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The Impact of Venture Capital on the economy of the Emerging Markets

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1. ABSTRACT

There is a large literature review that study the impact of financial activities on the economic growth of countries. Already in the 1911 A. Schumpter emphasized the positive effect of the development of a country' s financial sector on the level and on the growth of its per capita income. The core of the argument is that the financial sector's services—reallocating capital to the greatest value of use while minimizing losses due to moral hazard, adverse selection, or transaction costs—are a crucial engine for economic growth. This claim seems to be supported by empirical research. For instance, Raymond W. Goldsmith (1969, p. 48) draws the conclusion that "a rough parallelism can be established between economic and financial development if periods of several decades are evaluated" based on data from 35 nations between 1860 and 1963.

In this work the idea is to extend the idea of a correlation between financial activities and economic growth to Venture Capital Investment in the emerging markets

Keywords : Start-up; Venture Capital; Emerging Markets; Economic Growth

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2 Introduction

The venture capital is a way of financing company becoming each year more popular in the emerging markets thanks to the development of their economies, new regulations and the international expansion of VC funds to these countries, where there are a lot of blank space and where there is a huge space for innovation.

A growing number of empirical investigations outlines the crucial importance of VC for high-tech start-up growth (e.g., Engel (2002), and Davila, Foster and Gupta (2003)), product marketing strategy (Hellmann and Puri, 2002) and the overall survival of a new company in the market (Manigart and Van Hyfte, 1999). The aggregate role of VC in the economy begins to be an important area of research but very few quantitative investigations have been performed so far. At the aggregate economic level, Baumol (2002) argues with a theoretical model that entrepreneurial activity may account for a significant part of the "unexplained" proportion of the historical growth of the Western nations' output (pp. 58-59).

This paper aims to study the correlation between the increase of VC investments in the emerging markets and the growth in the value added of the industries that are more dependent on VC investments in developed countries.

The paper is structure as follow : the next chapter is a section focuses on the existing literature on the potential effect of VC, at the micro and macroeconomic level. The empirical model as well as the data and the results are presented in the fourth section. The final section concludes with the limitation of the model and future space for the research.

3 Literature Review

The following chapter presents the theoretical foundation of this master thesis. The aim here is to separately analyze what is Venture Capital and the impact on the economic growth. For this purpose, the theoretical part is structured like the following: The venture capital is first defined in 3.1. with an overview of its evolution in the last decade in Europe and in the established economies. Section 3.2. then defines first the role of Venture Capital in the Emerging market, main studies about the subject and the last trends. Furthermore, this chapter continues with an overview of the studies that already tried to explain a correlation between the financial investment, and in the specific venture capital investments, and the economic growth.

3.1 The definition on Venture Capital and its evolution

The venture capital industry is not specifically defined by law or regulation, in contrast to the majority of other areas of the financial sector. Shilit (1991, p. 34) gave in his paper a definition of VC, then used also by Brander (2002, p. 428), according to which "venture capital can be thought of as financing for privately held companies generally in the form of equity and/or long term convertible debt… The venture capitalist, like the banker, serves as an intermediary - or conduit—between the investors and the entrepreneurs. Another important characteristic of VC activity was highlighted by Kunze (1990), who writes that "The combination of equity participation plus active involvement in the development of the company is what distinguishes venture capital from all other investment vehicles."

The venture capital activities are increasing substantially in the last years. In 2021, according to analysis firm Dealroom and British promo agency London & Partners, were invested $675 billion in start-ups worldwide in 2021, doubling 2020′s previous all-time high. The venture capital activities is then increasing exponentially in the last decade and, has studied by Mason and Harrison (2016), it had a great economic role in the emerging of new technologies, through its support of new and rapidly growing firms, and through that its contribution to economic development regionally and nationally.

Already in the 2009 Mason identified that the terms to mobilize and employ capital resources to promote the development and usage of novelties is of great relevance in light of the worldwide shift towards the innovation-based society and economy, both for theoretical and practical considerations. Such a conclusion necessitates the performance analysis of the venture capital (VC) sector, as it is the latter that provides the resources and expertise for the innovators' activity of the entrepreneurs.

