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# **The Impact of Venture Capital on Startup Performance**

A study on the Portuguese Market

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Dissertation

Master in Finance

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## **Bibliographic Note**

João Machado was born in Porto on January 21<sup>st</sup>, 1997. João was raised in Porto and lived there until finishing his bachelor's degree in 2015 at the University of Porto, when he accepted an internship in a consulting firm in Lisbon. After the internship, he received an offer to work in the M&A team of Grupo Golden, one of the largest financial groups in Portugal, and was the fastest analyst to be promoted in the M&A team.

In September 2020, during COVID-19, João decided to do the QTEM master's in finance at the University of Porto and Edhec Business School. Before finishing the Masters, João interned at Inter-Risco, a leading private equity in Porto. He then went to Lisbon and joined Norfin, Portugal's leading real estate investment manager, as Private Equity Senior Analyst. After learning with some of the best real estate and private equity professionals, João moved back to Porto and joined Youropa Group, where he works as an Investment Associate.

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## **Abstract**

In times when Venture Capital is growing as a source of financing for young companies in Portugal, it is important to understand whether the engagement of VC funds offers more than just a straightforward infusion of capital, serving as an added-value solution for both the companies themselves and the entrepreneurs involved.

As such, this dissertation seeks to investigate the influence of venture capital on a company's performance. It aims to uncover evidence suggesting that companies receiving this form of funding exhibit notably strong operational performance, particularly in growth, investment, profitability, and productivity, often surpassing industry norms.

## **Resumo**

Num período em que o Capital de Risco, em particular Venture Capital, está a crescer como uma fonte de financiamento para empresas jovens em Portugal, é importante compreender se o envolvimento de fundos de VC oferece mais do que apenas uma simples infusão de capital, servindo como uma solução de valor agregado tanto para as próprias empresas quanto para os empreendedores envolvidos.

Como tal, esta dissertação procura investigar a influência do capital de risco no desempenho de uma empresa. Ela visa descobrir evidências sugerindo que as empresas que recebem essa forma de financiamento exibem desempenho operacional notavelmente forte, especialmente em termos de crescimento, investimento, lucratividade e produtividade, frequentemente superando as normas da indústria.

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## **1. Introduction**

When economic stability is threatened by the rise of interest and inflation rates to levels not seen in the last 15 years, investors and companies look for better returns.

As such, alternative investments, such as Private Equity and Venture Capital, can be a good alternative for investors since they can obtain superior returns, but also for companies since they provide them access to financing that companies might not get otherwise, especially companies in a critical stage of their life such as startups or distressed companies.

In a country like Portugal, where the economy is constituted mainly by SMEs, according to CMVM, Private Equity and Venture Capital might have an even more important role. In the last couple of years, we have seen a rise in the number of transactions that fit into the Venture Capital category.

This thesis intends to not only study the impact of Venture Capital (VC) firms on startup performance in the Portuguese market by analysing the performance of portfolio companies against similar companies not backed by venture capital funds but also to update the existing literature on the subject. In this analysis, the variables studied focus on the company's operational performance, namely on the growth, productivity, profitability, and efficiency of the startups.

## **2. Literature Review**

### **2.1. VC definition**

While the terms private equity and venture capital are often associated, it is important to understand the difference between venture capital and private equity firms. The first focuses on young, high-growth companies, while the former focuses on more mature companies. Venture Capital (VC) can be seen as a tool for early-stage companies to finance their operations that otherwise would not be possible. These early-stage companies can be considered companies which have few resources, are innovative and operate in markets that change quickly. (Gompers, P., & Lerner, J. (2001).

The maturity of the company is also an important factor, particularly because young companies find more constraints when trying to get access to financing than more mature companies, hence the importance of venture capital firms in the success of startups (Binks & Ennew, 1996)

Venture capital financing is the most effective form of startup financing for innovation outcomes, despite other financing sources such as public markets and corporate financing also playing an important role. (Kerr & Nanda, 2017)

Ueda, M. (2004) emphasises that VC has characteristics that allow it to deal with these difficulties better than other financial intermediaries. Since they are entities specialised in project analysis, they do it more competently than banks, dealing better with the risk of asymmetric information and adverse selection. According to this author, VC funds accompany the companies in their portfolio by monitoring their investments while at the same time holding important control; VC deals better with moral hazard.

