PRIVATE EQUITY AND VENTURE CAPITAL FUNDS: WHAT DRIVES THE DEMAND AND SUPPLY SIDES?

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ABSTRACT:

This study aims to evaluate the factors that influence Private Equity/Venture Capital (PE/VC) market analyzing the demand and supply sides, separately. We have selected 25 variables, consistent with the existing literature, of 25 countries assessed between 2006 and 2011. By the application of Factor Analysis, six factors were identified: Economic Activity, Development of Stock Markets, Corporate Governance, Social and Environmental Development, Entrepreneurship and Taxation. Applying pooled regression, we investigated relationships between those factors and the fundraising and the amount invested yearly by PE/VC funds, separately. The results indicate that investments are adversely affected by the depth of the capital market: PE/VC funds seek an exit strategy which the stock market can offer through IPOs. Other significant factors were the protection of investors, social and environmental development and the entrepreneurship. Different from expected, economic activity was not significant for demand. The result seems controversial but its lack of significance highlights the importance of the capital market as key drivers of PE/VC market. Taxation was also not significant to demand side, a fact which denotes that government can influence the local PE/VC market, and that it should offer high incentives to mitigate the effect of other barriers faced by the PE/VC market.

Keywords: Private Equity; Private Equity/Venture Capital; Factor analysis**.**

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 has been observed. One possible reason could be the search for different paybacks in economies that go through an economic and institutional maturity, given that developed markets have shown a decrease in profitability levels, since the 1990s (COMODO, 2009).

Despite it being widely disseminated around the world, the PE/VC activity is mostly concentrated in the United States and United Kingdom, which together make 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 the PE/VC activity, hence, they are the ones that have been successful in fundraising (BAIN, 2013).

However, the PE/VC industry is still in its early stages in Brazil, compared to the United States or England, for example. Although the capital market has considerably impacted the economy since 2004, 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 for the allocation of resources raised.

The main goal of this paper is to understand which factors have influence on the PE/VC market. To achieve it, we separately analyzed the supply and demand sides of the transaction. Twenty five variables were chosen consistent with the existing literature. Using Factor Analysis, we modeled variables that possibly affect the demand of the PE/VC. These factors include macroeconomic, financial, corporate governance, entrepreneurship, social and environmental development variables. After that, we exploited a pooled regression composed of 24 countries over a six year period (2006-2011).

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

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 the PE/VC. 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 higher returns in the long term and higher risk. Investments like this invariably have also been characterized by the informational asymmetry, since managers of PEs are seeking business opportunities that have not been priced by the market, which can be acquired at an attractive discount for a 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, thus being considered long-term investments. Such opportunities are identified by the company's stage of development. Despite it having been separately specified, it is possible to infer that Venture Capital is a type of Private Equity, so that the company being invested in is in its 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. At the end of this period, managers undo the long positions and assign the appropriate parties to investors, leaving a residual portion of that amount to pay for the service provided. Figure 1 below illustrates the agents and their interactions:
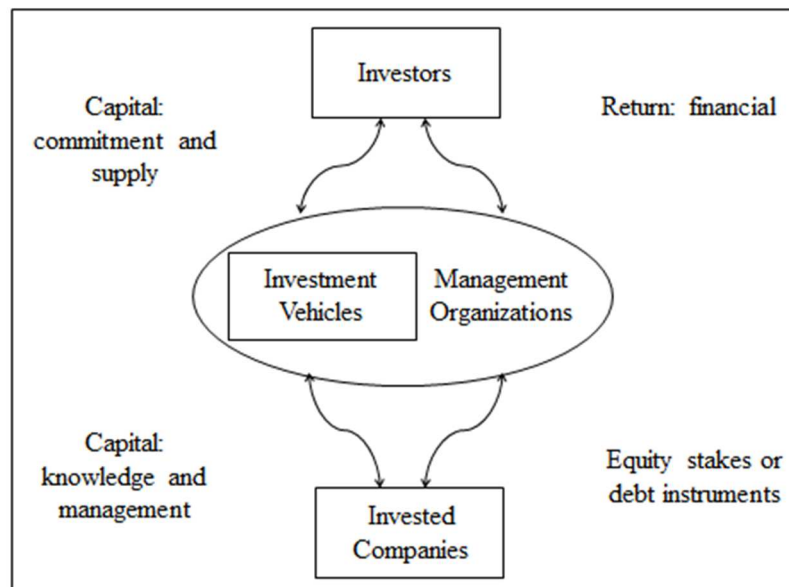