Internationally the main markets are Europe, China and USA. The main market in Europe is the UK market but Venture capitalists invested only $39.8 billion in start-ups in the UK in 2021, while $328.8 billion were invested in start-ups in the United States and $61.8 billion in start-ups in China. However, VC investment is increasing more quickly in the UK and Europe than it is in the US and China.

Venture capital evolved a lot in the last decade. As reported by Hellman & Puri 2001 and Sorensen 2007, the VC fund are approaching their investment in a new way, they are

following an approach that has been referred as “Spray and Spray” where a greater proportion of new businesses receive limited finance and control from early stage investors, the majority of which drop after their initial investment. The "spray and pray" investment strategy represents a significant departure from the traditional value-added "governance" in the early stages of a venture's life. This is especially important because venture capital investors are typically not merely passive, but rather play a key role in overseeing and managing new ventures until a successful exit. As stated by Ewens,Nanda & Kropf, 2018, this new way of doing business was facilitated by the technological shock of the last two decades that lower the cost to start a business and opened up a large number of investment opportunities across both new and traditional industries. This had a great effect on the world-wide diffusion of the VC and the opening of new fund all over the worlds, in order to help different countries to fully reach their potential.

3.2 The Venture Capital in the Emerging Markets

There is a growing evidence of the transfer of experience and knowledge from countries with a long tradition of VC activity (notably the US) to other countries seeking to develop their own VC industries, a process in which bodies such as OECD and the World Bank played a prominent role.

This process is still challenging both for established VC that for new fund. These countries are facing an economic transition and offer little protection for investor and private property.

Such a hazy atmosphere makes it even harder for venture capitalists to choose which businesses to invest in and successfully track those investments (Bruton & Ahlstrom, 2003; Pruthi, Wright, & Lockett, 2003).

To enable and protect their investments, venture capitalists rely on a stable institutional environment with predictable rule of law and enforcement practices (Cardis, Kirschner, Richelson, Kirschner, & Richelson, 2001). Venture investors seek out ecosystems with efficient corporate management and capital markets, low levels of corruption and exit strategies that are simple (Wright & Robbie, 1998). This institutional predictability and stability decreases risk and uncertainty and increases the probability that new initiatives will succeed. The operations of VC, which is already complex in established economies, is even more complex in these countries where they faced the added risk of being in an unpredictable and volatile economy where markets for digital services and capital are in a very nascent stage (Bruton & Ahlstrom, 2003; Lockett & Wright, 2002).

In these countries Venture capitalists may benefit more from network ties between entrepreneurs, investors, and businesses as they can overcome in this way all the challenges from the surrounding environment. A good network in the country can help them to overcome the government interference and partially compensating the risk in this country (Butler, Brown, & Chamornmarn, 2003; Peng, 2003; Hoang & Antoncic, 2003). (Henisz, 2000, 2003). Prior empirical research has indicated the significance of networks for East Asian entrepreneurship in general (Butler et al., 2003). Research on venture capital has also

looked at the role of networks in East Asian emerging economies (Bruton, Ahlstrom, & Singh, 2002; Bruton et al., 2004; Bruton, Dattani, Fung, Chow, & Ahlstrom, 1999; Lockett, Wright, & Ahlstrom, 2003).

Also the way of valuating new investment opportunities is different in the emerging economies for the venture capitalists.

Several ways of valuing startups are widely used by VCs, both for pre-money valuation and post. These methods have been extensively analyzed in the literature, and Nasser, 2016 highlighted 9 of them.

In the emerging markets the way of analyzing a business could be slightly different due to the difference in the economy highlighted by Wright & Robbie, 1998.

