
THE ROLE OF VENTURE CAPITALISTS' REPUTATION ON EXIT
TRANSACTIONS

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Abstract

Should an entrepreneur choose to receive funds from the Venture Capitalists who pay more for his business or should he opt for the ones with better reputation? Existent research finds that more reputable VCs lead portfolio companies more often and in shorter periods of time to an IPO or a trade sale and provide better performance even after the exit event, in the US. This work aims to assess the impact of VCs' reputation on the likelihood and timing of success for European portfolio firms. To do this, there were constructed three different measures of reputation as well as variables to control for portfolio firms' quality of portfolio firms and exit market conditions. Analysing firms which received their first round of VC investment between 2005 and 2012 and applying the logit and survival models we find European portfolio firms backed by higher reputation VC investors have higher probability, and take less time, to be involved in an IPO or a trade sale.

Key-words: venture capital, reputation, exits, IPO, trade sale

JEL-Classification: G11, G24, G30, G34

Resumo

Será que um empreendedor deve escolher receber financiamento do investidor de capital de risco que lhe oferece uma quantia mais elevada pelo seu negócio ou deve optar por aquele com melhor reputação? A literatura existente identifica que investidores com maior reputação levam as empresas das suas carteiras com maior frequência e num período de tempo mais curto a um IPO ou uma aquisição e que estas empresas são capazes de ter melhores performances mesmo depois destas transações, nos EUA. O objetivo deste documento é aferir o impacto que a reputação destes investidores tem na probabilidade e timing de sucesso para empresas europeias. Para isto, foram construídas três diferentes variáveis de reputação e adicionadas variáveis de controlo para a qualidade das empresas que constituem estas carteiras, assim como para as condições de mercado. Analisando empresas que receberam o seu primeiro investimento de capital de risco entre 2005 e 2012 e aplicando o *logit* e *survival models* concluímos que empresas europeias financiadas por investidores com maior reputação têm maiores probabilidades, e levam menos tempo, até estarem envolvidas num IPO ou numa aquisição.

Palavras-chave: capital de risco, reputação, saída, IPO, aquisição

Classificação JEL: G11, G24, G30, G34

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1. Introduction

How is European Venture Capital (VC) positioned against the one in the largest world's economy? Are European entrepreneurs stuck in a region that gives them worse conditions to succeed? Is it really important who entrepreneurs choose to help them to drive their business to the top?

The truth is the American VC industry receives much more hype. And there are reasons for this. This industry was born in the beginning of the second half of the past century whereas in Europe it only gave its first steps in the 90s (Martin et al., 2002). In the late 90s, VC in America was already exploding and in 2000 it totalized more than 70 billion USD in fundraising (Kaplan and Lerner, 2010).

So, why didn't the VC industry in Europe rise, in the 2000s, like the American in the 90s? Gompers et al. (2008) concluded that VC activity is highly and positively correlated with the financial situation of public markets. In the past decade, we lived two recessions that didn't let VC develop in the way that could be expected in the 90s. If we look carefully at the numbers we can see that VC total investments are growing since 2010 and that these amounts only by 2015 are reaching those of 2000 (Ernst & Young, 2016). So, the lag between the amounts invested by this industry in Europe and in the US can, possibly, still be justified by the late birth of it in Europe.

However, the effects of the latest recession were bigger than this. In fact, there has been a significant increase in VC holding periods, i.e., investors, nowadays, take more time between the moment they first invest in a portfolio firm and the moment they sell their participations. In 2005 and 2006 the average and median holding periods stood below 5 years. Since the financial crisis of 2007/2008 these figures haven't stop increasing and it is usual to see holding periods above 6.5 years (Ernst & Young, 2011).

People tend to overrate America on the business chapter. Axelson and Martinovic (2013) came up with the conclusion that European companies have a similar likelihood of succeeding¹ compared to American ones and the determinants for this success are the same in both regions. But, what makes some firms exit earlier than others? Is it the quality of the firm? Is it the entrepreneur's capacity? Or it depends on the VC investor who backs a

¹ Likelihood of success is measured by an exit either through an IPO or a trade sale.

business? In this work we focus on the role of VCs' reputation on the outcome of a portfolio company.

Reputation plays a huge role on VC activity and has a larger impact than one may think at first. VCs that do not own a high reputation do everything they can to earn it and those who already have it don't want to lose it. The reason behind this is that companies backed by higher reputation VCs send better signals to the market, i.e., to outside investors. In fact, companies backed by higher reputation VCs are more likely to exit successfully, with a shorter duration, and to have better performance (Nahata, 2008).

This seems an unexplored topic yet for European firms and the existent research focus more on IPO exits (due to information concerns) and post-IPO performance. With this work, we aim to add an analysis over the role of VCs' reputation on exit transactions (IPOs and acquisitions) in Europe. Thus, the hypotheses to be tested are:

H1. VCs' reputation is a key driver for the successful exit of European firms

H2. Higher reputation VCs exit their investments earlier than lower reputation VCs

H3. High reputation VCs are associated more often with IPOs rather than acquisitions

Using the logit and survival models it is possible to find that portfolio firms backed by high reputation VC investors successfully exit the VC stage more often and quicker than the remaining firms. The multinomial logit framework suggests that a company backed by a reputable VC has higher odds of doing an IPO than a trade sale.

Portfolio companies of higher quality also have higher chances of exit, either by an IPO or a trade sale. Differences on quality between companies that end up doing an IPO and a trade sale weren't found. In fact, the results show similar funds received by the two groups of successful companies.

This work proceeds as follows. Section 2 highlights some past literature, which lead to the formulation of the hypotheses. In Section 3, there are presented the hypotheses. The sample description and construction process come in Section 4, followed by the methodology in Section 5. Section 6 presents the empirical results. Section 7 concludes.

2. Literature Review

In this section, we present some literature, first, on some characteristics of Venture Capital and its evolution in Europe and in the US. Next, we show some hard data on success rates of portfolio companies, how VCs realize returns, how much are these returns and which percentage of equity they hold before and after an exit event. This topic evolves with the factors that lead to the exit decision and its process, as well as some theories that were raised throughout time. We introduce the role of VCs' reputation in the timing and type of exit and post exit performance of portfolio companies. Finally, we identify the literature gap that drives the realization of this work.

2.1. Venture Capital

2.1.1. What is Venture Capital?

Many are the definitions of Venture Capital (VC), but all land on the same idea. For instance, Sahlman (1990) defines it as a “professionally managed pool of capital that is invested in equity-linked securities of private ventures at various stages in their development”. On an entrepreneur perspective, VC is a possibility to gamble on markets that don't even yet exist (Schwienbacher, 2005). The idea we have to keep in mind is that the investee firms (portfolio firms) are usually young and small and carry huge levels of uncertainty (Gompers and Lerner, 2001), so they have more restricted access to financing through debt. This is why they seek to obtain their capital mainly in the form of equity rather than debt (Black and Gilson, 1998).

2.1.2. How does Venture Capital work?

In order to invest in portfolio companies, VC firms need to raise money from funds. These funds are often structured as limited partnerships and have a predefined lifetime, usually ten years with an option to extend it for three more years. Periodically, VCs have to give feedback to the managers of these funds to prove they deserved the money they raised (Gompers and Lerner, 2004). So, the decision to invest on a portfolio company is very well studied and based on a set of different preferred characteristics (Hochberg, 2012).

To reduce the risk of their investments, VCs don't invest all the money at once. They actually invest in several rounds as suggested by Sahlman (1990). Thus, VCs have the possibility to revalue their investments from time to time and make the best “next move”, which in bad scenarios can be the abandonment of the investment (Barry et al., 1990).

Hochberg et al. (2007) state that the median company receives two investment rounds in its VC lifetime.

The subsequent rounds of investment (after the initial one), typically channel two-thirds of the total VC investments and have the objective to “take the company to the next stage of development”. Also, the later the financing round the larger the amounts involved (Sahlman, 1990). This is consistent with the findings of Gompers (1995) that show early stage firms receive a lot less money per round.

In the pre-investment stage, VCs also need to pay attention to the VC inflow activity. In periods of high inflow, i.e., with more competition among VCs, portfolio companies tend to be overvalued (Gompers and Lerner, 2000b), which may have an impact on the future performance of these firms.

The last step and the most important for VCs is the exiting process. When VCs make the first investment they are already thinking how they will exit, once they have the lifetime of the fund as the limit time to conclude the exit process (Gompers and Lerner, 1996). This is crucial once this is the main source of return in venture capital due to the fact that portfolio companies realize low or negative cash flows during their initial lifetime (Schwienbacher, 2005).

2.1.3. The role of Venture Capitalists in the portfolio company

The idea that VCs give financing to their portfolio companies and wait for results is wrong. In fact, VCs are most of the times active participants in the activities of these firms. Following Hellmann and Puri (2002), there are cases where they replace the original founder(s) with an outside CEO they know. They also monitor strategy and investment decisions and have a vote on the choice of a VP of sales and marketing (Gompers and Lerner, 1999b).

Hochberg (2012) shows that the active role of VCs gives the opportunity to investee firms to have better performances than non-VC backed firms. The basic idea is VCs professionalize portfolio companies (Hellmann and Puri, 2002).

For entrepreneurs it is essential to choose the VC who fits better in their lines of thought and objectives (if they have the opportunity). Bygrave and Timmons (1992) sentence that

“it is far more important whose money you get (as an entrepreneur) than how much you get”.

2.2. Venture Capital in Europe and in the US

2.2.1. The development of VC in the US

The VC industry in the US started to gain shape in the 50s and 60s, but only in the 80s started to have relevancy and to become a case of study (Martin et al., 2002). The evolution in the second half of the 90s is quite impressive: in 1995 VC funds raised roughly 7 billion USD and 3 years later this amount had already broke the 20 billion USD threshold. In 1999, it reached the 50 billion USD border and one year later it totalized more than 70 billion USD (Kaplan and Lerner, 2010).

