ERASMUS UNIVERSITY ROTTERDAM

Erasmus School of Economics

Bachelor Thesis International Economics and Business Economics

VC investment and business creation in Europe

Abstract:

By means of a similar difference-in-differences model the paper shows that a shock in venture capital investment has a positive effect on the rate of new entries. The analysis makes use of a comprehensive database from OECD and Eurostat of 20 European countries over the period from 2010 to 2019. By controlling for country and yearly effects, GDP growth and interest rate, and the total number of existent firms, high volume investments in the VC sector over a short period of time increases new business creation.

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Introduction

Entrepreneurship And Economic Growth

The renowned economist Schumpeter was the first to recognize the role of entrepreneurship and innovation as a driver of economic growth. His early theories see the entrepreneurial activity as the engine that makes the capitalist reality dynamic. It is not just competition, as modelled by previous economists, that move the economy upward, but competition for the “new” market, “new” technologies. Any of what he would call “new combination” would bring change to an established equilibrium. He refers not just to new products or technologies but to new types of organizations, innovative use of human capital, new systems for decision making, ability to exploit opportunities. Anything that could give an advantage. Again, in his first works “entrepreneurial activity was seen as a third factor of production, next to labour and land”. (Hagedoorn, 1996; Ziemnowicz, 1942)

Even though his theories were exceeded, the role of innovation has been revamped in more recent research. The Austrian economist did not go too far from reality correlating entrepreneurial activity and economic growth. In an extensive study by Raynold & Curting (2010) new enterprises are the major source of job creation. New enterprises contribute to the economic growth of the market sector and region they operate. This theory is supported also by Cameron (1996). Spill over effects of small and new domestic enterprises are much more significant for the economic growth than international technology spill overs. Technology and innovation do not influence the whole economy simultaneously and exogenously as in the Neo-classical theories. Actually, the effects of entrepreneurial activity and innovation are to be seen regionally and can be influenced by internal policies. Entrepreneurship is therefore a “regional event” (Sternberg & Wennekers, 2005) that must be contextualized in an environment subject to different policies, cultures, education level and other factors. In the paper by Sternberg & Wennekers (2005) The positive effect on economic growth of entrepreneurship is strong

in highly developed countries. Thus, the research advises policymakers to promote these regional entrepreneurship clusters by favouring knowledge transfer, patent protection and a developed venture capital market. Moreover, the biggest drivers of economic growth are those ventures with high growth possibilities (high scalability) and opportunity ventures, or businesses that try to exploit a potential opportunity. The largest proportion of new businesses does not necessarily involve this type of enterprises, as 95% of new ventures represent minor changes to similar existing businesses. To cite Raynold & Curtin (2010) "Most new restaurants are very similar to existing restaurants". Still, as it is very difficult to adjust policies for the creation of these "gazelles", the research stresses the effect on economic growth of a sustained regional entrepreneurship environment.

The role of entrepreneurial activity and innovation is crucial for national long-term growth (Gregoriou et al, 2007), yet is difficult to design policies adapt to regional context. The most natural contributor to business creation and innovation is a developed venture capital market.

Venture Capital And Entrepreneurial Activity

Reasonably, business creation and growth should be positively influenced by the financial development of a country. (Guiso et al., 2004) Nevertheless, even in the more financially developed countries other factors can be detrimental for small enterprises. Beck et al. (2005) shows that access to banks financing it's not easy for SMEs because of high uncertainty, information asymmetry, and agency costs. Banks corruption (the need of special connections with banks), high level of bureaucracy and other financing access constraints, such as collateral requirements and fixed interest rates, are barriers that influence small firms more significantly than others and may arise also in countries with high level of financial development. Moreover, Ryan et al (2014) and Core (2020) shows that high bank market power damages new business creation and growth and the development of venture capital industry.

Compared to banks, the venture capital market offers easier solutions of financing for SMEs. Venture capitalists specialize in businesses diversification, screening, staged financing and team valuation. These strategies allow safer financing rounds to early-stage enterprises and innovation-based businesses which are unfeasible otherwise. Literature shows that Venture Capital positively influences new business entries. Mollica and Zingales (2007) shows that in the U.S. an increase in VC investments leads to an increase in business creation with a proportion of almost 4 to 1. The paper also shows that VC foster mostly business that innovate, using patents as a proxy. Accordingly, the most innovative businesses are the one that have the biggest spill over effects on the economy. (Sternberg & Wennekers, 2005)

Popov & Roosenboom (2013) studies the effect of VC on new business creation in Europe. In the introduction the paper identifies the mechanisms under which VC influences business creation. The role of VC does not involve just the direct effect of easier access to finance for SMEs. Venture capitalists contribute to a business environment that is fertile for a sustained creation of new enterprises.

Bhide (1994) shows that the majority of entrepreneurs founded their start-ups by using knowledge acquired in previous employment. Venture capital gives these new entrepreneurs better expectations to find the financing needed. That is, as employees are exposed to financial access of VC funds, they are more motivated to develop new business ideas and exert more effort within the company. According to Sevilir (2010) this process is modelled considering that general human capital causes the creation of new firms. As venture capital financing becomes available, the firm is willing to invest in general human capital triggering the creation of employee-founded and venture capital-backed new firms. Additionally, publicly traded firms are also more likely to develop other business ideas and start-ups when exposed to active VC environment (Gompers et al, 2005). According to Martin et al (2005), given its uniqueness and the risk exposure thereafter, venture capital activity shows a proximity effect. The funding rounds mostly focus on businesses closely located the VC fund. This creates a regional concentration of VC and start-ups, hubs of entrepreneurial activity, that inevitably influences other firms

within the region. This is the case of San Francisco, London, Berlin. The high level of entrepreneurial activity, the exposure to a network of new entrepreneurs and venture capitalists makes almost spontaneous the formation of new businesses. Finally, Venture capitalists directly monitor and assist new entrepreneurs. Hellmann & Puri (2000) shows that in the Silicon Valley being backed by VC meant faster pace of business development and market placement compared to not being assisted by Venture capitalists. Additionally, venture capitalists contribute to faster professionalization of firms, by bringing external human capital to exert control and monitor the firm development. (Hellmann & Puri, 2002)

Thus, venture capital is supposed stimulate entrepreneurial activity to a large extent. Even so, the factors that influence new business creation are multiple and it is not easy to derive statistically a causal relationship between venture capital development and new entries.

