LINEAR AND NONLINEAR DETERMINANTS OF THE PERFORMANCE OF INFORMAL VENTURE CAPITALISTS' INVESTMENTS. AN EMPIRICAL ANALYSIS

Vincenzo Capizzi*

Abstract

This paper is aimed at identifying and analyzing the contribution of the major drivers of the performance of informal venture capitalists' investments. This study analyzes data on Italian transactions and personal features of Italian Business Angels gathered during 2007 – 2011 with the support of IBAN (Italian Business Angels Network). The econometric analysis investigates the returns of business angels' investments and their major determinants (industry, exit strategy, experience, holding period, rejection rate, and year of divestiture). The major results are the followings:1) differently from previous literature, the relationship between Experience and IRR is quadratic and significant; 2) for the first time, is confirmed by quantitative data that short Holding period (below 3 years) earn a lower IRR; 3) the Rejection rate is logarithmic and the impact on IRR is positive and significant. Finally, the outcomes of the empirical analysis performed in this study allow identifying new and concrete insights on possible policy interventions.

Key Words: Business Angels, Informal Venture Capital, IRR, Determinants of Performance, Experience, Exit Strategies, Small Firms Equity Gap

JEL Codes: G24, G32

* *Associate Professor, Eastern Piedmont State University, Faculty of Economics, Novara, Italy, SDA Bocconi School of Management, Milano, Italy*
Tel.: +39 - 02-5836.5966
Fax: +39 - 02-5836.6893
E-mail: vincenzo.capizzi@unibocconi.it

1. Introduction

Either in developed or in developing market economies, each financial system does show a given deal of allocative inefficiency consisting in a gap between demand of financial resources by start-up companies and supply of early-stage capital. In details, debt is not the proper source of capital to finance start-up or seed firms, since creditors cannot count on collaterals, track records or other kind of risk mitigating factors that early-stage firms could not provide. Furthermore, volatile profitability items and unlevered cash flows – necessary to repay back and remunerate debt contracts – determine in most cases the ineligibility of start-ups for loan concessions, given the output of the creditworthiness analyses performed by credit institutions, which assigns these companies to the lowest rating class, as far as credit risk is concerned.

Regarding the equity market, the institutions that are supposed to invest in this kind of high-risk-return projects are venture capital funds. However, several studies show that venture capitalists prefer to invest in highly innovative firms, and that the minimum investment amount is usually over one million euro.[1] Because of VC investment policies, SMEs are cut off from their investments because they require smaller amount of capital (usually in the range 50,000 – 300,000 euro), their evaluation is time consuming and their cash flow generation pattern is difficult to predict, generating sustainable yields eventually only in the long run.[2] It is possible to argue that exists a gap – called "*funding gap*" – between the demand for capital from start-ups (early stage) and supply offered by venture capitalists.[3] The economic player who is capable to fill this gap is the Business Angel: a private investor who finances early-stage firms with his own private savings through the form of equity capital, adopting investment and way out policies characterized by high degree of flexibility. His purpose is to realize a financial gain when selling his shares of the company (usually after 3-7 years). This economic player has evolved during the past years and now can be

[1] NVCA, 2010
[2] Capizzi and Giovannini, 2010
[3] Amason and Sapienza, 1993; Gregorio and Shane, 2002; Arnstein, 2003 and Meyer, 2006

considered a professional investor, associated to networks of business angels and able to invest in syndication with other investors in order to supply financed firms with higher amount of capital (more than 1 million). Business angels – also called informal venture capitalists – are therefore crucial in order to stimulate and support the entrepreneurial propensity inside an economic system, and deserve indeed a much greater deal of attention and investigation by finance literature than in the past, although their informational opacity.

In this paper will be investigated the major drivers of the performance of business angels' investments,

thus extending to the informal venture capital market research areas and methodologies widely applied in the literature dealing with formal venture capital and private equity market.

The major contribution provided to finance literature is the extensive analysis of the Italian informal venture capital market performed by making reference to an unique database – built thanks to the information provided by surveyed business angels about their exits – containing the details of about 120 disinvestments made in Italy during the 2007 - 2011 time period and allowing the possibility to run a multivariate regression aimed at testing the substantial and statistically relevant explanatory power of an original set of independent variables (industry, exit strategy, experience, holding period, rejection rate, year of divestiture) to the profitability of business angels' investments. As a further contribution, differently from previous studies about informal venture capitalists, the empirical analysis will be performed through a multivariate regression based upon different functional forms for the set of independent variables used as proxies for the major determinants of the performance of business angels' investments. Both the research methodology and the results of the empirical analysis are innovative with respect to previous literature dealing with informal venture capital: firstly, the model demonstrates the relevance of the new set of explanatory variables used as proxies for the determinants of IRR of informal venture capitalist' investments; secondly, while previous empirical studies hypothesize linear relationships between the explanatory variables and IRR, this work tests different functional forms for the explanatory variables themselves, linear and non linear ones as well.

The paper is structured as follows: the following paragraph will shed light over the informal venture capital industry, showing its relevance all around the world, describing its main actors – business angels – and comparing them with venture capital funds, and disclosing business angels investment strategies. The third paragraph will examine the relevant literature regarding the informal venture capital industry. In the fourth paragraph will be analyzed data from the Italian venture capital market in 2007-2011 time period, while in the fifth paragraph will be performed the above mentioned empirical analysis. The final paragraph will end with conclusive remarks and suggestions for policy makers.

2. The role of the Informal Venture Capital industry

The informal Venture Capital is an important vehicle for the development of new firms: the market for informal venture capital finances more small firms than the formal venture capital market.[4] This market developed in the US and UK at the beginning of the 80s; grew steadily during the 90s and slowed down after the dotcom bubble burst in 2000. After 2002 the market began to grow at fast pace and is reaching high level not only in terms of invested capitals, but also in terms of specialization and professionalism of business angels.5

The market for *informal future capital* includes various typologies of investors, among which the most important are the Business Angels, who: finances small and newly constituted companies buying minority stakes.

They not only provides financed firms with capital, but also with knowledge and his personal network, filling not only the above mentioned funding gap, but also reputational and experience gap normally affecting start-ups.[6]

A seminal contribution by Mason and Harrison in 1994 identifies business angels as occasional investors, and most of them make only one investment per year; on average, they finance 8% of the project they analyze. Another relevant article by Coveney and Moore in 1998, while confirming the results of the precedent analysis, identifies some major drivers for business angels' investments, the most important of them at are the quality of the management and the potential growth of the company they are evaluating. Of course, business angels are mainly interested in capital gain, but the non-financial aspects of the investment (such as personal knowledge of the entrepreneur ad discovery of new technologies) are important too.

A study conducted by BVCA in 1999 on the British market highlighted the key features of the business angel: he is wealthy, with an entrepreneurial, managerial or consulting background, almost exclusively male and between 40 and 65 years old. Like venture capitalists, also business angels' aim is to realize capital gains through the sale of the shares after some years (usually from 3 to 7). However, business angels and venture capitalists are deeply different investors. The first, and maybe most important, difference is that business angels invest their own capital. The second difference is that business angels have a small amount of capital to

[4] Harrison and Mason, 1998
[5] EBAN, 2006
[6] Sorrentino, 2003

invest (compared to those at venture capitalists disposal), thus they prefer small companies[7] (even though, in the last years, business angels finance bigger projects thanks to syndication investments. The third difference between business angels and venture capitalists is represented by the reason for which they invest. Venture capitalists invest exclusively for financial reasons, with evaluation models, risk/gain profiles and diversification strategies. business angels have financial reasons too, but they invest also for other reasons: develop new technologies, play an entrepreneurial role, etc..[8] Because of the limited amount of capital they can invest, they don't have diversification strategies. Because of the scarce light publicly shed on angels, the research of investment opportunities is inefficient: differently from *formal venture capital*, where venture capitalists are visible and the match between them and entrepreneurs is easy, in the *informal venture capital* information costs are very high.[9] Also the evaluation process is longer; furthermore, the scarce visibility of the angels is problematic for entrepreneurs too. This gap of information has been filled (at least partially) by BANs (Business Angels Networks).

Since the 90s business angels tried to fill the information gap gathering in territorial groups. However, that was not enough to get over the most important problems of the informal venture capital market: the invisibility of the business angels and the high cost or research of new investment opportunities. The economic crisis of 2000 led most angels to found élite group where only the most professional angels were admitted. This selection favored the ripening of the angels and let them select the best business plans. These associations grew to regional and national level (for instance IBAN in Italy) or even continental (EBAN in Europe), and are called Business Angels Networks. Networks are associations of business angels whose members are selected and must face a ripening process (or prove to be professional angels). Entrepreneurs submit business plans to the networks, which select the best projects according to angels' preferences. Differently from websites of the 90s, networks are interactive and much less fragmented (for instance, in Italy exists only one network at national level), thus entrepreneurs who submit their projects are aware that they will be analyzed by the best angels, which ensures the professional screening of the projects.

3. Literature Review

Business angels have attracted several studies during the last 30 years. The first studies by Wetzel go back to 1981. In those years, business angels were almost unknown and the researches were aimed at discovering their main features. After some years other contributions approached the informal venture capital market analyzing its major characteristics also outside the US.

Angel investing studies can be classified at least in two different groups of contributions depending on the investigated research areas.[10] Indeed, while first generation studies were aimed at finding common features among business angels in order to divide them into different typologies, second generation studies focused on their investment process: investment decision-making, returns, non-financial contribution to target companies and negotiation issues. Are also part of the second generation studies those aimed at measuring the size of the informal venture capital market (usually at the national level) and the studies analyzing the relationship between business angels and venture capitalists. Several contributions have also analyzed the demand-side (entrepreneurs and financed firms). Thus, the difference between first and second generation studies lies in the aim of the analysis, and not in the year of publication.