During the first few decades of VC industry’s life only the US had relevance on the matter. To show the discrepancy between the US and the rest of the world, Jeng and Wells (2000) conclude that in 1996 the US VC industry was 3 times bigger than the total VC industry of 21 other high-income nations.

Gompers et al. (2008) suggested that VC activity is highly positively correlated with the conditions in public markets. When the market is in good shape, VC seems to follow the train and select more promising companies. The authors believe that public markets shifts provide information to VCs. This is why we don’t see VC activity permanently increasing. In fact, 2000 is still the year with the highest amount of investment by VCs. The recessions in the early 2000’s and in 2008 and 2009, certainly contributed to the slow pace of VC activity in the last decade. For instance, in 2009 VC deals decreased to 24.5 billion USD (Pitchbook, 2015).

In the last few years VC looks to be re-establishing its shape. In 2013, the amount of VC deals was 36 billion USD and 2 years later it doubled to 72.3 billion USD. This still represents roughly half of the total amount raised by VC firms globally (Ernst & Young, 2016).

2.2.2. The development of VC in Europe

The idea that the old continent is like a “rookie” when compared to the other side of the Atlantic in terms of VC is confirmed by statements made by Hege et al. (2003), “VC

funding is still a nascent industry in Europe” and Martin et al. (2002), “In Europe, the VC industry is much less developed (than is the US)”.

Unlike many other areas, VC in Europe is considered as an emerging market (Black and Gilson, 1998). Europe only began to take VC seriously in late 90s (Hege et al., 2003) which explains the difference to the US. In 1999, the total amount invested by VCs reached 12 billion Euros (EVCA, 2001), which positioned Europe a few steps behind the US.

In Europe, the relative evolution through the last decade is similar to the American one. In 2013, the aggregate amount of VC deals was 9 billion USD and in 2015 of 14 billion USD (Ernst & Young, 2016).

2.2.3. Major differences

The differences between European and American VC don't remain in total investment figures. These disparities go, for instance, from the way each market is organized, the type of securities used by VCs to finance their portfolio firms, and investments made whether in earlier or later stages of financing.

Black and Gilson (1998) compared the American VC market with the German one. They concluded that VC in the US is much more developed than the German one and that the number of funds relative to each economy size is much higher in America. Also, VCs in the US invest much higher amounts in their portfolio companies (Hege et al., 2009).

A considerable difference between the two regions is that in Europe investments are more concentrated in firms in expansion stage and in the US investments have more significant weight on early stage firms (Black and Gilson, 1998; Ooghe et al., 1991). A possible explanation presented by the authors is that, in Europe, banks are the most important group of investors in the VC industry.

The type of securities used by VCs to finance their portfolio companies is also different. Following Cumming (2008), in the US convertible preferred equity is the most important kind of security whereas in Europe VCs prefer to use common equity.

In the biggest concern of VCs – returns – the differences are also significant. Hege et al. (2009) found that investments in the US create more value than the European ones. Also, they concluded realized returns in Europe are lower than required returns.

2.2.4. What can justify the performance differences?

The reason behind the gap between European and American VC activity seems to be consensual. Black and Gilson (1998) suggest that the key for the dominance of the US is their “robust market for IPOs”. Even in our days this factor seems to be fundamental. Groh et al. (2010) and Félix et al. (2013), apart from the liquidity of the capital markets, suggest that the protection of investors and corporate governance and even interest rates seem to explain why American VC industry is much more developed.

2.3. How hard is to succeed in the VC world?

When entrepreneurs have the first thoughts of creating a start-up, they need to have very present the idea of a tough journey. The beginning is very hard, because these “project firms” don’t have immediate access to venture capital. Gompers (1995) says firms that seek venture capital investment are well over one year old, i.e., they aren’t start-ups anymore. During their short life they already had help from other type of funding, such as personal, “angel” or bank financing. Even when entrepreneurs surpass this first year, the success is still a mirage. There are venture capital firms that receive more than 1000 proposals each year. Those same firms invest roughly in a dozen (Sahlman, 1990). So, even before VC investment, failure is the most common outcome.

In most of the studies the success of VC is accomplished when VCs are able to sell their participations in the portfolio companies either through an IPO or a trade sale. Some authors have measured the likelihood of success of American portfolio companies. Gompers and Lerner (2000b)² report that 33.5% of the portfolio companies that received VC investment, from 1987 to 1991, were able to exit successfully. Using different time sets, Hochberg et al. (2007) and Nahata (2008) found lower success rates. Hochberg et al. (2007)³ for companies that received VC investment from 1980 to 1999 report a success rate of 26%, which is very similar with the results of Nahata (2008)⁴, who found a likelihood of success of 25% for portfolio companies that received funds between 1991 and 2001.

Returns realized by VCs are extremely volatile. When they build their portfolio they don’t expect all investments to produce positive returns, but they certainly expect that the few that turn to be successful are able to cover the losses and still to produce positive returns in

² Using VentureOne database

³ With a sample retrieved from Thomson Financial’s Venture Economic

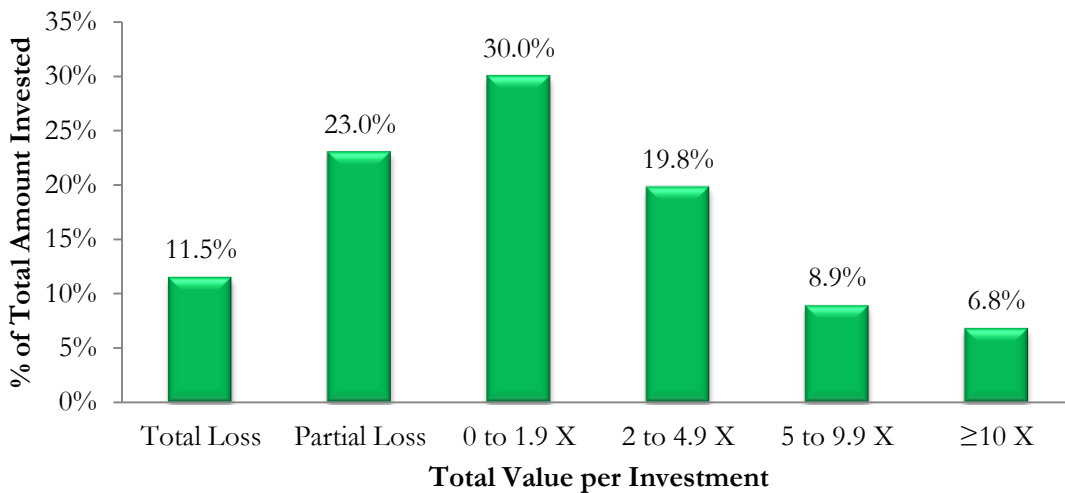
⁴ With a sample retrieved from Thomson Financial’s VentureXpert

the global portfolio. This makes the decision of how many firms a portfolio should hold tricky (Huntsman and Hoban, 1980).

In a study for the period between 1960 and 1975, Huntsman and Hoban (1980) realized that more than half of the investments of their sample had a realized return inferior to 10% and 25% ended up in an absolute loss.

As shown in Figure 1, 34.5% of the investments result in a loss. However, the remaining 65.5% are enough to typically produce positive outcomes in a fund, where it is inevitable to highlight that 6.8% of the investments end up producing a payoff more than ten times larger the initial investment value. Also, these 6.8% are responsible for 61.4% of the total profits in the portfolio (Sahlman, 1990).

Figure 1 - Distribution of Total Value per Investment



Source: Own creation based on Sahlman (1990)⁵

2.4. Ownership by Venture Capitalists

At this point, we already know VCs are active investors and that they usually have a seat on the board of directors. Also, they possess important economic rights on top of their ownership rights (Sahlman, 1990).

⁵ Sahlman (1990) used data from Venture Economics (1988)

Ownership depends from investment to investment. VCs don't own the same percentage on the different companies of their portfolios. Cumming (2008) states younger businesses have a larger ownership by VCs than expansion stage businesses. The author suggests the risk inherent to younger investments as a possible explanation for this.

Finally, it is important to know that ownership structure isn't the same after VCs exit their investments. The studies presented on this topic are based on IPOs as the exit route. Megginson and Weiss (1991) found that the mean ownership by VCs before an IPO is 36.6% and 26.3% after the IPO. Barry et al. (1990) found an ownership percentage of 34% at the time of the IPO, which is very similar to the prior one. VCs do not sell the entire ownership on the portfolio firms at the time of the IPO. In fact, they still hold it for about six months. This is to avoid a negative signal sent to the market, once outside traders may think VCs are "cashing out" their investments (Brav and Gompers, 2000).

So, in conclusion VCs have huge preponderance on portfolio firms. They hold around one third of the board seats and usually help these firms for about half their lives before the IPO (Barry et al., 1990) and still have a word on the decisions made by the company for a few months after this operation.

2.5. Exiting

The final step for VCs in portfolio companies is to choose the best way and the perfect timing to exit their investments (Giot and Schwienbacher, 2007). Jenkinson and Sousa (2015) identify capital markets conditions as the key factor for exit routes and, previously, Lerner (1994) showed that VCs carefully choose to exit their investments in periods with better market conditions.

Gladstone (1989) identifies six different routes. They are the sale of the company's shares in the secondary market (IPO), the sale of the company through the M&A market (trade sale), the repurchase of the shares by the portfolio firm, the sale of the shares to another VC investor (secondary sale), the reorganization of the firm and, lastly, the liquidation of the firm.

Initial Public Offerings and trade sales are the favourite exit forms for VCs and they are, at the same time, the two where universal literature underlies the most, especially IPOs, due

to information disclosure. However, exit via trade sales are more common than IPOs (Broughman and Fried, 2013).

