An exit-centric approach to business angel investing: The effect of angels' experience and valuation on investment return

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Abstract

At the time of investment, valuation of the company is one of the main drivers of return for business angels. Nevertheless, it is poorly understood how business angels should relate to the valuation in order to maximize investment returns. This study demonstrates that, consistent with previous research and stewardship theory, business angels who have made more investments value their opportunities higher, in contrast to venture capital investors who negotiate lower valuations when they have more experience. Nonetheless, this study suggests that a rational approach to investing, where the business angel negotiate lower valuations, produces higher investment returns for business angels. Contrary to other variables measuring business angel experience, business angels that have made many exits at the time of investment value their portfolio companies lower and thus act in accordance with the economic view of value distribution. As such, the results suggest that for optimal financial benefit of their investments, business angels should adopt a portfolio-oriented, rational approach to their investments, similar to venture capitalists. This study indicate that business angels' returns increase as they gather experience, which emphasizes that an institutional setting that encourage angel investments is important for maintaining a vibrant startup ecosystem.

Keywords Business angel, angel investor, valuation, exit, returns, venture capital, private equity

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Sammandrag

Värdering av företaget är en de starkaste drivkrafterna för affärsänglars avkastning i investeringsskedet. Kunskapen kring hur affärsänglar bör relatera till värderingen för att maximera avkastningen är dock bristfällig. Denna studie demonstrerar, konsekvent med tidigare studier och förvaltningsteorin, att affärsänglar som tidigare gjort flera ängelinvesteringar värderar deras portfolioföretag högre, till skillnad från riskkapitalinvesterare som förhandlar lägre värderingar när de har mera erfarenhet. Denna studie antyder att en rationell investeringsfilosofi, som innebär att affärsänglar förhandlar lägre värderingar, producerar högre avkastning för affärsänglar. I motsats till andra variabler som kvantifierar erfarenhet som affärsängel så värderar affärsänglar som har gjort flera försäljningar av sin andel i ett företag vid investeringstillfället sina portfolioföretag lägre, och agerar därmed i enlighet med den rationella investeringsfilosofin. Resultaten antyder att affärsänglar som önskar optimera avkastningen från sina investeringar bör anta en portfolio-orienterad, rationell investeringsfilosofi, likt riskkapitalinvesterare. Denna studie antyder att affärsänglarnas avkastning stiger med mera erfarenhet, vilket betonar faktumet att en institutionell omgivning som uppmuntrar till ängelinvesteringar är viktigt för att upprätthålla ett fungerande startup-ekosystem.

Nyckelord Affärsängel, företagsvärdering, försäljning, avkastning, riskkapital

Contents

1 Introduction

1.1 Background

The professionalization of business angel investing implies that business angels and angel groups must develop an increased emphasis on exits (Mason et al., 2019). In the past, when angel investing was more of a spare time activity, business angels made fewer investments, invested alone and placed more importance on the emotional excitement of contributing to a new company. Modern angel groups operate more professionally. The increased syndication activity among business angels causes a decrease in the possibility to develop an emotional attachment to investments (Ibrahim, 2008). This increases the emphasis on financial versus psychological incomes of angel investing. Most gatekeepers and business angels fail to adopt an exit-centric approach to investing for the primary reason that they consider the undertaking complex (Mason and Botelho, 2016; Botelho et al., 2019). An exit-centric investment strategy explicitly considers a potential exit in every stage of the decision making process as well as post-investment. At the time of investment, valuation of the company is one of the main drivers of return for business angels (Villalobos, 2007a). Valuation of the opportunity should be a key consideration at the negotiation stage of the decision making process of an exit-centric approach to business angel investing.

However, literature does not cover nor is it clearly understood in practice how business angels should approach the valuation negotiation from an exit-centric perspective. If the business angel places too low a value on their investment the founders' ownership of the venture is diluted and the cap table is less attractive for later funding rounds, but too high a value diminishes business angel's returns at a future exit and increases the risk of down-rounds. This problem is particularly tricky in light of previous research on valuation. Experienced business angels act more as stewards than rational investors (Collewaert and Manigart, 2016). Hence, they invest at higher valuations and share the value creation with the entrepreneur. On the contrary, more experienced venture capitalists (VCs) act as rational investors and use their negotiation power to invest at lower valuations (Hsu, 2004). These contradictory valuation strategies between experienced business angels and VCs increase the risk for down-rounds and sub-optimal investment returns both for investors and entrepreneurs.

The purpose of this study is to investigate how business angel experience and valuation affect investment returns. Two theories of value distribution, the economic view and the stewardship view, are used to develop the theoretical framework and hypotheses. The study explores which approach to the valuation negotiation actually produce higher investment returns for business angels. The hypotheses are empirically tested using a data set that includes 1009 business angel investments from 2013-2020. Considering that most business angels fail to adopt an exit-centric approach to investing (Mason and Botelho, 2016), this study clarifies how the valuation negotiation should be approached from an exit-centric point of view. Early-stage investors and entrepreneurs alike may utilize the results when approaching valuation negotiations to optimize their mutual financial benefit from the venture.

1.2 Research objective and research questions

The purpose of this study is to provide insight into which approach to the valuation negotiation that produce higher investment returns for business angels. Specifically, the aim is to build an understanding of the influence of investor experience on valuation and the relationship between valuation and return on investment.

(1) *How does the experience of angel investors affect valuations and exit profitability?*

The research can thus be split in two separate focus areas: research on the investment negotiation process and research on exits. These two focus areas together span the whole lifecycle of an investment and are intricately linked by the valuation.

Venture capital investors with higher levels of experience or social capital create more value in their portfolio companies through better monitoring, more value adding activities post-investment and enhanced legitimacy (Colombo and Grilli, 2010), leading to better post-investment performance of the portfolio companies. However, a part of this result may be explained by sorting in the VC market (Sørensen, 2007). Literature on deal flow generation in venture capital is reviewed to build an understanding of the dynamics of the two-sided matching phenomena. Research on valuations in venture capital investment rounds demonstrates that more experienced investors typically invest at lower valuations (Hsu, 2004), enabling them to appropriate a large part of the value they are expected to create in their portfolio. This is called the economic view on value creation in early-stage investing. However, given the differences between angel investors and venture capitalists (Mason and Stark, 2004), insights on venture capital investment behaviour cannot invariably be transferred to angel investors.

If business angels are consistent with the economic view of investors' behaviour, investors with more experience negotiate lower valuations. Alternatively, business angels are prepared to share the value created through their experience with the entrepreneurs and focus on growing the valuation of the company together, hence negotiating higher valuations. Research done by Collewaert and Manigart (2016) on 123 angel investment rounds in 58 Belgian companies show that experienced angels negotiate higher valuations, but the topic needs further investigation.

