.064)
Revenue CAGR	0.822***		0.832	1.758**		1.327	0.734**		0.149
	(0.289)		(0.525)	(0.790)		(0.962)	(0.310)		(0.595)
Ln target age		-0.052**	-0.174***		-0.008	-0.194		-0.102***	-0.216***
		(0.022)	(0.055)		(0.032)	(0.118)		(0.037)	(0.073)
Syndication		0.174*	0.258		0.397***	-0.111		0.049	0.158
		(0.087)	(0.168)		(0.138)	(0.452)		(0.147)	(0.228)
Mgmt participation		-0.219	-0.576**		0.428*	-0.781		-0.571**	-0.540*
		(0.169)	(0.284)		(0.232)	(0.589)		(0.260)	(0.317)
New entrant		-0.126	0.087		-0.570***	-0.220		0.328**	0.511*
		(0.112)	(0.215)		(0.172)	(0.718)		(0.167)	(0.277)
Ln PE fund size		-0.043	-0.034		-0.003	0.132		-0.019	-0.076
		(0.040)	(0.079)		(0.060)	(0.243)		(0.065)	(0.102)
Ln PE fund age		0.030	-0.276***		0.179**	-0.244		-0.023	-0.310***
		(0.049)	(0.095)		(0.082)	(0.195)		(0.072)	(0.119)
Ln PE firm age		0.041	0.185**		-0.030	0.140		0.128	0.266*
		(0.049)	(0.088)		(0.075)	(0.141)		(0.084)	(0.145)
Δ BAA yield spread	-0.009	-0.006	-0.013	-0.020	-0.026**	-0.027	-0.024**	-0.024**	-0.043***
	(0.008)	(0.005)	(0.013)	(0.025)	(0.011)	(0.039)	(0.011)	(0.011)	(0.016)
Ln number of M&As	-0.049**	-0.071***	-0.057**	-0.037	-0.132***	-0.041	0.003	0.001	0.017
	(0.019)	(0.016)	(0.027)	(0.084)	(0.041)	(0.100)	(0.023)	(0.021)	(0.034)
Ln number of IPOs	0.049***	0.041***	0.059***	0.020	0.008	0.017	0.019***	0.011	0.018*
	(0.006)	(0.004)	(0.010)	(0.017)	(0.009)	(0.024)	(0.007)	(0.007)	(0.010)

Table 7 *(continued)*

Explanatory variable	Full sample period			Observations pre-2008			Observations post-2008		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ln capital raised into BO funds	-0.012	-0.002	-0.024	-0.009	0.041***	0.004	-0.026***	-0.037***	-0.060***
	(0.008)	(0.006)	(0.015)	(0.028)	(0.012)	(0.047)	(0.009)	(0.009)	(0.017)
Ln number of BO funds raised	-0.046**	-0.018	-0.021	-0.002	-0.077***	0.136	-0.066***	0.011	-0.021
	(0.021)	(0.012)	(0.035)	(0.064)	(0.020)	(0.144)	(0.023)	(0.023)	(0.039)
Ln number of SME buyouts	0.040***	0.022***	0.036***	0.021	0.063***	0.001	0.115***	0.083***	0.149***
	(0.007)	(0.004)	(0.013)	(0.018)	(0.010)	(0.044)	(0.009)	(0.009)	(0.016)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald Chi2	255.74***	228.47***	199.27***	1927.69***	6414.97***	87962.74***	422.93***	207.65***	8880.27***
Prob > Chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
No of failures (exits)	608	774	275	134	375	68	474	399	207
Observations	17372	22839	8211	5177	11485	2473	12195	11354	5738

been underperforming or performed on a similar level compared to the public markets (i.e. PME ratios have been close to or less than 1.0) as shown by Harris et al. (2014) and Preqin (2015a). My results suggest that is has potentially been the first time funds which have been underperforming due to their prolonged portfolio company holding periods, and are thus in line with the findings of Giot et al. (2014).

Fund size does not seem to be related to the likelihood of an exit as the coefficient of *Ln PE fund size* is insignificant across all specifications. *Ln PE fund age* has a negative coefficient at the 1% level in specifications (3) and (9) whereas the coefficient turns positive and significant at the 5% level in specification (5). I expected a positive coefficient for *Ln PE fund age* so that the hazard rate of an exit increases with fund age. A potential explanation for the unexpected result is that the sample includes investments which have been categorized as initial investments even though they are follow-on investments, or that there are some outliers in the post-2008 data even though the variable is winsorized at 0.05 and 0.95 percentiles.[31] The paper by Schmidt et al. (2010) suggests an alternative explanation, namely that PE firms were forced to hold on to their portfolio companies (and to provide liquidity for them) during and shortly after the financial crisis. Thus, the PE funds which were close to the end of the investment period and made investments just before the crisis hit have probably been forced to extend the funds' lifetime over the typical 10 years, which would affect the estimation results. Alternatively, it may be that the funds which were making their investments late into their investment period were under buying pressure and paid higher multiples while using less leverage as found by Arcot et al. (2015). This could explain the unexpected negative sign as well.

The coefficient of *Ln PE firm age* has the expected positive sign and is significant at the 5% level in specification (3), indicating that the more experienced PE firms are more likely to exit their portfolio companies in a shorter time period. Namely, the estimation results suggest that the hazard rate of an exit increases by 20.3% relative to the baseline hazard, when the PE firm's age doubles.

Finally, the estimation results for the market level variables provide some interesting evidence on the impact that the capital market conditions have on the expected holding periods of portfolio companies. Overall, the

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[31] The sample includes around 280 observations in which the PE fund has been over five years old at the time of the initial investment. Revising the data would require better data availability, a more detailed dataset and/or manual verifications on the timing of initial and follow-on investments. These data are typically held private by the private equity firms and limited partners.

results indicate that it is important to control for the time-variance, as the significance of the loadings on the market level variables differs across the different sample periods.

Regarding hypothesis H_4, the coefficient of Δ *BAA yield spread* is negative and significant at the 5% level in specifications (5), (7) and (8), and at the 1% level in specification (9). Thus, the results suggest that in the pre-2008 period when the credit market conditions were presumably loose, credit availability was not in such a large role in driving PE firms' exit activity as a more consistent effect is found in the post-2008 period. The coefficient in specification (9) implies that a one-unit (i.e. 100 bps) change in BAA yield spread in the post-2008 period decreases the hazard rate of exit by 4.2% relative to the baseline hazard. These results provide support for the hypothesized effect that private equity holding periods are likely to be longer when credit availability tightens.