Figure 1 – Agents of PE/VC market
Source: Adapted from ABDI (2011, p. 72).

Some studies discuss the determinant attributes to the activity of the PE/VC market, but most of them deal with Private Equity markets separately from the Venture Capital markets. The reasons for this are obvious: while some attributes have the greatest impact on early-stage companies, there are other attributes that directly affect 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 as 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).

Considering 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.

On their research, Muscarella and Vetsuypens (1990) analyzed 72 companies that have gone through Reverse Leveraged Buyout (RLBO) and showed an improvement in profitability, while as a private company, the sample achieved 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 few 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 that PE/VC fundraising reacts positively to GDP growth and increases R&D expenditure. Lee and Peterson (2000) and Baughn and Neupert (2003) found similar results and also argued that the national culture shapes individual orientation and consequently the environmental condition that ultimately leads to different entrepreneurship levels.

Romain and De La Potterie (2004) investigated the determinants to the intensity of the VC market in sixteen countries using panel regressions and found evidence that the market reacts positively and significantly to GDP growth. They also concluded that technological opportunity 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 IPOs, making the development of the capital market one of the determining factors. Despite this result, fund managers tend to not 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 NASDAQ. The increased costs and monitoring efforts of geographically distant companies partially explains this phenomenon.

Black and Gilson (1998) found similar results; however, they divided countries into two classes: countries with centralization on the capital markets and countries with centralization on the banking system. This division will be the core of 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 an exit strategy possible through a public offer. In the same way, Balboa and Martí (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 range. The study evaluated laws protecting investors in 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:

AUTHORS	RESULTS
Black and Gilson (1998)	Economies with more developed capital market are more active in private equity than economy centered on banks.
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

Cumming et al. (2006);	The quality of the legal system is more likely to facilitate the activities of private equity than the size of the stock market. The legal origin and accounting standards have significant impact on the governance of private equity investments.
Armour and Cumming (2008)	Government programs hinder more, rather than help the development of private equity markets.
Cullen and Gordon (2002)	Taxes affect the entry and exit of business.
Megginson (2002)	Countries with growing R&D, especially in the national universities and laboratories, are important for the capital industry risk.
Schertler (2003)	The number of employees in R&D and the number of patents as a proxy of human capital has strong significance in PE.
Groh et al. (2010)	Investor protection and capital market are very important determinants for attractiveness of PE/VC market.

Frame 2 – Previous evidences
Source: The authors

As described, there are several determinants for PE/VC. Some of them can be observed at the macroeconomic level while others are microeconomic factors. Groh et al. (2010) identified what was 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 developed a theoretical model that aimed at understanding 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.

First, it is important to state that our data series is driven by previous literature findings. Our data covers the 2006-2011 period 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. The crime and education variables were used in previous research to describe the construct in question. Communication variables were added since weak telecommunication structures disturb the development of the economy and market competitiveness (FRIEDEN, 2005) can have a strong impact on business related to technology: a common characteristic of startups financed by venture capital.

The study aims to understand the forces that influence the fundraising (supply side) and resource allocation process (demand side). Thus, the formed factors will be used in

econometric models having, the sum of all resource raised to measure their impact on supply side, as dependent variables. Next, we tested a regression model using the same factors against the sum of the resources applied by PE/VC funds in companies as the dependent variable. A restrictive factor in obtaining this kind of data happens for the negotiations between PE/VC fund and firms are private, making its disclosure optional.