At this point, a conflict of interest between entrepreneurs and VCs may arise, once they have different preferences on the exit route. Black and Gilson (1998) suggest that entrepreneurs prefer IPOs and even found that when they (entrepreneurs) control the exit decision, IPOs happen more frequently. Moreover, when the exit decision is on the hands of entrepreneurs the liquidation of the firm is less likely. On the other hand, Carpentier and Suret (2015) report that VCs usually choose trade sales as their favourite way to exit the investment (see also Schwienbacher (2005)).

This raises the question on why do entrepreneurs and VCs have different preferences on this matter. An important idea to retain in order to analyse this question is that, typically, VCs hold preferred shares, while entrepreneurs hold common shares.

In the case of an IPO, the CEO and the other board members are likely to keep their jobs and face less direct oversight, once shareholder ownership becomes more disperse (Broughman and Fried, 2013). Schwienbacher (2005) identifies an IPO as a call option over control for entrepreneurs and that the going public process allows them to exercise that call option.

However, in the case of a trade sale, the CEO and the other board members have a high likelihood of being replaced, once ownership becomes more concentrated into the hands of the acquirer. More, in a trade sale exit, VCs see their preferred rights being useful, because they are paid before the common equity holders, which sometimes result in low payoffs for entrepreneurs. Broughman and Fried (2013) find this as the justification of why the entrepreneurial team is resilient of an exit through a trade sale. In Carpentier and Suret (2015) study, this commentary came more than once on their surveys: “Trade sales are easier to conclude, can be done quickly and generally provide a favourable rate of return or several opportunities, because large firms now prefer to buy small firms with developed concepts or products than to develop them internally”.

2.5.1. Mergers & Acquisitions

Literature review on the process of mergers and acquisitions is rare and not easy to find. In this topic, we will try to answer to a question that may arise from the previous topic. If entrepreneurs are sceptical in selling their firms through the M&A market, how do VCs

arrange to sell their portfolio firms in trade sales and make this exit route the most typical one?

Broughman and Fried (2013) analysed this question for Silicon Valley firms. First, it is important to take that the entrepreneur team has the power to avoid a trade sale, due to its influence on the board. More, entrepreneurs won't be against all trade sale scenarios, but it is likely that they will be against many of them.

The authors come with this result: in order to increase the likelihood of success of a trade sale, VCs offer bribes to entrepreneurs. They do it 45% of the times and these bribes are, on average, 9% of the total deal value.

2.5.2. IPO

Portfolio companies that end up exiting via IPOs are the ones that are “more promising” during the Venture Capital investment (Schwienbacher, 2005). Furthermore, these firms totalize a higher financing amount and a larger number of rounds before this operation (Gompers, 1995). Generally, these are firms of higher quality (Bayar and Chemmanur, 2011).

Most of the literature on Venture Capital use IPOs as the easiest form to study the performance of portfolio companies. Because of this, authors through the years were able to find similar conclusions and build some theories on Venture Capital.

2.5.2.1. Certification theory

As pointed in the topic about ownership by VCs, these investors are likely to retain part of their holdings on the portfolio firm after an IPO. This increases the levels of confidence of outside investors and reduces the costs of going public, once it is believed asymmetric information is lower in VC backed firms. Here arises the basic support of the certification hypothesis developed by Megginson and Weiss (1991). The authors state that VC backed IPOs carry lower levels of underpricing than non VC backed IPOs. It is also reported that VCs are very careful with the valuation process, in order to preserve reputation in the capital market.

2.5.2.2. Against certification

However, later research goes completely against the certification theory. Lee and Wahal (2004) results show that VC backed IPOs are in fact more underpriced than non VC

backed IPOs by 5% to 10.3%, between 1980 and 2000. These results are consistent with those presented by Chemmanur and Loutskina (2006), who found support for the market power theory.

Bradley and Jordan (2002) admit that VC backed IPOs carry higher levels of underpricing, but the authors do not present this result as a conclusion. In fact, they found that after controlling for industry effects there is no difference between VC and non VC backed IPOs.

2.5.2.3. Screening and Monitoring

The screening and monitoring theory was first introduced by Barry et al. (1990). This hypothesis gives great relevance to the active role of VCs inside a portfolio company. In the pre-investment stage, VCs have the ability to choose better quality firms to join their portfolio (screening) and during the venture investment stage, they can turn those firms into high quality ones (monitoring).

This hypothesis goes further and states that participants in the capital market are able to acknowledge the monitoring role of VCs, which enables lower levels of underpricing for issues of venture capital backed firms.

Chemmanur and Loutskina (2006) also recognize the power of the screening and monitoring theory and even extended it. They suggest that VCs don't have the same capacity to bring quality to the portfolio firm. In fact, following the authors' results, firms backed by VCs with higher reputation have higher quality than those backed by low reputation VCs.

2.5.2.4. Grandstanding

The grandstanding theory is probably the most sustained one, once the research on this matter seems to get to the same conclusions most of the times.

Gompers (1996) concludes that younger VCs tend to grandstand, i.e., they take companies public earlier than older VCs. In addition, these VCs spend less time in the board of directors of the companies they back (in fact, less 14 months, on average) and hold lower equity ownership in portfolio firms. Portfolio companies backed by younger VCs are roughly two years younger and more underpriced at the time of the IPO.

The grandstanding theory arises due to reputation issues. Neus and Walz (2005) and Gompers (1996) suggest that young VCs have difficulties in building up, so they use underpricing, in order to diminish this issue and to raise capital for new funds more easily. So, basically the grandstanding behaviour is no more than paying for reputation (Lee and Wahal, 2004).

Gompers and Lerner (2004) report that only young VCs need to signal IPOs, i.e., only these need to underprice their IPOs. The rest of VCs don't have to behave like that, once the participants of capital markets already know them and have already evaluated their performances over the years.

The grandstanding behaviour is more significant in periods when the capital market is in good shape (Cumming and MacIntosh, 2001). With this market conditions VCs tend to rush the exiting process in order to shift their investments into new projects.

At some point in their careers, VCs have to take an important decision: they need to perceive the moment when they do not have to grandstand anymore. At an earlier stage they underprice the IPOs to collect reputation, but further in time they will have strong incentives to price IPOs closer to the intrinsic value of the portfolio firm in order to establish reputation (Neus and Walz, 2005).

2.5.2.5. Market Power

The market power hypothesis comes as a rejection of the certification hypothesis. Here, Chemmanur and Loutskina (2006) argue that VCs have better relationships with underwriters, institutional investors, and analysts to an IPO, so they have the possibility to price their IPOs at a higher price, thus getting the highest payoff they can, whereas in the certification theory the concern of VCs is to preserve their reputation.

Most studies assess the role of VCs in portfolio companies through underpricing in an IPO. Chemmanur and Loutskina (2006) built the market power theory using different measures than IPO. They state that when underpricing is used, at the same time, the big assumption that the closing price on the first day after the IPO equals the intrinsic value of those stocks is being made, which doesn't corresponds to the truth.

2.6. Reputation

From the theories of the previous topic, we can take that reputation leads VCs to behaviours that tend to make things harder for outside investors. The latter group should be aware that VCs in the IPO process act on their best interest. Because of this, we think reputation needs to have a better understanding.

Reputation is a relevant intangible asset used to improve companies' performance and to provide better and positive economic outcomes (Rindova et al., 2005). Diamond (1989) considers reputation as a tool to distinguish between agents when their characteristics seem to be similar. For Sahlman (1990) reputation is a key driver for good relationships between all participants in the business world, such as entrepreneurs, lawyers, investment bankers, auditors and others.

VCs' reputation is relevant in the entire venture capital cycle, from the pre-investment stage until the exit process. VCs with well established reputation have access to less costly and higher fundraising for further investments and benefit from larger compensation (Gompers and Lerner, 1999a). When entrepreneurs are about to choose from whom they want to receive funds they face a price-reputation trade-off. Should they choose better financial conditions or higher reputation? Hsu (2004) reports that entrepreneurs are aware about the things reputable VCs can bring to their businesses. In fact, these VCs have a likelihood of being accepted three times bigger than other VCs and usually acquire their portfolio companies at a 10% to 14% discount. The existent evidence says this is a good choice by entrepreneurs. Nahata (2008) found that more reputable and experienced VCs lead their portfolio companies to successful exits more often than others and do this in a shorter period of time. Additionally, Giot and Schwienbacher (2007) suggest that the size of the syndicate⁶ has a positive impact on the success probability of a portfolio firm.

The effects of reputation don't end at the exit process. Portfolio firms backed by reputable VCs continue to outperform the others, even after an IPO. This is mainly due to the active participation by these VCs in the corporate governance of the portfolio firms in the post-IPO stage (Krishnan et al., 2011; Lee et al., 2011). However, it is important to know that this group of VCs tend to select better quality firms in order to maintain or improve their

⁶ The size of the syndicate is measured by the number of different VCs that participated in the financing rounds of the portfolio firm.

reputation (Nahata, 2008). These results come from research that has the US as geographic sample. However, Lin et al. (2017) found similar results for China.

Nahata (2008) found that more reputable VCs are more often associated with IPOs, VCs with medium reputation are more likely to drive portfolio firms to an acquisition and VCs with low levels of reputation are more associated with unsuccessful exits. To reach a level of high reputation takes a long way for VCs. The biggest signal arises when VCs are able to take a private small firm to an IPO. An IPO allows VCs to build higher levels of reputation than an acquisition (Nahata, 2008).

2.7. Literature Gap

Although, VC literature is extensive for the US, for other markets there is still a huge gap to be filled, that this study pretends to contribute. This is particularly relevant when we try to understand how important is to have a VC with a good background helping European companies and entrepreneurs. We can tell that, in the US, the success of a company can become more likely at the time of the VC investment, which can be surprising as the exit only occurs, on average, 5 years later. But, what about European companies and European entrepreneurs? Does reputation have a significant role in the old continent too?

In our opinion, VC studies for Europe are starting to make sense as this industry starts to gain shape in this region of the globe. The European VC industry is here to stay and to grow and foreign investors aren't missing it, as they are concentrating their attention also to this side of the Atlantic.

