PRIVATE EQUITY AND VENTURE CAPITAL FUNDS: WHAT DRIVES THE CAPITAL ALLOCATION?

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ABSTRACT:

This study aims to evaluate the factors that influence in the resources allocation process in Private Equity/Venture Capital (PE/VC) market. We have selected twenty five variables consonant with existing literature. Via Factor Analysis, we model variables that possibly affect the demand of PE/VC. The sample was composed of 25 countries between 2006 and 2011. Six factors were identified: Economic Activity, Development of Stock Markets, Corporate Governance, Social and Environmental Development, Entrepreneurship and Taxation. Employing pooled regression, we investigated relationships between the amount invested in PE/VC funds and those factors generated. The results indicate that investments are adversely affected by the depth of capital market: PE/VC funds seek an exit strategy that the stock market can offer through IPOs. Other significant factors were the protection of investors, social and environmental development and the level of entrepreneurship. Different from the expected, economic activity was not significant. The result seems controversial but its lack of significance highlights the importance of the capital market (through IPOs as a way of disinvestment) as key drivers of PE/VC market. Taxation was also not significant, which denotes that government can influence that the local PE/VC market should offer discount rates or tax incentive high enough to mitigate the effect of other barriers faced by PE/VC market. This result is relevant to academic literature, impacting on recent research on the attractiveness indices of the PE/VC market, as Groh et al (2010) that for the construction of indices consider these two constructs.

Keywords: Private Equity; venture capital; factor analysis.

Thematic area: Finanças Corporativas e Mercado Financeiro.

1. INTRODUCTION

The Private Equity/Venture Capital (PE/VC) industry has grown in recent years especially in developing economies, where a considerable increase in financing activities is observed. One possible reason could be the seeking for different returns in economies that go through an economic and institutional maturity, as developed markets show a decrease in profitability levels, since the 1990s (COMODO, 2009).
Despite it is widely disseminated around the world, PE/VC activity is mostly concentrated in the United States and United Kingdom, which together take about 60% of the raised capital, although there has been a continuous reduction in the difference, compared to other countries. Brazil, China and India, for example, have created conditions for the development of PE/VC activity, so they are the ones that have been successful in fundraising (BAIN, 2013).

However, the PE/VC industry still embryonic in Brazil, compared to the United States or England, for example, although its impact on the economy through the capital market since 2004 has been considerable, of the 88 IPOs occurred between 2004 and 2007, 31 (35%) were financed by PE/VC (GIONELLI, 2008). Despite the remarkable contribution to the market, there are few studies centered on the PE/VC funds, in particular on the key drivers in the allocation of resources raised.

The main goal of this paper is to understand which factors have influence in the resources allocation process. Twenty five variables were chosen consonant with existing literature. Via Factor Analysis we model variables that possibly affect the demand of PE/VC. These factors include macroeconomic, financial, corporate governance, entrepreneurship, social and environmental development variables. After that, we exploit a cross-section data composed of 24 countries over a six years period (2006-2011).

The results indicate that investments are adversely affected by the depth of capital market: PE/VC funds seek an exit strategy that the stock market can offer through IPOs. Other significant factors were the protection of investors, environmental development and the level of entrepreneurship. Different from the expected, economic activity was not significant.

The paper is structured as follows: The next section explains the market functioning and summarizes the findings of the existing evaluation of key drivers of PE/VC. The section 3 shows methodology aspects about dataset, multivariate data analysis and the models. The empirical results are interpreted in section 4. And section 5 presents the conclusions.

2. MARKET FUNCTIONING AND LITERATURE REVIEW

Private Equity (PE) can be defined as business investments in companies that are not listed in the stock market. This type of acquisition has as natural characteristics such as low liquidity, the expectation of high returns in the long term and higher risk. Investments like this invariably has been also characterized by the informational asymmetry, since managers of PE are seeking to business opportunities that have not been priced by the market, which can be acquired at an attractive discount to fair price and that have a valuation perspective (LOPES; FURTADO, 2006; GIONELLI, 2008; ABDI, 2011; ALMEIDA, 2013).