Along with the research areas of the studies, also the research questions changed considerably between the two generations. First generation studies answered questions like "What are the main features of the business angels (age, gender, residence, etc.)?", "What are their educational and working backgrounds?", "How much money do they invest (also as a percentage of their wealth)?". Second generation studies focused on less descriptive research questions, in order to shed light over the market for informal venture capital, the production process and the performance of business angels' investments, and the major differences between these investors and formal venture capitalist. Some examples of research questions investigated by second generation studies are: "What is the size of the informal venture capital market in a given country/area?", "What are the industries which receive most investments?", "What are the preferred exit strategies of informal venture capitalists?", "What is the average IRR of Business Angels investments?", "What are the major differences between business angels and venture capitalists"?

In order to answer to this series of research questions, it is necessary to build up a database of homogeneous data and information allowing for different kind of rigorous empirical analysis.

However, building such a database is a major obstacle because of the preference of business angels for anonymity, which makes difficult the data collection for researchers. This problem has been partly solved by analyzing relatively small samples of investors with different methods: surveys, BA associations and networks, snowball sampling methods, etc. Furthermore, the definition of angel investing is not univocal and has changed during the

[7] Harrison and Mason, 2000
[8] Hanf, 2007
[9] Mustilli and Gangi, 1999
[10] Mason, 2008

years, thus some studies consider as an angel investment also the financing from the family and friends.[11] Some business angels do not even consider their investments as "angel activity". Another problem is the representativeness of the sample: it is impossible to weight the answering business angels in order to infer the complete population, even at regional level. Furthermore, most business angels make relatively small investments, while only a few of them invest large amounts, thus missing just one big investment could jeopardize the results of the research. Other issues are the so-called virgin angels (individuals looking for their first investment) and the non-active investors (investors who made some investments in the past but are no longer active because of lack of liquidity and/or opportunities).[12]

During the years, data collection has been improved thanks to business angels networks and better knowledge about basic features of this kind of investors, which allows researchers to segment business angels and their investments in order to perform more sophisticated researches.

First generation studies are focused mainly on developed economies. The most important publications about the fundamentals of the business angels are Gaston (1989), Freear, Son and Wetzel (1992), Landström (1993), Visser and Williams (2001), Paul, Whittam and Johnston (2003), Harrison and Mason (2007) and Sohl and Hill (2007).

Second generation studies are focused on developing economies too. The most important publications about the investment process and the informal venture capital market are Van Osnabrugge (2000), Mason and Harrison (2003), Madill, Haines and Riding (2005), Sohl (2007) and Wiltbank *et al* (2007).

These studies shed light over processes and outcomes of angel investing. For instance, angels who emphasize control strategy experience fewer negative exits, while angels who emphasize prediction do not experience more exceptional (higher than 100%) returns (Wiltbank *et al*, 2007). Furthermore, the yield (acceptance) rate dropped after the dotcom bubble, but the membership to angel portals increased (Sohl and Sommers, 2003). About 50% of angel investment results in a loss (partial or total), and their returns are different from those of venture capitalists (neither higher nor lower) mainly because of different approaches to managing risk (Harrison and Mason, 1999).

Another relevant issue analyzed by several authors is the relationship between business angels' and venture capitalists. They are the most suitable investors for firms in the expansion stage that is the stage at which business angels usually look for a way out of their investment. However, as shown by Sheahan in 2005, about 40% of interviewed venture capitalists consider negatively the presence of a business angel at the screening stage. Conversely, another research carried out by Chirovolou in 2004 shows different results: the majority of surveyed venture capitalists think at the presence of a business angel as an added value. The main source of discord between the two investors is, of course, the valuation of the target firm: as shown by Sohl in 2006, while venture capitalists use scientific and standardized evaluation methods, business angels make reference also to their own experience and to "similar deals" (i.e. they take into account the evaluation performed by other investors for firms of the same industry and similar size), and retort that venture capitalists, when using their estimation methods, do not take into account the remuneration for the high risk borne by the angel (seeds and start-up are usually far more risky than established firms). A study on German-speaking countries carried out by Heukamp, Liechtenstein and Wakeling in 2007 shows that venture capitalists do not perceive the presence of business angels as a risk reduction factor, nor their presence influence, neither positive nor negative, the IRR.

In Italy there are only a few contribution on business angels, mainly descriptive analysis based upon IBAN surveys: Mustilli and Sorrentino (2003) and Capizzi and Giovannini (2010). The first study was aimed at understanding the main features of Italian business angels (first generation), while the latter measures the size of the Italian informal venture capital market (second generation).

Finally, a further stream of contributions – which we can label as "third generation studies" – is characterized by more rigorous econometric methodologies aimed at investigating quantitative issues such as the identification of the major determinants of investments in start up companies and the identification of the major determinants of performance of informal venture capitalists' investments.

Considering the determinants of the amount of invested capital, Harrison and Mason (2002) built an econometric model choosing as explanatory variables: tax incentives, macroeconomic growth, inflation rate and real estate prices, finding out that the first two factors were statistically significant

Turning to the Italian capital market, Capizzi and Tirino (2011) give their contribution to the research on this topic by building an econometric model based upon an alternative set of explanatory variables for the amount of invested capital: IBAN affiliation, number of co-investors, equity stake in the target company, life cycle of the target company, reference industry. The only variable that plays a significant role in determining the trend and volatility of the dependent variable is the equity stake in the target company, which proves once again the existence of the funding gap in the "institutional" financial system. Moreover, the authors suggest that

[11] Bygrave, Hay and Reynolds, 2003 and Maula, Qutio and Arenius, 2005
[12] Coveney and Moore, 1998

non-financial reasons have a higher impact on the amount angels are willing to invest, which is consistent with the characteristics of these type of investors and with the findings of previous literature.

As far as the determinants of the performance of business angels' investments are considered, Harrison and Mason (1999) first used an econometric approach selecting the following set of explanatory variables: exit strategy, holding period, life cycle of the target company, number of co-investors, potential of technologic innovation. The exit strategy and the holding period resulted to be significantly correlated with the IRR of business angels' investments. Wiltbank (2009) used a different set of explanatory variables (experience, duration of due diligence process, holding period, number of co-investors, strategic emphasis) finding out as statistically significant the experience of the investor and the duration of the due diligence process. Recently the Author (2011) performed an empirical analysis over the Italian informal venture capital market, selecting four explanatory variables: exit strategy, experience of the investor, holding period and reference industry. While exit strategy and industry proved to be relevant determinants of the performance of business angels' investments, the other two explanatory variables didn't show a statistically significant linear relation with the dependent variable.

Therefore, consistently with this last stream of contributions, the following empirical analysis is aimed at investigating the determinants of business angels' returns making reference to an innovative set of explanatory variables when compared with previous contributions. Furthermore, in this paper will be tested different functional forms – linear and non-linear – for the selected set of explanatory variables, in order to increase the predicting power of the whole econometric model.

4. The Italian informal venture capital market: descriptive analysis

Italian informal venture capital market is characterized by the difficulty to find data about the deals and their size. During the previous years were undertaken several studies about Italian Business Angels, but those researches considered only a limited number of informal investors. Following the features of the so-called second generation studies described in the previous chapter, the aim of this paragraph is to analyze data gathered during the analysis of the Italian informal venture capital market in the early months of 2008, 2009, 2010, 2011 and 2012, and to reckon the size of this market in Italy. Results will be analyzed in order to remark a trend in Business Angels' behavior and to extrapolate their key features. In order to do so, were analyzed operations undertaken during the five year period 2007-2011. After this preliminary analysis, the Italian data will be used in order to perform the empirical analysis described in the following paragraph.

As already anticipated, in Italy business angels are not recognized as a specific economic player, so doesn't exist a public register nor a track record of their transactions. Moreover, business angels have a preference for privacy that makes it difficult to find them for both entrepreneurs and researchers.[13]

IBAN (Italian Business Angels Network) carries out yearly a survey that studies the activity of Italian business angels. The analysis performed in this chapter was used by IBAN to publish the Surveys 2008, 2009, 2010, 2011 and 2012 on Italian informal venture capital market. The analysis was conducted forwarding an internet-based survey through different channels to a large number of individuals believed to be business angels operating in Italy. A fundamental role was played by IBAN, who submitted the survey to a vast number of individuals thanks to its wide network, the only legitimated at a political and regulatory level.

In this section will be analyzed data on Italian Business Angels.[14] As far as the sample for the descriptive analysis is concerned, we collected information on 104 Business Angels in 2007, 140 in 2008, 268 in 2009, 313 in 2010 and 225 in 2011.

The following points shed light over the structural features of the Italian informal venture capital industry, showing the personal features of Italian Business Angels, and considering both their investment policies and their exit strategies as observable from data dealing with capital invested and exits. [15]

First of all, regarding the wealth of the surveyed Angels, 21% of them has less than 500,000 euro, and 38% has between 500,000 and 2 million euro.

The most important source of deal flow are business angels networks, followed by investors clubs and other entrepreneurs. Conversely, the least important sources are banks and universities

The most relevant issues considered when evaluating a business plan in order to finance a firm are the team of managers and the potential growth of the target company; also the features of the product/service and the industry attractiveness play a major role, while the least important issues are tax benefits and the social impact of the delivered output.