Ln number of M&As and *Ln number of IPOs* are used in the Cox model to proxy for the M&A and IPO market conditions whereas dummies proxying the state ("hot" vs. "cold") of the M&A and IPO markets were used in the logit regressions. The coefficient of *Ln number of M&As* is negative and significant in specifications 1-3 and (5), indicating that holding periods are likely to be longer when the activity in the M&A market is on a high level. This is evidence against hypothesis H_5, as I expected the coefficient to have a positive sign as in the logit regressions. As *Ln number of M&As* is time-varying in the Cox model, a potential explanation is that the variable captures some effect concerning the PE firms' increasing activity in the M&A market (Hammer et al. (2014); Vild & Zeisberger (2014)) or that the variable is measured with error.[32] Hammer et al. (2014) argue that inorganic growth ("buy-and-build") strategies have become increasingly common and relevant to the PE firms. They report a similar boom-and-bust cycle with buyouts and add-on acquisitions, and there was a remarkably increase in add-on acquisitions in the boom period from 2004 to 2007. The authors also note that PE firms make relatively more add-ons in times of boom periods and less in times of bust periods. In line with these observations, my results for the pre-2008 period (specification (5)) indicate that when the M&A market activity doubles, the hazard rate of an exit decreases by 12.4% relative to the baseline hazard. As inorganic growth strategies are often time-consuming and the synergies are difficult to realize, I am inclined to accept the explanation that PE firms' increasing deal activity together with an increasing focus on the add-ons has resulted to prolonged holding periods.

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[32] In unreported results I check for the robustness of the estimation results by using the dummy variables for the proxy of the state of the M&A and IPO markets. Overall, the results remain unchanged even though the statistical significance decreases slightly.

Regarding the IPO market conditions, the coefficient of *Ln number of IPOs* is positive and significant at the 1% level in specifications 1-3 and (7). The coefficient in specification (3) implies that when the number of IPOs doubles the hazard rate of exit increases by 6.1% relative to the baseline hazard. The result provides support for hypothesis H_5, holding periods are likely to be shorter when the IPO market is active. This is in line with the findings of Ritter (1991), so that PE firms take advantage of the "windows of opportunity" in the IPO market by listing the portfolio companies when the investors are optimistic and market valuations arguably higher.

Ln capital raised into BO funds has the expected negative coefficient and is significant at the 1% level in specifications 7-9, providing support for hypothesis H_6. Using the estimation results for the post-2008 period (specification (9)), the hazard rate of exit decreases by 5.8% when the amount of capital raised into buyout funds doubles. Similar results were obtained with the logit regressions. In contrast to the logit estimation results, the coefficient of *Ln number of BO funds raised* is negative and significant at the 1% level in specifications (5) and (7). This again provides support for hypothesis H_6, so that the expected holding periods are likely to be longer when more buyout funds are raised. Lastly, the coefficient of *Ln number of SME buyouts* is positive and significant at the conventional levels in most of the specifications. The results of the logit regressions provided similar results in contrast to hypothesis H_3. As discussed earlier, the variable *Ln number of SME buyouts* might suffer from a definition or measurement error, but data availability limits my ability to perform further robustness checks.

8.4. Likelihood of exiting a portfolio company within a specific time frame

In this section I utilize a multinomial logit model to analyze the exit timing decision and to check for the robustness of the results obtained with the logit and Cox regressions. The sample includes only the exited portfolio companies for the full sample period and the holding period of 7+ years is used as the comparison group. Table 8 reports the empirical results. Specifications 1-2 include the portfolio company and market level explanatory variables, specifications 3-4 the deal, PE firm, PE fund and market level variables and specifications 5-6 all the explanatory variables. Industry fixed effects are not included in specifications 1-4 as the variance matrix becomes non-symmetric or highly singular when heteroscedasticity robust standard errors are used.[33] Specifications (1), (3) and (5) relate the probability of an exit in 0-3 years to the probability of an exit after seven years. Correspondingly, specifications (2), (4) and (6) relate the probability of an exit in 3-7 years to the probability of an exit after seven years.

Specifications (1) and (3) suggest that portfolio companies are more likely to be exited in 0-3 years (relative to 7+ years) when a larger company (by revenue) is being bought out, revenue growth is strong, IPO market is hot and less new buyout funds are raised.[34] The coefficient of *EBITDA margin* is negative and significant at the 5% level in specification (1), indicating that less profitable portfolio companies are relatively more likely to be exited within 3 years than in 7+ years. I would have expected a positive sign so that holding periods are more likely to be shorter (longer) for profitable (unprofitable) companies. However, the result is in line with the findings of Schmidt et al. (2010) who show that signaling is in an important role for private equity firms. The authors report that PE firms quickly write-off underperforming investments, and the more experienced PE firms are especially more disciplined in writing off the non-profitable portfolio companies.

Specifications (2) and (4) relate the probability of an exit in 3-7 years to the probability of an exit after seven years. The estimation results suggest that portfolio company level characteristics are not playing as a strong role than in the short term and that the use of syndication increases the probability of a timely exit in the typical 3-7 year frame relative to a 7+ year time period.

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[33] In unreported results I run the regressions with industry fixed effects without using robust standard errors. The estimation results remain unchanged.

[34] The coefficient of *Ln number of SME buyouts* is positive and highly significant across all specifications. This is against the hypothesized effect in H_3 but as mentioned, data availability limits me from performing additional robustness checks. Even though, running the regressions without the variable in question leads to similar results.