Investments in PE/VC are temporary and they usually take more than five years, being considered as long-term investments, identified by the company development stage. Despite it has been separately specified, it is possible to infer that Venture Capital is a type of Private Equity, so that the invested company is in early stage of development (such as startups). And the term Private Equity is used to designate companies already established in the market.

The PE/VC market has four agents: management organizations, investment vehicles, investors, and invested companies. Simplifying the market dynamic, investors apply their capital in investment vehicles that are driven by management organizations, which in turn, buy participation in portfolio companies for a specified period. In the end
of this period, managers undo the long positions and assign the appropriate parties to investors, leaving residual portion of that amount to pay for the service provided. Figure 1 below illustrates the agents and their interactions:

![Figure 1 – Agents of PE/VC market](image)

**Source:** Adapted from ABDI (2011, p. 72).

Some studies discuss the determinants attributes to the activity of the PE/VC market, but most of them deal with Private Equity market separately from the Venture Capital market.

The reasons for this are obvious: while some attributes have the greatest impact on early-stage companies, there are other attributes that affect directly mature companies already established in the market (JENG; WELLS; 2000). However, the intention is not to discuss these differences, therefore both segments will be treated with a single element.

The Private Equity and Venture Capital market is an important object of study in academic research. Some authors have focused on the economic impact of PE/VC funds (KORTUM; LERNER, 2000; ENGEL, 2002; HELLMANN; PURI 2002), while other studies have focused on fund performance and management skills (KAPLAN; SCHOAR, 2005).

Taking into account the performance and value creation, Jensen (1989) argues that public companies suffer the entrenchment of management, allowing possible cash flow deviations, thus decreasing efficiency. So Leveraged Buyouts generate value through significant improvement of operational processes.

Muscarella and Vetsuybens (1990) analyzed 72 companies that have gone through Reverse Leveraged Buyout (RLBO) and showed an improvement in profitability. While private, the sample achieved a 34% increase in its value. This result is due to organizational restructuring, forced by the entry of a PE/VC fund in a management that enabled the reduction of costs resulting in greater operational efficiency. Similar results can be found in Kaplan (1989), Kaplan and Schoar (2005) and Phalippou and Gottschalg (2007).

Contrary to expectations, only a few portion of those papers attempted to understand the determinants of PE/VC. Studying the US market, Gompers and Lerner (1998) found that performance, size and the fund age are important factors to raise more capital. Yet, they found PE/VC fundraising reacts positively to GDP growth and increased R&D expenditure. Lee and Peterson (2000) and Baughn and Neupert (2003) found
 similar results and also argue that the national culture shapes individual orientation and consequently the environmental condition that leads ultimately to different entrepreneurship levels.

Romain and De La Potterie (2004) investigated the determinants to the intensity of the VC market in sixteen countries through panel regressions and found evidence that the market reacts positively and significantly to GDP growth. They also concluded that technological opportunities indicators (such as increased investment in research and development and number of patents) significantly influence the VC market.

Jeng and Wells (2000) state that the PE/VC market suffers strong fluctuations over time and that the driving force of these fluctuations are Initial Public Offerings (IPO), making the development of the capital market one of the determining factors. Despite this result, fund managers tend not to take the companies in which they invest in countries where capital markets are more developed looking for more IPO opportunities, as Israeli technology companies have done in the NASDAQ. The increased costs and monitoring efforts to geographically distant companies partially explains this phenomenon.

Black and Gilson (1998) found similar results. However, they divide countries into two classes: countries with centralization in the capital markets and countries with centralization in the banking system. This division will be central to the development of the PE/VC market, since the centralization in the capital market is a precondition for the existence of a PE/VC vibrant market, given that a well-developed capital market makes possible exit strategy through a public offer. In the same way, Balboa and Martín (2003) showed dependence between the increase in fundraising volume by PE/VC funds and the liquidity of the stock market in the previous year.