(1.1) *How does experienced business angels use their negotiation power to influence the pre-money valuation of an entrepreneurial firm in the investment negotiation process?*

Two arguments can be made for why the economic view produce higher returns. First, a larger share of a company's equity allows the investor to appropriate more value at the event of an exit. Second, a larger stake in a company might provide more incentive for the investor to be active in growing the company. On the contrary, if the investor follows a stewardship approach to value creation, the investor and the entrepreneur work tightly together with an aligned determination to increase the value of the company as much as possible, increasing the likelihood of a highly profitable exit.

(1.2) *What is the relationship between the valuation of a startup at an angel invest-
ment and returns at a future exit?*

Finally, an understanding of the two previous questions might provide useful insights into how investors should approach value creation in early-stage startup investing in general. According to the economic view of value creation, investors should appropriate as large a share of the ownership as possible, hence investing at a low valuation. This should correlate with profitable exits. On the contrary, the stewardship view of value creation argues that investors should focus on the post-investment relationship with the entrepreneur and co-creation of value, thus investing at higher valuations but growing the value of the company significantly. This should also correlate to profitable exits.

(2) *How should the expected value creation be shared between business angels and
entrepreneurs in the investment negotiation process for optimal financial benefit
of both sides?*

Table 1: Research questions of this study.

No.	Question
1	How does experience of angel investors affect valuations and exit profitability?
→ 1.1	How does experienced angel investors use their negotiation power to influence the pre-money valuation of an entrepreneurial firm in the investment negotiation process?
→ 1.2	What is the correlation between the valuation of a startup at an investment and returns at a future exit?
2	How should the expected value creation be shared between business angels and entrepreneurs in the investment negotiation process for optimal financial benefit of both sides?

The research questions of this study are summarized in table 1.

1.3   Research design and methodology

This study comprises a theoretical and an empirical section. The theoretical part is composed of a literature review of previous research on early-stage investor behaviour. The literature review examines five topics. First, it examines existing literature on the business angel decision making process. Second, it reviews the sparse literature available on valuation of pre-revenue companies. Third, it reviews literature on business angel exits. Fourth, it explores the influence of experience on the investment decision making process. Finally, it investigates how the expected value creation in startups may be shared between business angels and entrepreneurs in the investment negotiation process. It distinguishes two different views of value distribution: an

economic view and a stewardship view. The aim of the literature review is to build a theoretical understanding of how investors' experience is correlated with value creation in their investments. Since the academic research on angel investing is limited, the review includes research on venture capital investors and findings from practitioner reports and surveys. The research hypotheses are formed based on the findings and conclusions from the literature review.

The empirical section tests the hypotheses developed in the theoretical section. Quantitative methods are implemented to analyse data gathered by the Finnish Business Angels Network (FiBAN) between 2013 and 2020. In total, the data set includes 2484 responses by 747 business angels. The data consists of information on 3229 business angel investments into identifiable companies. Of these investments, 1009 contains the data needed to test the hypotheses of this study. The majority of the respondents in the final data set are Finnish angel investors, completing on average 2.7 angel investments per year.

The study theoretically examines the sorting mechanisms inherent to the VC market which allows better investors access to investment opportunities of higher quality. Four control variables are introduced to control for the arising endogeneity problem in the empirical study. The controls are revenue of the company at the time of the investment, company age at the time of the investment, the size of the financing round and if the investment was an initial or follow-on investment.

A second empirical study is conducted to investigate the relationship between valuation and return on investment. The same data set from FiBAN is used to quantitatively track the performance of investments from the initial investment to a potential exit. Return multiple and internal rate of return (IRR) are the performance metrics used to evaluate the efficiency of an investment. The return multiple is expressed in the number of times the initial investment was regained. The data set includes 49 companies with information on both valuation at the investment and return multiple at the exit.

1.4 Scope

The scope of this study is limited to angel investing. It focuses on the pre-money valuation of realized investment opportunities and exit returns. Most of the research on valuation in private equity made to date have been limited to the later-stage venture capital asset classes. To the author's knowledge, only one research has been done on the correlation between investor experience and valuation in an angel investing context. This study includes investments and exits made by business angels 2013-2020.

This study investigates each angel investor and his/her investments deals individually, and does not take syndication activity into consideration. Other deal terms than valuation and other forms of equity than financial equity are outside the scope of this study, such as sweat and network equity.

The first part of the study is located at the negotiation stage of the investment decision making process, where business angels and entrepreneurs negotiate the valuation of the company. The study examines and accounts for the endogeneity
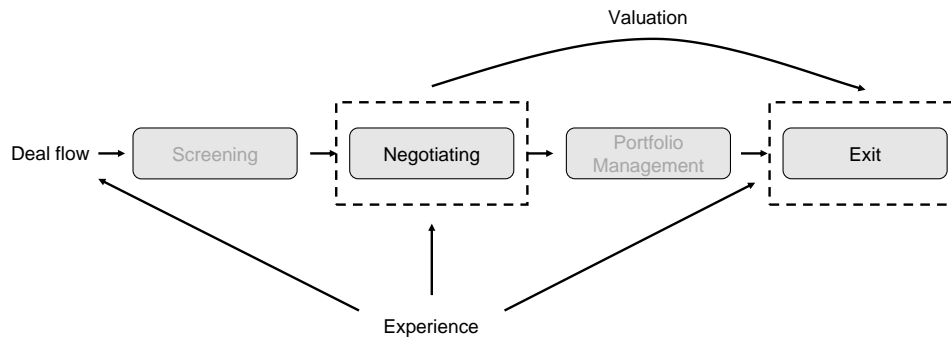
Figure 1: The scope of this study.

problem that arises from sorting in the market using control variables. The second part of the study is based after the exit event, when returns have been realised. The study aims to comment on how angel investors should approach the valuation negotiation for optimal mutual value creation in an entrepreneurial firm over its lifetime. It does not take a position regarding portfolio management or investment strategies. Fig. 1 outlines the general scope of this study.

The geographical scope of the study is limited to Finland for two reasons. First, regional differences on valuation are large between countries, even inside Europe. Second, tax and legal structures of angel investment differ between countries, affecting the structure and practices of the angel investing industry. By limiting the study to only Finnish angel investments, effects of regional differences can be eliminated.

2 Literature review and hypotheses development

2.1 Business angels

2.1.1 Definition of business angels

Business angels are high net worth individuals investing their own private wealth into unlisted companies. Mason (2006) outlines four characteristics that are regarded as fundamental to business angels and distinguish angel investing from other types of investment:

- Business angels invest their own capital.

- Business angels invest in private unlisted companies and thus accept the corresponding potential loss of liquidity.