Of the surveyed business angels, 95% bought less than 50% of the shares of the financed companies. Given the nature of angel investing, the purchase of majority stakes is not consistent with the role of the informal investor

[13] Hanf, 2007

[14] The analysis is about the informal venture capital market in Italy, and is based on data gathered during the Survey 2008, 2009, 2010, 2011 and 2012 (gathering data from the previous year), conducted by IBAN under the supervision of the Author; see Author (2013) for a more extensive presentation discussion of the results of the descriptive analysis provided in this paper.

[15] Ibidem.

Considering the share of personal savings invested, the 75% of the angels invest less than 10% of their wealth, and 15% invest between 11% and 20% of their wealth. Only 10% of the

As far as the total number of angel investing deals is considered, the 77% of the interviewed angels performed between 1 and 5 investments in their life, and only 12% made 6 or more investments.

Surprisingly, only 34% of investors says that their most important contribution to the financed firms is the capital they provide. The most important contribution to the financed firms is strategy (49%), followed by personal network of industrial and financial relationships.

Dealing with the favorite exit strategy for 66% of the interviewed angels is the sale/merge to other firms. This strategy has gained consensus among angels in the past three years. The second preferred exit strategy is the sale to other investors (53%).

Analyzing 2011 investments made by the observed sample, the total amount invested increased from €31,460,000 in 2009 to €34,847,000 in 2011 (this figure was €400,000 in 2000). The average investment decreased from €183,000 in 2007 to €124,000 in 2011 The number of reported investments is 281 (229 in 2010).

In 2011 the number of the deals under 30,000 euro increased from 33% to 53%, while the 83% of the investments were under 100,000 euro.

The preferred industry changes over the considered time period: in 2011 Italian business angels financed mainly ICT firms, while in 2010 the most financed industry was ICT and in 2009 it was biotech.

Turning to the analysis of reported exits, in 2011 they were 19 (only 7% of the surveyed angels reported at least one exit). Excluding a reported duration of 18 years, the average duration has been 4.9 years (in 2010 this data was 4 years), and 17% of exits took place within the third year of the investment (67% within the fifth year).

Dealing with the performance, in 2011, none of the reported disinvestments have caused a total or partial loss for the investors. Only one investor reported a total gain lower than 50%.

Summing up, it is possible to argument that the Italian informal venture capital market has grown steadily in the last decade – surging from €400,000 in 2000 to €34,847,000 in 2011 (CAGR +50%) – and the number of reported investments shows that the financial crisis has not hit angels' behavior. In addition, the yield rate (rate of financed business plans) has increased in the last 5 years, suggesting an increased ability of the business angels to classify good projects from bad ones, contributing to give rise to potentially more successful new ventures.

Furthermore, this analysis has shown how Italian business angels are converging to their European peers, both for personal features and investment behaviors, constituting therefore a challenging opportunity for investigating a representative sample of the informal venture capital market.

5. The determinants of the performance of business angels' investments: relevance and functional form

Making reference to the latest studies about business angels and their investments, this paragraph is aimed at testing the relevance of a set of explanatory variables deemed as proxies for the major determinants of the performance of informal venture capitalists' investments. Business angels are often considered "atypical" investors: they finance newly constituted firms providing risk capital, but they are not venture capitalists because they invest their own money. Furthermore, their approach is often informal and their contribution to the financed firms goes beyond the capital provided, consisting also in managerial competences and relationships to share with the entrepreneur. However, business angels are investors whose main purpose is to obtain appropriate returns when compared with the entrepreneurial risk undertaken. This issue has not received much attention from researchers until recently, thanks to the fact that business angels are being seen ever more as financial investors.[16] In Italy there is only one contribution on business angels returns and their determinants, which, as shown in paragraph 3, is a preliminary version of the empirical analysis performed in this paragraph.[17]

5.1 Data and methodology

Data have been collected referring to the 2007-2011 time horizons with an on-line survey: they include details on 119 exits made during those years. For this analysis, differently from data shown in descriptive tables, the sample of the econometric model is 81 exits because not significant variables (with less than three data) have been excluded from the sample.

Data on exits have been processed in order to reckon the IRR and to break down the disinvestments by: industry, exit strategy, experience, holding period, rejection rate of business angels and year of exit. These are the explanatory variables constituting the econometric model to be run in this paragraph.

In particular, the determinants of profitability of informal venture capitalists' investments have been selected by a 2-step process: selection of a wide set of variables from literature dealing with of both formal and informal venture capitalists' investments, as analyzed and classified in paragraph 2 (step 1) and screening process aimed at choosing of a short list of determinants making reference to the output of the survey dealing with personal features of business angels (step 2). In this way, it has been possible to

[16] Mason, 2008.
[17] Author, 2011.

select an original set of explanatory variables, when compared with previous studies, where, furthermore, the rejection rate characterizing the deal flow and screening process of business angels is an innovative determinant of profitability of business angels' investment to be tested

Regarding the dependent variable, that is the performance of a given investment, business angels often evaluate their returns as a multiple of their initial investment. However, to better compare different investments, it's useful to reckon the yearly return of an investment (i.e. the IRR). Table 1 shows the total returns of business angels investments (not adjusted for the duration). Once adjusted for duration (i.e. IRR), the distribution of the returns changes as shown below.

Of course, the number of total and partial losses is unchanged, but the number of higher than average returns (i.e. IRR of at least 20%) is smaller. This is owed to the fact that higher returns could require more time to ripe, thus curbing the IRR. About one third of business angels' investments results in a loss (partial or total). Considering only investments whose return is higher or equal to zero, the average total return is 107%. However, once adjusted for the duration, the average IRR is 25%.

The final econometric model to be tested through an OLS multivariate regression analysis will therefore be:

$$IRR_j = \alpha + \beta_1 Sector\_Dummy_j + \beta_2 E_j + \beta_3 E_j^2 + \beta_4 HoldingPeriod\_Dummy_j + \beta_5 ln(R_j) + \beta_6 Year\_Dummy_j + \varepsilon_j$$

where:

α - constant

$_j$ - divestment j

IRR - Internal Rate of Return

S - Sector *(dummy, base: Technology sector)*

E - Experience

H - Holding Period *(dummy, base: lower than 3 years)*

R - Rejection Rate

Y - year of exit *(dummy, base: 2007)*

ε - residuals.

Table 1. Total return and IRR of business angels' investments

Total return	**Percentage of total exits**
Total loss	7.8%
Partial loss	22.3%
0-19%	23.3%
20-49%	15.5%
50-99%	11.7%
≥100%	18.5%

IRR	**Percentage of total exits**
Total loss	7.8%
Partial loss	22.3%
0-19%	49.5%
20-49%	8.7%
50-99%	6.8%
≥100%	3.9%

Source: Author's elaboration

Hereafter a description of all the independent variables - together with their selected functional forms – is provided, as well as the description of the research hypothesis to be tested.

Industry

It is a *dummy* variable. Differently than in previous analysis where industries have not been clustered, here the different industries are aggregated in five classes: *Manufacturing, Commercial & Distribution (MCD); Financial Services; High-Tech (Includes Electronics, ICD and Biomedical); Media &*

Enternainment; Other (Include Construction, Security and Medical Services).

Such a classification can be explained basing upon the following arguments:

1) The number of sectors is very high – depending on the years it can vary from 12 to 14– when compared to the number of observations. Maintaining this number of dummies would result in a high disparity of observations across sectors, ranging from 2 to 15 observations, depending on the dummy.

2) The list of sectors available to respondents varies each year, making the original classification heterogeneous and not usable for comparison –e.g. the sector "other services" is present in the 2010 survey but not in the 2008's. Embedding all the different sectors into clusters restores homogeneity across years and across observations.

That being said, since the very seminal work of Wetzel (1983), and through many studies during the last 30 years, it has been demonstrated how the High-Tech played a key role in the economy due to both the growth rate of the market in the last years and its relevant contribution to job creation. Therefore, the following research hypothesis to be tested express the expected impact of this first explanatory variable.

H1: Investments in the High-Tech industry earn a significantly higher return then investments in other industries.

Looking at the data in the sample – table 2 –, the High-Tech industry does show the highest average return. It is worth noting, however, that the high volatility might not lead us to statistically significant difference between this sector and the second best performing one, *MCD.*

Table 2. Average IRR per Industry

Industry	Average IRR	N	Std. Deviation
Fin	-,0188	7	,28497
M&E	-,3007	7	,40901
MCD	,0200	12	,37113
Other	-,1232	9	,23684
Serv	-,0891	21	,51098
Tech	,0230	25	,41205
Total	-,0543	81	,41033

Source: Author's elaboration

Exit Strategy

It is a *dummy* variable. It is widely accepted among scholars and professionals (Mason, 2002; Gompers *et al*., 2010; Author, 2011) that a trade sale is the most profitable exit for a private investors, second only to the IPO, although the latter occurs very rarely for start-up firms. The reason is that a trade buyer is a strategic buyer who is willing to pay a premium price for the company due to the synergies that she expects to exploit after the acquisition, such as reduction of redundant assets or application of the new technology to existing products.

Sale to another financial investor is the third in the hierarchy of the most profitable exit strategies, while sale to the entrepreneurs is considered as a *last-best* before the ultimate way-out: abandonment due to the failure of the project.

This lead to the research hypothesis stated as follows.

H2: All the exit strategies will yield higher returns than "closed activity", with the highest ones associated with "listing", followed by "trade-sale", "sale to other investors" and "sale to the entrepreneur".