Research Methodology

This paper wants to address the effect of Venture capital investment volume on the creation of new firms in Europe. For new firms it is intended the registration of de novo enterprises to reflect the role of entrepreneurial activity. The data are incorporated from the Eurostat and OECD dataset to compare total invested venture capital volume and the total number of entries (as well as other variables of interest) for 25 European countries from 2010 to 2019. The time span reflects the business cycle that started after the 2008 crisis and ended before the economic impact of the Covid19 crisis. Subsequently, given the data availability, I will implement a panel data approach to eliminate the effect of time-invariant country level variables that are not accounted for. As shown in the introduction, entrepreneurship is subject to many regional factors that cannot be easily isolated, and a fixed effect model will help to account for those.

The research question has high social relevance. Venture capital is a sector that is still under development in many European countries. In the U.S. there is evidence on the positive effect of VC on entrepreneurial activity. If the same effect is expected in the

European environment, policymakers should consider attentively the consequences of a developed venture capital sector. The literature review exposed that long term economic growth is correlated with entrepreneurial activity.

Literature already infers a casual effect between VC investments and new entries in Europe as in the case of Popov & Roosenboom (2013). Still, the paper takes in consideration the years from 1998 to 2008. The venture capital market changed its magnitude significantly after the 2008 crisis, especially from 2017 to 2021 where the total value of VC deals doubled. (KPMG, 2022) Moreover, as the sector develops in time, venture capitalists are expected to become more efficient due to knowledge, professionalization and development of financing strategies. This paper will make different controls and use of instrumental variables, as well as different data and analysis.

Data

The data of new entries are retrieved from Business Demography dataset by Eurostat containing new enterprise entries per employees, industry and country from 2010 to 2019. New entries are drawn from business registers, and some countries integrate other sources to have more precise data for employment and turnover. The dataset comprehends also indicators of survival rate of firms created in the previous n- year. The industries are divided by NACE denomination, with two levels of specification. For the sake of our research, we will consider the total number of businesses as denominated with [B-S_X_K642] or the activity of Industry, construction and services except insurance activities of holding companies. For holding companies, it is intended an organization that owns a controlling interest in other companies, and for this reason they are excluded from our sample.

The employees ranges comprehend 4 class size of 0, 1 to 4, 5 to 9 and >10 employees.

Our other variable of interest for the analysis is the total venture capital investment in a given country. Data are retrieved from the OECD dataset of Timely Indicators for Entrepreneurship and comprehend 2 countries for the years 2010 to 2019. The total

amount is expressed both in millions of US dollars and as a share of GDP and it is broken down by investment in seed, start and later stage firms. There are no harmonised definitions of venture capital stages across venture capital associations and other data providers. The original data have been re-aggregated to fit the OECD classification of venture capital by three stages.

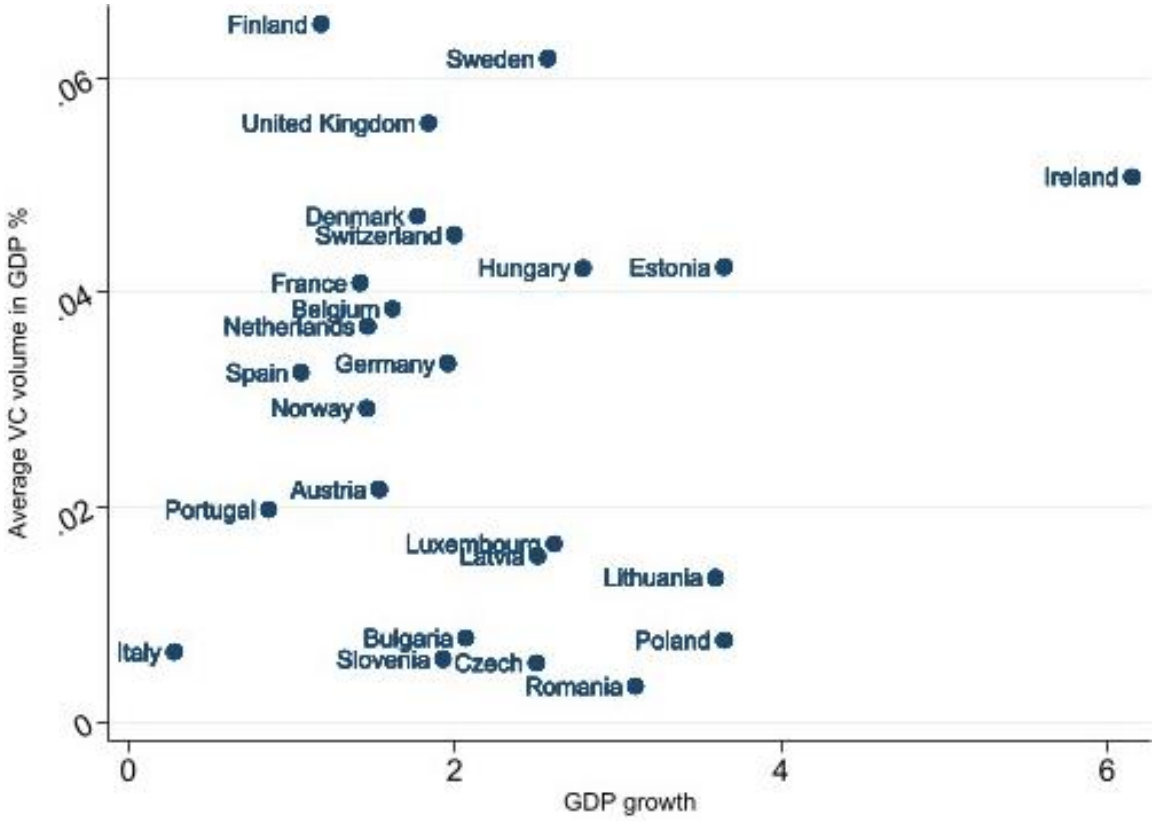
Moreover, we are interested to check the effect of interest rates of loans to SME. Weighted-average interest rate to small and medium enterprises are retrieved from the dataset Financing SMEs and Entrepreneurs: An OECD Scoreboard. The average comprehends business loans and bills outstanding of banks and non-bank financial institutions to firms with a small turnover (50 million).