With this work we aim to add an analysis over the role of VCs' reputation on exit transactions (IPOs and acquisitions) in Europe.

3. Hypotheses

This work gives special focus on VCs' reputation and its importance to the successful outcome of a portfolio company in Europe. In this section, there are presented the hypotheses previously proposed.

The following hypotheses arise from the studies of Nahata (2008), Krishnan et al. (2011) and Lee et al. (2011) who found that the reputation of a VC plays a relevant role on a portfolio company's life, in the US. The latter two focus their studies on the performance of a portfolio firm after an IPO, i.e., after the exit event.

The research of Nahata (2008) goes further as he also studies the importance of the entrepreneur's decision when he chooses the VC he wants to receive financing. In fact, the author reports that portfolio companies backed by higher reputation VCs are more likely to do an IPO or to be acquired. Moreover, Nahata (2008) suggests that high reputation VCs have the ability to exit their investments sooner than lower reputation ones. Even inside the group of portfolio firms that were able to successfully exit, those backed by higher reputation VCs are more likely to exit through an IPO. These three ideas, respectively, give birth to the three research questions, as follows.

H1. VCs' reputation is a key driver for the successful exit of European firms

H2. Higher reputation VCs exit their investments earlier than lower reputation VCs

H3. High reputation VCs are associated more often with IPOs rather than acquisitions

4. Sample

4.1. Sample construction

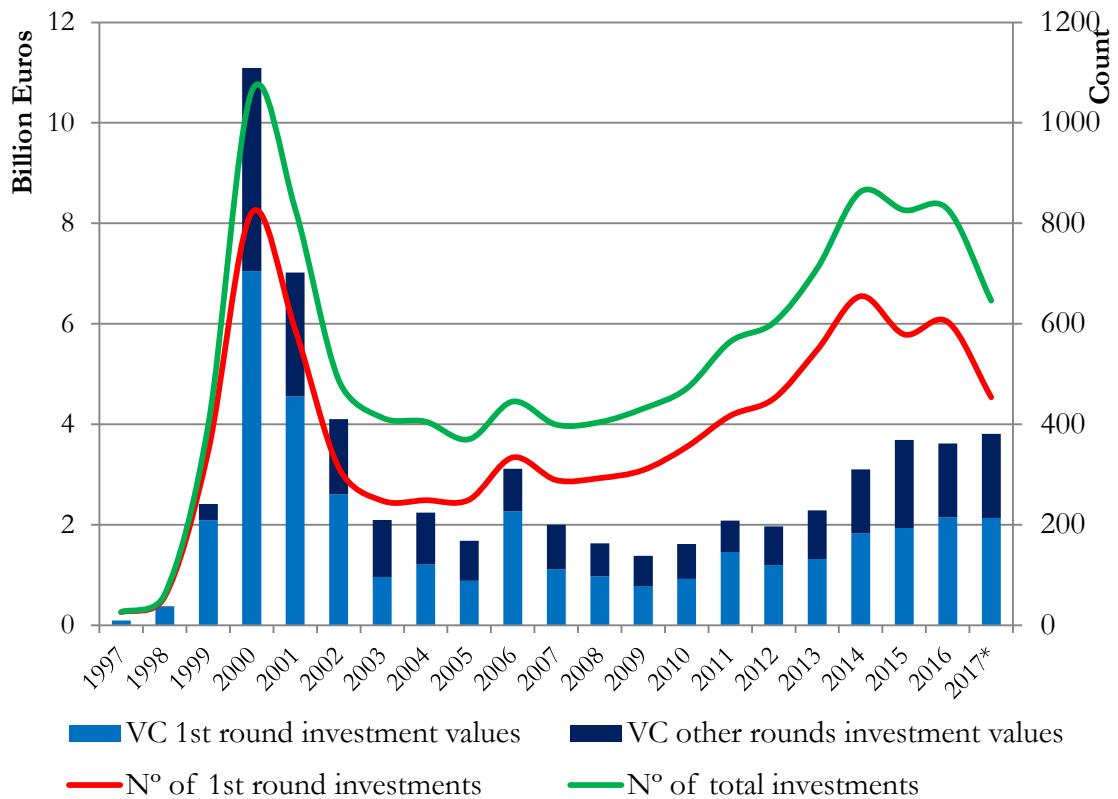
The sample consists of portfolio companies based in the European Union (EU-28) which received their first round of VC investment between the January 1st, 1997 and November 17th, 2017. The objective is to cross this information with European IPO and M&A data from the same time period and see which companies successfully exited the VC stage. Zephyr was the database used to collect the sample.

Our sample includes all VC transactions that occurred in the period considered, that involved portfolio companies based in the European Union and for which the date of the investments/rounds, the investors name and the amount received in each round of investment was available. The list of portfolio firms was then crossed with IPOs and trade sales that happened after the first round. In cases when a portfolio company completed an IPO and a trade sale it was only considered the first transaction. Also, investments made by individual investors were excluded. My initial sample includes 8188 portfolio firms and 11240 investment rounds.

4.2. Description of VC industry between 1997 and 2017

The distribution of the value of VC investments and the number of investment rounds, both divided in first and remaining rounds, between 1997 and 2017, is shown in Figure 2.

Figure 2 - Number and value of VC investments between 1997 and 2017 in selected sample



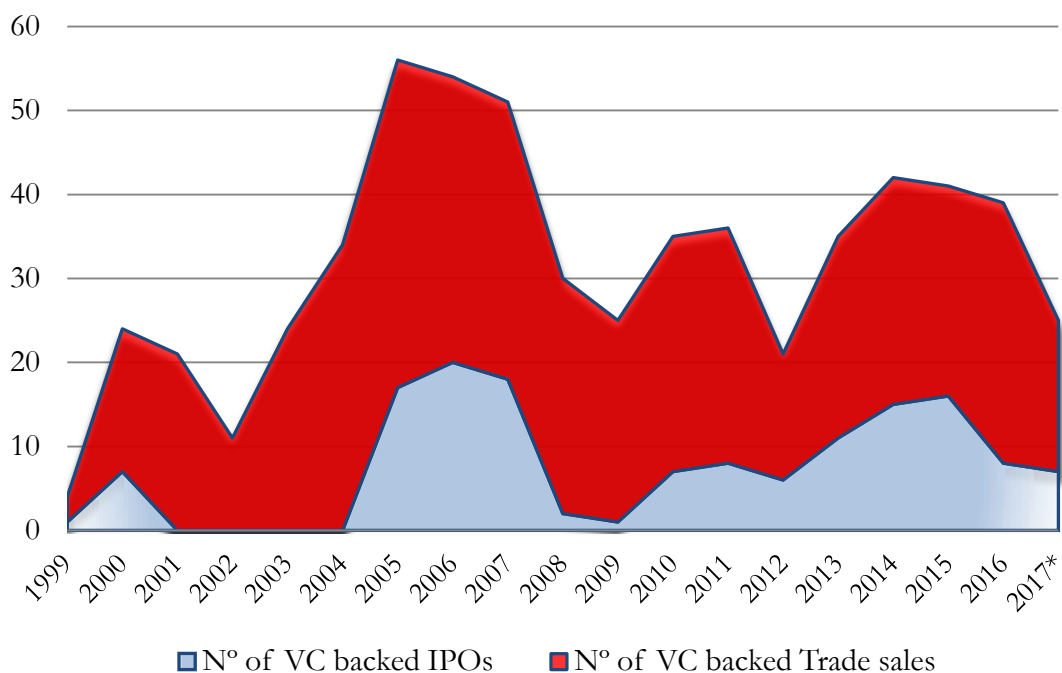
*Data until November 17th, 2017

As Hege et al. (2003) identify, VC in Europe only gave its first steps in the late 90s and 2000 is the year European VC really starts to be taken seriously. This fast growth is, however, slowed down by the dot.com bubble burst which marked the following couple of years. Only in 2006, the VC industry shows some significant signs of recovery, which rapidly disappeared due to the financial crisis of 2007-2008. Starting in 2000, the percentage of money applied on first round investments is established between 53% and 70%, except in 2003 (46%) and 2006 (73%). This percentage in 2006 shows what could have been the beginning of a new cycle where an optimism wave takes place, once the percentage of money invested in new portfolio firms increases considerably. What VC investors weren't expecting was the financial crisis of the following years which completely took down any kind of positive expectations.

The figure also shows that although after 2006 the number of investments started to slowly recover to the levels of 2000, the aggregate value of these investments clearly continues far from the ones in 2000. This suggest that VC investors invest, on average, less per round, which suggest they are more careful in their investment decisions, probably learning from the recent past years.

Figure 3 shows the number of IPOs and trade sales within the sample completed in each year.

Figure 3 - Number of exit transactions between 1997 and 2017 in selected sample



*Data until November 17th, 2017

The idea of Lerner (1994) that exit transactions occur in periods when markets are in better conditions is also represented on our sample. This is more evident in IPOs where between 2001 and 2004 there is no record of any of these transactions, possibly due to the dot.com bubble burst. The financial crisis of 2007-2008 also had an impact on exit transactions activity. In the case of trade sales, economic activity impacts in a smoother way. In recent years we can see signs of recovery and, in 2016, there were 8 VC backed IPOs and 31 VC backed trade sales.

In Table 1 are presented the holding periods of VC investments for the two different exit routes. We should look carefully for the period up to 2003 as our sample only starts in 1997 and so the only after 2003, portfolio companies had considerable time to successfully exit. Throughout the years, holding periods have been increasing, especially after the financial crisis of 2007-2008. This meets the results of Jenkinson and Sousa (2015) who found the same trend for private equity investments. Considering IPOs and trade sales separately, the average holding period for IPOs is consistently lower than for acquisitions, although the medians don't follow a particular pattern. All in all, the differences between IPOs and acquisitions exits are not statistically significant.