Table 8 – Likelihood of an exit within a specific time frame

This table presents the results of a multinomial logistic regression model in which the dependent variable takes a value of 1 if the exit was made in 0-3 years, 2 if the exit was made in 3-7 years and 3 if the exit was made after 7+ years. Group 3 is used as the comparison group. The sample includes only the deals with a known exit date. All explanatory variables are defined in Table 2. Revenue, EBITDA margin, total assets, target age, syndication dummy, management participation dummy, new entrant dummy, PE fund size, PE fund age and PE firm age are defined and measured at the time of entry. Revenue CAGR is measured from entry to exit. Capital raised into buyout funds, number of buyout funds raised and number of SME buyouts are measured at entry year; Δ BAA yield spread, Hot M&A market dummy and Hot IPO market dummy at the quarter before exit. Heteroscedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Explanatory variables	0-3 years	3-7 years	0-3 years	3-7 years	0-3 years	3-7 years
Ln revenue	0.204*	0.116			0.541***	0.242*
	(0.113)	(0.087)			(0.188)	(0.145)
EBITDA margin	-1.553**	-0.730			-0.873	0.139
	(0.658)	(0.501)			(1.134)	(0.857)
Ln total assets	-0.035	-0.095			-0.646***	-0.322**
	(0.100)	(0.076)			(0.155)	(0.131)
Revenue CAGR	1.028*	0.372			2.221**	0.695
	(0.581)	(0.432)			(0.972)	(0.814)
Ln target age			-0.039	-0.040	-0.230	-0.228
			(0.059)	(0.047)	(0.161)	(0.145)
Syndication			0.127	0.380**	0.538	0.778*
			(0.252)	(0.190)	(0.512)	(0.418)
Mgmt participation			-0.106	0.027	-2.984**	-0.334
			(0.515)	(0.379)	(1.493)	(0.590)
New entrant			-0.187	0.001	0.700	0.112
			(0.351)	(0.259)	(0.804)	(0.604)
Ln PE fund size			-0.045	0.068	0.413*	0.237
			(0.100)	(0.073)	(0.231)	(0.185)
Ln PE fund age			-0.006	0.027	-0.237	-0.339
			(0.128)	(0.099)	(0.276)	(0.223)
Ln PE firm age			0.204	0.035	0.861**	0.342
			(0.165)	(0.103)	(0.368)	(0.277)
Δ BAA yield spread	0.532	0.179	0.182	-0.162	1.685**	0.524
	(0.344)	(0.247)	(0.314)	(0.242)	(0.812)	(0.417)
Hot M&A market	-0.481	-0.271	-1.380***	-0.680***	0.110	0.556
	(0.292)	(0.235)	(0.255)	(0.215)	(0.508)	(0.382)
Hot IPO market	1.658***	0.752**	1.742***	0.766***	2.700***	0.771
	(0.377)	(0.311)	(0.296)	(0.217)	(0.651)	(0.502)
Ln capital raised into BO funds	-0.576	-1.463***	0.038	-0.486*	-1.704**	-2.292***
	(0.398)	(0.351)	(0.352)	(0.259)	(0.849)	(0.680)
Ln number of BO funds raised	-2.799***	0.477	-2.332***	0.045	-1.154	1.953*
	(0.643)	(0.550)	(0.693)	(0.519)	(1.443)	(1.030)
Ln number of SME buyouts	1.452***	1.110***	1.345***	0.740***	1.761***	1.055**
	(0.272)	(0.234)	(0.179)	(0.127)	(0.505)	(0.410)
Constant	8.375***	-0.367	5.138**	-0.855	-0.305	9.405***
	(2.151)	(1.959)	(2.274)	(1.784)	(4.767)	(3.425)
Industry fixed effects	No		No		Yes	
Observations	610		770		275	
Wald chi2	108.85		111.23		.	
Log pseudolikelihood	-518.578		-701.655		-195.356	
Pseudo *R2*	0.100		0.069		0.235	

The coefficient of *Ln capital raised into BO funds* is negative and significant at the 1% and 10% level in specifications (2) and (4), respectively. Interestingly, the same kind of a result is obtained in specification (6), indicating that the probability of an exit in 3-7 years (relative to an exit after 7+ years) decreases as more capital is raised into buyout funds. This is in line with hypothesis H_6, but it is a bit of a puzzle why a 7+ year holding period is more likely relative to a shorter one when there is more capital raised in the buyout funds. One explanation is that the abundant amount of capital raised into buyout funds is employed poorly, so that also "bad" deals get financed. Arcot et al. (2015) report that PE funds under buying pressure pay higher multiples, use less leverage and syndicate less which suggests that the motive is to spend equity. Another explanation is that the variable *Ln capital raised into BO funds* captures some effect of the increasing importance of SBOs as an exit route. Jenkinson & Sousa (2015) report that exits through SBOs happen on average later into the life of the fund and Wang (2012) finds that the longer the company has been in the PE firm's portfolio, the more likely it is exited to another PE firm.

Against the hypothesized effect in H_5, the probability for an exit to take place within three years (relative to after seven years) decreases when the M&A market is hot. Namely, the negative and highly significant loading on the *Hot M&A market* dummy in specifications (3) and (4) could suggest that the companies in the PE firms' portfolios are active players in the M&A market. This explanation would be in line with the results of Hammer et al. (2014), so that PE firms have increasingly acquired companies which are used as platforms in a buy-and-build type of strategy.

All the three sets of explanatory variables are included in specifications (5) and (6) and the estimation results confirm most of the results discussed so far. The main difference is that in specification (5), which relates the probability of an exit in 0-3 years to the probability of an exit after seven years, the coefficients of variables *Mgmt participation, Ln PE fund size, Ln PE firm age* and Δ *BAA yield spread* become significant. Namely, there is some evidence that deals with strong management participation are less likely to be exited within 3 years (relative to after 7+ years), supporting the fact that management is generally a long-term owner. This is also in line with the results of Strömberg (2008). Furthermore, the results provide weak evidence that larger funds and more experienced PE firms are relatively more likely to exit their portfolio companies in a shorter time period than in a long one. Finally, the coefficient of Δ *BAA yield spread* is positive and significant at the 5% level, providing support for hypothesis H_4 and showing that credit availability plays an important role in exit timing decision.

8.5. Alternative methods

This section presents the results of the robustness checks for the estimation results reported in the earlier sections. I perform the robustness checks by running multivariate ordinary least squares (OLS) regressions, and show that (i) the holding periods have lengthened even when controlling for time and country effects, and that (ii) it is important to control for the time-variance of the market level variables as the OLS estimation results can point to mixed conclusions. The following regression model is fitted:

$$Holding\ period_i = \ \beta_0 + \beta_1 \dots \beta_4 X_i + \beta_5 \dots \beta_{11} Y_i + \beta_{12} \dots \beta_{17} Z_i + \ \epsilon_i \qquad (8)$$

The dependent variable in the OLS regressions is *Holding period*, measured in months. For exited (current) portfolio companies, *Holding period* is the time from the initial investment date to the observed exit date (from the initial investment until September 2015). Portfolio company level explanatory variables (denoted with X_i) include *Ln revenue, EBITDA margin, Ln total assets* and *Revenue CAGR*. The set of deal, PE firm and PE fund level variables is denoted with Y_i and includes *Target age, Syndication* dummy, *Mgmt participation* dummy, *New entrant* dummy, *Ln PE fund size, PE fund age* and *PE firm age*. Finally, market level explanatory variables, denoted with Z_i, include Δ *BAA yield spread, Hot M&A market* dummy, *Hot IPO market* dummy, *Ln capital raised into BO funds, Number of BO funds raised* and *Ln number of SME buyouts*. Compared to the variables used with the models in the earlier sections, I do not take logs of the age variables and the *Number of BO funds raised* variable to ease the interpretation of the results.

