POLITECNICO DI MILANO

School of Industrial and Information Engineering

Master of Science in Management Engineering

POLITECNICO
MILANO 1863

Do BA investments boost VC financing in European start-ups?

On the complementary or substitute roles of BAs and VCs in Europe

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Academic Year 2017/2018

ABSTRACT

The relationship between Business Angels and Venture Capitalists has been at the centre of discussion by researchers since the first identification of the importance of the Business Angel market by Wetzel in 1981. Business Angels have been attributed the role of filling start-ups' equity gap in the first stages of their development, while follow-up investments by Venture Capitalists are expected to fuel ventures' growth in later stages. In this direction, scholars, so far, have conducted qualitative research to understand the relationship between Business Angels and Venture Capitalists finding evidence on the role of Business Angels as facilitator of follow-up investments by Venture Capitalists. However, a recent quantitative study performed by Hellmann in 2017 on a database of Canadian start-ups has shown that the presence of a Business Angel investment decrease by 30% the probability of receiving a follow-up investment by Venture Capitalists. Tapping into this hot topic, the aim of this work is to bring light into the relationship between Business Angels and Venture Capitalists with a specific focus on the European market.

In particular the thesis investigates how a previous investment made by Business Angels affects the probability of receiving follow-up investments by Venture Capitalists; an increase in the probability will confirm the theoretical perspective that states that Business Angels and Venture Capitalists are complementary investors that finance the same start-ups at different stages; on the other hand if the probability decreases it means that the two investors are substitutes that work on parallel streams of financing. Results on a large sample of European start-ups show that in Europe the presence of a Business Angel investor decreases by 5% the probability of receiving follow-up investments by Venture Capitalists supporting the view that these two types of investors are substitutes also in the Europe market, even though at a lesser extent compared to Hellmann's results.

A breakdown of Venture Capital investors subtypes according to their governance structure shows that Independent Venture Capitalists are the ones less willing to invest in the presence of a

Business Angel in the target company ownership structure, while Corporate and Governmental Venture Capitalists hold better relationship with Business Angels and are prepared to collaborate with them.

ABSTRACT (ITALIAN)

La relazione che sussiste tra Business Angels e Venture Capitalists è al centro di discussioni da parte dei ricercatori sin dalla prima identificazione dell'importanza del mercato dei BA effettuata da Wetzel nel 1981. Ai Business Angels è stato attribuito il ruolo di colmare l'equity gap che esiste nei primi stadi dello sviluppo della start-up mentre gli investimenti da parte dei Venture Capitalists servono a finanziare stadi successivi. In questa direzione i ricercatori hanno condotto studi qualitativi per investigare meglio il rapporto tra BAs e VCs trovando indizi sul ruolo dei Business Angels come facilitatori per ottenere futuri investimenti da parte dei Venture Capitalists. D'altro canto un recente studio quantitativo effettuato da Hellmann nel 2017 su un database di start-ups Canadesi ha dimostrato che la presenza di un investimento da parte di un Business Angel diminuisce del 30% la probabilità di ricevere successivi investimenti da parte di Venture Capitalists. Lo scopo di questa tesi è di portare luce sul rapporto tra Business Angels e Venture Capitalists spostando l'attenzione sul mercato Europeo.

In particolare questa tesi indaga come un precedente investimento da parte di Business Angels influisca sulla probabilità di ricevere successivi investimenti da parte di Venture Capitalists; un aumento nella probabilità confermerebbe la teoria che vede i Business Angels e i Venture Capitalists come investitori complementari che finanziano le stesse start-up ma a stadi diversi; d'altra parte se la probabilità dovesse diminuire vorrebbe dire che i due investitori si comportano come sostituti che finanziano le compagnie in parallelo. I risultati del modello ottenuti su un vasto campione di start-up europee dimostrano che in Europa la presenza di un Business Angel diminuisce del 5% la probabilità di ricevere successivi investimenti da parte di Venture Capitalists, supportando l'ipotesi che vede Business Angels e Venture Capitalists come sostituti, anche se i risultati sono meno drastici rispetto a quelli trovati da Hellmann. Suddividendo i Venture Capitalists nei loro sotto tipi si può notare come gli Independent Venture Capitalists siano quelli

più negativamente correlati alla presenza di Business Angels, mentre Corporate and Governmental Venture Capitalists mantengono migliori rapporti coi Business Angels.

RINGRAZIAMENTI

Inizio ringraziando il mio relatore Vincenzo Butticè e

La mia correlatrice Francesca Tenca, angelo custode di questa tesi

Ringrazio Andrea, sballottato con me di scaglione in scaglione durante questi anni universitari

Ringrazio il gruppo di amici *Gondor* con cui da ormai 10 anni vivo avventure e disavventure

Ringrazio Marco, Lucia e Ado ed Emanuele per quello che mi hanno insegnato negli anni

Ringrazio Federica, Giulia, Laura, Stefano e Riccardo per il cammino che percorriamo assieme

Ringrazio i miei ragazzi del 2000 a cui auguro di continuare il loro cammino insieme

Ringrazio lo zio Pietro, la zia Lucia, lo zio Stefano, Paolo e Sara

Ringrazio la nonna Mariola che mi sfama da quando ero piccolo e

Il nonno Mario che raggiungo tra gli ingegneri

Ringrazio la nonna Angela che mi ha insegnato a come cavarmela in ogni situazione e

Il nonno Giacomo che mi ha trasmesso il gusto del Bello e dello stupore

Ringrazio Marco che sono sicuro raggiungerà presto e con successo questo stesso traguardo

Ringrazio Mamma e Papà che servirebbe una tesi intera per descrivere ciò che fanno per me

Grazie a Valeria che, da lontano e da vicino, mi è sempre stata accanto

ACKNOWLEDGEMENTS

I want to thank my supervisor Vincenzo Butticè and

My co-supervisor Francesca Tenca, guardian angel of this thesis

Thank you Andrea, that migrated from class to class with me during these years at university

Thanks to my group of friends *Gondor* for the adventure and misadventure of the last 10 years

Thank you Marco, Lucia, Ado and Emanuele for what you taught me during the years

Thank you Federica, Giulia, Laura, Stefano and Riccardo for the journey we walk together

Thank you to the guys of 2000 to whom I wish to continue their journey together

Thank you Pietro, Lucia, Stefano, Paolo and Sara

Thank you to my grandmother Mariola that feeds me since I was a baby

Thank you to my grandfather Mario that I reach along the engineers

Thank you to my grandmother Angela that taught me how to solve any problem

Thank you to my grandfather Giacomo that taught me the value of Beauty and wonder

Thank you to Marco who I'm sure will soon successfully reach this goal

Thank you to Mum and Dad, that do so many things for me that an entire thesis would be needed to list them all

Thank you Valeria who, from far and near, always stood y my side

TABLE OF CONTENTS

INDEX OF FIGURES

INDEX OF TABLES

INTRODUCTION

Since their identification by Wetzel in 1981, Business Angels role and characteristics have always been at the centre of studies and debates; particular attention is dedicated to the similarities, differences and relationship between Business Angels and the more known Venture Capitalists investors.

Business Angels have been initially defined as high net-worth individuals that provide risk capital to start-ups in the early stages of their development (Wetzel 1983), other definitions given by researchers in later years never differed too much from this initial one that still holds as common consensus today.

Business Angels role is primarily to fill the equity gap left by formal investors, such as Venture Capitalists, in the early stages of the start-up's development (Freear et al. 1990, Berger 1998); in this way Business Angels have always been seen as a way for companies to receive the capital necessary to survive and grow in early stages (in addition to the capital provided by founders, family and friends), and benefit, at the same time, from the active involvement of the Business Angel in the company, while ventures usually obtain Venture Capital financing in later stages. Many researchers have found qualitative evidence on how Business Angels function as facilitator for obtaining further financing: for example Freear and Wetzel in 1990 and Harrison and Mason in 2000 argue that the work of Business Angels creates a pool of pre-screened high quality start-ups in which is easier for Venture Capitalists to invest in. Also Madill (2005) hypothesizes that the presence of a Business Angel works as a positive signal that the company represents a high growth investment opportunity, more precisely the expertize and mentoring provided by angels allow the company to achieve better performance and be more appealing for Venture Capitalists, furthermore the presence of a Business Angel has a validation role reducing information asymmetries between the start-up and Venture Capitalists interested in investing in the company.

It is just in recent years that researchers started to question if Business Angels are really able to boost the financing from Venture Capitalists in the company and if the relationship between the two investors is really this tight as qualitative evidence suggests.

Particularly interesting is the study conducted by Hellmann (2017), analysing the investments made in a sample of start-ups based in Canada. He found that the presence of an investment made by a Business Angel actually drastically decreases the probability of receiving further investments by Venture Capitalists.

Even though Hellmann's sample is limited to a narrow geographical area the results show a clear trend that is apparently against the suggestion presented by qualitative researches made in the past.

Keeping as a reference Hellmann's study, the aim of this work is to analyse whether and at what extent an investment made by a Business Angels influences the probability of receiving further investments by Venture Capitalists. In other words, I aim at understanding if Business Angels and Venture Capitalists in Europe can be considered complementary investors, as theoretical studies have suggested, or if the results will be in line with Hellmann's one identifying Business Angels and Venture Capitalists as substitute investors, which work on parallel channels.

This work utilizes the VICO database provided by Politecnico di Milano that contains data from companies belonging to 8 European countries that have received investments after 1998. Thanks to this large dataset, I was able also to differentiate between different types of Venture Capitalists: Independent Venture Capitalists, Corporate Venture Capitalists, Governmental Venture Capitalists and Bank-affiliated Venture Capitalists, as well as identifying various types of syndication between these investors. Since each different type of Venture Capitalist has different strategic objectives the relationship with Business Angels is likely also to be different and this work aims to analyse these relationship providing, when possible, potential explanations for the behaviour of the different types of Venture Capitalists.

To perform this analysis I will present three models based on a logistic regression that calculate the probability of receiving investments by Venture Capitalists given the fact that a Business Angel investor is already present in the start-up's equity. In particular, the third model calculates and compares this effect separately for each type of Venture Capitalists considered.

This work is structured as follows: Chapter 1 aims at providing an overview of the literature on Business Angels in order to better explain and contextualize the research. Chapter 2 presents the aim of the work and the research questions. Chapter 3 provides a description of the sample and a list of the variables used in the model. Chapter 4 presents the methodology and the econometric models used to obtain the results. Chapter 5 presents and discusses the results as well as providing suggestion for future research directions. Finally, the last section concludes the research.

CHAPTER 1. LITERATURE REVIEW

1.1 Start-up definition and relevance

"Start-up" is generically used to refer to new, young and innovative ventures, however there is no unique definition for the term. In time different definitions were given to better identify and describe the characteristics that make a new venture a start-up. One of the most comprehensive definition was given in 2013 by Forbes (Robehmed 2013) putting together definitions and considerations made by founders, entrepreneurs and economists. The characteristics that were considered are the following:

- up to 3-5 years old
- independent company
- far from IPO (Initial Public Offering)
- a single office
- revenues lower than 20 mln $
- less than 80 employees and less than 5 people in the board
- founders who haven't personally sold shares yet
- high ability to achieve unconstrained grow

Nevertheless, there is no accordance on these constraints and some founders believe that a start-up is a culture not delineated by metrics but a start-up can remain so at all stages and ages.

A less specific definition is given by the European Start-up Monitor (Kollmann et al. 2015) starting from the definition given by the Silicon Valley serial entrepreneur Steve Blank according to whom a start-up is "an organization built to search for a repeatable and scalable business model".

Based on this concept the European Start-up Monitor proceeds to analyse only businesses with these characteristics:

- Start-ups are younger than 10 years
- Start-ups feature (highly) innovative technologies and/or business models

- Start-ups have (strive for) significant employee and/or sales growth

In this work, since the focus is on investors types and financing provided, all the firms that have received a round of financing by Business Angels or Venture capitalists in their history, besides of age, size or other characteristics are considered as start-ups.

Even though there is not a clear definition of what they are, the importance and relevance of start-ups in today economic environment is undeniable.

There is evidence that start-ups are the main creators of new jobs, creating more than 3 million jobs yearly in the US only (Kane 2010) as well as promoters of new ideas and innovation in the market. As Shane and Venkataraman (2000) argue, the field of entrepreneurship is defined by the study of "how, by whom and with what consequences opportunities to produce future goods and services are discovered, evaluated and exploited."; this would suggest that innovation and entrepreneurship are almost a tautology, signalling how much entrepreneurship is a keystone for the development of society; furthermore, it is clear that we are entering in an era of young firms, which importance is the highest in the last 70 years (Jovanovic 2001), thus the role of entrepreneurship in generating innovative activity is expected to continue to increase (Acs et al. 2005).

There is also evidence of positive collateral effects of start-ups on population growth and other social issues in the areas where the start-ups are founded (Westlund 2011).

"Start-ups are vital to our economy, job market, and digital future. They are drivers of European innovation. No one creates more opportunities for employment than start-ups and other young companies; they provide around 50% of all new jobs." (Andrus Ansip, European Commission Vice-President for the Digital Single Market).

1.2 Start-up funding

To finance their growth and expansion start-ups need capital but given the risky nature of an investment in a start-up, banks have historically been reluctant to give loans to new ventures, so

they are forced to find capital from different sources in order to support the different phases of their business development.

Shachmurove (2001) has identified three main stages of financing that are classified as follows:

Early-Stage Financing

Seed Financing is a relatively small amount of capital provided to an investor or entrepreneur to prove a concept and to qualify for start-up capital. If the initial steps are successful, this may involve product development and market research as well as building a management team and developing a business plan.

Research and Development Financing (R&D) is a tax-advantaged partnership set up to finance product development for start-ups and more mature companies. Investors secure both tax write-offs for the investments and a later share of the profits if the product development is successful.

Start-up Financing is provided to companies completing product development and initial marketing. These companies may be in the process of organizing or they may already be in business for one year or less, but they have yet to sell their products commercially. Usually such firms will have made market studies, assembled the key management, developed a business plan, and readied themselves to do business.

First-Stage Financing is provided to companies that have expended their initial capital (often in developing and market testing a prototype) and require funds to initiate full-scale manufacturing and sales.

Expansion Financing

Second-Stage Financing is working capital for the initial expansion of a company that is producing and shipping and has growing accounts receivable and inventories. Although the company has made progress, it may not yet be showing a profit.

Third-Stage or Mezzanine Financing is provided for major expansion of a company with an increasing sales volume that is breaking even or showing a profit. These funds are used for further plant expansion, marketing, working capital, or development of an improved product.

Bridge Financing is needed at times when a company plans to go public within sLx months to a year. Bridge financing, which is often structured so that it can be repaid from the proceeds of a public underwriting, can also involve restructuring of major stockholder positions through secondary transactions. Restructuring is undertaken if there are early investors who want to reduce or liquidate their positions, or if management has changed and the stockholdings of the former management, their relatives and associates are being bought out to relieve a potential oversupply of stock when going public.

Acquisition/Buyout Financing

Acquisition Financing provides funds to finance an acquisition of another company.

Management/Leveraged Buyout (LBO) funds enable an operating management group to acquire a product line or business (which may be at any stage of development) from either a public or private company; often these purchased companies are closely held or family owned. Management/leveraged buyouts usually involve revitalizing an operation in such a way that entrepreneurial management gains a significant equity

interest.

Another classification of the different stages of funding was made by Gabriellson et al. (2004) that already consider the possible sources of funding for each of the phases and his analysis is focused on “born global” firms:

Establishment phase / Start-up capital:

- Founders capital
- Angels

- Seed Money

International phase / Commercialization capital

- Domestic/international public/private VC

Global phase / Worldwide expansion capital

- Global partner resources

- Global VC resources

- IPO

All the different stages and sources of capital have been summarized in one graph from Cumming and Johan (2009) that can be used as a comprehensive reference to analyse investors (Figure 1).

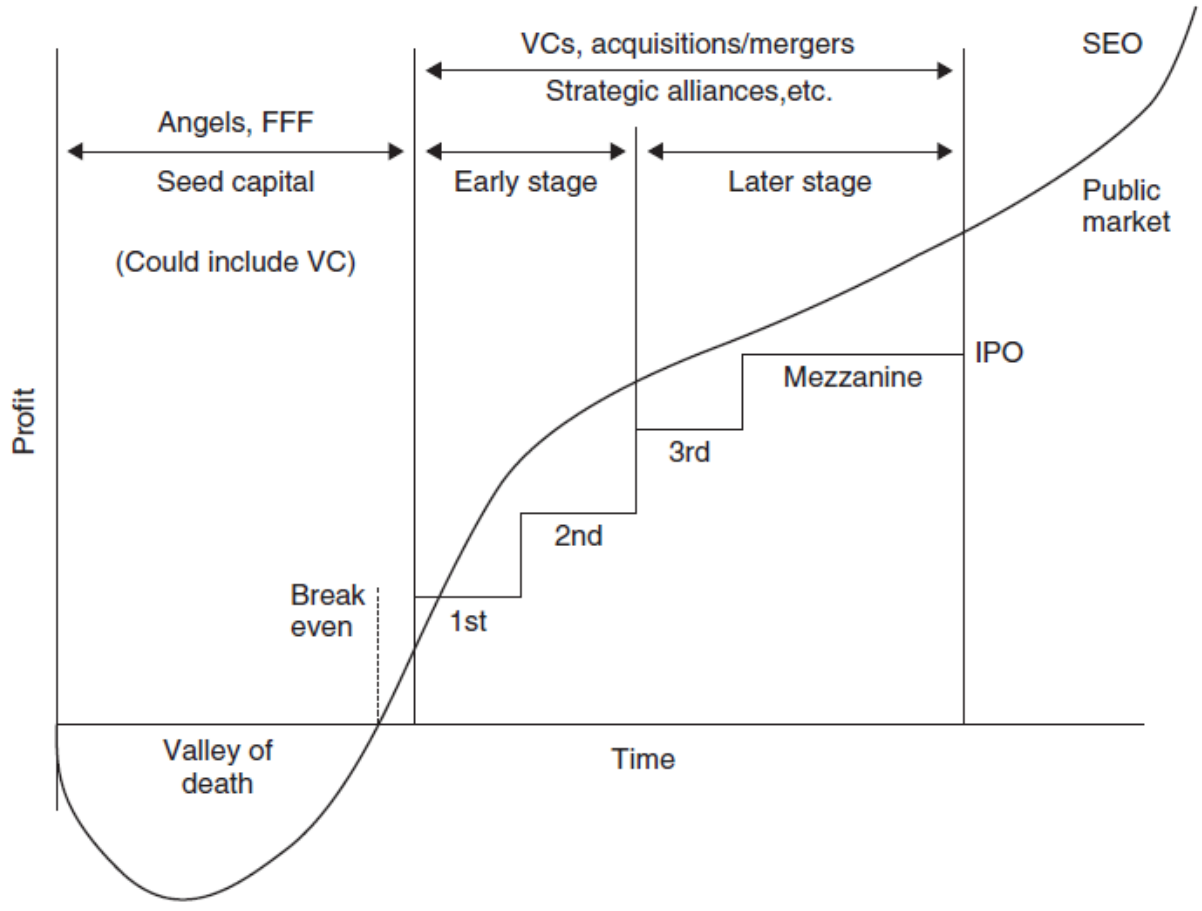

Figure 1: Stages of Entrepreneurial Firm Development (Cumming and Johan 2009)

The first capital that entrepreneurs that are starting a new venture usually obtain is the one from Friends, Family and Fools (FFF), so capital coming from the finance availability of the founders or their families or from "fool" people that decide to invest in this initial stage called the "valley of death" because the new venture is absorbing capital but showing very poor results in term of revenues and profits.

A common source of capital before obtaining financing from formal institutionalized Venture Capital are professional individual investors known as Business Angels.

Business Angels are wealthy individuals who decide to invest their own capital to finance start-ups in their early stages.

Venture Capital firms on the other hand usually have a higher availability of money since they manage funds that typically come from institutional investors, for this reason Venture Capital firms usually invest in later stages of the start-ups compared to Business Angels.

In the latest stages the start-up usually is looking for a way of exit that comes from Initial Public Offering or through Mergers and Acquisitions.

There is also a new way of collecting capital in the initial stages not considered in this figure that is the crowdfunding, money raised from the general public through online campaigns.

1.3 Business Angels definition and characteristics

After introducing the various rounds and sources of funding for start-ups I will now focus on the characteristics and role of the individual investors, the Business Angels.

Many authors during time use the terms "informal Venture Capital investor", "business angel" and "private investor" interchangeably in their works (Farrell et al. 2008) often creating confusion around these terms. Hereafter, I will refer to them as Business Angels (BAs).