In these market the valuation process of the young companies differ for three main indicators:

- Cost of Capital : in these markets is difficult to analyze the free cash flow of the company due to difficulties in estimate both the cost of equity and cost of debt. For the cost of equity the greatest challenge is the estimation of the risk-free rate since emerging markets don’t have governments bond that could be considered riskless investments. In this case Duyvesteyen and Martens, 2014 suggest to use the inflation rate differential between the local economy and a developed nation and using that as a spread on top of that developed nation's long-term bond yield

- Cost of Debt : this could be calculated by adding comparable spread from a developed countries or similar companies. Adding these to the risk-free rate will give a good estimation of the pre-tax cost of debt.
- Weighted Average Cost of Capital : the calculation of DCF, especially for later stage of investment, could be biased by the use of an inappropriate country risk premium. For emerging markets, should be added a country risk premium to the firm WACC in order to calculate a proper discount rate that take into consideration the overall picture of the economy and all the external frictions related to that. The research shows that a VC should derivate the proper risk premium from the CAPM, taking into consideration past valuations of the company (Bruner, Conroy 2001).

3.3 The effect of the Venture Capital on the economic growth

Several studies showed the economic impact that VC have on the performance of startups.

A study of DRI- WEFA on US VC founded companies over 1970 – 2000 showed that "*venture capital-backed companies had approximately twice the sales, paid almost three times the federal taxes, generated almost twice the exports, and invested almost three times as much in R&D as the average non-venture capital-backed public company, per each $1,000 of assets"*.

The study, performed exclusively on the USA market, showed also how big is the impact of VC on the local and regional development.

A similar study, conducted by the European Venture Capital Association (EVCA in 1996 and 2001) showed how venture-backed companies have a great incentive on the economy of European nations by generating jobs, maintaining a remarkable growth rate, making significant investments, and expanding internationally. Furthermore, the amount of time needed to introduce an idea to the market is thought to be significantly reduced by venture capital.

Hellmand and Puri (2000) also studied the impact of VC on micro-level. Their study proved that company backed by VC, in the German market, innovate more often and in a better way and develop easily ready to go to market product.

Several other studies proved how VC can improve the economics of startup and speed up the R&D process.

In this paper the claim is to study the effect of VC on the economic growth of emerging markets, the research on this subject is less extensive.

Over the year several studies tried to analyze the impact of VC on the economic growth of countries where the VC were a common way of investment.

Romain & Potterie, 2004 studied the macroeconomic impact of VC in Europe, based on that, VC can be seen as an investment similar to the R&D investments done by large firm.

Following this methodology, the VC can improve the economy of a country mainly through two channels : by helping launching new product on the market faster and by improving the absorptive capacity of the knowledge generated by private and public research institutions.

There is considerable literature about the stimulus to economic growth caused by entrepreneurial activity. In 1934 Schumpter first highlighted the necessity of an entrepreneurial spirit to have an economic progress by introducing the idea of "creative

destruction." Beaumol, 2002 studies this phenomenon and proves how individual entrepreneurs, the founders in the VC context, are responsible for the greatest technological revolutions. And the high impact of entrepreneurship on technological advancement has a direct effect on large firms in a free market economy. These company are less free to experiment and innovate but without the revolutionary contributions of entrepreneurs, large firms would have much less to develop.

Gu & Qian, 2019 studied if the entrepreneurship is fostered by venture capital in the emerging markets. Here entrepreneurship is defined following two aspects : Business Entrepreneurship (BE) and Innovation Entrepreneurship (IE)[1]. The research shows that there is a positive correlation between the VC activity and the increase of IE because VC spurs IE through the increase in patents application by VC -backed startups, that are usually better than the non-VC backed companies, and similar correlation was found for the BE.

As saw there are several studies that tried to study how VC can help the economic growth of a country and The impact of VC on a country economy was identified mainly by the increase of the technological development of the country, both in emerging markets that in developed economies.

This paper aims to deepen the analysis by taking into consideration other forms of economic growth and by following the methodology used by Rajan & Zingales 1998, that will be explained in detailed in the next chapters'.

[1] BE is defined as Business Entrepreneurship and IE is defined as Innovation Entrepreneurship, these concepts are further analyzed in the section 4.5

4.1 Methodology

The following chapter presents the methodology of this thesis. As previously discussed, this thesis aims to study the correlation between the increase of VC investment in the emerging markets and the economic growth of these countries.