Construct			Variable	Source
Depth of Capital Market			IPO volume (% of GDP)	World Bank
			IPO numbers	
			Private credit available for banks and financial institutions (% of GDP)	
			Number of banks (total of agencies)	
			Numbers of listed companies	
			Merge and Acquisition (% of GDP)	Thomson One
			Merge and Acquisition (numbers of negotiation)	
Entrepreneurial Culture			Number of procedures to open a new business	World Bank
			Number of trademarks and patents	
			Percentage of per capita income for the payment of fees and other expenses for compliance with legal records	
Economic Activity			GDP per capita	World Bank
			GDP grow (%)	
			Price Level (2005 = 100)	
Social and Environmental Development	*Subconstruct:*	*Education*	Number of researchers per million inhabitants	World Bank
			Expenditure per student, primary (% of GDP per capita)	
			Expenditure per student, secondary (% of GDP per capita)	
		Communication	Internet users (per 100 people)	World Bank
			Fixed broadband Internet subscribers (per 100 people)	
			Telephone lines (per 100 people)	
		Crime	Intentional homicides (per 100,000 people)	World Bank
			Corruption Perception Index	Transparency.org
Investor Protection			Business extent of disclosure index	World Bank
			Ease of Shareholder Suits index	
			Strength of legal rights index	
Taxes			Corporate Tax	Thomson One

TABLE **1** – CONSTRUCTS

Source: The authors

For this reason, the study was limited, in investigation, to the use of existing public information, which in this case was obtained from the Thomson Reuters database. Formally defined as dependent variables:

- **Fundraising (FUNDR):** Total funds raised by PE/VC funds coming from investors. Gompers and Lerner (1998) define these resources as the desire of investors to deposit their capital excess in PE / VC funds. Quantitatively, it is measured by the sum of the resources of all residents funds in each country.

- **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 into a smaller set of hypothetical variables that can compress what is common among 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 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 use of these attributes (GROH ET AL., 2010). Nonetheless, 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), applies to a correlation matrix of variables to identify the latent dimensions.

Factor analysis becomes crucial due to the number 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 among 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 represent the constructs, rectangles represent the variables used to describe the overlying construct and triangles represent the factors resulting from the use of the technique:
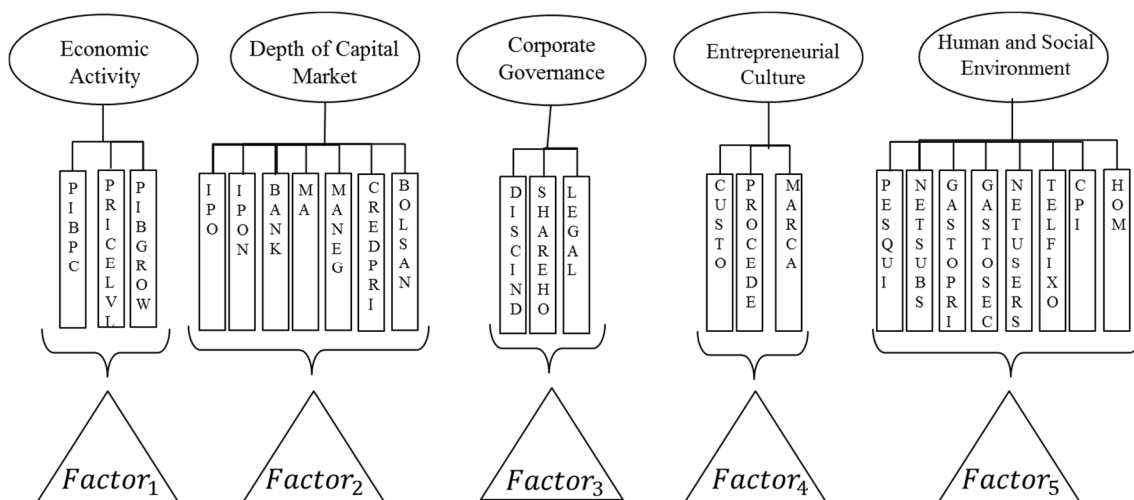

Figure 1 - Factor Analysis Scheme
Source: The authors

3.3 MULTIPLE REGRESSION

Considering the previous studies and our proposal, we modeled a regression using, as explanatory variables, the resulting factors to examine their impact on the dependent variable.