- Business angels make their own investment decisions. Thus, even if an opportunity is presented to an angel group, the business angels still have to make their own decision whether or not to invest. This implies that investments made through a pooled investment vehicle where the allocation of funds is made by a hired manager into unlisted companies are not regarded as angel investing.

- The primary goal of angel investing is commercial returns on the capital invested.

Reflecting these features, one of the most broadly accepted definitions of business angels is "high net worth individuals who invest their own money directly in unquoted companies in which they have no family connection in the hope of financial gain and typically play a hands-on role in the businesses in which they invest" (Mason, 2006, p. 138).

The nature of business angel investing is most closely related to VC investing. Compared to VC investors, business angels differ in three significant ways (Mason and Harrison, 2015). First, business angels invest earlier in a firm's life cycle. Second, they provide fewer funds per deal on average. Third, business angels are comparatively sector agnostic. In addition, VC-funds seek shorter exit cycles and lower levels of risk than business angels and primarily do minority investments in later funding rounds or majority investments, called buyouts (Sohl, 2003*b*) (Fig. 2). A business angel investment is a minority investment (Mason and Harrison, 2000).

Business angels also invest knowledge and networks apart from capital. Sætre (2003) interviewed 20 entrepreneurs and investors about the capital-acquisition process from the demand side. He found that the sweat equity and networks investors bring are substantially more valuable for startups than capital alone. Knowledge and networks provides an opportunity for investors to work hands-on in the startup. Business angels can thus actively affecting the return on their investment by contributing to the success of the startup.

The pioneer of business angel research, William Wetzel Jr, introduced the term "business angel" in his study "Informal risk capital in New England" (Wetzel and
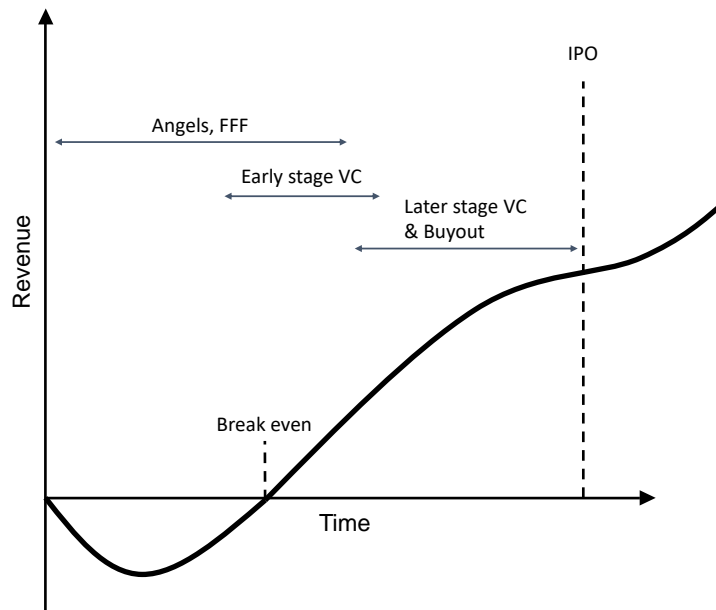
Figure 2: Business angels invest in early stage startups, while VC-funds primarily do later stage investments.

Seymour, 1981). He defined them as "financially sophisticated individuals of means, often with previous investment or management experience with entrepreneurial ventures" (Wetzel and Seymour, 1981, p. 281) who provide risk capital informally to emerging entrepreneurial ventures. He later observed that the population of business angels "is unknown and probably unknowable" (Wetzel, 1983, p. 26) due to the invisibility and desire for anonymity of business angels. Mason (2016) recognize that definitional issues and data representativeness have become more problematic in the years since Wetzel coined the term "business angel", mainly for three reasons. First, the angel population is heterogeneous. Research has identified several types of angel investors (for example, Lahti (2011); Sørheim and Landström (2001)). Second, Mason (2016) observed that the original distinctiveness of angel investing from other forms of investing is diluted by an increasing number of possibilities for investors to invest in private companies through networks, syndicates and angel groups. Finally, he noted that the Global Entrepreneurship Monitor (GEM) defines the term "informal investment" to also encompass investments by family members and friends (FFFs), which is a major source of definitional imprecision. Indeed, Sohl (2003a) highlighted the gap between FFFs and business angel finance, while Kelly (2007) joined the call for keeping FFFs and the term business angel separate on the grounds that they are conceptually distinct types of investments.

2.1.2 Business angel motivations

Business angels seek by definition commercial returns, but are also motivated by non-financial considerations, as multiple studies show. After studying responses from 473 business angels, Sullivan (1994) found that there was a distinct willingness to forgo economic return to make venture investments that were seen as socially beneficial. Another motive for making business angel investments is satisfaction from being involved in starting a new business, termed psychic income by Wetzel and Seymour (1981). Madill et al. (2005) substantiates this claim in their research of 71 angel investors across Canada, finding that investors are highly motivated by helping the entrepreneur achieve his or her goals. Also Benjamin and Margulis (1996) provides evidence for a partly altruistic nature of business angels, finding that they are partly motivated by making a contribution to their community. It has become established that business angels are partly motivated by emotional considerations, apart from commercial returns, and may even be prepared to compromise financial returns for non-financial considerations. Many business angels consider their ability to contribute to the startup post-investment to be of critical importance, while some are not active in the post-investment operations at all. Business angels' ability to contribute to the success of the startup is influenced by their industry experience (Benjamin and Margulis, 1996) and access to complementary operational resources (Smith et al., 2010).

2.1.3 Stages of the investment decision making process

The investment decision making process begins when the business angel identifies an investment opportunity and ends when he exits from the company (Lahti, 2008). Even though the start and ending points are the same, there are significant differences in the decision making processes between individual investors. In general, however, the decision making process can be outlined as a linear multiple stage process.

Fried and Hisrich (1994) assumed that business angels follow the same decision making process as VC investors and developed an initial model of the business angel investment decision making process based on a case study methodology. Duxbury et al. (1997), however, conducted in-depth interviews with 300 Canadian business angels, based on which they challenged the assumption that business angels followed the same process as VC investors. They outlined a plausible model of business angels' decision process that differs markedly from that developed by Fried and Hisrich (1994). Their conclusion was that the decision process can be characterized as linear process of five steps where the steps are

1. Deal origination and first impressions

2. Review of business plan

3. Screening and due diligence

4. Negotiation

5. Consummation and deal structuring.

Riding et al. (2007) developed this model further. They observed that the business angels' considerations of post-investment activities influence the decision process. To account for this, they extended the model to also include stages after the investment decision has been made. Indeed, Maxwell and Lévesque (2014) used observational interaction techniques to analyse 602 business angel-entrepreneur interactions on the TV-show "Dragon's Den" and found that one such post-investment factor that influence the decision making process of business angels is the business angel's anticipation of the nature of the long-term relationship with the entrepreneur. Haines et al. (2003) observed that the business angel's expectations about his or her role in the development of the venture is another important post-investment factor that influences the investment decision making process of business angels, further substantiating the extended model of Riding et al. (2007).

