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MSc Thesis in Finance

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Saving Face or Greedy Opportunism?

External Conditions' Influence on Private Equity Exits

ABSTRACT

This paper aims to contribute to the current discussion where both academia and the private sector debate the benefits and drawbacks of the Private Equity industry. Recent critics have accused Private Equity Funds of acting opportunistically by exploiting beneficial conditions, imposing risks to their portfolio companies and increasing personal remuneration on the expense of extensive lay-offs. Our research focus relates to how external conditions affect the duration of Private Equity investments and investigates the prevalence of opportunistic behavior in the exit strategies and timing of exits. The study applies 12 control variables measuring the conditions in the external environment and tests their impact on the duration and timing of the exit decision for a set of 1 880 deals in 17 European countries between 1997 and 2007. We find that holding periods are higher in economic booms and in mature industries, and decrease in periods of high IPO and M&A activity, expansive governmental budget policies and liberalization of legal systems. Interestingly, we find no clear support for our hypothesis that duration is decreasing in stock market performance.

KEY WORDS

European Private Equity, Exit Strategies, Duration, Opportunistic Behavior, Macroeconomic Conditions

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1. Introduction

Private Equity (PE) is a young phenomenon that has gained increasing attention over the past decade as the industry has grown in terms of volume, global scope, size range of investments and the number of industries in which financial sponsors engage. In parallel to this, the rising critique towards the industry has accused of acting opportunistically and using methods like window dressing to make their portfolio companies appear to be in perfect shape at exit while in reality they are more like anorexic skeletons. Others have called PE managers greedy and pointed at the streams of wealth flowing in to their personal accounts over the holding periods (Beltran 2012, DeMaria 2010, Lipson 2010).

The debate intensified during the US Primary Elections in 2012 because of the Republican presidential candidate Mitt Romney's previous engagements in Bain Capital. Critics reported that the job growth in PE-controlled firms was significantly slower than in the rest of the economy and that the prevalence of exhaustive layoffs was higher, while the remuneration to fund managers has increased more rapidly than for other managers, calling this *Private Inequity*. They also pointed at the risk the heavy debt portions impose on the target investments and that the improvement plans often are more cosmetic than substantial (Surowiecki 2012). On the other side of the debate, proponents argued that PE investments are like any other investment type and that they also have to emphasis value creation in the longer perspective (Kumar 2012).

One way in which the degree of opportunism among Leveraged Buyout (LBO) funds can be investigated is by looking deeper into the exit strategies. If fund managers act opportunistically, they should exploit arbitrages in environment surrounding the PE industry, e.g. buying when market valuations are low or acquiring targets operating in industries and countries that are subject to proposed political or legal reforms. This has only received little interest in previous research.

In this paper, we focus exactly on this topic by testing how the external environment affects the exit decision, in particular how duration in PE depends on a set of 12 factors measuring conditions in external environment. The data used for this purpose consists of 1 880 PE deals completed during 1997-2007 in 17 European countries, and comes from Kaplan and Strömberg (2009). The 12 external factors are divided into six categories: economic (GDP and unemployment), political (government size), commercial (industry revenue), M&A (number of M&A deals), market (number of IPO transactions, country index, industry index) and legal factors (legal system and property rights, credit market regulation, labor market regulation, business law).

To accurately measure the impact on duration, we perform two tests. First, we run a cross-sectional OLS regression with the length of the holding period as dependent variable and the 12 factors recalculated as annual average changes (or on equivalent relevant forms) as independent variables in order to gain an understanding of the relationship between duration and trends in the external environment. Second, we apply the Cox Proportional Hazard Model with the exit decision (sell or not sell) as dependent and the year-on-year changes in the same set of factors as independent variables, which allow us to draw conclusions on how the exit strategy depends on external shocks.

When formulating the expectations and hypotheses, we start with the assumption that PE firms sell whenever they can achieve their return targets, thus assuming that PE funds act opportunistically. For the more qualitative factors, i.e. the political and legal ones, we assume that PE funds respond to changes in these areas in a pattern corresponding to the findings in Groh *et al* (2010), where they develop an index measuring how attractive it is for a PE fund to operate in a country based on e.g. the juridical conditions and taxation.

However, we find only little support for these assumptions in our data. We summarize the main results into five propositions. First, we find that duration is positively correlated with the state of the economy, which is in contradiction to our expectations. This suggests that the funds hold their investments longer and are less willing to sell when the economy is booming. Second, our analysis indicates that portfolio companies in growth industries are exited earlier. This means that growth firms provide an opportunity to quickly make money, hence in line with the assumptions, although the statistical support is too weak to make any safe conclusions. Third, the PE funds are subject to a type of microeconomic optimization problem relating to the M&A and IPO markets. When there are many active buyers on the market, the chances to dispose the investment at a sufficiently high price are higher and as a result, the funds are more likely to exit when these markets are growing. This finding has the strongest explanatory power in our study.

Fourth, the relation to the stock market is puzzling. We find that the funds react differently to changes in the country compared to the industry index. Fifth, we find that the sensitivity to legal and political reforms is low. It is important to notice that this is a very complex area for several reasons, notably that the majority of both funds and target act on a global level which enables them to relocate headquarters or pay taxes in low-tax countries. However, we find that duration tends to decrease when government size increases, as in line with expectations, and that it also appears to decrease when the juridical conditions become more transparent, less bureaucratic and the ease of business is improved.

1.1 Definition of PE

The Private Equity (PE) and Leverage Buyout (LBO) industry has over the past decades grown in terms of volume, global scope, size range of investments and the number of industries in which financial sponsors engage. The commonly used definition of a LBO is that it is a transaction carried out through a special purpose vehicle (SPV) financed with debt, often arranged in several tranches, and non-traded equity claims with a significantly larger debt share than the average in non-PE-backed companies. Following from these characteristics, LBO investments are generally highly illiquid and highly leveraged, which makes them very risky relative to more conventional investment types (Brunnermeier 2009).

One issue in PE and LBOs that is constantly discussed by academia and business professionals is value generation and performance. There is not one right way to measure this, but some methods are very commonly used, e.g. internal rate of return (IRR) and modified IRR (M-IRR) for performance measuring and a couple of financial, operational and managerial levers for understanding how value is generated. A successful transaction should offer a substantially higher annualized return on the equity stake (IRR) than other, less risky investments would generate during the same time-period (Gottschalg and Phalippou 2007, Berg and Gottschalg 2004).

1.2 The Exit Decision

The key event in a PE investment is thus to find a buyer willing to pay a sufficiently high price, i.e. a price that enables the fund to realize its high IRR target (Povaly 2010). Research in the field of PE tends to agree that a typical investment lasts for five years at average, but deviations occur with shorter holding periods being more common.

There are several ways in which PE funds can exit the investment. Kaplan and Strömberg (2009) find that during the period 1970-1997, the most common types were selling to a strategic buyer (38%), secondary buyouts¹ (24%) and IPO (14%), with the latter one being the most volatile over time in terms of fraction of total deals in a given year. Secondary buyouts are a relatively new phenomenon that developed in the mid-1990s. Other, less frequent exit types include selling to management and selling to a LBO-backed firm.

Many researchers have attempted to explain what deal-specific characteristics determine duration and timing of exits. They have mainly emphasized size of investment, leverage and IRR targets. The literature on external conditions' impact on the exit decision is more limited. Ljungqvist and Richardson (2003) stress the relationship to interest rates as it has a direct effect on the performance of the LBO model, i.e. the debt repayments, and the opportunities to find a

¹ A secondary buyouts, or simply "secondary", is when a PE fund sells to another PE fund

suitable buyer, since higher interest rates make it more difficult to obtain financing. However, no studies have adopted an exhaustive perspective on this topic prior to today.

1.3 Disposition

The remainder of the papers is organized as follows: section 2 provides an overview of previous research in PE with focus on the exit decision; section 3 discusses and presents the hypotheses of the paper; section 4 presents the data sample and the variables used to perform the studies; section 5 outlines the research methodology and econometric concerns; section 6 reports and discusses the results from the analyses; and section 7 delivers our conclusion split into five key points.

2. Previous Research

This section provides an exposé over academic findings on the industries in general and on PE performance measuring, in order to establish a set of key concepts to be applied in the analysis further ahead. This will be followed by an overview of papers on the external and risk environment and papers focusing on the impact on the length of holding periods and timing of exits. The availability of previous findings within this topic, which is this paper's research focus, is relatively limited. However, some authors have mapped the external environment affecting the industry and stated bases of risk in PE. In sum, they have found six main categories impacting the industry: economic, political, commercial, M&A, market and legal factors.

2.1 Characteristics and Value Generation in the Private Equity Industry

Povaly (2010) finds that the industry, which was developed in the US market during the years around WWII and took off in Europe largely as a result of incentivizing policies by political regimes (the Thatcher government strongly supported venture capital financing through e.g. facilitating laws and regulations surrounding this type of financial companies) four decades later, recently has become more globally interrelated. Kaplan and Strömberg (2009) present an overview over how the leveraged buyout industry has evolved between 1970 and mid-2007; the number of transactions amount to 17 171 globally during this period. Geographically, they find that the majority of the transactions have taken place in the Western World (US, Canada and Western Europe) with no signs of any radical shifts towards other regions. As for exits, it is clear that IPOs naturally are dependent on the state of the economy and that the other types of exits have kept quite stable shares over the studied period. Without engaging in explaining the underlying factors and drivers for why, they conclude that there appears to be some correlation between choice of exit strategies and external macroeconomic or market conditions.

Berg and Gottschalg (2004) provide a general framework for understanding how buyouts can generate value. They suggest that there are six levers through which a PE firm can do so: financial arbitrage (acquiring undervalued firms or exploiting synergy effects), financial engineering (optimizing cost of capital and reducing corporate taxes), increasing operational effectiveness (reducing costs and working capital), increasing strategic distinctiveness (e.g. changing marketing mix), reducing agency costs (aligning interests and incentives) and mentoring effects (advisory). Commonly, a mix of several of these levers is used to optimize the investment strategy over the holding period. Phan and Hill (1995) and Wiersema and Liebeskind (1995) empirically investigate what means of value generation PE funds mostly use and conclude that LBOs typically move business focus from top-line growth to cost efficiency, including decreased employee growth and narrower scope of business, hence a change of strategy.

From corporate finance theory, the idea of agency costs (Jensen and Meckling, 1976) has often been applied to explain value creation in LBOs and is one of the six levers in Berg and Gottschalg (2004). It is argued that LBOs generate value through reduced agency costs via a set of mechanisms, of which the combination of heavy debt financing and equity stake held by management is the most important: instead of allocating surplus cash to inefficient investments or empire-building investments, this cash is allocated to repayment of loans (Jensen 1986, Kaplan and Stein 1993).

These previous scholars have contributed to the setup of a common comprehension of what PE firms do over the whole value chain from acquisition via improvement packages to exit. This thesis will refer back to these concepts and definitions when explaining key findings and their possible underlying reasons.

2.2 Performance of Private Equity Funds and Investments

Studies on performance of PE have focused on the return the funds generate on the capital invested by the external providers of financing, which usually is denominated in annualized IRR, and on the relationship between return of individual investments and the target characteristics, e.g. industry, size and stage of the product life-cycle (maturity), as well as overall economic conditions, notably cyclicity and stock market performance.

Most of the previous work in this area finds that PE funds generate positive returns and more so than other investments (see e.g. DeAngelo and DeAngelo, 1987; Smith (1990) Morskowitz and Vissing-Jørgensen, 2002). Kaplan and Schoar (2005) investigate the performance of LBO and VC funds in relation to a proxy for the overall market. They find, in contradiction to previous scholars, that LBO funds generate slightly lower returns² than the

² Returns are measured net of fees; most previous researchers have looked at returns gross of fees.

market. However, they find evidence of skilled general partners (GP), i.e. fund managers that consistently outperform the market and can find and exploit attractive investment opportunities even under turbulent macroeconomic conditions.

Ljungqvist and Richardson (2003) use a data sample containing complete cash flows and their exact timing to investigate the characteristics of PE fund performance. They specifically look at how capital investments are distributed over time and when returns turn positive. They find that it takes at average six years for 90% of committed capital, which is not the same as total funds raised³, to be invested. The reasons behind this time lag are mainly two-fold: there must be attractive investments available and there is often intra-industrial competition on potential targets.

Several authors early observed that there is a positive *ex ante* effect of LBOs. The target's stock price usually rises as a consequence of the buyout announcement (Madden *et al* 1990, DeAngelo *et al* 1984). This gives a hint about markets having confidence in PE firms and pricing this upon announcement, but it does not necessarily reveal anything about efficiency contributions during and after the holding period. The success rate⁴ in PE is reported to be around 75% over the holding period, which is higher than in e.g. M&As (Gottschalg and Phalippou 2009), although other scholars find that returns in PE and VC are similar to Nasdaq Small Cap stocks, but with substantially higher volatilities (Cochrane 2005).

2.3 Risk Environment and External Conditions

On a general level, PE investments are found to be more risky than more conventional investment types, mainly due to the heavy exposure to interest rate risk due to high share of debt financing, the illiquid nature of the deals and ambitious business plans implemented by the GPs. Baule *et al* (2008) calculate idiosyncratic (equity) risk for individual LBO transactions and report a mean of 94.1 per cent and median 93.5 per cent (annualized values) using a manually collected sample of 40 LBO transactions. Studying the relation between holding period and idiosyncratic risk, there appears to be negative correlation between holding period and risk. This should be expected given the nature of the levers of value creation proposed above; some restructuring activities and cost-cut programs may require an implementation period before results can be realized. Cochrane (2005) applies a leverage-neutral maximum-likelihood estimation and generates a mean volatility of 86 per cent p.a. for a sample of 16 638 LBO and VC transactions.

Another source of risk is the increased share of cross-border investments and financing activities. On the one hand, this enables investors to exploit a larger range of attractive

³ Most PE funds do not invest all capital they have raised before liquidation.