Pooled regressions were used to describe the following linear relationship model between the variables:

$$FUNDR_i = \beta_0 + \beta_1 ECO_i + \beta_2 MCAP_i + \beta_3 INVPROT_i + \beta_4 DSA_i + \beta_5 EMP_i + \beta_6 CORPTX_i + \varepsilon_i \tag{E1}$$

$$INVM_i = \beta_0 + \beta_1 ECO_i + \beta_2 MCAP_i + \beta_3 INVPROT_i + \beta_4 DSA_i + \beta_5 EMP_i + \beta_6 CORPTX_i + \varepsilon_i \tag{E2}$$

In the E1 model, FUNDR is the number of resources raised by PE/VC funds. In the E2 model, INVM is the amount invested by PE/VC funds in firms. The independent variables are the same for both regressions, where: 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 a variable for taxes, measuring the Corporate Tax.

A positive and significant relationship with the economic activity is expected (β_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 (β_2 has a strong impact on the market PE/VC and a positive and significant relationship is expected). Consequently, a positive and significant relationship to β_3 as described by La Porta et al. is foreseen. (1997). β_4 reflects the impact of environmental structure and a positive relationship is expected. β_5 reflects the influence of entrepreneurial culture and it is expected to have a positive relationship: more available projects allow managers to choose those with the highest growth potential. Corporate taxation (β_6) has a negative impact on the volume of PE/VC as described by La Porta et al. (1997) and for this reason to have a negative relationship is foreseen.

4. EMPIRICAL RESULTS
4.1 DESCRIPTIVE STATISTICS AND FACTOR ANALYSIS 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 values similar to the GDPPC, GDPGROW, PRICELVL, BANK, CREDPRIV, DISCINDEX, SHAREHD, LEGAL, PROCEDE, GASTOPRIM GASTOSEC, CPI and CORPTX variables. This shows possible evidence of normal distribution, but this analysis is not conclusive and a formal test is required. For this purpose, the Shapiro-Wilk test was executed. Only six variables did not reject the null hypothesis of normality (SHAREHD, LEGAL, PROCEDE, GASTOPRI, GASTOSEC, and CORPTX).

TABLE 2 - DESCRIPTIVE ANALYSIS

CONST	VARIABLES	MEAN	MED	ST.DEV	KURT	ASM	MIN	MAX	NUM
ECO	GDPPC	31199.16	34673.83	21811.06	0.02	0.56	830.16	99091.09	150
	GDPGROW	2.47	2.71	3.45	0.79	-0.54	-8.54	10.26	150
	PRICELVL	113.55	109.57	14.26	5.40	2.21	99.30	176.85	150
CAPIT. MARK	IPO	6129.77	2041.02	13376.55	23.07	4.48	0.00	96877.73	144
	IPON	46.05	13.00	85.63	14.32	3.55	0.00	508.00	144
	BANK	28.52	22.52	20.47	4.23	1.97	6.06	105.25	149
	MA	99306.49	34766.21	228408.90	25.52	4.81	134.32	1675895.24	135
	MANEG	1183.43	678.00	1771.96	13.39	3.49	51.00	10571.00	135
	BOLSAN	1303.80	411.50	1551.28	0.22	1.26	79.00	5603.00	150
	CREDPRIV	112.77	111.26	58.07	-1.08	0.00	13.03	215.06	142