Amit et al. (1998) highlight the lack of historical data, information asymmetry, and the scarcity of tangible assets as contingencies characterising VC investment. These limitations prevent the risk of projects from being assessed according to the volatility of their historical cash flows, as there is also a high degree of uncertainty regarding future cash flows. The authors also point out that problems related to high information asymmetry are the main reason VC exists.



Also, Venture Capital funds can serve as a significant market signal. When investors face high research costs and limited information, entrepreneurs may be incentivised to offer lower-quality projects, prompting investors to allocate their capital elsewhere to investments with lower returns. However, financial intermediaries, acting as informed agents, can help to eliminate information asymmetry and provide everyone access to information. This enables investors to make informed decisions that lead to greater well-being. (Chan, 1983)

Gompers, P. and Lerner, J. (2001) also highlight the importance of the long maturity of funds committed to VC and their high-risk tolerance as two advantages compared to other financial intermediaries in financing this type of project. The authors also point out that the experience, know-how and reputation of VC companies in the evaluation and monitoring of this type of companies helps to create a contractual relationship between the parties that creates the necessary incentives to reduce the agency risk and facilitates the sale of companies either through IPO or through acquisition.

Venture capital firms are experienced investors whose partners possess in-depth industry expertise and, frequently, prior managerial background. Their unwavering dedication to achieving substantial returns over the medium term renders them engaged investors, as Bottazzi, Da Rin, and Hellmann (2007) indicated. Consequently, VC firms have the potential to influence portfolio companies' innovation strategies significantly, guiding them effectively toward achieving commercial success.

## **2.2. Venture Capital impact on startup growth**

According to both Berger and Udell (1998) and Gompers and Lerner (1999), there are three main reasons venture-backed companies outperform non-venture-backed companies: venture capital's pre-investment screening process, monitoring and value-adding. Gompers et al. (2020) found that venture capitalists (VCs) consider pre-investment screening and post-investment monitoring as the primary drivers of value creation.

Startups that receive venture capital are more likely to expand and become profitable and experience successful exits like initial public offerings (IPOs) or acquisitions. The authors also discover that the impact of venture capital on startup performance depends on the business's industry and the stage of funding at which it is obtained. (Wongsunwai & Kim., 2021) Other authors also found that Venture Capital has an important role in forming growth-oriented startups. (Fackler, T. A., & Nagler, M., 2019)

## **2.3. Venture Capital Investment Process**

### **2.3.1. Pre-Investment Screening Process**

The pre-investment screening process is crucial as it allows VC funds to identify areas where they can provide value through monitoring and support activities (Kaplan & Stromberg, 2001). These authors suggest that funds consider various factors, such as the attractiveness of the opportunity, including market size, strategy, technology, level of competition, management team, and agreement terms.

This is also by a more recent study that found that pre-investment screening can increase the likelihood of investment success by improving the selection of investment opportunities and reducing the risk of investing in poor-quality ventures. (Diaz-Garcia et al., 2017). During the selection process, VC fund managers carefully examine the start-up's business plans and contracts with entrepreneurs to minimize potential agency costs (Gompers, 1995).

According to Tyebjee and Bruno's (1984) findings, referrals from stakeholders within the VC community, such as banks and brokers, account for 65% of all initial contact between VC companies and potential investment opportunities. The authors also highlight the importance of VC firms themselves, who proactively seek out partners and form alliances, thus facilitating the exchange of information. Additionally, entrepreneurs may establish direct contact with VC firms or actively search for investment opportunities, making up the other two mechanisms for deal origination. This underscores the crucial role of networking in the VC industry.