⁴ Success rate is measured as whether the level of returns generated over the holding period exceeds certain target levels.

opportunities, while on the other hand it implies larger risks relating to market performance and macroeconomic conditions. Although there is a long-term trend of increased volumes of invested capitals, which is a result of the industry becoming more mature and spread across industries and geographies, there have been temporary drops in PE activity caused by poor state of the economy in large (Poalvy 2010, EVCA 2004).

Groh *et al* (2010) develop an attractiveness index to comprehend the large differences in relative PE activity across European countries. They conclude that legal factors such as property rights and corporate governance laws and size and liquidity of capital markets (composed by IPO activity, stock market, M&A activity, debt and credit market and VC/LBO investments) are the most important when determining country attractiveness. Although economic activity (GDP, price index, unemployment rate and FDI) and human and social environment (education and labor regulation) provide some explanatory support, this is subordinate to notably capital market quality.

2.4 Timing of Investment and Exit Decisions

A typical PE investment is approximately five years long (Kaplan and Strömberg 2009, Kaplan and Schoar 2005, Butler 2001), although this may differ from case to case. Under ideal conditions, i.e. what is popularly referred to as the “golden age” of the PE industry, the financial sponsors were facing low interest rates, large opportunities to leverage investments, a lot of deal possibilities, high return per effort and as a result short holding periods. In crisis periods, the investment focus shifts towards carve-outs, distressed debt investments and restructuring projects; all of these are generally associated with weaker profit and later exits (EIF 2010).

The choice of exit strategy has extensively been investigated notably for VC investments and from a contract theory perspective. Presence of strong control rights is typically associated by exit via acquisition-type exits, whereas weaker defined control rights rather ends with an IPO (Cumming 2008); control rights here includes e.g. right to replace CEO and certain veto rights (Hart 2001; Kaplan and Strömberg 2003). The choice of exit route is crucial when entering an investment and is subject to a conflict between the entrepreneur and the LBO firm, where the former prefers an IPO that can result in a higher valuation whereas the latter prefers a trade sales (strategic takeover or secondary LBO), as this provides more security and predictability (Schmidt *et al* 2010; Yousfi 2010; Phalippou and Gottschalg 2009). Another potential conflict is that between the general GPs managing the fund and the investors placing capital in the fund. To align interests, GPs are compensated for their effort through annual fees corresponding to some 1-2 per cent of assets under management and through carried interest (some share of fund's

profit); hence, it lies in both parties' interest to take rational decisions, i.e. divest holding portfolios at best price and best time (Ljungqvist and Richardson 2003).

The longevity of LBOs is generally found to be decreasing in size of buyouts and increasing in level of IRR targets. Due to the illiquidity of the investments, authors have concluded that the overall stock market has a strong impact on the PE industry in that it will be more difficult to divest in bearish market conditions. They also argue that sudden drops in GDP and increases in real interest rates can cause the exit decision to be delayed. Furthermore, given that the probability of failure is increasing with higher leverage and delays in the restructuring plan, it is reasonable to believe that these internal factors also cause longer holding periods (Chandrasekhar 2007, Wright *et al* 1996, Wright *et al* 1994). Giot and Schwienbacher (2007) argue that the exit decision is also dependent on the industry life cycle and level of innovation; in younger firms in more dynamic industries, e.g. Internet-related and biotechnology, the probabilities of both reverse LBO and write-off (indicating failure) are higher. It therefore makes sense to investigate how industry growth and market valuation affect the exit decision.

The macroeconomic environment is thus not unimportant to the PE industry. However, although the deal volume tends to decrease for all industries in parallel to negative GDP shocks, the investments still generate higher returns than conventional, publicly traded asset classes. One important underlying factor for this volume decline is connected to market psychology and how investors become less risk appetite in unstable market conditions. On the exit side, the most common type of exit is then write-offs; PE funds holding what they judge as successful typically wait for recessions and market instability to wave over before selling off through M&A or IPO (EIF 2010). However, the importance of GDP growth for the industry is still disputed: Conway (2007) finds that the capital inflow to PE funds and hedge funds remained high during the market turbulences in 2007 with banks granting loans at below interest rates.

Ljungqvist and Richardson (2003) find that better investment environment, defined as available opportunities and the intensity of the competition the fund faces, leads to shorter holding periods. They also gain support for a size effect, where larger investments are exited faster, which is in line with their hypothesis on the size-IRR relationship suggesting that larger initial investments restrict the potential up-side of returns. On the direct macro side, more expensive high-yield debt delays exit decision as that implies larger interest payments and slower repayment rate. IPO activity has a negative and significant correlation with investment duration, i.e. higher IPO rate implies quicker exits, whereas M&A and stock market conditions appear to be of limited or no effect.

There is an important interest risk which has a double effect on PE performance: first, there is a risk of facing increased interest payments as a consequence of higher interest rates; second, there is a risk of not generating enough cash flows – e.g. due to slowing growth in demand or unexpected increases in costs – to cover interest payments and debt repayments (FSA 2006, Ljungqvist and Richardson 2003). The findings on what factors determine ideal conditions for private equity and similarly constitute the most important risks can be classified into six areas: economic, political environment, commercial, M&A, market and legal factors, as summarized in Table 2a.

Economic factors involves overall macroeconomic performance, including interest rates, GDP and taxes. Political factors may be more difficult to measure accurately, as it concerns the independence of business from government activities and the stability of governing coalitions. Commercial factors are mostly industry-specific and take into account how mature the industry is and how it performs in terms of aggregated revenue. For M&A activity, it is suggested that a more active deal market is better for the PE industry. The stock market measures the strength of the bank sector and factors related to that, e.g. liquidity on the market and the availability of financing possibilities. More liquid markets are synonymous with more ideal PE conditions. Lastly, the legal environment is to a large extent on a national level, although there are a lot of similarities especially within the European Union. Relevant legal factors are naturally property rights and rules that govern PE firms, i.e. M&A legislation, business laws and capital market regulations, as observed in e.g. Groh *et al* (2010).

Table 2a – Determinants of Private Equity Attractiveness

Determinants of Private Equity Attractiveness	
Area	Factors
Economic	<i>Interest rates, GDP, productivity, taxation</i>
Political	<i>Business independence, government stability</i>
Commercial	<i>Market maturity, no. of firms, ownership structure</i>
M&A	<i>Activity of M&A market</i>
Market	<i>Maturity of bank sector, capital markets liquidity, financing opportunities</i>
Legal	<i>Property rights, M&A legislation, business law</i>

3. Research Focus and Hypotheses

The paper will examine what factors explain exits of PE investments. This has only received limited attention in previous research and further investigation of this topic will help explaining why exits occur at specific times. In order to understand the main characteristics of different years, a set of macroeconomic, industry-specific and market-related factors that both scholars

argue to be central for PE and legislators and supervisors, e.g. FSA, is use to assess the riskiness in the PE sector.

In Table 2a, these factors are categorized as economic, political, commercial, M&A, market and legal. How the categories relate to this study, what the rational arguments are and what the research hypotheses are will be treated separately below. It is worth noting that the factors are partly interlinked, which will be accounted for when discussing the outcome from the econometric tests.

3.1 Economic Factors

The pure economic measures that have been suggested to influence PE investments are interest rates, GDP, productivity and taxation. This paper will focus on GDP and unemployment. As most of the countries in the sample introduced the euro, there will be very small differences between the countries with respect to interest rates so it is left out here. Moreover, interest rates are typically adjusted several times per year and would therefore require a higher frequency of the study, for instance month-based rather than year-based data.

As GDP and unemployment go up, the demand in the economy is typically decreasing since the supply goes up and income per capital goes down. This will harm investments where focus lie on revenue growth or global expansion. There are two potential outcomes from this: either, PE funds could sell earlier in order to mitigate risks of underperforming portfolio firms such as decreased brand image, or they will hold the companies longer and wait for growth in demand to turn to positive so that initial growth plans will be met. In the first scenarios, PE funds are expected to have a risk-averse approach; also, a too early exit where the fund does not succeed in implementing the initial business plan can signal weakness in the fund management. The latter scenario with delayed exits due to low or negative GDP growth and high unemployment rates will be more likely.

Hypothesis 1: Duration of PE investments is decreasing in GDP growth

Hypothesis 2: Duration of PE investments is increasing in unemployment rate.

3.2 Political Factor

The political governance can influence the business environment by budget activities, e.g. subsidies and taxation, which partly is an economic factor; and by owning or nationalizing industries or firms. A natural expectation on the impact of taxation and size of government subsidies is that lower rates are associated with better conditions for PE. Berg and Gottschalg (2004) argue that one of the main levers of value creation relates to how PE funds experiment with the corporate tax rate to improve financial performance and increase cash flow generation. If governments announce tax increase plans, the hypothesized response is to exit early and vice

versa; if governments plan to reduce taxes, it can be profitable for PE funds to postpone exit plans in order to exploit the new, more favorable fiscal conditions.

Hypothesis 3: Duration of PE investments is decreasing in size of public spending, taxation and the level of government activity in business.

One limitation here, however, is that PE firms may also choose to move parts of the business or register the company abroad when taxes increase; this possibility has become a more viable option for businesses as the economies have been more globalized and interlinked, e.g. as part of the European integration process. It is impossible to identify such cases given the restrictions imposed by the availability of data. However, this could be one explanation if *Hypothesis 3* does not hold.

3.3 Commercial Factor

A couple of the commercial factors presented in earlier studies relate to the maturity of the market, which in the best case can be investigated using product life cycles and the number of firms within the industry. A more implementable and more easily observable instrument which captures both these more precise measures is industry revenue growth. Mature industries are expected to have a moderate or even declining growth and a rather constant number of firms when comparing on a year-to-year basis, whereas new and expansive industries should report high growth rates and a relatively high number of entrants.

In order for PE funds to reach their IRR targets, it will require less effort and time spent on firms operating in dynamic and rapidly growing industries, rather than in mature markets where there might be more need of operational and strategic changes to turn around the business and accomplish improvement goals. Also, new industries have shown to attract more interest in media and by investors; an example of that is the dotcom bubble 1998-2001 where hundreds of IT companies, out of which a large share owned by LBO or VC funds, were bought and listed. Following this, companies operating in these types of industries will be surrounded by more potential buyers willing to bid and acquire them than companies in slow-growing sectors. Hence, the idea is higher industry revenue growth should be accompanied by shorter duration.

Hypothesis 4: Duration of PE investments is decreasing with revenue growth in the industry.

3.4 M&A Factor

A lot has been said about the influence of M&A activity on PE. Whereas some find no effect (Ljungqvist and Richardson 2003), others include it as one component of market liquidity and

claim it to have a strong impact (Groh *et al* 2010), which shows how complex and important it is to understand the overlaps between M&A and PE activity.

First, the LBO event is similar to an acquisition, thus PE funds may compete with other non-PE buyers when acquiring their target hence higher demand due to more players. It is therefore useful to include this factor because of this strong connectedness.

Second, an active M&A market increases the possibility of a PE fund to find a suitable buyer for exiting their portfolio firm in the case where they seek to exit through secondary buyout, trade sale or MBO. One driver behind such a market scenario is large enterprises with excessive cash on hand and no internal investment opportunities are available to go out on the market and look for acquisition opportunities.

Third, M&A activity is a proxy for the availability of financing opportunities, especially debt finance, as this is one of the most critical activities in the acquisition phase of PE funds. Following this reasoning, high growth in M&A activity will be associated with shorter holding periods.

Hypothesis 5: Duration of PE investments is decreasing in growth in M&A activity.

3.5 Market Factors

Given the nature of PE investments with generally high leverage ratios, market performance and liquidity has been claimed to have a large impact for performance and duration of LBOs. As with M&A factors, market factors give an indication of financing opportunities on the market. How the relationship looks like is not crystal clear since there are two points of view that have been brought up in earlier research. On one hand, scholars treat LBO and VC as non-conventional non-traded asset classes. As part of this, the financial performance should by nature be less correlated with overall market performance; in particular so because of the limited transparency of the business in terms of reporting. From this perspective, the illiquid characteristic is an advantage.

On the other hand, that only holds for the performance during the holding period, because as they are illiquid investments that at some point need to be disposed, the timing of the exit event will be highly dependent on the liquidity available on the market. One instrument to measure the opportunities of exiting is the IPO activity. This is obviously true when there is a planned private to public exit (IPO or reverse LBO), but also for trade sales as it gives an indication of the possibilities of financing the acquisition through raising more equity.

Another aspect of the market is its signaling mechanisms. A bull market, which is associated with high returns and relatively low volatility, incorporates investors' positive future outlook in the pricing, whereas a bear market incorporates a duller outlook in prices, generating

lower returns and higher level of uncertainty. Investors' interest and activity is also very high during bull periods as opposed to in bearish times (Gonzalez *et al* 2003, Maheu and McCurdy 2000). If the equity markets are prosperous, this would mean that potential buyers are both more willing to pay a high price for the targeted firms and more likely to obtain financing from debt institutes and shareholders for these potential acquisitions. Timing exit with periods when market valuations are high would then be optimal for PE funds, as this helps them reaching the high IRR targets.

Hypothesis 6: Duration of PE investments is decreasing in growth of IPO activity.

Hypothesis 7: Duration of PE investments is decreasing in stock market performance.

3.6 Legal Factors

As all business entities, PE funds operate in a complex legislative environment, especially given cross-border differences evolving from the increasing degree of globalization in business activities. The economic freedom of a PE fund, i.e. the extent to which it can implement business plans and realize profits from financial engineering activities, is regulated on both national and supranational (e.g. within the EU) level. In order to obtain a complete comprehension of the most relevant sets of regulation for the exit decision in PE investments, this paper will look into a wide range of laws covering multiple aspects and phases of the transaction phase.