Several studies in literature tries to prove and explicate the correlation between financial development and economic growth

Joseph A. Schumpeter (1911), emphasizes the positive influence of the development of a country' s financial sector on the level and the rate of growth of its per capita income. He says that service, provided by financial sector, of re-allocating resources to the highest value-use without substantial risk of loss through moral hazard, adverse selection, or transactions cost are strictly correlated to economic growth.

Before analyzing the thesis methodology in more detail, it is worth reviewing how the correlation between financial development and economic growth has been proven in the literature.

Greenwood and Jovanovic (1990) developed a model explaining how financial intermediaries, especially banks, help with a country's economic growth because they are able to better identify either investment opportunities, earning a higher rate of return on capital, and to provide the means to implement costly financial structures.

In their paper, the impact on economic growth is analyzed in terms of better accounting, disclosure and corporate governance rules resulting from increased financial market activities toward those sectors most dependent on external financing.

In this paper, the methodology followed was the one implemented by Rajan e Zingales, 1998 where they studied the correlation between financial development and growth. In order to analyze this correlation they analyze if the sectors that are more dependent on external financing in developed countries are the one that grew more in emerging countries with more developed financial growth.

In this thesis a similar approach was followed. The research was conducted at industry level for several emerging markets. The main hypothesis is that the industries that are more dependent on external financing on the US market, the most developed in terms of VC investment, will have higher growth rate in countries with an higher development of the VC activity.

In total were analyzed 10 industries in 9 emerging countries over a period of 14 years.

The choice of which industry analyze was based on the data available on the US market. Were chosen the industries that in 2021 received the most fund by Venture Capital Investments. According to NVCA[2] in the 2021 $329.9 billion was invested across an

[2] The National Venture Capital Association Yearbook for 2021

estimated 17,054 deals. The main industries funded were the one analyzed in the paper with the Internet industry, Financial and Business Products the ones that received more funds.

The industries analyzed were divided into 9 main industries related to Internet, Agriculture, Business Products, HealthCare, Mobile & Tech, Industrial, Financial, Energy, Food and Automotive.

For the choice of the countries analyzed, the ratio was to first choice countries in as many continents and part of the world possible[3].

For Africa, were chosen the 3 countries that received the most fund in the last year. In 2021, 5.3 bilions of USD were invested in African Startup. Of which, 1.8 billions were invested in Nigeria, 831.5 milions in South Africa, 651.6 millions in Egypt and 570.9 millions in Kenya[4].

For South America was chosen the Brazilian market, the main country for venture capital related investments among the south American countries with a total investments of 5.1 Billions of USD in the first six months of the 2021.

In Europe, the countries that experimented the best growth were Hungary with a CAGR of 15.99% in the period of the analysis, Czech Republic with a CAGR of 26.96%, Estonia with 31.79%, Lithuania with 15.1% and Poland with 5.9%.

[3] The asian market was not take into consideration due to the low quantity of data available on the Asian emerging economies

[4] Report 2021 Partech Partners – Africa Tech Venture Capital

Following the hypothesis previous reported a model were built in order to assess the correlation using a regression analysis.

The dependent variable of the analysis is the change in value added in industry j in country k over the period 2007 – 2020.

In order to correct the analysis for country and industry characteristics, indicator variables were used for each country and for each industry.

The values that were used to find this correlation as X were :

- The external dependence of industry j, calculated as share of VC investment in that specific industry.
- The VC development in the country k in a selected year, calculated as percentage share of GDP.

The model estimated was then :

Growth in value added = i.country i.industry industry_size VC_dependence_times_VC_development,

Where "i." indicated the use of factors variables for the countries and industries.

The decision of following this specific methodology was driven by the fact that this methodology has an important advantage on other cross countries studies of growth.

Predictions about how industries difference within a country were based on how a country and industry characteristics interact, without taking into consideration any additional and external risk. Therefore, adjustments can be done for country and industry characteristics.

The main goal of the paper is to find a causal interpretation of why the industries had this increase in value added over the years. Since the impossibility to analyze all the factors, this methodology allows us to control in a solid way for country and industry unobserved factors

To control these variables for the cross country analysis, as seen, the degree of VC dependence on sectors in the U.S. was chosen.