The first definition of informal investor and business angel was given by Wetzel and Seymour (1981) in their analysis of informal risk capital in New England where they firstly identified

Business Angels as an important source of capital for new ventures to cover the capital gap left from other formal investors, such as Venture Capital, in the seed stage. Their definition includes all the investors who provide risk capital other than small business investment corporations, Venture Capital, other institutional investors, and public equity markets; those with high net worth and financially sophisticated; excludes family, friends, and debt instruments. In this definition it is important to remark the exclusion of family and friends and the exclusion of investors that use debt instruments, even if often they are used by angels. , However there are authors such as Carpentier et al. (2007) and O'Gorman et al. (2006) that use the term "informal investor" to define the sources of capital that come from family and friends and not from more sophisticated investors, but as will be later discussed it is now common agreement to exclude family and friends when analysing informal investors and Business Angels in accordance to the first definition given by Wetzel and Seymour (1981).

In their work they quoted a pilot research project conducted in the Fall of 1978 by the Whittemore School of Business and Economics of the University of New Hampshire that could be considered the first attempt to identify and characterize informal investors. The project aim was to test two hypotheses:

"1. Informal venture investors, essentially individuals of means, represent a potentially significant source of seed capital for foundation firms.

2. Informal investors employ investment criteria that differ in material ways from the criteria employed by professional Venture Capital firms."

The pilot research was based on a comprehensive questionnaire distributed to one hundred individuals with a known interest in venture-type investment situations. However only 48 questionnaire were returned and gave these results:

"1. Average age of respondents was 48, and over half had previous experience as entrepreneurs or investors in start-up situations.

2. Average desired investment in any one situation was $32,000 with 10% preferring to invest over $50,000 and 10% preferring to invest under $10,000. The total potential of Venture Capital represented by respondents exceeded $1 million per year over three years.

3. Respondents, in general, were interested in participating with others in venture-type investments. Preferred partners included other financially sophisticated individuals, banks and Venture Capital firms.

4. Required rates of return were lower than those typically required by professional Venture Capitalists, ranging from 22% per year for start-ups to 16% per year for investments in established, growing firms. On the average, exit horizons appeared to be longer than those required by Venture Capital firms.

5. Over half of the respondents indicated that they would accept a lower rate of return on investment in exchange for some form of non-monetary return. The creation of local job opportunities in an area with high unemployment was an acceptable substitute for 59% of respondents with an average ROI reduction of approximately 20% or nearly four percentage points.

6. Respondents have been offered approximately three venture investment opportunities per year, most of which were directed to them by friends or business associates, not from sources such as bankers, accountants, lawyers, or investment firms. Over 60% indicated an interest in a regional service that would screen and refer Venture Capital investment opportunities to them."

These results gave a first, rough, description of what could be the physiognomy of an average business angel.

In his work Farrell (2008) analysed the evolution of the definition of Business Angels in time and found out that later studies on informal capital relaxed some of the constraints posed by Wetzel and Seymour; for example, Tymes (1983), Harr (1988) and Gaston (1989) considered in their analysis also capital coming from family and friends while other studies by Aram (1989) and Sullivan (1990) relaxed also the absence of debt hypothesis. On the other hand some studies added new constraints, for example Fiet (1995) and Van Osnabrugge (1998) considered as Business Angels only the individuals who have invested at least once in the last three years. Following studies

however kept on relaxing the definition: one study included all the individual making investments in business not run by themselves (Riding et al. 1993), others studies included in the samples even companies (Stevenson et al. 1994; Coveney et al. 1996) or potential investors, so people who could become Business Angels (Coveney et al. 1996) while Mason and Harrison (2002) loosened the reins to private individuals who had made at least one investment in an unquoted company.

Analysing the different definition collected Farrell (2008) identified six main key issues in which the various definitions differs: (1) the timing of the investments; (2) whether to include debt sources; (3) whether companies make angel investments; (4) whether to include virgin angels; (5) whether the investee was a family member; and (6) whether the investee was a friend. Later on Argerich (2017) starting from the work of Farrell added four more key issues in the definition of a Business Angel that are: (7) Net worth, (8) Investment Size, (9) Investment Type and (10) Involvement.

1. Timing: The amount of the time that passed since the last investment is often used as a determinant to consider a person as an angel or not. This time limit usually vary between three (Haar et al. 1988; Fiet 1995; Van Osnabrugge 1998) and five years (Wetzel 1983). There are also debates on investors that have invested in the past and are still holding these investments but did not make any new investment in the last year, should these individuals considered angels or not?
2. Debt: The claim against considering investors that use loans as a mean to invest in a start-up is that they are missing the risk capital element, fundamental for Venture Capital. However, is possible to notice that angels are often using convertible debts as an instrument to accommodate entrepreneurs' interests. By doing so, entrepreneurs can get funds without being excessively diluted in terms of equity.
3. Virgin investors: they are the potential business angel, that is to say high net worth individual that could have the characteristics of an informal investor but that never actually invested. Even tough different studies have included potential investors in their analysis (Lumme and Mason 1996; Coveney et al. 1998; Feeney et al. 1999; Hindle and Wenban

1999 and Paul et al. 2003), there are no strong reasons to include them in the definition of business angel only because they might invest at some time in the future.

in this context is relevant the study conducted by Freear (1994) that analysed a group of high net worth individual and found a lot of similarities between Business Angels, that is to say people who already invested, and potential investors. It's important to underline how throughout all the work the author keep referring the term "business angel" only to the people that already invested while, even if they have similar characteristics, potential investors must not be considered as angels.

4. Corporate Angels: Some Business Angels with incorporated companies use their firms to make the investments rather than from their personal funds. This reduces their personal risk but it is difficult to assess the boundary between informal and formal Venture Capital. Generally whether the investment is carried out privately or through a company is not of primary interest. It is rather whether the business angel has a decisive influence on the investment decision that is the key. (Argerich 2017)
5. Family: When the investee has blood connection with the entrepreneurs, they are often not considered as Business Angels since their possible irrationality in investing given the relationship with the entrepreneurs.
6. Friends: There is a general consensus among researchers that family and friends should be differentiated by Business Angels mainly because of their biased considerations toward the business they are investing in. Furthermore, they cannot be considered a market, since they are different for each entrepreneur (Mason 2005). The main problem is the fact that often, in particular for friends, they are difficult to separate from unrelated investors so that their exclusion from the definition of business angel introduces methodological issues in choosing the sample.
7. Net worth: If some studies refer to Business Angels as "high net worth individual" only few of them set clear boundaries to this definition; for example, Wetzel (1987) consider only angels as individuals with net worth over $1mln and annual income over $100k. Other

studies instead researchers start to identify potential investors by looking for high net worth and high net income individuals, for example from tax filings, setting a limit in practice but these approaches create several problems such as the reparability of such information, the lack of a common definition of "high net worth individual" and finally the reason why lower net worth investors shouldn't be considered as business angel is unclear. The only great benefit from this distinction is a simplification in the data collection.

8. Investment size: the issue is similar to the previous one and is unclear why some investments of lower entity should be excluded from the sample considered during the studies.
9. Investment Type: even though Business Angels tend to invest in early stages (Freear et al. 1994, Madill et al. 2005) and in technology firms there is no reason to exclude different investments since business angles invest in all type of development phases and sectors (Shane 2010)
10. Involvement: The involvement in the entrepreneurial activity and the non-financial support that angels give to the firm is one of the most interesting topic regarding Business Angels since has always been discussed and it is the thing that make this kind of investors so peculiar, such as that often they are considered more close to entrepreneurs than investors. (Sullivan 1991, Landstrom 1998, Kelly et al. 2003) However, the entity and the role of this involvement differs from firm to firm and from angel to angel, so it is impossible to exclude some individuals and classify them as non-angels based on this criterion.

It is possible to make a meaningful extension to this framework by adding an eleventh category of issue in defining a business angel that is the location of the investment. Often in the literature Business Angels are defined as individuals that prefer to invest in ventures located close to their home in terms of geographical distance (Freear et al. 1994); Harrison and Mason (1992) found out that in US, Sweden and UK informal investors have a preference for investing in companies that are located fairly close to where they live and work. Even though it has been a common

consideration that Business Angels usually invest in local economies (Madill et al. 2005) it does not represent a discriminating factor for considering an investor an angel or not; it makes no sense to exclude from the group all the people that decide to invest their capital in ventures far from their home.

Based on these findings Argerich "propose to define Business Angels as any individual that currently holds an investment made (debt and/or equity) directly with his or her own money in an unquoted company, is neither the entrepreneur nor his or her relatives, and plays an active or passive role in the investee firm." (Argerich 2017).

Another topic researchers tried to understand about Business Angels regards the motivation behind their investments and their decision to become an angel.

Since the first studies on informal investors it was clear that the financial motivation were not the only one that push this kind of people to make investment (Wetzel 1983, Duxbury et al. 1996).

In their work Sullivan and Miller (1996) propose a segmentation of a sample of 214 informal investors based on the main motivation that they have for investing. The segmentation proposed focuses on three motives: Economic motivations, Hedonistic motivations and Altruistic motivations. The economic motivation is coherent with the theories that want the investors to invest with the only scope of maximizing their wealth so the motivations behind the investment should be purely financial, that is to say the maximization of the return. The hedonistic motivation refers to the investors that don't look at returns as their primary target but expect to receive back a sense of pleasure and "happiness", in this context the emotions are more important than the rationality behind the economic convenience of the investment and angels tend to maximise the pleasure and minimize the pain from the economic transaction (Oser 1970), they will get back a sort of 'psychic income' from the opportunity to play active roles in the entrepreneurial process. Altruistic motivations introduce a moral dimension that informal investor could embrace; angels would invest not moved by interests in return or for self-satisfaction but just because they want to help others entrepreneurs to succeed, this can come also from the fact that some business angles are

or have been entrepreneurs by themselves (Sullivan 1991, Landstrom 1998). They invest on 'moral' ground, feeling an obligation to give back to society, through investments in new entrepreneurs, job creation in areas of high unemployment, ventures developing socially useful technology (for example medical or green energy) and ventures created by minorities. The researchers found out that of the initial 214 investors 101 were moved mainly by economic reasons, 66 were classified as hedonistic investors and 47 as altruistic; the heterogeneity of informal investors however suggests that for each angel there is a different mix of these motivations and that rarely the investor is moved by only one of them even tough probably one is more predominant than the others. These results are relevant since they confirm the fact that Business Angels are moved by different motivations than formal investors, such as Venture Capitals, that look only at the possible return to decide for their investments. Also Landstrom (1993) claim that the motives behind the investment of informal capital is a mix of financial motives, for example to get appreciation of the capital or for future income, entrepreneurial motives, reason that is linked to the involvement of the business angel in the entrepreneurial activities of the stat-up, and other non-financial motives, that could be linked to the sphere of morality or hedonistic motives such as having fun while investing (Landstrom 1993).

Szerb (2007) insists on the idea that one of the main motivations that bring angels to invest in start-ups is the fact that they are more similar to entrepreneurs than they are to traditional investors (Sullivan 1991, Landstrom 1998, Kelly et al. 2003), their investments could be guided by entrepreneurial spirit rather than rational investor logic so their decisions are based on different drivers and emotions. In a 2017 report by EBAN a group of Business Angels was asked through a survey to indicate the factors that impact a negative investment decision, so why they decided not to invest in a particular new venture; if the main reason is the fact that some projects were considered too risky, it is also possible to notice that only 7% of respondents indicated as a reason to not invest a too low return potential. This enforces the view of Business Angels as an atypical investor that do not look only at financial returns.

1.4 Role of Business Angels and start-ups' equity gap

Since the first researches on informal investors their importance as a source of risk capital for new ventures was evident: in 1983 departing from data on private placements and comparing that with the investments done by institutional Venture Capitalists, Wetzel concluded that Business Angels 'not only do exist, but they may represent the largest pool of risk capital in the country'. (Wetzel 1983) In fact in 1981 Wetzel had already identified an important gap in the funding for new ventures: it was extremely difficult for them to raise amount of money that were greater than $50.000 but lower than $500.000; the lower bound is the maximum amount of money that a start-up could raise using money from family and friends (FFF) while the upper bound is given by the fact that institutional VC investors had a minimum investment threshold of $500.000. In this context the presence of informal investors was crucial to cover that gap and provide adequate funding to new ventures as they were described as "one of the few potential sources of such financing" between $50k and $500k.

A following study on NTBF in New England by Freear and Wetzel (Freear et al. 1990) confirmed these findings and the importance of informal investor for investment lower than $500.000. The average size of a round of financing for private individual was around $250.000 while for Venture Capital was more than $1mln, in fact investment from private individuals accounted for 47% of the total for rounds under $1mln and they accounted for the 84% of the rounds under $250.000 and for a 57% for rounds between $250.000 and $500.000. With their investments informal investors were the largest single source of seed financing, accounting for 48% of seed capital funds. However, their role declined from the start-up stage with only 20% of the funding and arriving at the third stage where private individuals provided only 2% of the dollars raised. These results confirmed the importance of Business Angels for the very first stages of new ventures development while they are almost absent in later stages investments.

A study from Berger confirmed the role of angels as investors that are able to fill the gap between family and friends financing and the investment by Venture Capitals (Berger et al. 1998).

Similar studies were made also in countries different from the US: for example in UK Mason and Harrison (Mason et al. 1995) noticed that the role of Venture Capital in the provision of new equity to start-ups and early stage businesses were becoming more and more marginal. This was due to the increasing costs in evaluation and monitoring of firms that makes it uneconomic for funds to make investments of less than about £250,000 together with a tendency in investing in more developed and less risky businesses.

The consequence of these trends is that there were various "gaps" in the supply of Venture Capital, companies at the seed, start-up and early stages of development and requiring external financing encountered great difficulties in raising equity finance from the Venture Capital industry. To cover this gap they found that informal Venture Capital was the best option available; in particular Business Angels invest precisely in those areas in which institutional Venture Capital providers are reluctant to invest. They typically make small investments, well below the minimum size of investment considered by most Venture Capital funds. In the UK the vast majority of angels invest less than £50,000 in a single deal (although deal sizes that involve investments that are syndicated between a number of investors are larger), differently from the findings in the US where single angels could come up also with investment around $250.000. Investments by private investors are also relatively more concentrated in start-ups and early stage ventures whereas most Venture Capital funds. Another big advantage compared to formal capital is that Business Angels are much more dispersed on the English territory and given their tendency to invest near home or office (Freear et al. 1994, Madill et al. 2005) they are able to provide capital to start-ups on all around the country. Estimates for the UK suggested that SMEs have raised about £2 billion from the informal Venture Capital market. By comparison, estimates for the same year showed that the formal Venture Capital industry has invested only £1.25bn in SMEs in the UK, suggesting that the informal Venture Capital market was almost twice as important to the SME sector as formal Venture Capital. Similar considerations about the usefulness in covering the equity gap between family and friends and Venture Capital were made by Short and Riding (1988) while analysing the informal capital market in Canada with findings that confirm the one of Wetzel (Short et al. 1988)

In Sweden if the amount invested by Business Angels is comparable to the one in the UK but the target of the investments is different: in fact, in Sweden the informal investors tend to provide capital to already established firm rather than financing start-ups in the seed and early stages. Accordingly, in Sweden the role of Business Angels as investor that could fill the equity gap between FFF and VC is only partially fulfilled (Landstromm 1993).

1.5 Business Angel networks

One of the main problem related to informal investors is that they are dispersed and have a preference for anonymity (Wetzel 1981) representing what is often defined as an "invisible market" (Mason et al. 1997), for these reasons entrepreneurs could experience difficulties in getting in contact with potential Business Angels and on the other hand also the informal investors lack the experience and tools that formal Venture Capitalists have to engage entrepreneurs (Landstrom 1993). In fact looking for and evaluating investment are activities that usually require a lot of time and effort while Business Angels often dedicate only their spare time to this initiative (Mason et al. 1997). For this reasons angels tend to adopt a passive approach to sourcing investment opportunities relying on referral by friends or in their business environment. This situation creates a matching problem: even though there is capital available for start-up that would fill the equity gap, the access to this capital is more difficult because either entrepreneurs can not find a suitable angel or the other way around (Zu Knyphausen-Aufseß et al. 2008). In addition to this there is the problem of potential investors (Freear et al. 1994), individual that are not angels since they have not invested in any new venture yet, but are interested in becoming one; for them the access to possible investments could be harder contributing to an even greater loss in the matching of demand and supply. It is possible to say then that, together with the financial gap a new "knowledge gap" is present that obstacle the funding of start-ups (Harding et al. 2006), the gap of information provokes inefficiencies in the informal capital market where communication flows badly and this affect the number and quality of deals (Sohl 1999). This gap is bigger for the high

growth potential technology start-ups, a sector historically very favoured by informal investors, since it is more difficult to communicate the real potential of entrepreneurial ideas with the risk that a possible good deal it is not perceived by the angel, further aggravating the problem (Harding et al. 2006).

Business Angel Networks (BANs) are born with the idea of helping entrepreneurs and investors to overcome this problem. Since the beginning researchers have noticed the tendency of Business Angels to syndicate and co-invest in new ventures to reduce the risk and increase the efficiency of the deal flow (Wetzel et al. 1983). Angel deals are often made by a small and close group of investors led by an expert ex-entrepreneur that is more capable of catching opportunities and good deals thanks to the past experience in the same field (Wetzel 1994). Mason (1995) give further importance to the role of the archangel, the experienced ex- entrepreneur/investor around whom the other angels syndicate (Mason et al. 1995). Also Prowse (1998) noticed that often Business Angels work in small informal network and coordinates their activities where a number of passive investors is led by one or more Business Angels that are more skilled and actively look for deals, perform the due diligence, syndicate the deal between the network and manage the investments (Prowse 1998). Sometimes these informal networks use the help of "gatekeepers" such as lawyers or accountants that support the deals and the writing of contracts (Berger 1998). Also Porter (2013) identified the role of "nexus angels" as skilled former entrepreneurs that guide the flow of the deals between other, more passive, angels and new ventures and start-ups (Porter et al. 2013).

Therefore, business angel groups can improve the situation of the informal investor market by providing communication channels through which entrepreneurs seeking finance can contact possible investors. Business Angel networks can be considered as the formalized version of the informal tendency of angels to gather in groups, but the motivations behind remains pretty much the same. The definition of BAN provided by the EBAN (European Business Angel Network) organization is in fact a "private or semi-public bodies whose aim is to match entrepreneurs looking for equity with Business Angels" (EBAN 2004). The goal of the network is then two-folded, on one side it allows the entrepreneur to present his/her idea to a wide number of private

investors, on the other side it provides Business Angels a way to analyse and evaluate a great range of investment opportunities at the same time.

To ensure this improvement in efficiency BANs must work on two directions: for the side of start-ups and entrepreneurs the network must ensure a transparent marketplace where investors and new ventures can interact; this can be done through events, newsletters, magazines, databases and matching through internet (Mason et al.1997). On the other side it must ensure that all the parties that have access to this marketplace have an adequate level of quality, therefore possible deals must pass through a pre-selection process while the business angel network guarantee, through internal regulations, that only high-quality Business Angels are admitted inside the network (Knyphausen-Aufseß et al. 2008).

In addition to these services that are at the one necessary to define a business angel network, BANs have started to provide a wider range of services (Gulander et al. 2003). First of all, they support the networking between investors and provider of legal and consultancy services; they are of course needed to help during the investment process and they can also provide valuable information on possible deals and opportunities.

Furthermore, business angel networks directly provide consultancy services to young entrepreneurs to make their start-up more "investment ready", this can include the communication of investment criteria and selection process that Business Angels usually adopt, helping in developing the business plan and how to communicate to possible investors (Sohl 1999, Mason et al. 2002).