The structure of the legal system and the protection of property rights include the independence of the legal system from politics and business, regulations on purchase and sales of property and respect for contracts. Countries with, from a business perspective, more open principles within this area would be expected to report more PE activity than countries with more limited property rights. To illustrate with a polarized example, it is more likely that a multinational company decides to establish in a market-oriented country based on capitalist principles, like an EU member state, than in an authoritarian closed economy, like Zimbabwe or North Korea. Since the data sample here focuses on European countries and with the European integration process, it could be reasonable to believe that these countries score very high on this measure. Nonetheless, there are differences between countries and also over time, which can have implications on the duration of PE investments. Given the above reasoning, an improvement in the legal system and property rights should make it easier to sell off a company and following from that, duration should have negative correlation with any instrument for this measure.

Hypothesis 8: Duration of PE investments is decreasing in improvements of legal system and property rights.

Credit market regulations involve laws on bank ownership, openness to competition from non-national banks and the existence of interest rate controls. The importance of debt financing has already been stressed and legislation surrounding it should have some explanatory power for the ease of obtaining financing, also the quality of the financing. With a more competitive bank sector, there should be more activity in PE and M&A that in its turn should generate shorter holding periods; hence, PE funds should respond to any improvements in this field by disposing the portfolio companies earlier.

Hypothesis 9: Duration of PE investments is decreasing in improvements of credit market regulations.

One lever of value creation in PE is operational efficiency, which e.g. can mean reducing the number of staff (Berg and Gottschalg 2004). This should be particularly important for industries that are intensive in low-skilled labor, such as many sectors in manufacturing. In countries where it is easy and cheap to hire and fire, it would require less time to implement such business plans and realize the target returns. If a government announces that it will make labor laws less strict, for instance by removing or reducing minimum wages or reducing taxes on hiring people, the natural result would be earlier exits of the portfolio companies.

Hypothesis 10: Duration of PE investments is decreasing in improvements of labor regulations.

The fourth and last branch of legal factors is business laws, which focus on requirements of administration and bureaucratic procedures as well as costs associated with this. The intuitive idea from an economic perspective would be that bureaucracy is time-consuming and will make the investment period for PE funds longer as each step of the process requires more effort. Thus, any facilitation of these kinds of rules should be welcome by PE funds and result in earlier exits.

Hypothesis 11: Duration of PE investments is decreasing in improvements of business laws.

4. Data Sample

4.1 Availability of Private Equity Data

Many previous articles and theses focusing on buyout investments are lacking on data, which can harm the trustworthiness of the statistical findings. This is largely due to the nature of PE

business: during the holding period, PE firms will in the general case not reveal any performance-related data as they are exempted from public disclosure requirements. Some databases, like Thomson ONE Banker, do provide performance results in the form of IRRs of 3 555 PE funds⁵, but the underlying calculations are missing as well as the names of the funds. Venture Economics collect data quarterly and the decision from the PE funds' side to reveal information is on a voluntary basis. Other databases like Capital IQ and Mergermarket provide data on M&A transactions and it is possible to gather a substantial share of data through those sources. Despite the availability of figures in these databases, there is a high risk of data error; Kaplan, Sensoy and Strömberg (2002) compare 143 VC transactions they had complete details on to Venture One and found that 15% of the deals were missing. Hence, there are still issues with data reliability despite the evolution of PE databases and the opportunities to control retrieved figures are limited due to private information.

4.2 Data Set

The raw data set on PE transactions is originated from Kaplan and Strömberg (2009). Though it includes many different variables and information, only the following are necessary for this study: registration filed date, exit date, holding period in months, exit type, location of headquarters and Capital IQ industry classification. This data set has been cleaned to fit the research focus.

First, all companies who had operations outside of Europe were excluded from the sample. Among the European countries, 25 countries were excluded due to availability of data; however, most of these countries have only limited PE activity. Further, there were no observations from Turkey, Greece or Ireland after the data set was cleaned for time period, bankruptcies and industry classifications, hence leaving 17 countries in the sample.

Second, all companies within the financial and real estate industry were excluded. These two industries have very different characteristics and are thus cleaned for in order to make comparisons more feasible. Third, the time period is set from 1997 to 2007 and therefore companies bought before 1997 or sold after 2007 are not in the final sample. Fourth, types of exits that are not included in the sample are confirmed bankruptcy, confirmed exit of unknown type, partial exits, no buyer exit but public and unknown if exited. Hence, only confirmed secondary buyout, IPO, MBO and trade sales are included.

Besides the private equity data several control variables have been gathered. To measure economic factors, inflation-adjusted GDP and unemployment rates are used; these were downloaded from Eurostat and are country specific. Industry revenue was downloaded from

⁵ Thomson ONE Banker, cumulative performance for PE funds as by 31/12/2010.

Eurostat and is industry specific. However, Eurostat's industry classification is wider than Capital IQ's sub-sector categorization, so each Capital IQ category has been re-classified into the Eurostat corresponding industry. The two types of stock market indices applied are from MSCI and were downloaded from Datastream: the first is country specific and the second is industry specific. Also here, the industry classification is broader than in Capital IQ and another re-classification was necessary. To account for M&A and IPO activity, the numbers of M&A deals and completed IPOs in Europe on a year basis were retrieved from Zephyr.

One political and four legal factors are accounted for using proxies from Fraser Institute, an independent non-partisan research and educational organization based in Canada that annually presents a report on Economic Freedom of the World. The indices used here are government size, legal system and property rights, and regulation index for business, the credit market and labor market. These indexes are computed by a number of relevant factors and are further developed under *Research Focus and Hypotheses*.

The raw data retrieved from MSCI, Eurostat, Fraser Institute and Zephyr is transformed into variables to be used for running the tests. Table 4.2a summarizes the raw variables used.

Table 4.2a Variables Description

VARIABLES DESCRIPTION			
Area	Variable	Description	Source
Economic	<i>gdp</i>	Real GDP, euro	Eurostat
	<i>unemp</i>	Unemployment rate, %	Eurostat
Political	<i>govsize</i>	Government size index, score on scale 1-10	Fraser Institute
Commercial	<i>indrev</i>	Industry revenue, euro	Eurostat
M&A	<i>manda</i>	M&A volume, number of deals	Zephyr
Market	<i>countryindex</i>	MSCI country index, index value	MSCI
	<i>indindex</i>	MSCI industry index, index value	MSCI
	<i>ipo</i>	IPO volume, number of transactions	Zephyr
Legal	<i>legalprop</i>	Legal system & property rights index, score on scale 1-10	Fraser Institute
	<i>cmreg</i>	Capital markets regulation index, score on scale 1-10	Fraser Institute
	<i>laborreg</i>	Labor regulations index, score on scale 1-10	Fraser Institute
	<i>businessreg</i>	Business regulation index, score on scale 1-10	Fraser Institute

4.3 Descriptive Statistics

Figure 4.3a displays the distribution of the sample observations by holding period and Table 4.3a reports summary statistics for holding period expressed in months per country. The average holding period for the full sample is 41.8 months, roughly 3.5 years, with a slightly lower median, 38 months. There are some deviations on country level; the Portuguese transactions in the sample have the lowest mean (27.6 months) and the Hungarian the highest mean (54.5). The difference in mean from the total sample is only statistically significant⁶ in the case of Portugal;

$$^6 \text{ t-statistic: } t = \frac{\text{holding period}_{\text{Country}} - \text{holding period}_{\text{Sample}}}{\sqrt{\left(\frac{\sigma_{\text{Country}}^2}{n_{\text{Country}}}\right) + \left(\frac{\sigma_{\text{Sample}}^2}{n_{\text{Sample}}}\right)}}$$

the reported t-statistic for the difference-in-mean test is -1.67 (10% level). Also the Italian and Finnish transactions report statistically significant differences in means with t-statistic of -2.79 and 4.14 (0.5% level).

Figure 4.3a Descriptive Statistics - Observations per Holding Period

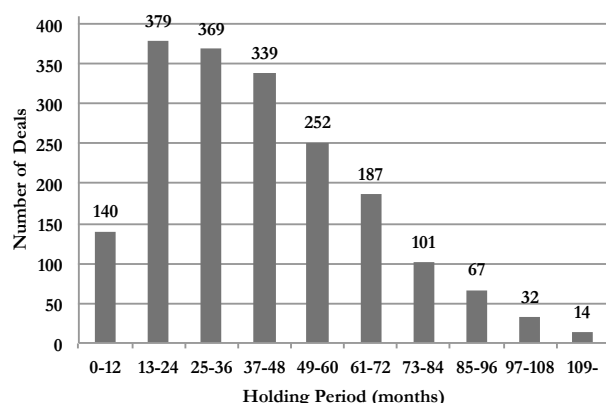


Table 4.3a Descriptive Statistics - Holding Period per Country

DESCRIPTIVE STATISTICS, HOLDING PERIOD PER COUNTRY						
Country	Observations	Holding Period (months)				
	Number	Mean	Std	Min	Max	Median
Austria	14	35.6	20.8	6	70	30
Belgium	38	43.0	26.4	4	103	37
Czech Republic	9	34.3	25.9	12	79	19
Denmark	24	38.3	18.5	7	66	39.5
Finland	50	56.9	25.4	17	111	54.5
France	361	40.9	22.1	2	105	38
Germany	187	39.7	23.2	2	119	35
Hungary	4	54.5	37.4	27	109	41
Italy	98	35.6	21.4	1	101	31.5
Netherlands	81	41.9	27.3	2	113	37
Norway	20	36.4	26.6	4	114	28
Poland	14	46.6	23.1	10	94	52.5
Portugal	8	27.6	24.1	4	70	21
Spain	94	40.1	21.6	1	105	37
Sweden	97	41.3	24.4	1	107	37
Switzerland	33	42.5	24.2	17	110	38
United Kingdom	748	43.3	23.6	1	126	40
TOTAL	1880	41.8	23.6	1	126	38

For the economic and political factors, as reported in Table 4.3b, there is some spread in GDP growth and unemployment rate both across time and countries. This indicates that the sample period captures boom and recession years, as in line with expectations. As for government size, there is somewhat less spread within countries over time, but more so between countries. Five countries have mean scores that are lower than average (indicating larger size of government than full sample average) and that are statistically significant on at least the 10% level: Czech Republic, Denmark, Finland, France and Sweden. Three countries show the opposite result: Portugal, Switzerland and the UK.

Table 4.3b Descriptive Statistics - Economic and Political Factors by Country

DESCRIPTIVE STATISTICS, EC/POL FACTORS BY COUNTRY												
Country	GDP Growth (%)				Unemployment Rate (%)				Government Size (score)			
	Mean	Std	Min	Max	Mean	Std	Min	Max	Mean	Std	Min	Max
Austria	2.7	1.1	0.9	3.8	4.3	0.5	3.6	5.2	3.9	1.2	2.8	5.2
Belgium	2.4	1.1	0.8	3.7	8.1	0.9	6.6	9.3	4.4	0.2	3.7	4.7
Czech Republic	3.5	2.6	-0.9	7.0	7.6	1.1	5.3	8.7	3.7	0.9	2.9	5.2
Denmark	2.1	1.1	0.4	3.5	4.7	0.6	3.8	5.5	3.7	0.5	3.1	4.4
Finland	3.9	1.5	1.8	6.2	9.4	1.6	6.9	12.7	3.8	1.0	2.8	5.2
France	2.3	0.9	0.9	3.7	9.3	1.0	8.2	11.1	3.5	0.8	2.6	5.0
Germany	1.7	1.3	-0.4	3.7	9.4	1.1	7.9	11.3	4.8	0.8	4.0	5.8
Hungary	3.6	1.3	0.1	4.8	6.9	1.1	5.7	9.0	4.8	1.1	3.7	6.3
Italy	1.6	1.0	0.0	3.7	8.9	1.8	6.1	11.3	5.1	0.7	4.1	6.0
Netherlands	2.8	1.6	0.1	4.7	4.1	1.0	2.5	5.5	4.4	0.2	4.1	4.7
Norway	2.7	1.2	1.0	5.4	3.6	0.6	2.5	4.5	4.2	1.2	3.1	5.8
Poland	4.5	1.9	1.2	7.1	15.4	3.9	9.6	20.0	4.6	0.8	3.3	5.5
Portugal	2.3	1.8	-0.9	5.1	6.6	1.6	4.5	8.9	5.6	0.3	5.3	6.0
Spain	3.8	0.7	2.7	5.0	11.7	3.0	8.3	17.8	5.6	1.0	4.4	6.7
Sweden	3.4	1.1	1.3	4.7	7.0	1.3	5.6	9.9	3.3	0.3	2.8	3.7
Switzerland	2.1	1.3	-0.2	3.6	2.9	0.6	1.9	3.8	7.4	0.5	6.6	8.0
United Kingdom	3.3	0.7	2.1	4.5	5.4	0.6	4.7	6.8	6.1	0.2	5.7	6.5
TOTAL	2.9	1.6	-0.9	7.1	7.4	3.4	1.9	20.0	4.6	1.3	2.6	8.0

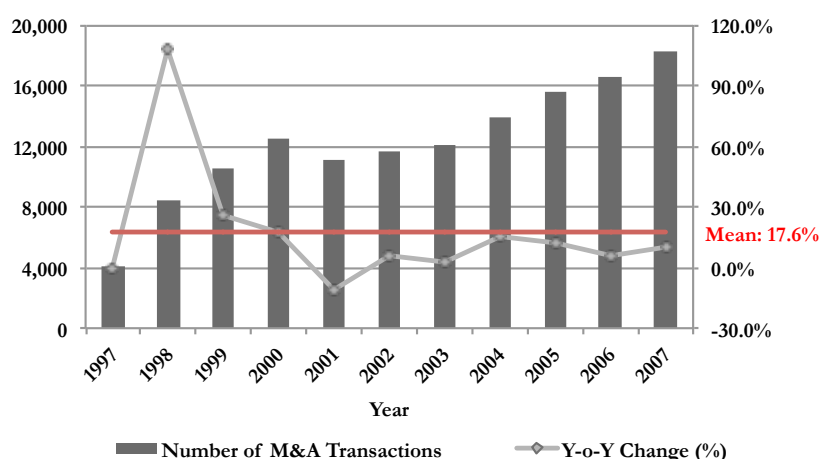
Industry revenue, the commercial factor, is downloaded from Eurostat, which uses quite broad industry classifications with eight being applicable here. From the descriptive statistics (Table 4.3c), it appears that Manufacturing, Hotels/Restaurants and Wholesale are the most mature given rather slow average growth rates and small variance. Mining and Utilities report the highest averages and standard deviations together with the largest difference between minimum and maximum value, and could hence be interpreted as less mature, more dynamic and potentially also more vulnerable to external shocks.