Table 9 presents the results of the OLS regressions for the full sample period including only the exited portfolio companies. Each set of explanatory variables is included separately to specifications (1), (2) and (3), respectively. Specification (4) includes portfolio company and market level variables; deal, PE firm, PE fund and market level variables are included in specification (5); and specification (6) includes all the three sets of explanatory variables. Industry, country and exit year dummies are included in all specifications. [35]

As a whole, the OLS specifications capture between 17% and 69% of the variation in the holding period length, and the estimations results confirm the earlier univariate findings. Across all specifications, the loadings on the exit year dummies are statistically significant at the conventional levels, indicating that holding periods have significantly lengthened year-over-year.

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[35] Dummy for exit year 2000 is omitted.

Table 9 – Holding periods of exited portfolio companies with time fixed effects

This table presents the results of a multivariate OLS regression model in which the dependent variable is Holding period, measured in months. The sample includes only the deals with a known exit date over the full sample period. All explanatory variables are defined in Table 2. Revenue, EBITDA margin, total assets, target age, syndication dummy, management participation dummy, new entrant dummy, PE fund size, PE fund age and PE firm age are defined and measured at the time of entry. Revenue CAGR is measured from entry to exit. Capital raised into buyout funds, number of buyout funds raised and number of SME buyouts are measured at entry year; Δ BAA yield spread, Hot M&A market dummy and Hot IPO market dummy at the quarter before exit. Heteroscedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1%, 5% and 10% level, respectively.

Dependent variable: Holding period (months)						
Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)
Ln revenue	-2.338***			-1.164*		-0.091
	(0.867)			(0.676)		(0.931)
EBITDA margin	5.269			1.741		1.351
	(4.244)			(3.348)		(4.227)
Ln total assets	1.624**			0.679		0.997
	(0.738)			(0.563)		(0.808)
Revenue CAGR	-15.554***			-7.456**		-7.500*
	(4.151)			(3.363)		(4.385)
Target age		-0.006			0.003	0.023
		(0.031)			(0.020)	(0.039)
Syndication		0.334			-1.367	0.384
		(2.230)			(1.506)	(2.327)
Mgmt participation		-4.790			2.033	1.259
		(3.880)			(2.709)	(4.037)
New entrant		6.010**			2.834*	2.644
		(2.874)			(1.723)	(2.947)
Ln PE fund size		-1.278			0.370	1.071
		(0.909)			(0.595)	(1.033)
PE fund age		-1.320***			-0.320	-0.314
		(0.432)			(0.294)	(0.542)
PE firm age		0.139*			0.042	-0.009
		(0.083)			(0.048)	(0.074)
Δ BAA yield spread			-1.473	0.882	-1.858	0.595
			(1.550)	(2.097)	(2.413)	(3.762)
Hot M&A market			2.337	2.205	-0.062	-5.612*
			(1.700)	(2.150)	(2.586)	(2.878)
Hot IPO market			-9.782***	-5.424*	-5.359*	4.457
			(2.220)	(3.055)	(3.254)	(4.593)
Ln capital raised into BO funds			4.440**	3.438	5.803*	8.816**
			(1.990)	(2.64)	(3.160)	(3.785)
Number of BO funds raised			0.270***	0.345***	0.244***	0.293***
			(0.044)	(0.059)	(0.073)	(0.087)
Ln number of SME buyouts			-34.243***	-33.102***	-37.817***	-42.749***
			(1.418)	(2.718)	(1.711)	(4.009)
2001	-25.650	6.482	4.835	18.737	8.822	-12.260
	(23.697)	(9.634)	(7.084)	(35.356)	(9.028)	(16.587)
2002	1.707	18.759**	12.616***	22.305	14.667**	
	(20.064)	(8.165)	(4.765)	(15.144)	(7.138)	
2003	-3.929	15.637**	26.806***	24.160**	35.939***	45.429**
	(12.937)	(7.253)	(5.185)	(12.094)	(7.420)	(21.011)
2004	-1.194	25.530***	39.203***	39.745***	48.475***	67.912***
	(10.133)	(6.296)	(4.434)	(11.914)	(6.661)	(20.318)

Table 9 *(continued)*

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: Holding period (months)						
2005	4.226	26.638***	58.636***	58.714***	66.523***	71.787***
	(9.985)	(6.413)	(4.095)	(11.304)	(5.749)	(17.646)
2006	-7.843	22.864***	60.911***	55.520***	69.072***	80.645***
	(9.623)	(6.296)	(4.233)	(11.781)	(6.075)	(17.940)
2007	1.745	30.615***	68.113***	64.047***	80.188***	91.893***
	(9.899)	(6.436)	(4.389)	(12.084)	(6.091)	(17.922)
2008	-2.921	37.527***	71.843***	63.702***	88.250***	97.673***
	(9.980)	(6.854)	(4.884)	(12.320)	(6.691)	(19.594)
2009	2.403	39.923***	78.344***	75.164***	94.469***	115.194***
	(9.819)	(8.218)	(4.948)	(13.256)	(6.903)	(20.800)
2010	8.850	36.969***	80.378***	83.005***	98.932***	117.710***
	(9.382)	(7.652)	(5.697)	(13.314)	(7.351)	(20.461)
2011	12.768	29.534***	89.144***	87.431***	104.380***	119.835***
	(9.267)	(6.502)	(5.048)	(13.157)	(6.832)	(19.872)
2012	14.004	39.687***	91.407***	86.808***	111.729***	132.471***
	(9.459)	(6.391)	(5.745)	(13.835)	(8.203)	(21.147)
2013	22.763**	46.268***	100.415***	99.435***	121.714***	142.265***
	(9.054)	(6.306)	(5.312)	(13.793)	(7.493)	(20.898)
2014	25.209***	49.511***	110.395***	106.773***	129.038***	149.161***
	(9.189)	(6.368)	(5.246)	(13.487)	(7.220)	(20.442)
2015	17.945*	53.164***	107.015***	105.366***	132.568***	155.873***
	(9.698)	(7.509)	(5.621)	(13.826)	(8.411)	(21.029)
Constant	30.348	54.747***	59.922***	44.433**	57.481***	14.727
	(22.222)	(13.894)	(8.744)	(21.225)	(11.058)	(21.084)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.221	0.176	0.543	0.518	0.631	0.690
Observations	611	802	1577	610	798	282

The coefficients on market level variables ΔBAA *yield spread* and *Hot M&A market* dummy turn insignificant when exit year dummies are included, but the coefficient of *Hot IPO market* dummy remains significant, and suggests that when the IPO market is hot, the holding periods are on average around 5 to 10 months shorter.