This study utilizes the model of angel investment decision making developed by Riding et al. (2007). Schematics of the model is depicted in Fig 3. This study focuses on the later stages of the decision making process. However, it is important to remember where it is situated in the context of the full process. For now, the review does not include the stages outside the scope of this study.

Origination
↓
Initial screening
↓
Due diligence
↓
Negotiating
↓
Decision-making
↓
Post-investment activity
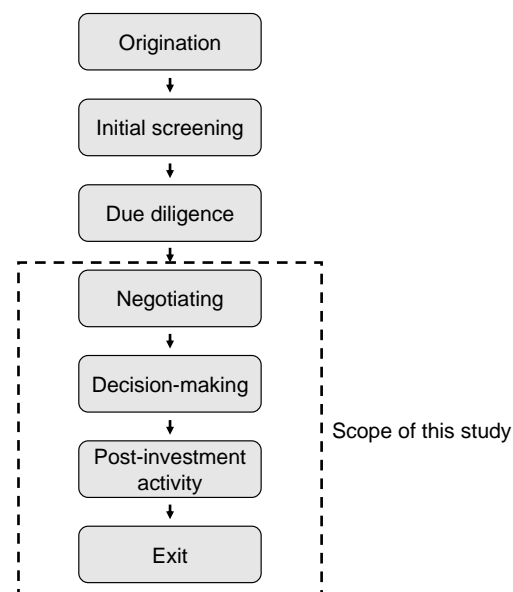↓
Exit

Scope of this study

Figure 3: Stages of the business angel investment process (modified from (Riding et al., 2007)).

2.1.3.1 Negotiating

The negotiation phase of the decision making process can start when the business angel have learned enough about the startup in the due diligence process to start pricing negotiations and no fundamental concerns about the startup has surfaced.

In this phase, the business angel offers an investment amount in return for a certain equity percentage and a broad array of clauses in the shareholder agreement (Kelly and Hay, 2003). However, founders and business angels frequently disagree about their respective, relative contributions to the firm. This leads to rejection of, on average, half of the deals that reach the negotiation stage (Riding, 1993). Indeed, De Clercq et al. (2006) found that agreeing on the firm valuation is one of the main hurdles of VC investments to take place, while Mason and Harrison (1996, 2002a) confirmed the large hurdles of agreeing on valuation in the angel investor context. Other studies have found other factors that can cause either party to abandon the negotiation, for example terms in the shareholder agreement (Haines et al., 2003). However, most studies seem to agree that agreeing on the valuation is the largest issue at this stage of the decision making process.

Seeking to understand the decision making process of business angels, Maxwell (2011) studied 602 business angel-entrepreneur interactions on the Canadian version of the TV-show "Dragon's Den" between 2006-2009. He came to the conclusion that entrepreneurs tend to overvalue the venture, usually because they ignore the value created by the business angel's involvement which provides advice and signals credibility. Entrepreneurs tend to overlook the fact that lower valuations can be beneficial when attracting later rounds of investment (Mason et al., 2015) and lowering the risk of down-rounds.

2.1.3.2 Post-investment activity

After the offer has been accepted, the business angel offers the capital to the startup, usually in pre-determined batches tied to milestones negotiated in the deal. In contrast to VCs, business angels are actively involved in the startup post-investment. They seek to contribute to the success of the startup more than merely supervising. After studying questionnaire responses from CEOs of 42 Canadian businesses in the technology sector that had received angel investment capital, Madill et al. (2005) found that business angels can play both formal and informal roles after the investment. 24 of 33 CEOs in the study noted that angel investors provide useful and on-going management advice, while 15 of 33 valued their business angels highly for making introductions. Many CEOs also reported that their angel investors joined the board of directors and helped the startup source subsequent funding. It is thus not surprising that most business angels and entrepreneurs perceive the contribution by the business angel to the startup as positive (Mason and Harrison, 1996).

2.1.3.3 Exit

The exit is the final stage of the investment, where the business angel sells his/her share of the company. This is arguably the most important stage of the investment process, because without profitable exits the angel may struggle to find the capital for future investments into startups. Interestingly, Mason and Botelho (2016) notes that business angels fail to adopt an exit-centric approach to investing, even though various angel communities identify the struggle to achieve exits as an urgent and important problem for business angels. Maxwell (2016) validates this, noting that

discussing or establishing an exit strategy during the negotiation does not seem to be a priority for the business angel. Collewaert (2012) even indicate that some business angels does not have a clear preference of exit or do not prefer to exit at all. This study will investigate exits more thoroughly in subsequent chapters.

2.2 Valuation of early-stage companies

The purpose of equity valuation is to estimate the intrinsic value of a company. When considering an investment opportunity, investors approximate the worth of potential investments using the valuation. There are, however, many different methods and techniques for arriving at a valuation, each of which may produce a different value (Waldron and Hubbard, 1991). For example, the valuation of an investment opportunity with continuous revenues and earnings is usually based on established industry specific multiples.

Estimating the intrinsic value of a startup with an unpredictable future is particularly difficult. A startup in its early stages of development may not have a revenue or even a saleable product yet and will be consuming resources to develop their product and attract their first customers. Investors usually use different methods to value a pre-revenue venture, but none of them are mathematically rigorous. Hence, different investors with different experiences will use different methods and arrive at different valuations. Valuation of pre-revenue startup companies is therefore thought of as more of an art than science (Payne, 2007a). Nonetheless, at the time of investment, valuation of the company is one of the main drivers of return for business angels (Villalobos, 2007b). Villalobos (2007b) notes that the valuation negotiation is a misconceived part of the investment process. It may lead to confrontational negotiations that inject negative feelings to the relationship between the founder and the business angel at this critical first stage of developing the relationship.

Commonly used valuation usually refers to valuation prior to an investment, called pre-money valuation. This differs significantly from post-money valuation, which is the valuation after an investment. Pre-money valuation is thus

$$\text{Pre-money valuation} = \text{Post-money valuation - investment size.} \tag{1}$$

The post-money valuation usually determines the share in the company received by the investor. The equity stake that investors get in return for their investment in the company is equal to the proportion of their investment compared to the company value:

$$\text{Equity received (\%)} = \frac{\text{investment size}}{\text{post-money valuation}}. \tag{2}$$

Currently, no systematic understanding of how venture capitalists value a prospective startup exists (Miloud et al., 2012). Miloud et al. (2012) concludes that since it is challenging to value a startup based on output (eg. future revenues) a better alternative than guessing is to value it based on inputs, such as team and industry. Moreover, Payne (2007a) outlines five factors that angels take into account when valuing a startup: the management team, the size of the opportunity (potential to

scale), competitive landscape, sales channels, business stage and funding required. Using this method, called the scorecard method, an investor first determines a median value for pre-revenue companies in a given industry or region, assign weighting for each critical factor and finally multiply the median valuation by the weighted average of the critical factors.