Table 4.3c Descriptive Statistics - Commercial Factor, Industry Revenue by Industry Classification

DESCRIPTIVE STATISTICS, COMMERCIAL FACTOR					
Eurostat Industry Category	Observations	Y-o-Y Change (%) in Ind. Revenue			
	Number	Mean	Std	Min	Max
Manufacturing	518	4.0	3.0	-0.7	9.1
Construction	73	6.3	3.7	1.2	13.3
Utilities	176	9.1	8.4	-2.8	22.9
Hotels Restaurants	103	4.4	2.9	-0.1	10.1
Real Estate	1	7.9	4.1	0.8	12.5
Transport & Communication	328	7.6	4.2	0.7	13.5
Mining	2	8.7	11.8	-4.1	37.6
Wholesale	679	5.0	3.9	-4.8	11.1
TOTAL	1880	6.6	6.1	-4.8	37.6

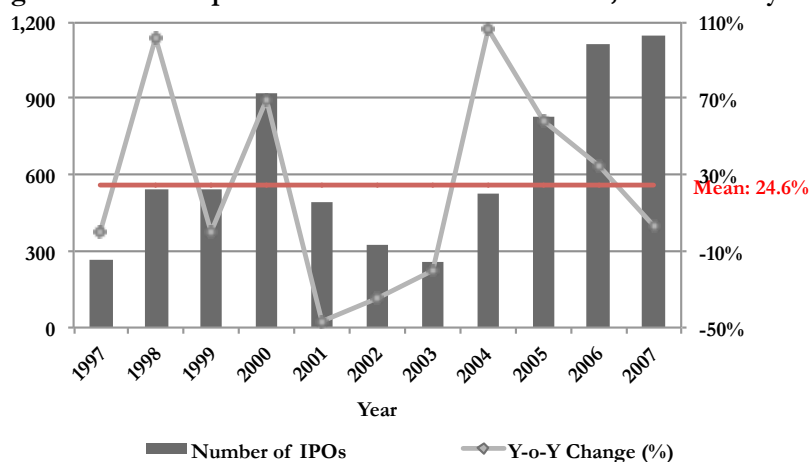
The M&A market took off in the late 1990s, as reflected in Figure 4.3b, where the reported growth rate between 1997 and 1998 amounted to 107%. Besides that, the year-on-year growth rate over the sample period has been very close to the mean of 17.6% with significant deviations during the DotCom-crisis (2001). From the graph, it can therefore be concluded that the M&A market is highly cyclical and can thus be used as an instrument to assess how correlated holding periods of PE investments are with this cyclicity.

Figure 4.3b Descriptive Statistics – M&A Factor, M&A Activity 1997-2007



The market factors used here are IPO activity and market indices on country- and industry-level. Figure 4.3c shows the IPO activity over the sample period. The mean year-on-year growth rate is 24.6% but the variance is high; for the crisis years, the growth is strongly negative with rates of almost -50%, and during the beginning of the bull periods it goes up to almost 110%. If the M&A market is volatile and cyclical, the IPO market is even more so.

Figure 4.3c Descriptive Statistics – Market Factors, IPO Activity 1997-2007



The descriptive statistics for the MSCI country indices are reported in Table 4.3d. Sample mean (equal-weighted) across all countries is 13.6% with standard deviation of 30.4%. The highest values for Finland (193.7%) and Sweden (108.2%) are attributable to 1998, which is logical as they are heavy on IT companies and this was the year when the IT industry boomed; Finland also has the highest mean in year-on-year change with 28.9% followed by Hungary and Czech Republic, which were liberalized later than the other sample countries and hence have seen a more rapid economic development as their GDP growth statistics indicated.

Table 4.3d Descriptive Statistics – Market Factors, Country Index

DESCRIPTIVE STATISTICS, MARKET FACTOR (COUNTRY INDEX)				
Country	Y-o-Y Change in MSCI Index			
	<i>Mean</i>	<i>Std</i>	<i>Min</i>	<i>Max</i>
Austria	12.7	22.4	-9.1	57.0
Belgium	8.6	24.4	-29.7	52.8
Czech Republic	21.9	25.7	-11.6	65.3
Denmark	15.5	23.6	-29.6	55.0
Finland	28.9	67.6	-41.6	193.7
France	11.0	23.6	-34.0	49.9
Germany	11.8	26.8	-44.0	43.8
Hungary	23.3	43.0	-22.8	125.5
Italy	10.9	24.0	-24.0	55.4
Netherlands	7.1	21.2	-34.3	42.5
Norway	13.6	27.2	-36.1	51.7
Poland	10.7	26.8	-24.8	52.9
Portugal	10.4	25.8	-28.3	70.4
Spain	14.0	22.4	-29.5	44.2
Sweden	14.3	40.2	-41.8	108.2
Switzerland	10.3	24.5	-24.4	66.8
United Kingdom	5.9	19.4	-30.2	38.8
TOTAL	13.6	30.4	-44.0	193.7

The MSCI market indices are reported in Table 4.3e. Most companies belong to either Consumer Discretionary or Industrials while only 5 and 19 companies belong to Energy and Telecom respectively. The overall sample mean is lower than for the country indices which can be explained by the fact that the industry indices are based on a European level and hence should include more countries than above, and the country indices also include the Financials sector.

Table 4.3e Descriptive Statistics – Market Factors, Industry Index

DESCRIPTIVE STATISTICS, MARKET FACTOR (INDUSTRY INDEX)					
Eurostat Industry Category	Observations	Y-o-Y Change in MSCI Index			
		<i>Mean</i>	<i>Std</i>	<i>Min</i>	<i>Max</i>
Consumer Discretionary	671	4.6	18.7	-35.2	24.2
Energy	5	9.8	18.0	-17.7	40.4
Industrials	590	10.1	22.6	-34.6	34.1
Consumer Staples	95	10.2	15.7	-15.4	33.4
Health Care	119	7.6	20.7	-28.2	45.7
IT	188	16.4	54.1	-59.3	141.0
Telecom	19	13.7	40.0	-36.7	83.6
Utilities	193	12.8	19.3	-22.7	34.2
TOTAL	1880	10.8	28.1	-59.3	141.0

For the legal factors, some interesting observations are worth noticing from Table 4.3f. The Germanic countries score high on the indices over Legal System, Credit Market Regulation and Business Laws while the southern and eastern European countries score lower on especially Legal System and Business Laws. Most variety is found for Labor Regulations, where the UK and Switzerland appear to have the most deregulated labor market and Germany and Sweden the most regulated. Two main reasons for these differences can be late market liberalization and entry in the EU (the case of Poland and Czech Republic) and, most importantly, differences in juridical traditions (Merryman and Pérez-Perdomo 2007).

Table 4.3f Descriptive Statistics – Legal Factors by Country

DESCRIPTIVE STATISTICS, LEGAL FACTORS BY COUNTRY																
Country	Legal Syst./Prop. Rights (score)				Credit Market Reg. (score)				Labor Reg. (score)				Business Laws (score)			
	Mean	Std	Min	Max	Mean	Std	Min	Max	Mean	Std	Min	Max	Mean	Std	Min	Max
Austria	8.9	0.3	8.6	9.3	8.6	0.6	7.6	9.4	5.1	1.0	3.9	6.1	7.0	0.4	5.9	7.5
Belgium	7.7	0.4	7.0	8.3	9.2	0.2	8.9	9.5	5.9	0.9	4.9	6.9	6.4	0.8	4.5	7.6
Czech Republic	6.5	0.2	6.2	6.9	7.7	1.3	6.4	9.3	6.4	1.2	5.1	7.8	5.7	0.5	5.1	6.7
Denmark	9.2	0.2	8.9	9.5	9.5	0.1	9.3	9.5	6.1	1.4	4.6	7.5	7.5	0.5	6.6	8.2
Finland	9.2	0.2	8.8	9.5	9.4	0.3	8.8	9.8	4.2	0.8	3.3	5.1	8.2	0.7	6.9	8.8
France	7.6	0.3	7.1	8.1	8.6	0.4	8.1	9.2	5.1	0.5	4.0	5.5	6.6	0.6	5.3	7.3
Germany	8.9	0.3	8.5	9.1	8.0	0.1	7.7	8.2	3.4	0.4	2.8	3.9	7.0	0.6	5.6	7.8
Hungary	6.8	0.3	6.4	7.4	8.0	0.5	7.3	8.8	6.1	0.6	5.5	7.0	6.5	0.5	5.8	7.3
Italy	6.7	0.8	5.6	7.7	7.4	0.5	6.8	8.1	4.7	1.2	3.5	6.5	5.7	0.4	5.0	6.3
Netherlands	9.1	0.4	8.4	9.6	9.3	0.2	9.0	9.5	5.8	0.9	4.5	6.7	7.1	0.8	6.0	8.3
Norway	8.8	0.3	8.3	9.2	8.8	0.5	8.1	9.5	4.5	0.5	3.8	5.3	7.2	0.5	6.2	7.8
Poland	6.0	0.5	5.2	6.7	7.6	1.2	5.3	9.0	5.5	1.2	4.2	6.6	5.2	0.6	4.1	6.2
Portugal	7.5	0.3	7.0	7.9	7.7	0.3	7.2	8.2	4.8	0.4	4.3	5.3	6.0	0.4	5.2	6.7
Spain	6.9	0.5	6.3	7.5	8.9	0.4	8.4	9.5	4.8	0.7	3.9	5.4	6.2	0.4	5.6	6.9
Sweden	8.7	0.4	8.1	9.3	9.1	0.4	8.4	9.5	4.3	0.9	3.2	5.2	7.6	0.6	6.5	8.3
Switzerland	8.9	0.3	8.6	9.3	8.9	0.2	8.5	9.0	6.8	1.0	5.7	7.9	7.3	0.4	6.5	7.8
United Kingdom	8.9	0.4	8.0	9.3	9.1	0.2	8.7	9.3	7.7	0.7	6.9	8.5	7.3	0.7	6.6	8.3
TOTAL	8.0	1.1	5.2	9.6	8.6	0.8	5.3	9.8	5.4	1.4	2.8	8.5	6.7	1.0	4.1	8.8

5. Methodology

Two econometric methods will be used to answer the research hypotheses. First, we will apply a cross-sectional OLS analysis using the holding period expressed in months as dependent variable. Second, we will analyze the decision whether or not to exit in a given year using a duration model. The first method gives an indication of how the length of the investment depends on the development in the six categories of factors, i.e. this method is more trend-oriented. The second method more precisely relates the exit decision to the current state of the environment surrounding the PE industry. Through this, we can detect how PE funds react to, potentially sudden, external shocks in the industry, legal frameworks, state of the economy in the country etc.

5.1 Cross-Sectional OLS Analysis

When applying a cross-sectional multiple regression, the 12 variables in the six categories must be re-calculated as averages, average changes or average growth rates over the holding period in order to be usable in the analysis:

- *unemp* is recalculated as average unemployment rate over the period: $\sum_{t=\tau}^T \frac{unemp_{it}}{T-\tau+1}$, where *i* denotes the relevant country, $t=\tau$ for the LBO year, $t=T$ for the exit year,
- *gdp*, *indrev*, *manda*, *indindex*, *countryindex* and *ipo* are recalculated using CAGR: $\left(\frac{Variable_{iT}}{Variable_{i\tau-1}} \right)^{\frac{1}{T-\tau}} - 1$, where *i* denotes the relevant country or industry (for IPO Activity and M&A activity, this indicates Europe and is the same for all observations), and
- *govsize*, *legalprop*, *cmreg*, *laborreg* and *businessreg* are recalculated as average annual change in score: $\sum_{t=\tau}^T \frac{score_{it} - score_{i,t-1}}{T-\tau+1}$.

To distinguish the recalculated averages of the variables from the way in which they were labeled in Table 4.2a, they here will be given the suffix “*avg.*”. The main specification will then be as below:

$$\begin{aligned}
\text{holdingperiod}_i = & \beta_0 + \beta_1 \times \text{avg.gdp}_i + \beta_2 \times \text{avg.unemp}_i + \beta_3 \times \text{avg.govsize}_i + \beta_4 \times \text{avg.indrev}_i + \\
& \beta_5 \times \text{avg.manda}_i + \beta_6 \times \text{avg.indindex}_i + \beta_7 \times \text{avg.countryindex}_i + \beta_8 \times \text{avg.legalprop}_i + \\
& \beta_9 \times \text{avg.cmreg}_i + \beta_{10} \times \text{avg.laborreg}_i + \beta_{11} \times \text{avg.businessreg}_i
\end{aligned}
\tag{Eq. 1}$$

Since many of the observations are from the same countries or industries, they will report similar or the same values for the independent variables. To correct for this, we use standard errors that are clustered on Capital IQ industry classification as this determines both Eurostat and MSCI industry classification. We also introduce dummy variables for UK and France, as these two countries together make up a majority of all observations and there might be particular underlying patterns for these countries that affect the results of the main specification.

5.2 Duration Modeling

For the duration model, Cox proportional hazards model is applied to give clarity to whether PE funds respond to year-on-year changes in the six categories of factors by exiting their investments or not. To do this, we expand the data set and create one observation for each year where an observed PE transaction was held and create a dummy variable that equals 1 for the year when it was exited and 0 else.