Since the exit strategies are five, four dummies are part of the model, with the base being "closed activity". Looking at table 3, the sample does reflect the expected trend where the abandonment of the investment (closed activity) is the exit with the minimum average IRR, which increases in the case of a sale to entrepreneur (although remaining negative), and becomes positive in the case of sale to another financial investor, hitting the peak with the trade sale. Unexpectedly, in the sample the option of IPO (Listing) does not represent the best choice, since the average return of the divestment that followed this strategy is even negative. However, it has to be noted that only four investors chose this strategy, which makes this option really low pursued – most a theoretical one –hardly comparable with the others.

Table 3. Average IRR per Exit strategy

Industry	Average IRR	N	Std. Deviation
Fin	-,0188	7	,28497
M&E	-,3007	7	,40901
MCD	,0200	12	,37113
Other	-,1232	9	,23684
Serv	-,0891	21	,51098
Tech	,0230	25	,41205
Total	-,0543	81	,41033

Source: Author's elaboration

However, once inserted in the model, for the considered sample the inclusion of the dummies related to exits led to a misleading result. Using as a base dummy "trade sale", only the dummy related to *"closed activity"* showed a significant (p-value < 0,01) beta, negative and with a high magnitude (|beta| > 5). This means that, *ceteris paribus*, the investor who chooses this exit strategy will earn a much lower IRR with respect to the investor who opts for a trade sale. The result is misleading in the sense that the variable *"closed activity"* does not explain the IRR, but instead it is explained by the failure of the initiative, which inevitably leads the investor to abandon the project.

The considerations above do not diminish the relevance of this variable in precedent studies carried out on different samples, since it is possible to control for this problem by deleting the observations related to *"closed activity"* and running the regression with the remaining observations to see the unbiased relationship between the type of exit and the dependent variable. However, in this specific case, it was not possible due to the limited amount of observations, the variable exit strategy was not inserted into the final model.

Consequently, *H2* is considered not supported by the data because, apart from *"closed activity"*, all the other dummies did not show a significant impact on the IRR and, therefore, neither could their impact be ranked as in *H2*.

Experience

It is a *scale* variable. As in Wiltbank *et al.* (2009) and in Author (2011), it is computed taking into account the number of investments made by the angel during her life. The descriptive statistics given by the authors, and confirmed in this study, show how the IRR peaks with a medium level of experience, giving a hint on the possible function of the variable. While it is clear why a low level of experience might lead to lower performances, different reasons might underpin the fact that lower returns are also associated with a high level of experience with respect to a medium level (Parhankangas and Hellström, 2007).

Firstly, an increase of the level of experience might reduce the risk aversion of the angel. In fact, the most successful investors are the ones who are more likely to continue to invest, and therefore it is more likely that investors that have collected a lot of positive results in the past will invest again and be overconfident.

The second explanation derives from an intrinsic potential weakness of the dataset, which depends entirely on the sincerity of the respondents. In fact, investors who already invested in a number of ventures (and who are more mature and elder) might also be more sincere in his responses to the questionnaire when compared to lower experienced informal investors.

The last reason, is that experience comes also with time, and as the investor becomes more expert and elder her knowledge might become less and less up to date with respect to the modern business environment, especially in those sectors which change very fast, the ones in which business angels typically invest.

Therefore, the following research hypothesis to be tested express the expected impact of this first explanatory variable.

H3. There is an inverted U-shaped relationship between Experience and IRR. Return will initially increase, and beyond a certain point decrease

However, with respect to Author (2011), the metric used in this paper to compute experience is more holistic, being not only linked to the number of previous investments, but also to age. In fact, as stated in paragraph 3, angels hold and have held relevant managerial positions, or they are and have been successful entrepreneurs. Since angels provide "smart money", it is reasonable to take into account also the expertise gathered during their professional life, besides the number of investments performed: age is the most synthetic measure to do so.

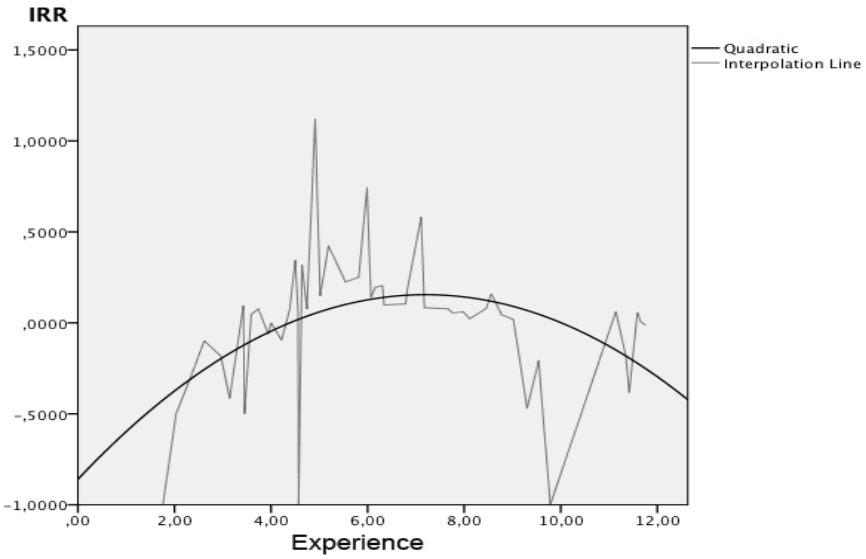
This reasoning is consistent with the study of Wiltbank (2005, 2009), who employs a metric similar to age – the number of years that angels have been investing in unquoted companies– to refine the measurement of experience. Strong ground for this practice is also given by researches on another field of study: the relationship between CEOs and top management on firm's performance (Henderson *et al.*, 2006; Gottesman and Morey, 2010) (Researches in this field widely use age as a proxy for experience

of manager, with conflicting results: Henderson et al. (2006) find that firm performance, especially for high tech firms, declines across the tenure of the CEO, whilst Gottesman and Morey (2010) conclude that managers age is positively related to firms' results). The similarity between this field and the informal venture capital industry is given by two factors. On the one hand, business angels are hands-on investors and entrepreneurs find their experience at least as fundamental as the capital they provide. On the other hand, IRR of private investors is, obviously, strictly related to the actual or potential performance of the investee firm.

For these reasons, in this paper age has been standardized and the final experience index is computed as a weighted (The weights have been arbitrarily set as 80% for the number of investments, and 20% for age. The higher weight attributed to the number of investments is due to the necessity to maintain consistency with previous literature (Author, 2011; Capizzi and Tirino, 2011), in order to preserve comparability of the results. However, since age takes into account expertise that represents one of the main sources) product of age and the number of investments made by the angel during her lifetime.

With this adjustment experience becomes a continuous variable (Experience computed only as the number of investment ever made by the single respondent is given as a range, therefore the median point of each range is used for the statistical analysis. This makes the variable discrete), and figure 1 shows the representation of the expected relationship.

Figure 1. Relation between IRR and Experience



Source: Author's elaboration

The blue line –interpolation- represents the true distribution of the observations in the sample, while the black line shows how the quadratic function approximates the data. As noticeable, the level of IRR peaks at a medium level of experience -five to eight investments- whilst at the extremes the return is lower, on average

Holding period

It is a *scale* variable, but is expressed in the model as a *dummy*. There are some reasons to believe that relationship between this variable and the IRR will be negative positive. In Author (2011), for example, it was assumed that the reason why angels keep their investment for too long is that they have difficulties in divesting due to lack of success of the investee company. On the other hand, there are reasons to believe that the relationship will be positive. In fact, contrarily to venture capital funds, that have a short time horizon for their investments in growth companies, angels are long-term investors, since they hold their investment for 3 to five years, on average (Wetzel, S. E., 1983; Sohl, 1999, 2007, 2010). This is also because they invest in the early stage of start up businesses, and even at seed level, thus they need time to let the investee company develop. Moreover, angels invest a very low portion of their own wealth in entrepreneurial ventures, and therefore have the freedom to decide not to divest in case the market is not ready to fairly value their company.

For these reasons, it is reasonable to believe that divestments that occur within the third year (the minimum in the range provided above) will be related to the abandonment of the project due to the failure of the initiative. Therefore, data on holding period have been divided into two categories: equal or lower than 3 years and higher than 3 years. This lead directly to the following research hypothesis.

H4: A Holding period lower than 3 years is associated with lower IRR.

Data presented in table 4 give us a qualitative confirmation of this hypothesis. As can be seen, holding periods below three years are generally associated with negative returns, whilst angels who liquidate their investments after three years are generally rewarded with a higher return averaging 7.7%.

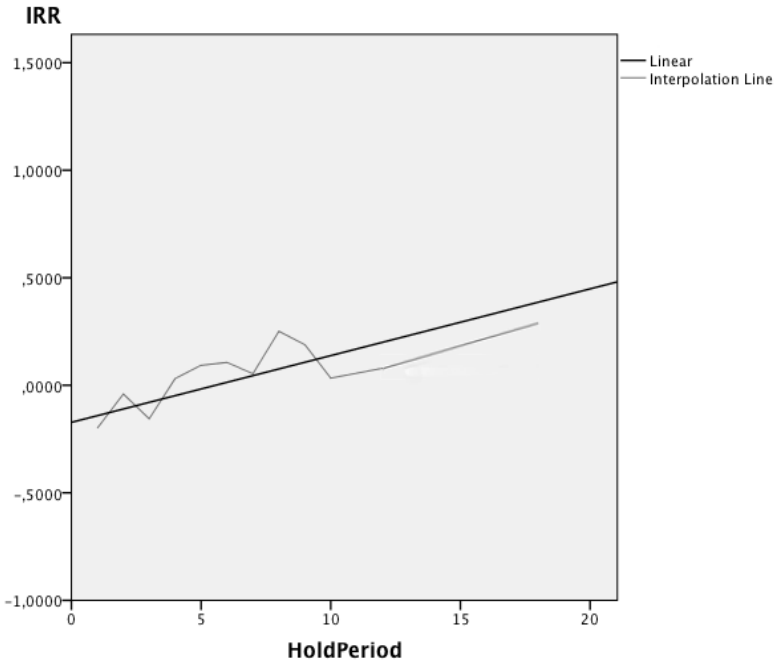
The graphical representation of this relation is showed by figure 2, where the interpolation line - which connects the arithmetic averages of IRR for a given number of year in the x axis- shows the distribution of the sample's observations, while the black line represents the trend, that is the linear model fit with the observations.