Finally, I retrieved data of total investments in pension funds from the OECD dataset Pension Statistics for 24 countries from the years 2010 to 2019. Data are measured in millions of USD.

Descriptive Statistics

Figure 1.1

VC volume and GDP growth



Note: The scatterplot displays the average values in percentage from 2010 to 2019 of GDP growth and VC investments as percentage of GDP. Data are retrieved from the OECD database for VC investments and from Eurostat for GDP values.

Data on the volume of Venture capital invested and GDP growth and are presented in Figure 1.1. The scatterplot presents the volume as a % of GDP. Some countries radically have a higher percentage of GDP that comes from VC investments compared to other countries. We could distinguish countries with a developed VC sector with more than 0.015% of GDP such as United Kingdom (0.056%) and Finland (0.065%) from countries in which the VC industry is still under development such as Romania (0.003%) and Italy (0.006%). This distinction will be used for further analysis. The scatterplot suggests a positive correlation between average GDP growth and Venture capital investment from 2010 to 2019.

The summary of the Eurostat database (Table 1.4 and 1.5 in the appendix) shows significant variation across countries. In particular, countries as Latvia, Lithuania and Portugal can be considered as high-entries countries, with Lithuania with more than 21.7% of business creation rate. These rates are almost double the one of the small-entries countries such as Ireland, Italy and Belgium, with Belgium being the lowest with 6.2% of entries ratio. Unfortunately, data on entries of Greece and Poland are not available. The total average of business creation rate for this sample is significantly bigger compared to the previous business cycle from 1998 to 2008 from 7.89% to 10.7% (Popov & Roosenboom, 2013).

Table 1.1

Entries and GDP growth averages per year

Year	Total entries	Entries/total firms	GDP growth	Interest SME
2010	119274.24	0.110	1.981	4.255
2011	122798.19	0.115	2.090	4.708
2012	119749.00	0.109	0.171	4.403
2013	114461.94	0.108	0.733	3.986
2014	123402.22	0.111	2.305	3.672
2015	118940.68	0.107	3.519	3.229
2016	125853.32	0.107	2.419	2.919
2017	125730.58	0.106	3.429	2.711
2018	137255.83	0.107	3.090	2.797
2019	137328.44	0.109	2.643	2.815

Note: For each country, the table presents across country averages of entries, entries ratio, GDP growth and interest rates averages to SMEs for the years 2010 to 2019. The entries ratio is calculated by dividing the total number of entries by the total number of existing firms. Business is considered as [B-S_X_K642] by NACE denomination. The sample considers the year from 2010 to 2019. Data on weighted average interest rates to SMEs are taken from the OECD database while the rest comes from Eurostat dataset. Because this last dataset does not include Romania, Sweden, Norway and Bulgaria, the table descriptive statistics are depicted only for the remaining countries.

Table 1.1 provides a time dimension perspective to the total number of entries across European countries. Clearly, from 2016 to 2019 we see an average increase in the total

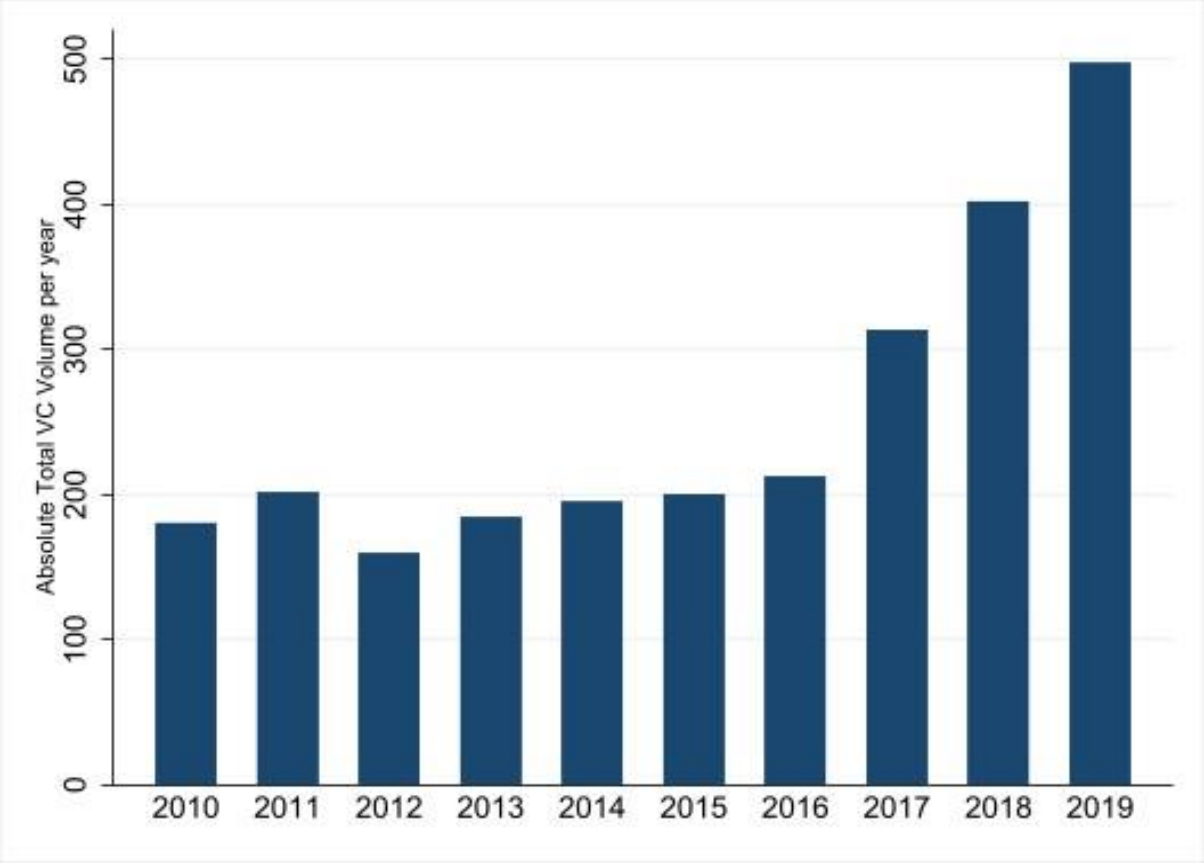
number of entries, especially in the last two years. The second column identifies the ratio of the total number of entries over the total number of existent firms. The ratio is meant to represent an index for new business creation. Even if average total entries increased in the last four years, the index for new business creation does not change significantly.