INVEST. PROTEC	*DISCINDEX*	6.74	7.00	2.13	2.49	-1.16	0.00	10.00	150
	SHAREHD	6.49	7.00	1.64	-0.65	-0.36	3.00	9.00	150
	LEGAL	6.68	7.00	2.08	-0.81	-0.33	3.00	10.00	150
ENTERP	*PROCEDE*	7.37	7.50	3.29	-0.19	0.38	1.00	16.00	150
	CUSTO	10.00	5.90	13.82	11.30	3.13	0.40	78.40	150
	MARCA	67331.83	47717.50	61666.71	4.94	2.07	5447.00	306049.00	144
HSE	*PESQUI*	2971.81	3185.78	2133.56	-0.88	0.25	154.00	7717.48	122
	GASTOPRIM	18.64	18.43	4.20	0.08	-0.30	7.07	28.35	125
	GASTOSEC	22.46	23.77	6.11	-0.78	0.06	9.97	36.53	127
	NETUSERS	59.01	68.75	25.69	-0.89	-0.59	2.81	93.49	150
	TELFIXO	38.00	43.41	17.82	-1.11	-0.24	2.68	67.12	150
	NETSUBS	19.59	23.11	11.92	-1.38	-0.25	0.20	38.99	149
	CPI	6.32	6.90	2.27	-1.36	-0.28	2.10	9.60	150
	HOM	6.63	1.80	10.43	2.95	2.05	0.40	40.00	135
TAX	*CORPTX*	29.91	30.00	5.79	-0.27	-0.19	17.00	40.69	150

Source: The authors

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 greater than 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, an Anti-image matrix has to be analyzed investigating whether any specific variable have to be dropped, so that values below and above the main diagonal 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 number of stars (*).

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

Comp	Eigenvalues			Extractions Sums of Squared Loadings			KMO	Bartlett
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %		
Panel A - Economy								
1	**1.697**	**56.578**	**56.578**	**1.697**	**56.578**	**56.578**	**0.542**	**64.118*****
2	0.843	28.087	84.665					
Panel B – Depth of Capital Market								
1	**4.193**	**59.902**	**59.902**	**4.193**	**59.902**	**59.902**	**0.775**	**773.873*****
2	**1.266**	**18.086**	**77.987**	**1.266**	**18.086**	**77.987**		
3	0.612	8.747	86.734					
Panel C – Investor Protection								
1	**1.592**	**53.062**	**53.062**	**1.592**	**53.062**	**53.062**	**0,541**	**47.875*****
2	0.894	29.806	82.868					
Panel D – Entrepreneurship								
1	**1.648**	**54.928**	**54.928**	**1.648**	**54.928**	**54.928**	**0,548**	**47.875*****
2	0.962	32.055	86.983					

Panel E- Social and Environmental Development								
1	5.364	67.044	67.044	5.364	67.044	67.044	0,883	728.324***
2	0.829	10.358	77.402					

Source: The authors

Panel E (Social and Environmental Development) has presented the biggest explained variance, with a 67.04% total. The results of table 2 show that all the constructs have formed a single factor, except for the Capital Market. This one was split in two factors to explain 77,98% of the variables variance. After 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 it also shows their names. It is worthy to note that Capital Market was divided in MCAP and BANK.

TABLE **4** - FACTORS SUMMARY

Construct	Num of Factors	Factors Name
Economy Activity	1	ECO
Depth of Capital Market	2	MCAP
		BANK
Investor Protection	1	INVPROT
Entrepreneurship	1	EMP
Social and Environmental Development	1	DSA