The basic assumption made here is that there are technological differences that drive one sector to be more dependent on VC investment than others. Indeed, this may be due to a higher need for R&D investment, high production costs, higher gestation period, etc..

In this paper, following the above literature, the assumption was made that these differences persist cross-country. The degree of dependence of an industry in the US may be very similar to that in other countries. In addition, very often the most active VC funds in these countries are U.S.-based and are also more likely to invest more in those sectors they know more about and work with more at home.

Data Collection

For the collection of the data several database were used.

For the USA market, in order to valuate which industries were the ones that received more funding were used the data reported on the report of the National Venture Capital Association for 2021.

Then were collected the data on these industries on several countries.

For the Brazilian market, were used the national statistic database IBGE.

One aspect that deserved to be mentioned is that all these sources use different classification of industries. The ratio followed here is to use the classification used for the US, and elaborate the data on the various country by following the macro-segmentation used by the NVCA.

For the financial development of the countries were used the data reported by the OECD by using the variable : VC as percentage share of GDP where was reported the data of the evolution of VC by comparing it with the GDP of the countries.

For the African Countries, the computation of the variables were done by used the evolution of the VC investment in this country in the last 15 years and compute this value with the evolution of the total GDP per country in order to have the same estimation of the value used by the OECD database.

Another variable, strictly related in our model to the financial development, is the degree of dependence of a given sector on external funding. The variables used here follow the ratio used in the Rajan e Zingale paper.

Was calculated the total investment in VC in USA in 2021 and were calculated the quote of the investment for each industry. The dependence was calculated as percentage of the total investments in the VC in a certain industry. The value was then multiply for the VC development of the country.

The VC development was calculated for each year as a percentage of VC investment over the GDP of the country. This data was collected from the World Bank database.

4.3 The variable analyzed

In this part will be analyzed the ratio behind the choice of the variables used in the linear regression.

The first thing that deserve to be analyzed is to see if the dependence of US sectors is a good proxy for our analysis.

First of all, in a situation of global economic equilibrium, the need for young companies to raise funds is dictated not only by domestic economic reasons but by technological shocks that, in a highly connected economy such as the modern one, affect all countries in the world, especially emerging ones.

A study by Dieppe, Francis & Hanlon 2021[5], indeed analyzed how technology shocks occurring in the U.S. have an effect on the economies of EMDE countries. The effect in the paper is studied as an increase in the efficiency of the sector in which the technology is applied. This has a trailing effect on investment by entrepreneurs in those sectors, who see greater opportunities for profit. International VC funds are also more likely to invest in that particular industry since they already have enough expertise to judge the goodness of an entrepreneurial project.

[5] See also Chen and Wemy (2015), Fisher (2006), Francis and Ramey (2005).

These values were then multiplied for the level of VC development in different countries. The financial development of a country, in terms of VC, is identified with the ease with which firms and investment funds can be brought together and the degree to which this type of investment is developed in the country. In using this variable, an important assumption was made. Indeed, it was assumed that in order for a country's financial development to have any effect on its industrial growth, firms would finance themselves largely in their own country. In other words, only if world capital markets are not fully integrated can domestic financial development influence a country's growth.

Regarding the choice of the value added for each country and each industry, the ratio seems to be a good ratio for the analysis of the development of a certain industry and his impact on the national economy.

As reported in the OECD database "*Value added reflects the value generated by producing goods and services, and is measured as the value of output minus the value of intermediate consumption. Value added also represents the income available for the contributions of labour and capital to the production process. Value added by activity shows the value added created by the various industries (such as agriculture, industry, utilities, and other service activities)"*, in the analysis the indicator presents value added for an industry, as a percentage of total value added.

The national value added is shared between capital and labor and so can be interpreted as a good indicator of the evolution of the economy of a country. As discussed in Kehoe and Ruhl

(2008) the GDP can be identified as the sum of the value added produced by each industry within the country.

In this paper the value added is used as Y value so as variable whose value, it is assumed, is correlated with the country's VC development values multiplied by the degree of industry dependence on VC investment.

In the following part will be analyzed and discussed the main findings of the research.