These services are rarely provided by external service providers but are responsibility of the employees of the network therefore their training is a key success factor for the BAN, so to increase the efficiency of the services networks try to standardize them and sell them with minimum individual customization (Knyphausen-Aufseß et al. 2008). One of the biggest question that researchers investigated about business angel networks is whether or not they are profitable (Mason et al. 1997, FHG-ISI 1998, Knyphausen-Aufseß et al. 2008). A study commissioned by the EU in 2002 pointed out how difficult it is for European business networks to find a successful and sustainable profit mechanism, in fact in many case their legal entity is the one of a non-profit

organization (European Commission 2002). Actually BANs have always tried to look for ways to make profit or at least cover the costs related to the network. For example, BANs can ask for membership fees to the Business Angels, but this could discourage new angels to enter the network, so nullifying the value that the network wants to bring, and the angels that are already member have shown disagreement toward this practice. Another kind of fee is related to the success of the investment; if the new venture in which the angels invested thanks to the network generate high returns for the investors they are asked to pay a fee to the network, however this practice presents the same problem as before plus the difficulty in assessing the real contribution that the network gave to the in term of support to the investment and to the start-up. Finally, the idea of asking money to start-ups in exchange of advisory services is to discard since typically the economic availability of new ventures is close to zero. (Knyphausen-Aufseß et al. 2008). Conventional wisdom and experience suggest that there is not a long-lasting profit mechanism that would work for BANs (Mason et al. 2005, EBAN 2017) and most of business angel networks in Europe agree to that (European Commission 2002b). Apart from fees in order to survive BANs mainly rely on sponsorship by parent companies and on governmental and public institutions subsidies (Saublens et al. 2002, EBAN 2017); there have been studies around the theme of public financing towards BANs, since it seems absurd that individuals that are wealthy for definition should receive incentives from public institutions but the already discussed difficulties in asking members for money make the subsidies crucial for the survival of BANs. Incentives from public institutions are however justified by the fact that BANs helping in addressing and resolving market failures related to information flows between angels and entrepreneurs. Furthermore it has been demonstrated that BANs contribute positively to the economic development and growth in the area where they operate and in addition to that BANs can create indirect benefit to the economic environment such as: raising the awareness and legitimacy of Business Angels to the eyes of entrepreneurs and other financial actors, such as Venture Capital; entrepreneurs that received coaching and education from BANs services, even though they didn't receive investments, have benefitted from this and could improve their chances for future investments. All of these reasons

justify the subsidies and incentives that governments and public institutions are devolving to support business angel networks (Colleweart et al. 2008, Christensen 2011). However, debates over the effectiveness of Business Angel networks are still ongoing: a study from Knyphausen-Aufseß and Westphal (2008) questioned the value that BANs offer to Business Angels; if on one side it's true that a greater number of deals is available to them on the other side the quality of these deals are lower compared to the one that angels usually get in the free market. This is due mainly to an information asymmetry problem: paradoxically if the BAN help the angels and entrepreneurs to reduce the information gap in the first phases of the deal in later stages the asymmetry is higher compared to the deal made outside the network; the reason is the activity of the network itself that, through advice and consulting to start-ups and helping in writing the business plan, improve the quality of the pitch that entrepreneurs will present (Mason et al. 1997, Sohl 1999, Mason et al. 2002, Colleweart et al. 2008, Christensen 2011) but obviously the quality of the idea itself would not be higher. This will create problems for angels that will have more difficulties in assessing the quality of a project and consequently the investments made through the networks results to be less profitable than the one made outside (Knyphausen-Aufseß et al. 2008).

Another problem that the arise of Business Angel Networks and Groups presents is the creation, or better a replication, of an equity gap for start-up in the earliest phases. There is in fact a concern over the fact that the essence of angel investing is at risk of being lost as the process becomes more and more organised. In this way BANs can become more and more similar to Venture Capitalists shifting the attention of angels to making larger and longer investments and losing the ability to add the kind of value they usually do. This shift in interests by informal investors probably reduced the number of investments around 50.000€ that are too small to be of interests for groups; the equity gap in the earliest phases of the start-up are the reason why the figure of the Business Angel is so important in the development of the start-up and the fact that more and more Business Angels are investing in larger deals through syndication thanks to the networks could be a problem since entrepreneurs would have difficulties in finding money in the early stages of the firm development; recreating the equity gap that angels were initially meant to fill.

One of the undeniable benefits that the born of Business Angel networks have brought is the possibility for researchers to work on data from official sources and the invisible market of Business Angels partially reveal itself through the networks (Mason et al. 1997, Saublens et al. 2002, Macht et al. 2009). "The emergence of these 'visible' sources of informal Venture Capital now makes it possible for the first time to collect and analyse comprehensive statistics on investment activity on one section of this market" (Mason et al. 1997).

1.6 Business Angel market in Europe

To better understand the relevance of the Business Angel market today, in particular in Europe, for small and medium enterprises and for start-ups some data collected from the EBAN statistic compendium of 2017 developed by the European Business Angel Network will now be provided (EBAN 2017).

The early stage investment market in Europe for 2017 is estimated to be worth 13.18 billion Euros and Business Angels are the most important investors in this early stage market with a total of 7.30 billion Euros of investments, accounting for more than 55% of the market, against a total of 3.50 billion Euros of investments by VCs. The other main sources of capital for this stage are the newly introduced Initial Coin Offerings (ICOs) that with their rapid growth in the last years already count for more than the 13% of the market with 1.75 billion Euros worth of investments, and the equity crowdfunding that even though is rapidly growing it still counts for a minority of the market with only 0.63 billion euros.

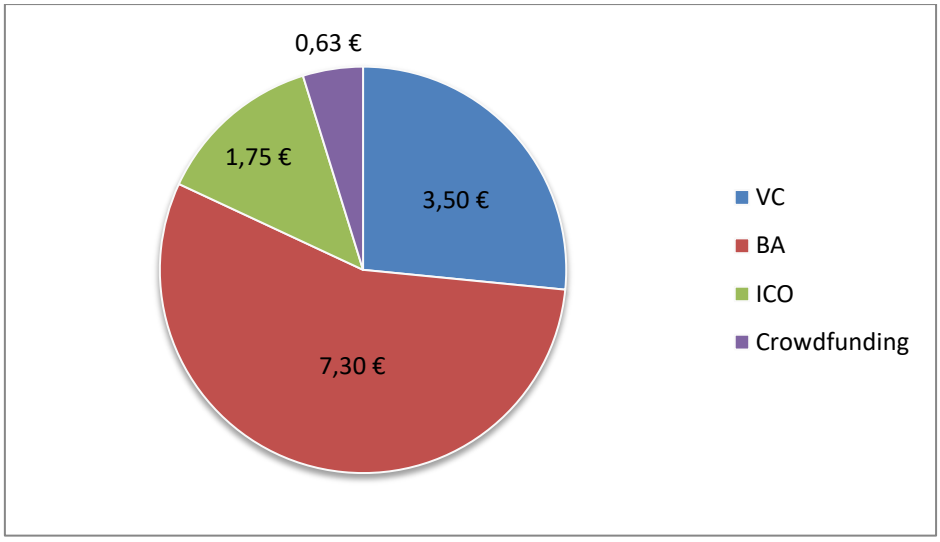

Figure 2: Early stage investment market in EU 2017. Data in billion Euro. Source: EBAN Statistics compendium

Both the total size of investments and the number of Business Angels in Europe are growing steadily year by year signalling a market that is in constant development and it is growing more and more in importance.

The number of Business Angels in Europe at the end of 2017 was of 337.500 with a growth of +8% compared to 2016 and of almost +17% in the last four years. As far as total investments are concerned the growth rate marked a +9% between 2016 and 2017 and a +26% in the last four years. This growth is given by a mix of two factors, the first one is the already commented increase in the number of Business Angels, the second is due to the increase in the average investment size per single BA; so a combination of more angels and more investment per angel caused a more than significant increase in the total investments in the last year.

The data confirm the predominant role of Business Angels in the early stage financing for new ventures and how the hypothesis and finding of researchers like Wetzel made in the '80s were correct and still hold true today.

Also the data on the distribution of investments by stage confirm that still today angels focus on financing the earlier stages of development of a new venture. In fact, 63% of the investors declared

that they invest in the seed stage and 44% invest in the pre-seed stage, while only a 30% provide capital at the start-up stage and around 8% invest also in later stages (European Commission 2017).

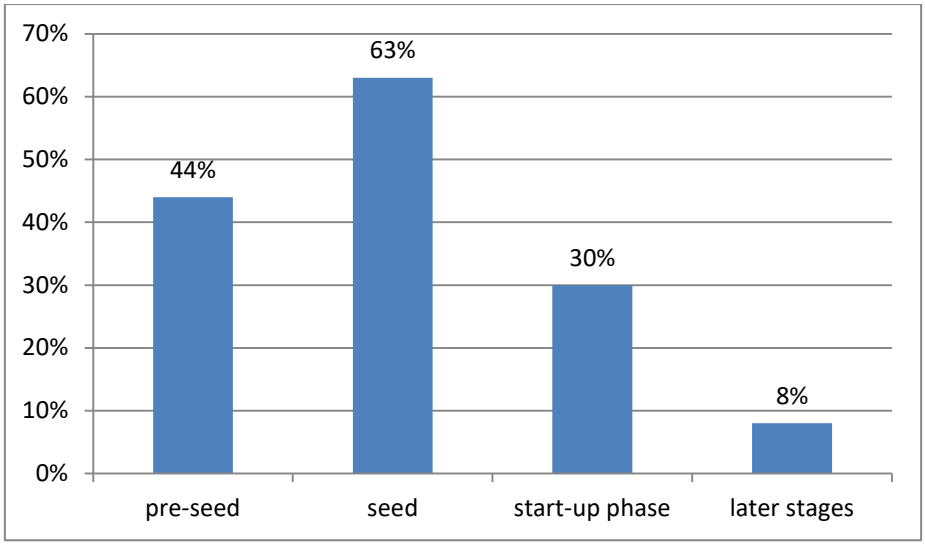

Figure 3: Percentage of angels investing in each stage. Source: EBAN Statistics compendium

Even though today globalization and technological development allow to communicate fast and effectively all around the world opening the possibility to invest in other countries and continents it is still intact the tendency for Business Angels to invest "near home" (Freear et al. 1994) with 59% of the investments of European angels made in the same country where the investor lives; a not irrelevant number of 16% of investments are made even in the same region of the investor. These numbers are however decreasing over time, in 2015 national investment counted for almost 94%, giving a clear signal that also this reality of investments is becoming more and more global each year.

Literature has always claimed that Business Angels are more attracted by investments in high-technology firms than other sectors (Duxbury et al. 1996, Hindle et al. 2002, Politis 2008) and data collected about the sectors of investment by Business Angels tend to confirm this claim.

In fact, Fintech and ICT sectors collect the majority of the investment by Business Angels with a 25.2% and a 21.3% of the total respectively, accounting for almost half of the investments in Europe. However, it is important to notice that more than 25% of the Business Angels interviewed declared that they usually do not focus on one single sector for investing, but evaluate more the

idea, the entrepreneurial team and the market than the industrial sector. Another interesting sector is the healthcare that has gathered 16.4% of the investments and is growing rapidly (it accounted for 13% in 2016).

Breaking down the analysis country by country United Kingdom clearly dominates the market with the highest number of active Business Angels, business angel networks and total investment in 2017 with a growth of +9.2% in the last year and a +24% in four years. Germany and France follow with a significant gap in term of total investments but the growth rate in the last year is considerable, around 50% for both of the countries. At fourth place there is Spain that however reports a drop of 14% in investments compared to 2016; a drop is reported also by Finland but here the number is more drastic with nearly a 50% decrease. Belgium occupies the 12th place in Europe and the investments are growing, while Italy is ranked only 19th and recorded a drop of 23% compared to 2016.

If we consider a different type of breakdown comparing the total investments of Business Angels and the GDP of the country it is possible to notice that smaller countries in terms of absolute total investments, such as Estonia, Latvia, Monaco and Finland, have in reality a very active community of angels, while bigger countries such as UK, France and Italy drastically drop in the last positions of the ranking.

As far as Business Angel Networks are concerned after an average growth of 17% between 2003 and 2012 their growth in number is stagnating since then, suggesting a consolidation trend in the market as the number of BAN in Europe remained almost stable from 2013, in 2017 only one new business angel network was founded in Europe. However, BANs are still experiencing some sort of growth with an average of 23 new members for each network in 2017 and an average loss of only 5 members in the same period.

The great majority of funds for BANs still come from public institutions both at national and European level, that counts for more than 50%, while network fees accounts only for less than 25% of the total, showing that still is quite impossible for BANs to be a profitable businesses and the great majority of them are non-profit associations.

Making a step to step comparison between the market in Europe and the one in the United States it would be impossible since there are far less data regarding the business angel due to the lack of a comprehensive detailed study of the phenomenon like it has been done in Europe by the EBAN institution. There are, however, some aggregate data available that come from a study performed by the Angel Capital Association (ACA), in 2016. The data show that in 2015 the total capital invested by Business Angels in the U.S. was around $24bln; a number that is far greater compared to nearly 7bln€ investments in Europe in the same year. On the other side, the total number of Business Angels that are present in the U.S. is the same as the number in Europe with both region that counts around 300.000 Business Angels. This means of course that Business Angels in the U.S. invest on average far more than Business Angels in Europe; data confirms this fact with the average investment per deal in Europe around 184.000€ in 2015 compared to an average of $347.000 in U.S. in the same year and a far higher number of deals as well: 71.000 in U.S. versus 33.000 in Europe. This represents a huge difference in the behaviour of Business Angels between U.S and Europe, in America individual investors tends to invest more money and the deal size is considerably higher, aggravating the problem of the equity gap that companies experience in earlier stages of their life cycle.

1.7 Business Angel Investment process

To better understand how Business Angels interact with entrepreneurs and what is their contribution for the investee start-up, it could be useful to describe the different steps concerning the relationship between Business Angels and entrepreneurs. Paul et al. (2007) built a model that analyses the investment process of the Angel investor; to do so researchers used theoretical references as well as empirical evidences based on interviews to thirty Business Angels. The first phase identified by Paul is the *Familiarization Stage* in which the Business Angel learn about the opportunity of an investment, through his contacts and network; then if the opportunity seems

interesting to him the investor arranges a first meeting with the entrepreneurs to get to know the project and the team.

The second stage is the *Screening Stage* in which the Business Angel engage in more structured assessments of the start-up, including a deep analysis of the business plan as well as trying to understand how the team of entrepreneurs will perform considering both hard and soft data, the so called "due diligence". After gathering and analysing all this information, if the Business Angel considers that the start-up is worth investing, it is time for the *Bargaining Stage* in which the deal is structured and negotiated and finally signed.

Now that the Business Angel has invested in the company, he can give post-investment contributions to the start-up thanks to his experience in the phase called by Paul *Managing Stage*. Finally, there is the *Harvesting Stage* in which there is an exit for the Business Angel and the performances of the investments are evaluated.

1.8 Business Angel value added

Going more in detail regarding the Managing stage is since the first identification of the existence of the informal Venture Capital by Wetzel (1981) that researchers immediately found that money is not the only thing that Business Angels provide to new ventures, but they bring with them a series of value added services that contribute to the development of the investee company (Wetzel 1981, Wetzel et al. 1983, Saetre 2003, Madill et al. 2005, Politis 2008). The contribution is so important that researchers coined the term "smart capital" or "smart money" (Szerb et al. 2007, Bjørgum et al. 2015) to characterize that the investment made by a business angel represents a contribution that goes well beyond the economical one but includes a range of value added activities that are much important for the growth of the company.

A first thing that is important to underline is where these value added activities come from and why angels are inclined to offer them. The most widespread answer that researchers give is linked to the past experience of Business Angels, in fact they often have entrepreneurial or managerial

background (Aernoudt 1999; Politis et al. 2002; De Clerq et al. 2006), this experience with previous own ventures make them able to benefit the new ventures in which they invest with knowledge and know-how acquired during their career (Politis 2008). Numerous studies have investigated the background and origin of Business Angels: in the first researches in US Wetzel (1981) found out that the 78% of informal investors in New England had experiences with start-ups in the past. In a later study made by Gaston (1989), that gathered results by three surveys made in different areas of the US, the 83% of informal investors resulted to have past experiences with start-ups and new ventures. In UK Mason, Harrison and Chaloner (1991) found out through a survey that more than 67% of English Business Angels have had entrepreneurial experience during their careers. Similar studies where made also in the non-anglosaxon world, for example Tashiro (1999) characterized the Business Angels in Japan and 60% of them founded at least one own business in the past. Always in the far-east, in particular in Singapore, Hindle and Lee (2002) found out that 72% of the sample of Business Angels were involved in the management of their own businesses. A similar number was obtained by Brettel (2003) with his research on the business angel in Germany reporting that 73% of informal investors have founded a business in the past; he also noted that more than two third of them, so a number close to 50% of the sample, have established two or more start-ups during their career. This data underlies the fact that Business Angels have a really marked inclination toward entrepreneurial activities. However, the most impressive results come from two Nordic countries, Sweden and Finland. In fact, Landstromm (1993) found out that in Sweden an astounding 96% of Business Angels have had previous experience in founding start-ups and a similar number, 95%, resulted from the study of Suomi and Lumme (1994) in Finland. The most underwhelming result strangely come from a Nordic country as well: Reitan and Sørheim (2000) during their study on informal investors in Norway stated that only the 46% of the surveyed Business Angels have had previous experience in start-ups, but it's important to notice that if on one hand the entrepreneurial aspect in this study is not so strong on the other hand the majority of the Business Angels interviewed have had managerial experiences in start-ups and new ventures, supporting the initial claims of past managerial experience by the

investors. Based from all these findings all around the world it seems reasonable to assume that the background and prior career achievements have prepared Business Angels to conduct the right due diligence in evaluating an investment and mainly to support the venture in all its phases since they know how to start, manage and harvest a successful entrepreneurial activity (Van Osnabrugge 1998; Wright, Westhead, and Sohl 1998; Aernoudt 1999). Together with the know-how another crucial thing that informal investor can exploit from their past experience is the network of valuable business contact that the start-up can use to foster its growth (Politis 2008, Macht et al. 2009 Bjørgum et al. 2015).

During time some researchers have conducted empirical studies that address the issue of what are the value added activities that Business Angels bring to the new ventures. Harrison and Mason in 1992 identify many types of support that angels give to entrepreneurs; the most important contribution is that angels act as a sounding board for the start-up ideas and entrepreneurs find very important the support that informal investors give during the phase of developing new products, market plans and business strategies; one more contribution appreciated by the entrepreneurs is the help given by angels in the recruitment of the management team (Harrison et al. 1992). Ehrlich in 1994 through a survey analysed the answers of 47 entrepreneurs in US that have received funding by private investors on questions about the perceived and desired level of contribution by the investors in their firm. In the survey they indicated that the main areas in which they receive support are interfacing with the investor group, obtaining alternative sources of equity financing, monitoring financial and operating performance, serving as a sounding board to the entrepreneurial team, and formulating business strategy; Ehrlich however registered dissatisfaction of the entrepreneurs towards their Business Angels since they would prefer an higher level of involvement in some activities such as managing crises and problems, monitoring financial performance soliciting customers and distribution, developing professional support groups and, even if Business Angels already do so, they want an increased level of involvement in acting as a sounding board, reflecting the importance of such element in the range of value added activities that angels could offer (Ehrlich et al. 1994).