Table 4. Average IRR with respect clustered Holding Period

HP - clusters	Average IRR	N	Std. Deviation
HP <= 3 years	-,148974	47	,5130838
HP > 3 years	,076523	34	,1039872
Total	-,054321	81	,4103313

Source: Author's elaboration

Figure 2. Relationship between Holding Period (HP) an IRR



Source: Author's elaboration

Rejection rate. It is a *scale* variable. It is computed as 1 minus the ratio number of investment over the total number of projects evaluated by the investor (1- acceptance rate):

RR = 1 - (# investments performed / # investment considered)

The best way to calculate this ratio would be to use the total number of investments ever made over the total number of investments ever evaluated by the angel. This latter number is very difficult for an individual to remember, since one hardly keeps count of the business plans one ever dealt with in her life. The questionnaire, instead, provides us with the number of investment opportunities the investor came across during each year. In order to maintain homogeneity, the numerator is computed as the number of actual investments performed by the investor in the same year.

Regarding the relationship between this independent and the dependent variable, the IRR should increase at a diminishing rate with the rejection rate. The relationship between the two variables, in this case, is logarithmic.

Three main assumptions must hold for this metric to add value to the model:

Firstly, projects that come to the various business angels have, on average, the same quality; otherwise an investor who receives few high-potential business plans might register a RR equal to 0, still making a very high return with respect to the others.

Secondly, it is assumed that angels decide upon rational criteria (Lumme *et al.* , 1998) and that every one invests also for maximizing financial returns (The return on investment is a major motivation for

business angels, although not the sole one (Wetzel, 1981; Mason and Harrison, 1994; Lumme, Annareetta, Mason, Colin, The returns from informal venture capital investments: An exploratory study, 1996, Journal of Entrepreneurial & Small Business Finance, 10992219, Vol. 5, Issue 2). They also want to have fun while making money (Benjamin and Margulis, 1996). Wetzel (1981) reports that some business angels are influenced by 'hot buttons' and both Wetzel (1981) and Sullivan (1994) note that some business angels are willing to make a trade-off between financial and nonfinancial returns).

Lastly, an implicit assumption is that when informal venture capitalists pass investment proposals to scrutiny, they hold the money to invest in it during that given year. An angel that does not intend to invest would have a RR = 1 even though he came across very good proposals, but then her evaluation would be a waste of time and resources, since she would not invest in the first place. In other words, investors are assumed to be rational.

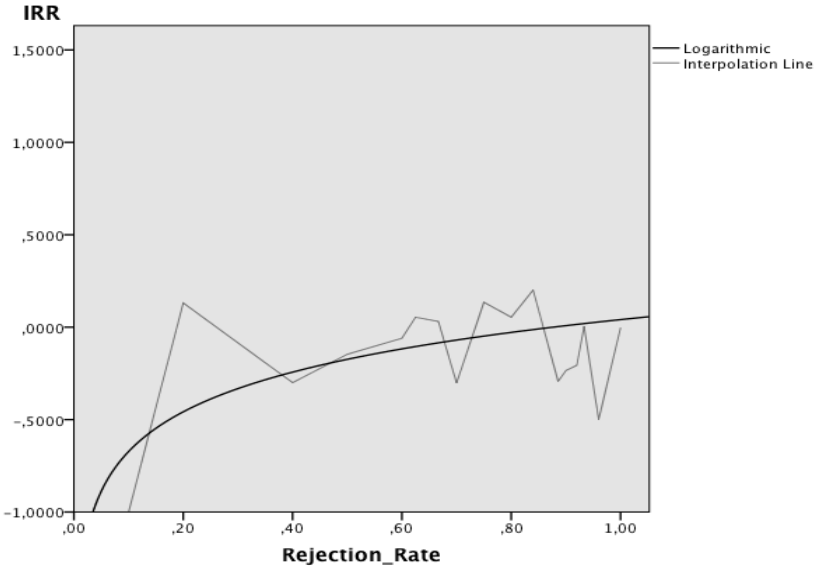
A possible limitation to the explanatory power of this metric is that, given the economic period in which observations were collected, the rejection rate could be artificially high, not because of differences in the application of the "killing criteria", but because of lack of funds or poor perspectives of the market.

Therefore, the following research hypothesis to be tested express the expected impact of this fourth – and innovative, when compared with previous studies – explanatory variable.

H5: As the Rejection Rate increases also the IRR does, at a diminishing rate.

Figure 3 shows how well the logarithmic function approximates the observations in the sample -blue line.

Figure 3. Relationship between Rejection Rate (RR) and IRR



Source: Author's elaboration

Year of divestiture. It is a *dummy* variable. Divestments occurred before the financial turmoil – in 2007 and 2008 – are expected to have obtained higher returns, *ceteris paribus*. In fact, as table 5 shows, in 2008, 2009 and 2010 showed a decreasing annual GDP growth rate, due to the condition of the international financial markets.

Table 5. Annual Italian GDP growth rate, 2006-2011

Year	GDP growth
2006	0,10%
2007	1,90%
2008	1,40%
2009	-1,00%
2010	-5,10%
2011	1,10%

Source: Author's elaboration

Since "*company valuations are often based on multiples of comparable publicly traded companies*" (Weiding *et al*., 2005), those years of economic recession are expected to cause lower market prices, and therefore lower returns for private investors, whose investee firm would be undervalued. Therefore, four dummies were created, with the base being 2007 year.

The following research hypothesis states the expectation about the impact of the yearly macroeconomic growth over the IRR of business angels' investments.

H6: *IRR will be lower for divestments that took place after the beginning of the current financial turmoil and economic recession*

A first, qualitative look at sample's data – table 6 – seems to confirm the hypothesis. IRR is around 10% in 2007 and 12% in 2011, while the years in between register negative returns ranging from -8% to -13%.

Table 6. Average IRR per year

Year	Average IRR	N	Std. Deviation
2007	,091016	8	,5170798
2008	-,113984	23	,4639784
2009	-,077039	24	,4102642
2010	-,131721	15	,4021240
2011	,119843	11	,0633777
Total	-,054321	81	,4103313

Source: Author's elaboration

Summing up, the following table provides the reader with a synthetic overview of all the research hypotheses to be tested, the explanatory variables and their functional forms as well as their expected impact on the IRR of business angels' investments.

Table 7. Sum up of research hypotheses, independent variables and expected results

Hypotheses	**Independent variable**	**Functional Form**	**Expectations**
H1.	Industry	Dummy	Hi-tech industry significantly more profitable
H2.	Exit	Dummy	Descending order profitability: • Listing • Trade Sale • Sale to other financial investor • Sale to entrepreneur • Closed Activity
H3.	Experience	Quadratic	Inverted U-shaped
H4.	Holding Period	Linear	Positive
H5.	Rejection Rate	Logarithmic	Positive
H6.	Year	Dummy	2008, 2009, 2010 associated with lower IRRs.

Source: Author's elaboration

5.2 Results

The econometric model has been tested using a backward procedure,[1] and it is able to explain 23,7% (R^2) of the variability of the dependent variable. Appendix 1 and 2 present the summary statistics from the regression analysis and the major output: Backward procedure, Model summary and Anova table.

By comparing the obtained results with the expected results, the conclusions below evidenced can be drown from the empirical analysis.

H1 is not supported. This means that, given the specification of the model, for the sample analysed, investments in Technology sector do not lead to

[1] The Backward procedure starts from the complete model, which includes all the possible explanatory variables. At each step the statistical software automatically removes the variable with the lowest t statistic (if it is not significant). It is possible do define a criterion of minimum significance required to keep each explanatory variable into the final model. In this case, the minimum level of significance was set at 10%.

significantly higher returns with respect to investments in other industries.

H2 is not supported for the reasons explained in preceding see paragraph 4.1.

H3 is fully supported. Experience does have a positive impact on IRR (positive Beta, significant at a 5% level). The variable "Experience squared" is also significant (5% level) and has a negative beta. This means that Experience positively affects IRR up to a certain level, after which additional levels of experience lead to decreasing returns on investment. Therefore, experience is related to IRR with an inverted U-shaped relationship, confirming the expectations. This implies that the non-significant linear relationship found by Capizzi (2011), might be due to misspecification of the functional form.

H4 is partly supported. The variable *Hold_high* is positive and significant at 10% confidence level. Therefore, investors who maintain their financial resources in the investee company for more than 3 years do show a return 0.18% higher than investors that, *ceteris paribus*, hold their investment for less than 3 years. In other words, the independent variable has a positive, although not strong, linear relationship with the IRR.