Regarding the key variables of interest, the coefficients of *Ln revenue* and *Revenue CAGR* are negative and significant at the 1% level in specification (1), implying that larger companies (by revenue) and companies with a strong revenue growth are exited faster. This is in line with the earlier results and hypothesis H_2. Regarding the magnitude of the results, by using specification (1) I can say that a 1% increase in revenue shortens holding periods by 0.02 months on average, meaning that doubling revenue shortens holding period by approximately two months, on average. Additionally, holding periods are on around 7 to 15 months shorter for fast growing companies with an annual compound revenue growth rate of 100%.

Deal, PE firm and PE fund level variables seem to play some role in determining portfolio companies' holding periods, again in line with the earlier results found by using the more advanced methods. Interestingly, the coefficient of *New entrant* dummy is statistically significant at the conventional levels in specification (2) and (5), suggesting that the holding periods are on average around 3 to 6 months longer for new buyout market entrants. This is in line with the earlier results and supports hypothesis H_6. As expected, the coefficient of *PE fund age* is negative and significant at the 1% level in specification (2), implying that the later the initial investment is made into the life of the fund, the shorter the holding period on average.

As the coefficients on the key market level variables turn statistically insignificant when the exit year dummies are included, I also run the OLS regression model without the exit year dummies. Table 10 presents the results for the sample of both exited and current portfolio companies. Specifications 1-3 present the results for the pre-crisis period and specifications 4-6 for the post-crisis period, respectively.

In line with the earlier analyses, the estimation results suggest that the market level conditions are in an important role in determining the portfolio company's holding period. The coefficient of Δ *BAA yield spread* is positive and significant at the conventional level in all specifications for the post-crisis period, and the results suggest that a 100 bps increase in BAA yield spread results to a 7 to 10 months longer holding period on average. This is in line with my hypothesis H_4 and with the findings of Kerola (2014), indicating that the credit market conditions have remained somewhat tight in Europe after the financial crisis.

The coefficient of *Hot M&A market* dummy is positive and significant at the 1% level in the pre-crisis period (specifications (1) and (2)), confirming the earlier Cox estimation results. However, the coefficient of *Hot IPO market* dummy is negative and insignificant in most of the specifications, which highlights the importance of controlling for the time-variance of the market level variables. The coefficient of *Ln capital raised into BO funds* is negative and significant at the 1% level across all specifications for the post-crisis period, contradicting the results obtained in earlier sections. The unexpected results is potentially explained by the fact that the boom years in buyout fundraising were in the years before the financial crisis, and the deals done from those pre-crisis funds have only been exited during the last years. Again, this highlights the importance of controlling for the time-variance. The coefficient of *Number of BO funds raised* is positive and significant at the 1% level in all specifications for the post-crisis period, confirming the earlier findings.

Table 10 – Holding periods of exited and current portfolio companies

This table presents the results of a multivariate OLS regression model in which the dependent variable is Holding period, measured in months. The sample includes both exited portfolio companies (deals with a known exit date) and portfolio companies which have not been exited by the end of the sample period (current holdings). Specifications 1-3 include the observations for the time period before the financial crisis, and specifications 4-6 for the time period after the financial crisis. All explanatory variables are defined in Table 2. Revenue, EBITDA margin, total assets, target age, syndication dummy, management participation dummy, new entrant dummy, PE fund size, PE fund age and PE firm age are defined and measured at the time of entry. Revenue CAGR is measured from entry to exit. Capital raised into buyout funds, number of buyout funds raised and number of SME buyouts are measured at entry year; Δ BAA yield spread, Hot M&A market dummy and Hot IPO market dummy at the quarter before exit. Heteroscedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1%, 5% and 10% level, respectively.

Dependent variable: Holding period (months)						
	Pre-2008 period			Post-2008 period		
Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)
Ln revenue	-0.449		2.597	-1.594**		-1.057
	(1.753)		(2.566)	(0.783)		(1.272)
EBITDA margin	7.849		-1.786	7.904**		8.696
	(6.121)		(7.165)	(3.987)		(6.025)
Ln total assets	1.604		-0.818	2.166***		3.222***
	(1.749)		(2.368)	(0.682)		(1.032)
Revenue CAGR	-6.801		-1.417	-6.175*		-1.421
	(6.320)		(10.692)	(3.401)		(6.266)
Target age		-0.012	-0.030		0.045	0.050
		(0.032)	(0.069)		(0.030)	(0.046)
Syndication		-2.405	9.372**		1.675	-1.624
		(2.165)	(4.084)		(2.306)	(3.377)
Mgmt participation		4.541	17.616*		1.148	4.586
		(3.807)	(9.161)		(3.967)	(4.957)
New entrant		2.080	-0.276		-1.015	-1.363
		(3.317)	(7.554)		(2.559)	(3.532)
Ln PE fund size		-0.878	-2.606		0.740	-1.231
		(0.945)	(2.106)		(0.840)	(1.251)
PE fund age		-0.120	1.671		0.444	0.370
		(0.56)	(1.082)		(0.444)	(0.705)
PE firm age		0.067	0.128		-0.099	-0.095
		(0.079)	(0.121)		(0.107)	(0.159)
Δ BAA yield spread	7.095	21.891***	12.383	6.674**	7.799**	9.885*
	(7.189)	(5.520)	(8.712)	(2.949)	(3.776)	(5.445)
Hot M&A market	16.252***	17.784***	12.055	-3.736*	-2.170	-7.660**
	(4.947)	(3.634)	(7.347)	(2.204)	(2.418)	(3.198)
Hot IPO market	-9.362	9.117**	-10.126	-1.496	-6.222	-3.645
	(5.713)	(3.965)	(7.686)	(3.393)	(3.828)	(5.539)
Ln capital raised into BO funds	-0.455	2.685	8.865	-17.452***	-21.188***	-12.687***
	(6.923)	(4.404)	(9.054)	(1.850)	(2.451)	(3.586)
Number of BO funds raised	0.078	0.119	-0.427	0.726***	0.816***	0.678***
	(0.202)	(0.100)	(0.278)	(0.035)	(0.045)	(0.063)
Ln number of SME buyouts	-17.755***	-25.720***	-15.894***	-9.217***	-30.142***	-19.548***
	(4.095)	(1.777)	(5.065)	(2.889)	(2.912)	(6.721)
Constant	114.899***	110.305***	117.855***	60.553**	168.061***	89.811***
	(13.542)	(14.489)	(20.448)	(27.483)	(21.567)	(29.884)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.470	0.550	0.728	0.478	0.497	0.488
Observations	134	368	68	783	677	337

9. DISCUSSION OF THE RESULTS

This section provides a summary of the key findings and elaborates the results of the study in comparison to the earlier research. I discuss both the evidence on the length of the private equity holding periods and the potential key drivers behind the prolonged holding periods. A summary of the hypotheses is presented at the end of this section, in Table 11.