Table 1 - Holding periods of VC investments

This table distributes the mean and median of holding periods per year of the exit event and exit route, as well as the two exit routes together (Success column). Holding period is the number of months between the first round of VC investment and the exit transaction. The line "2017*" only includes deals until November 17th, 2017.

Year of Exit Transaction	IPO			Trade Sale			Success		
	N	Mean	Median	N	Mean	Median	N	Mean	Median
1999	1	0	0	3	6	4	4	5	4
2000	7	7	7	17	7	6	24	7	7
2001	0	-	-	21	15	15	21	15	15
2002	0	-	-	11	25	28	11	25	28
2003	0	-	-	24	36	39	24	36	39
2004	0	-	-	34	39	41	34	39	41
2005	17	59	61	39	50	52	56	53	54
2006	20	45	44	34	58	64	54	53	54
2007	18	46	52	33	67	73	51	59	60
2008	2	33	33	28	72	84	30	70	80
2009	1	34	34	24	54	48	25	53	47
2010	7	59	69	28	67	59	35	65	64
2011	8	58	48	28	77	78	36	73	74
2012	6	72	72	15	77	72	21	75	72
2013	11	76	78	24	86	75	35	82	78
2014	15	76	87	27	91	78	42	85	83
2015	16	77	71	25	87	94	41	81	81
2016	8	76	56	31	82	67	39	81	67
2017*	7	50	35	18	93	67	25	81	66

The average (median) holding period of VC investments during this time span is 60 (53) months, which is higher than the 45 months Schwienbacher (2008) found until 2001. Gompers and Lerner (2000a), Hochberg et al. (2007) and Nahata (2008) in their analyses give a minimum of 4 years to VCs to sell their investments. In this work, we will give VCs 5 years to successfully exit. We think it is a more suitable period to this sample, once the average holding period stands on 5 years and holding periods have been increasing in the last few years. Thus, from now on, first round VC investments from January 1st, 2013 are ignored, as they wouldn't have time to exit successfully. In other words, this analysis only considers VC investments between January 1st, 1997 and December 31st, 2012. So, portfolio companies which do not have made an IPO or acquisition by November 17th, 2017 are considered as unsuccessful exits⁷.

The final sample consists of 5348 portfolio companies, where 578 are listed as successful exits and 4770 as unsuccessful ones. From the 578 successes, 132 exited through an IPO and 446 through a trade sale.

4.3. Sample Description

Table 2 presents the distribution of portfolio companies which received VC investment between 1997 and 2012 and their status on November 17, 2017. The highest success rates occurred in the end of the past century when the number of VC investments in Europe was low. With the entrance in the new millennium, the number of new investors and investments drastically increased and consequently the rate of success decreased, partly explained by the investment euphoria during the dotcom bubble followed by the downfall of the economy in the years after the bubble burst. After that, only companies initially funded in 2002 present a success rate comparable to those of the 90s. A big part of these successes (77%) are companies which were able to make an IPO or a trade sale before the financial crisis of 2007-2008. In more recent years the percentage of portfolio firms with ability to exit decreased, still due to the effect of the recession and to the consistent increase of investments holding period (which increases the likelihood that a portfolio company has not successfully exit yet in 2017). Overall the success rate of 10.8% is considerably lower than the 26% and 25% reported by Hochberg et al. (2007) and Nahata

⁷ However, a company which has received its first VC investment in 2000 and was acquired in 2005 is considered a success, as well as a company which has received its first VC investment in 2012 and in 2017 has gone public. This follows the methodology adapted by Nahata (2008).

(2008), respectively. However, we must keep in mind this 16 year period is marked by two recessions which made impossible to many portfolio companies to survive.

Table 2 - Portfolio firms' outcomes by year of funding

The table distributes VC 1st round investments made between 1997 and 2012 per different outcome at November 17th, 2017, as well as the successful rate per year. Success rate is the relation between the number of IPOs and trade sales completed and the total number of portfolio companies which received VC investment in each year.

Year of 1st Investment	At November 17 th , 2017			% Successful
	IPO	Trade sale	Unsuccessful	
1997	0	5	21	19.2
1998	4	4	49	14.0
1999	12	62	272	21.4
2000	11	78	732	10.8
2001	9	78	502	14.8
2002	17	41	256	18.5
2003	10	22	216	12.9
2004	9	24	216	13.3
2005	11	17	222	11.2
2006	11	24	299	10.5
2007	10	23	256	11.4
2008	5	19	269	8.2
2009	8	13	288	6.8
2010	6	11	338	4.8
2011	5	14	398	4.6
2012	4	11	436	3.3
Total	132	446	4770	10.8

Table 3, Panel A distributes the number of portfolio companies and their different outcomes per country. The UK and France are clearly the two countries where the VC industry is more developed and consequently where the number of successes is larger. French portfolio companies stand out by the number of IPOs completed, the British by the number of trade sales, but it is in Belgium where the highest success rate is located. Panel B reports similar information but sorts it for different industries.

Table 3 - Portfolio firms by geography and industry

This table presents portfolio companies' different exit routes. Panel A sorts the 132 IPOs, the 447 trade sales and the 5348 unsuccessful exits by portfolio firms' country. Panel B sorts the sample by industry and exit route. Industry classification is based on the 2-digit SIC code. Success rate is the relation between the number of IPOs and trade sales completed and the total number of portfolio companies which received VC investment.

Portfolio company country	Exit route				%
	IPO	Trade sale	Unsuccessful	Total	Successful
<i>Panel A: Portfolio firms' nationality</i>					
United Kingdom	10	191	1737	1938	10.4
France	67	87	914	1068	14.4
Germany	12	38	505	555	9.0
Spain	4	20	330	354	6.8
Sweden	8	30	277	315	12.1
Ireland	1	18	195	214	8.9
Belgium	10	14	118	142	16.9
Netherlands	4	11	114	129	11.6
Denmark	6	10	113	129	12.4
Finland	2	8	118	128	7.8
Italy	3	6	102	111	8.1
Other 17	5	13	247	265	6.8
Industry	Exit route				%
	IPO	Trade sale	Unsuccessful	Total	Successful
<i>Panel B: Portfolio firms' industry</i>					
Agriculture and Mining	3	2	17	22	22.7
Construction	1	2	19	22	13.6
Manufacturing	37	86	1073	1196	10.3
Transportation and Communication	5	43	291	339	14.2
Retail and Wholesale Trade	4	19	217	240	9.6
Financial and Other Services	82	294	3153	3529	10.7

In Table 4 are presented the 20 VC firms with the highest success rate (with the minimum of four exit transactions completed). Similarly to Table 3 Panel A, the VC firms who complete more exit transactions and have higher success rates are based on France, the UK and Germany, as these are also the countries where the VC industry is more developed. It is worth to highlight the dominance of French firms on this matter, as there are 5 French firms in the top 7 and 9 in the top 20.

Table 4 - Portfolio firms by VC investor

In this table exit routes and successful rates are shown separately by VC firm. Here, are presented VC firms which were able to lead portfolio companies they invested in, between 1997 and 2012, to a successful exit at least four times, until November 17th, 2017. Then this group of VC firms was sorted by highest successful rate.

VC firm	VC firm country	Exit route			% Successful
		IPO	Trade sale	Unsuccessful	
BNP Private Equity	France	1	3	2	66.7
Truffle Capital	France	6	0	3	66.7
Abingworth Management	UK	2	2	3	57.1
Advent International Corporation	US	0	4	5	44.4
Auriga Partners	France	6	3	12	42.9
Sofinnova Partners	France	5	6	15	42.3
CDC Innovation Partners	France	2	3	8	38.5
Northern Venture Managers	UK	0	4	8	33.3
Techno Venture Management	Germany	2	4	12	33.3
Apax Partners Worldwide	UK	2	3	12	29.4
GIMV	Belgium	4	5	24	27.3
I-Source Gestion	France	1	4	14	26.3
Société Generale Asset Management	France	2	3	17	22.7
Wellington Partners VC	Germany	2	3	20	20.0
Galileo Partners	France	2	2	21	16.0
Innovacom Gestion	France	1	3	23	14.8
3i Group	UK	5	41	265	14.8
Atlas Venture	UK	1	6	41	14.6
Bayern Kapital	Germany	0	4	27	12.9
Newmedia Spark	UK	0	4	29	12.1
Other 1811		88	339	4209	9.2

5. Methodology

In this section, it is clarified the process that allows us to answer the hypotheses we intend to test. First, it is important to mention that during this analysis only the reputation of the lead VC, i.e., the VC that participated in the first round of investment, was considered. In cases in which the first round of investment has more than one investor, the lead VC is considered as the one that bought a higher percentage of the portfolio company.

Each hypothesis requires a different framework, so we present each one at a time as well as its variables.

For the purpose of the first hypothesis, i.e., that VCs of high reputation take portfolio firms more frequently to a success, it's used the logit regression analysis. The second hypothesis, i.e., portfolio companies backed by high reputation VCs exit successfully faster than others, is solved with the help of the survival analysis, first introduced by Cox (1972). To test if higher reputation VCs are associated more often with IPOs than trade sales we use the multinomial logit approach. The processes that enable us to answer the first and the third hypotheses are based on Nahata (2008).

In all three frameworks we will analyse portfolio companies that received their first round of VC investment between January 1st, 2005 and December 31st, 2012.

5.1. Logit framework

$$SUCCESS = \beta_0 + \beta_1 REP + \beta_2 ROUNDS + \beta_3 VCS + \beta_4 AMOUNT + \beta_5 MARKET + \mu + \eta + d + \varepsilon \quad (1)$$

The reputation variable may assume one of three values as explained below.

To answer to H1, a successful exit is proxied by a dummy variable (*SUCCESS*), which takes the value of 1 if the portfolio firm has gone public or been acquired and 0 otherwise.

5.1.1. Independent variables

5.1.1.1. VC reputation

To measure the VC reputation we construct three different variables. Two of them measure the ability of an investor to lead a portfolio firm to a successful exit and the third measures the ability of an investor to receive funds from limited partners.