European countries experience a rapid increase in GDP growth from 2014 onward maintaining an average of around 3%. This is significant as positive indexes in the economy are expected to influence new business entries as consequence of an increased trust in the economy. GDP growth varies within European countries (Figure 1.1) (Mazurek, 2013).

The average rate of interest to small enterprises follows a downward trend. In an almost linear fashion, the value drops from 4.25% to 2.8%. This trend could correlate with an increase in the average number of total entries. Ideally, as interest rates drop, favourable credit conditions prompt business creation. This suggests that the control variable of interest rates can take out significant effects.

Figure 1.2

Across-country average VC investment per year



Note: The bar chart presents across-country averages for VC investment for the years 2010 to 2019. Data are retrieved from the OECD database.

Data on the total VC investments over time are displayed in Figure 1.2 The graph is meant to underline the increasing trend of VC investment in the most recent years (2016-2019). The sample only ends in 2019 but during 2020 and 2021 we know for a fact that the volume of deals value almost doubled from 2019. (KPMG, 2022) The trend is currently (2022) reversed because of the downward trend of the overall economy (Covid19 crisis, war in Ukraine and inflation rate). Looking at the graph 2.2 in the appendix we can add that most of the increase happened for investments in later and start stage firms. Interestingly, the increase in VC investment both as % of GDP (Table 2) and in absolute terms correspond with the increase in total number of entries during the years 2016 – 2019. Nevertheless, we would expect a correlation of lagged VC investment with entries.

Methodology

The model will be described by the following equation:

$$Entries_{cy} = \alpha_0 + \beta 1 VCvolume + \beta 2 Mcountries + \beta 3 Myears + \beta 4 iSMEs$$

Where Entries identifies the absolute number of new entries for a given country c in the year y. B_1 will reflect the effect of venture capital investment on entries. I will be using lagged averages of total VC investment for the prior 3 years to mimic the time it takes for the investment to produce the output. The coefficient is expected to be positive as Venture capital investment should influence positively business creation. The coefficient β_2 will account the effect of the matrix Mcountries to absorb time invariant variables that influences business creation within each country. The same is true for β_3 and Myears but, in turn, it will be a set of dummy variables that absorb the business cycle trends. Finally, β_4 will capture the effect (negative) of interest rates to small and medium enterprises.

Inevitably, for the way it is constructed, the model allows for endogeneity problems. There could be a significant number of variables that influence both the creation of new firms and the volume in venture capital investment. Nonetheless, by using a lagged average of Venture capital investment 3-years antecedent the synchronicity of an endogeneity effect is partially taken out. This also reflects the actual time that the process of firm creation entails. Still, this smoothing process is not enough, some effects that influence entrepreneurial opportunities can apply to longer periods. Therefore, literature suggests the use of an instrumental variable to further get rid of this issue. A valid candidate is an indicator that represents the level of institutional investments. An increase in institutional investment (such as pension funds) should not influence new entries directly (exclusion restriction) but, in turn it should signal an increase in total venture capital investments. Naturally, other effect could influence simultaneously entries and institutional investments as, for example, trust in the economy. Nonetheless I consider will assume the exclusion restriction to be valid as it should partially absorb the endogeneity issue. To this account I will consider the total investments of pension

funds as a valid instrumental variable. Data on the total investments are retrieved from the OECD pension database.

Moreover, this paper will control for additional variables. Data on the interest rate to SMEs are retrieved from OECD database. A higher level of interest rates should influence negatively the creation of new firms. GDP growth is another variable that can control for the creation of new firms, assuming that GDP growth is not significantly influenced by the total volume invested in venture capital.

The model will initially make use of GDP growth and Interest rate to SME in percentage value, which should not be compared with the absolute total values of VC investments and entries. Given that the model is using fixed effect, we are interested in the effect within countries. By this means, as we are already taking out the absolute size of the country, and GDP growth and Interest rates to SME are thus valid within the model.

Results

The result section I will report the output of the main model together with other results. We will correct for endogeneity the VC series and perform other tests.

Table 2

Venture capital and business creation

	(1)	(2)	(3)	(4)
VARIABLES	Model 1	Model 2	Model 3	Model 4
Total absolute entries				
Lagged average VC volume	197.3***	199.1***	199.7***	200.9***
	(21.99)	(21.99)	(21.81)	(21.85)
GDP growth		1,101		883.5
		(904.6)		(907.9)
Interest SME			-5,117*	-4,690

			(2,899)	(2,933)
Constant	77,369***	76,037***	97,175***	94,452***
	(5,460)	(5,556)	(12,456)	(12,770)
Fixed Effect	Country	year		
Observations	127	127	127	127
R-squared	0.546	0.553	0.560	0.564
Number of countries	19	19	19	19

Note: This table reports results from the OLS regression. The dependant variable is the total number of entries. In the four columns are presented four different models regressing for the average of VC investments in the three years antecedent, dummies for the year effect (first column) and controlling for GDP growth (second column), Interest rates to SMEs (third column) and both together (fourth column). All variables are calculated from the OECD and Eurostat dataset. The sample comprehends 19 countries (all 27 eurozone excluding Greece, Sweden, Norway, Poland, Cyprus, Malta, Slovenia, Romania, Germany, plus Switzerland) from 2010 to 2019. * is used for 10% significance level. ** is used for 5% significance level. *** is used for 1% significance level.

Results of the first model are depicted in Table 4 first column. The OLS regression makes use of fixed effects per country and year and does not include GDP growth and interest rates to SMEs. The lagged average of total VC investments in absolute values is regressed by means of a fixed effect with the total number of entries. The coefficient β1 is positive and statistically significant indicating that according to the model venture capital investments cause an increase in the total number of entries. Particularly, an increase in 1 million USD in the lagged average of VC investment would induce 197.3 new entries.

Unfortunately, the sample selection for the construction these models has been reduced. Data on interest rates of SMEs are not available for Romania, Sweden, Germany and Bulgaria. This dropped the total observation from 154 to 127.

Beside the first column, the regression is controlled for GDP growth and interest rates to SMEs. One main concern can be that the second model make use of the absolute total value of entries while GDP growth and interest rates to SME are percentages. The fixed effect model accounts for this issue. The research question is interested in the effects

within a country and, therefore, any time invariant effect such as the size of the country economy is taken out.