Once again, the variables listed in Table 4.2a need to be recalculated as we will study the impact of year-on-year changes and will be given the suffix “yoy.”. The recalculation is done in the following manner:

- yoy.unemp is calculated as percentage point change compared to previous year, i.e. $\text{unemp}_{i,t} - \text{unemp}_{i,t-1}$, where i denotes the relevant country and t is the relevant year,
- yoy.gdp , yoy.indrev , yoy.manda , yoy.indindex , yoy.countryindex and yoy.ipa are created from absolute values in the raw data and are hence calculated as percentage change compared to previous year, i.e. $100 \times \left(\frac{\text{variable}_{i,t}}{\text{variable}_{i,t-1}} - 1 \right)$, where i is the relevant country or industry (for IPO Activity and M&A activity, this indicates Europe and is the same for all observations), and
- yoy.govsize , yoy.legalprop , yoy.cmreg , yoy.laborreg and yoy.businessreg are created from ranking scores (scale 1-10) and are hence recalculated as annual change in score compared to previous year: $\text{score}_{i,t} - \text{score}_{i,t-1}$, where i denotes the relevant country.

The proportional hazard (PH) model, $h(t, x)$, can simply explained be interpreted as the probability of exit in $t+1$ given the observation being in the portfolio of a PE fund in time t . The PH model is the cumulative sum of the base-line hazard function, $\square(t)$, which is constant in the case of the Cox PH model, and the underlying function of the independent variables. The PH model is thus expressed as:

$$\begin{aligned}
h(t, x) = & \lambda(t) \times \exp (\beta_1 \times \text{yoy.gdp}_i + \beta_2 \times \text{yoy.unemp}_i + \beta_3 \times \text{yoy.govsize}_i + \beta_4 \times \text{yoy.indrev}_i \\
& + \beta_5 \times \text{yoy.manda}_i + \beta_6 \times \text{yoy.indindex}_i + \beta_7 \times \text{yoy.countryindex}_i \\
& + \beta_8 \times \text{yoy.legalprop}_i + \beta_9 \times \text{yoy.cmreg}_i + \beta_{10} \times \text{yoy.laborreg}_i \\
& + \beta_{11} \times \text{yoy.businessreg}_i)
\end{aligned}
\tag{Eq. 2}$$

The interpretation of the regression results is not as straight-forward as in OLS regressions. The partial derivative of (Eq. 2) with respect to the variable $yoy.gdp$ and the equation for the beta coefficient is given by:

$$\frac{dh(t, x)}{dyoy.gdp} = h(t, x) \times \beta_1 \rightarrow \beta_1 = \frac{\left(\frac{dh(t, x)}{dyoy.gdp}\right)}{h(t, x)} \quad (\text{Eq. 3})$$

Assuming two observations have the same values for all independent variables apart from $yoy.gdp$ where observation 1 has $yoy.gdp_1=1\%$ and observation 2 $yoy.gdp_2=0\%$ the expected difference in probability of exiting in the next period is given by:

$$\frac{h(t, yoy.gdp_1 = 1\%)}{h(t, yoy.gdp_2 = 0\%)} - 1 = \exp(\beta_1 \times (1 - 0)) - 1 = \exp(\beta_1) - 1$$

Hence, a one percent increase in variable $yoy.gdp$ increases (decreases) the probability of exit by the exponential of the beta coefficient minus 1.

6. Results and Analysis

The results are divided into two parts. First, we present the results from the OLS analysis used to assess the relation between the length of the holding period and the trends of the independent variables during this period. Second, we present the results from the duration model, where we more precisely ask if any year-to-year changes (shocks) trigger the exit decision and if so, for what factors and how does the effect look like.

6.1 Length of Holding Period

This part of the analysis focuses on the OLS estimation, where we study the length of the holding period as dependent variable with the independent variables expressed as average changes over the holding period. First, we perform the main specification (Eq. 1) and then we perform robustness checks, where we investigate differences between the largest countries and add country-fixed effects.

6.1.1 Main Specification

Table 6.1a reports the results from the OLS regressions on (Eq. 1); columns (1) to (6) treat each category of factors separately in order to see the sign on the coefficients when isolating them from the other categories. Column (7) studies all factors apart from M&A and IPO since these proved to have very high explanatory power; thus, excluding them enables us to see if the signs and significance levels of the other variables are strongly impacted by them. Column (8) is the main specification and column (9) is the main specification including dummy variables for France and UK. The dummies are included in the last column to provide robustness to the results, since more than 50% of the observations originate from these countries and if there are

significant differences between observations from any of these countries compared to the rest of the sample, this would complicate the picture.

We use clustered standard errors with Capital IQ classification as cluster variable. We do this because many of the variables are on industry-level, thus many of the observations will have the exact same or similar observed values for the independent variables. Figure 6.1a plots the actual observed holding periods expressed in months on the y-axis against the estimated holding periods from the main specification (Eq. 1) on the x-axis.

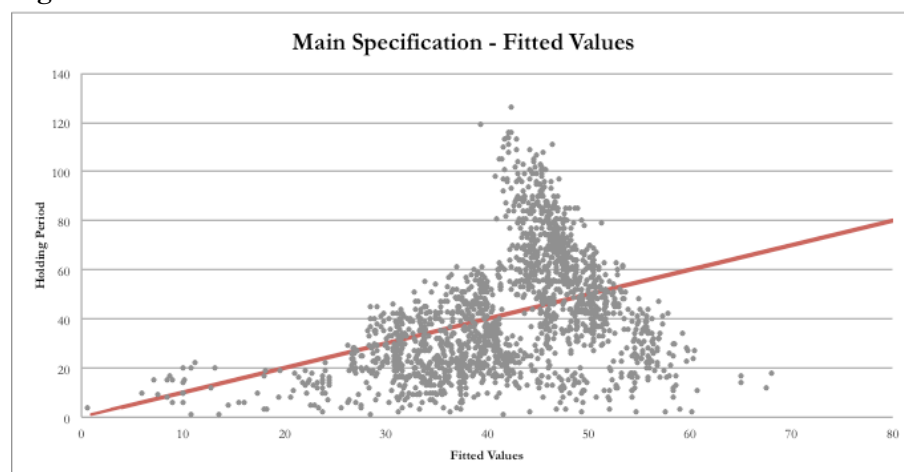
Table 6.1a – OLS Regression Results

OLS Regression Results. The table displays the result of regressions on versions of (Eq. 1), where column (8) is the main specification. The dependent variable is *holdingperiod*, which is the investment period expressed in months. The independent variables are the ones listed in Table 4.2a, recalculated as averages over the holding period for each investment. In regression (9), d.UK and d.France are added as dummies for UK and France registered companies. The standard errors are clustered on Capital IQ classification. Standard errors in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ec. factors	Pol. factor	Comm. factor	M&A factor	Market factors	Legal factors	Main spec. ex. M&A/IPO	Main spec.	Main spec. w. dummies
<i>avg.gdp</i>	0.837 (0.554)						1.680** (0.573)	1.663** (0.605)	1.218 (0.625)
<i>avg.unemp</i>	-0.344 (0.224)						-0.0848 (0.212)	-0.0644 (0.195)	0.167 (0.257)
<i>avg.govsize</i>		8.647** (2.736)					6.644 (3.460)	-0.601 (3.339)	-0.429 (3.300)
<i>avg.indrev</i>			-0.91*** (0.243)				-0.156 (0.260)	-0.128 (0.225)	-0.115 (0.225)
<i>avg.manda</i>				-0.28*** (0.021)				-0.165*** (0.022)	-0.167*** (0.0225)
<i>avg.indindex</i>					-0.0688 (0.064)		-0.297*** (0.077)	0.00786 (0.060)	0.0127 (0.060)
<i>avg.countryindex</i>					0.0210 (0.045)		0.0250 (0.048)	0.0456 (0.046)	0.0540 (0.048)
<i>avg.ipo</i>					-0.226*** (0.021)			-0.220*** (0.028)	-0.224*** (0.027)
<i>avg.legalprop</i>						-5.693 (3.430)	-5.718 (3.864)	-3.427 (3.607)	-2.728 (3.543)
<i>avg.cmreg</i>						-12.9*** (3.162)	-3.773 (2.620)	2.448 (2.782)	3.310 (2.736)
<i>avg.laborreg</i>						18.28*** (3.663)	11.00** (3.448)	3.103 (3.448)	3.420 (3.490)
<i>avg.businessreg</i>						-2.644 (1.653)	-2.417 (1.845)	7.136** (2.143)	7.106** (2.140)
<i>d.UK</i>									2.187 (-1.562)
<i>d.France</i>									-0.264 (1.467)
<i>_cons</i>	42.1*** (2.481)	40.7*** (0.746)	46.81*** (1.498)	45.4*** (0.770)	46.76*** (1.296)	39.13*** (1.056)	36.97*** (2.818)	44.81*** (3.171)	43.39*** (3.662)
N	1879	1879	1879	1879	1877	1879	1879	1877	1877
R²	0.003	0.005	0.010	0.046	0.112	0.048	0.074	0.132	0.133

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 6.1a – Plot – Fitted Values



6.1.2 Economic Factors

The economic variables are not statistically significant when tested in isolation from the others, see column (1) in Table 6.1a. However, both *avg.gdp* and *avg.unemp* lie close to the 10% level, hence they provide some indication on how they affect the length of the holding period. Surprisingly, *avg.gdp* has a positive sign (0.837), suggesting that all other being equal, if the GDP growth is 10% higher on average, the holding period will be 8.37 months longer. In the main specification as well as in the main specification without the M&A/IPO variables and with the UK and France dummies, *avg.gdp* is significant on the 1% level for the two first ones and almost the 5% in column (9). The sign is now even more positive: 1.663 for the main specification. Thus, it appears that if the higher the average growth in GDP over the holding period, the longer do the PE funds hold the investments, which stands in contrast to Hypothesis 1.

For unemployment, the results are very weak apart from in column (1) where it was somewhat stronger. In the main specification the t-statistics are between 0.33 and 0.65 in absolute terms and the coefficient shifts sign. Thus, it appears that average unemployment rate does not have any important effect on the investment length which is in contrast to Hypothesis 2. One reason for this can be related to the proposition by Berg and Gottschalg (2004) that lay-offs can be a common strategy for PE funds when they wish to increase the operational effectiveness in the portfolio companies. However, this proposition is on a strict microeconomic level and does not have a direct relation to unemployment in large in the country where the portfolio company operates.

6.1.3 Political Factor

The political variable, *avg.govsize*, is significant on the 1% level and also on an economic level, when studied alone. The coefficient in column (2) is estimated to 8.647, suggesting that a 1.0 annually average improvement in ranking based on e.g. taxation or size of subsidies is followed

by almost 9 months longer holding period. Similar result is drawn in column (7), the main specification where M&A/IPO variables are excluded (significant on 10% level), but the effect loses its significance when these are included again. This is puzzling as the correlation between *avg.govsize* and *avg.manda* is -0.13 and between *avg.govsize* and *avg.ipo* is -0.20, which is rather low. All correlation levels can be found in Appendix.

Thus, when isolating the political factor from the other or when including all but the M&A/IPO factors, the estimated coefficient is significant and positive suggesting that increases in taxation, subsidies or level of government activity in business (all which gives a lower ranking score for the variable *govsize*) is followed by shorter holding periods, and vice versa, that improved political climate (from a business perspective) is followed by longer investment horizons. This is in line with Hypothesis 3.

One limitation to this conclusion that cannot easily be covered in these types of studies is that while there are many useful measures of the level of taxation, it cannot be observed if the PE fund has undertaken actions to avoid paying taxes in countries with high rates. By doing so, they will automatically be less vulnerable to changes in the government size in the portfolio company's home country. Another limitation is that tax pressure does not reveal anything about the opportunities of special taxation rules; this is particularly important if an LBO fund aims at creating value by reducing effective tax rate by financial engineering. Both of these limitations can be further investigated by applying more qualitative methods, e.g. case studies.

6.1.4 Commercial Factor

The commercial factor here is the average growth (CAGR) in the European industry revenue, denoted *avg.indrev*. When studied alone (column (3) in Table 6.1a), the coefficient is estimated to -0.91 and significant on all commonly used levels of significance, but no longer significant when adding other variables as in columns (7)-(9). In the case where it is isolated, the suggestion is that any percentage increase in average industry growth is followed by a shorter holding period by almost one month. The key rationale behind this is that firms in dynamic and expansive industries are more likely to receive interest from potential buyers, at the same time as the portfolio firms benefit from increasing demand in the industry by accelerated sales growth which in its turn helps the LBO funds to more rapidly reach desired IRR targets (in this case, the revenue effect will be larger, all other equal).

However, as the effect disappears when adding the other variables, any conclusions drawn from here must be taken with caution. If there is any effect, it appears to be in line with Hypothesis 4, although neither the statistical significance nor the economic significance provide enough support for this.

6.1.5 M&A Factor

From Figure 4.3b, it is apparent that the number of M&A deals was almost constantly increasing over the sample period with exception for 2001, just after the dotcom crisis. However the size of the growth rate varied a lot and there is a big spread with 24 observations with more than 100% in average growth rate (CAGR) and 74 below 0%.

The variable, *avg.manda*, is together with the IPO variable the most significant throughout all tests (see Table 6.1a columns (4), (8) and (9)). When studied alone the M&A coefficient is -0.28 and when tested in the main specification -1.65. This translates to a conclusion that the portfolio firms are exited earlier when the M&A market is growing a lot, hence in line with Groh *et al* (2010) and in line with Hypothesis 5. As discussed under section 4, there are multiple explanations supporting the importance of an active and growing M&A market. The key objective for the LBO fund prior to investing in the portfolio firm is to find a suitable buyer that is willing to a price corresponding to the initial price plus a premium that covers the fund's required IRR. Naturally, the probability of finding such a buyer should be larger when there are many players on the market, i.e. when *avg.manda* is high.