H5 is supported. Investors that are more selective with the projects they evaluate earn on average 0.27% higher returns than less selective ones, and this impact on IRR is strongly significant (p-value < 0.01%).

H6 is not supported. Even though the descriptive statistics showed that the average return during the period of financial crisis -from 2008 to 2010- is negative and lower with respect to year less affected by the downturn, this difference is not statistically significant. Furthermore, 2011 resulted to be an year characterized by positive GDP growth, but still affected by economic recession.

The results obtained from the analysis of the Italian informal venture capital industry cannot be compared with the domestic formal venture capital market, due to the small size of the VC market in Italy, its information opacity and the lack of a sufficiently homogenous database of institutional investors to use as benchmark sample.

Nevertheless, the major findings of the empirical analysis run in this study can be partially compared with some relevant contributions at the international level dealing with the formal venture capital industry.

Starting from the most interesting finding of this study, which is the quadratic relationship that links Experience with the performance of business angels' investments, it is interesting to observe that also

Parhankangas and Hellström (2007), who studied the Finnish venture capital industry, found that the most experienced venture capitalists – similarly to Italian informal investors – tend to overestimate the probability of success of the ventures they finance.

Other contributions dealing with VC industries of developed markets (Rosenstein et al. 1993; Sapienza et al. 1996) find that inexperienced venture capitalists earn lower returns with respect to more experienced ones. However, Fleming (2004) finds that in emerging markets experienced venture capital firms do not earn higher returns than inexperienced ones.

The conclusion is that the results of this study are consistent with the outcomes of a great deal of contributions dealing with the formal venture capital industry, as far as we demonstrated that both inexperienced angels and angels with overwhelming experience tend to earn lower returns.

Looking at the relationship between *holding period* and IRR in the forma venture capital industry, Stevenson *et al.* (1987) and Manigart *et al. (*2002), reach opposite results to this study. They demonstrate that venture capital firms bear expectations of higher returns when they plan to divest within the first years. In fact, as already mentioned, closed-end venture capital companies need to return financial resources harvested from exits to the shareholders. This implies that the company cannot reinvest the money to increase returns, and thus it will require higher yields if the holding period is expected to be short.

The key difference that explains the opposite result obtained in this research is that business angels invest their own money, and their involvement in the firm is high and effective – when compared with that of venture capital fund managers. For these reasons, angels will gain a higher return with a long-enough holding period (minimum 3 years) along which period the entrepreneur can take advantage of the expertise and network the angel can provide.

Although the econometric model used in this study has to be still better specified – and maybe there is the space for the identification of further explanatory variables – the outcomes of the empirical analysis give hints to business angels on which capabilities to improve and which behaviours to follow in order to boost financial performances:

- Improve the ability to evaluate business plans, that is approximated in the model with the level of rejection rate;
- Increase expertise, by performing more investments, rather than few very considerable ones;
- Do not fall into the trap of overconfidence, for instance by sharing information with other angels and co-investing;
- Invest with a long-term perspective.

6. Conclusions and policy suggestions

The descriptive and econometric analysis performed in the previous paragraphs allows to shed light over a still opaque segment of the capital market, and low regulated as well, but crucial in order to fill the

funding gap and boost the creation of new start-up companies: the informal venture capital markets.

This study firstly gives a comprehensive review of the literature on the informal venture capital, sorting the different studies by the three generations widely accepted by scholars.

Secondly, it analyses the results of five yearly surveys –from 2007 to 2011– carried out by the Italian Business Angels Network (IBAN): today, this is the widest and most innovative database that provides data on Italian business angels over a 5 year time period. The descriptive analysis, in comparison with the results of previous studies and international literature, provides the reader with an accurate and updated snapshot on the attitudes, behaviors and characteristics of Italian business angels.

Finally, the empirical analysis leads to innovative results and deepens the level of accuracy with respect to previous studies regarding the informal venture capital industry, in particular by innovating the econometric models used in previous studies through the introduction of an original set of independent variables (industry, exit strategy, experience, holding period, rejection rate, year of divestiture), and by choosing different and more appropriate functional forms for the classic linear ones.

Regarding the tested hypothesis, H1, H2 and H6 are not supported by the data. This means that in this sample, running the multivariate regression, on average, different *industries*, *exit strategies* or *years of divestiture* are factors that do not have a statistically significant impact on the dependent variable: the IRR. On the other hand, H3 is fully supported by data: *experience* positively affects IRR up to a certain level, after which additional levels of experience lead to decreasing returns on investment: therefore, experience is related to IRR with an inverted U-shaped relationship, confirming the expectations. H4 is just partially supported by empirical analysis: longer *holding periods* mean, on average, higher IRR, but only within a 10% level of significance. H5 is supported: investors characterized by higher *rejection rates*, that is more selective with the projects they evaluate, earn on average 0.27% higher returns than less selective ones, and this impact on IRR is strongly significant.

The importance of the informal venture capital industry has been repeatedly stressed during the course of this study. Business angels are the most relevant suppliers of funds for seed and start-up ventures, since they way overcome the amount of financial resources that venture capital funds allocate to firms in these early stages.

Today more than ever before, the role of these economic players is fundamental. In fact, angels replace the reduced bank's credit capacity, and new ventures absorb the excessive supply of labor, mitigating the soaring unemployment rate that plagues especially young workers. In such a harsh macroeconomic environment innovation and entrepreneurship must be encouraged by policymakers, as they can represent the solution to restart economic growth.

More concretely, a part from classical - though not herein criticized - financial and fiscal incentives, basing upon the results of the empirical analysis performed in this study, it is possible to give insights on further possible policy interventions.

The quadratic relationship between experience and IRR implies that angels should gather experience as quickly as possible, in order not to be on the left part of the inverted U-shape curve. Two instruments allow angels to gather experience without paying with lower IRRs.

The first one is to co-invest with other angels through syndicates. In this way, angels can learn from more experience peers and lower their risk exposure. Furthermore, the advice of co-investors and network members can limit the risk of overconfidence that threatens expert angels' performance.

The second one is participating to specific training courses offered by the Networks (BAN) to the investors, in order to give them the instruments to better evaluate business plans and improve the quality of their screening processes. In fact, the positive relationship between Rejection Rate and IRR demonstrates that angels with more stringent killer criteria will earn more. Also in this case, syndication and BANs play a key role in the refinement of angels' criteria and in their ability to evaluate business plans with an eye on potential IRR.

Unfortunately, as previously mentioned, BANs in Italy are still not thoroughly organized nor officially legitimated and do not have the financial availability to offer the educational services that angels would so much benefit from. If public incentives were focused on stimulating network membership, BANs would be able to gather the finances needed to offer educational services and angels would be pushed to actively participate. Moreover, angels would improve their ability in business plans' evaluation also by taking benefit of the sharing of experience inside BANs: Higher level of experience and better evaluation would lead to higher performance and, therefore, to a more efficient informal venture capital market. This, in turn, could further increase financial resources available to start-up businesses, stimulating the growth of the economic and social system as well.

References

1. Amason, A. C., and Sapienza, H. J. (1993), *Effect of Innovativeness and Venture Stage on Venture Capitalist-Enterpreneur Relations.* The Institute of Management Sciences, 38-51.
2. Arnstein, D. E. (2003), *Venture Capital, Chapter 17 of White, Sammis B. et al - Financing Economic Development in the 21st Century.*