In another study in the US Freear, Sohl and Wetzel (1995) report the results of a survey from 124 entrepreneurs that have raised capital from Business Angels or from Venture Capital; even if the main goal of the survey was not the analysis of value added activities, some questions were orientated also in this area. It resulted that the 80% of the angel investors maintain a working relationship with the start-up after the investments, the most common forms to maintain this relationship are the representation of the investor on the board of directors followed by consultancy provided by angels to the venture. Furthermore, it was found that nearly the 25% of angel investors kept working in full or part-time capacity in the firm in which they invested establishing a trust worthy and productive relationship with the entrepreneurs. The relationship between private investor and start-up was classified as productive by 75% of respondents, confirming the importance of the value added by angels. Mason and Harrison (1996) interviewed 31 Business Angels and 28 entrepreneurs that received funds by Business Angels. As a result the main contribution identified by entrepreneurs given by informal investors is the provision of strategic advice; other important contribution were identified in networking, in particular with potential customers, marketing, finance and accounting management and general management. On their side investors believe that their single most important contribution has been their general business experience. Other specific contributions identified were accounting, project planning, guidance on marketing and financial control; man responses also highlighted also some intangible contributions such as 'lifting the spirits', 'enthusiasm', 'sharing the burden' and 'providing a broader view', indicating the important value-added contribution of the angel in the role of 'coach' or 'mentor' As far as the effectiveness of this value added activities is concerned more 50% of the entrepreneurs reported that the contribution of the business angel in their business was helpful or very helpful. In another study, Stevenson and Coveney (1996) made a research on a sample of 484 Business Angels in the UK and, within the others findings, found out that they perceive the provision of advice and hands-on involvement to be their main value added contribution. Lumme, Mason and Suomi (1998) performed an extensive study on 59 Business Angels in Finland, and classified 22 different types of value added activities that Business Angels perform for the start-up indicating that Finnish

angels make a very wide range of different contributions. They decided to divide these activities in 5 sub-groups that are: Strategic Management and Control, Assistance in Operational Management and Control Systems, Networking, industry knowledge and Resourcing New Dynamic Business Structures. Between the most popular activities it's possible to indicate: Developing new personnel, purchasing, product development or marketing scheme, performed by the 87% of the angels, always the 87% support also the development of the board work, 90% contributes in organising budgeting and other control systems while the most widespread activity is initiating contact with other source of funding, performed by 93% of investors. Also the other activities listed are actually almost all performed by a great majority of the investors with seven activities performed by more than the 80% of the sample and only 4 activities performed by less than the 50%. Finnish Business Angels are relatively modest in the importance that they attach to the contributions they have made to their investee companies. Overall, their self-assessment is that their contributions have been of only moderate importance to their investee companies. However, they attach a slightly higher importance to their contributions in the area of strategic management and control and also in organising budgeting and other control systems, assisting in negotiations and initiating contacts with new sources of funding (Lumme et al. 1998). Tashiro (1999) conducted an analysis of 20 Japanese Business Angels and a majority of them declared that they provide non-financial support to the investee company, mainly in the form of outside advisors or board members. The main contributions are in the Management area but some of them supported the firm with specific advice on technology, human resources and finance. Ardichvili (2002) conducted a study with a survey to 27 Business Angels in the US and analysed the types of non-financial resources that angels give to new ventures. These resources are based on the knowledge of the informal investor and can be classified as Human capital, abilities and skills that Business Angels provide to the start-up, social capital, that includes all the network potential that investors have and organizational capital, that is to say all the resources that are codified and stored inside the organization (e.g. patents). The most common activities performed by angels providing these kind of resources are similar to the one found in previous studies, such as helping in shaping the business model of the venture, facilitate

further funding through networking, provide knowledge of specific industries and management skills and supporting the recruitment of new personnel and managers. In Scotland, Paul, Whittam and Johnston (2003) surveyed 140 Business Angels and found out that the great majority of them believed that they have brought non-financial benefits in addition to the money invested and that they added value to the start-up; the most popular benefits were identified as the providing of business contacts, so always related to the network ability, and enhancing the management skills of the entrepreneurs inside the new firm. The 50% of the respondents benefitted also the start-up in term of raising additional fund from other sources. Saetre (2003) made a study on 20 Business Angels in Norway and results showed that most of the investors were active in the investee company and asked for regular updates from the management. In particular with their involvement angels provide competencies and expertise that were used by the start-up to formulate the corporate strategy and to decide how to approach a larger client, in fact investors provide also information to enable the small firm to approach a larger company. Other contributions by angels were reported in form of industry insights that help the firm in making the right strategic choice and the access to high-level industry network provided by the angels help the company in actuating their strategies. In the study it's also reported the other face of the relationship indicating that investors often require timely updates and information on the company they invested in, this needs an extra effort by the entrepreneurs, that are willing to do that in exchange of the already mentioned benefits. Always in 2003 Brettel conducted a study on 40 Business Angels in Germany and three quarter of them indicated that they were actively involved in the supervisory board, the advisory council and the shareholders' meeting and also provided informal advisory help. The most important contributions that investor reported were the use of their personal network, coaching of entrepreneurs and financial know-how; other contributions reported by fewer respondents were the marketing know-how, providing help in building the strategy, knowledge of the industry and support in finding and choosing new personnel and managers. In a very focussed way Amatucci and Sohl (2004) made an in-depth analysis of four women entrepreneurs that received financing from Business Angels and in the interview the researchers asked also about the post investment

relationship and non-financial help that was provided to the entrepreneurs by the angel investors. In this case three of the four women declared that the investors were really involved after the investment and acted as a mentor providing very needed non-financial services such as support strategic and operational activities and coaching to the management team . Sorheim (2005) made an in-depth analysis of five Business Angels in Norway focusing on their role of facilitator for further finance. All the five investors claimed that they fulfil an important role in facilitator of further financing but the motivation behind are slightly different: in facts some of them attribute a lot of importance to the network, often on a regional level, that they were able to create during their experience as business men and that the start-up can use to get access to further financing. Others angels utilize their experience in the industry to find player of the same industry that can enter as new investor in the firm and finally others contribute to further financing through giving advice and mentoring the entrepreneurs on how to effectively look and obtain capital but without utilize their personal networks. Also Madill, Haines and Riding (2005), through a survey conducted on technology-based firm in Canada, worked on the topic of angels as facilitator of further financing by Venture Capital. In their study they also analysed what are the non-financial contributions that Business Angels provide to the new ventures; first of all the respondent to the survey noted that private investors provide useful on-going advice in matters such as finance management, choosing professional service providers, corporate strategy and strategic planning, managerial advices, general business advice and marketing. They also acted as sounding board for the projects of the start-up as well as providing information about government programmes and assisting in the choice of professional lawyers and accountants. Another value added from Business Angels is their network that includes contacts with other investors and providers of capital, other players in the same industry, potential customers and contacts with the government. The angels were reported also to help during the recruiting of new employee, during negotiations and in general in the day-to-day activities when needed. Finally private investors were also able to provide market and business insights related to industry, potential customers, market feedback, product development and identification of potential acquisition targets.

As it's possible to see researchers during time have identified a wide range of non-financial activities and contributions that Business Angels provide the companies in which they invest; these study however lack of a common ground of classification for the various value added activities that has been found. In this direction Politis (2008) focussed on the similarities between all the activities listed by previous researchers and identified a set of four distinct but complementary value adding roles that Business Angels have been reported to perform (Politis 2008). These roles are:

1. Sounding board/strategic role
2. Supervision and monitoring role
3. Resource acquisition role
4. Mentoring role

Sounding Board/Strategic role

Based on all the analysed studies the most frequent value added role that Business Angels perform is acting as a sounding board where the investor, thanks to his/her extensive past experience and business know-how, provide the entrepreneur strategic and managerial advice (Harrison et al. 1992, Ehrlich et al. 1994, Mason et al. 1996, Stevenson et al. 1996, Lumme et al. 1998, Tashiro 1999, Brettel 2003, Paul et al. 2003, Amatucci et al. 2004, Madill et al. 2005). From the studied it's possible to notice that Business Angels are active in this "sounding board/strategic role" in a variety of different ways, such as helping to formulate the business strategy, giving feedbacks on the new ideas, enhancing the general pool of available management resources in the firm, and giving advice on the manner and timing for how to realize the value that is created in the firm. The past business experience and managerial know-how seems to be at the basis of this kind of contribution since they can transfer to the investee start-up all of their past knowledge acquired while working as entrepreneurs or in relation with new ventures (Wetzel 1994, Mason et al. 199,; Politis et al. 2002). Indeed, Business Angels often seem to possess unique personal capabilities that have been developed throughout their careers, which in turn gives them opportunities to combine a wide set of diverse competencies to generate ideas and creativity for the realization of

entrepreneurial ventures (Van Osnabrugge 1998, Wright et al. 1998, Politis et al. 2002). In this perspective of a resource-based view of the firm the knowledge of the investors can be seen as a resource that the business angel provide the new venture together with money. This kind of resources such as managerial capability, finance and marketing experience are often missing in small firms and are necessary to build a competitive advantage that can last in time (Barney 1991; Teece et al. 1997, Shepherd et al. 2000; Brush 2001). This knowledge provided by Business Angels is a resource that is not easily imitable or substitutable but is unique for each investor that spend time and effort in the company and so it's able to generate great value and can improve the competitive position of the firm.

Supervision and Monitoring role

Another role that is often reported to be performed by Business Angels is their involvement in the supervision and monitoring activities (Ehrlich et al. 1994, Lumme et al. 1998, Sætre 2003); this supervision and monitoring role is about protecting the investment of the shareholder of the firm, as well as debt holders and employees, from potential management misbehaviour (Van Osnabrugge 2000, Markman et al. 2001). The most common ways to supervise and monitoring the activities inside a new venture are instituting a proper account information system and directly serving in the board of directors of the firm. As analysed researchers have found a lot of example of Business Angels that after the investment stayed in the company sitting in the board of directors, making it a common practice between informal investors. This enable Business Angels to oversee the operation inside the firm, protect the assets of the company and hold managers accountable for their actions in order to guarantee the surviving and future success of the new venture. This involvement and monitoring role can be linked with the agency theory of the firm and the problem of asymmetric information between managers and shareholders; in particular the separation of ownership (shareholders) and management (managers of the firm) of day-to-day activities creates a principal-agent relationship in which the objectives of managers and owners are not aligned (Jensen et al. 1976, Eisenhardt 1989). In particular managers can have access to a higher amount of information

regarding resources and performances of the enterprise and can use this information asymmetry for their own advantage, even unconsciously, reducing the return for the investors (Markman et al. 2001). For this reason Business Angels are incentivised to closely monitor the ventures in which they invested and theory says that the best way reduce potential agency costs and maximize the value for shareholders is that investors actively perform direct supervision and monitoring activities (Jensen et al. 1976, Van Osnabrugge 2000). So based on the principal-agent theory angels are expected to perform the value added activities of supervision and monitoring not only to benefit the entrepreneurs but mostly because of their personal interests in protecting their investment by reducing asymmetric information and minimizing agency costs.

Resource acquisition role

The majority of Business Angels seems able to contribute to the investee firm by adding value with valuable resources acquired through their personal network, built with previous experiences as managers and entrepreneurs (Harrison et al. 1992, Ehrlich et al. 1994, Mason et al. 1996, Lumme et al. 1998, Ardichvili et al. 2002, Brettel 2003, Paul et al. 2003, Sætre 2003, Amatucci et al. 2004, Sørheim 2005). The value adding role of resource acquisition can be related to different activities such as interfacing with investor group, providing business contacts (e.g. potential suppliers or customers), raising additional fund; these networking activities performed by Business Angels can support the early development of the new venture connecting it with important stakeholders. This also help the company to be better prepared in catching unexpected opportunities that arise in the marketplace as they have the necessary information and knowledge necessary to act in the best moment to take advantage of the "strategic window" that appears (Harvey et al. 1995). The resource acquisition role can be linked to the resource dependency prospective that states the dependency of the long-term survival of the firm from its ability to interact effectively with the external environment (Pfeffer et al. 1978). The theory argues that, in order to reduce this dependency from external resources, the firm should maintain control over critical relationships, assets and contacts; these are all things that usually start-ups and new ventures lack since they are

not able to create an efficient network of stakeholders in the early phase of their development (Stinchombe 1965, Aldrich et al. 1986). In this context the personal network provided by Business Angels is very useful to overcome the initial difficulties of start-ups in getting access to critical stakeholder contacts and consequently to critical resources also providing legitimacy to the firm.

Mentoring role

The last value adding role is the involvement of the business angel in mentoring activities, that is to say building an enriching relationship between the more experienced investor and the less experienced entrepreneur. (Freear et al. 1995, Mason et al. 1996, Saetre 2003, Brettel 2003). The role is about building a stable and committed working relationship in which the business angel can be a trustful and helpful partner for the entrepreneur. Some of the activities related to this role that the researchers have reported include providing moral support, lifting the spirit, sharing the burden, providing a broader view of the situation and discussing and dealing with sensitive personal issues. Through this relationship the business angel can support the business operations in the day-to-day activities while building trust and solidarity. Trust is very important in this context since can lead to economize on transaction costs, improving the performances of the firm, and generates greater commitment by both angel and entrepreneur and promotes collective learning (Child et al. 2003). The mentoring role that Business Angels cover in the new ventures seems to be very correlated with their past experience as entrepreneurs as well as to the perception that informal investors have of themselves as entrepreneurs and not merely as provider of funds in their business angel activity. Several studies revealed that Business Angels are more similar to entrepreneurs than they are to investors; with entrepreneurs they share some common traits, personal characteristics and motives such as need for achievement, independence and intrinsic motivation (Sullivan 1991, Duxbury et al. 1996, Landstrom 1998, Kelly et al. 2003). In addition to that Business Angels often have had past experiences as entrepreneurs (Sullivan 1991, Landstrom 1993, Duxbury et al. 1996, Van Osnabrugge 1998, Aernoudt 1999) and most of them do not consider them as former entrepreneurs but rather as active entrepreneurs in their career of Business Angels. In this context it seems

suitable to consider the angels as co-entrepreneurs in the new ventures rather than only financers and investors; the similarity between entrepreneurs and Business Angels in term of characteristics, personality and way of thinking might also strengthen the relationship between the two and increase the importance of the mentoring role and the value that this role add to the start-up. The benefits of the mentoring role can be connected to the theories of relational governance, that claim that exchanges rely heavily on social components and that repeated cycles of exchange over time will create a psychological identity between contracting parties characterized by shared norms, values and beliefs (MacNeil 1980, Huse 1993, Cable et al. 1997, Ferguson et al. 2005, Grandori 2006). An ongoing business relationship of this kind generally foster trust and enable the parties to cooperate in more efficient ways that allow to overcome conflict of interests fostering continuance, reciprocity and bilateralism. Thus, in a relational governance perspective Business Angels contribute adding value through the mentoring role by instituting a shared vision, mutual understanding and trust in the relationship between the business angel and the entrepreneur, that creates the potential to reduce harmful conflict and promote cohesion and long-term commitment (Politis 2008).

It is furthermore possible to differentiate these four value adding roles along two major dimensions; the first discrimination can be made based on in which area the role adds value, it can improve the competitive base of resources of the firm or work on the relationship between business angel and entrepreneur; the former is related to what is possible to call the production system of the firm while the latter to the governance system. The main focus of the production system is to attract and maintain resources and use them to create products and services that in the end determine the performances of the firm. On the other hand the governance system is focused on the relationship and interactions that allocates rights and responsibilities among the various actors inside a firm. In particular governance mechanism must determine how organizational resources will be deployed and how to deal with the resolution of conflicts between organizational actors who have potentially divergent goals, such as investors and entrepreneurs. So it's possible to classify the value adding

“sounding board/strategic role” and the “resource acquisition role” as contribution focused on improving the production system by providing resources; while the “supervision and monitoring role” and the “ mentoring role” help in managing the relationship between Business Angels and entrepreneurs adding value to the governance system.

The other direction in which is possible to classify these value adding role is whether the value adding role is based on the social capital of the angel or on his human capital. The first can be defined as the advantage created by an individual’s location in a structure of relationships (Adler et al. 20029, so the features of the business angel’s relationship network that mediate norms and social trust and facilitate coordination and cooperation for mutual benefit (Sorheim 2003). The human capital on the other hand can be defined as the set of skills, knowledge and experience that Business Angels have acquired through their past works and entrepreneurial initiatives and that they can pass on to the younger entrepreneurs in the new venture. It’s possible then to classify the “sounding board/strategic role” and “supervision and monitoring role” as based on the human capital of the business angel while the social capital allows the business angel to perform the value adding role of “resource acquisition” and “mentoring”.

It’s also important to underline the interrelationships that exist between these value adding roles; for example the resource acquisition and the sounding board roles are complementary in the production system of the firm. In fact the business angel can use it’s know-how as part of the firm’s bundle of unique capabilities to provide the basis for its strategy and then use its network to support this strategy by acquiring critical external resources. In a similar way formal and informal governance mechanism are both important and needed to build a profitable relationship between business angel and entrepreneur, so it’s key the complementary function of the supervision and monitoring role, that is a more formal mechanism, with the more informal mentoring role in which angel and entrepreneur build mutual trust. In addition there are also interrelationships between the two dimensions of analysis for example mentoring can support the business angel’s ability to effectively transmit business know-how and managerial expertise since the entrepreneurs is more inclined to listen to the advice of the angel because they have built a trustful relationship; in this

way the mentoring is directly supporting the effectiveness of the sounding board/strategic role performed by the angel. Furthermore the social network of friends and business contacts on which Business Angels rely to fulfil the role of resource acquisition for the start-up can also provide the angel with valuable information and tips on performances measurement criteria and industry benchmark; the angel can therefore use this information to improve the quality of the mentoring role by giving more detailed advices to the entrepreneur. In sum, even though the four roles are distinct and cover different and unique value adding activities, their complementary potential has not to be underestimated and can reciprocally enhance the performances of one another (Politis 2008).

	Human capital	**Social capital**
Resource provision	Sounding board/Strategic role	Resource acquisition Role
Governance	Supervision and monitoring role	Mentoring role

Figure 4: Classification of value adding roles. Source: Politis 2008

Following findings by Macht and Robinson (2009) can be as well classified in the framework proposed by Politis. Through interviews to directors from nine companies funded by Business Angels Macht and Robinson asked them questions about the involvement and activities that Business Angels perform in the investee firm. In particular they found evidences of Business Angels that are directly involved in the firm and perform value adding activities such as the monitoring of business reports, that can be classified in the supervision and monitoring role, or the use of past experience and know-how to provide strategic advice and mentoring, fulfilling the "mentoring" and "Sounding board/strategic roles". Most of the respondents also indicated the importance of the network of contacts that the Business Angels provided to the start-up; through these contacts the firm gained access to a wide range of external resources and in particular most of

the respondents obtained support in order to get further funding (Macht et al. 2009). The use of the network can be classified in the framework proposed by Politis (2008) under the "Resource acquisition role" performed by the Business Angels.

More recently Bjorgum and Sorheim (2015) identified four areas in which investors can add value to the investee firm and in which the different value adding activities can be classified. The four categories are Business development and Technology development, that refer to the internal value added contributions, and Investor's outreach and Legitimacy, that are considered as external value added contribution. The categories of business and technology development contains all the value added activities, such as strategic and operational planning, mentoring and support in day-to-day activities, that can be classified using the categorization of Politis as strategic role and mentoring role, and also in part as supervision role. The category of investor's outreach is very similar to the resource acquisition role described by Politis, in both case the investor utilizes his network of business contacts and his knowledge to support the company in gathering resource from the external and getting in contact with different crucial stakeholders, such as future investors and industry partners. The last category, Legitimacy, is the most peculiar one; it's defined by Bjorgum and Sorheim as "A passive contribution in which the perceptions of the investor's brand and image help strengthen the new venture's credibility and reputation to external stakeholders" (Bjorgum et al. 2015). Politis mentioned this term while talking about the resource acquisition role and said that the importance of the angel in the network could give legitimacy to the start-up and help it in acquiring more resources (Ardichvili 2002, Politis 2008). Therefore the legitimacy category could be classified inside the resource acquisition role identified by Politis but on the other side it's possible to argue that this is not a real active role played by Business Angels but just a passive contribution that works as a signal for external stakeholders and that plays an important role for the growth of the firm (Bjorgum et al. 2015). Apart from its classification issues legitimacy remains one of the main contribution that Business Angels give to the start-up thanks to the signalling effect that an investment by business angel provide (Madill et al. 2005). In fact legitimacy is a key resource for new ventures since it provides access to other resources and resources necessary for

growth such as capital, technology, managers, competent employees, customers, and networks (Zimmerman et al. 2002, De Clercq et al. 2006, Large et al. 2007); legitimacy has been in fact linked to faster growth rate and higher survivability rate for start-up (Zimmerman 2002).

1.9 Business Angel performances

Another question that researchers tried to answer regards the performances that the start-ups backed by Business Angels obtain, and if these performances are better or worse than the one that would have been obtained without funding by angel investors. More in general the issue is to evaluate and quantify the impact that an investment by a business angel has on the performances of the start-up and if they benefits the new venture.

Given the difficulties of gathering reliable data about start-ups performances most of researchers decided to focus their attention on the IPO valuation and underpricing in order to evaluate the impact of angel investors. Chahine (2007) used a sample of 444 entrepreneurs in UK and France and found out that IPO's underpricing is negatively correlated to the retained ownership by Business Angels; the hypothesis behind is that angel investors perform a signalling role that indicates the quality of the firm, hence the firm is expected to generate more value and the underpricing during the IPO is lower (Chahine et al. 2007). The findings of Bruton (2009) go in the same direction analysing a set of IPOs in the UK and showing that The mitigating effect of the Business Angels' retained ownership on underpricing of the firm's IPO is higher than that of the Venture Capitalists' retained ownership. Again this is possible thanks to the fact that the involvement of Business Angels represents a more potent signal of the quality of the IPO firm than does the involvement of the VC (Bruton et al. 2009). Always Bruton (2010) analysed data coming from 224 IPO divided between UK and France and tested the hypothesis that IPO performances are positively correlated with the retained ownership by Business Angels. The initial hypothesis is confirmed by the model and BA seems to have a significant value-enhancing effect that could be due to the fact that BA are expected to utilize their longer-term commitment and trust relationship

to influence management and ensure the performance of the venture (Politis 2008). Furthermore higher retained ownership by BAs signals they believe that maintaining their investment is worthwhile since they will be incurring monitoring costs. Thus, Business Angels retained ownership should more actively mitigate the extent of agency problems positively affecting IPO performance (Bruton et al. 2010). Johnson and Sohl (2012) however found contrasting results since their studies, based on a sample of 636 firms, show a negative correlation between the presence of Business Angels and the post IPO performances of the firm, however they suggest that this results is related to the function and role of Business Angels in the life cycle of a new venture; typically the most important contribution of this kind of investor is on the initial stages of the start-up in a pre-IPO environment. Their results also show that angels have no effect in mitigating the IPO underpricing for the firms in the sample, however result suggests that angels are not directly causing this additional underpricing. Rather, angel investors either select firms with higher underpricing ceteris paribus, or another factor is correlated to both, angel backing and underpricing (Johnson et al. 2012a, Johnson et al. 2012b).