The venture capital method is another commonly used method for calculating the valuation of pre-revenue companies (Payne, 2007b). This method calculates the post-money valuation as

$$\text{Post-money valuation} = \frac{\text{Terminal value}}{\text{ROI}}, \tag{3}$$

where terminal value is the valuation at exit and return on investment (ROI) calculated as cash-on-cash. Using this method, the investor first estimates the likely terminal value of the company using one or many techniques. One common method is to first estimate revenues in the exit year, then use industry standard for earnings as a fraction of revenues and finally use price/earnings (P/E) ratios to calculate the terminal value. To illustrate, assume that an investor estimates revenues of 30 M€ for the target company in the exit year, companies in this industry earn 15 % after-tax earnings and the P/E ratio for companies in this industry is typically 14. The terminal value is thus 30 M€ x 0.15 x 14 = 63 M€. However, investors often use a weighted average of many methods to estimate the terminal value. Due to the high-risk nature of business angel investing, the anticipated ROI, expressed in cash-on-cash multiple, of every company needs to be sufficiently high (20X-30X) to cover all potential losses in the portfolio and account for dilution. To continue the illustration, the post-money valuation for the company would be 63 M€/30X = 2.1 M€. Assuming a funding round size of 500 k€, the pre-money valuation is thus 1.6 M€.

Dilution is the reduction in percentage ownership of the company that founders and investors suffer due to subsequent funding rounds. Dilution entails that the returns on investments from a company do not increase directly proportionally to the company's market valuation. Indeed, drawing from his own experience, Villalobos (2007a) estimates that the valuation of investors' shares will likely increase by 3-5 times less than the company valuation due to dilution.

The firm valuation as part of the investment process is of crucial importance to both the investor and the entrepreneur. For investors, the lower they can negotiate the valuation for a given amount of capital, the higher equity stake. As the fraction of the exit value that the investors receive will be higher for higher equity stakes, this enhances their return potential (Manigart and Meuleman, 2004). A higher equity stake for investors also increases the control they can gain over the venture (Cumming and Dai, 2011), increasing the incentive to actively help the entrepreneur succeed. For entrepreneurs, valuation is important as it determines the equity stake they are able to retain in return for an investment (Vance, 2005). This will impact the control they are able to secure and hence their feeling of ownership over their own company. If the valuation is too high, investors' opportunity to get a decent return on their investment decreases, which decreases their involvement in the company. Further,

a high valuation at an early financing round may block future funding possibilities. On the other side, a too low valuation dilutes the founders' shares and thus their sense of ownership.

A number of studies on valuations in VC investment rounds have been made. After studying 502 venture capital backed companies over the period 1993-2003, Armstrong et al. (2006) found that valuations are strongly driven by firm characteristics, while Heughebaert and Manigart (2012) found that competition plays an important role in firm valuation. Characteristics of the venture capital investor also explain a considerable part of firm valuations (Hsu, 2004), which this study investigates further in subsequent chapters.

2.3 An exit-centric approach to investing

Investor-led exits are important for the entrepreneurial ecosystem for four reasons Mason and Botelho (2016). First, companies that have previously attracted investment and now a buyer signals that they are high growth businesses with a significant potential for contributing positively to society by means of job opportunities and taxes. Second, exits where the investor earns financial returns enhance the reputation of business angels and VC funds, allowing them to attract investors in the future. Third, exits provide the financial and psychological resources to continue investing in the future. Finally, exits are probable to spark a process of circulation, as founders and investors will reinvest their profits from the exit, experience and time in other businesses, for example by starting another company, becoming an investor in early-stage startups or mentoring founders. The ability of business angels and VC funds to achieve successful exits is therefore a key indicator of a vibrant startup ecosystem.

Nonetheless, studies on the investment decision making process establishes that the exit is a consideration of little importance for business angels, both in the screening process and in the involvement with the company after the investment (Harrison and Mason, 1992). Business angels generally have no preferred plan of exit at the time of investment nor a plan for timing the exit (Lumme et al., 1998; Maxwell et al., 2011). Moreover, Collewaert (2012) mentions that the entrepreneur may misinterpret the business angel's intention to exit, which may lead to conflict. However, not all studies agree on to what extent the business angel's intention to exit is a source of conflict. Mason and Botelho (2016) finds that gatekeepers to angel groups generally do not consider the willingness of the entrepreneur to exit to be an issue. Not surprisingly, practitioners have noticed that the struggle to achieve exits is an urgent and important problem for business angels. Consistent with this view, Mason and Botelho (2016) finds that angel groups based in Scotland and Northern Ireland have made few exits, only 4 % of their investments, with the majority of exits concentrated amongst the oldest groups.

Business angel literature include few studies on exits, as a recent review demonstrate (Tenca et al., 2018). The studies that have been made have mainly focused on investment returns (Mason and Harrison, 2002b; Wiltbank, 2009; Gregson et al., 2017).

The nature of business angel investing is most closely related to VC funds. Hence, it is appropriate to compare the performance of investments by business angels to that of VCs, who use the internal rate of return (IRR) as measure of performance. However, in contrast to VC funds, business angels tend to think about investment performance in terms of capital gains multiples on individual investments (Mason and Harrison, 2002a). Therefore, the most appropriate evaluation metric for investment performance of business angels is on a deal-by-deal basis, measured as the multiple achieved and the length of the holding period.

Nonetheless, prior studies of angel returns have deployed the IRR metric as measure of performance of business angel investing, mainly for the purpose of comparison to VC returns. In their study of business angel investing returns, Gregson et al. (2017) reviews 10 major studies on business angel returns, mostly dominated by US and UK studies. They find that the majority of the reviewed studies report IRRs between 17.6 % and 37.4 %, with an average IRR of 26.6 %, possibly exceeding published returns from venture capital. Indeed, a study on 126 business angel exits done in Finland by FiBAN (2017) found an IRR of 25 %. However, the returns from business angel investing are highly negatively skewed. The study of 128 exited business angel investments in UK by Mason and Harrison (2002a) found that of all exits, 34 % results in the business angel losing everything, 13 % at partial loss or break-even and 23 % with an IRR at or above 50 %. Just 10 % of the exits returned IRRs above 100 %. Most studies included in the review by Gregson et al. (2017) report average holding periods of 3.5-4 years. The study by FiBAN (2017) reported average holding times of 5.5 years amongst Finnish business angels, substantially longer than the US and UK counterparts.