In the fourth (iiii) column the coefficients of both are statistically insignificant. Nonetheless, GDP growth coefficient is positive (suggesting a positive effect) while Interest rate coefficient is negative (negative effect). Additionally, from Model 3 to Model 4 when adding GDP growth as control the estimator for the effect of interest rates to SMEs lose significance, meaning that the two variables are likely to be correlated.

GDP growth is expected to be positively correlated both with venture capital investments and new entries and adding such control should shrink the coefficient of β1 of lagged VC average. The same effect on β1 should be caused by interest rate to SMEs as expected to be negatively correlated with both lagged VC and entries. Actually, from the first model, the coefficient of VC investment did not experience any significant change.

This is symptom of a serious bias to which the model is exposed. Even if the fixed effect model accounts for the size of the country's economy, the regression will not consider a change in entries in relative terms. That is, if the increase in entries is from 10 to 15 or from 1000 to 1005 the regression will count the change of 5 equally. This problem requires a weighting factor for the number of entries. In the next model the absolute value of entries is therefore divided by the total number of existing firms within a country.

Weighting And Endogeneity

Furthermore, the previous model did not account endogeneity problems. Entries and VC investments can be influenced simultaneously by a series of factors. As proposed in the methodology section, the model will implement the total investment in pension funds as an instrumental variable for VC investments. More invested capital of institutional investors to private asset class, should affects simultaneously fundraising for VC. This

should be statistically independent to the rates of new business creation, satisfying the exclusion restriction. (Popov and Roosenboom, 2013)

Table 2.2

Venture capital and creation, addressing weighting issues and endogeneity

	(1)	(2)
VARIABLES	Model 1	Model 2 (IV)
Ratio entries/total firms		
Lagged VC volume	0.0000231	
	(1.47e-05)	
Lagged VC instrumented		0.0000206
		(6.06e-05)
GDP growth	0.000487	0.000510
	(0.000610)	(0.000648)
Interest SME	-0.00314	-0.00323
	(0.00197)	(0.00211)
Constant	0.115***	0.118***
	(0.00858)	(0.0122)
Fixed Effect	Country year	
Observations	127	127
R-squared	0.0667	0.0673
Number of Countries	19	19

Note: This table reports results from the OLS regression. In the two columns are presented the models with the entries ratio (calculated entries / existing firms) as a dependent variable regressing for the average of VC investment the three years antecedent, dummies for the year effect and controlling for GDP growth and Interest rates to SMEs (first column). The second columns make use of the 3 years lagged average of pension funds' investments as an instrumental variable for the lagged average of VC Investments. All variables are calculated from the OECD and Eurostat dataset. The sample comprehends 19 countries (all 27 eurozone excluding Greece, Sweden, Norway, Poland, Cyprus, Malta, Slovenia, Romania, Germany, plus Switzerland) from 2010 to 2019. * is used for 10% significance level. ** is used for 5% significance level. *** is used for 1% significance level.

Table 2.2 contains results of the implementation of the entries ratio (Model 1) and the instrumental variable of pension funds (Model 2) in the original model. The weighting factor led to completely different results. The regression estimator for VC investment lost significance with the pvalue = 0.118 for the first model and pvalue = 0.734 for the model with the Instrumental variable. The coefficient dropped to 0.0000206 meaning that for each million invested in VC we would experience an increase in the entry's ratio by 0.002%.

Shock effects

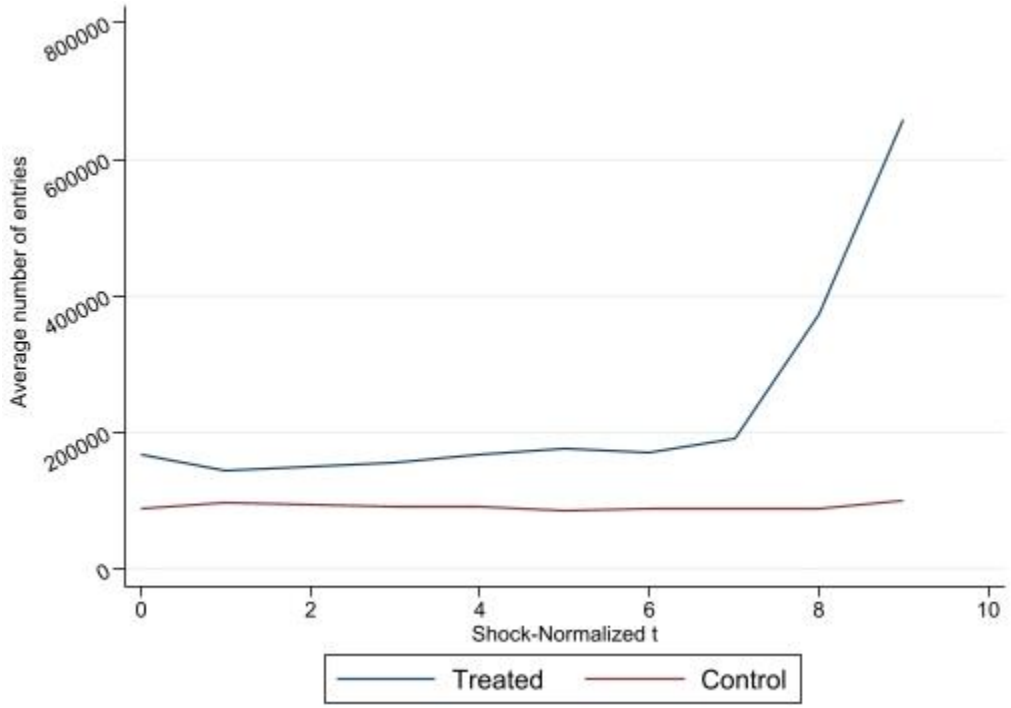
Because of these results, I decided to take a different approach to answer the research question. Table 1.3 and Figure 1.1 in the descriptive statistics section highlight a rapid increase in the across country average during the last years both in the volume VC investments and total entries. Moreover, Table 1.2 and Figure 4 in the appendix highlights that VC is not developed across all countries and not every country experienced a shock in total VC investments. One approach is to check whether countries that experienced a shock in VC investments had an increase in the number of entries compared to the countries that did not experience such shock. The analysis is similar to a staggered difference in difference model.