Hearn (2014) analysed the IPO firm underpricing across North Africa and the results supported the hypothesis that Business Angels retained ownership is negatively correlated with IPO firm underpricing; this is due to the positive signalling effect that angel investors provide by retaining the ownership during the IPO. Changing the perspective of analysis, Vanacker (2013) using data from 1215 Belgian firm performed a study on the impact of Venture Capitalists and Business Angels on the slack resources available for the firm. Slack resources are defined as "potentially utilizable resources that can be diverted or redeployed for the achievement of organizational goals" (George 2005), in particular Vanacker distinguish between financial slack resources and human slack resources. Results show that the presence of an angel investor positively affect the impact of human resource slack on firm performances, compared to the venture that are not angel-backed. On the other side there are no evidences that support the hypothesis that the presence of Business Angels influence the relationship between financial slack resources and firm performances. (Vanacker 2013).

One of the most detailed study of the impact that Business Angels have on the investee firm has been performed by Kerr et al. (2014). Their analysis exploits very detailed data collected at the deal level of start-ups that pitched to two prominent angel investment groups (Tech Coast Angels and CommonAngels) during the 2001-2006 period. The dataset allows to compare funded and unfunded ventures that approached the same investor. Furthermore available information on the interest levels expressed by the angels was used to form specialized treatment and control groups that have similar qualities. This is very important since there would be an important bias in the analysis if all the company discarded by angels are considered; this is of course because there is a clear correlation between the quality of the venture discarded and the likelihood of funding. In order to overcome this problem only new ventures that fall in a narrow quality range were used to compare them with the one that received angel financing. The results clearly states the several advantages of having an angel investor on board; the firm that receive angel financing are 20-25% more likely to survive for at least four years, they are also 9-11% more likely to undergo a successful exit (IPO or acquisition) and are 16-19% more likely to have either reached a successful exit or grown to seventy-five employee in the four years after the investment. Moreover companies that have received investments by Business Angels have on average 16-20 more employee than the companies that didn't received investments and are 16-18% more likely to have a granted patent and are growing faster in term of web traffic performances. One of the most important data is that angel-backed companies have a 70% higher likelihood of obtaining entrepreneurial finance and on average have a little less than two additional financing rounds (Kerr et al. 2014).

1.10 Business Angels and Venture Capitalists relationship

When speaking about Business Angels is very common to compare them to Venture Capitalists, since they are the most important and famous source of capital for start-ups; on this direction Morrissette (2007), while defining a profile of the business angel investor, analysed the main differences between Venture Capitalists and Business Angels that are summarized in Figure 5.

	Business Angels	**Venture Capitals**
Funding Source	Angel's own money	Investors
Number of deals per year	One every two years	5-10 per year
Typical investment per company	$25-250,000; average $50-75,000	$1-10 million; average $4 million
Company Stage	Small, start-up, early stage	Larger, expansion stage
Geographic Focus	Usually near (within one to two hours) of home	Usually nationwide, sometimes regional
Industry Focus	No focus, but prefer industries they know	Often focus on one or two industries
Source of deals	Other angels, friends, business contacts	Proposals submitted, other VCs
Decision Maker	Individual, experienced entrepreneur, personal, 50 years old	Professional, MBAs, committees, 40-year-olds
Analysis/Due Diligence	Minimal, informal, subjective, judgment	Extensive, formal, analytical, spreadsheets
Investment Structure	Simple, common stock	Complex, Convertible Preferred Stock
Involvement	Hands-on	Strategic, Board Seat
Investment Time/Horizon	Longer, five or more years	Shorter, three to five years
Exit/Harvest Strategy	Less important, long-term investment horizon	Important, IPO or Sell Company
Return on Investment Expectations	20-30% but often don't have predetermined ROI expectation	Expect 30-50% ROI

Figure 5: Differences between BC and VA. Source: Morrissette 2007

Even more relevant than the differences and similarities between the two kind of investors is the relationship that Business Angels and Venture Capitalists establish and it has always been a point of discussion for researchers since the first identification of the role of the Business Angels.

In particular during the years the discussion revolved around the fact of considering Business Angels and Venture Capitalists as "friends or foes"; in other terms researchers tried to understand if the two investors benefit one another or are in competition. Already in 1990 Freear and Wetzel identified the informal investors as complementary compared to the formal Venture Capital since they fill the equity gap between capital from friends and family and the one received by formal investors; in this way Business Angels and Venture Capital are considered completely complementary both in term of investment size and business development stage. In particular, the kind of complementary hypothesised initially was limited to the sequential investing one, with Venture capitalists that invest after the venture has already received investments by Business Angels. (Freear et al. 1990). In the same direction also Harrison and Mason (2000) expanded the research analysing different possible kind of relationship that can exist between Business Angels and Venture Capital. In particular, they identified four models of collaboration between Business Angels and Venture Capitalists:

1. sequential investing in businesses at different stages of business development
2. co-investing in deals
3. provision of finance to Venture Capital funds;
4. deal referring

Sequential Investing

Harrison and Mason defined this complementary role of financing different stages of business development of start-ups as the "most obvious" way in which informal and formal Venture Capital market interact. This form of complementarity has been initially demonstrated by researchers in the US where informal investors provide small-scale early capital and the formal Venture Capital industry provides later larger-scale capital at sequent stages (Freear et al. 1990, Freear et al. 1995,

Manigart 1997). They argue that through the work of Business Angels and the support that they give to the new ventures the formal investors have a pool of pre-screened high quality start-ups where they can invest. In other words, an effective and well developed informal capital market can create more investment opportunities and increase the deal flow for the formal Venture Capital market. On the other side this kind of complementarity is beneficial also for the Business Angels that require a flourishing institutional Venture Capital market to provide follow-on finance that the ventures require and that angels can not provide by themselves, or in some cases this can represent an exit way for angels.

If on one side the tendency of Venture Capitalists to invest in later stages is widely demonstrated (Wetzel 1983, Freear et al. 1990, Freear et al. 1995, Manigart et al. 1997, Morrissette 2007) the effectiveness of Business Angels as providers of further financing by Venture Capitalist is still discussed and will be discussed more in depth later in this work.

Co-investing in deals

Another way in which Business Angels and Venture Capital can collaborate it is by investing together in a venture at the same round. There are evidences of Venture Capital funds that co-invest with Business Angels within their network, and use the technology or entrepreneurial experience of the angel to assist in the due diligence process and in the post investment relationship with the portfolio firm. The advantages for a business angel that co-invest with a Venture Capital fund are that generally the quality of the investment is higher and the risk is heavily reduced. The Venture Capital fund benefits in two ways: first, from the business angel's contribution of commercial, often sector-specific, experience; and second, from their performance of non-executive director function, which reduces the time input which Venture Capital executives need to make. Furthermore the collaboration with Business Angels can help the Venture Capital to invest in earlier round thanks to the support and the knowledge of the informal investor (Harrison et al. 2000).

Provision of funds

Another way in which formal and informal Venture Capital can complement one another is when a business angel become a source of finance for the Venture Capital fund. This approach to investing may be particularly attractive to Business Angels whose ability to identify their own investment opportunities is handicapped by time constraints or poor referral networks and also to potential investors who are deterred from investing on their own by their perceived inability to evaluate investment opportunities and structure deals. The business angel has the opportunity to syndicate investments, thereby spreading the risk, and also benefits from the Venture Capitalist's skills in sourcing, screening and structuring the deals. Venture capital fund that can benefit from this kind of relationship are the one that specialize in early stage and small high technology firm; moreover Business Angels are thought to be less short-term oriented compared to traditional investors of Venture Capital funds; this reduces the pressure on the Venture Capital fund manager that do not need to generate quick returns but can focus on investment that can possibly give more returns but in a longer time (Harrison et al. 2000).

Deal referring

The last kind of complementarity between the formal and the informal market is the informal networking of deals and deal flow between Business Angels and Venture Capital firms. On one side the access for Venture Capital firms to a network of Business Angels provides a potential referral mechanism for investment proposals which, while potentially fundable, do not meet the venture fund's investment criteria in terms of deal size, stage of investment or sector and so are re-directed to Business Angels that can find them interesting. On the contrary for Business Angels, Venture Capital funds can provide the potential for funding deals which lie outside their resources or expertise, thereby increasing both the quantity and quality of the deal flow for the Venture Capital fund. This mechanism can work properly only if there is an open communication channel between the two sectors.

Through two surveys conducted in the UK dedicated to Business Angels and Venture Capital firm Harrison and Mason analysed the impact and frequency of the four complementarity style identified in theory. The results are the following. Only a 29% of the Venture Capital firm reported that either Business Angels or, indeed, high net worth individuals have invested in any of their funds. Moreover, in the limited number of situations where this did occur the amounts were generally small in both absolute terms and as a proportion of the total fund. It's also important to underline that the great majority of the Business Angels that invest in a Venture Capital fund remain passive and are not involved neither in the management of the fund nor in the negotiation of any deal. This type of complementarity is then to consider very limited and not a relevant element in the relationship between the two markets. As far as sequential investment is concerned the 50% of the Venture Capital firm reported the presence of this kind of complementarity, while this number decrease to 18% on the side of Business Angels. However, second or subsequent round investment by a Venture Capitalist normally does not provide an exit route for the business angel: only 6% of respondents in the business angel survey indicated that Venture Capital funds had provided an exit route from an investment. In fact Venture Capital firms reported that mainly Business Angels remains as shareholders and continue to play an important role inside the investee company; Venture Capital reported that often Business Angels keep advising and mentoring the company also after the investment by VC. Venture capital funds on their side have mixed views on the merits of providing follow-on investments in situation where Business Angels had invested in early round. Only half of them see the presence of a business angel in a positive light while for the other there are no real benefits in investing in a firm where an angel have already invested. The one that perceive as positive the presence of a business angel as reasons the availability of the business angel's expertise, the enhanced credibility of the business and the indication that the business was willing to take on equity partners and take account of outsiders' viewpoints. Most of these fund managers stated that, other things being equal, this would make them more likely to invest, however a number stated that it depends on who is the business angel. On the other side the major

disadvantage highlighted concerned the differences in approach of Venture Capital funds and Business Angels.

Deal referring seems to be very common with a 66% of Venture Capital funds that report to have received information about possible opportunities from angels and a 71% that report to have referred deals to Business Angels. However the flow of information between Venture Capital fund and Business Angels is limited to a small number of trusted partners with consolidated business relationships; in fact only a 29% of the Business Angels report to have received information about possible deals from Venture Capital managers. In this context is relevant the role of BANs, Business Angel networks, that are indicated by Venture Capital as the most important actors in this process of sharing information, this suggests that BANs are coming to occupy an important role linking Venture Capital and business angel market.

In terms of intrinsic quality, more Venture Capital fund managers report that deals referred by Business Angels are good or very good, however, most report that the quality depends on the source: evidently, not all Business Angels have equal access to quality deals. Venture capital funds refer deals to Business Angels in three situations: if an investment project is too small to be of interest; if an investment project is thought to more need input from a business angel, for example, because sector or market expertise is required or ongoing advice and support is required; and if the Venture Capital fund has no interest in the deal offered (which usually arises because of a lack of fit with the fund's investment focus). The deals which Business Angels refer to Venture Capital funds generally require additional finance to proceed.

The 58% of Venture Capital fund managers have reported to have co-invested with a business angel at least once in the same round of the same start-up, however in most of the cases this is not a frequent form of investment since only the 25% have reported to have co-invested in more than ten occasions. On the side of Business Angels only a third of them have been involved in co-investments deals with Venture Capital funds; as for the deal referring the same consideration can be made: co-investing is a phenomenon that is confined to Business Angels that already have pre-

existing relationship with a Venture Capital fund making this kind of complementarity relevant only for a small portion of informal investors.

Focussing on the sequential investing complementary Madill, Haines and Riding (2005) in their work expanded the findings of Harrison and Mason; before working on the empirical data they identified five conceptual reasons why angel financed firms should be more likely to be successful with respect to subsequent Venture Capital financing.

1. Many firms tend to resist to equity financing (Feeney et al. 1999), growth. It is therefore reasonable to expect that firms willing to accept angel financing are also open to equity capital in general and therefore likely to be more receptive to institutional Venture Capital. (Elitzur et al. 2003)
2. Angels usually tend to identify and invest in high growth opportunities, the same opportunities that Venture capital funds are looking for.
3. The various value adding activities that angels perform for their investee firms may better qualify them for being able to grow and access institutional capital. Often angels can provide the company with expertise and mentoring that make the firm to perform better and be more appealing for subsequent investment by Venture Capital.
4. The presence of an active investor in the firm represents a validation role, reducing the information asymmetry thanks to the monitoring activity and this can incentivize following investments (Van Osnabrugge et al. 2000).
5. Business Angels are very likely to seek a means of profitable exit for their investments, to do so, they need to make the firm grow to the point where an IPO is feasible or the firm is appealing for mergers and acquisitions by big companies. To reach that kind of growth typically the firm needs more tranches of investments of bigger size that usually come from Venture Capital funds.

The study was performed through a survey sent to a set of firm in Ottawa region in Canada and they were asked what kind of investment they received. A 22.5% of the respondents declared that

they have received angel investments and an important 57.1% of them reported a successive round of investments by Venture Capitals; while on the contrary of the remaining firms that didn't receive investments by Business Angels, only a 10% was able to get financing from Venture Capital funds. The regression analysis on this results confirm the trend and suggest that angel financing may be an important precursor for institutionalized Venture Capital enforcing the complementary view of Bas and VCs as friends. Always in the optic of Business Angels as facilitators of further financing Sorheim (2005) conducted a study through in depth interviews to five experienced Business Angels in Norway. The focus of the interviews was on the ways in which Business Angels are able to help the investee company in obtaining further financing and in particular how they use their social capital, for example the network built with previous experiences, and how their background affect the type of investor that they are able to bring on board.

Based on the findings of his paper Sorheim advocated six propositions related to the role of business angel as facilitator of further financing:

1. The Business Angels' previous track record that defines if and how they can act as facilitator for further finance to their portfolio firms.
2. Active Business Angels can be viewed as part of the entrepreneurial team, hence reducing the "liability of newness" for the entrepreneurial firms in their search for further finance. New and unexperienced entrepreneurs can have more difficulties in raising capital so the help of an experienced angel is very useful.
3. Industry specific investors both have access to and act as referrers in the process of establishing cooperation with strategic partners.
4. Regional Business Angels both have access to and act as referrers in the process of bringing in other Business Angels to their portfolio firms.
5. Compared to regional investors, industry specific investors are more involved in bringing in VC funds as financiers to their portfolio firms.
6. Compared to industry-specific Business Angels, regional Business Angels are more involved in the process of securing debt finance to their portfolio firms.

Even if the analysis is not focused on the relationship between Business Angels and Venture Capitalists there are evidences of Business Angels that use their networks to present the companies in which they invest to Venture Capital funds. Another common trait between interviewed angels is that they strongly care about their reputation inside the network so they stated that want to present to the investors only good quality projects that they are quite sure will receive further investments. Even though the analysis conducted by Sorheim is qualitative and not quantitative there are still some important suggestions about the high quality of the start-ups backed by Business Angels and presented as opportunities to Venture Capitalists that can be therefore more inclined to invest.

With another approach also Elitzur and Gavious (2003) support the fact that Business Angels brings benefits for subsequent VC investments; they examined the relationships between entrepreneur, business angel and Venture Capitalist analysing the equilibrium contract between the players and the importance of the signalling aspect of the game. In particular, they focused on the moral hazard problem and their results show that entrepreneur exerts less effort than he should because they rely on the actions of the other players. Similarly, the VC pays less effort than he should because they rely on the angel and the entrepreneur to pick up the slack. In equilibrium, the entrepreneur's overall level of effort and the VC's level of investment are both inefficient and lead to a situation where all the parties are worse off because of the opportunistic behaviour. This can even lead to failure if the parties involved decide to not expend any resource because they fear to be the only one that is playing honestly and so each participant fears that the others are going to avoid doing their part in effort or money, so each avoids investment or exertion of effort, leading to a failure. Elitzur and Gavious however show in their model that this inefficient outcome can be eliminated thanks to entrepreneur's signalling while approaching a business angel. In particular if the entrepreneur incur in some costs while engaging the business angel, the action itself is a signal to the Venture Capitalist that the entrepreneur has chosen to exert a positive level of effort and so an efficient equilibrium may be reached, where value is generated. The cost that can be associated with approaching an angel are mainly the opportunity costs, in fact the entrepreneur must lose

valuable time to prepare the pitch and the material to interact with the business angel, time that could be used to work on the start-up. So basically the fact that an entrepreneurs have approached an angel and put effort on it is an incentive for a Venture Capitalists to consider to invest in it. This fact can support the complementarity model of sequential investment, since a firm that have received angel financing sends a signal about the effort put in the project and availability to receive funding in general that could make the Venture Capitalists more prone to investing.

Chemmanur and Chen (2014) went deeper in explaining how the complementarity between Business Angels and Venture Capitalists develops. They built a model in which they predicted that Business Angels will fund the majority of early-stage projects while Venture Capital funds will focus on later-stage projects in which they have more possibility to create value. So Bas and VCs are natural complementary since they work in different and sub-sequential stages of start-up development. This is particularly true in case of scarcity of Venture Capital financing compare to the demand; in this case the fraction of early-stage financing from Venture Capitalists is lower and lower, leaving the role of financing to the Business Angels. In fact, they claim from their model that if the Venture Capitalist starts funding a project at an earlier stage, there is a greater chance that he is investing in a firm where he cannot create significant value, and therefore has to exit the firm before project completion (earning a return lower than his opportunity cost of capital). However the model shows also that, ceteris paribus, a company that was financed in the early stage by a VC is more likely to receive further funding from the same VC and to have a successful exit, hence it would be better for a start-up overall to receive funding from Venture Capital funds since the very beginning but this is very unlikely to happen because Venture Capitalists prefer to invest in later-stages projects leaving the ground to Business Angels in order to finance early projects.

It is only in the recent years that studies have hypothesized and demonstrated a possible conflict between the interests of BAs and VCs. In particular Hellmann and Thiele (2015) analysed theoretically how angel, entrepreneurs and Venture Capital markets interact. Is clear that Business Angels have limited funds, so typically they need Venture Capitalists to provide follow-on funding for their companies. At the same time Venture Capitalists rely on Business Angels for high quality

deal flow so these two actors seem to play a complementary role in the process of financing new ventures, in this case they can be considered as “friend”, since the actions and roles of Business Angels and Venture Capitalists benefit each other. On the other side however there is a concern around the so called “burned angels”: Angels frequently complain that Venture capitalists can abuse their market power by offering unfairly low valuations. Expectations of low valuations at the VC stage then affect the willingness of angels to invest in early stage start-ups. Michael Zapata, an angel investor declared: “In cases where the VCs do see a profit opportunity, they have become increasingly aggressive in low-balling the managements and investors of emerging companies by placing lower valuations on them. They also have gotten tougher by diluting the shares of previous rounds of investors, converting special classes of shares to common stock or diluting previous investors’ representation on boards. Angels call these actions “cram downs” or “push downs.” The market has been very rough on the Venture Capitalists and they are making it tougher on the angels” (Holstein 2012). If this is the case Business Angels and Venture Capitals are actually “foes”. The problem in this case is that Venture Capitalists no more need the angels to make investments and to remain in the company, so this create a friction between the two different kind of investors. So in the end it is possible to say that there is no a unique vision of Business Angels and Venture Capitalists as “foes” or “friends”, but that changes from deal to deal, in particular the Venture Capitalists' bargaining power depends on how competitive venture markets are, and how well angels are legally protected. One of the most interesting study has been made by Hellmann et al. in 2017 made a study with data from the British Columbian Investment Capital Program in Canada for a total of 2.184 funding round analysed. The primary objective of the analysis was to identify the kind of relationship that exists between Business Angels and Venture Capitalists comparing the two opposing views of “complementary” and “substitutes”. The first theory sees angels and Venture Capitalists as synergistic members of a tightly knit ecosystem; they have different funding availability, objectives, abilities and networks and so investee companies can benefit from the combination of these attributes. So as for many researchers in the past under this view angel financing is a prelude to obtaining further Venture Capital financing, for example

angels finance the seed funding and the companies that survive proceed to the VC funding (Elitzur et al. 2003, Madil et al. 2005, Sorheim 2005, Chemmanur and Chen 2014). The second perspective sees Business Angels and Venture Capitalists as offering to the companies separated paths of financing that rarely cross each other. Once the start-up has chosen one investor, is highly probable that till the exit it will stay with the same type of investor, for example if a company received the first funding from an angel, the following funding round will be probably provided by other Business Angels. This could be because certain company attributes suit themselves better to one type of financing mode (i.e. a selection reason), and/or because once companies have received funding, the investors explicitly or implicitly guide their companies towards a path involving investors of their own type (i.e. treatment reason). For this reason, another question that researchers address is if the dynamic of financing is led by investors or by companies. An investor-led dynamic means that once a company has received funding by an investor, that investor plays an important role in determining the company's future funding choices, so this correspond to the treatment effect. If the dynamic is company-led it means that companies have some peculiar characteristics that make them more or less suitable for a specific kind of investor compared to others; this correspond to the selection effect. Combining the views on complementary versus substitutes roles of BA and VC and the company/investor led dynamic researchers have identified four hypotheses about companies' dynamic financing pattern across angels and VCs: investor-led complements (Launch Pad), investor-led substitutes (Sing Hole), company-led complements (Stepping Stone), and company-led substitutes (Parallel Stream).