Before investing in startups, VC firms do their due diligence to select the best projects to be invested in. The Due Diligence phase includes gathering information about the project and entrepreneur, performing risk analysis, and drafting the contract. In a comparative analysis of divestment in Portugal and Europe by Bentes, Cortês, Esperança, and Simões (1998), it was found that the most important source of information for venture capital firms is an interview with the promoters, followed by their Curriculum Vitae, balance sheet, and statements of forecast results. After gathering information, a detailed analysis is performed using a set of criteria, such as the experience of the promoters, expected return, market fit of the product/service, and intended disinvestment policy. At this stage, the exit method is given great importance, even before financing, as it is an essential factor in planning the

operation and must be defined before the venture capital company enters the subsidiary's capital.

According to Cumming and Macintosh (2001), the higher the information asymmetries, the lower the value buyers will be willing to pay for the participation since there is greater risk involved, and they may end up paying more than the real value of the business.

Other authors outlined five essential factors that determine investment attractiveness. These factors include the market's potential for growth, size, and accessibility to customers; the product's differentiation based on exclusivity, technical sophistication, patent protection, and market margin; the management team's capacity and expertise in marketing, management, finance, and personal references, the resistance to environmental threats, such as sensitivity to business cycles, technology life cycles, barriers to entry, and risk protection, and the potential to realise gains through future exit opportunities like acquisitions, mergers, or public offerings. Tyebjee and Bruno (1984)

### **2.3.2. Monitoring and Value-Adding**

VC funds play an active role in monitoring and controlling the companies in their portfolio, and their objective is to maximise the financial profitability of Limited Partners (LPs) (Metrick et al.; A., 2011). According to some studies, VC funds are distinguished from direct investments by investors because they possess advanced management skills. Literature also commonly mentions that VC funds have a more hands-on approach in companies, often overseeing their decision-making.

This proactive role has been an integral part of VC since its inception. As early as 1985, investors would visit their portfolio companies an average of 19 times a year (Gorman and Sahlman, 1989), incurring monitoring costs. Geographic proximity is also highlighted as an important factor for VC funds in some articles (Lerner, 1995; Chen et al., 2010; Cumming & Dai, 2017).

These studies showed that VC monitoring positively impacts the performance of startups, particularly when VCs are more actively involved in monitoring and have more experience in the industry. Specifically, they find that VCs who take a more hands-on approach to monitoring, such as attending board meetings and providing strategic guidance, are associated with better outcomes for their portfolio companies.

The impact of monitoring varies depending on the stage of the startup. Early-stage startups benefit more from monitoring than later-stage companies, as they are still developing their business models and strategies. (Bernstein et al., 2018)

This has important implications for both VCs and entrepreneurs, highlighting the importance of selecting VCs who can provide effective monitoring and guidance to their portfolio companies. VC monitoring is also important for aligning incentives between investors and founders. (Kaplan et al. 2016)

It is suggested that investors should have more representation on the board of directors during periods when close monitoring is required, given their crucial supervisory role (Lerner, 1995). In 14% of cases, the management team is formed before the investment. In comparison, 50% is formed after the investment, often leading to replacing the company's manager and adding experienced professionals to the team (Kaplan and Stromberg, 2001). The literature also highlights the importance of the agreements' structure between investors and entrepreneurs in facilitating and enabling investors to exercise greater control over the company's monitoring process (Kaplan and Stromberg, 2001; Gompers, 1995).

Besides the actual monitoring process, there are indications that companies with VC fund relationships tend to become more professionalised. This trend is observable in numerous prosperous companies in Silicon Valley, where the ideas of one or a few individuals have been transformed into contemporary and successful enterprises (Hellmann & Puri, 2000). The study reveals that one of the indications of professionalisation is the increased likelihood of external individuals assuming managerial roles, which can often result in the company's founder departing from their position. The authors contend that companies that receive venture capital are considerably more inclined to professionalise, as evidenced by examining their recruitment procedures, human resources policies, compensation methods (such as stock options), and the employment of specialised professionals (such as marketing or sales personnel).