4.4 The main findings

For the regression analysis performed, some indicators will first be analyzed to verify the correctness of the statistical model, and after that the main results will be studied.

For the analysis of the validity of the model we should first analyze the P value of our F test. In this case we have two main hypotheses, the null hypothesis for our F test is that R squared test is equal to 0, so that our model is not good because it doesn't explain none of the variation of our dependence variable. The alternative hypothesis is that the R squared is not equal 0 and so that our model has explanatory value.

So first we'll look to the probability of F being less then 0.01 and 0.05, corresponding to the 99% and 95% level of significance.

The P- value of the model for F is 0.0000, and as it is less than 0.01 and 0.05, can be said that is statistical significance at all this statistical level and so that the model is statistically

significance. We can reject at 99% the null hypothesis and state that the model has explanatory power.

Another variable that explain the power of the model is the coefficient of determination, equal to 0.9586, a value pretty close to 1 that explain the goodness of the model.

For the T values we want to see it if it is less than 0.1 and if our constant is equal to 0. The result shows that the constant is 0 and also here we reject the null hypothesis.

The actual coefficient of the VC dependence * VC investment is 1.11 and constant of 15, so we can state that an increase of 1 in value added could be explained by the increase of 1.11 in the variable of the VC development. This value seems to be significance, as showed also by the value of the p-value, 0.024, below the common level of significance.

If we look at the result for all the countries and all the industries, we can see that there are differences in the different countries and industries.

The countries where we can find a strong and positive relationship between the variables are Czech Republic, Estonia, Lithuania, South Africa and Nigeria. This data is a reasonable data as these countries have strong VC development and a strong domestic and expanding economy.

South Africa and Nigeria as seen are the ones that have attracted the most capital and it is therefore logical that the many funds attracted have a positive effect with the increase in the value of the industries.

In European countries, the values are slightly lower. This could be explained by the fact that companies in these countries also have the ability to attract capital through other forms, thanks to strong financial development and the support of highly developed national banks. The variety of forms through which raise capital therefore allows for other forms of financing, and thus the growth of various industries has multiple sources.

If compared with the finding of the Rajan and Zingales paper, the finding are quite different.

The coefficient they found is quite smaller that the one found in this paper.

This, as we'll see in the conclusion, could explain how important is in this country VC for the development of the country.

To restate and confirm the finding, another linear regression was performed. The difference with the previous model here is that instead of using the value added as proxy for the development of the industry, was used the number of new firms in a certain sector.

The findings here are quite similar to the one we discussed, in terms of country that have a bigger coefficient, especially African countries.

The coefficient found is quite smaller, this however, could be due to several factors that, within the methodology reported here, have been overlooked such as the degree of industry development and number of established companies operating. In fact, the data reported here are both for the number of new firms and the new establishments opened by firms already operating in the industry.

In the paper were analyzed also sectors that are characterized by companies that hold large market shares and are continuously expanding in the market, in terms also of new establishments. Therefore, the fact that coefficient is smaller in this analysis can be explained by the different type of factors that can affect the increase in number of companies and by the fact that also new establishment from company already operating in a certain sector was consider in the variable.

However, the coefficient has a magnitude that still can prove that there is a positive correlation between VC and economic growth.

4.5 Limitations of the model and of the analysis

In this part the main limitations of the analysis will be analyzed.

A first limitation might be that of the randomness effect, i.e., it might be difficult to interpret whether the increase in VC investment is due to strong economic growth in the industry and the nation in general or whether instead, as hypothesized in this paper, it is VC investment that drives industry growth. This problem has already been addressed by Robert G. King and Ross Levine (1993a) who investigated the causality problem by following a post hoc, ergo propter hoc approach. They show that the pre-determined component of financial development is a good predictor of growth over the next 10 to 30 years.

This thesis tried to overcome this limitation by the use of dummy variables (industry and country). These variables allow us use a single regression equation to represent multiple

groups. This means that we don't need to write out separate equation models for each subgroup. The dummy variables act like 'switches' that turn various parameters on and off in our equation when analyzed a specific country or a specific industry.