Source: The authors

The results of the factor analysis changed the econometric models 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 (Label: BANK). Thus, the econometric models can be described by the following equations:

$$FUNDR_i = \beta_0 + \beta_1 ECO_i + \beta_2 MCAP_i + \beta_3 BANK_i + \beta_4 INVPROT_i + \beta_5 DSA_i + \beta_6 EMP_i + \beta_7 CORPTX_i + \varepsilon_i \qquad \text{(E3)}$$

$$INVM_i = \beta_0 + \beta_1 ECO_i + \beta_2 MCAP_i + \beta_3 BANK_i + \beta_4 INVPROT_i + \beta_5 DSA_i + \beta_6 EMP_i + \beta_7 CORPTX_i + \varepsilon_i \qquad \text{(E4)}$$

This division of the construct corresponds to the Black and Gilson (1998) proposition and, therefore, β_2 is expected to be positive, while β_3 is expected to signalize a negative relationship with the dependent variable. In the next subsections we estimate the correlation matrix and regression models to analyze the coefficients.

4.2 CORRELATION MATRIX

We evaluated the existence of almost exact linear dependencies among the independent variables, which would result in the instability to estimated coefficients and models as a whole. There is some complexity in an attempt to accurately assess the individual effects of explanatory variables on the dependent variable, since they can be naturally related.

Because of this possible natural relationship, it is important to evaluate among the regressors what level and type of relationship exists between them. Possible evidence of these relationships can be found in the correlation matrix (Table 5):

TABLE 5 – CORRELATION MATRIX

	ECO	MCAP	BANK	INVPROT	EMP	DSA	CORPTX
ECO	1						
MCAP	0.3374*	1					
BANK	0.4616*	0.1117	1				
INVPROT	0.1200	0.3634*	-0.1766**	1			
EMP	**0.6137***	0.0922	0.2508*	0.2630*	1		
DSA	**-0.7899***	-0.3645*	-0.4774*	-0.1649**	**-0.6593***	1	
CORPTX	-0.0225	0.1383***	0.0064	0.2631*	-0.2121*	0.0995	1

Significance Level: * Significant at 1%; ** Significant at 5%; *** Significant at 10%
Source: The authors

It is possible to infer that higher than 0.80 absolute correlations indicate strong linear association and relationship collinear detrimental to the model (HILL ET AL., 2010). By visual inspection, none of the variables in the correlation table exceeded the acceptable level, but three pairs of variables (ECO-EMP, ECO-DSA and DSA-EMP) obtained correlation values near the critical point.

For this reason, we modeled auxiliary regressions (not reported) between the independent variables searching for multicollinearity problems. When variables ECO, DSA and EMP were used as dependent variables obtained r² coefficient of 0.669, 0.579 and 0.716, respectively. We conclude that none of the independent variables is highly collinear with any other because the R² coefficients of the auxiliary regressions was not greater than 0.80 (HILL ET AL., 2010).

Before reporting the results of the regressions we tested some assumptions:

- Homoscedasticity: The Breusch-Pagan test for E3 equation resulted in Chi-Square of 420.74 (p-value = 0.000), and 383.72 (p-value = 0.000) for E4 equation, rejecting the null hypothesis of homoscedasticity of residues. As a corrective measure we used the White's robust correction.

- Normality: The Asymmetry/Kurtosis test for Normality was used where the null hypothesis is normality of residues. This test resulted in statistical chi-square of 24.97(p-value = 0.000) for the E3 model and chi-square statistic of 18.34 (p-value = 0.000) for the E4 model, rejecting the null hypothesis of normality. Despite the results, we did not take any corrective action. Nonetheless, the Central Limit Theorem as stated by Levine et al. (2005) postulates that samples larger than 30 observations tend to normal curve.

4.3 RESULTS FOR THE DEMAND SIDE

First, we tested the econometric model for demand side and results are presented below (Table 6).

The explanatory variables presented statistically significant coefficients for the variables 'MCAP' and 'EMP' at 5% significance level. The variables 'BANK' and 'INVPROT' have presented significant coefficients at 10% significance, and 'DSA' at 1% significance level. 'ECO' and 'CORPTX' were not significant.

The results show the resource allocation process does not suffer significant impact from 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 results 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."