Mason and Harrison (2002a) also found some tentative findings on the characteristics of the best performing investments. High-performing investments tend to involve multiple types of investors, such as business angels, VC, banks or the public sector, while investments only involving business angels have a significantly lower proportion of high-performance investments. Interestingly, the study found that investments that business angels made on their own tend to perform as good as investments done with other business angels, contrary to the assumptions by Kelly and Hay (1996). Further, the study suggests that management buyouts and deals involving large amounts of follow-on investments are most likely to generate very high returns. Contrary to common belief, it finds no evidence of correlation between deal size and investment performance. Gregson et al. (2017) confirms this, noting that the correlation between deal size and exit return is modest at best, but most likely nonexistent. As expected, the risk of unsatisfactory returns cannot be completely offset, but may be mitigated by increasing the size of the portfolio Gregson et al. (2017). Their study shows that to reduce the risk of IRR < 10 % below 1 in 5 portfolios, a minimum portfolio size of 50 business angel investments is required.

The changing nature of angel investing, as presented by Mason et al. (2019), implies that business angels and angel groups must develop an increased emphasis on exits. In the past, when angel investing was more of a spare time activity, angels made fewer investments and placed more importance on the excitement of being involved in a new venture. However, modern angel groups operate more professionally. The

increased syndication activity among angels causes a smaller possibility for angels to develop an emotional attachment to investments (Ibrahim, 2008), increasing the emphasis on financial versus psychological incomes of angel investing. Further, angel groups are investing more frequently and make larger investments with a stronger focus on follow-on rounds (Mason et al., 2019), and are hence more likely to provide the funds a company needs to mature to an exit without involvement of VC funds.

Recent research on business angel exits have focused on studying to what extent business angels and gatekeepers of angel groups adopt an exit-centric approach to investing (Mason and Botelho, 2016; Botelho et al., 2019). An exit-centric approach to business angel investing explicitly considers a potential exit in every stage of the decision making process as well as post-investment, for example by considering possible business strategies in light of exit possibilities. Other characteristics of an exit-centric approach to investing include having "good" failures where the business angel only loses 100 % of the invested capital and don't have to cover costs of winding down the venture or taking reputational damage and failing fast by recognizing the warning signs of a "living dead" investment sooner rather than later and take decisive action (Mason and Botelho, 2016). Most exits are a result of planned behaviour (Botelho et al., 2019). Nevertheless, most gatekeepers to angel groups fail to adopt an exit-centric approach to investing (Mason and Botelho, 2016), primarily for the reason that they attribute a high level of complexity to preparing a company for an exit and therefore lack confidence in the task (Botelho et al., 2019).

A key consideration at the negotiation stage of the decision making process of an exit-centric approach to business angel investing should be the valuation of the opportunity. However, how the business angel should approach the valuation negotiation from an exit-centric perspective is not covered in literature. If the business angel places too low a value on their investment the cap table does not attract subsequent investors, diminishing returns, but too high a value makes it difficult to attract investors at the subsequent funding rounds or increases the risk of down-rounds, also diminishing returns.

2.4 The influence of experience on the investment process

Experiential learning theory defines learning as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience." (Kolb, 1984, p. 41). An individual learns how to process and interpret new knowledge and develops mental processes from a task at hand in direct proportion to how specific the individual's previous knowledge is compared to that task (Dimov and Shepherd, 2005). As a result, experienced individuals possess more complete and detailed mental processes of specific domains than inexperienced individuals (Holcomb et al., 2009). This allows more experienced individuals to draw on clearer concepts and apply domain-specific problem-solving procedures (Gruber et al., 2010).

Smith et al. (2010) notes that most previous studies on business angel decision making indirectly accept that business angels are knowledgeable and that experience does not change their approach to investing. To address this gap in the literature,

the authors gathered three groups comprising 4 Scottish business angels each with different investment experience. Using verbal protocol analysis as the angels reviewed a potential funding opportunity in real time, the study found that both experienced and novice angels have continuously learnt from their investment experience, but that the learning manifests itself more as developing the techniques and methods rather than the fundamental investment philosophy. Further, the learning seemed to impact more how the angels approach later stages of the investment decision making process rather than the initial screening stage. The study concludes that both experienced and new business angels learn also from failed investments.

2.4.1 Investor experience and investment decision making

Interestingly, most studies on the influence of experience on investment decision making of business angels have been conducted on the initial screening stage. When presented an investment opportunity, the very experienced business angels in the study by Smith et al. (2010) made a decision to reject an opportunity notably faster than nascent and novice business angels. This suggests that experienced business angels have faster cognitive processes, providing some evidence of experiential learning. However, Forrester (2014) found that business angels with more entrepreneurial experience perform more due diligence than inexperienced angels after the initial screening stage in his study of answers from 86 investor groups with 539 business angels who made 3097 investments 1972-2007 in the US. The author presents two hypotheses for this: first, business angels with more entrepreneurial experience may have experience from poor diligence or have learned to conduct better due diligence, or second, that experienced angels more frequently lead a syndicate and thus perform the majority of the due diligence. Similarly, Payne and Macarty (2002) found that angel groups usually have business angels with subject expertise who lead deals and perform the due diligence. These findings propose that experienced angels spend less time than inexperienced angels on the initial screening stage, but once an opportunity has passed the first stage, they perform a more rigorous due diligence process.

After studying 150 interactions between entrepreneurs and angel investors on the Canadian version of "Dragon's Den", Maxwell et al. (2011) found that more domain expertise caused the business angel to be more critical when evaluating an opportunity at the initial screening stage and focus on a limited number of critical investment factors. However, Smith et al. (2010) found that experienced business angels considers a broader set of investment factors than less experienced business angels when evaluating an opportunity. These seemingly contradictory results may be explained by the differences in definition of "experienced angels". While Maxwell et al. (2011) investigated the influence of domain expertise on investment decision making, Smith et al. (2010) focused on the number of investments of a business angel in general, defining an experienced angel as a business angel who had made five or more angel investments. These results provide evidence that domain-specific experience of business angels influences cognitive processes differently than investment experience, underlining the importance of distinguishing between different types of experience.

Business angels with more experience tend to pay less attention to financial

projections than those with less experience (Mason and Rogers, 1997; Van Osnabrugge and Robinson, 2000). The study by Smith et al. (2010) supports this claim. In their study of how business angels evaluate new opportunities in the screening stage, novice angels considered finances of the startup the most important decision making criteria, while experienced business angels ranked finances only as the fourth most important criteria. Finally, Sørheim (2005), in his interviews with five experienced business angels, found that more experienced business angels tend to spend more time examining the entrepreneur's previous partnerships than inexperienced angels.