Firstly, I selected eight countries that experienced a break point were VC investments started to increase in the subsequent years. These countries are Belgium, France, Netherlands, Denmark, Spain, Hungary, Finland and Estonia (Figure 4). Then I created a dummy variable to identify the treated and control groups. Moreover, each country experienced the shock during different years. A second dummy variable was created equal to 1 when the country experienced the years of increase in VC investment and 0 when not. In order to check graphically if the actual shock in (lagged) VC corresponded with a shock in entries, I had to be able to compare averages of control and treated groups over time. As the shock happened in different years for different treated countries, I had to normalize the time series so that the averages could be taken equally

across country before and after the shock. I took the indicative value of 7 (because, out of 9 years most of the shocks were experienced around 2017) and made so that for each country the 7 would coincide with the shock. Then, using the shock-normalized time-series I was able to compare averages in VC investments both for the treatment and control group. Results are depicted in Figure 3.1 and 3.2

Figure 3.1

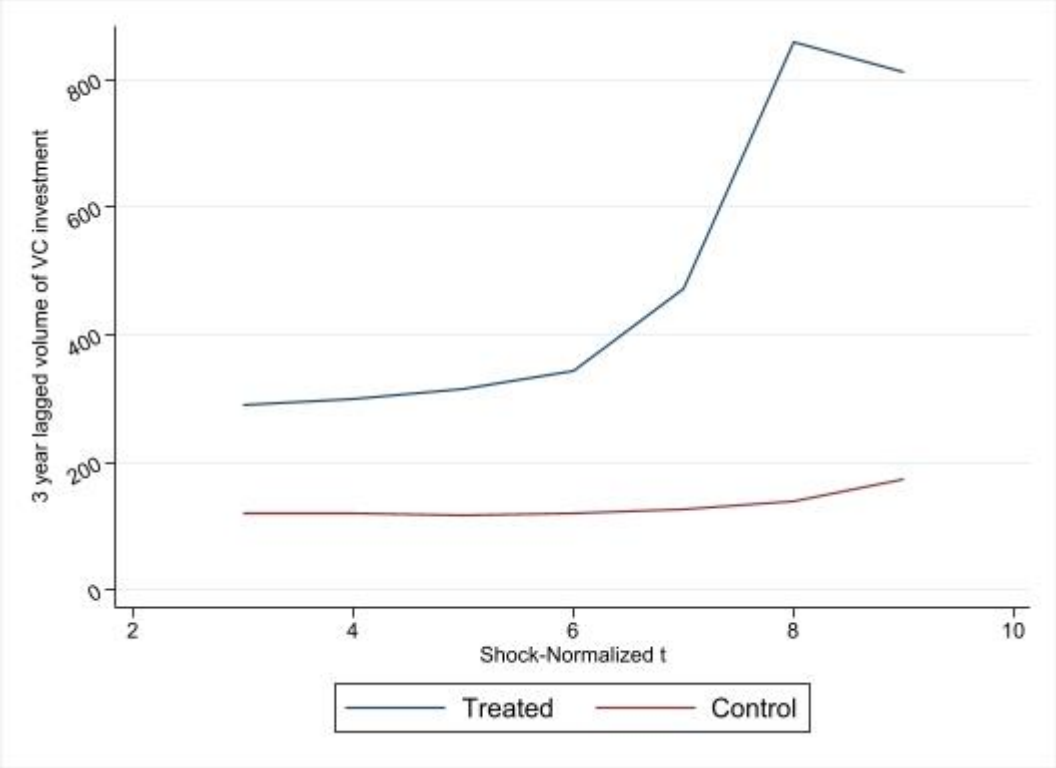
Average number of entries for treated and control group



Note: The figure depicts averages for the number of entries for two groups, treated and control. The countries in the treatment group and their corresponding shock are the following: Belgium, France (2016) UK, Netherlands, Spain, (2017) Finland, Denmark, Estonia (2018) and Hungary (2019). The time series normalizes the shock in VC investments as happening at t=7.

Figure 3.2

Average number of lagged VC investment for treated and control group



Note: The figure depicts averages for 3 year lagged average of VC investment for two groups, treated and control. The countries in the treatment group and their corresponding shock are the following: Belgium, France (2016) UK, Netherlands, Spain, (2017) Finland, Denmark, Estonia (2018) and Hungary (2019). The time series normalizes the shock in VC investments as happening at t=7. The graph starts at time t=3 as I am considering 3 year lagged averages of VC investments.

The figures above are explicative of the effect. The time series has been built in such a way that at 7 we would experience a major shock in the average VC investment of the treated group (Figure 3.2). The same effect is not present in the control group. Interestingly enough, at the same time 7 we experience a rapid increase in the total number of entries for the treated group. Again, the control group does not experience such variation. This visual effect suggests a causal inference of the shock in VC investment on entries. By this means I proceeded with a final model that makes use of the dummy variable to identifies the years correspondent and after the increase in VC investments.

Table 4

Shock in VC investments and entries

VARIABLES	(1) Model 1
Ratio entries/total firms	
GDP growth	0.000953*
	(0.000574)
Interest SME	-0.00361**
	(0.00147)
Shock dummy	0.00809**
	(0.00404)
Constant	0.124***
	(0.00761)
Fixed Effect	Country year
Observations	176
Number of Countries	20
R-squared	0.118

Note: This table reports results from the OLS regression. The Entries Ratio (calculated as entries / existing firms) is the dependent variable regressed over the dummy variable that represent being treated with the shock on VC investments. Control variables are GDP growth and Interest rates to SME. All variables are calculated from the OECD and Eurostat dataset. The sample comprehends 20 countries (all 27 eurozone excluding Greece, Sweden, Norway, Poland, Cyprus, Malta, Romania, Germany, plus Switzerland) from 2010 to 2019. * is used for 10% significance level. ** is used for 5% significance level. *** is used for 1% significance level.

Table 4 shows results of the estimators. As the fixed effect model is interested in effects within countries there was no need of a dummy variable to identify control and treated group. Even when weighting entries, by using the dummy variable to represent the shock treatment (interaction term), results are much more consistent. The coefficient of the dummy is equal to 0.00809 at 5% level of significance. By this means the interaction factor increases the averages of the entry ratio by 0.0081% for the treated group. Moreover, the control variables such as GDP growth and Interest rates to SMEs are significant at 1% and 5% respectively. The behaviour of their coefficient (positive and negative) corresponds to a certain extent to the expected effect of the variables.