The first variable (*REP*)⁸ is a dummy which takes the value of 1 for the portfolio companies backed by the top 10% VC investors in terms of reputation on the sample. Here, reputation is measured through the cumulative market capitalization of IPOs and trade sales backed by the VC firm from 1997 to the year prior to the new investment relative to the aggregate market capitalization of all VC backed IPOs and trade sales within the same period.

VCs who are able to take portfolio companies into the public market collect more reputation than those that simply drive them to an acquisition (Nahata, 2008). This is the basic idea that led to the construction the first two reputation variables. One relatively to IPOs and trade sales and other that merely considers IPOs.

The second variable (*IPO_REP*) is similar to the previous one, but this time it takes the value of 1 for portfolio companies backed by the top 5% VC investors in terms of IPO exits as, in this case, the reputation measure is built only by the cumulative market capitalization of IPOs backed by the VC firm from 1997 to the year prior to the new investment normalized by the aggregate market capitalization of all VC backed IPOs within the same period. The reputation of VCs is assessed at the time of the first round of investment in the portfolio company.

The third variable (*INV_SHARE*) is similar in construction, however this time the dummy takes the value of 1 for top 50% VC investors in terms cumulative VC investments value made by the VC firms from 1997 to the year prior to the new investment relative to the total value of investments in the VC industry within the same period.

In all three measures a higher value represents higher reputation. As referred above, we will just include in the regressions portfolio companies that received first round of VC investment between 2005 and 2012. This process permits VC firms to “collect” reputation at least in the previous 8 years (from 1997 to 2004)⁹. Thus, we avoid a huge number of VC firms with no reputation at all in the sample. The regressions will include 60 IPOs, 132 trade sales and 2506 unsuccessful exits.

⁸ The rankings of reputation are presented in Appendix 1, 2 and 3.

⁹ Assume a VC investor backs a new portfolio firm in 2008. His reputation measure will include all the transactions (IPOs, trade sales, VC investments, depending on the variable) he made between 1997 and 2007.

5.1.1.2. Control variables

A set of control variables for portfolio firms and market characteristics will also be included.

- i. In order to capture the quality of the portfolio company we add three variables¹⁰: the number of investment rounds received by a portfolio firm in the five years after the first round (*ROUNDS*), the number of different VCs that participated in the investment rounds in the first five years (*VCS*) and the total amount of VC funding, in million of Euros, across all rounds (*AMOUNT*). Companies with higher quality attract more VCs and their quality gives them some advantage to succeed, so we expect a positive coefficient for the three variables.
- ii. We control for exit market conditions, using the natural log of the number of IPOs (*MARKET*) in the three months prior to the portfolio firm's exit. In the case of unsuccessful exits, it will be used the average of IPOs during the entire investment period. It is expected a positive coefficient.
- iii. Lastly, we control for funding year fixed effects (μ), industry (η) and country (d) effects.

5.2. Survival analysis¹¹

As stated in section 2, VC in Europe gained bigger relevance after the recession of 2008. Many investment rounds were made from then, so it is normal that a big percentage of these deals didn't successfully exited yet. Because of this, it is important to use a survival analysis framework, which takes into account information of portfolio firms that are yet to exit (Giot and Schwienbacher, 2007). The hazard¹² function is given by (2) and assesses the conditional instantaneous probability of a portfolio firm successfully exit given that it hasn't exited yet.

¹⁰ These variables will be measured at the time of the exit

¹¹ This is a model typically used on health studies, such as cancer treatments. In these cases, the failure event is given by the death of a patient, which is a bad thing. Here, the failure event is given by the successful exit of a portfolio firm, which isn't a bad thing at all. In the survival model context, a positive coefficient means a given factor accelerates the event in study. So, portfolio firms which haven't exited yet are treated as "open observations", i.e., these observations are right-censored at November 17th, 2017.

¹² Hazard is the likelihood of a study participant that didn't live a certain event at a given moment, to live it at that moment. In other words, in a health study, the hazard is the probability of an individual that didn't die yet, to die right now. In our case, it represents the probability of a company that didn't exit yet, to exit at this moment.

$$\lambda(t) = \lim_{\Delta t \rightarrow 0} \frac{\Pr(t \leq T < t + \Delta t \mid T \geq t)}{\Delta t} = \frac{f(t)}{S(t)} = -\frac{S'(t)}{S(t)} \quad (2)$$

Where,

$S(t) = \Pr(T > t) = 1 - F(t)$ (survivor function)

$F(t) = \Pr(T \leq t)$ (exit time distribution function)

$f(t) = dF(t)/dt$ (density function of exit time distribution)

The Cox proportional hazard model can be seen as an extension of the survival model, where the hazard function¹³ can be written as:

$$\lambda(t) = \lambda_0(t) \cdot e^{(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)} \quad (3)$$

Where λ_0 is an unspecified function.

Equation (4) can also be written as follows:

$$\lambda(t) = [\lambda_0(t) \cdot e^{\beta_0}] \cdot e^{(\beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)} \quad (4)$$

The value of β_0 isn't important, once $\lambda_0(t)$ is an arbitrary function, i.e., it is an undefined function, as it is $\lambda_0(t) \cdot e^{\beta_0}$. Thus we can conclude the Cox model doesn't have an intercept value (Cleves et al., 2010).

The explanatory variables used to solve H2 are the same as the ones used to respond to H1, so the model can be written as:

$$\lambda(t) = \lambda_0(t) \cdot e^{(\beta_1 REP + \beta_2 ROUNDS + \beta_3 VCS + \beta_4 AMOUNT + \beta_5 IPO + \beta_6 M\&A + \mu + \eta + d)} \quad (5)$$

Where t is defined by the natural log of the investment time to exit, i.e., the holding period. The reputation variable assumes one of three values as explained previously.

This time, we allow the exit market conditions variable, *Market*, for time-varying. This is the only variable which depends on time, i.e., its value depends on how much time a portfolio company needs to exit the VC stage. This technique is able to relax the assumption that the hazard ratio depends on the covariates, but not on time t . This is something the logit framework doesn't allow to do.

¹³ This model doesn't have residuals.

5.3. Multinomial logit framework

For H3, a success is measured the same way as in the logit framework topic. Thus, the analysis will include only portfolio firms that received their first round of investment between 2005 and 2012.

$$EXIT = \beta_0 + \beta_1 REP + \beta_2 ROUNDS + \beta_3 VCS + \beta_4 AMOUNT + \beta_5 MARKET + \mu + \eta + d + \varepsilon \quad (6)$$

The reputation variable may assume one of three values as previously explained.

The multinomial logit framework objectively compares IPOs, acquisitions and unsuccessful exits separately. In this case, the dependent variable (*EXIT*) takes the value of 1 for IPOs, 2 for trade sales and 0 for unsuccessful exits (base outcome).

This framework uses the same explanatory variables (three different variables for VC's reputation and a set of control variables) as the ones used to answer to H1 and H2.

6. Empirical Results

The objective of this section is to understand the role of VCs' reputation on the life of a portfolio company. Furthermore, it is also studied the importance of these firms' quality and the exit market conditions on their development. In section 6.1, it is presented the univariate analysis of the variables that are used to answer the hypotheses proposed. Section 6.2 presents the multivariate tests where the three hypotheses were tested.

6.1. Univariate Analysis

Through Table 5 it is possible to analyse some relevant statistics on the 192 successful exits and 2506 unsuccessful ones. More specifically, Table 5 shows the means and medians of the different variables sorted by successful and unsuccessful exits, as well as the respective equality tests. The range of results for each variable is presented in Appendix 4.

First, looking at the three VC reputation measures we can see that the percentage of portfolio companies backed by a reputable VC that end up on a success is significantly different and higher than those whose outcome is an unsuccessful exit. Between IPOs and trade sales the difference is significant if we consider a VC earns reputation only through completed IPOs¹⁴, which suggests that VCs that have done more IPOs in the past are more likely to exit through an IPO in the future.

The results for the quality of the portfolio firms start to meet those of Gompers (1995) and Nahata (2008), i.e., that firms of better quality are more frequently linked with successful exits. From the measures built, two out of three, the number of rounds a company received in the five years after the first VC investment and the total funding a company received, explain with significance the difference between successful and unsuccessful exits. The other variable, which counts the number of VCs which participated in the investment rounds of a portfolio company, is dropped from the multivariate analyses due to multicollinearity concerns with the number of rounds received by each portfolio firm. Additionally, there were computed the tests of equality between IPOs and trade sales. The difference between the means and medians is not statistically significant for any of these measures, but for the median of the total VC funding at the 10% significance level. Overall,

¹⁴ Tests of significance between IPOs and trade sales weren't included on the table.

Table 5 - Summary statistics for each exit event

In the table are presented statistics on VC backed firms that received investment between 2005 and 2012. Successful exits include portfolio companies that made an IPO or a trade sale by November 17th, 2017. Unsuccessful exits include those companies that didn't exit by same date. Overall, there were analysed 192 successful events - 60 IPOs and 132 trade sales - and 2506 unsuccessful events. The figures for the three reputation measures indicate the percentage of portfolio companies backed by a VC belonging to the top 10%, top 5% and top 50% in terms of the measure of reputation we built, respectively. The tests of equality refer to the total of successful and unsuccessful exits. To test the means it was used the t-test. For the medians the Wilcoxon rank-sum (Mann-Whitney) test was used.