The legal environment also impacts significantly as demonstrated by La Porta et al. (1997): a “good” legal environment protects potential financiers against expropriation by entrepreneurs increasing their willingness to supply resources to the funds in exchange for securities. Therefore, it extends the market reach. The study evaluated laws protecting investors from 49 countries and it showed that Common Law countries provide greater protection to investors than Civil Law countries. Some other evidence was gathered in the table below:

<table>
<thead>
<tr>
<th>AUTHORS</th>
<th>RESULTS</th>
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<tbody>
<tr>
<td>Black and Gilson (1998)</td>
<td>Economies with more developed capital market are more active in private equity than economy centered on banks.</td>
</tr>
</tbody>
</table>
| Jeng and Wells (2000) | 1) IPO as driving force for Private Equity investments;  
2) Government policies can have a strong impact in Venture Capital market. |
| Balboa and Martín (2003) | The volume growth in "t" of investments in Private Equity is partially explained by the market liquidity in "t-1" |
| Gompers and Lerner (2000) | The level of the market liquidity influences the level of investments in Private Equity |
| Gompers and Lerner (1998) | 1) The annual growth in Private Equity is affected by regulatory changes relating to pension funds, the growth of the economy as a whole, the fund's performance in question and its reputation;  
2) The tax on capital gains also influence the Private Equity activity |
As described, there are several determinants of PE/VC. Some of them can be observed at the macroeconomic level while others are microeconomic factors. Groh et al (2010) identified what was the most attractive for financiers, for it used 42 parameters that formed six factors: economic activity, taxes, investor protection, entrepreneurial culture, social and environmental development, depth of capital market.

The next section will present these variables and how they were measured and grouped by factor analysis. Following we develop a theoretical model that aims to understand the impact of these factors in the PE/VC market, especially on the demand side.

3. METHODOLOGY ASPECTS

3.1 DATA SAMPLE AND VARIABLES

Table 1 summarizes the variables that will be examined in the construction of factors to best represent the constructs mentioned. Also, it shows the source of each variable, as follows:

<table>
<thead>
<tr>
<th>TABLE 1 – CONSTRUCTS</th>
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<tr>
<td>Construct</td>
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<tr>
<td>Depth of Capital Market</td>
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<tr>
<td>Entrepreneurial Culture</td>
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</table>
First, is important to state that our data series is driven by previous literature findings. Our data covers the period 2006-2011 and was composed of 25 countries: Argentina, South Africa, Australia, Brazil, Canada, Chile, Colombia, South Korea, Spain, USA, Finland, France, Holland, India, Israel, Italy, Japan, Malaysia, Mexico, Norway, UK, Russia, Sweden and Switzerland.

The selection of countries was also imposed by data availability. The major task at this point is to find appropriate variables that reveal the characteristics of the constructs. Table 1 shows the constructs and the correlate variables and their sources:

Table 1 shows the constructs and variables we use to describe them. A total of 25 selected variables divided in 6 constructs. The construct ‘Social and Environmental Development' was divided into 3 sub-constructs: education, crime and communication. Crime and education variables were used in previous research to describe the construct in question. Communication variables were added once weak telecommunication structures disturb the development of the economy and market competitiveness (FRIEDEN, 2005) which can have a strong impact on business related to technology: common characteristic of startups financed by venture capital.

The study aims to understand the forces that influence the resource allocation process (demand side). Thus, the formed factors will be used in an econometric model having as dependent variable the sum of the resources applied by PE/VC funds in companies. A restrictive factor in obtaining this kind of data happens because the negotiations between PE/VC fund and firms are private, making its disclosure optional.
For this reason, the study was limited to investigate using existing public information which in this case was obtained from the Thomson Reuters database. Formally defined as the dependent variable:

- **Invested Resources (INVM):** is the amount of resources invested on the demand side of the PE/VC market. The demand comes from entrepreneurs interested in obtaining resources from PE/VC funds. Numerically, is the amount of resources applied by the PE/VC funds of each country in the sample.