9.1. Evidence on the prolonged private equity holding periods

In line with my first hypothesis, I find strong evidence that the private equity firms' average portfolio company holding periods have significantly lengthened after the financial crisis. While the average holding period from 2000 to 2015 has been 4.9 years, the exits were made on average after 4.7 years (5.8 years) from the initial investment in the period before (after) the financial crisis. Previous research has reported that the average holding periods are around four to five years (see, e.g., Achleitner & Figge (2014); Degeorge et al. (2015); Jenkinson & Sousa (2015)) and my findings contribute to this literature by showing that the private equity holding periods have recently lengthened.

My results also show that the private equity holding periods have significantly lengthened despite the exit route, and that only 42% of the exits were made in less than five years from the initial investment in the period after the financial crisis, while the same figure was 61% for the pre-crisis period. Even more disturbingly, 44% of the exited portfolio companies in 2014 had stayed for longer than seven years in the PE firms' portfolios. Strömberg (2008) finds that 42% of the US and European PE sponsored buyouts had been exited within five years from the initial investment in the period from 1970 to 2008, and my results show that buyout exits were accelerated in the period from 2000 to 2008. Arcot et al. (2015) find that MBO deals are somewhat more likely to be exited through SBO, and Strömberg (2008) notes that pure MBO deals take significantly more time to exit. My results contribute to these findings by showing that the hazard rate of an exit decreases around 43% relative to the baseline hazard, and exits are less likely done within three years (relative to exiting the company after seven years) in case of a strong management participation in the post-crisis period. Taken as a whole, the evidence on the prolonged private equity holding periods suggests that a private equity backed organizational form *needs* to be a suitable governance structure even for the longer term, and thus provides various avenues for future research.

9.2. Potential key drivers of the prolonged private equity holding periods

9.2.1. Portfolio company level characteristics

Turning to the hypotheses on the potential determinants of the prolonged private equity holding periods, I find strong support for my hypothesis H_2, so that portfolio companies with strong sales growth are more likely to be exited faster. Even though the economic significance of the results varies somewhat depending on the used model and specification, I find that the probability of exiting a portfolio company successfully within five years from the initial investment increases by about 6.5% when there is a positive shock of one standard deviation on the variable *Revenue CAGR*. The change in the likelihood of a successful exit is economically large; the probability of an exit increases by 17.3% relative to the unconditional mean. The results hold after performing a variety of robustness checks, in which I find that portfolio companies with strong revenue growth are more likely to be exited in less than three years (rather than after 7 years) and that exits are accelerated by around 7 to 15 months on average for the fast growing portfolio companies with an annual compound revenue growth rate of 100%.

Despite my best efforts, I have found no previous papers providing evidence on the effect that a stronger revenue growth has on the expected length of the holding period. Stronger revenue growth increases the likelihood of an IPO compared to an exit through SBO, and companies with higher EBIT margins are more likely to be sold through SBO rather than listed (Jenkinson & Sousa 2015), but the economic significance of these results is somewhat unclear as a trinomial logistic model is used to obtain the results. Regarding other portfolio company level variables, Jenkinson & Sousa (2015) report that older companies are exited more quickly (hazard rate of an exit increases by around 5.5% relative to the baseline hazard), whereas my results suggest that older companies tend to stay longer in PE firms' portfolio (hazard rate if an exit decreases by around 16 to 20%). I find a similar but stronger effect for the portfolio company's size, so that larger companies *by total assets* are exited more slowly; and contribute to this finding by showing that larger companies *by revenue* are exited faster.

Regarding hypotheses $H_{2.1}$ and $H_{2.2}$, I find no evidence that the operational development of the exited portfolio companies would have differed between the pre-crisis and post-crisis periods. Namely, the compound annual revenue growth rate has been on average 12.7% (10.0%) for the portfolio companies exited before (after) the financial crisis and a median portfolio company has had an EBITDA margin of 8.9% (9.6%), respectively. The difference is insignificant at the conventional levels, suggesting that in the case of

exited portfolio companies, the private equity firms have been able to deliver similar operational performance improvements both before and after the crisis.

My third hypothesis suggests that the number of buyouts involving small and medium sized companies has increased and that this change has resulted to prolonged private equity holding periods. The results do not provide support for the hypothesized effect. Even though there seems to have been more buyouts involving SMEs, also the number of large company buyouts has increased at the same time. In fact, my estimation results suggest that as the number of SME buyouts increases, the holding periods are more likely to be shorter, in contrast to the hypothesized effect.

9.2.2. *Capital market conditions*

Previous research has shown that the capital market conditions such credit availability as well as M&A and IPO market activity are one of the most important drivers for private equity activity (see, e.g., Gompers et al. (2015); Jenkinson & Sousa (2015); Axelson et al. (2013); Schmidt et al. (2010); Ljungqvist & Richardson (2003)). For example, as credit availability tightens, the likelihood of a secondary sale decreases (Arcot et al. (2015); Jenkinson & Sousa (2015)), and holding periods are likely to be longer. Ljungqvist & Richardson (2003) report that as bond yields increase by one standard deviation, average holding periods lengthen by a staggering 1.9 years, from a mean of 3.6 years to 5.5 years. While the earlier papers vary in terms of the used methodology, I study the effect that the market level variables have on the exit timing decisions by using both static and time-varying controls.

My results suggest that, in line with the fourth hypothesis, private equity holding periods are more likely to be longer when credit availability tightens. For the full sample period from 2000 to 2015, I find that when there is a one standard deviation increase in BAA yield spread, the likelihood of an exit within five years from the initial investment decreases by about 7.5% to 12.6%. The economic magnitude of the change is large as the probability of an exit within five years from the initial investment decreases by 20.7% to 33.3% relative to the unconditional mean. Furthermore, I find a similar and economically stronger effect for the post-crisis period, suggesting that it has been especially the tightening availability of credit which has been driving the private equity holding periods longer. Namely, a 100 bps increase in BAA yield spread in the post-crisis period decreases the hazard rate of exit by 4.2% relative to the baseline hazard, and the probability of an exit within five years from the initial investment decreases by around 10% to 19% with a one standard

deviation change in BAA yield spread, which is a substantial 41% to 63% decrease relative to the unconditional mean. As the economic significance of the result varies somewhat depending on the time period in question, I perform a variety of robustness checks. These checks suggest that it is important to control for the time-variance of the market level variables and point to a direction that a 100 bps increase in BAA yield spreads results to a 7 to 10 months longer holding periods on average.