When comparing columns (7) and (8), i.e. the main specification without the M&A/IPO factors and then the pure main specification, there are striking differences for several of the other variables. When adding *avg.manda* and *avg.ipo*, the statistical significance disappears for *avg.govsize*, *avg.indindex* and *avg.laborreg* whereas *avg.businessreg* is not significant until after the inclusion. There is no sophisticated rational explanation related to e.g. correlation between the variables; instead, it seems simply to be that M&A and IPO activity provide more accurate explanatory power when determining the length of the holding periods.

The conclusion drawn on the M&A factor is that our data strongly support Hypothesis 5, i.e. that duration of PE investments is decreasing in growth in M&A activity.

6.1.6 Market Factors

For the market factors, we have the two index variables (MSCI country indices and MSCI industry indices) along with IPOs. We first study these three isolated from the others, as reported in column (5) in Table 6.1a and then with the main specification in columns (7)-(9), however with exclusion of IPO in column (7).

As with *avg.manda*, *avg.ipo* is highly significant on all levels of significance over all specifications with coefficients between -0.22 and -0.226, hence very consistent results. This variable is included here to measure both exit opportunities and market confidence; the results support the idea that PE firms exit their investments earlier in times of high IPO activity, thus when the market has a positive outlook, typically are willing to pay a higher price for newly listed

stocks and private to public sale is a viable option. These findings are in line with Hypothesis 6, stating that holding periods has a negative relation to IPO activity.

The MSCI indices for countries and industries are also included since the market prices indicate what investors are willing to pay for buying shares in or whole firms, and as such provide some guidance on the future prospects for firm performance. However, we do not find support for this here; the coefficients lie close to 0 and are mostly insignificant with one exception for the industry index variable *avg.indindex*, which is significant in the main specification only when the M&A and IPO variables are excluded. We can therefore not verify *Hypothesis 7*: that duration is decreasing in market performance, but only state what the effect appears to be. One potential reason for this is that we in the OLS regressions use CAGR on the indices over the entire holding period; hence, it may still be the case that PE funds exit earlier once there is a sudden year-on-year increase in growth rates that will be later studied in the duration modeling analysis. Nevertheless, it seems that PE funds do not adjust the holding period of the portfolio firms after the general market conditions in the country or industry in which the portfolio firms operate.

6.1.7 Legal Factors

Already when identifying the legal factors to be included in the study, it was apparent that the legal framework surrounding the PE industry is complex and varies to a large extent with the operations of the portfolio firm; as an example, an investment providing private schooling may be subject to laws and regulations on profit generation while an energy producer may be dependent on e.g. environmental laws in the countries where it operates. However, here, the focus is on regulations related to business freedom, capital markets and property rights.

Understanding the results from the regressions (legal factors in column (6), variations of the main specification in columns (7)-(9)) is also complex. When studying the legal factors isolated from the other variables, all variables are significant or almost significant on at least the 10% level. Here, the indices for legal system and property rights (*avg.legalprop*), credit market regulations (*avg.cmreg*) and business regulations (*avg.businessreg*) have negative signs, indicating that improvements in the score on these indices are followed by earlier exit, whereas the coefficient on *avg.laborreg* has a positive sign and hence indicating the opposite. Hence, a +1.0 score improvement on the ranking, all other equal, for legal system and property right leads to a c.6 months shorter holding period, for credit market regulations it is c.13 months shorter, for business regulations it is c.3 months shorter and for labor regulations it is c.18 months longer. It should be noted that +1.0 improvements at average are rare and mainly occur when there have been large and important reforms in a country.

In the main specification, only business regulation is significant and switches to a positive sign, indicating that any improvements here has longer holding periods as consequence. This factor measures specifically the degree of bureaucracy and ease of making business in a country. It is therefore counterintuitive and in opposition to what we expected in the hypotheses. None of the other variables are significant or close to being significant even on the 10% level.

Overall, none of the hypotheses 8-11 can be fully supported or rejected, due to the weak results. For Hypothesis 8 and Hypothesis 9, they appear to have some validity as they have a negative sign and are significant when ignoring non-legal factors; the same but with an opposite sign holds for Hypothesis 10. The impact of business regulations provides very contradictory results for the different studies; changing signs and weak statistical significance. Hence, no conclusions can be drawn with regards to Hypothesis 11.

6.1.8 Largest Countries

In the first stage, dummies for France and the UK were included to investigate if there were any particular country-fixed effects for these countries as they make up over 50% of the initial sample. However, this did not generate any significant findings in the model specification. To more in-depth explore for differences between countries, we run regressions with the main specification for sub-samples for the largest countries. The results are provided in Table 6.1b.

Table 6.1b – OLS Regression Results, by Main Countries

OLS Regression Results, by Main Countries. The table presents the results from (Eq. 1) on subsamples of the 8 largest countries in the sample. *holdingperiod* is the dependent variable. The independent variables are those listed in Table 4.2a. Robust standard errors in parentheses.

	(1) UK	(2) France	(3) Germany	(4) Italy	(5) Sweden	(6) Spain	(7) Netherlands	(8) Finland
<i>avg.gdp</i>	10.12 [*] (5.035)	-20.01 ^{***} (4.941)	-0.978 (5.753)	-7.096 (12.449)	-3.791 (10.831)	-11.51 (16.681)	-2.657 (4.503)	50.26 (26.877)
<i>avg.unemp</i>	35.02 ^{***} (10.423)	30.29 [*] (13.894)	-6.216 (5.224)	-4.417 (8.494)	11.02 (15.096)	6.494 (3.365)	21.28 (11.20)	-54.42 [*] (22.303)
<i>avg.govsize</i>	-141.4 (76.022)	15.05 (15.202)	18.04 (22.835)	19.96 (43.391)	146.2 [*] (56.015)	-17.18 (16.208)	110.3 [*] (51.065)	-28.99 (53.685)
<i>avg.indrev</i>	-0.125 (.403)	-0.048 (.369)	0.0629 (.484)	0.365 (.986)	-1.646 (1.483)	-0.00511 (.511)	0.957 (1.063)	-0.667 (1.419)
<i>avg.manda</i>	-0.362 ^{***} (.089)	-0.636 [*] (.265)	-0.122 (.153)	0.0322 (.322)	-0.149 (.177)	-0.239 [*] (.114)	-0.494 (.307)	1.176 (.740)
<i>avg.indindex</i>	-0.143 (.122)	-0.000723 (723.)	-0.252 (.219)	-0.0905 (.302)	0.0293 (.326)	-0.0326 (.217)	-0.162 (.216)	-0.458 (.271)
<i>avg.countryindex</i>	0.269 (.245)	0.0121 (.067)	0.136 (.145)	-0.279 [*] (.135)	0.156 (.144)	-0.00655 (.164)	0.0626 (.209)	-0.0082 (.273)
<i>avg.ipo</i>	-0.485 ^{***} (.088)	-0.311 ^{**} (.10)	-0.135 (.136)	-0.438 (.237)	-0.493 [*] (.218)	-0.0839 (.147)	-0.379 [*] (.169)	-1.814 ^{**} (.526)
<i>avg.legalprop</i>	-48.74 (31.244)	13.55 (32.262)	-114.7 [*] (48.602)	30.42 (30.42)	-35.91 [*] (15.152)	88.3 (84.904)	89.52 (75.227)	-199.8 (173.74)
<i>avg.omreg</i>	-31.25 (18.169)	15.28 (26.807)	22.91 (49.804)	-38.43 (103.865)	31.03 (54.439)	-8.958 (21.849)	100.2 (65.49)	424.4 [*] (192.91)
<i>avg.laborreg</i>	-5.113 (8.116)	75.19 (72.298)	-24.62 (41.729)	16.89 (33.118)	-9.071 (16.798)	116.8 (101.565)	97.28 ^{***} (19.894)	-26.17 (54.521)
<i>avg.businessreg</i>	71.41 ^{**} (26.646)	-1.255 (15.688)	13.58 (9.70)	6.382 (25.528)	-15.87 (8.916)	-0.946 (8.60)	-64.40 ^{***} (16.859)	115.6 (57.8)
<i>_cons</i>	-142.1 ^{***} (37.995)	-192.6 (114.643)	98.78 [*] (45.105)	95.77 (64.709)	-21.26 (101.24)	10 (50.00)	-38.58 (36.743)	389.3 (202.76)
N	746	361	186	98	97	94	81	50
R²	0.200	0.205	0.241	0.286	0.284	0.250	0.457	0.439

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note first that there is here less variation within the variables with country-specific data; however, there is still the time component so it varies over time. Since the sub-samples here are so small, we are more interested in studying the signs of the coefficients rather than the economic significance.

The signs on the variables for average change in IPO and M&A, GDP growth and industry index returns are in line with the hypotheses for six or seven of the countries. IPO has a significant coefficient for five of the countries, making it the most consistent and coherent variable in this part of the study. When comparing the results country by country, seven or eight of the variables were in line with expectations for most countries. For Sweden, as one of the exceptions, ten of the 12 variables showed the same sign as in the hypotheses and for Italy, the other one, only five of the variables corresponded to the hypotheses.

6.1.9 Country-Fixed Effects

As the results in Table 6.1b display, the results vary across the country sub-samples, which motivate further robustness testing for country-fixed effects on the full sample⁷. This is done by re-estimating (Eq. 1) using a factor by factor and then the full main specification. The results are reported in Table 6.1c below.

An overall comment is that the absolute values of the coefficients and t-statistics generally are higher here. Most of the exceptions to this are for the industry-specific (measuring industries on a Europe-wide basis) and the Europe-specific variables (M&A and IPO). Also, the R^2 are slightly higher here.

When studying the economic factors, reported in column (1), *avg.unemp* now has a higher absolute value of the coefficient and it is also more significant. This is mainly due to the fact that there were large differences in unemployment rate between the countries during the sample period 1997-2007, potentially explained by different natural unemployment rates and differences in monetary policy and target inflation rates. The political factor, *avg.govsize*, is also higher (reported in column (2)) and more significant: the coefficient is now 14.59 versus 8.65 before. Underlying reasons for this can be that the countries in the sample did not follow the same pattern in terms of number of reforms etc.; some countries, e.g. Poland and Hungary joined the EU during the sample period which may have caused them to be more active on this front with accelerated liberalization of the government and the economy in large. For columns (3)-(5), i.e. the commercial, M&A and market factors, there were no significant differences from the original OLS regressions results with Capital IQ clustered standard errors in Table 6.1a. All four legal variables (column (6)) now provide higher absolute values and in the case of *avg.legalprop* (score on index over legal system and property rights), the coefficient is now significant on the 5% instead of the 10% level. The explanations for these higher values are similar to the reasoning for the political factor.

In the main specification (column (7)) the GDP variable is no longer significant on any of the commonly used levels. As with the unemployment variable in column (1), this is attributable to differences in growth rates, economic development and vulnerability to crises that occurred during the period. Whereas most countries are developed and have been so for a longer time, other states, mainly in Eastern Europe, were or are still in a developing stage. The dissimilar industry composition can also play an important explanatory role here: countries that rely more on e.g. IT companies may have suffered more from the stagnation in this industry in the post-dotcom crisis period. Another variable that showed different results in the fixed effects

⁷ We also use standard errors clustered on countries, but the differences are too small to have any impact on the conclusions of the tests.

estimation was the one on credit market regulation that is 6.05 here compared to 2.45 before. The prevalence of inter-country differences was expected here given finding in earlier research (see e.g. Groh *et al* 2010) and the deviations in the descriptive statistics as reported in Table 4.3f.

Table 6.1c – OLS Regression Results with Country Fixed Effects

OLS Regression Results with Country Fixed Effects. The table displays the result of regressions on versions of (Eq. 1) including country fixed effects, where column (7) is the main specification. The dependent variable is *holdingperiod*, which is the investment period expressed in months. The independent variables are the ones listed in Table 4.2a, recalculated as averages over the holding period for each investment. Standard errors are clustered by Capital IQ classification and are reported in the parentheses.

	(1) Ec. factors	(2) Pol. factor	(3) Comm. factor	(4) M&A factor	(5) Market factors	(6) Legal factors	(7) Main spec.
<i>avg.gdp</i>	-0.715 (1.067)						0.784 (1.244)
<i>avg.unemp</i>	-2.547** (.881)						1.051 (.906)
<i>avg.govsize</i>		14.59*** (3.228)					-1.004 (3.719)
<i>avg.indrev</i>			-0.917*** (.205)				-0.126 (.217)
<i>avg.manda</i>				-0.279*** (.029)			-0.173*** (.033)
<i>avg.indindex</i>					-0.0671 (.054)		0.0102 (.06)
<i>avg.countryindex</i>					0.0325 (.043)		0.0545 (.044)
<i>avg.ipo</i>					-0.225*** (.021)		-0.230*** (.025)
<i>avg.legalprop</i>						-6.918* (3.218)	-2.678 (3.266)
<i>avg.cmreg</i>						-12.88*** (3.903)	6.052 (4.262)
<i>avg.laborreg</i>						20.35*** (2.616)	4.253 (3.016)
<i>avg.businessreg</i>						-1.456 (1.891)	7.446*** (2.216)
<i>_cons</i>	61.90*** (6.051)	39.89*** (.689)	46.83*** (1.24)	45.40*** (.642)	46.66*** (.629)	38.81*** (.834)	39.09*** (6.346)
<i>N</i>	1879	1879	1879	1879	1877	1879	1877
<i>R²</i>	0.006	0.011	0.011	0.049	0.110	0.052	0.132

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6.2 Probability of Exit

This section reports the results from the duration model with the Cox PH model, which measures changes in probability of exit with respect to year-on-year changes in the set of independent variables. We first report the results from the main specification by discussing each of the six categories of factors separately, which is then followed by robustness checks.

6.2.1 Main Specification

Table 6.2a summarizes the results of the different versions of (Eq.2). Columns (1) to (6) treat the category of variables separately and column (7) is now the main specification. The model investigates how the exit decision is affected by the 12 variables we defined in Table 4.2a; for each of the variables we obtain a coefficient with which we can calculate how the probability of divesting a PE investment changes given a change in the underlying factor.