Conclusion

This paper is an attempt to link empirically venture capital investments and new entries. Using a panel of 20 countries over the period from 2010 to 2019 I investigated the effect of venture capital investments on new business creation. Data on VC investments were retrieved from the OECD database and data on business creation are retrieved from Eurostat database. The analysis shows that a shock in VC investments influences positively Entrepreneurial activity. Particularly, being treated by the increase in VC investment led to an increase on average of 0.00809 points for the entries ratio (entries over total number of existent firms). The research method can be significantly improved. The analysis did not consider European or country-level policies that could be cause of the shock by influencing both entries and VC investments. An additional control could have been using additional fixed effects for industries. VC is expected to influence differently new entries depending on the industry domain. Fixed effect on industries could account the effect. Still, the result suggests that venture capital foster entrepreneurial activity. Concerning the positive effects of entrepreneurial activity for a country's economy, they were extensively discussed in the introduction. By this means policymakers should attentively consider VC activity as a source of growth for the economy: venture capital investments bring new young companies to the marketplace. Hopefully the increasing availability of data on the VC industry will allow further analysis on the topic. Additional questions remain to be answered. How does VC actually influence new entries? Is it simply because of its direct assistance on entrepreneurs or is it because of the awareness of easier financing opportunities? Which of the two is more relevant? I believe this last question has the most significance for policymakers, as governments could look up to the venture capital system and adapt policies to mimic their effects.

Appendix

Table 1.1

Entries and GDP growth averages per country

Country	Total entries	Entries/total firms	GDP growth
Austria	44140.7	0.079	1.540
Belgium	44464.3	0.062	1.620
Switzerland	40053.3	0.073	2.000
Czech Republic	103995.2	0.091	2.500
Denmark	29503.6	0.110	1.770
Estonia	10981.4	0.114	3.650
Spain	327789.6	0.092	1.060
Finland	30288.3	0.083	1.180
France	467893.6	0.105	1.420
UK	336085.0	0.128	1.840
Hungary	75360.7	0.111	2.790
Ireland	22378.0	0.069	6.150
Italy	324537.1	0.073	0.280
Lithuania	45565.3	0.218	3.600
Luxembourg	3348.8	0.093	2.610
Latvia	21008.1	0.161	2.510
Netherlands	159503.6	0.105	1.470
Portugal	156594.6	0.144	0.860
Sweden	50214.0	0.075	2.570
Slovenia	18062.6	0.112	1.930
Total			

Note: For each country, the table presents averages of total entries, GDP growth and entries ratio for the years 2010 to 2019 in the first, second and third column respectively. The entries ratio is calculated by dividing the total number of entries by the total number of existing firms. Business is considered as [B-S_X_K642] by NACE denomination. The sample considers the year from 2010 to 2019. All data are retrieved from the Eurostat dataset.

Table 1.2

Average of VC investment by country

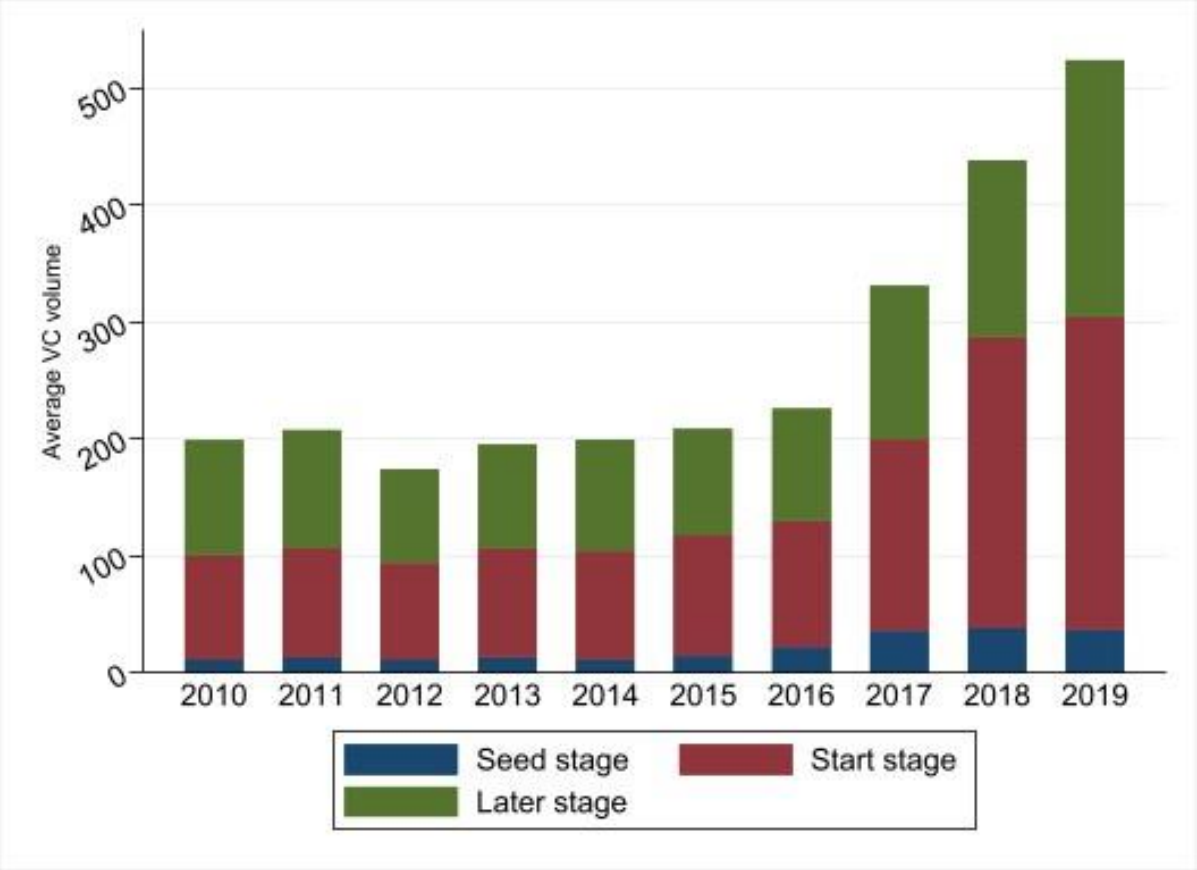
Country	VC as GDP%	VC total	Seed %	Start %	Later %
Austria	0.022	90.89	0.002	0.009	0.010
Belgium	0.038	198.12	0.003	0.024	0.012
Switzerland	0.045	320.57	0.002	0.030	0.013
Czech Republic	0.005	12.32	0.001	0.003	0.003
Denmark	0.047	160.38	0.005	0.023	0.019
Estonia	0.042	11.37	0.008	0.017	0.020
Spain	0.033	436.45	0.002	0.018	0.012
Finland	0.065	170.47	0.005	0.036	0.024
France	0.041	1097.14	0.005	0.014	0.022
UK	0.056	1565.97	0.003	0.029	0.024
Greece	0.009	20.09	0.002	0.004	0.005
Hungary	0.042	60.95	0.007	0.027	0.008
Ireland	0.051	152.45	0.004	0.031	0.016
Italy	0.006	134.01	0.001	0.004	0.002
Lithuania	0.013	6.21	0.003	0.007	0.007
Luxembourg	0.017	10.81	0.003	0.011	0.004
Latvia	0.015	4.60	0.004	0.011	0.003
Netherland	0.037	319.40	0.002	0.022	0.013
Poland	0.008	40.79	0.001	0.004	0.003
Portugal	0.020	44.68	0.002	0.014	0.004
Sweden	0.062	337.04	0.003	0.032	0.027
Slovenia	0.006	2.75	0.001	0.003	0.003