Venture capital funds can serve as a significant market signal. When investors face high research costs and limited information, entrepreneurs may be incentivised to offer lower-quality projects, prompting investors to allocate their capital elsewhere to investments with lower returns. However, financial intermediaries, acting as informed agents, can help to eliminate information asymmetry and provide everyone access to information. This enables investors to make informed decisions that lead to greater well-being. (Chan, 1983)

### 2.3.3. Exit

Once VC funds invest in a company and make necessary changes, they aim to sell their share and generate profit to give back to the investors in the fund. There are five main methods for exiting a VC investment: (i) IPO, where a significant portion of the company's shares are sold on the market; (ii) acquisition, where a third party purchases the company through buying shares, merging, or buying assets; (iii) buyback, where the stake is sold back to the previous owners; (iv) secondary sale, where the company is sold to another VC fund; and (v) write-off, where the VC fund withdraws from the investment. The IPO is generally preferred for highly valued companies, while write-offs are a preferred exit strategy for lower-value companies (Cumming and MacIntosh, 2003).

The optimal exit strategy depends on various factors, including the startup's growth potential, the probability of a successful exit, and the investment horizon of the venture capital firm (Nishihara & Shibata, 2015), as well as the tax regime. (Chen, J., & Li, K., 2020). When examined the impact of different exit strategies on the value creation of venture capital-backed firms. The authors found that an IPO exit strategy creates more value for the venture capital firm than an acquisition exit strategy, as startups that go public tend to have higher valuations and better long-term performance. (Kim, S., Lee, S., & Lee, S., 2017) Additionally, they found that longer investment horizons are associated with higher valuations. (Kaminski and Reardon, 2017)

In comparison, while there are many similarities between exits in the US and Europe, there are also significant differences. These include differences in the length of the exit phase, the utilisation of convertible bonds, and the replacement of management teams (Schwienbacher, 2005). Moreover, research indicates that the greater control rights held by VC funds, the higher the likelihood that the exit will be made through acquisition instead of write-off or IPO. When considering the relationship between contracts and exit choices, using convertible bonds in Europe makes acquisitions more probable and IPOs less likely (Cumming, 2008).

Since the reputation of VC funds is an important factor considered in their investment and exit strategies, various measures, such as the age of the fund, total investment amount, and number of investment stages, are used to determine their reputation. Companies that receive funding from highly reputable VC funds are more likely to have successful exits and gain access to financial markets at a faster pace (Nahata, 2008).

Thus, new VC funds tend to place their shares in the markets earlier than established ones to create a reputation and, in this way, attract more investors (Gompers, 1996).

#### **2.4. The Impact of Venture Capital Firms in Portugal**

Unlike countries like the United Kingdom and the United States, Portugal (like most other countries in Continental Europe) has a relatively recent history of investment in private equity (PE). This activity only began to gain significance in 2001 (Domingos, 2010).

Venture capital investment positively impacts the growth and survival of startups in Portugal. Venture-backed startups tend to have higher employment and sales growth levels than non-venture-backed startups. The characteristics of venture capital-backed startups in Portugal differ from those of non-venture-backed startups, with venture-backed startups being larger, younger, and more likely to be in the technology and life sciences sectors.

Besides that, the determinants of venture capital investment in Portugal typically include the quality of the management team, the stage of development of the startup, and the size of the investment opportunity. (Coelho, Luís & Ferreira, Ana, 2018)

Also, venture capital firms in Portugal tend to focus on later-stage investments in established companies rather than early-stage investments in startups. This may limit the availability of venture capital funding for early-stage startups in Portugal. (Lourenço, D. R., & Rodrigues, M. A., 2020) Studies also found that the relatively small size of the Portuguese venture capital market, with a large portion of investments concentrated in a few VC players, and the lack of both a strong startup ecosystem and skilled human capital are the major challenges that the Portuguese venture capital industry must overcome. (Pereira, P. J., & Teixeira, A. A. C., 2017; Lourenço, D. R., & Rodrigues, M. A., 2020)