TABLE 6 - POOLED REGRESSION: DEMAND SIDE

INVM	COEF.	RBST ST.ERR	T	P>T	SIG.
ECO	-2788,25	1917,817	-1,45	0,14	
MCAP	3123,99	1300,697	2,4	0,01	**
BANK	-2198,53	1172,76	-1,87	0,06	***
INVPROT	1414,35	735,3351	1,92	0,05	***
EMP	2377,53	1161,33	2,05	0,04	**
DSA	7398,28	2685,657	2,75	0,00	*
CORPTX	-12,665	108,426	-0,12	0,90	
_CONS	4816,99	3942,406	1,22	0,22	
OBS.: 150	F(7, 142) = 3,06	Prob. >F = 0,0049	R² = 0,1658		

Significance Level: * Significant at 1%; ** Significant at 5%; *** Significant at 10%
Source: The authors

The coefficients of the factors 'MCAP' and 'BANK' corroborate international literature having a positive relationship with the first variable (GOMPERS; LERNER, 1998; JENG; WELLS, 2000) and a negative one with the second (BLACK; GILSON, 1998). Through relationship it is possible to infer that the capital market positively influences the generation and maintenance of a vibrant PE/VC market. Inversely, the banking system has a negative effect, which weakens the PE/VC market. One possible explanation is the necessity PE/VC funds have for an exit strategy. Among the possibilities, capital market provides an efficient and widely used way out for 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) who states that a structured legal environment to protect potential financiers of being expropriated, which increases the willingness to allocate their financial resources on riskier investments such as stock, 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; POTTELSBERGHE DE LA POTTERIE, 2004). The result of this variable relates to the findings by Gompers and Lerner (1998, p. 188) which concluded that "the greater the number of good firms, the greater the 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 task was to find variables that could properly identify it. Besides variables like education and crime, communication is also important, once it impacts startups linked to the technology sector (apps companies for example). It could be crucial in an investment decision due to the dependence of this market on technological infrastructure for dissemination and functioning of products.

4.4 RESULTS FOR THE SUPLY SIDE
Since the demand side has been reported, it is necessary to understand how the generated factors impact on the supply side:

TABLE 7 – POOLED REGRESSION: SUPLY SIDE

FUNDR	COEF.	RBST ST. ERR	T	P>T	SIG.
ECO	4100,945	2180,464	1,88	0,06	***
MCAP	49431,28	5997,064	8,24	0,00	*
BANK	-17159	2921,183	-5,87	0,00	*
INVPROT	-5546,53	1768,253	-3,14	0,00	*
EMP	6499,003	2103,004	3,09	0,00	*
DSA	8890,166	2475,678	3,59	0,00	*
CORPTX	-510,018	282,4335	-1,81	0,07	***
_CONS	30973,39	8842,037	3,50	0,00	*
OBS.: = 150	F(7, 142) = 10,59	Prob. > F = 0,000		R² = 0,848	

Significance Level: * Significant at 1%; ** Significant at 5%; *** Significant at 10%
Source: The authors

On the supply side the variable for economic activity was significant only at 10%, contrary to the difference found by Jeng and Wells (2000) but in accordance with the evidence of Gompers and Lerner (1998). Again the MCAP and BANK variables were significant and their coefficients had their signs as expected and proposed in the literature.

The INVPROT variable resulted in a negative and significant coefficient which is contrary to the results found by La Porta et al. (1997). This result obtained different signal obtained on the demand side, a condition that the motivations of agents changes according to the financial flow: while on the supply side, fundraising is adversely affected when there is greater protection to investors, funds seek better protective conditions to put money on the demand.

The level of entrepreneurship resulted in a sign as expected: the positive impact shows that the supply side is also sensitive to the number of new businesses. As well as on the demand side, the Social and Environmental Development factor was significant and positive. This means that for solid investments by funds to come to be, the environment must provide qualified persons, low crime, and fair quality communication structure.