2.4.2 Investor experience and deal flow

In venture capital, investors find opportunities in three ways: cold contacting, referrals and outbound contacting. In their study of 889 venture capital investors, Gompers et al. (2016) found that cold contacts by entrepreneurs accounted for 10 %, outbound 30 % and referrals 60 % of the total number of deals sourced by the VC firms. These mechanisms presumably also operate in the business angels market.

Entrepreneurs with prior founding experience have better chances of raising VC funding via a direct tie (Hsu, 2007), implying that investors invest in entrepreneurs they have worked with before and thus have proprietary deal flow. As more experienced investors have worked with a greater number of entrepreneurs in their career than their less experienced counterparts, they have more proprietary deal flow. As the ability of a VC fund to generate proprietary deal flow is highly correlated to the success of the fund (Gompers et al., 2016), more experienced business angels are expected to have larger returns than their less experienced counterparts.

The bargaining power of an investor is enhanced by proprietary deal flow. As VC fund types with more bargaining power relative to the entrepreneur negotiate lower valuations than VC fund types with less bargaining power (Heughebaert and Manigart, 2012), proprietary deal flow have implications for the valuation strategies of investors. Further, human and social capital of founders are positively correlated to valuation (Hsu, 2007). Through their proprietary deal flow, experienced investors have access to founders with more human and social capital than less experienced investors, and thus negotiate higher valuations than less experienced investors. Since business angels invest in the early stages of a startup's development, the effects of human and social capital might not yet have been translated into financial success of the startup. Human and social capital are characteristics that are inherently difficult to capture in data. If not carefully considered, the positive effect of these characteristics on valuation might go unobserved.

In the VC market, sorting arises from the matching between VCs and investment opportunities. When companies that raise funding receive many offers from VCs, they frequently accept the offer from the investor that adds value in multiple ways, not necessarily the offer with the best financial proposal (Hsu, 2004). Hence, as startups are more likely to accept investments from more experienced and more reputable investors, these investors have better opportunities to choose from. Consequently, sorting predicts that the reason why investments by experienced VCs perform better is not because the VCs build value in the portfolio startups, but because the startups

themselves are inherently better (Sørensen, 2007). An implication of sorting is that as the experience of investors in a market increase, any given investor is relatively less attractive and receives worse deal flow (Sørensen, 2007). Sorting thus creates an endogeneity problem in the business angel market. Evidence show that the effect of sorting is significant, with sorting almost twice as important as post-investment influence on differences in IPO rates of VC backed companies (Sørensen, 2007).

2.4.3 Investor experience, education and perceived value of an opportunity

According to experiential learning theory, more experienced individuals possess more complete and detailed mental processes of specific domains than inexperienced individuals. Translating this into the business angel context, angel investors with more entrepreneurial and investment experience should be better able to develop the opportunity into a value-creating company, for example by making more informed strategic decisions. Hence, more experience should enable angel investors to see more value-creating opportunities in the startups they have proceeded with to the valuation negotiation, having a positive effect on the valuation of the opportunity.

Apart from seeing more value-creating options, the post-investment involvement in the development of the portfolio companies of more experienced business angels should be more valuable to the company than the involvement of less experienced business angels (Sørensen, 2007). Studies have established that business angels provide hands-on support to their portfolio companies (Politis, 2016), and business angels are thus considered value-adding investors. Gruber et al. (2010) employed a choice-based conjoint analysis to study 141 individuals with varying backgrounds with regard to technology, marketing and management. Substantiating the claim by Sørensen (2007), they found that investors will have different perspectives on the value they can create in an investment opportunity depending on their experience. In addition, evidence from the realm of venture capital shows that more experienced VC investors are more likely to join their portfolio companies' boards of directors (Bengtsson and Sensoy, 2010).

An investor is more likely to acquire the expertise needed to help startups grow if he or she has experience from the same specific industrial sector as the startup operates in, which contributes to the reputation of the investor (Hsu, 2004). Indeed, the study by Kelly and Hay (2000) found that more experienced business angels have a better reputation and more deeply-rooted networks than less experienced business angels. They may therefore more strongly certify the startups' value to others than less experienced investors (Hsu, 2004). The benefits of certification are well documented (e.g., Megginson and Weiss (1991); Stuart et al. (1999)) and may, for example, enable ventures to hire better managers, partner with better suppliers or raise future funding at better conditions. Consequently, as experienced business angels are expected to add more value to their portfolio companies through their post-investment involvement and their certification, their expected value of an opportunity will be higher.

An individual's stock of knowledge acquired through education positively impacts

his or her learning process and ability to recognise opportunities (Shane, 2000; Politis, 2005). Individuals with higher education have a broader knowledge base and are generally better informed, while less educated individuals appear to not account for changing conditions as well (Mudd et al., 2010), thereby decelerating their learning. Therefore, highly educated individuals should be able to assimilate new knowledge faster than less educated individuals. As developing a new venture involves a continuous change of environmental conditions, this should allow highly educated investors to more flexibly adapt their behaviour and the venture's strategy. Highly educated business angels are therefore expected to be able to contribute more to an opportunity's development into a value-adding venture than less educated investors. Accordingly, it has been shown that venture capital investors with higher levels of education and more specific education have more highly successful portfolio companies and less failures than less experienced VC investors (Dimov and Shepherd, 2005). It is therefore expected that ventures backed by highly educated business angels should have a higher probability of survival and better performance. This increases the value of an opportunity.

To conclude, both novice and experienced business angels continuously learn from their investments, even from failed ones. As evidence shows, investor experience have a tangible influence on the investment process from beginning to end. More experienced investors receive better deal flow, approach investment decision making differently and is expected to add more value to the target company after the investment than novice investors. The questions remaining is whether business angels choose to appropriate the value created in their portfolio companies and whether this produces higher investment performance.

2.5   An economic view on value distribution

According to the classic manifestation of financial theory, investors make rational decisions. Following this assumption, financial decisions should be based on rational reasoning, considering all available information in the decision making process, including their own knowledge, expectations and experience in the capital markets. Following the assumptions of standard financial theory, the economic view on value distribution assumes that investors are rational. Rational individuals pursue one overarching goal: to maximize their own utility (Persky, 1995). Translating this to the investor context, rational investors' utility is maximized if their wealth is maximized (Cohen and Kudryavtsev, 2012). Recent evidence shows that investors in the equity crowdfunding market act rationally, successfully reading signals from early-stage company statements (Nitani et al., 2019). The rational approach to maximize the wealth from an investment is to maximize the equity stake acquired in a company for a given amount of invested capital, thus enhancing the return potential. Evidence from the VC industry shows that more experienced VC investors negotiate lower valuations (Hsu, 2004), indicating that they act as rational investors appropriating as much value in the negotiation process as possible. Hence, as Collewaert and Manigart (2016) also hypothesize, more experienced business angels will also act rationally and appropriate the value they expect to create, and thus negotiate lower valuations.