3. Author (2011), *What Drives the Returns of Business Angels' Investments? An Empirical Analysis of the Italian Informal Venture Capital Market*. GSTF Global Business review, Vol.1 No. 2.
4. Author (2013), *Selecting the functional forms of the determinants of the performance of business angels' investments: an empirical analysis of the Italian informal venture capital market*, Research Division "C. Dematté" SDA Bocconi, SSRN Working Paper.
5. Benjamin, G. A., and Margulis, J. (1996), *Finding your wings: How to locate private investors to fund your venture*. New York: Wiley.
6. Bygrave, W. D., Hay, M., Ng, E. and Reynolds, P. (2003), *A Study Of Informal Investing In 29 Nations Composing The Global Enterprise Monitor.* Venture Capital: An International Journal of Entrepreneurial Finance, 5, 101-116.
7. Black, B. S. and R. J. Gilson (1997), *Venture capital and the structure of capital markets: banks versus stock markets.* Journal of Financial Economics 47: pp. 243-277.
8. Capizzi, V. (2001), *I Fondi Mobiliari Chiusi di Diritto Italiano: aspetti normativi e operativi.* Milano: SDA Bocconi.
9. Capizzi, V. (2007), *L'Investment Banking in Italia.* Bancaria Editrice.
10. Capizzi, V. and Giovannini, R. (2010), *Business Angels e Informal Venture Capital in Italia*. Bancaria Editrice.
11. Capizzi, V. and Tirino, G. (2011), *Business Angels and Informal Venture Capital in Italy: emerging trends and investment policies of Italian Business Angels*, SDA Bocconi, Working Paper .
12. Chiruvolu, R. (2004), *Making peace with our Angels*. Venture Capital Journal , Vol. 8, 29-30.
13. Cochrane, J. H. (2004), *The risk and return of venture capital*, University of Chicago.
14. Coveney, P., and Moore, K. (1998), *Business Angels - Securing Start-Up Finance.* Wiley.
15. EBAN, (2006), *Excerpt from www.eban.org*
16. EBAN, (2008), *EBAN winter University 2008.*
17. Evanson, D. R. (1998), *Where to go when the Bank Says No: Alternatives for Financing Your Business.* New York: Bloomberg Press.
18. EVCA, (2002), *The Economic and Social Impact of Venture Capital in Europe.*
19. EVCA, (2006), *EVCA Report 2006.*
20. Fleming, G. (2004), *Venture Capital Returns in Australia.* Venture Capital: An International Journal of Entrepreneurial Finance, Vol. 6, No. 1: pp. 23-45.
21. Freear, J., Sohl, J. E. and Wetzel, W. E. jr. (1992), *The Investment Attitudes, Behavior And Characteristics Of High Net Worth Individuals.* In Frontiers of Entrepreneurship Research 1992, edited by N. C. Churchill, S. Birley, W. D. Bygrave, D. F. Muzyka, C. Wahlbin and W. E. Wetzel, jr., pp.374-387. Babson College, Babson Park: MA.
22. Gaston, R. J. (1986), *The scale of informal capital market*. Small Business Economics, 223-230.
23. Gaston, R. J. (1989), *Finding Private Venture Capital for Your Firm: a Complete Guide*. New York: Wiley.
24. Gervasoni A. and Sattin F. (2008), *Private equity e venture capital*. Guerini e Associati Editore, 2008
25. Giovannini, R. (2000), *La gestione del Venture Capital e dell'Early Stage Financing*. Bancaria Editrice.
26. Gompers, P., Kovner, A., Lerner, J., and Scharfstein, D. (2010), *Performance Persistence in Entrepreneurship*, Journal of Financial Economics, No 96, pp. 18-32.
27. Gottesman, A. A. and Morey, M. R. (2010), *CEO Educational Background and Firm Financial Performance.* Journal of Applied Finance, No. 2: pp. 70-82
28. Gregorio, D. D., e Shane, S. (2002), *Why do some Universities generate more start-ups than others?* Research Polivy , Vol. 32, 209-227.
29. Hanf, D. (2007), *Interdependence and Respect Balanced with Strife and Discord.*
30. Harrison, R., and Mason, C. (1998), *Informal Venture Capital - Evaluating the impact of Business Introduction Services.* Prentice Hall - Woodhead-Faulkner.
31. Harrison, R. T. and Mason, C. M. (1999), *Is it worth it? The rates of return from informal venture capital investments.* Journal of Business Venturing, 17, 211-236.
32. Harrison, R., e Mason, C. (2000), *Venture Capital Market Complementarities: the Link Between Business Angels and Venture Capital Funds in the United Kingdom*. Venture Capital Journal , Vol. 2, 223-242.
33. Harrison, R. T. and Mason, C. M. (2002), *Barriers to investment in the informal venture capital sector*. Entrepreneurship & Regional Development 14: p. 271.
34. Harrison, R. T. and Mason, C. M. (2003), *'Auditioning For Money': What Do Technology Investors Look For At The Initial Screening Stage?* Journal of Private Equity, 6 (2), 29-42.
35. Harrison, R. T. and Mason, C. M. (2007), *Does gender matter? Women business angels and the supply of entrepreneurial finance*. Entrepreneurship Theory and Practice, 31, 447-474.
36. Henderson, A. D. et. al. (2006), *How Quickly Do Ceos Become Obsolete? Industry Dynamism, Ceo Tenure, And Company Performance.* Strategic Management Journal 27: pp. 447–460.
37. Heukamp, F. H., Liechtenstein, H. and Wakeling, N. (2007), *Do Business Angels alter the risk-return equation in early-stage investments? Business Angels as seen by venture capitalists in the German speaking countries.* The Journal of Private Equity, pp. 67-86.
38. IBAN, (2008), *Survey 2007.*
39. IBAN, (2009), *Survey 2008.*
40. IBAN, (2010), *Survey 2009.*
41. IBAN, (2011), *Survey 2010.*
42. IBAN and KPMG, (2008), *Quaderno IBAN - Guida pratica allo sviluppo di progetti imprenditoriali.*
43. Jeng, L. and Wells, P. (2000), *The determinants of venturecapital funding: evidence across countries.* Boston University School of Management, Boston, MA, USA.
44. Landström, H. (1993), *Informal risk capital in Sweden and some international comparisons*. Journal of Business Venturing, 8, pp. 525-540.
45. Lumme, A. et al. (1996), *The returns from informal venture capital investments: An exploratory study.* Journal of Entrepreneurial & Small Business Finance, 10992219, Vol. 5, Issue 2
46. Madill, J. J., Haines, G. H. jr. and Riding, A. L. (2005), *The Role Of Angels In Technology SMEs: A Link To Venture Capital*. Venture Capital: An International Journal of Entrepreneurial Finance, 7, 107-129.
47. Manigart, S., De Waele, K., Wright, M., Robbie, K., Desbrières, P., Sapienza, H. J. and Beekman, A.

(2002), *Determinants of required return in venture capital investments: A five-country study.* Journal of Business Venturing 17: pp. 291-312
48. Mason, C. (2006), *Business Angels and Business Angels Networks in Europe* - EBAN Winter University.
49. Mason, C. (2008), *The real venture capitalists: a review of research on business angels.*
50. Maula, M., Qutio, E. and Arenius, P. (2005), *What drives micro-angel investments?* Small Business Economics, 25, 459-475.
51. Meyer, T. (2006), *Venture Capital in Europe Spice for European Economies*. Deutsche Bank Research.
52. Mustilli, M. and Sorrentino, M. (2003), *Business Angel in Italia.* Torino: Giappichelli Editore.
53. Mustilli, M. and Gangi, F. (1999), Innovazioni fiscali e scelte di struttura finanziaria.
54. NVCA, (2004), *Venture Impact 2004 - Venture Capital Benefits to the US Economy.*
55. NVCA, (2010), *Venture Capital Investments Q3-2010 – MoneyTree Results*.
56. Paul, S., Whittam, G. and Johnston, J. B. (2003), *The Operation Of The Informal Venture Capital Market In Scotland*. Venture Capital: An International Journal of Entrepreneurial Finance, 5, 313-335.
57. Parhankangas, A. and Hellström, T. (2007), *How Experience and Perceptions Shape Risky Behaviour: Evidence from the Venture Capital Industry.* Venture Capital, Vol. 9, No. 3: pp. 183 – 205.
58. Riding, A., Dal Cin, P., Duxbury, L., Haines, G. and Safrata, R. (1993), *Informal investors in Canada: the identification of salient characteristics*. Ottawa: Carleton University.
59. Rosenstein et al. (1993), *The CEO, venture capitalists, and the board.* Journal of Business Venturing, Vol. 8, Issue 2: pp. 99–113.
60. Sapienza, H. J., and Korsgaard, M. (1996), *The role of procedural justice in enterpreneurventure capitalist relations.* Academy of Management Journal , 544-574.
61. Serio, L., and Lo Valvo, P. P. (2003), *Il fenomeno dei BAN in Italia: modelli e pratiche di funzionamento. In M. Mustilli, e M. Sorrentino, I Business Angel in Italia* (p. Chap. 5). Giappichelli Editore.
62. Sheahan, M. (2005), *Why can't Angels and VC just get along?* Venture Capital Journal, 10-11.
63. Sohl, J. E. (1999), *The early stage Equity market in the United States*. Venture Capital: An International Journal of Entrepreneurial Finance 1: pp. 101-120.
64. Sohl, J. E. (2006), *Angel and Venture Capitalist relationship: Peaceful neighbors or outright enemies?* The Angel Journal - December.
65. Sohl, J. E. (2006), *The Early Stage Equity Market in the USA.*
66. Sohl, J. E. (2007), *The organisation of the informal venture capital market.* In Handbook of Research on Venture Capital, edited by H. Landström. Edward Elgar, Cheltenham, pp. 347-368.
67. Sohl, J. E. (2008), *The angel investor market in 2007: mixed signs of growth.* Center for Venture Research.
68. Sohl, J. E. (2010), *The Effect of Gender Diversity on Angel Group Investment.* Entrepreneurship Theory and Practice, Wiley-Blackwell: pp. 709-725.
69. Sohl, J. E. and Hill, L. (2007), *Women business angels: insights from angel groups*. Venture Capital: An International Journal of Entrepreneurial Finance, 9, 207-222.
70. Sohl, J. E. and Sommer, B. (2003), *Angel Investing: changing strategies during volatile times*. Working paper.
71. Sorrentino, M. (2003), *Le nuove imprese. Economia delle nuove iniziative imprenditoriali*. CEDAM, Padova.
72. Sorrentino, M., (2006). *Venture capital informale e imprenditorialità innovative*. Sinergie No. 71, pp. 99 – 126.
73. Stevenson, H. H., Muzyka, D. F. and Timmons, J. A. (1987), *Venture capital in transition: A Monte Carlo simulation of changes in investment. Patterns.* Journal of Business Venturing 2: pp. 103-122.
74. Van Osnabrugge, M. (1998), *The financing of enterpreneurial firms in the UK: a comparison of Business Angel and Venture Capital investment resources.* Oxford.
75. Van Osnabrugge, M., and Robinson, R. (2000), *Angel Investing - Matching start-up funds with start-up companies.* San Francisco, CA: Jossey-Bass.
76. Van Osnabrugge, M. (2000), *A Comparison Of Business Angel And Venture Capitalist Investment Procedures: An Agency Theory-Based Analysis*. Venture Capital: An International Journal of Entrepreneurial Finance, 2, 91-109.
77. Visser, R. and Williams, R. (2001), *Prospecting For Gold: How Dutch Informal Investors Appraise Small Businesses In Trouble.* Venture Capital: An International Journal of Entrepreneurial Finance, 3, 1-24.
78. Weidig, T., Kemmerer, A., Born, B. (2005), The Risk Profile of Private Equity Funds of Funds. Journal of Alternative Investments, Vol. 7 Issue 4: pp. 33-41
79. Wetzel, W. E. (1983). Angels and informal risk capital. Sloan Management Review 24: pp. 23–34.
80. Wetzel, W. E. (1986), Enterpreneurs, Angels and Economic Renaissance. Lexington Books, MA.
81. Wetzel, W. E. (1987), The informal risk capital market: aspects of scale and efficiency. 412-428.
82. Wetzel, W., and Freear, J. (1993), *Promoting informal venture capital in the United States: information, networks and public policy.*
83. Wiltbank, R. (2005), *Investment Practices and Outcomes of Informal Venture Investors.* Venture Capital, Vol. 7, No. 4: pp. 343 – 357
84. Wiltbank, R. Read, S., Dew, N. and Sarasvathy, S. D. (2009), *Prediction and control under uncertainty: outcomes in angel investing*. Journal of Business Venturing, No. 24, pp. 116-133.
85. Zider, B. (1998), How Venture Capital Works. *Harvard Business Review* . Vol. 76, No. 6, pp. 131-139.