However, the authors suggest that recent initiatives by the Portuguese government and private sector actors to support entrepreneurship and innovation are promising signs for the future of the venture capital industry in Portugal. (Lourenço, D. R., & Rodrigues, M. A., 2020; Coelho, Luís & Ferreira, Ana, 2018; Pereira, P. J., & Teixeira, A. A. C., 2017)

In fact, according to CMVM, in 2021, assets under management and investment made directly into the Private Equity & Venture Capital (PE & VC) Companies' (SCR) own portfolio increased by 188 million euros (66%) to 472 million euros, while assets under management in the national PE & VC sector increased by 32% compared to 2020, to around 7.5 billion euros.

Also, according to the CMVM 2021 report on Venture Capital and Private Equity, the significant increase in the number of venture capital companies operating in the national market in such a short time horizon fuels a strong demand for human resources with adequate experience and knowledge for the exercise of regulated venture capital activity. In an industry that is still growing, this evolution generates the need to prevent situations that may lead to increased risks for the entities' internal governance models. It is important to foster an organisational culture of compliance among the problems that are intended to prevent the potential emergence of weak organisational structures given the volume of activity of the entity or the concentration of functions in a reduced number of key people of the company, without safeguarding a minimum segregation of responsibilities, particularly in roles with potentially conflicting interests.

### **3. Impact of Venture Capital on the Portuguese Startups**

This section presents the empirical work and the main conclusions regarding the impact of VC on supported companies in Portugal. A sample of 43 companies was selected, each referring to a transaction in a national territory involving a VC specialist player. Firstly, it explains the main criteria used in defining the sample and presents the characteristics of the companies supported by VC funds in Portugal. Afterwards, it demonstrates the methodology adopted and the main indicators used to compare both groups (companies that received investments and companies that did not). Finally, the results regarding the impact of VC on Portuguese companies, the central objective of this dissertation, are presented, specifically at the level of growth, capital structure, productivity, profitability and efficiency.

#### **3.1. Sample**

To obtain a sample of companies that were subject to transactions involving Venture Capital funds in Portugal, it was used Orbis M&A, which aggregates information about transactions at the global level of various companies and investors. The criteria used for the selection of the sample was the following: the investment had to be made in Portugal, the deal status selected was completed and confirmed, and lastly the type of company selected was startups. This led us to a sample of 200 transactions that occurred between August 2013 and November 2022.

After selecting this sample, the SABI and Amadeus databases provided by Bureau Van Dijk were used to obtain the accounting information for each company that received

the investment, while the data regarding the sector activity was obtained through the Bank of Portugal's database. Companies that did not have accounting information for the year before or after the transaction occurred were excluded from the sample, if such information was not available in the mentioned databases. As a result, 157 companies were excluded from the sample. The remaining 43 companies constitute the final sample of this dissertation. It is important to note that for some years, not all relevant information was available, and therefore, the sample size may be occasionally reduced to draw certain conclusions.

### 3.2. Methodology

In order to understand the impact of such transactions and related support on the growth of companies, two variables were analyzed from the year prior to the VC investment (n-1) up to two years after that investment (n+2). Therefore, the total asset value and the turnover value, which are key metrics in a startup's valuation, were considered.

On the other hand, to assess the impact of venture capital on the capital structure of the supported companies, an analysis was performed using the financial autonomy ratio (shareholders equity/total assets). As a proxy for operational performance, three indicators were used, namely: (i) EBITDA margin, as a measure of profitability, (ii) return on assets, as a measure of productivity, and (iii) asset turnover, as a measure of efficiency, as in other studies.

To compare the results in both groups, it was used as a reference, the year before the investment, since all the companies selected were already in operation at least a year before the investment was done. Thus, the evolution of operational performance is measured according to the formula  $(X_i^{n+t} - X_i^{n-1}) / X_i^{n-1}$ , where  $i$  symbolizes the company,  $n$  is the year of the operation, and  $t$  is the number of years after the operation. This formula will be used to calculate the performance in both groups, the one that received the investment and the sector group.