Next, my fifth hypothesis relates to the importance that the M&A and IPO market conditions have on the timing of the exit. In line with the hypothesized effect, I find that when the number of IPOs doubles, the hazard rate of an exit increases by 6.1% relative to the baseline hazard. The result is robust when alternative models and specifications are used. Namely, I find that (i) when the IPO markets go from "cold" to "hot" the likelihood of an exit within five years increases by around 31.5 percentage points[36], (ii) when the IPO market is hot exits are more likely to be made in less than three years (relative to exiting the portfolio company after seven years) from the initial investment, and (iii) exits are accelerated by around 5 to 10 months on average when the IPO market is hot. My results on the importance of the IPO market activity are largely in line with previous research which highlights the fact that PE firms take advantage of various "windows of opportunity" in the capital markets. For example, Arcot et al. (2015) report that the hazard rate of a secondary exit decreases by about 17% relative to the baseline hazard when the IPO market is cold, and Ljungqvist & Richardson (2003) show that a one standard deviation increase in the number of IPOs results to around 10 months shorter holding periods.

Regarding the M&A market conditions, I find somewhat contradicting results. First, using a dummy to proxy for the M&A market conditions suggests that when the M&A market turns from cold to hot, the likelihood for an exit increases by around 10 to 20 percentage points. The effect is statistically significant both for the full sample period and for the post-crisis period. However, using the number of M&As as a time-varying control variable in the Cox model suggests that the holding periods are more likely to be longer when there are more M&As. The robustness checks provide similar results, implying that in the pre-crisis period private equity exits were delayed by around 16 months during hot M&A markets, whereas in the post-crisis period exits have been accelerated during hot M&A markets by around 3.7 to 7.7 months. As discussed, the time-varying control variable potentially captures some effect concerning the PE firms'

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[36] The marginal effect varies from 20 to 30 percentage points, depending on the set of controls. The result reported here is obtained when all the control variables are included.

increasing activity in the M&A market (Hammer et al. 2014), so that the increased reliance on inorganic buy-and-build strategies has resulted to prolonged holding periods; and exits through trade sales have potentially been accelerated in the post-crisis period as IPO market activity has dried up and obtaining leverage for secondary deals has become more difficult. Ljungqvist & Richardson (2003) find no evidence that the M&A markets would influence the PE holding periods, whereas my results provide a more nuanced picture of the M&A markets role for the PE industry.

9.2.3. *Deal, private equity firm and fund level characteristics*

Finally, my sixth hypothesis suggests that the private equity holding periods are more likely longer when there are more new entrants in the buyout market. Ljungqvist & Richardson (2003) find no relationship between holding periods and the fund being a newly raised one, whereas my results show that the likelihood of an exit within five years from the initial investment decreases by 11.5 percentage points when the fund is newly established, translating to around 3 to 6 months longer holding periods. This is evidence against the grandstanding hypothesis (Gompers 1996) and reputational building motives (Ljungqvist et al. 2008), but in line with the expertise-based explanations of Giot et al. (2014), so that novice funds underperform the more experienced funds and have less successful exits early on.

Interestingly, my results provide evidence that the new buyout market entrants were more likely to hold the companies longer in their portfolios before the financial crisis, and have accelerated their exits post-crisis. I also find some evidence that the older, and thus probably more experienced, PE firms are likely to have shorter holding periods. Considering these results, it seems that the newly established PE firms differ from the established players in their investment strategy, and that the more experienced PE firms were either more successful in investing in "good" companies before the financial crisis or that they were successful in making timely exits before the crisis hit. These findings are in line with the results of Giot et al. (2014). My results also suggest that the new PE funds established prior to the financial crisis can be expected to have lower returns, as equity IRR decreases when holding periods lengthen, *ceteris paribus* (Valkama et al. 2013). Also Strömberg (2008) finds evidence that the more experienced PE firms have shorter holding periods, whereas the results of Jenkinson & Sousa (2015) provide no support for this argument.

I also control for the capital raised into buyout funds and for the number of buyout funds raised. The results vary somewhat depending on the used model and specification, but when time-varying controls are used, the

results point to a direction that the holding periods are more likely to be longer when there are more buyout funds raised and more capital committed into buyout funds. Overall, I am inclined to accept hypothesis H_6.

Considering other deal, PE firm and PE fund level characteristics, Jenkinson & Sousa (2015) find that funds making investments later into the life of the fund are likely to have shorter holding periods, and my results for the pre-crisis period are in line with this finding. However, my results also suggest that the "late investors" have been less likely to exit their portfolio companies post-crisis, which potentially signals that these investors were either under buying pressure (Arcot et al. 2015) or simply made "bad" deals while using too much leverage (Axelson et al. 2013). In line with Ljungqvist & Richardson (2003), I find no evidence that fund size affects the exit timing, whereas Jenkinson & Sousa (2015) report that larger funds are likely to have shorter holding periods. Finally, I find evidence that the use of syndication in buyout deals is likely to results to shorter holding periods; Cumming & Johan (2010) find no similar evidence in case of the VC deals.

Table 11 – Summary of hypotheses

This table presents a summary hypotheses and whether the results provide support for the hypothesized effect.

Hypothesis		Result
H_1	Private equity firms' average portfolio company holding periods have significantly lengthened after the financial crisis.	Support
H_2	Weaker sales growth is likely to result to a longer holding period.	Support
$H_{2.1}$	Portfolio companies' compound annual growth rate (CAGR) of revenue has been on average significantly lower for exits after the financial crisis	Rejected
$H_{2.2}$	Portfolio companies' EBITDA margins have been on average significantly lower for exits after the financial crisis.	Rejected
H_3	Holding periods are more likely to be longer when there has been a larger number of buyouts involving small and medium sized companies	Rejected
H_4	Holding periods are likely to be longer when the credit availability is tight.	Support
H_5	Holding periods are likely to be longer when the there is a lower number of M&As and IPOs.	IPOs: support M&As: partly support
H_6	Holding periods are more likely to be longer when there are more new buyout funds raised.	Support

10. CONCLUSION

In this thesis I aim to address the lack of understanding behind the prolonged private equity holding periods, evident especially in the time period after the financial crisis. To my best knowledge, this paper is one of the first ones to show that the average holding periods of private equity backed portfolio companies have significantly lengthened in recent years. Furthermore, I have found no previous papers providing evidence on the potential determinants behind this change. Recent studies on private equity exits have mainly focused on exit strategies and exit route decisions (see, e.g., Arcot et al. (2015); Jenkinson & Sousa (2015); Schmidt et al. (2010)). Even though these papers and the earlier one by Ljungqvist & Richardson (2003) shed some light on the exit timing decisions, the potential reasons behind the prolonged private equity holding periods are not assessed. This thesis aggregates an extensive set of data and uses an array of factors to show that the exit timing decisions are not always determined by the same set of factors, but it is the development and interplay of the different factors through time which influences the timing of an exit.