Table 6.2a – Cox Proportional Hazard Model Results

Cox Proportional Hazard Model Results. The table displays the result of regressions on versions of (Eq. 2), where column (7) is the main specification. The model predicts the probability of a PE investment to be exited within the next period given a set of independent variables, which are the ones listed in Table 4.2a, recalculated as year-on-year changes. The standard errors are clustered on Capital IQ classification and reported in parentheses.

	(1) Ec. factors	(2) Pol. factor	(3) Comm. factor	(4) M&A factor	(5) Market factors	(6) Legal factors	(7) Main spec.
<i>yoygdp</i>	-0.0215 (.032)						-0.0485 (.034)
<i>yoyunemp</i>	0.00477 (.025)						0.0591 (.037)
<i>yoygovsize</i>		0.065 (.064)					0.0576 (.093)
<i>yoyindrev</i>			-0.00159 (.001)				-0.00182 (.001)
<i>yoymanda</i>				0.0299*** (.006)			0.0464*** (.004)
<i>yoyindindex</i>					-0.0125*** (.003)		-0.00888*** (.002)
<i>yoycountryindex</i>					0.000819 (.003)		0.00463 (.002)
<i>yoyipo</i>					0.00198 (.001)		-0.00258* (.001)
<i>yoylegalprop</i>						-0.239* (.096)	-0.212* (.104)
<i>yoycmreg</i>						-0.208 (.112)	-0.338*** (.097)
<i>yoylaborreg</i>						0.566*** (.104)	0.558*** (.107)
<i>yoybusinessreg</i>						-0.00971 (.057)	-0.204** (.067)
N	8337	8337	8337	8339	8336	8337	8336

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6.2.2 Economic Factors

The economic factors are not significant on any level, neither when studied isolated from the other variables nor in the main specification. However, *yoy.unemp*, which measures the percentage point in unemployment rate compared to previous year, is almost significant on the 10% level in the main specification and the coefficient of 0.0591 implies that the probability of exiting increases by $\exp(0.0591)-1$, i.e. 6.1% when the unemployment rate increases by 1%. Likewise, for *yoy.gdp*, the coefficient is also negative in both specification and corresponds to a 4.7% decrease in probability of exit as GDP goes up 1% on year-on-year basis. The economic significance of this is high: if a country's GDP from one year to the other increases by 5%, which is a fair yet not extreme scenario, the probability of exiting is 23.5% higher than for an investment in a country where the real GDP is unchanged.

Both of these findings are in opposition to the expectations as formulated in *Hypothesis 1* and *Hypothesis 2*. The results actually indicate, although without statistical support, that PE firms are more likely to sell when the economy is going down than in a boom scenario.

6.2.3 Political Factor

yoy.govsize measures the annual change in score on the government size index (1-10). We first study it alone, as reported in column (2), and then together with all other variables in column (7).

The expected outcome was a negative coefficient meaning that the likelihood of selling a PE investment becomes larger in the case where the score on government size has declined (worse political environment, e.g. higher taxation, higher public spending).

In contrast, the estimated coefficient indicates instead a positive correlation (less likely to sell in the event of e.g. announced tax increases), even if it is not statistically significant in either of the cases. Neither is the economic significance particularly high; a 1.0 increase in the *govsize* variable is at average followed by a 5.9% increase in likelihood of exit, all others equal, and since changes of this magnitude are rare, this makes the economic significance limited. Nonetheless, the Cox PH model does not provide any support for *Hypothesis 3*; instead, it shows opposing and weak results.

6.2.4 Commercial Factor

The commercial factor used in the model is *joy.indrev*, which measures year on year percentage change in industry revenue. The coefficient is of similar size in both column (3), when studied alone, and column (7), the main specification, and it is close to 0 with small statistical significance (absolute value of z-statistic 1.13 and 1.27 respectively). A 1% increase in industrial revenue generates 0.2% lower probability of exit. The reverse would be expected, i.e. a positive relationship between exit probability and change in industrial revenue, meaning that the PE funds are more likely to sell their investments when the industry is booming. This would also suggest that firms in new and growing industries are held shorter than firms in mature and stagnating industries. However, the signs observed here are opposed to expectations and the statistical significance is very low. As a consequence, data does not support *Hypothesis 4*; it appears that the commercial factor has no effect on exit probability at all.

6.2.5 M&A Factor

The M&A factor was highly significant in both statistical and economic terms in the OLS regressions, and had a negative coefficient which indicates shorter holding periods in times of expansive M&A activity. In the Cox PH tests, we find equivalent results as displayed in columns (4) and (7) in Table 6.2a.

The coefficient has a positive sign both when studied alone and in the full main specification and the z-statistics are 5.31 and 11.81 respectively, thus providing strong statistical support also in this model. As for the economic significance, the results propose an increase by 3.0% and 4.7% respectively in exit probability for each percentage increase in M&A activity on year-to-year basis. This is compatible with *Hypothesis 5*, which stated that this relationship is logical given one of the most crucial tasks in the exit process: finding a suitable buyer. When

there is a lot of M&A activity on the market, the supply of buyers should be larger, therefore making it easier for the PE fund to identify and contract a buyer.

6.2.6 Market Factors

The hypotheses on the market factors suggest that the signs of the coefficients here should be positive, i.e. suggesting a higher likelihood of exit in year where the industry and country indices report high positive returns and the IPO market is very active.

The results from the Cox PH tests do however not correspond to the expectations. When we only use the three market variables as independent variables, only *yoy.indindex* (annual change in MSCI industry index), is significant and has a negative coefficient corresponding to a -1.2% decrease in exit probability per 1% increase in the index. The other two are not significant but have positive signs.

In the main specification, however, all variables are significant on at least the 10% level. The results suggest that for each positive percentage change in the market index, the probability of exit decreases by 0.9%; in the country index, the probability increases by 0.5%; and in IPO activity, the probability decreases by 0.3%. Hence, the economic significance is only modest for all three of them, but the results are puzzling for several reasons. First, in the OLS estimation, CAGR of IPO activity was among together with the M&A factor the most significant variable and its sign was in line with *Hypothesis 6*. The economic story for this could be the PE funds not necessarily exiting earlier because there was a sudden shock on the IPO market but rather because there is a more long-term trend starting already during the time of the initial investment towards more IPO activity. Thus, the rationale behind the IPO factor appears to be more complicated than at first sight.

Second, the opposite signs of the index factors also contribute to a less apparent economic story. A qualified first guess would be that they both measure the market conditions, although slightly differently, and should provide the same partial conclusions. Here, instead, it seems that PE firms are more likely to exit when the stock market in the country is booming and less so when the stock market in the industry is booming. If the industry index is seen as a prediction of future value generation in the industry, it may be that the PE funds want to wait and realize some of these gains before selling of the investments. This would also imply that the funds believe they can sell at an enough good price (to simplify here, we define this as a price where they at least fulfill the IRR target of the fund), even if the market valuation of the industry is not as prosperous, in the future. In general, we here find support against *Hypothesis 6* and mixed results for *Hypothesis 7*.

6.2.7 Legal Factors

From previous literature on the relationship between legislation and the PE industry, we formed hypotheses 8 to 11 that all suggest that the probability of exit should be higher when there are improvements in the relevant legal frameworks, e.g. if there is less bureaucracy, lower tax rates or less regulated labor market.

The results from the Cox PH tests violate these presumptions for the first three but not for the fourth variable: labor regulations, *yoy.laborreg*. The factor on legal system and property rights, *yoy.legalprop*, is significant on the 5% level in both specifications and has estimated coefficient corresponding to roughly 20% decrease in probability of exit given a 1.0 year-to-year increase in score on this index. As with all of these indices on legislation and political system, changes of this multitude are not the norm, but they do appear from time to time, especially when there is a shift in political majority of a country or if e.g. a country enters the EU. The factor on credit market regulation, *yoy.cmreg*, is also negative; in the main specification it has a coefficient corresponding to a -29% decrease in probability for each 1.0 increase in the index on credit market regulation. It is significant on all commonly used levels of significance.

The variable on business legislation, *yoy.businessreg*, is not significant when the legal factors are studied alone but is in the main specification. The coefficient predicts that for each 1.0 increase in the index over business regulation, the likelihood of exit declines by 18%. These findings violate *Hypothesis 8*, *Hypothesis 9* and *Hypothesis 11* and indicate that PE funds are more likely to sell off their investments when they face worse legislative conditions on the credit market, concerning bureaucracy and ease of business and relating to the robustness of the legal system and the protection of property rights. An economic interpretation of this would be that they might fear even worse conditions in the preceding years and they thus choose to sell early in order to avoid future losses.

Lastly, the labor market regulation variable is significant on all commonly used levels in both specifications (columns (6) and (7)). The estimated coefficients correspond to a c.75% increase in exit probability for each 1.0 increase in the index score. This is in line with *Hypothesis 10*, which states that PE funds should divest earlier when there is the labor market is less regulated. The key rationale for this is that this allows them to be more flexible in HR policies and to announce lay-offs as a tool to make the holding companies more operationally efficient, enabling them to much faster realize the scheduled business plans for their investments.

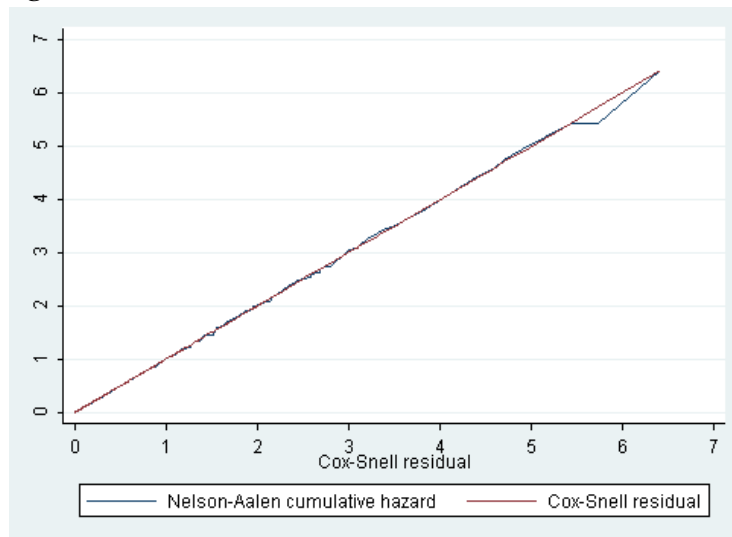
To sum up this part, it stands clear that PE funds react differently to changes in separate parts of the legal framework. When the credit market becomes more restricted, the protection of property rights weakens or the business regulation becomes heavier on rules and administrative requirements in a country, they interpret this as that the attractiveness of making business in the

country the investment operates in is worsen which makes them more likely to sell off at an earlier stage. Vice versa, if the development is the other way around, the decision is rather to stay and exploit the gains from the improvements in these regulations. For the labor market regulations there is another story, namely that improvements enable the funds to fulfill the business plan at a more rapid phase, hence the strong and positive correlation between the labor market factor and the probability of exit.

6.2.8 Goodness of Fit

In order to assess the model's goodness of fit, we estimate the Cox-Snell residuals and graph these together with the Nelson-Aalen cumulative hazard function, as reported in Figure 6.2a below. The evaluation criterion is that the closer the cumulative hazard function follows the 45 degrees line, the better the fit is. More precisely, the hazard function then has an exponential function with hazard rate 1. In our case, the slope of the hazard rate follows the residual very closely except from for the higher values.

Figure 6.2a – Cox-Snell Residuals and Nelson-Aalen Cumulative Hazard Function



6.3 Summary of Findings

After having investigated the hypotheses outlined in section 4 in two ways – first, by testing the length of the holding period against the trend in the independent variables over the holding period and second, by testing how the probability of exit within the next year depends on year-on-year changes in the independent variables – we will now summarize the results and present five key propositions from the analysis.

To comment on the two respective models, the expectation was to find similar or equal results for both analyses. However, the outcome was not consistent for all eleven hypotheses. This shows that there are differences between how PE funds respond to long-term trends and

short-term year-on-year shocks. As an example, PE funds tend to divest earlier when the average annual growth in industry revenue is positive, but the probability of exit appears to decrease for one-year positive shocks in this variable, although the latter is neither statistically nor economically significant.

Overall, only hypotheses 5 (M&A activity), 6 (IPO activity) and partially 7 (industry index return) are confirmed by both tests. Hypotheses 1 (GDP growth) and 2 (unemployment rate) are disproved in both studies. Concerning the other six hypotheses, the results are more blurred: we find either that PE funds react differently for long-term trends and short-term shocks or that the conclusion depends on whether the factors are studied separately or included in the main specification. All results are summarized in Table 6.3a below.