The sector group (group control) was gathered through the Bank of Portugal database, and the selection criteria used took into consideration the sector of the company (considering the Rev.3 CAE of each company) and the size of the company. According to the European Commission, companies with 10 people or less and revenues less than 2 million euros are considered micro companies, whereas companies with more than 10 and less than 50 employees and revenues between 2 and 10 million euros are considered small companies. As such, if the company that received the investment is considered a micro



company according to these definitions, the data used for the group control was for the micro companies in that sector. If the company that received the investment was considered a small company, the data considered for the sector group was based on small companies in that sector.

Furthermore, the Wilcoxon test was then performed between these two groups, in order to understand if the difference in the growth rates in these two groups is statically different for a level of significance of 5%.

### 3.3. Sample Summary Information

As shown in Table 1, despite the dispersion among the years considered in the sample, transactions occurred the most in 2019 and 2015, that is, after the financial crisis in Portugal between 2011 to 2013.

Table 1: Distribution of the number of operations per year

Year	Transactions
2019	14
2018	3
2017	3
2016	3
2015	10
2014	6
2013	4
Total	43

Table 2 presents information at the sector level, highlighting the importance of the tertiary sector over the secondary and primary sectors, particularly sectors related with technology, since computer programming activities, web portals and computer consultancy activities are around 40% of the total transactions.

Table 2: Distribution of the number of operations per sector

Sector	Transactions	Percentage
Computer programming activities	10	23,3%
Web portals	4	9,3%
Research and experimental development on biotechnology, natural sciences and engineering	4	9,3%
Computer consultancy activities	3	7,0%
Business and other management consultancy activities	2	4,7%
Retail sale via mail order houses or via Internet	2	4,7%
Others	18	41,9%
Total	43	100%

Table 3 presents the characteristics of the companies that make up the sample in the year in which the investment was made (n). It is observed that the Portuguese VC funds target small-sized companies, with an average (median) total asset of 1.8 million euros (0.5 million euros). Although there are outliers that, given the size of the sample, influence the mean, it is evident that investments are made in companies with a small number of employees, low turnover volume, and whose operational results (EBITDA) are reduced or negative, which is in line with international literature on the subject, as well as the specific characteristics of this type of investment.

Table 3 Characteristics of the companies in the sample

Variables	Average	Median	Standard Deviation	N° Observations
Total Assets	1 812 748	552 508	3 678 040	43
Shareholder Equity	991 983	367 606	1 916 690	43
Turnover	1 231 561	264 527	2 593 509	43
EBITDA	-176 656	-112 564	1 006 293	43
Employees	24	7	48	43

\*units in euros

### 3.4. Growth

To assess the influence on the growth and scale of the companies backed by venture capital funds this section will seek to analyze the evolution of key accounting indicators, namely (i) the total assets value and (ii) the turnover value.

When analyzing the growth of the companies in both groups, this study compares the two variables total assets and total turnover. When looking at both the total assets and turnover growth rates it becomes evident that the companies that received the investment from Venture Capital firms have higher growth rates. In the case of the variable “total assets”, the median growth rate in companies that received investments in the year n, the investment grew 215% while the companies that didn’t receive the investment decreased the turnover by 3%. These results are statistically significant for a level of significance of 5%. The same is true for the following years, with increases of 189% and 232% for companies that received the investment and a decrease of 4% in the year after the transaction and an increase of 2% two years later for companies that didn’t receive the investment. These results are also statistically significant for a level of 5%. In the case of the turnover, the median growth rate in companies that received investments, in the year n, the investment grew 91% compared to n-1, while the companies that didn’t receive the investment didn’t grow. The same is true for the following years, with increases of 174% and 255% for companies that received investments, and the companies without investments had no growth in the year n+1 and grew 2% in the year n+2%.

The results found for the total assets and turnover are in accordance with the literature, and they make sense since companies that receive investments have more capital available to invest in marketing and assets that will increase their capacity to sell and produce more. These results are statistically significant for a level of 5%.