### 3.2 FACTOR ANALYSIS

Factor analysis is a technique that aims to synthesize a set of interrelated variables in order to find common factors. It allows the reduction of data in a smaller set of hypothetical variables that can compress what is in common between the initial variables (KIM; MUELLER, 1978; FÁVERO et al, 2009).

Fávero et al (2008) divides the factor analysis in confirmatory and exploratory, the first being performed when there is solid prior knowledge of how the variables are related and, therefore, it is assumed that the factor structure is known. In the exploratory factor analysis there is a little or no prior knowledge about the behavior of variables.

Due to the characteristics of the study, we used exploratory factor analysis because there are previous studies that report the attributes used (GROH ET AL, 2010), but there is disagreement in the literature about the variables used for the formation of factors. Since the purpose is to summarize variables, we use the Principal Component Analysis (PCA) and R-Type that, according to Hair et al (2005), it applies to a correlation matrix of variables to identify the latent dimensions.

Factor analysis becomes crucial due to the amount of variables used (25), which would cause an impact on the parsimony of the econometric model, since the aim is to evaluate a model that best describes the relationship between the variables and, at the same time, to be as simple as possible. Thus, for each construct, a Factor analysis was used in order to extract a smaller data set, where the priority is the generation of a single factor for each construct.

Figure 1 demonstrates the use of this method in the study, where ellipses represents the constructs, rectangles represents the variables used to describe the construct overlying and triangles represents the factors resulting from the use of the technique:
3.3 MULTIPLE REGRESSION

Considering the previous studies and our proposal, we modeled using as explanatory variables the resulting factors to examine their impact on the dependent variable. Were used pooled regressions to describe the following linear relationship model between the variables:

\[
INV_{M_i} = \beta_0 + \beta_1 ECO_i + \beta_2 MCAP_i + \beta_3 INVPROT_i + \beta_4 DSA_i + \beta_5 EMP_i + \beta_6 CORPTX_i + \epsilon_i
\]

In this model, INVM is the amount invested by PE/VC funds in firms. ECO is Economic Activity factor, MCAP is factor of capital market, INVPROT is factor of investor protection, DSA is social and environmental development factor, EMP is entrepreneurial culture factor and CORPTX is variable of taxes measuring by Corporate Tax.

It is expected a positive and significant relationship with the economic activity (\(\beta_1\), since all the environmental performance also stems from the economic behavior of the country. Groh et al (2010) argue that the size of the economy is an indicator of the number of organizations and general opportunities flow. The previous literature states that the depth of capital market (\(\beta_2\) has a strong impact on the market PE/VC and is expected a positive and significant relationship. Consequently it is expected a positive and significant relationship to \(\beta_3\) as described by La Porta et al. (1997). \(\beta_4\) reflects the impact of environmental structure and is expected a positive relationship. \(\beta_5\) reflects the influence of entrepreneurial culture and is expected a positive relationship: more available projects allow managers to choose those with the highest growth potential. Corporate taxation (\(\beta_6\) has a negative impact on the volume of PE/VC as described by La Porta et al (1997) and for this reason it is expected to have a negative relationship.

4. EMPIRICAL RESULTS

Table 2 shows the descriptive statistics of the variables commented on the theoretical framework and methodology divided by construct. Looking at the table below, the mean and median have similar values to the variables GDPPC, GDPGROW, PRICELVL, BANK, CREDPRIV, DISCINDEX, SHAREHD, LEGAL, PROCEDE, GASTOPRIM GASTOSEC, CPI and CORPTX. Possible evidence of normal distribution, but this analysis is not conclusive and a formal test is required. For this purpose was executed the Shapiro-Wilk test: only six variables do not reject the null hypothesis of normality (SHAREHD, LEGAL, PROCEDE, GASTOPRI, GASTOSEC, CORPTX):