However, there are still aspects that could be as a limiting factor. In general, financial markets capitalize on the current value of growth opportunities, and financial institutions lend more if they think sectors will grow. Therefore, financial development could simply be an anticipatory indicator rather than a causal factor. Thus, increased VC activity could be seen as an anticipatory factor for the development of the industry, meaning that because there is an increase in the value added of the industry, venture capitalist decided to invest in that sector.

Another limitation of the analysis could be the comparison of the data on VC among different countries.

The data on the Venture Capital activity is generated mainly by, national or regional Private Equity and Venture Capital Associations, that generates statistics frequently with the assistance of for-profit data suppliers. The quality and accessibility of aggregate venture capital data have significantly increased in recent years; yet, international comparisons are still challenging due to two key issues.

The absence of a consensus international definition of venture capital is the first challenge. Although there is a basic agreement, different nations and areas have different definitions of the types of investments that are included in venture capital. Differences can be purely linguistic in some situations or more substantive in others. The second issue is related to the

various approaches that data compilers use. Depending on the method used for data collection, the completeness and representativeness of venture capital statistics with regard to a nation's venture capital industry will vary.

4.6 The space for future research

From the analysis performed in the paper, a positive correlation between the analyzed variables was found.

It would then be possible to extend the research further to test the correctness of the results reported here.

Another factor of financial development of the various countries, bank credit to private sectors, could be added to the reported model and see, for each industry and country, how much of the added value generated each year is attributable to VC investment and how much to investment by large banking institutions.

Another linear regression could then also be run with the same values for the Xs but with new values for the Ys in the model, as was done with the values concerning the growth of industries. The model could consist of Y variables that decompose the growth of an industry as an evolution of numbers of new firms, numbers of employees, or numbers of new patents. One would then try to see if there is a positive correlation between the various components of an industry's growth and the evolution of VC.

Another way to test the relation between VC and Economic Growth of emerging countries could be to change the approach to the problem completely.

A study by Quo & Qian 2019, as already mentioned, has studied the positive effect of VC on Business Entrepreneurship and Innovation Entrepreneurship.

By Business Entrepreneurship (BE) it's meant that thanks to VC entrepreneurs have access to funds to finance their ideas and therefore there is a technological development.

Innovation Entrepreneurship (IE) refers to the role of the VC in promoting innovation activities.

A model could be constructed in order to study the correlation between BE, IE and the economic growth of the countries.

In order to study this correlation, first should be investigate whether VC–backed firms have more IE or BE than non-VC–backed firms.

Then should be defined some ratios to analyze the BE and IE in a country. Could be used the employee ratio of private firm (*PFR*) as a proxy of BE and the number of patent applications (*P1*) and the number of granted patents (*P2*) as the IE index. This value could be related with the increase in the value added of each industry and see if there is a positive correlation between these variables. If so, could be another proof that there is a positive effect of the VC on the economic growth of emerging countries.

5.1 Conclusion

This paper provide an attempt to analyze the impact of VC activity on the economies of emerging markets. The model used in this thesis was based on the one used by Rajan and Zingales.

The result of the linear regression performed shows how there is a positive correlation between the increase in the value added of the industry and the increase of VC activity in that industry. This is true especially for countries were the VC is the most common way of finding investments for young companies and for the industry that are less dominated by big traditional players and where there is more space for innovation.

From this paper, an important lesson is that VC could be of great importance for the development of the emerging countries. Already several studies, such as Levine and Sarah Zervos (1998), studied the positive effect of stock markets and bank on the economic growth of the countries. In this paper we did a step further and tried to focus the analysis on emerging markets and VC. The choice was done because, as showed, the increase of VC activity could be a great engine for the growth of these countries. Many of the developing countries are at a stationary stage in their evolutionary process, and increasing VC activity could push these growth processes even faster, foster innovation and benefit the entire national economy. Every year, in countries such as Nigeria, Indonesia, Brazil, etc., a new record is set for the amount of funding raised through VC funds by domestic start-ups, so the market is growing rapidly, has a positive effect on the economy, and could be the missing

piece in the transition for these countries from developing economies to developed economies.