The sample used in this thesis is obtained from VentureXpert, Zephyr and Orbis through a multistep process. The final sample from January 2000 to September 2015 includes 2,328 European private equity buyout deals, and of these 1,585 (68%) are identified as exits and 743 (32%) as current holdings. I utilize univariate analyses, logit regressions, Cox's proportional hazard model, multinomial logit regressions and OLS regressions to study the data and the drivers behind the private equity holding periods in different time periods, focusing especially on exits before and after the financial crisis.

The main findings are as follows. First, the private equity holding periods have significantly lengthened from the pre-crisis average of 4.7 years to 5.8 after the financial crisis. Holding periods have lengthened despite the exit route, and only 42% of the post-crisis exits were made in less than five years compared to 61% for the pre-crisis period. Most disturbingly, I find that 44% of the exits in 2014 had stayed for longer than seven years in the PE firms' portfolios. Recent private equity performance data shows that the pre-crisis vintage funds have performed on a similar level or slightly worse than the public markets (see, e.g., Harris et al. (2014); Preqin (2015a)), and my results suggest that it has potentially been the first time funds which have been underperforming due to their prolonged portfolio company holding periods.

Second, I find that strong revenue growth increases the likelihood of a successful exit and that quickly growing portfolio companies are exited in a 7 to 15 months shorter time period on average. Interestingly,

larger portfolio companies (by revenue) are more likely to be exited faster, whereas the asset heavy portfolio companies' holding periods are likely to be longer. These results highlight the fact that it is vital for the PE firms' to capture the immediate growth and operational improvement opportunities quickly after closing the deal.

In line with previous research, I find that the holding periods are likely to be longer when credit availability tightens. Tightening availability of credit seems to have been in a major role in the post-crisis period, and the results show that a 100 bps increase in BAA yield spread results to a 7 to 10 months longer holding period on average. As the credit availability continues to be tight in Europe (Kerola 2014), my findings suggest that the European private equity firms' holding periods will remain somewhat longer than historically or when compared to the US. This will also affect the fund returns and the fundraising cycle in the long run.

Third, private equity holding periods are likely to be around 5 to 10 months shorter during hot IPO markets, and when IPO markets turn from cold to hot, the exits are around 20 to 30 percentage points more likely to be made within five years from the initial investment. Surprisingly, my results suggest that the PE firms have on average focused strongly on inorganic buy-and-build strategies in the pre-crisis period, which has subsequently led to longer portfolio company holding periods. This evidence contributes to the findings of Hammer et al. (2014)

Finally, I find that the holding periods are likely to be longer for new buyout market entrants; the results indicate that the likelihood of an exit within five years from the initial investment decreases by 11.5 percentage points when the fund is newly established one. Controlling for industry, country and time effects suggests that holding periods are around 3 to 6 months longer for new entrants. Furthermore, my results provide a nuanced picture and suggest that the new buyout market entrants were more likely to hold companies longer in their portfolios in the pre-crisis period and have accelerated their exits post-crisis. The results also provide evidence that the more experienced PE firms have potentially been more successful either in making "good" investments or in timing their exit successfully before the financial crisis, and thus contribute to the findings of Giot et al. (2014).

The findings of this paper open up various avenues for future research. First, the corporate governance structures in a private equity setting are important especially in MBO and MBI deals where the management

has a strong equity participation. While both the management and the private equity firm can be typically thought to have a common goal, increasing the value of the underlying business by e.g. improving operations, corporate governance practices and by aligning the incentives, these goals can be in conflict in times of market turbulence or when the PE fund is close to the end of its lifetime. Second, the availability of high quality private equity research data has improved lately, as the commercial data providers like Preqin and Burgiss have improved their coverage. Collecting a complete time-varying "event history" of the development of the private equity firms, funds and portfolio companies alike would provide interesting research topics, especially when combined with the PE firms' and funds' performance data. For example, how have the strategies used by the largest PE firms developed over time when more new private equity firms have entered the private equity buyout market with similar fund sizes and focus areas? Only in the Nordics there are probably tens of buyout funds competing for the same deals, and typically not all are able to be the "winners" who deliver the promised results.

From a practical point of view, it seems the private equity organizational form *needs* to be a more suitable governance structure even for the longer term than often thought, as secondary buyouts have become more common and as the private equity holding periods have prolonged. A typical private equity fund has a limited lifetime of ten years and it needs to exit the portfolio companies within this time period,[37] and the findings of this thesis can thus provide insights for the general partners, limited partners and portfolio companies' management alike on why some portfolio companies can be expected to stay in the PE firms' portfolios for longer than the typically targeted three to seven years.

The general partners can benefit from understanding that the use of syndication, strong management participation as well as the fund age at the time of entry impacts the exit timing dynamics, especially at the times of market turbulence or when the fund approaches the end of its investment period and/or lifetime. Naturally, the return and payback expectations are likely to be lower for the funds which are struggling in exiting portfolio companies. For example, consider a fund that is able to meet a return target multiple of 3.0x with an average portfolio company holding period of 5.8 years (post-crisis average) instead of 4.7 years (pre-crisis average). This means that the fund's IRR drops from 26.3% to 20.9%.

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[37] The lifetime of the fund can be extended typically up to three years (in one year intervals), based on a mutual agreement between the general partner and limited partners.

For GPs in a fundraising phase, it is important to note that the limited partners are likely to make less new commitments until enough capital is returned, if the LP's targeted PE allocation is not increased. This way, prolonged private equity holding periods have a prolonging effect also on the general private equity cycle. It is thus not surprising that the average time taken for PE funds to achieve the final closing has lengthened from around 11 months in 2006 to around 17 months in 2014 (Preqin 2015a).

For the limited partners, it is important to note that the prolonged holding periods are not necessarily signals of the PE firms' inability to add value on their holdings, as the capital market conditions such as a tightening availability of credit has a significant prolonging effect on the private equity holding periods. The portfolio companies' management (who often have an equity stake too) should note that there might be reasons related to the capital market conditions which prevent the PE firm from exiting the portfolio company within the targeted time period, even if the initially set growth and performance targets are met.

As a whole, I believe that this thesis provides an in-depth analysis of the potential drivers behind the prolonged private equity holding periods and contributes to the existing private equity literature by showing that it is the time-varying combination of operational development, PE firm's experience and capital market conditions that determine the ultimate holding period and exit timing of the portfolio companies.

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