<table>
<thead>
<tr>
<th>TABLE 2 - DESCRIPTIVE ANALYSIS</th>
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<td><strong>CONST</strong></td>
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<tr>
<td>ECO</td>
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<td>IPO</td>
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<td>IPO</td>
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<td>BANK</td>
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<td>MA</td>
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Fávero et al (2008) states an assessment of the technical suitability is essential through some tests, which are presented below. The first one is the Correlation Matrix Analysis, seeking to identify significant relation greater than 0.3 to justify the use of this method. The next step is the analysis of the KMO statistic, which needs to be up to 0.5 in a range between 0 and 1; Bartlett’s test, in turn, examines the null hypothesis of the correlation matrix to be an identity matrix with the determinant equal to one. Once rejected, it means that the variables are correlated. After that, Anti-image matrix has to be analyzed investigating whether any specific variable has to be dropped, so that low values at the principal diagonal and higher values out of that reveal the inadequacy of the method. Table 3 presents the total of the explained variance, revealing the number of factors of each construct. Furthermore, it shows the KMO statistic and also, for the Bartlett’s test, it presents the Chi-Squared with significance represented by the stars.

**TABLE 3 - TOTAL OF EXPLAINED VARIANCE, KMO AND BARTLETT’S TEST**

<table>
<thead>
<tr>
<th>Comp</th>
<th>Eigenvalues</th>
<th>Extractions Sums of Squared Loadings</th>
<th>KMO</th>
<th>Bartlett</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
<td>Total</td>
</tr>
<tr>
<td><strong>Panel A - Economy</strong></td>
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<tr>
<td>1</td>
<td>1.697</td>
<td>56.578</td>
<td>56.578</td>
<td>1.697</td>
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<tr>
<td>2</td>
<td>0.843</td>
<td>28.087</td>
<td>84.665</td>
<td></td>
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<tr>
<td>3</td>
<td>0.460</td>
<td>15.335</td>
<td>100.000</td>
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<tr>
<td><strong>Panel B - Depth of Capital Market</strong></td>
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<td></td>
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<tr>
<td>1</td>
<td>4.193</td>
<td>59.902</td>
<td>59.902</td>
<td>4.193</td>
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<tr>
<td>2</td>
<td>1.266</td>
<td>18.086</td>
<td>77.987</td>
<td>1.266</td>
</tr>
<tr>
<td>3</td>
<td>0.612</td>
<td>8.747</td>
<td>86.734</td>
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<tr>
<td><strong>Panel C - Investor Protection</strong></td>
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<td></td>
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<tr>
<td>1</td>
<td>1.592</td>
<td>53.062</td>
<td>53.062</td>
<td>1.592</td>
</tr>
<tr>
<td>2</td>
<td>0.894</td>
<td>29.806</td>
<td>82.868</td>
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</table>
The panel E (Social and Environmental Development) has presented the biggest explained variance, with a total of 67.04%. The results of the table 2 shows all the constructs have formed a single factor, except for the Capital Market, which were divided in two factors to explain 77.98% of the variables variance. Evaluating the structure of these factors, it was possible to differentiate them through the variables that composed these factors: the first factor has grouped variables related to the capital market and the second factor has added variables of financial institutions and banks.

Table 3 below summarizes the number of factors formed in each construct, and also it shows the name of them. It is noteworthy that Capital Market was divided in MCAP and BANCO.

The results of the factor analysis changed the econometric model E1 because it was increased by new variable once the construct 'Capital Markets' resulted in two factors: the first variable with the capital market characteristics (Label: MCAP) and the second factor variable with banking system characteristics. Thus, the econometric model can be described by the following equation:

\[
INV_{M} = \beta_0 + \beta_1 ECO_i + \beta_2 MCAP_i + \beta_3 BANCO_i + \beta_4 INVPROT_i + \beta_5 DSA_i + \beta_6 EMP_i + \beta_7 CORPTX_i + \varepsilon_i
\]  (E2)

This division of the construct corresponds to the proposition of Black and Gilson (1998) and, therefore, \(\beta_2\) is expected to be positive, while \(\beta_3\) is expected to signalize a negative relationship with the dependent variable. We used pooled regression to estimate the coefficients. Due to the detection of heteroskedasticity, the model was estimated with White’s correction (robust model):
The explanatory variables presented statistically significant coefficients for the variables 'MCAP' and 'EMP' at 5% of significance level. The variables 'BANCO' and 'INVPROT' have presented significant coefficients at 10% of significance, and 'DSA' at 1% of significance level. 'ECO' and 'CORPTX' were not significant.