	Successful Exits						Unsuccessful Exits		Tests of Equality	
	IPO		Trade Sale		Total		Mean	Median	Mean	Median
	Mean	Median	Mean	Median	Mean	Median				
VC Reputation										
Reputation based on IPOs and trade sales (%)	21.67		18.94		19.79		9.22		-4.73***	
Reputation based on IPOs (%)	18.33		8.33		11.46		4.51		-4.27***	
Reputation based on previous VC investments (%)	70.00		64.39		66.15		48.76		-4.66***	
Portfolio company's quality										
N° of rounds in the first 5 years	1.52	1.00	1.53	1.00	1.53	1.00	1.37	1.00	-2.86***	-3.07***
N° of different VCs in the first 5 years	1.27	1.00	1.23	1.00	1.24	1.00	1.25	1.00	0.32	0.33
Total VC funding (€Million)	18.30	6.37	16.20	5.00	16.90	5.15	5.38	1.70	-7.61***	-9.50***
Exit market conditions										
N° of IPOs in the 3 months prior to the exit	93.0	77.0	80.3	78.0	84.3	77.5	80.9	78.6	-3.63***	1.76*

this may indicate a similar structure for European portfolio firms that end up doing an IPO or a trade sale. This will be clarified further on this work.

On exit market conditions we find results similar to the literature – the number of IPOs in the quarter before the exit transaction is significantly higher than the average number of these transactions on normal periods. In addition, there were computed equality tests between IPOs and trade sales. The results suggest that the average number of IPOs is significantly higher in the quarter before a portfolio company concludes an IPO. These outcomes may be a reflection of the higher seasonality of an IPO transaction compared to a trade sale, which we can also see on Figure 3 (Section 4.2).

6.2. Multivariate Analysis

As previously referred, in this section is where the results that enable to answer the three proposed hypotheses are presented. The three following topics refer to H1, H2 and H3, respectively.

6.2.1. Logit framework

The results on Table 6 suggest that portfolio companies backed by more reputable VCs have a larger likelihood of successfully exit either through an IPO or a trade sale. This idea is supported by the three different reputation variables. For instance, if we look at the variable *Rep*, which considers IPOs and acquisitions as a source to gain reputation, we find that, *ceteris paribus*¹⁵, portfolio firms backed by the top 10% VCs have 1.90 [$e^{0.641}$] higher chances to successfully complete an IPO or a trade sale.

When we analyse portfolio company quality, we see that those which received more funding have higher odds to end up being a success. Analysing more carefully the variable *Amount*, in Model 1, we can say that if a portfolio firm receives additionally one million dollar investment, its odds of success increase 1.3% [$(e^{0.013}-1) \times 100$].

To conclude that it is indeed the reputation of VCs that drives portfolio firms more often to a success and not the quality of the firm further robustness checks are needed. However, if the tests provided aren't enough, one can keep in mind that a reputable VC is able to invest more frequently on more promising firms than the remaining ones and, consequently, take them to an IPO or a trade sale.

¹⁵ All numerical analysis will be under this assumption

In terms of macroeconomic conditions, the results suggest exit transactions occur frequently in periods when the market isn't performing very well, which isn't consistent with Lerner (1994).

The three models give support to H1, i.e., VCs' reputation is associated with higher success probability.

Table 6 - Logit framework results

The table summarizes the results of the logit framework. In the three regressions there were included portfolio firms which received their first round of VC investment between 2005 and 2012. The dependent variable takes the value of 1 if the portfolio company made an IPO or was acquired by November 17th, 2017 and 0 otherwise. Reputation is proxied by three different dummy variables. The first one takes the value of 1 for the portfolio firms backed by the top 10% investors in terms of reputation (this measure of reputation accounts for IPOs and trade sales) and 0 otherwise. The second takes the value of 1 for portfolio firms backed by the top 5% in terms of reputation (where reputation accounts only for IPOs) and 0 if not. The third takes the value of 1 if a portfolio company was backed by the top 50% of VC investors in reputation terms (here, reputation is based on previous investments in the VC industry) and 0 for the remaining firms. The quality of the portfolio firms was captured by two variables: Rounds (which was constructed through the number of VC investments a portfolio firm received in the first 5 years) and Amount (captures the total funding across all investment rounds by each portfolio firm). Exit market conditions were proxied by the variable Market (log of the number of IPOs in the three months prior to the exit). For companies which hadn't exit on November 17th, 2017 the measure was the 3-month average number of IPOs or trade sales between the month of the first round and November, 2017. Country, funding year and industry effects are included. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%. The constant term is omitted. Standard deviations are presented in parenthesis.

Dependent variable	Success (1 for IPOs and trade sales; 0 otherwise)					
Variables	Model 1		Model 2		Model 3	
VC Reputation						
Rep	0.641***	(0.211)				
IPO_Rep			0.772***	(0.266)		
Inv_share					0.611***	(0.169)
Portfolio company's quality						
Rounds	0.151	(0.100)	0.147	(0.100)	0.144	(0.100)
Amount	0.013***	(0.004)	0.014***	(0.004)	0.014***	(0.004)
Exit market conditions						
Market	-2.958***	(0.506)	-2.962***	(0.505)	-3.045***	(0.513)
Country and funding year effects	Included		Included		Included	
Industry effects	Included		Included		Included	
-Log likelihood	628.64		629.11		626.04	
<i>LR Chi</i> ²	127.55***		126.61***		132.75***	
Observations	2698		2698		2698	

6.2.2. Survival Analysis

Table 7 includes the results of the survival model. The difference of this framework compared to the others is that a survival analysis allows taking conclusions not only on the likelihood of such an event to happen, but also on its timing.

Starting with the VC reputation variables, from the three different models, we can conclude portfolio firms backed by higher reputation VCs have higher probability and take less time to exit the VC stage. Looking at Model 1, the positive coefficient on the reputation measure tells that a portfolio firm backed by a top VC has a higher probability of completing an IPO or a trade sale and typically take shorter periods of time to do it than a firm backed by a lower reputation investor. In fact, this probability increases by $[(e^{0.598}-1) \times 100] = 81.8\%$.

The variables on portfolio firms' quality in the survival model indicate higher quality firms have better odds of succeeding. In Model 1, an additional round of investment increases the likelihood of success in $[(e^{0.186}-1) \times 100] = 21.3\%$. A portfolio firm which receives 10 million more Euros than other firm has a probability of exiting $[(e^{0.005 \times 10}-1) \times 100] = 5.1\%$ higher.

The exit market conditions, although in the survival analysis they are allowed for time-varying, as the in the logit framework, suggest VC portfolio firms have the ability of succeeding on average economic conditions.

All in all, the survival model supports H2, i.e., that firms backed by higher reputation VCs take shorter periods of time to conclude an IPO or a trade sale.

Table 7 - Survival Analysis results

The table reports the coefficients of the Cox proportional model. In the regressions were included portfolio firms which received their first round of VC investment between 2005 and 2012. The dependent variable is the natural log of the holding period. The holding period of successful exits is the number of months between the first round of investment and the exit transaction. For unsuccessful exits the holding period is right-censored at November 17th, 2017. Reputation is proxied by three different dummy variables. The first one takes the value of 1 for the portfolio firms backed by the top 10% investors in terms of reputation (this measure of reputation accounts for IPOs and trade sales) and 0 otherwise. The second takes the value of 1 for portfolio firms backed by the top 5% in terms of reputation (where reputation accounts only for IPOs) and 0 if not. The third takes the value of 1 if a portfolio company was backed by the top 50% of VC investors in reputation terms (here, reputation is based on previous investments in the VC industry) and 0 for the remaining firms. The quality of the portfolio firms was captured by two variables: Rounds (which was constructed through the number of VC investments a portfolio firm received in the first 5 years) and Amount (captures the total funding across all investment rounds by each portfolio firm). Exit market conditions were proxied by the variable Market (log of the number of IPOs in the three months prior to the exit). For companies which hadn't exit on November 17th, 2017 the measure was the 3-month average number of IPOs between the month of the first round and November, 2017. We allow for time-varying for these two variables. Country, funding year and industry effects are included. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%. Standard deviations are presented in parenthesis.

Dependent variable Variables	Log of the holding period					
	Model 1		Model 2		Model 3	
VC Reputation						
Rep	0.598***	(0.190)				
IPO_Rep			0.681***	(0.232)		
Inv_share					0.524***	(0.162)
Portfolio company's quality						
Rounds	0.193**	(0.087)	0.183**	(0.087)	0.190**	(0.086)
Amount	0.005***	(0.001)	0.006***	(0.001)	0.005***	(0.001)
Exit market conditions						
Market	-1.060***	(0.081)	-1.056***	(0.080)	-1.036***	(0.080)
Country and funding year effects	Included		Included		Included	
Industry effects	Included		Included		Included	
-Log likelihood	1397.99		1398.71		1396.92	
<i>LR Chi</i> ²	144.71***		143.27***		146.85***	
Observations	2698		2698		2698	

6.2.3. Multinomial Logit framework

The multinomial logit framework, illustrated on Table 8, allows us to compare each successful route with unsuccessful ones (base outcome). We can't take the same conclusions of Nahata (2008), i.e., that top VCs are more frequently related with IPOs, medium VCs with trade sales and low reputation VCs with unsuccessful exits, but we can conclude something similar. Models 1 and 3 suggest that top VCs create conditions so their portfolio companies have higher probability of doing an IPO compared to a trade sale. Looking this time to the variable *Inv_Share*, we can take that the presence of a reputable VC increases the likelihood of a portfolio company doing an IPO by $[(e^{0.724}-1) \times 100] = 106\%$ compared to the bottom 50% VCs. In the case of trade sales, this probability increases by 75%. So, a portfolio company backed by a reputable VC has a likelihood of doing an IPO 31 p.p. higher than completing a trade sale. This supports H3.

As in the logit framework, the variable *Rounds* isn't statistically significant, which doesn't enable to conclude that companies that make an IPO are of better quality than the ones that are acquired, or the opposite. In fact, the only variable with statistical significance both in IPO and trade sale exits, *Amount*, suggests the probability of completing an IPO or a trade sale doesn't depend on the funds a portfolio firm receives, once both coefficients are identical in the 3 models.

The macroeconomic measure doesn't show any significance for exits through IPOs. Contrary to what we expected, the models indicate trade sales occur with frequency on average economic conditions.