Taxation has a negative and weak significant impact (significant at 10% level only) on supply side and shows that, in comparison with other factors, this is the one of least impact. It reinforces the idea that for greater impact, higher discount rates or incentives should be provided for both the demand and the supply sides.

4.5 DISCUSSIONS

To make it easy to understand what the results demonstrate, we summarized supply and demand results together (Frame 3).

Despite the increasing growth in recent years, the PE/VC market faces challenges to its stabilization, once is influenced by regional characteristics. One is the cultural differences in willingness to take riskier investments as pointed out by Black and Gilson (1998). A possible solution to investors in conservative cultures would be investing in geographically distant companies, but the cost of monitoring can explain why this solution does not occur in practice (despite the Israeli case, see Jeng and Wells, (1998)).

The results show that there is dependence between the capital market and the PE/VC market, but also suggest that the shrinkage of the PE/VC market may occur due to the lack of secondary institutions that support fundraising and investment activities. Thus, to attract investors, a local infrastructure is required with ability to find lucrative opportunities, smooth the bureaucratic issues and ensure compliance with the contracts.

Another possible cause is that investment PE/VC activities often goes beyond the allocation of financial resources, once non-financial contribution (management activities) is common. However, the latter is an uncommon fact among investors in the banking system.

FRAME 3 – RESULTS OVERVIEW

Variable	Supply Side	Demand Side
Dependent Variable	Sum of total resources raised by PE/VC funds	Sum of total resources applied by PE/VC funds
Economic Activity	Positive, significant	Positive, not significant
Depth of Capital Market	Positive to MCAP, Negative to BANK (both significant)	Positive to MCAP, Negative to BANK (both significant)
Investor Protection	Negative, significant	Positive, significant
Entrepreneurship	Positive, significant	Positive, significant
Social and Environmental Development	Positive, significant	Positive, significant
Taxation	Negative, significant	Negative, not significant

Source: The authors

Overall, it was understood that stimulate the analyzed constructs singly, may be an ineffective way to strengthen the PE/VC market. For example, it cannot expect substantial investments in countries that reduce the taxes to zero on these transactions, but there are high rates of unemployment, corruption and bribery.

5. CONCLUDING REMARKS

This paper aims to contribute to the academic literature on the key drivers of PE/VC. Our contribution consists of testing econometric models using proxies as dependent variables to the supply side and the demand side. We also added communication structure variables in the construction of factors. We used a sample of five years (2006-2011) and twenty-six countries. 25 variables were selected 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 and supply side of PE/VC market proved strongly sensitive to the volume traded in the stock market, the number of IPOs and the number of M&A, for example. This explains, for example, the reason of US being the biggest PE/VC market. Obviously this is not the only factor, but it is the most relevant.

The evidences confirm the impacts of economic activity on supply side as proposed by Romain and van Pottelsbergue de la Potterie (2004). But some prudence is necessary regarding that result: lack of strength on the significance should be further analyzed using larger samples or longer periods. The protection of investors proved controversial: while proved negative on the supply side, its signal was inverted on the demand side. Possibly, PE/VC funds seek greater protections in their investments than they are willing to deliver to its investors.

The PE/VC market is positively affected by the Social and Environmental Development factor at both ends. This shows that a PE/VC market growth occurs when the environment provides resources and ideal conditions. Reversing the idea, it could be argued

that the PE/VC market tends to start with a greater chance of success, in locations where there is low crime, qualified people available, and a quality communication structure.

The results reveal the importance of these constructs to PE/VC market, but it is clear, for example, that the depth of the capital market has greater impact than taxation. Conclusions as this can impact on recent research as Groh et al. (2010) that, for the construction of attractiveness indices, considered these constructs equally.

Our research has a variety of practical implications for those interested in stimulating the PE/VC market: in fundraising, the evidence indicates that specific policies are necessary to the greater commitment in the PE/VC market, or rather; current policies have not had the desired effect, at least in the sampled countries.

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