Appendix 1. Summary statistics from the regression analysis

	HP_high	Exp	Exp_squared	Ln_Rejection_Rate	SectorMCD	SectorOther	SectorME	SectorFin	SectorServ	y_2011	y_2008	y_2009	y_2010	Residuals
HP_high	1													
Exp	0,04	1												
Exp_squared	0,001	,981**	1											
Ln_Rejection_Rate	0,144	-0,089	-0,117	1										
SectorMCD	0,209	0,053	0,054	0,042	1									
SectorOther	-0,062	0,059	0,082	0,024	-0,147	1								
SectorME	-0,084	0,023	0,066	-0,174	-0,128	-0,109	1							
SectorFin	-0,173	-0,064	-0,069	0,059	-0,128	-0,109	-0,095	1						
SectorServ	-0,047	0,023	0,057	-0,026	-,247*	-0,209	-0,182	-0,182	1					
y_2011	,320**	-0,052	-0,07	-0,066	-0,165	-0,14	0,006	-0,122	0,012	1				
y_2008	-0,092	-0,005	-0,032	-0,128	-0,031	-0,048	0,001	0,196	-0,123	-,250*	1			
y_2009	-0,168	0,096	0,117	0,041	0,034	-0,057	-0,007	0,089	0,11	-,257*	-,409**	1		
y_2010	-0,019	-0,203	-0,186	0,097	-0,02	,236*	0,08	-0,147	-0,064	-0,189	-,300**	-,309**	1	
Residuals	0	0	0	0	0,036	-0,023	-0,071	0,036	0,014	0,117	-0,088	0,022	-0,12	1

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*

Looking at the data, none of the variables show high level of Pearson's correlation coefficient. Moreover, none of the VIF coefficient is higher than 2.5, much lower than the conventional cut-off rate of 3, above which there would be a mild collinearity. This means that there is no multicollinearity among the variables.
Also the residuals of the model have been put into the correlation matrix and tested against the other independent variables. The VIF coefficient gave results even lower than 1: all the explanatory variables are uncorrelated with the error term

Appendix 2a. Regression outputs. Backward procedure. Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-,174	,249		-,699	,487
	Ln_Rejection_Rate	,265	,109	,270	2,437	,017
	Exp_squared	-,010	,004	-1,356	-2,197	,031
	Exp	,127	,062	1,259	2,064	,043
	HP_high	,112	,098	,136	1,141	,258
	Sector MCD	,050	,149	,044	,337	,737
	Sector Other	,025	,162	,019	,153	,879
	Sector ME	-,054	,177	-,037	-,305	,761
	Sector Fin	,072	,172	,050	,419	,676
	Sector Serv	,004	,123	,004	,032	,974
	y_2011	,004	,198	,003	,021	,984
	y_2008	-,189	,168	-,209	-1,128	,263
	y_2009	-,125	,161	-,140	-,781	,438
	y_2010	-,220	,179	-,209	-1,230	,223
2	(Constant)	-,171	,215		-,798	,427
	Ln_Rejection_Rate	,264	,107	,269	2,479	,016
	Exp_squared	-,010	,004	-1,356	-2,214	,030
	Exp	,127	,061	1,259	2,080	,041
	HP_high	,113	,095	,136	1,189	,238
	Sector MCD	,049	,139	,043	,354	,725
	Sector Other	,024	,159	,019	,153	,879
	Sector ME	-,054	,176	-,037	-,308	,759
	Sector Fin	,072	,170	,050	,422	,674
	Sector Serv	,004	,120	,004	,029	,977
	y_2008	-,191	,125	-,212	-1,529	,131
	y_2009	-,127	,124	-,143	-1,031	,306
	y_2010	-,222	,141	-,211	-1,575	,120
3	(Constant)	-,168	,191		-,884	,380
	Ln_Rejection_Rate	,264	,106	,269	2,497	,015
	Exp_squared	-,010	,004	-1,350	-2,343	,022
	Exp	,127	,058	1,253	2,191	,032
	HP_high	,113	,094	,136	1,198	,235
	Sector MCD	,047	,125	,041	,379	,706
	Sector Other	,022	,144	,017	,155	,877
	Sector M&E	-,056	,160	-,039	-,351	,727
	Sector Fin	,070	,160	,048	,440	,661
	y_2008	-,191	,124	-,212	-1,540	,128
	y_2009	-,127	,122	-,142	-1,039	,302
	y_2010	-,222	,140	-,211	-1,586	,117
4	(Constant)	-,164	,187		-,877	,383
	Ln_Rejection_Rate	,265	,105	,270	2,519	,014
	Exp_squared	-,009	,004	-1,336	-2,365	,021
	Exp	,125	,057	1,241	2,205	,031
	HP_high	,112	,093	,136	1,205	,232
	Sector MCD	,044	,122	,038	,359	,721
	Sector M&E	-,061	,156	-,042	-,394	,695
	Sector Fin	,067	,157	,046	,427	,671
	y_2008	-,190	,123	-,210	-1,543	,127
	y_2009	-,126	,121	-,141	-1,040	,302
	y_2010	-,216	,135	-,206	-1,608	,112
5	(Constant)	-,159	,186		-,856	,395
	Ln_Rejection_Rate	,265	,104	,270	2,539	,013
	Exp_squared	-,009	,004	-1,320	-2,358	,021
	Exp	,124	,056	1,227	2,199	,031
	HP_high	,119	,091	,144	1,312	,194

	Sector M&E	-,069	,153	-,048	-,451	,653
	Sector Fin	,061	,155	,042	,390	,698
	y_2008	-,187	,122	-,207	-1,533	,130
	y_2009	-,123	,120	-,137	-1,019	,311
	y_2010	-,215	,134	-,205	-1,607	,112
6	(Constant)	-,152	,184		-,829	,410
	Ln_Rejection_Rate	,269	,103	,274	2,598	,011
	Exp_squared	-,009	,004	-1,322	-2,375	,020
	Exp	,124	,056	1,226	2,210	,030
	HP_high	,114	,089	,138	1,278	,205
	Sector M&E	-,074	,152	-,051	-,489	,627
	y_2008	-,178	,119	-,197	-1,495	,139
	y_2009	-,117	,119	-,131	-,985	,328
	y_2010	-,217	,133	-,207	-1,633	,107
7	(Constant)	-,166	,181		-,920	,361
	Ln_Rejection_Rate	,276	,102	,281	2,709	,008
	Exp_squared	-,010	,004	-1,375	-2,533	,013
	Exp	,129	,055	1,277	2,354	,021
	HP_high	,115	,089	,139	1,291	,201
	y_2008	-,180	,118	-,199	-1,525	,132
	y_2009	-,118	,118	-,132	-1,000	,321
	y_2010	-,223	,132	-,212	-1,693	,095
8	(Constant)	-,251	,160		-1,572	,120
	Ln_Rejection_Rate	,268	,102	,274	2,644	,010
	Exp_squared	-,010	,004	-1,401	-2,585	,012
	Exp	,131	,055	1,302	2,403	,019
	HP_high	,140	,085	,169	1,640	,105
	y_2008	-,113	,097	-,125	-1,162	,249
	y_2010	-,155	,113	-,148	-1,374	,174
9	(Constant)	-,273	,159		-1,717	,090
	Ln_Rejection_Rate	,283	,101	,288	2,797	,007
	Exp_squared	-,009	,004	-1,296	-2,420	,018
	Exp	,122	,054	1,208	2,250	,027
	HP_high	,151	,085	,183	1,780	,079
	y_2010	-,116	,108	-,111	-1,077	,285
10	(Constant)	-,324	,152		-2,130	,036
	Ln_Rejection_Rate	,272	,101	,278	2,705	,008
	Exp_squared	-,009	,004	-1,343	-2,513	,014
	Exp	,129	,054	1,275	2,389	,019
	HP_high	,152	,085	,184	1,788	,078

a. Dependent Variable: IRR

Appendix 2a. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
10	,487[a]	,237	,197	,3677040

a. Predictors: (Constant), Ln_Rejection_Rate, Exp, HP_high, Exp_squared
b. Dependent Variable: IRR

Appendix 2c. ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
10	Regression	3,194	4	0,799	5,906	,000a
	Residual	10,276	76	0,135		
	Total	13,47	80			

a. Predictors: (Constant), Ln_Rejection_Rate, Exp, HP_high, Exp_squared
b. Dependent Variable: IRR

Source: Author's elaboration