Table 4: Changes in growth variables in companies after the investment

Investment timeline	n-1...n	n-1...n+1	n-1...n+2
<b>A. Total Assets</b>			
Change % (Sample median)	215*	189*	232*
Sample Amount	43	43	43
Change % (Sector median)	-3*	-4*	2*
Sample Amount	40	40	40
<b>B. Turnover</b>			
Change % (Sample median)	91*	174%*	255*
Sample Amount	43	43	43
Change % (Sector median)	0*	0*	2*
Sample Amount	40	40	40

\*the samples are statistically different for a level of significance of 5%

### 3.5. Capital Structure

At the capital structure level, it was analyzed the financial autonomy ratio (ratio between shareholders equity and total assets), and from the analysis of Table 5, it is observed that there is an increase of 3% in financial autonomy in the year of the operation for the companies that received investments followed by decreases in the following years, which makes sense since the investment will increase the shareholders equity and in the following years they will look for other financing alternatives, although this results are not statically relevant for the year of the investment,  $n$ , and the first year after the investment,  $n+1$ , for a level of significance of 5%. When analyzing the data for the year  $n+2$ , it is observed that there is a reduction in the financial autonomy ratio of 91% in the companies that received the investment, which means that they used more debt as a financing alternative and an increase of 225.9% in the companies that didn't receive investments. In the year  $n+2$ , the results were found statistically significant for a level of 5%.

The fact that the results in the first two years were not statistically significant for a level of 5% can be justified because of the size of the sample that is too small and the existence of many companies in the sample with a negative EBITDA, which is also a characteristic of these types of companies.

Table 5: Changes in the capital structure in companies after the investment

Investment timeline	$n-1...n$	$n-1...n+1$	$n-1...n+2$
<b>C. Financial autonomy</b>			
Change % (Sample median)	3	-88	-91*
Sample Amount	43	43	43
Change % (Sector median)	6	6	225,9*
Sample Amount	40	40	40

\*the samples are statistically different for a level of significance of 5%

### 3.6. Profitability

According to Table 6, it can be observed that profitability, measured by the EBITDA margin (EBITDA/ Turnover), shows a decrease of 5 percentual points in the year of the investment for the companies that received an investment, followed by decreases of 35 and 3 percentual points in the following two years. In the case of the sector companies, it is not

observed a specific trend. Nevertheless, these results are not statistically significant for a level of significance of 5%. So according to the results and against the literature, there is no difference between the companies that receive investments from VC funds and companies that did not receive on the profitability level. These results might be justified for the small size of the sample and for the significant amount of negative EBITDA values observed in the companies that are part of the sample.

Table 6: Changes in the Profitability variables in the companies after the investment

Investment timeline	n-1...n	n-1...n+1	n-1...n+2
<b>D. EBITDA / Turnover</b>			
Change p.p (Sample median)	-5	-35	-3
Sample Amount	43	43	43
Change p.p (Sector median)	0	1	2
Sample Amount	40	40	40

### 3.7. Productivity

Table 7 illustrates the progression of asset profitability (EBITDA/total assets). This metric serves as a stand-in for productivity, and its examination seeks to assess the company's capability to generate cash flows from its assets. It is observed that the companies that received the investment had a negative variation, in percentual points, during all the years following the investment. Once again, this result is not expected but can be justified for the size of the sample and for the negative EBITDA values that affect these results hence the units are in percentual points instead of percentage like in the other metrics. In this case, the difference between the two groups, the sample group and the sector group, is not statistically significant for an error of 5%.

Table 7: Changes in the productivity variables in the companies after the investment

Investment timeline	n-1...n	n-1...n+1	n-1...n+2
<b>E. EBITDA / Total Assets</b>			
Change p.p (Sample median)	-3	-16	-5
Sample Amount	43	43	43
Change p.p (Sector median)	0	1	2
Sample Amount	40	40	40

### 3.8. Efficiency

Table 8 displays the changes in asset turnover (the ratio between revenue and total assets) over time. It is verified that the companies that received investments have a decrease in this ratio in the years  $n$  and  $n+1$ , 16% and 22%, respectively, since total assets increased more than turnover. In the sector sample, the trend is not clear. Nevertheless, according to these results, the difference between samples is not statistically relevant for a level of significance of 5%.