Launch Pad: Angels plays an active role in preparing companies to raise VC funding, of course not all the companies are suitable to reach that stage and can fail before but angel generally help investee companies in receiving further financing from Venture Capitalists.

Stepping Stone: Angels are part of a company's path towards raising VC. However, angels don't play an active role in steering companies to VC, it is company characteristics that determine the financing path.

Sink Hole: It means that once the company enters the angel world, it become less likely to raise VC fund in the future rounds; in this case is the presence and the guidance of the angel itself that directs the company towards receiving financing from other angels and not from VCs.

Parallel stream: In this case companies self-select into whatever type of financing that works best for them. Companies that suit the angel model are unlikely to switch from angel to VC and vice versa, because their needs are fulfilled better by one of the two investors, depending on the characteristics of the companies.

	Investor-led	**Company-led**
Complements	Angels are a launch pad that help a company to get to VC funding	Angels are a stepping stone that a company gets through on the way to VC funding
Substitutes	Angels are a sink hole. They encourage companies to remain angel funded and avoid VC	Angels are a parallel stream for funding companies as an alternative to VC funding

Figure 6: Hypotheses about the transition from angel to VC funding (Hellmann et al. 2017)

Analysing the data through regression tools results suggest that companies that already have received funding from one type of investor, are more likely to receive further funding from the same type of investor. In particular one of the most interesting results is the fact that there is a negative correlation between angel and VC funding; If a company received prior angel funding, it is less likely to raise VC funding in next rounds; and vice versa if a company received prior VC funding, it is less likely to raise following angel funding, These findings suggest a dynamic financing pattern of "substitutes" between BA and VC, they are not complements that cover different round of financing but they work in "parallel" with different start-ups. In particular, the regression coefficients indicates that the prior presence of angel investors increases the probability of obtaining new angel investors by 30%, while on the other side the presence of Business Angels

reduce the probability of obtaining new VC investors by 34.7%. Vice versa the prior presence of Venture Capitalists increases the probability of receiving funding by new VC investor by 30% while decreases the probability of getting angel investments by 24.6%.

One concern about the meaning of these results is that it is possible to argue that the reason why companies fail to progress from angel financing to VC is that their underlying performance does not allow it. The problem could be that the "parallel stream" hypothesis that the results suggest might be generated by a large number of bad quality companies that remain stuck at the angel phase , while only the good angel-backed companies are able to receive further VC funding. To evaluate if this "quality sorting" hypothesis is true researchers evaluated the performances of the companies in the sample using the exit performances and the revenues at the time of funding. Taking into consideration also these data researchers did not find evidences that the negative relationship between prior angel funding and sequent VC funding is weaker for higher quality companies both in term of revenues or exit performances. So the obtained result that the substitutes patterns does not vary along the performance range is inconsistent with the quality sorting hypothesis instead evidences suggests that angel-backed companies are likely to remain in the angel stream independently from their performances.

These findings suggest that the Venture Capital and Business Angel ecosystems are not tightly connected networks where company pass from one investor in the early stage, the business angel, to another one at later stages, the Venture Capitalists, as it was previously hypothesized by theoretical studies. Instead evidence suggests the existence of parallel streams where different investors invest in different types of companies, with only limited cross-investing across types, thus angels keep investing in different companies than VCs and angel-backed companies are somewhat less likely to ever switch to VC financing (Hellmann et al 2017).

One issue of this study by Hellmann is that it is based only on data from British Columbia in Canada and the empirical findings could be note generalizable also to other ecosystems, such as the US and Europe. However, these findings are still relevant and strongly question the way in which

the relationship between Business Angels and Venture Capitalists has been seen in the past asking for more research in the field.

CHAPTER 2. RESEARCH QUESTIONS

2.1 Research questions

The first question that this work wants to address is about the relationship between Business Angels and Venture Capitalists and in particular how an investment from one of the two investors influences the probability of further investments by the other actor. The first research question can be therefore divided into two questions formulated as follows:

Q1: What is the impact of an investment made in a start-up by a BA on the probability of receiving further investments by VCs?

Theoretical research would suggest a positive relationship between BAs and VCs with Business Angels that work as facilitator for further financing from Venture Capitalists (Freear et al. 1990; Harrison and Mason 2000; Elitzur and Gavious 2003; Madill, Haines and Riding 2005; Sorheim 2005; Chemmanur and Chen 2014). Therefore, we would expect that the presence of a BA investor would positively affect the probability of receiving new funds from VC investors with the two actors that work in a complementary way, with the former that covers the first steps of new firms' development and the latter that invest only in the subsequent stages.

On the other hand, in recent years Hellman has firstly supposed the possibility of BAs and VCs being in competition (Hellmann and Thiele 2015) and then empirically verified that the presence of Business Angels is negatively correlated with future investment rounds by Venture Capitalists (Hellmann et al. 2017). However, Hellmann obtained those results studying a very limited and concentrated dataset of Canadian companies, so the results may vary if a larger and more heterogeneous sample of companies is taken into account. For this reason, using a large dataset of European start-ups could improve the comprehension of the phenomenon and whether Hellmann's preliminary results will be confirmed or contradicted. Furthermore, the pattern of investments in Europe is slightly different from the one in North America: as I shown in section x, European

Business Angels tend to invest lower amount of money compared to angels from the U.S. and Canada (Wilson 1995). The lower amount invested per company makes the angels to be less of a threat for VCs, since they do not compete in the same rounds, so the follow-up investments by VCs are more necessary for the next round of financing for the start-up. Thus, we could expect that in Europe the probability of a follow-up investments by VCs after a BA investment to be higher and more meaningful for the growth of the start-up than in North America.

On the other hand, another difference between the EU and North America is that in US and Canada the investor markets, both for VC and BA, are more developed than in Europe and start-ups have more chances to get in contact with possible investors and have the possibility to choose which investor they want to approach and have on board in the various stages. In Europe start-ups do not have this kind of privilege, but the scarcity of potential investors especially in some areas of the continent leave no choice for the entrepreneur to choose where to ask for money. So it may happen that if in some areas where only Venture Capitalists are present, start-ups will receive funding only from VC and will have no relationship with angels. On the other hand, if in the geographical area there are some strong Business Angels networks it is more probable that the firm will be invested by angels and will stay with them till the exit, without receiving further financing by VC. Finally, some peripheral geographical area may be reached just by Business Angels and, thus, we will not see follow-on VC investments as well.

One thing to take into consideration is of course the revealed quality of the start-up at the time of the potential investment by a Venture Capital. One phenomenon that could happen is that only high quality companies will receive further investments besides low quality ones will not receive any VC investment after an initial investment made by Business Angels. Therefore, one question that I want to answer is if the quality of the start-up changes the previous results, impacting the probability of receiving funds by a VC after an initial BA investment.

Venture Capitalists differ according to their governance structure. It is therefore interesting to distinguish the behaviour of Corporate Venture Capitalists (CVC), Bank-affiliated Venture Capitalists (BVC) and Governmental Venture Capitalists (GVC) in opposition to traditional Independent Venture Capitalists (IVC). In fact, different types of VC are known to follow different strategic objectives and so are likely to interact with previous investments by Business Angels in different ways.

Q2: *How differs the probability for an angel-backed company of receiving a follow-on VC investment according to the VC type? (IVC, CVC, GVC, BVC)*

For example IVCs may seek quicker returns from the investment compared to BAs, so the presence of a Business Angel investor could interfere with this objective being an obstacle on the control that the IVC can exert over the start-up. For this reason IVC may choose not to invest in companies were a BA is already present.

As far as GVCs are concerned I do not to expect any particular linkage between them and Business Angels since Governmental Venture Capitalists focus their attention on potential investment areas where there is a lack of investments by Independent Venture Capitalists or other investors (Colombo et al. 2014). If angels are investing in some start-ups it means that the sector is already known by investors and additional help by the government could be more useful elsewhere; therefore it seems unlikely to find a meaningful relation between investments of BAs and further investments by GVCs. I basically expect GVCs to act as substitutes of BAs investing in different markets or typologies of start-ups.

Corporate Venture Capitalists generally have different objectives compared to IVCs; they rarely pursuits only financial gain from their investments, but they rather privilege investments in start-ups that can strategically provide benefits to the parent company in the long term (Chemmanur 2014). Without the impelling need of making financial profit CVC managers are more free to "make bets" and invest in companies at earlier stages compared to IVC (McNally 2002), from

which they also may extract more value for the parent company and/or are more easily to expropriate of their technology. For these reasons, we can expect CVCs to be more a competitor of Business Angels compared to IVCs since they tend to invest in earlier stages where also BAs are investing. On the other hand, since CVCs are not seeking a heavy financial return as their main goal, an already existing BA investment in the company may not impact so much the probability of getting further investments by CVCs because the CVC would rather analyse the start-up based on how well it integrates with the firm strategy and would take the BA stake in the company into less consideration compared to other VC types. Thus, the expectation regarding follow-on financing from CVCs remains unclear at this stage.

Moreover, both GVCs and CVCs may be more inexperienced compared to IVCs and may look for help in finding deals and good start-ups in which they can invest; in this case the Business Angels investment may be seen as a positive signal about start-up quality and as a way to make a safer investment. Thus in this regards the two, angels and GVCs and CVCs respectively may act as complements.

In conclusion, I will let the results tell us what is the dynamic that is actually at play between BAs, CVCs and GVCs and how they are related.

As far as Bank-affiliated Venture Capitalists are concerned we do not expect any particular difference compared to Independent Venture Capitalists in the relationship with Business Angels unless the results will show particular patterns concerning this specific kind of investor.

Furthermore, I want to understand if particular co-investment dynamics may further affect the follow-on VC investments in addition to differences in VC types. Thus I formulate the third research question as follows:

Q3: After a BA investment, does the syndication between Venture Capitalists increase the probability of investment compared to VC investing alone?

In case of syndication deals the amount of money involved is very high and out of reach for Business Angels, hence the substitution effect is very unlikely to happen and probably a syndication deal is more probable to happen after an investment by Business Angels.

Finally characteristics of the investee start-ups, such as industry, nationality and age of the company are likely to influence each company investment pattern; thanks to regression it is possible to see how the results change based on the characteristics of the company and highlight possible interesting differences in the way in which a BA investment influences a VC follow-up.

Q4: Which characteristics, such as industry, nationality and age of the company are more relevant when considering BA and follow-on VC investments?

Understanding if there are differences between industries or countries in the way in which an investment of BAs influences further VCs investment is crucial in order to have a better knowledge on the dynamics that are at play. For example, we could expect that since both BAs and VCs invests heavily in high tech companies, in this specific industry the probability of receiving further VCs investments after a BA round is higher. Another example can be made on the country where the company is located: in countries where the BA sector is well developed and it is more recognized, the signals that it sends to the VC investors could be stronger so we could expect a stronger linkage between the two kind of investors.

CHAPTER 3. THE SAMPLE

3.1 Database Description

The database used for this research is the "VICO Updated" database created and provided by Politecnico di Milano. This database has been developed in the context of the WP20 of the project "RISIS-Research Infrastructure for Research and Innovation Policy Studies", funded by the European Commission under the Seventh Framework Programme with the aim of updating and enlarging the already existing VICO database, developed within the project "VICO – Financing Entrepreneurial Ventures in Europe".

The database includes companies that have received at least a Venture Capital or angel investments after 01/01/1998 in one of the following European countries: Belgium, Finland, France, Germany, Italy, Spain, and the United Kingdom plus one country outside Europe that is Israel. The data collected gives information about the investee companies, the investors and the characteristics of the investment round itself.

The database consists of a total number of 52,657 observation concerning investment-level data that come from a total of 17,863 companies and 7,834 investors (Venture Capitalists, Business Angels, Crowdfunding, Others) that have been involved in 28,044 investment rounds.

The criteria for inclusion of a company in the database are:

1. Company founded starting from 01/01/1998
2. First investment received starting from 01/01/1998
3. Companies established in Belgium, Finland, France, Germany, Italy, Spain, United Kingdom and Israel.

The sources used to identify these kind of companies are collected from the two commercial databases, Thompson One Private Equity and Zephyr and the on-line database Crunchbase. Overall Thomson One Private Equity is the main source of information of the VICO Updated database, accounting for 13,058 companies. However, it is worth pointing out that the inclusion of companies

coming from Zephyr and Crunchbase allowed to significantly increase the coverage of the database, with additional 4,805 companies.

In order to collect additional accounting data and improve data availability and reliability other sources of information were used, such as Orbis, company websites, press releases, and online company directories such as, e.g., www.bloomberg.com. Using all these sources the database is able to provide a wide set of information regarding the investee company, in particular the following information have been collected:

a) General company information:

- Company ID (Company ID code, Company Name)
- Address (Nation, City, Street, Zip Code, ISO codes);
- Industry classification (including NACE Rev. 2 codes, description, main section);
- Foundation year;
- Listed status (including year of IPO);
- Status (active, acquired, bankrupt).

b) Accounting data: accounting data up to a 10-year time horizon (2005-2014):

- Income statement figures;
- Balance sheet figures;
- Number of employees.

As far as investor are concerned the VICO Updated database collects information about:

- Investor ID (Investor ID code, Investor Name);
- Address (Nation, City, Zip Code, ISO codes);
- Type of investor (Type of VC: Independent VC, Corporate VC, Bank-affiliated VC, Governmental VC, University VC; BA; Crowdfunding; Other);
- Year of foundation of the VC management company;
- Number of funds managed by VC management company;

- Status (active or inactive).
- Industry classification (including NACE Rev. 2 codes, description, main section) where available

Finally, for each investment this deal specific information is provided:

- Date of the investment;
- Total amount invested

3.2 Sample construction and descriptive Statistics

I based my empirical analysis on the *VICO Updated* database. First, I eliminate from the sample all the companies that have received one single round of financing, since the objective of the analysis is to understand the relationship between investors along different type of subsequent rounds. Then, I eliminate all the observations that refer to investments made through Crowdfunding, or by University Venture Capitals (UVC) and generic other investors, these categories only counted for 503 observations and are not relevant for this analysis.

The final sample is thus composed by 5,140 different Companies for a total of 30,302 observations accounting for 15,209 distinct round of investments. Breaking down the sample by Investor Type, it is possible to notice that the investments made by VC comprehend 95.5% of the total number of observations: in particular IVC are the most prominent VC type and count for almost 75% of the observations, followed by GVC at 8%, CVC with 7.45% and BVC at around 5.1%; Business Angels on their side count for 4.5% of the total with 1,368 observations (Table 1). Syndication between BAs and VCs happens only in 631 rounds, around 4% of all rounds, while syndication between different kinds of VC is present in 3,152 rounds (i.e. 20%), lastly syndication between VCs of the same type can be found in 3,948 different rounds of investments, so in more than 26.5% of total rounds.

As far as the nationality of the investor is concerned, it is possible to notice that the majority of investors come from the United Kingdom that lead with 6483 investments (more than the 25% of

the total sample), followed by France, United States, Germany and Israel; these first five countries alone count for more than the 80% of the total number of investments as shown in Table 2.

Table 3 presents the classification of invested Companies by Nation and we can notice that the pattern is similar to the one of the investors since UK, France, Germany and Israel are the countries that presents the higher numbers of companies that received at least one investment. It is no surprise then that the majority of investments come from investors that belong to the same country of the invested company (57%); the foreign investors are mainly represented by the United States investors and by European investors that decide to invest in companies that come from other European countries.

The concentration of companies and investors in UK, France and Germany are also not a surprise since these countries are surely the more active in Europe regarding the start-up environment.

As far as the industry of investee companies, Table 4 shows the classification of the various industries and the related number of companies for which we know the industry. As expected the *Software* field dominates the investment with almost 30% of the companies operating in the software world. The second most popular industry category is the generic *R&D and engineering* one that counts for more than 11% followed by Medical and Health services, Support services, Consultancy and Computers and electronic components manufacturing; each of all the other industries counts for less than 5% on the total. If we divide the start-up between high-tech and non-high tech we can notice that the two numbers are very close with the 47.37 % of the companies that can be defined as heavily focused on technological activities and the 52.63% that do not. Considering the industry, our sample is a more balanced compared to the one used by Hellmann et al (2017), the most similar study to ours, which had more than 80% of start-ups belonging to the high-tech sector.

The average age at which companies received the first investment round is around 2.66 years while the average age across all rounds and investments is around 4.3 years old.

As far as balance sheet data are concerned we have data available only for a portion of the companies present on the database; for example on the 145,138 observations that are the

combination of companies and year we have data on total assets for only 62,452 of them. After eliminating the tails of the distribution thanks to the winsor method at 1% (to eliminate some outliers and incorrect observations, i.e. negative values) we can see that the average amount of total assets of a company before the first investment round is around 5.9 million € with an average portion of intangible assets of 612 k€.

3.3 Variables used in the model

3.3.1 Dependent Variables

VC_follow: It is a dummy variable that identifies the presence of a follow-up investments by a Venture Capitalists, in particular they can be IVC, CVC, GVC or BVC but in this stage they are aggregated and considered as a general "VC". Since we do not want to consider follow-up investment made by investors that have already financed the start-up the variable takes in consideration only the presence of new VC investors that invest in a round that is not the first one. This is made in order to avoid the bias of a recurring investors, since it is more probable that they will invest also in following rounds but we can be exclude that this is much influenced by the presence of angels in the previous round.

This is the key variable of our specification since we want to understand what factors and presence of previous investors influence the probability of receiving a follow-up investments by a new Venture Capital. Summarizing the VC_follow variable will assume the value "1" if the invested company has received a follow-up investment by a new Venture Capitalist otherwise VC_follow will be assigned the value "0". It is to note that all the companies that have received only one round of investments, and for which the VC_follow would have been equal to zero, have been already eliminate from the sample so that the analysis is focused only on the start-ups that have received more than one round of investment. VC_follow takes value 1 in %.. of the sample.

VC_type: Since the VC_follow variable does not take into consideration what kind of Venture Capitalists is making the follow-up investment a different variable is needed to analyse how different types of VC according to their governance structure may follow a different investment strategy. For this reason, for each different kind of Venture Capitalist a different value is assigned to the VC_type variable that allows to analyse the different effects separately on Independent Venture Capitalists (IVC), Governmental Venture Capitalists (GVC), Corporate Venture Capitalits and Bank-affiliated Venture Capitalists (BVC). Furthermore, the variable takes also in consideration the possibility of a follow-up investment mad through a syndication between different kinds of Venture Capitalists or between VCs of the same kind.

Summarizing the variable VC_type will be assigned values at follows:

VC_type=1 if the follow-up VC investor is an IVC

VC_type=2 if the follow-up VC investor is a CVC

VC_type=3 if the follow-up VC investor is a GVC

VC_type=4 if the follow-up VC investor is a BVC

VC_type=5 if the follow-up investment is a syndication between different types of VCs

VC_type=6 if the follow-up investment is a syndication between VCs of the same kind

VC_type=0 if there is the case in which there is no follow-up investment by a new Venture Capitalist

3.3.2 Independent Variables

BA_presence: This is the crucial independent variable of the model since it represents the link between the investment of Business Angels and the investment of Venture Capitalists. In particular. this is a dummy variable that identifies the presence of a Business Angel in a round preceding an investment made by a new Venture Capitalist. The variable just considers the presence of the angel so it could be that the angel invested alone, in syndication with other angels or in syndication with other Venture Capitalists. BA_presence is then equal to “1” if there are one or more round of

investments by Business Angels previous to the round in which a new VC is present, otherwise BA_presence is assigned the value "0". BA_presence is 1 in 6.56% of the sample.