The results show the resource allocation process does not suffer significant impact of economic activity. The result seems controversial but its lack of significance highlights the importance of the capital market (through IPOs as a way of disinvestment) as key drivers of PE/VC market. Similar result can be found in Jeng and Wells (2000, p.32) who claim that “the absence of significance on our macroeconomic variable, GDP growth, underscores the importance of IPOs as the main explanatory factor for venture capital and private equity investments.”

The coefficients of the factors 'MCAP' and 'BANCO' corroborate the international literature having a positive relationship with the first variable (GOMPERS; LERNER, 1998; JENG; WELLS, 2000) and negative with the second (BLACK; GILSON, 1998). Through relationship is possible to infer that the capital market positively influences the generation and maintenance of a market PE/VC vibrant. Inversely, the banking system has a negative effect, which weakens the PE/VC market. One possible explanation is the necessity of PE/VC funds have previously an exit strategy. Among the possibilities, capital market provides an efficient and widely used by companies financed by PE/VC funds: the IPO.

The investor protection factor (INVPROT) resulted in positive and significant relationship (significance level: 10%) The result confirms, on the demand side, those found by La Porta et al. (1997) states that a structured legal environment to protect potential financiers of being expropriated by entrepreneurs, which increases the compliance to allocate their financial resources on riskier investments such as stocks, which enhances the participation of PE/VC funds.

The variable of entrepreneurial culture (EMP) resulted in positive and significant coefficient confirming the findings of previous studies (GOMPERS; LERNER, 1998; ROMAIN; POTTELBERGHE DE LA POTTERIE, 2004). The result of this variable relates to the findings by Gompers and Lerner (1998, p. 188) which concluded that "the greatest number of good firms leads to more demand for Venture Capital".

The "corporate tax" was not significant. One possible explanation is that the levels of taxation in the sample are too close and did not change over time and therefore do not impact the PE/VC market. This means that a government can influence the local PE/VC market should offer discount rates or high tax incentive enough to mitigate the effect of other barriers faced by PE/VC market.

The Social and Environmental Development factor (DSA) has a significant impact on the demand side: the sub-levels of the construct help to explain the investments of PE/VC funds. Given the construct characteristics, the most difficult is to find variables that
could properly identify it. As variables of education and crime, communication is an important one, once it impact startups linked to the technology sector (apps companies for example) could be crucial in investment decision due to the dependence of this market to technological infrastructure for dissemination and functioning of products

5. CONCLUDING REMARKS

This research analyzes the PE/VC market, specifically on the demand side, in order to understand the key drivers of this market. For this we used a sample cross-sectional five and twenty-six countries (2006-2011). We selected 25 variables to characterize six constructs.

Our methodological structure consisted of descriptive analysis, factor analysis and multiple regressions. The results reinforce the findings in the literature: a positive relationship between the level of financing generated by PE/VC funds and the depth of the capital market. The demand side of the PE/VC market proved sensitive to the volume traded in the stock market, the number of IPOs and the number of M&A, for example. Other constructs were also significant: protecting investors, entrepreneurial culture and social and environmental development.

However, our evidence is contrary to the impacts of economic activity as proposed by Romain and van Pottelsberge de la Potterie (2004) and Corporate Tax as proposed by Gompers and Lerner (1998). This result is relevant to academic literature, impacting on recent research on the attractiveness indices of the PE/VC market, as Groh et al (2010) that for the construction of indices consider these two constructs.

The study only covers the relationship between financiers and entrepreneurs, then an analysis of the funding of resources in the market and the factors that influence this relationship is a possibility of research. Investigate separately the Private Equity and Venture Capital markets would help to understand the influential factors for each market.

REFERENCES