Note: The table present averages for VC investment for each country for the years 2010 to 2019. In the first and second column data on total VC investment as % of GDP and in total value are presented. The last three columns describe the % of GDP invested in each sector. The sum of the three not always correspond to the total value because of missing values in the dataset. Still, data

are indicative to identify the trend of investment in each stage by country. Data are provided by OECD dataset.

Figure 2.1

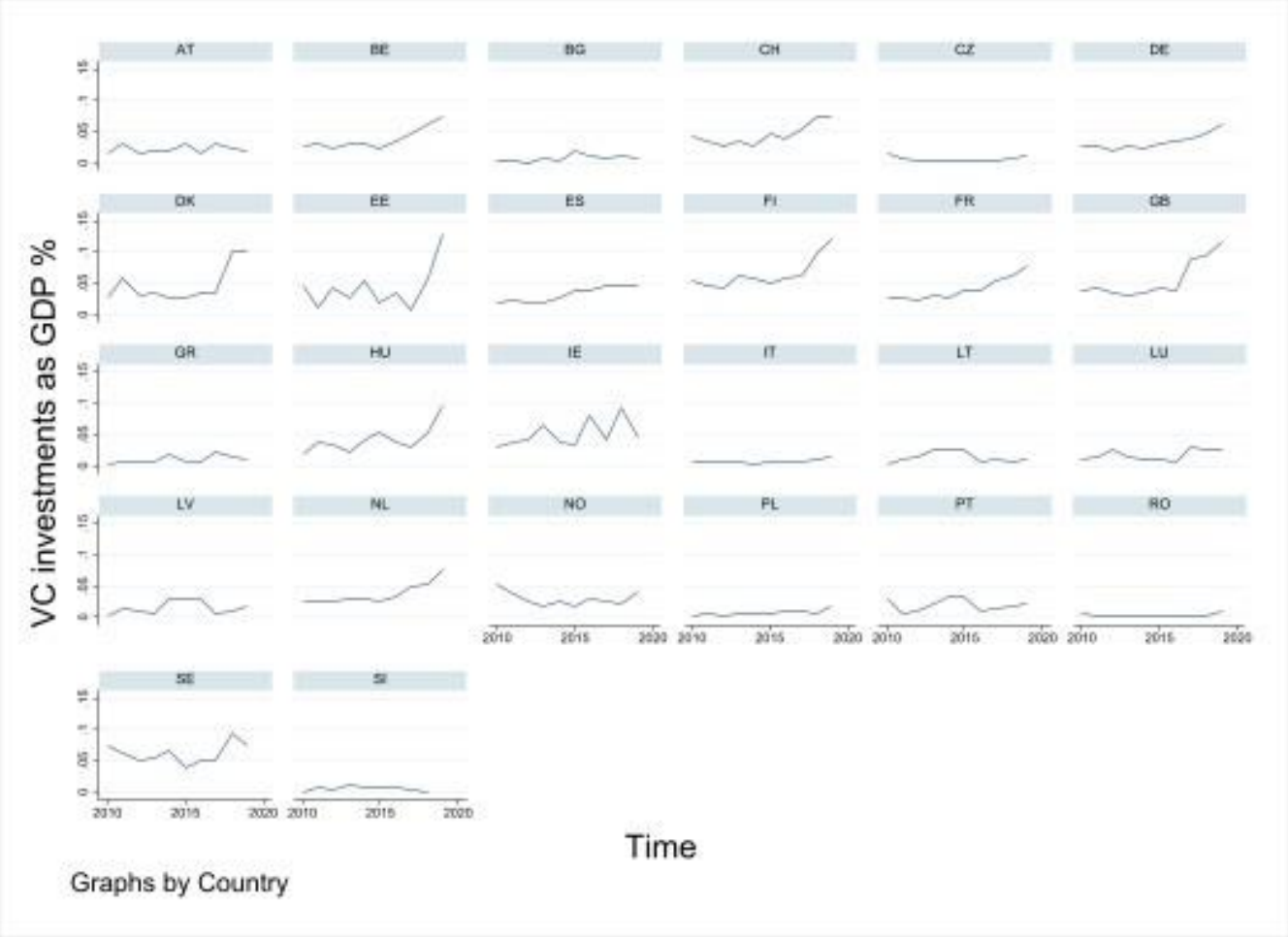
Across-country average VC investment per year



Note: The bar chart presents across-country averages for VC investment for the years 2010 to 2019. The bars are cumulative of the amount in seed start and later stage investments. The sum of the three not always correspond to the total value because of missing values in the dataset. Still, data are indicative to identify the trend of increase in the investment in each stage. Data are provided by OECD dataset

Figure 4

VC investments as % of GDP per country



Note: The graph shows VC investments as a percentage of GDP over time from 2010 to 2019 for each of the countries in the sample. Countries are identified by the alpha 2-letter denomination. The completion of this graph was part od the process to find shocks in VC investments within the sample.

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