Table 8: Changes in the efficiency variables in the companies after the investment

Investment timeline	<b>n-1...n</b>	<b>n-1...n+1</b>	<b>n-1...n+2</b>
<b>F. Turnover / Total Assets</b>			
Change % (Sample median)	-16	-22	8
Sample Amount	43	43	43
Change % (Sector median)	-2	0	-2
Sample Amount	40	40	40

## 4. Conclusion

This dissertation focused on the impact of venture capital investments on startup performance, aiming to understand if the investments by venture capital firms are just a cash injection in the company or if the investment has a more profound impact on the startup performance at the operational level such as on their growth, capital structure, profitability, productivity and efficiency. Previous studies are consistent with the idea that startups backed by venture capital funds outperform similar companies that these funds do not back.

Despite the literature's previous results, in this study, it was only found that both revenues and total assets from companies that received investments grew significantly more than those of the companies that did not receive any investment, for a level of significance of 5%. These results are in accordance with the strategy of most VC funds that are focused on increasing revenues as the main strategy.

This study showed that in Portugal, most VC investments were done in the tertiary sector, particularly in the technology sector. Besides that, it was observed that the Portuguese VC funds target mainly micro companies with a median turnover of 264 527 euros.

Also, it is important to mention the limitations of this study, which are mainly due to the lack of publicly available data that resulted in a very small sample which limits the study's conclusions and their statistical significance. Moreover, it is also relevant to notice that these companies, due to their very small size and their lifecycle, typically present negative EBITDA, which then affects the results of the metrics that use EBITDA, namely the productivity ( $EBITDA/Total\ Assets$ ) and profitability ( $EBITDA/Turnover$ ) variables.

Finally, I would also like to suggest for future research some interesting topics related to Venture Capital, namely studying the performance between public and private venture capital funds in the Portuguese market as well as studying the impact of VC funds in the Portuguese market over a longer period to have a more robust sample and also to understand if the impact is similar over the years.

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## Appendix

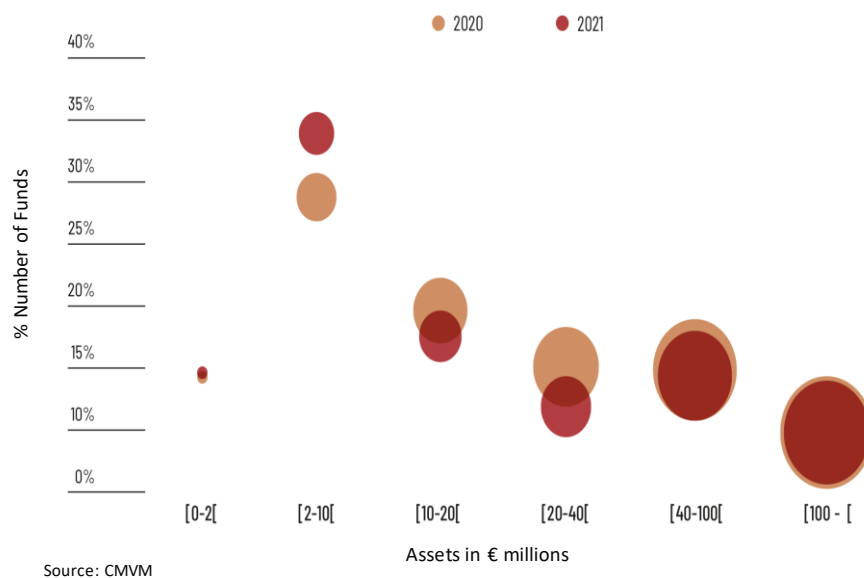


Figure 1: Growth in the number of Funds and Funds size in the Portuguese Market