BA_pre: very similar to BA_presence this variable identify the presence of a Business Angels in a round preceding an investment by a new VC, however the BA_pre variable isolates the cases in which the Business Angel was the only type of investor present in the round so the variable get the value "0" also in the cases where there is a syndication between BA and VC, isolating the effect of the investment by one or more Business Angels.

So the BA_pre is equal to "1" only if there is a round where only Business Angels invested that precedes the round in which a new VC has invested; BA_pre is equal to "0" in all the other cases. BA_pre takes value one in 1.82% of the sample.

3.3.3 Control variables

I consider a set of control variables, which are the most used in previous literature about VC investment (e.g. Helmann et al 2017).

first_inv_age: it represents the age at which the start-up have received its first round of investments; the age of the company can affect the probability of receiving funding by further investors.

foreign_inv_majority: it is a dummy variables which assumes value "1" if the majority of the investors that have invested in the start-up come from a different country from where the company is founded. The attention from foreign investors that the company has received can influence the attraction of further investments.

d_nation: A dummy for each nation where the companies are from; the place in which the company is founded can influence the access to stream of financing and so the probability of receiving investments by new actors.

d_industry: A series of dummies that indicates in which industry the start-up is operating, it is helpful to know in which industries is more likely to get further investments and in which is not. Table 5 links each dummy to its correspondent industry

d_first_inv_year: A dummy for each year from 1998 to 2015 that indicates in which year the start-up has received the first round of investments. It is useful to see if the patterns of investment have changed during the time.

high_tech: A dummy variable that assume value "1" if the start-up operates in the high-tech sector; we could expect that these kind of companies are more attractive for Venture Capitalists and follow-up investors.

vc_hub: It is a dummy variable that indicates if the company is located in one of the most important cities in Europe and Israel in terms of number of investment opportunities. The variable assumes the value "1" if the company is located in one of the top 12 cities in term of number of investment made in the area, which accounts in total for 11.26% of investment in all sample. The cities are: London, Paris, Berlin, Munchen, Helsinki, Cambridge, Tel-aviv, Barcelona, Madrid, Espoo, Hamburg, Milan. We can expect that companies that comes from these cities are more probable to receive investments by new Venture Capitalists since they are closer to possible investors.

total_ass_3y: It represents the natural logarithmic of the average amount of total assets of the company in the 3 years prior to the investment. The year considered for the analysis is the one in

which the first new VC investor entered the company, if there is one; if there has been no new VC investor the year considered is the last one before the exit or, eventually, the failure of the company. It is the first of three control variables linked to the balance sheet of the start-up that give us information on if and how the characteristics of the company influences the attraction of future investments rounds.

inonas _3y: It is the natural logarithmic of the ratio between the amount of intangible assets and total assets calculated as a 3 years average; it is useful to characterize the company to see if it is heavily tangible or intangible asset oriented and how it influences future investment opportunities. As for the previous variable the year considered in the analysis is the one in which the first new Venture Capital invested, if present, or in alternative the last year before exit or failure.

curr_ass_on_liab_3y: it is the natural logarithmic of the ratio between current assets and current liabilities, calculated as an average of the same ratio in the previous 3 years. The variable gives valuable information on how is the situation of the company in the short term and tells us how a positive ratio may influence further investments. The year considered for the analysis is again the year of the first round in which a new VC is present or in alternative the year before exit or failure of the company.

summary statistics for dependent and independent variables are shown in Table 6

The correlation matrix between the variables can be found in Table 7 and is shown in order to discuss possible issues arising from multi-collinearity; that is to say when two or more variables are highly correlated and inflate the standard errors in the regressions. In our case there are no evidences of problems linked to the correlations between variables since no correlation index exceeds 20%.

CHAPTER 4. METHODOLOGY

4.1 Methodology

Given the fact that our dependent variable VC_follow is a binary variable the technique of logistic regression appeared to be the most appropriate choice in order to approach the problem. Logistic regression is a technique that allows to convert binary classification problem into linear regression ones by means of a proper transformation.

The logistic regression model postulates that the posterior probability P(y|**x**) of the response variable conditioned on the vector **x** follows a logistic function, given by

$$P(y = 0|\boldsymbol{x}) = \frac{1}{1 + e^{\boldsymbol{w}'\boldsymbol{x}}}$$

$$P(y = 1|\boldsymbol{x}) = \frac{e^{\boldsymbol{w}'\boldsymbol{x}}}{1 + e^{\boldsymbol{w}'\boldsymbol{x}}}$$

By inverting the two expressions, we observe that the logarithm of the ratio between the conditional probabilities of the two classes depends linearly on the predictive variables, that is

$$\ln \frac{P(y = 1|\boldsymbol{x})}{P(y = 0|\boldsymbol{x})} = \boldsymbol{w}'\boldsymbol{x}$$

Consequently, by setting

$$\mathrm{z} = \ln \frac{P(y = 1|\boldsymbol{x})}{P(y = 0|\boldsymbol{x})} = \boldsymbol{w}'\boldsymbol{x}$$

the binary classification problem is traced back to the identification of a linear regression model between the dependent variable z and the original explanatory attributes, so in this way the original binary classification problem can be approached as a linear one and thus meaningful conclusion can be draft on how the independent variables influence the VC_follow dependent variable.

In the case of the dependent variable VC_type that it is not binary but assumes different values the logistic regression must be expanded to a multinomial logistic regression model. A multinomial logistic regression is a classification technique that allows to generalize the logistic regression to

multiclass problems, so it predicts the probability of different possible outcomes of a categorical distributed dependent variable, as in the case of VC_type.

Basically given J possible outcomes the multinomial logistic regression model choose 1 of the outcomes as a pivot and then runs a binary logistic regression model for each of the others J-1 outcomes against the one chosen as a pivot, for example if the outcome J is chosen as a pivot the model would be as follows:

$$\ln \frac{P(Y_i = 1)}{P(Y_i = J)} = \beta_1 * \boldsymbol{X_i}$$

$$\ln \frac{P(Y_i = 2)}{P(Y_i = J)} = \beta_2 * \boldsymbol{X_i}$$

…

$$\ln \frac{P(Y_i = J - 1)}{P(Y_i = J)} = \beta_{J-1} * \boldsymbol{X_i}$$

This allows us to use a multiclass variable such as VC_type and have information on how the probability of receiving investments by a class of VC compares to the probability of receiving investments by other classes of VCs.

I used the econometric program STATA to clean, manage and merge the databases involved in the analysis, and build and run the econometric models illustrated above.

4.2 The models

4.2.1 Model 1

In the first model the dependent variable is VC_follow and the independent variable is BA_presence; the aim of this model is to test whether or not there is a correlation of some kind between the presence of a business angel and the probability of getting further financing by new Venture Capitals in the future. This is the same correlation that was tested by Hellmann (2017) and does not takes into account if the BA is in syndication with a Venture Capitalist. The regression technique used for Model 1 is the logistic regression model.

The control variables for this model are all the ones previously listed:

The age of the company (d_first_inv_age), the dummy variable on the foreign investor massive presence (d_foreign_inv_majority), the dummies on nation (d_nation), industry (d_industry) and first year of investment (d_first_year_inv), the dummy on the high tech nature of the start-up (high_tech), the dummy on the location of the company in a big city for the VC market (vc_hub), and finally the three variables on the balance sheet of the company (total_ass_3y, inonas_3y, curr_ass_on_liab_3y).

The expectation from this model is to have a first clear idea of what is the influence of a Business Angel on the likeability of receiving follow-up investments by new Venture Capital investors, the results we expect are less drastic compared to Hellmann's one with a closer relationship between angels and VC in Europe compared to North America.

4.2.2 Model 2

The second model uses as a dependent variable VC_follow but as a main independent variable there is the BA_pre variable, that assumes value "1" if Business Angels are the only kind of investors in the rounds before an investment by a new VC. So the cases of an early syndication between VC and BA are not considered in the variable. In this way the model tries to isolate the effect of the Business Angels alone on the probability of receiving new investments by Venture Capitalists. The problem is that the companies in the database for which the variable BA_prec assumes value "1" are very limited in number and so could represent a dataset that obliges to be very cautious when making conclusion through this model. This model should then be seen in context with model 1 as a way to enforce and possibly better explain the results of the first model.

The control variables are the same used in the first model and the regression technique used is the logistic regression as well.

4.2.3 Model 3

In this model the dependent variable is the VC_type variable that differentiate between the different kinds of new Venture Capital investors and possible syndication deals between VCs. In this case the variable is not a binary variable and so I need to use the multinomial logistic regression to approach the problem. Unfortunately in order to make the *mlogit* model run properly on the software it has been necessary to reduce the number of control variables, in particular the control variable included in the model are the first_inv_age and foreign_inv_majority dummies, the dummies on the industry has been removed but the dummy on the high_tech nature of the start-up business is kept, the final two controls are vc_hub dummy and the dummies on the nationality of the company (d_nation*). I also exclude the three control variables on accounting data of the company (total_ass_3y, in_on_ass_3y, curr_ass_on_liab_3y) in order to make the model run properly, this is due to the fact that the balance sheet data are available only for a relatively small subset of the companies. The aim of the model is to see how the different types of VC influences the results and which ones are more or less related to previous Business Angels investments. Another useful piece of information that this model gives is the possibility to compare the various VC types between each other just changing the pivot value for the variable each time.

For the sake of a better confrontation between the VC types, the mlogit model has been run excluding the observation for which the VC_type has value "0", that is to say when there is not a follow-up investment by any VC. In this way it is easier to compare the results and see which Venture Capital invest more after an initial investment by a business angel.

CHAPTER 5. RESULTS

5.1 Model 1

Table 8 shows the results for the first model, the logistic regression. Columns 1-2 shows the model with only control variables (for comparability purposes), Columns 4-5 shows the complete model with different sets of controls. Indeed, including our dependent variable improved significantly the explanatory power of the model (the adjusted R2 improves from 0.0576% to 0.1115%). Looking at model 2, the first and most important result is the negative relationship between the BA_presence and the VC_follow significant at 5% level. This negative relationship confirms the results obtained by Hellmann (2017) and tells us a very important thing regarding the way in which BA and VC interact; it appears in fact that also in Europe a previous investment by a business angel negatively influences the probability of receiving a follow-up investment by a Venture Capital investor. It is to notice that the coefficient does not yet represent a linear connection between the dependent and the independent variable but it was necessary to calculate the derivative in order to obtain a coefficient that indicates the correct extent for which the independent variable influences the dependent one; the significance remains the same and complete results can be found in Column 7 of Table 8. Computing the average marginal effect of BA_presence we see that this result translates into a -5.2% probability of receiving a follow-up VC investment, an impact that is yes relevant but lower compared to the 30% discovered by Hellmann. The hypothesis that the negative effect of Business Angels on follow-up financing by VC is lower in Europe than in North America stated during the first research question is therefore confirmed.

Concerning controls, the variable first_investment_age is slightly negatively correlated with VC_follow with a significance at 0.01% level it means that the older the start-up was at the time of the first investment, the lower is the probability of receiving further investments by a new Venture capital. A significance at 0.05 level is present also for the coefficient linked to the foreign_inv_majority, in particular if this dummy assumes value “1” it increases the probability of receiving investments by a new VC, underlying the importance that Venture Capitalists give to the

presence of foreign capitals in the start-up. Other variables that present a significant coefficient in the regression (unreported in the table for the sake of clarity) are two dummies about the investee company nation, linked to the company being based in France or Germany. In particular, if the company is in one of these two countries it has a significant higher probability of receiving follow-up investments by new Venture Capitalists. Also, the high_tech dummy variable present a positive coefficient with a significance level of 0.10% indicating that the companies operating in the high tech industry are more likely to receive a follow-up investment by new Venture Capital investor.

5.2 Model 2

As already said the big difference between the first and the second model is the main independent variable, that in this case is BC_pre, that assumes value "1" only if the business angel was the only kind of investor present in the rounds preceding the investments from a new Venture Capitalist. The results for this model can be found in Table 9, while column 4 of the same table shows the average marginal effects, as for model 1.

The main outcome of model 2 is the very negative relationship that exists between the independent variable BA_pre and the dependent one, VC_follow; the coefficient is strongly negative and significant with a significance level of 0.01%. In fact the probability of receiving a VC follow-up investment after a round of investment that included only Business Angels decreases by 17.5%, indicating a strong negative correlation between the investment of Business Angels and the one of Venture Capitalists. Again Hellmann's finding is confirmed but the effect is still lower than the one in North America. For the other variables of the model very little changed from the model 1 results and so the same considerations still hold.

It is important to remark that the number of observations for which the BA_pre assumes the value "1" is very limited and so the results of the model must be taken as a first explorative result and considered in the wider context of the research as a whole.

5.3 Model 3

Table 10 shows the results for the mlogit model run with VC_type=1 as a base outcome, so all the other kinds of Venture capitals and syndication are compared with the baseline case of a follow-up investment made by an Independent Venture Capital. The focus is of course on the main independent variable, BA_presence, to see how the different kind of VCs interact with a previous investment made by Business Angels. It appears immediately evident that all the other kinds of VCs are more influenced by the presence of an angel investor, in fact the coefficient for the BA_presence variable are positive and significant ($p<0.01$) both for for CVCs (VC_type=2) and GVCs (VC_type=3). That is to say that both Corporate Venture Capitals and Governmental Venture Capitals are more likely to invest after a round of Business Angels compared to IVCs. The same consideration can be made for syndication of both kinds, between VCs of different types but also between VCs of the same type; in fact, the coefficient is largely positive and significant ($p<0.01$) for both VC_type=5 and VC_type=6. Hence also in the case of syndication the follow-up investment is more influenced by the presence of Business Angels compared to the results of Independent Venture Capitalists.

This tells us how strongly negative is the relationship between the presence of BA and a follow-up investment by a new IVC, to further confirm this expectation the margins for the model have been calculated and the results for the BA_presence variable are summed up in column 4 of Table 10. The table provides us the coefficient that relates the BA_presence variable to the follow-up investment by each different kind of VC; we can notice that the coefficient for the value of Independent Venture Capital (VC_type=1), is largely negative and with a high significance ($p<0.01$); so a previous round of investment by BA decrease drastically the probability of receiving further funding by new Independent Venture Capitalists by 44%. In the same way, it is possible to notice that BA_presence presents a significant ($p<0.01$) and positive coefficient for both VC syndication types, meaning that an investment by Business Angels increases the probability of receiving a follow-up investment by a syndication between two or more VCs (8.6% for syndication of the same C type and 35,9% for syndication of different VC types). Thus, the answer to the

Research question number 5 is positive since after a business angel investment it is more likely to obtain financing by a syndication of more VCs.

5.4 Robustness check

In order to make a check over the robustness of the models used I decide to build a control sample where each company that has received a financing from one or more BAs (so for which the variable BA_presence has value 1) is matched with a "twin" company that shares the same characteristics but has not received any financing from BAs. In this way the model is "clean" from possible hidden effects: for example it could happen that the companies in which the BAs have invested are considerably different from the one in which VCs want to invest and these differences are the only thing that determines the probability of receiving investments by VC, regardless of the presence of the BA. The matching between companies with similar characteristics allows us to exclude this phenomenon and analyse if the presence of the BA is truly a determinant factor for the VC follow-up investment. I do this applying a standard propensity score matching procedure on the following control variables: BA_presence, first_inv_age, foreign_inv_majority, d_industry*, d_first_inv_year*, d_nation*; and performing a 1:2 matching with replacement.

By running the first model on the sample obtained through the matching we can notice that the BA_presence variable has still a significant ($p<0.10$) and negative coefficient confirming the fact that it is the presence of the BA that influences the probability of obtaining further investments by VCs and this does not change based on the characteristics of the start-up. Robustness Check results are shown in Table 11.

This provides a first confirmation of the robustness of the model and partially corrects from a potential selection bias present in the data.

5.5 Results discussion

The first important result to discuss is without any doubt the negative correlation that is present between the independent variable BA_presence and the dependent one VC_follow in the first model. This result tells us that, as Hellmann (2017) found in North America, also in Europe there is a significant negative relationship between the investment of Business Angels and the probability of obtaining further investments by Venture Capitalists. As discussed previously this result is in contrast with a great number of theoretical hypothesis discussed by researchers in the past years. From interviews and common sense it appears in fact that the role of Business Angels is to invest in early stages and make the company able to survive and attract future stage investments, in particular by VCs. However, empirical results from Hellmann first in North America and for the present study in Europe seem to highlight a different pattern of investments between Business Angels and Venture Capitalists pushing for a vision of the two investors as substitutes rather than complementary actors. Start-ups will prefer to stay with the same type of investor rather than passing from one kind to another in different stages; however, these results are not implying any form of rough competition between VCs and Angels on who is able to get the most promising start-ups. In fact, the demand for investment is generally higher than the offer and the world is plenty of entrepreneurs seeking for funding while investors need to carefully choose where to put their money in; moreover different companies have different needs and on the other side VCs and Angels can provide different benefits to the investee start-ups. It seems reasonable to assume then that start-up will seek and receive investment from the type of investor that better suits its needs.

One further explanation for this trend could be that VCs do not want to cope with the problem of having a BA investor with different strategic objective in the company. Typically VCs seek for quick exit and short term returns while Business Angels are more patient and long-term oriented; this create a mismatch between the objectives of the two investors that can harm the return of the VCs. Another factor that may influence and push for the substitutes view of angels and VCs is the geographical position of the start-up; in fact, the entrepreneur not always is exposed to a large offer of both kind of investors in the area where the company is founded and this is particularly true in

the European countries and areas outside the big cities where the investor market is poorly developed. Since the geographical proximity is an important driver in order to get investment this fact could “force” the entrepreneur to seek and receive investments from the only investor present in the area and stick with it from that moment on.

Further confirmation of this negative correlation between BA and VCs investments is given by the second model which tries to isolate the effect of the Business Angel investments on the probability of future VCs investments. In particular, we can notice that the correlation between the independent variable BA_pre and the dependent VC_follow is negative at a larger extent compared to the coefficient of BA_presence in the first model. Even if the set of observations is more limited this result emphasise the negative effect that Business Angels have on future investments by VCs and corroborates the results of the first model.

Even though both in North America and in Europe the presence of a BA negatively influences further investments by VCs the results change in term of the extent in which they are correlated, in fact from model 1 it is possible to notice that the decrease in probability of receiving a VC follow-up after a BA investment is only 5%, against the 30% found by Hellmann in Canada. Even in the second model where the coefficient between the BA_pre and the VC_follow variables is very negative the probability is reduced only by 17%, still far from Hellmann’s results.

This discrepancy can be explained by the different data set and mainly by the differences between European and American investors and start-up markets. As already discussed the fast sprouting and growing of business angel networks is bringing angels to participate in deals where larger amount of money is invested and so the angels are going to compete with VCs in term of deal size, in response VCs are moving even further and entering deals where the investments are really huge and not suitable for every kind of start-up.

The result is that the old equity gap at the first stages of the start-up life, that was once filled by BAs, is representing itself and entrepreneurs are trying to find new ways of getting money in the

earlier stages (e.g Crowdfunding). We can expect this phenomenon to be more relevant in North America where the investors market, both for BAs and VCs is more developed and as a result Business Angels are no more the main source of capital for early stage start-ups. In Europe however, since the investors' market is less developed, we can expect this phenomenon to be not as relevant and that Business Angels are still covering some of the earlier stages of start-up life cycle.

The 5% lower probability of receiving investment by VCs caused by the presence of angels is still an impressive result since suggestions from the theory would imply a positive effect of Business Angels presence on follow-up investments by VCs; while, also in Europe, this correlation goes in the opposite direction. Even more impressive is that the probability of receiving follow-up financing by Venture Capitalists decreases by 17% if the only investors in previous rounds were Business Angels enforcing the view that describe Business Angels and Venture Capitalists as substitutes that work and invest on parallel tracks.

Does it mean that Venture Capitalists and Business Angels have no relationships at all? Probably not: it is important to remember that sequential investing is only one of the way in which BAs and VCs interact between each other. For example, Harrison and Mason (2002) listed as a very popular kind of relationship the deal referring between VCs and BAs with a 66% of Venture Capital funds that report to have received information about possible opportunities from angels and a 71% that report to have referred deals to Business Angels. The popularity among this kind of interaction is a confirmation of the hypothesis that BAs and VCs work as substitutes, not as complements but neither as competitors: if they were to be competitors they would not recommend deals to one another but they would try to obtain for themselves as many investment opportunities as possible "stealing" them from other investors. The referring of deals between investors happens because they know if a start-up is more suitable for them or for an another kind of investor. In this way BAs and VCs work in parallel each financing the companies that would benefit more from their involvement, creating a situation that is more profitable both for start-ups and investors. On the other hand, Harrison and Mason found that only a 18% of Business Angels reported that the presence of "sequential investment" kind of complementary: the fact that only a small portion of

Business Angels is reporting a sequential investment pattern between BAs and VCs is a qualitative confirmation of the results obtained.