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Table 1 – Results of the Linear Regression performed with STATA with Value Added

Source	SS	df	MS		
Model	586366.274	19	30861.3828	Number of obs	1,260
Residual	25351.9535	1,240	20.4451238	F(19, 1240)	1509.47
				Prob > F	0.0000
Total	611718.227	1,259	485.876272	R-squared	0.9586
				Adj R-squared	0.9579
				Root MSE	4.5216

ValueAdded	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
country						
Czech Republic	.0399861	.5404733	0.07	0.941	-1.020357	1.100329
Egypt	-2.791856	.5421008	-5.15	0.000	-3.855392	-1.72832
Estonia	.8073381	.5408814	1.49	0.136	-.2538056	1.868482
Hungary	-.9727063	.5564044	-1.75	0.081	-2.064304	.1188919
Lithuania	1.065685	.540614	1.97	0.049	.0050661	2.126305
Niger	-3.88667	.5417871	-7.17	0.000	-4.949591	-2.82375
Poland	-1.024917	.5570747	-1.84	0.066	-2.117831	.0679958
South Africa	1.897295	.5783181	3.28	0.001	.762705	3.031885
industry						
Business Products	41.68512	.5733767	72.70	0.000	40.56023	42.81002
Energy	-.2066452	.5769349	-0.36	0.720	-1.338522	.9252313
Financial	41.62584	.5769349	72.15	0.000	40.49396	42.75772
Food	41.84942	.5697207	73.46	0.000	40.7317	42.96715
Healthcare	41.92904	.5712652	73.40	0.000	40.80829	43.04979
Industrial	.0016938	.5696721	0.00	0.998	-1.115934	1.119322
Internet	41.75966	.5902512	70.75	0.000	40.60166	42.91766
Mobile & Tech	41.93247	.5713802	73.39	0.000	40.81149	43.05345
agricoltura	-7.238422	.5724559	-12.64	0.000	-8.361511	-6.115333
Xnew	1.110986	.4906326	2.26	0.024	.1484242	2.073548
_cons	15.69582	.5414552	28.99	0.000	14.63355	16.75809

Table 2 – Results of the Linear Regression performed with STATA with Number of New Firms

Source	SS	df	MS		
Model	5.37783456	19	.283043924	Number of obs	1,260
Residual	22.2913868	1,240	.017976925	F(19, 1240)	15.74
Total	27.6692213	1,259	.021977142	Prob > F	0.0000
				R-squared	0.1944
				Adj R-squared	0.1820
				Root MSE	.13408

NewFirms	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
country						
Czech Republic	-.0047603	.0160264	-0.30	0.766	-.0362023	.0266816
Egypt	.1192749	.0160747	7.42	0.000	.0877383	.1508115
Estonia	-.0048491	.0160385	-0.30	0.762	-.0363148	.0266165
Hungary	-.0484235	.0164988	-2.93	0.003	-.0807922	-.0160548
Lithuania	.0150144	.0160306	0.94	0.349	-.0164357	.0464645
Niger	.1028958	.0160654	6.40	0.000	.0713774	.1344142
Poland	-.0024037	.0165187	-0.15	0.884	-.0348114	.030004
South Africa	.117291	.0171486	6.84	0.000	.0836474	.1509345
industry						
Business Products	-.0020496	.0170021	-0.12	0.904	-.0354057	.0313065
Energy	.0351338	.0171076	2.05	0.040	.0015707	.0686969
Financial	-.0061693	.0171076	-0.36	0.718	-.0397324	.0273938
Food	-.0077921	.0168937	-0.46	0.645	-.0409355	.0253513
Healthcare	.0415826	.0169395	2.45	0.014	.0083494	.0748159
Industrial	-.0244264	.0168923	-1.45	0.148	-.0575669	.0087142
Internet	.0506695	.0175025	2.89	0.004	.0163317	.0850073
Mobile & Tech	-.0162648	.0169429	-0.96	0.337	-.0495048	.0169751
agricoltura	.0162816	.0169748	0.96	0.338	-.0170209	.0495842
Xnew	.0342941	.0145485	2.36	0.019	.0057516	.0628365
_cons	.0331695	.0160556	2.07	0.039	.0016705	.0646686