Table 6.3a – Summary of Results

SUMMARY OF RESULTS									
#	Hypothesis: Duration is...	Length of Holding Period (OLS)				Exit Probability (Cox PH Model)			
		Exp. sign	Obs. sign	Significant	Comment	Exp. sign	Obs. sign	Significant	Comment
1	decreasing in GDP growth.	-	+	Yes	In line with hypothesis for 6 of 7 countries in sub-sample study with the largest countries.	+	-	No	
2	increasing in unemployment rate.	+	-	No	Positive sign in fixed effects study.	-	+	No	
3	decreasing in size of public spending, taxation and the level of government involvement in business.	+	+	(Yes)*	Some variation across different specifications.	-	+	No	
4	decreasing in industry revenue growth.	-	-	(Yes)*		+	-	No	Small economic significance (close to 0).
5	decreasing in M&A activity.	-	-	Yes		+	+	Yes	
6	decreasing in IPO activity.	-	-	Yes		+	+/- ***	(Yes)*	Small economic significance (close to 0).
7	decreasing in stock market performance.	-	+/- ****	No	Market index significant in main spec exc. IPO and M&A	+	+/- ****	Yes/No****	Small economic significance for country index (close to 0).
8	decreasing in improvements in legal system and property rights.	-	-	(Yes)*		+	-	Yes	
9	decreasing in improvements in credit market regulations.	-	-/+****	(Yes)*		+	-	Yes	
10	decreasing in improvements in labor market regulations.	-	+	(Yes)*		+	+	Yes	
11	decreasing in improvements in business laws.	-	-/+****	(Yes)**		+	-	(Yes)**	Effect only observed in main
*Significant when only studying the variables in the category, but not in the main spec.									
**Significant in the main spec., but not when only studying the variables in the category									
***Shifts sign from - to + in main spec.									
****Different signs for industry and market index									

6.3.1 Proposition 1: Length of Holding Period is Positively Correlated with the State of the Economy

From what has been written about the relationship between PE and the economy in general, it appears that PE funds act opportunistically and exit earlier when the investment environment is

more advantageous (see e.g. Ljungqvist and Richardsson 2003). The intuitive outcome in the results would then have been a negative correlation between the holding period and the state of the economy; here, however, it turned out to be the opposite, i.e. that PE funds do not exit earlier as a response to high GDP growth and low unemployment. Rather than being opportunistic and profiting from prosperous macroeconomic conditions by selling at high valuation, they hold the companies over the boom to potentially incorporate the strong market demand into the business plan up to exit. To provide a practical example, it would mean that a PE fund holding an investment in a boom focuses on increasing customer base and sales overall in the investment, rather than at selling it off in an optimistic economic environment.

Previous scholars have noted that PE firms are very focused on the generation of cash flows and the rate at which debt can be repaid. It is also observed that one key successful factor of many funds is that the managers typically can find attractive candidates and turn around their businesses even under poor macroeconomic conditions (Kaplan and Schoar 2005). The combination of these two facts provides an explanation for the positive correlation between duration and the state of the economy. Interest rates are generally lower when unemployment rate is high, which follows from the Phillips curve⁸. This would mean that PE funds face better loan conditions in recessions enabling them to pay back debt faster and as a result also exit earlier.

In sum, our findings suggest that PE funds relate to the macroeconomic conditions by holding investments longer in booms to benefit from increased demand and sell earlier in recessions when debt typically is cheaper than in booms.

6.3.2 Proposition 2: Earlier Exits in Industries with Growth Characteristics

The outcome for the commercial factor industry revenue was in line with the hypothesis in the OLS study. However, at first glance, the results from the duration model appear contradictory but the economic significance was almost zero. With regards to the PE funds' mission to generate high IRR over the holding period, which implies selling at a sufficiently high price, there is a rational story that can help understand the results.

To determine the price of an exit, most PE funds apply an LBO model where future sales numbers generally are projected using historical data from three to five years back (Hooke 2010). Thus, if there has been high growth in revenues in a holding company's industry over the previous two or three years, it is more likely to obtain a high valuation price than if the industry

⁸ The Phillips curve is a tool to measure the relation between inflation and unemployment. It states that when inflation is high, unemployment is low and vice versa. Federal banks and governments typically use interest rate to control these two. When inflation is high and unemployment rate low, the interest rate should be high to balance them out. See eg. Akerlof *et al* (2000).

revenue has been stable or stagnating. Naturally, the PE fund is more likely to exit early in the first case: a trend of increasing growth, than the other case: a year-on-year positive shock, as the results from the OLS regressions verify. The reason for why this does not hold in the duration model is simply that one-year shocks are more seen as deviations when the revenue projections are performed and thus not fully taken into account.

Another point of view relates to the findings of Giot and Schweinbacher (2007). They suggest that the exit decision is related to the industry and the level of innovation, where firms in expanding industries such as IT or biotechnology are exited earlier. The key characteristic of such industries is exactly that the industry output is growing at a fast pace over a longer period of time, i.e. temporary shocks do not apply, thus in line with our findings on the industry revenue factor here.

6.3.3 Proposition 3: Supply and Demand of Attractive Buyers

Starting with the presumption that PE funds sell whenever they can (at a price that fulfills their required IRR) and that the most crucial activity over the holding period is to find a suitable buyer, the results for the M&A and IPO variables are expected. The negative correlation between length of holding period and growth in IPO/M&A activity shows that the PE industry is dependent on the demand and liquidity on the buy side. Many executed M&A transactions imply a large appetite among strategic buyers and financial players, and when many companies are being listed on the stock market, this implies a large appetite among smaller investor and institutional buyers.

As for strategic buyers and financial players, a wider range of these being active on the M&A market enables the PE funds to initiate competitive bidding processes with several interested buyers involved. The expected outcome of a competitive bidding process compared to a bidding process with only one interested buyer is a higher exit price. Thus, it is natural that PE funds are more likely to exit when there is high growth in M&A activity since it is easier to reach the required price level. Concerning the IPO market, this is another way through which the PE funds can exit their portfolio firms and the activity on the market is a measure of liquidity and how significant these opportunities are. Hence, when the number of IPOs carried out on the market is increasing, the exit opportunities increase in parallel.

6.3.4 Proposition 4: Correlation with Equity Markets is Puzzling

In the study, both industry (on European level) and country indices were included to reflect how the PE funds react to trends and shocks on the equity market. The rational outcome would be to observe similar results for the both variables, as reflected in *Hypothesis 7*, i.e. that higher market returns generate higher market valuations (e.g. higher trading multiples), which in its turn gives

rise to shorter duration since this enables PE funds to sell at a high price. However, the results from our analyses are very puzzling – the industry index factor is in line with the hypotheses, whereas the country index is not – although the statistical significance is generally low. More specifically, the significance on the country index is lower and close to zero in most specifications. The underlying explanation may be that most PE funds operate on an international level and to a large extent involve in cross-border and cross-continental deals (Aizenman and Kendall 2008), which decreases the dependency on the overall equity market development on country-level while it remains high on industry-level.

Hence, the conclusion drawn from here is that PE funds are only loosely affected by fluctuations in the country index, but still face a high exposure to market risk attributable to the relevant country, as the latter one takes into account investors' expectations on future attractiveness and development in the sector on an international level whereas the first focuses on the domestic market.

6.3.5 Proposition 5: Weak Dependency on the Legal and Political System and Reforms

Regarding the political and legal factors, the picture is not very clear at first glance. From previous findings in the field of PE, the overall conclusion is that there is a strong connectedness between political and legal system and PE activity. Once again, however, it is important to recall that PE funds operate on an international level, which makes the dependency on country-specific policies and systems less strict. There are still a couple of conclusions to be made from the analyses of political and legal factors.

If there is a trend of worsening in the political system, from a PE perspective – e.g. increased tax burden and governmental involvement – the holding period decreases as a consequence. This can be related to the importance of generating strong cash flows to repay debt and interests: if the government increases the tax rate during the holding period, it will be more difficult to realize the initial business plan and following from that, it may be more rational to look for a potential buyer at an earlier stage and through that avoid failures at a later time. This finding is however not consistent over year-to-year shocks, where we find a positive sign without any significance, which may be because such changes do not have immediate effect and are subject to a political implementation delay.

For the legal factors, it is obvious that reform trends towards more transparency in the legal system and less bureaucracy cause the holding period to decrease, which is natural as these types of reforms makes it easier to do business in a country. Also here, this is not consistent for year-to-year shocks, where only improvements in labor regulations were both significant and had a positive sign as in line with *Hypothesis 10*. The rational explanation for this is the same as above,

i.e. there is an implementation delay but also that sudden changes in the legal system in a country can be interpreted as there being governance instability.

Generally, the PE funds tend to divest earlier when on the one hand the ease of business increases and on the other hand when governments raise taxes and size of the state. This may appear contradictory or inconsistent, but the first variable relates more to systemic aspects that have an indirect effect on the business plan and the latter more directly to economic aspects that directly affect the business plan.

7. Conclusion

This paper highlighted what conditions in the external environment determine the length of the holding period and the probability of exit in PE, in order to measure the level of opportunistic behavior among PE funds. Our findings provide guidance for both academic and business professionals concerning what factors are important in this area. The length of the investment period proves to be longer when the economy is booming. PE investments in slow-growing industries also show to be longer. Furthermore, we find that the most important determinants for the exit timing and decision relate to the supply of attractive buyers, which we here proxy as growth in M&A deals and IPO transactions.

However, our analysis does not provide any clear story on how the sector responds to trends or shocks on the equity market. In most of the tests, the effect is insignificant, which can be attributable to the fact that PE is an unconventional, non-traded, illiquid asset class that as such, is less exposed to market fluctuations. The relation to the legal and political system is also intricate, but partly in line with previous findings on what determines an attractive country from a PE point of view. Sudden labor market changes results in short duration of investments.

Overall, we find that evidence of opportunistic behavior relating to timing of exits only holds for some parts of the analysis. For future research, there are five key suggestions on how the study can be improved and further extended.

First, it would be useful to apply another sample period. During the chosen sample period, 1997-2007, the PE industry in Europe was still developing; it would therefore be interesting to investigate the development in the years after that since it is more mature. Also the non-booming market during the financial crisis would be interesting to study. A more recent sample period would also make it possible to respond directly to the recent critique voiced during and after the crisis.

Second, as discussed in the paper, many PE funds operate on a global field. For instance, they involve a lot in cross-border and cross-continental deals, which is not controlled for here. It would specifically be interesting to see how the interpretation of the country-specific factors

relating to taxation, interest rates, legislation and domestic equity market changes when this is taken into account.

Third, for the commercial factor, it could be useful to add other instruments to assess the industry maturity, e.g. number of new firms registered per year, bankrupted per year and some productivity metric. This would more accurately measure the industry maturity and phase in the industry life cycle.

Fourth, we investigate unemployment and labor regulations. However, we do not consider how dependent the holding companies are on their work force, i.e. how labor intensive different industries are. It is reasonable to believe that more labor-intensive companies are more dependent on changes in the labor market.

The fifth and last recommendation for future studies derives from the fact that this study is done with a deal-level focus, meaning that we study the duration of individual investments. In order to obtain another view on the PE firms' strategic decisions and how they respond to trends and shocks in the surrounding macroeconomic, commercial and market environments, future research could study the aggregated average duration of all investments held by each firms. This would also make it possible to draw conclusion about the quality of management among GPs, which previous scholars claim to determine the investments available and the capacity to turn around businesses even in crisis periods. As identified in previous research, however, PE firms typically raise funds and invest 90% of the capital within six years at average. This should then be accounted for, i.e. that there occur periods where the PE firms have closed all outstanding funds and are unable to do new investments.

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9. Appendix

9.1 Correlation Tables

Table A.1 – Correlation Tables

Simple Correlation Results of OLS Factors. The table displays the result of a simple correlation analysis of the geometric average. Each factor is tested for correlation with each factor. Negative outcome indicates a negative correlation between the two chosen subjects, as does a positive result indicate a positive correlation.

	avg.gdp	avg.unemp	avg.govsize	avg.indrev	avg.manda	avg.ind-index	avg.country-index	avg.ipo	avg.legal-prop	avg.cmreg	avg.labor-reg	avg.business-reg
avg.gdp	1.0000											
avg.unemp	-0.2167	1.0000										
avg.govsize	-0.3442	0.3386	1.0000									
avg.indrev	0.1176	0.0641	-0.2256	1.0000								
avg.manda	0.1530	0.0532	-0.1281	0.0827	1.0000							
avg.ind-index	0.0269	0.1107	-0.2609	0.3417	0.2900	1.0000						
avg.country-index	-0.1130	0.1469	0.0200	0.1522	0.1466	0.2688	1.0000					
avg.ipo	-0.0912	0.0810	-0.1994	0.2148	0.3436	0.6744	0.2264	1.0000				
avg.legalprop	0.0747	0.1318	0.1420	0.0456	0.2236	0.0519	0.0353	0.0322	1.0000			
avg.cmreg	-0.0549	0.2193	-0.1215	0.2110	0.0729	0.4142	0.2329	0.4476	-0.0662	1.0000		
avg.laborreg	-0.0743	-0.0660	0.0687	-0.2422	-0.2336	-0.5244	-0.2194	-0.4700	-0.0106	-0.3006	1.0000	
avg.business-reg	-0.3039	0.1181	0.2844	-0.2132	0.1966	-0.0117	0.0793	0.2385	0.2021	0.0146	0.0710	1.0000

(obs=1878)

Simple Correlation Results of Duration Factors. The table displays the result of a simple correlation analysis of year-on-year factors. Each factor is tested for correlation with each factor. Negative outcome indicates a negative correlation between the two chosen subjects, as does a positive result indicate a positive correlation.

	yoygdp	yoyunemp	yoygovsize	yoyindrev	yoymanda	yoyind-index	yoycountry-index	yoyipo	yoylegal-prop	yoycmreg	yoylabor-reg	yoybusiness-sreg
yoygdp	1.0000											
yoyunemp	-0.4758	1.0000										
yoygovsize	-0.2287	0.0341	1.0000									
yoyindrev	0.0521	-0.0448	-0.0169	1.0000								
yoymanda	0.2633	-0.2464	-0.1029	0.0018	1.0000							
yoyind-index	0.0937	-0.2685	0.1805	0.0368	0.2386	1.0000						
yoycountry-index	0.1719	-0.3650	0.1220	0.0404	0.2691	0.6894	1.0000					
yoyipo	0.2828	-0.2177	-0.2492	0.0634	0.5466	0.3457	0.3460	1.0000				
yoylegalprop	0.1353	-0.2120	0.1364	-0.0087	0.2012	0.1098	0.1003	0.0142	1.0000			
yoycmreg	0.0086	-0.0681	-0.2013	0.0294	0.1519	0.2256	0.2891	0.3689	-0.1304	1.0000		
yoylaborreg	-0.1623	0.0966	-0.0118	-0.0695	-0.1472	-0.5020	-0.4303	-0.3401	0.0213	-0.1613	1.0000	
yoybusiness-sreg	-0.1640	0.0198	0.2145	-0.0398	0.2138	0.1548	0.1427	0.1328	0.3249	-0.0735	0.1446	1.0000

(obs=8347)