The third model presents us the comparison between the different types of Venture Capitalists and allows to make considerations about how they differ in the way in which they interact with previous investments by Business Angels.

Using IVC as a baseline outcome it is possible to notice how all the others VCs tend to invest more after an investment by BAs. In particular Corporate Venture Capitalists and Governmental Venture Capitalists present significant positive coefficients for the variable BA_presence.

Starting from CVCs it is possible to say that they are less experienced and less selective compared to Independent Venture Capitals, moreover they often pursue strategic objectives (e.g., use the technology of the investee firm, potentially acquire it or externalise some R&D activities) more than financial ones. Thus, they may favour the expertise and help of BAs in choosing and managing the ventures in which they invest. In this case Business Angels may represent a useful support for CVC. In addition to that the presence of the angel could function as a signal of the quality of the start-up, something that the managers of a CVC could find difficult to determine on their own. These are just some of the reasons that could determine the difference between IVC and CVC in the way in which they relate with already present BA investors.

Similar consideration about the inexperience of the Venture capital managers can be made for GVCs that may use the presence of a business angel as a positive signal in order to choose which start-up is better to finance. Furthermore we know that GVCs tend to invest with the objective of covering the equity gaps left by the IVCs, so for example GVCs invest in industries that are not attractive for IVCs or in rural areas, far away from the vc-hubs, where the investments by IVCs are concentrated. Considering the fact that the results show how IVCs tend to not invest in companies where a BA is present, it is more probable that GVCs will intervene in this kind of companies and cover the gaps left by the Independent Venture capitals, increasing the probability of a GVC investment in a start-up where a BA is already present.

In addition to that both CVCs and GVCs usually invest much lower amounts of money compared to Independent Venture Capitals, if at a first hypothesis this could seem to make them enter in competition with Business Angels, probably this is not the case but, on the contrary, CVCs and GVCs invest in start-ups that are similar to the one in which BAs invest and for this reason they tend to have closer relationship with them and engage in follow-up investments.

Very interesting are then the results associated with the IVCs, looking at the Table 10 Column 4 for margins we can notice that the presence of a business angel decreases the probability of receiving IVC follow-up investments by more than 44% indicating a strong negative relation between the two kind of investors. The consideration on the reasons of this result are the same made for the results of the two first models: IVCs are probably investing in different companies compared to Business Angels and the two investors are working on two parallel trails, each with the start-ups that better fit them as investors.

On the other side what is peculiar is the positive increment in probability of receiving funding by a syndication of Venture Capitalists given the presence of Business Angels in previous round. The reason behind this could lie in the great amount of money that is involved in syndication deals: in fact, when two or more VCs syndicate it is usually in order to reach a greater amount of money that will help the company to scale up and eventually reach the exit. These numbers are too high for a single business angel or a business angel network to achieve, so start-ups that till that moment have received investments by business angel are now in need of a capital that the BA cannot provide. For this reason, they are "forced" to look for other investors that can afford this kind of capitals and this is where VCs and syndication come in to play; the phenomenon is particularly evident for syndications between VCs of the same type, in this case in fact the main reason to make a syndication is the economic one, compared with syndications between different kind of VCs that could have a primary strategical focus.

As far as the other variables are concerned we can see that the older was the start-up at the time of the first investment, the lower is the probability of receiving further investments by Venture

Capitals; this could be due to the fact that the sample is dominated by the presence of IVCs, which tend to avoid risky investments in start-ups that are too young.

An other interesting result, it is the positive influence on the probability of receiving further investments by VCs is the presence of foreign investors; in fact if it happens that the majority of the investors come from a country that is not the one where the company is founded, the start-up as a higher chance to receive further investments by VCs. The presence of foreign investors gives a positive signal on the good quality of the start-up to future investors and it opens up the company to the international market where the possibilities of receiving funds are higher in numbers, since it can get in contact with potential investors from all around the world.

Finally, France and Germany seem to be the countries where receiving follow-up investments by Venture Capitalists is the easiest; this is because they are the countries in the continental Europe where the start-up and investors markets are more developed. In particular Paris, Berlin and Hamburg are some of the European cities where a high number of start-ups and investors are located granting the opportunity for demand and offer to meet and make deals. The geographical proximity is very important to sustain the relationship between the investors and the entrepreneurs, for this reason founding the company in countries and regions where the market is already developed can be a strategy to increase the probability of finding suitable VC investors.

As far as the United Kingdom is concerned we know that this is the most developed market in Europe but in this case our results do not provide a direct relationship between the follow-up investments by VCs and the location of the company in UK. This is probably due to the fact that the market is so developed that the Venture Capitalists are not the only kind of investors that can provide follow-up investments, but business angel networks, banks and other investors can come into play and bring the company to the exit. Another hypothesis is that in the UK, the same investor, or group of investors, has the economic possibility to finance each round of the start-up life cycle preventing the need of further investments by new actors. In addition to that, since the

market in UK is so well developed, VCs can be more selective and choose not to invest in companies where there is already a BA for the strategic reasons aforementioned.

Classifying the sample between high-tech and non high-tech companies we can notice that the high-tech companies have a higher probability of receiving follow-up investments by VCs: the high-tech sector has been in the last years at the centre of attention of investors since it is able to provide with very high valuations at exit and is seen as the sector that can provide the most innovative and profitable ideas.

5.6 Limitations and further researches

This work has however some limitations that arise mainly from the dataset available.

First of all, the number of observations that include an investment by BAs is small compared to the total number of observations and also in absolute terms the amount of start-ups that has received investments by BAs is limited, in particular the number is even smaller for investments by BAs alone. I tried to partially solve this problem through the use of a matching sample composed by "twin" BA and VC only financed start-ups and preliminary results, on the effect of BA investment in line with the results from the main model, are encouraging. Nevertheless, research on ample BA invested start-ups' samples is envisioned to confirm these first results.

Since the database included only companies that have received investments during their life we were forced to consider only follow-up VC investments from the second and later rounds onwards; it would have been interesting to analyse the effect that business angel investment have in obtaining VC financing compared to companies that do not have already received any investment but that are actively seeking for a VC investment for the first round. This kind of analysis would, certainly, help in better understanding the relationship between BAs and VCs. This approach would also result in the construction of an "ideal" control sample that would not suffer from a potential selection bias (as all companies are looking for VC), unfortunately is very difficult to obtain this data only from public sources and with no access to the VCs' deal flows.

A last limitation of this work is that it has not been possible to separate and control for the possible selection effect, checking the quality of the start-ups in which BAs and VCs invested with more sophisticated models that take into account the endogeneity of the BA presence variable. This was mainly due to the fact that it was not possible to find appropriate variables on a European scale correlated with the demand and offer (at the market level) of exclusively BA capital versus VC capital in order to isolate the effect of Business Angels investments from Venture Capitalists investments. Future studies addressing this problem are therefore recommended.

Even with these limitations this study still analyses a sample spread over different European countries representing the first exploratory study of this kind that can provide useful information and data for expanding the research in the direction of understanding the nature of the dynamics between BAs and VCs.

In particular future research can analyse in detail the relationships that exist between Business Angels and the various types of Venture Capitals, trying to understand the different motivations and impacts on the start-up that these VCs have.

Furthermore, it would be useful to analyse what is the impact on the VC follow-up investment of the different characteristics of BAs, for example investigate if there are differences between the effect of single BAs and Business Angel Networks.

Another future research direction could be the one of keeping track of the performances of the European start-ups from the first investment until the exit and see how are the different impact of BA, VC and both investor types investments in the same company affect investee firms' exit performances.

Lastly it would be important to extend the study to all the countries in Europe using a larger sample, in particular regarding the number of companies that have received investment by Business Angels, even though I recognize the difficulty in obtaining this kind of information given the nature of Business Angels investors and in particular the ones not involved in any Business Angel Network.

CONCLUSIONS

This work analysed the relationship between Business Angels and Venture Capitalists in all their aspects, starting from the theoretical perspective given by researchers and arriving to the data collected by Hellmann (2017) in Canada that seem to contradict previous qualitative studies: if on the one side researchers have found qualitative evidence that Business Angels should positively affect the probability of obtaining financing by new VC investors, on the other Hellmann's quantitative study found that the opposite effect at play in Canada, where the presence of BAs lower the probability of obtaining further financing from VCs by 30%.

Thus, the focus of this work was to understand what is happening in Europe and how Business Angels and Venture capitalists interact in the old continent. Since the investors and start-up market is not as developed as in North America we expected the results to be closer to the one hypothesized by theoretical researches, with a tighter relationship between BAs and VCs compared to the one found by Hellmann in Canada.

These expectations have been partially confirmed: there is still in fact a negative correlation between the presence of a Business Angel in the company and the probability of receiving follow-up investments by Venture Capitalists but in this case the negative effect is limited to a minus 5% that is by far lower compared to the minus 30% found by Hellmann. This represent the first main outcome of the work since it shows that also in Europe the presence of Business Angels negatively affects the probability of receiving follow-up investments by Venture Capitalists overturning the investment dynamics hypothesized by theoretical studies. Is then possible to affirm that the two kind of investors work mostly as substitutes; they invest in different pool of start-ups and do not facilitate the passage to another kind of investor but work on parallel streams.

This work also takes the analysis a step further differentiating the effect of Business Angel investments for each type of Venture Capital investor: results indicate how Independent Venture Capitalist are the one that are less likely to invest in companies where a Business Angel is already present; on the other side Corporate Venture Capitalists and Governmental Venture Capitalists share a more positive relationship with angels.

This is probably due to the different objective that the various types of Venture Capitalists want to achieve: IVCs typically look for short term financial returns while GVCs and CVCs are more patient and share with angels a long term investment horizon, furthermore the inexperience of GVCs and CVCs managers could bring them to rely more on Business Angels to find suitable companies to invest in. One final consideration can be made also on the syndicated deals between VCs, they are in fact very positive correlated with a previous Business Angel investment, resulting in an increase by 35% on the probability of receiving funding by a syndication between two or more different VC types.

The study has some limitations, mainly concerning the restricted number of observations that present a Business Angel investment, however the research represents a first exploratory study at a European level that can open up further research to better understand the dynamics that exists between Business Angels and Venture Capitalists.

TABLES

Table 1: Investor Type distribution

Investor Type	Freq.	Percent
BA	1,368	4.51
BVC	1,553	5.13
CVC	2,256	7.45
GVC	2,427	8.01
IVC	22,698	74.91

Table 2: Investor Nation distribution

Investor Nation	Freq.	Percent	Cumulative
United Kingdom	6,483	25.56	25.56
France	5,165	20.36	45.92
United States	4,118	16.23	62.15
Germany	3,268	12.88	75.03
Israel	1,428	5.63	80.66
Finland	1,015	4.00	84.66
Spain	693	2.73	87.39
Belgium	631	2.49	89.88
Switzerland	573	2.26	92.14
Netherlands	385	1.52	93.66
Italy	264	1.04	94.70
Denmark	152	0.60	95.30
Sweden	150	0.59	95.89
Norway	128	0.50	96.39
Japan	119	0.47	96.86
Russian Federation	110	0.43	97.29
Ireland	105	0.41	97.70
Luxembourg	99	0.39	98.09
Canada	98	0.39	98.48
Singapore	57	0.22	98.70
Australia	37	0.15	98.85
Austria	36	0.14	98.99
Hong Kong	23	0.09	99.08
…			

Table 3: Company Nation distribution

Company Nation	Freq.	Percent
United Kingdom	1,697	33.53
France	1,117	22.07
Germany	910	17.98
Israel	441	8.71
Finland	363	7.17
Spain	279	5.51
Belgium	138	2.73
Italy	116	2.29

Table 4: Industry classification

Industry	Freq.	Percent
Software	1,162	29.34
R&D and Engineering	470	11.87
Medical/Health/Life Science	273	6.89
Support services	238	6.01
Consultancy	213	5.38
Computers and electronic components	198	5.00
Biotechnology	192	4.85
Wholesale and retail trade	156	3.94
Information services	144	3.64
Machinery and equipment	143	3.61
TLC	125	3.16
Financial & Insurance	115	2.90
E-commerce	85	2.15
Media & Publishing	84	2.12
Food & bevarege	41	1.04
Energy & environment	33	0.83
Cultural and creative industries	30	0.76
Chemicals	27	0.68
Construction	27	0.68
Transportation services	27	0.68
Other manufacturing	26	0.66
Manufacture of other non metal products	24	0.61
Real estate	22	0.56
Transportation	21	0.53
Sport	18	0.45
Manufacture of metal products	15	0.38
Agriculture, forestry and fishing	14	0.35
Public & social actvities	11	0.28
Accommodation	8	0.20
Texitiles, wearing & leather	8	0.20
Manufacture of wood & furniture	6	0.15
Other services	3	0.08
Aerospace	1	0.03

Table 5: Dummies on Industry

d_industry	Industry
1	Accommodation
2	Aerospace
3	Agriculture, forestry and fishing
4	Biotechnology
5	Chemicals
6	Computers and electronic components
7	Construction
8	Consultancy
9	Cultural and creative industries
10	E-commerce
11	Energy & environment
12	Financial & Insurance
13	Food & bevarege
14	Information services
15	Machinery and equipment
16	Manufacture of metal products
17	Manufacture of other non metal products
18	Manufacture of wood & furniture
19	Media & Publishing
20	Medical/Health/Life Science
21	Other manufacturing
22	Other services
23	Public & social actvities
24	R&D and Engineering
25	Real estate
26	Software
27	Sport
28	Support services
29	TLC
30	Texitiles, wearing & leather
31	Transportation
32	Transportation services
33	Wholesale and retail trade

Table 6: Summary statistic for dependent and independent variables

Variable	Num. Obs.	Mean	Std. Dev.	Min	Max
VC_follow	5,061	.889	.313	0	1
BA_presence	5,061	.065	.248	0	1
BA_pre	5,061	.018	.134	0	1
first_inv_age	4,196	2,759	3,185	0	22
foreign_investor_majority	5,061	.290	.454	0	1
high_tech	5,061	.476	.499	0	1
vc_hub	15,222	.113	.316	0	1
total_ass_3y	7,938	7,225	2,663	0	13,321
curr_ass_on_liability_3y	7,485	1,248	1,003	3.30e-08	14,008
inonas_3y	7,408	.119	.167	0	.693

Table 7: Correlation Matrix

	curr_ass_on_liab_3y	inonas_3y	total_ass_3y	vc_hub	high_tech	foreign_inv_majority	first_inv_age	BA_presence	VC_follow
VC_follow	0.0491	-0.0014	-0.0231	0.0231	0.0670*	0.0724*	-0.0709*	-0.0187	1,000
BA_presence	-0.0094	-0.0089	-0.1940*	0.0886*	-0.0160	0.1595*	-0.0859*	1,000	
first_inv_age	-0.1516*	0.0031	0.1831*	-0.1308*	-0.0674*	-0.0828*	1,000		
foreign_inv_majority	0.0480	-0.0898*	0.0231	0.1268*	-0.0286	1,000			
high_tech	0.0699*	0.0832*	-0.0657*	-0.0475*	1,000				
vc_hub	0.0739*	-0.0278	0.0183	1,000					
total_ass_3y	0.0244	-0.0642*	1,000						
inonas_3y	-0.1586*	1,000							
curr_ass_on_liab_3y	1,000								

Table 8: Model 1 results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	No accounting variables			**Complete model**			**Average Marginal effects**
	Coefficient	Std. Error		Coefficient	Std. Error		dy/dx
VC_follow							
BA_presence	-0.553**	(0.224)		-0.630**	(0.297)		-5.217%**
first_inv_age	-0.066***	(0.018)		-0.088***	(0.025)		-0.728%***
foreign_investor_majority	0.504***	(0.161)		0.591**	(0.239)		4.891%**
d_nation1 (Belgium)	-0.660**	(0.318)		-0.642	(0.413)		-5.314%
d_nation2 (Finland)	-0.336	(0.240)		-0.292	(0.337)		-2.419%
d_nation3 (France)	0.455**	(0.178)		0.653**	(0.256)		5.403%**
d_nation4 (Germany)	0.346*	(0.191)		0.748***	(0.278)		6.191%***
d_nation5 (Israel)	0.512	(0.338)		.	.		0.000%
d_nation6 (Italy)	-0.086	(0.453)		0.379	(0.552)		3.137%
d_nation7 (Spain)	-0.248	(0.278)		0.079	(0.371)		0.650%
d_nation8 (UK)	.	.		.	.		0.000%
high_tech	0.411	(0.285)		0.661*	(0.366)		5.467%*
vc_hub	0.005	(0.147)		0.027	(0.206)		0.223%
total_ass_3y				-0.094	(0.067)		-0.775%
inonas_3y				-0.483	(0.617)		-3.997%
curr_ass_on_liability_3y				0.02	(0.125)		0.165%
Number of observations	3.311			1.694			
Pseudo R2	0.0576			0.1115			

The dependent variable is VC_follow. Estimates are derived from logistic regression model with robust standard errors. All regressions are estimated with an intercept term and dummy variables for industry, first investment year and nation. Standard errors in round brackets.
*** p < 0.10; ** p < 0.05; *** p < 0.01.**

Table 9: Model 2 results

	(1)	(2)	(3)	(4)
	Complete model			**Average Marginal effects**
	Coefficient	Std. Error		dy/dx
VC_follow				
BA_pre	-2.153***	(0.420)		-0.175***
first_inv_age	-0.089***	(0.025)		-0.007***
foreign_investor_majority	0.593**	(0.238)		0.048**
d_nation1 (Belgium)	-0.614	(0.411)		-0.049
d_nation2 (Finland)	-0.265	(0.340)		-0.021
d_nation3 (France)	0.761***	(0.256)		0.062***
d_nation4 (Germany)	0.767***	(0.280)		0.062***
d_nation5 (Israel)	.	.		0
d_nation6 (Italy)	0.41	(0.537)		0.033
d_nation7 (Spain)	0.123	(0.377)		0.010
d_nation8 (UK)	.	.		0
high_tech	0.696*	(0.368)		0.056*
vc_hub	0.125	(0.210)		0.010
total_ass_3y	-0.102	(0.066)		-0.008
inonas_3y	-0.409	(0.613)		-0.033
curr_ass_on_liability_3y	0.028	(0.129)		0.002
Number of observations	1694			
Pseudo R2	0.1282			

The dependent variable is VC_follow. Estimates are derived from logistic regression model with robust standard errors. All regressions are estimated with an intercept term and dummy variables for industry, first investment year and nation. Standard errors in round brackets.

*** p < 0.10; ** p < 0.05; *** p < 0.01.**

Table 10: Model 3 results

					Average Marginal effects
		(1)	(2)	(3)	(4)
Types of VC		Coefficient	Std. Error		dy/dx
IVC	BA_presence	BASE OUTCOME			-0.442***
CVC	BA_presence	1.716***	(0.497)		0.007
GVC	BA_presence	1.646***	(0.623)		0.014
BVC	BA_presence	0.107	(1.062)		-0.024
Different type syndication	BA_presence	1.839***	(0.297)		0.086***
Same type syndication	BA_presence	2.340***	(0.269)		0.359***
Number of observations		3,794			
Pseudo R2		0.0653			

The dependent variable is VC_follow. Estimates are derived from multilogistic regression model with robust standard errors. All regressions are estimated with an intercept term and variables for first investment age, presence of foreign investors and dummy variables on high tech sector, vc hub and nation. Standard errors in round brackets.
* **p < 0.10; ** p < 0.05; *** p < 0.01.**

Table 11: Robustness Check results

	(1)	(2)
	Coefficient	Std. Error
VC_follow		
BA_presence	-0.499*	(0.298)
first_inv_age	-0.082	(0.079)
foreign_investor_majority	1.054***	(0.390)
d_nation1	.	.
d_nation2	-1.126*	(0.683)
d_nation3	0.038	(0.473)
d_nation4	0.460	(0.511)
d_nation5	-0.621	(0.736)
d_nation6	0.466	(1.205)
d_nation7	-0.222	(0.645)
d_nation8	.	.
high_tech	-0.530	(0.769)
vc_hub	-0.812**	(0.344)
Number of observations	456	
Pseudo R2	0.1172	

The dependent variable is VC_follow. Estimates are derived from logistic regression model with robust standard errors. All regressions are estimated with an intercept term and dummy variables for industry, first investment year and nation. Standard errors in round brackets.
*** p < 0.10; ** p < 0.05; *** p < 0.01.**

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