Table 8 - Multinomial Logit framework results

The table summarizes the results of the multinomial logit framework. In the regressions were included portfolio firms which received their first round of VC investment between 2005 and 2012. The dependent variable takes the value of 1 if the portfolio company made an IPO, 2 if it was acquired and 0 if it didn't exit by November 17th, 2017. Reputation is proxied by three different dummy variables. The first one takes the value of 1 for the portfolio firms backed by the top 10% investors in terms of reputation (this measure of reputation accounts for IPOs and trade sales) and 0 otherwise. The second takes the value of 1 for portfolio firms backed by the top 5% in terms of reputation (where reputation accounts only for IPOs) and 0 if not. The third takes the value of 1 if a portfolio company was backed by the top 50% of VC investors in reputation terms (here, reputation is based on previous investments in the VC industry) and 0 for the remaining firms. The quality of the portfolio firms was captured by two variables: Rounds (which was constructed through the number of VC investments a portfolio firm received in the first 5 years) and Amount (captures the total funding across all investment rounds by each portfolio firm). Exit market conditions were proxied by the variable Market (log of the number of IPOs in the three months prior to the exit). For companies which hadn't exit on November 17th, 2017 the measure was the 3-month average number of IPOs or trade sales between the month of the first round and November, 2017. Country, funding year and industry effects are included. Statistical significance is represented by * at 10%, ** at 5% and *** at 1%. The constant term is omitted. Standard deviations are presented in parenthesis.

Dependent variable	Exit (1 for IPOs; 2 for trade sales; 0 otherwise)					
Variables	Model 1		Model 2		Model 3	
	IPO	M&A	IPO	M&A	IPO	M&A
VC Reputation						
Rep	0.828**	0.554**				
	(0.340)	(0.254)				
IPO_Rep			1.421***	0.345		
			(0.366)	(0.353)		
Inv_share					0.724**	0.557***
					(0.300)	(0.202)
Portfolio company's quality						
Rounds	0.141	0.160	0.126	0.162	0.128	0.154
	(0.165)	(0.117)	(0.168)	(0.116)	(0.165)	(0.117)
Amount	0.013***	0.013***	0.014***	0.014***	0.014***	0.014***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Exit market conditions						
Market	-0.384	-3.753***	-0.250	-3.797***	-0.591	-3.835***
	(1.014)	(0.554)	(1.026)	(0.556)	(1.007)	(0.560)
Country and funding year effects	Included		Included		Included	
Industry effects	Included		Included		Included	
-Log likelihood	732.12		730.36		729.78	
<i>LR Chi</i> ²	159.09***		162.59***		163.77***	
Observations	2698		2698		2698	

7. Conclusion

When we talk about European VC we are basically talking about France, the UK, Germany and Spain, the strongest economic markets. In these 20 years, the VC industry suffered some significant changes and one of the most relevant concerns to holding periods. It is in fact a trend. Holding periods have been increasing over the years. This is something an entrepreneur should take into consideration when creating a new business nowadays.

The main question we tried to answer with this work is whether the entrepreneurs' decision on who they choose to finance their business is relevant for its future outcome. Are out there VC investors which provide better odds to succeed? Does reputation matter? Based on these questions there were built three different reputation measures. One which measured reputation by the exit transactions each VC had made in the past. Other which only considered completed IPOs, once there are some who believe IPOs give more reputation to an investor than an acquisition. And finally, a measure which considered the past VC investments made by an investor.

During this work, we use three different methodologies, logit, multinomial logit and survival model, in order to provide a richer analysis. The results indicate the reputation of your lead investor matters if you look to grow a business. This is consistent with the three different reputation measures created. A portfolio firm backed by a reputable VC, not only has higher odds of success, but also of succeeding with a shorter holding period. Between IPOs and trade sales we find that reputable VCs have slightly higher odds to drive a portfolio company to an IPO.

Previous research also finds better quality firms have higher chances of successfully exit the VC stage. Portfolio firms' quality was proxied in two different ways. The results suggest firms which receive more financing rounds and higher amounts have a higher likelihood of completing an IPO or a trade sale. The multinomial logit framework doesn't show a significant difference in the quality of portfolio firms which make an IPO and a trade sale. In fact, it suggests these firms receive similar funds before an exit. This is a different result than what it was expected and different from research for American portfolio companies.

Finally, we find exit transactions can occur in moments when the economic market isn't performing well. This is a relevant result among trade sales, as suggested by the multinomial logit framework.

In order to verify if it is the VC reputation or the selection of better quality portfolio companies that drives more frequently these firms to a successful exit and to enrich this work further robustness checks would be needed. However, we may also think that better investments are chosen more often by reputable VCs.

So, if one looks to enter the entrepreneurial world, probably it is better if he doesn't stay too excited and worried about the money, but look for someone who really has the capacity to help his business grow and the ability to drive it to the top.

8. Appendix

Appendix 1 - Top 15 VC firms based on IPOs and trade sales reputation

The ranking presented on this table is based on the value of the exit transactions completed by a VC in comparison with the total value of exit transactions in the VC industry from 1997 to the end of 2016. Therefore, this ranking sorts VC investors by reputation at the beginning of 2017. The latest column tells us where these investors stood on the ranking in the beginning of 2010. The * means the VC investor didn't belong to the top 50 in 2010.

2017 Rank	Venture Capital firm	Country	REP (%)	2010 Rank
1	3i Group	UK	7.81	1
2	Mangrove Capital Partners	Lithuania	7.45	2
3	Sofinnova Partners	France	3.69	16
4	GIMV	Belgium	2.94	3
5	Technologie-Beteiligungs-Gesellschaft	Germany	2.82	*
6	Atlas Venture	Netherlands	2.57	5
7	London Venture Partners	UK	2.47	*
8	Vision Capital	Sweden	2.13	4
9	Novare Kapital	Sweden	1.87	6
10	Techno Venture Management	Germany	1.62	9
11	EEP Advisers	UK	1.44	*
12	Auriga Partners	France	1.44	*
13	Caja General de Ahorros	Spain	1.41	*
14	New Leaf Venture Partners	US	1.32	*
15	MVM	UK	1.24	*

Appendix 2 - Top 15 VC firms based on IPOs reputation

The ranking presented on this table is based on the value of the IPOs completed by a VC in comparison with the total value of IPOs completed by VC investors from 1997 to the end of 2016. Therefore, this ranking sorts VC investors by reputation at the beginning of 2017. The latest column tells us where these investors stood on the ranking in the beginning of 2010. The * means the VC investor didn't belong to the top 50 in 2010.

2017 Rank	Venture Capital firm	Country	IPO_REP (%)	2010 Rank
1	3i Group	UK	10.51	1
2	GIMV	Belgium	5.45	2
3	Inversiones Hemisferio	Spain	3.69	3
4	AGF Private Equity	France	3.62	34
5	Sofinnova Partners	France	3.58	9
6	Paribas Deelnemingen	Netherlands	3.38	*
7	Sunstone Capital	Denmark	2.95	*
8	Auriga Partners	France	2.63	18
9	Apax Partners Worldwide	UK	2.63	4
10	Dinamia Capital Privado	Spain	2.45	5
11	Truffle Capital	France	2.11	32
12	Petercam	Belgium	2.02	*
13	T-Venture Holding	Germany	1.95	6
14	Index Venture Management	UK	1.94	*
15	Capricorn Venture Partners	Belgium	1.92	7

Appendix 3 - Top 15 VC firms based on previous VC investments

The ranking presented on this table is based on the value of all financing rounds made by a VC in comparison with the total value of all financing rounds completed by VC investors from 1997 to the end of 2016. Therefore, this ranking sorts VC investors by reputation at the beginning of 2017. The latest column tells us where these investors stood on the ranking in the beginning of 2010. The * means the VC investor didn't belong to the top 50 in 2010.

2017 Rank	Venture Capital firm	Country	Investment share (%)	2010 Rank
1	3i Group	UK	6.94	1
2	GIMV	Belgium	1.45	2
3	Morgan Stanley Capital Partners	US	1.23	3
4	Atlas Venture	UK	1.21	5
5	Deutsche Bank	Germany	1.19	4
6	Sofinnova Partners	France	1.14	10
7	Techno Venture Management	Germany	1.13	6
8	Accel Management Company	US	1.05	*
9	Granville Baird Capital Partners	UK	1.01	7
10	Intel Capital Corporation	US	0.96	8
11	Auriga Partners	France	0.86	9
12	Amadeus Capital Partners	UK	0.86	11
13	Index Venture Management	UK	0.85	12
14	New Enterprise Associates	US	0.79	*
15	Industrifonden	Sweden	0.70	26

Appendix 4 - Other summary statistics

In the table are presented statistics on VC backed firms that received investment between 2005 and 2012. Successful exits include portfolio companies that made an IPO or a trade sale by November 17th, 2017. Unsuccessful exits include those companies that didn't exit by same date. Overall, there were analysed 192 successful events - 60 IPOs and 132 trade sales - and 2506 unsuccessful events. Panel A presents relevant data for successful exits, whereas Panel B does it for unsuccessful exits.

	Minimum	1 st Quartile	3 rd quartile	Maximum	Std Dev
<i>Panel A: Successful Exits</i>					
Portfolio company's quality					
N° of rounds in the first 5 years	1	1	2	5	0.82
N° of different VCs in the first 5 years	1	1	1	5	0.62
Total VC funding (€Million)	0.00	2.12	15.41	72.10	55.20
Exit market conditions					
N° of IPOs in the 3 months prior to the exit	19	60	98.5	296	37.66
N° of acquisitions in the 3 months prior to the exit	404	505	603	903	90.85
<i>Panel B: Unsuccessful Exits</i>					
Portfolio company's quality					
N° of rounds in the first 5 years	1	1	2	7	0.71
N° of different VCs in the first 5 years	1	1	1	10	0.65
Total VC funding (€Million)	0.00	0.62	4.5	360.00	14.30
Exit market conditions					
N° of IPOs in the 3 months prior to the exit	73.95	75.11	81.74	100.46	7.66

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