Further, business angels who have founded multiple companies are more likely to have more experience in firm valuation (Hsu, 2007). Negotiating with investors is usually a rare event for entrepreneurs, who therefore lack a deep understanding of the complex valuation process. Therefore, business angels with prior experience in founding companies have greater bargaining power than business angels with no such experience. If business angels with prior founding experience are rational, they will exploit the advantage of their experience and negotiate lower valuations.

H1a: *Business angels with more investment and entrepreneurial experience and higher education will negotiate lower valuations.*

The lower business angels can negotiate the valuation of a company for a given amount of capital invested, the higher equity stake they will receive and the more control they can gain over the company. Hence, according to the economic view on value distribution, the larger share of a company the business angel can negotiate in the valuation process, the more value the business angel can appropriate from a future exit event.

H2a: *A lower negotiated valuation at the investment stage will correlate positively with investment returns.*

2.6   A stewardship view on value distribution

Contrary to the economic view on value distribution and following stewardship theory (Davis et al., 1997), a stewardship view on value distribution depicts business angels as trustworthy partners to the entrepreneur. Stewards place a higher value on mutual cooperation rather than their own interest. Literature on angel investing suggests that business angels generally view entrepreneurs as partners and attach great importance to creating and sustaining a cooperative relationship with the entrepreneurs of their portfolio companies (Landström, 1992; Mason and Harrison, 1996; Politis, 2008). As a result of a focus on sustaining a cooperative relationship with the entrepreneur, business angels following the stewardship view approach the valuation negotiation more flexibly than purely rational investors, allowing the entrepreneur to keep a large ownership of the company. Consistent with the stewardship view, prior evidence suggests that more experienced business angels tend to negotiate higher valuations (Collewaert and Manigart, 2016), but the matter needs further research.

H1b: *Business angels with more investment and entrepreneurial experience and higher education will negotiate higher valuations.*

If business angels follow the stewardship view on value distribution, they view themselves as partners to the entrepreneur. Consequently, they will be highly motivated to help the entrepreneur to develop the venture post-investment. The business angel might thus be actively involved in the startup and provide more hands-on support than business angels who adopt an economic approach to value distribution. As previously noted, most entrepreneurs perceive the contribution of

the business angel to the startup as positive (Mason and Harrison, 1996), supporting the argument for the stewardship view on value distribution. Considering the value-adding capabilities of business angels, the value of the company will increase as a result of the joint efforts from the entrepreneur and the investor, even if the business angel owns a small share of the company. The involvement of the business angel should correlate to higher investment returns.

H2b: *A higher negotiated valuation at the investment stage will correlate positively with investment returns.*

3 Data and methods

3.1 Data

The hypotheses are tested using a data set of Finnish angel-backed companies. Information on the investments was gathered from the annual surveys of FiBAN 2013-2020. Financial statements of the angel-backed companies were retrieved from the Bisnode database, which is sourced from the Finnish Patent and Registration Office. These two data sources were combined using the business identity code of the angel-backed companies that the business angels have reported in the survey.

The annual survey of FiBAN is emailed electronically to all FiBAN members every spring. The survey asks business angels to report on all investments they have made in unquoted companies in the previous calendar year. Investors are asked to give details of their investor profile (portfolio size, lead investor experience, full-time angel activity, total number of investments and exits in the calendar year), company characteristics (industry, stage of business development), investment characteristics (amount invested, share of equity received, round size, presence and type of co-investors, follow-on investment) and exit information (exited company, exit form, return multiple on a cash-on-cash basis). The composition of the survey has slightly changed during the years. Starting in 2018, an incentive to answer the survey was introduced by granting business angels a membership fee discount for answering the survey. Only a few of the questions are usually mandatory to answer.

In total, the original data set includes 2484 responses to the annual member survey of FiBAN 2013-2020, representing 747 business angels who invested into 1501 companies and exited from 301 companies. The average number of investments per business angel per year was 1.7, while, on average, 66 % made at least one investment in a given year. The response rate varies from 44-74 %, with the lower rates before the incentive was introduced in 2018 and higher rates (65-74 %) after 2018.

The data set include details on 3229 investments into identifiable companies. Of these, 2211 investments contain the information needed to calculate the pre-money valuation of the investment using Eq. 4. No answers from 2016 can be included, since the data contains no means of identifying the business angels from that year. This drops 275 investments from the data set. Further, out of the remaining answers, 385 do not cover whether the investment was an initial or follow-on investment, making that control variable the largest source of data unavailability. The questions on investor profile have only been asked some years. These data points have been used to extrapolate backwards and forwards to cover years where the questions were not asked. For example, if a business angel reported in 2015 that he has made two exits in total in his career and reported one exit in 2017, the total number of exits for that business angel is three as of year 2017. The business angels' education degree has been assumed unchanged if not otherwise reported. In total, data unavailability reduced the final sample size to 1009 investment rounds in 507 companies, representing 258 business angels. As expected, the data unavailability skewed the data towards active investors: the average number of investments per business angel per year for the final data set was 2.7. The pre-money valuation is derived using the investment size and

equity received reported by the business angel:

$$\text{Pre-money valuation} = \frac{\text{investment size}}{\text{equity received}} - \text{investment size.} \qquad (4)$$

The most popular industry sector for the business angels in the sample was business services (28 %), followed by cleantech and bioeconomy (9 %). However, the sample contains investments into a very wide variety of industry sectors, indicating that business angels in Finland are sector agnostics. 70 % of the investments in the final sample was made after 2016 (Table 2). Business angels frequently participate in later funding rounds of their portfolio companies to protect their equity stake and avoid dilution. Investments in later-stage companies are usually done at higher valuations. In this sample, 43 % of the investments were initial investments by the business angel into the startup, 24 % second investments, 15 % third investments and 17 % later investments. Hence, the investment activities of the business angels in this sample is focused on new investments.

64 % of the business angels in the final sample have made at least one exit at the time of investment. However, to model the influence of valuation on investment return, data on both the pre-money valuation at the investment and investment return at the exit is needed. Data on both valuation at the investment and return is available for 49 investments in 36 companies (Table 2). The median holding period of the investments was 2 years. This is significantly lower than the 5 years median holding period previously reported for Finnish business angels (FiBAN, 2017). This is most likely due to the relatively short time period this data cover and the concentration towards investments done in the past three years. Hence, this data only covers the shortest holding times.

Bisnode maintains a database that includes financial statements from Finnish companies, including unquoted companies. The database includes balance sheets and income statements and is sourced from the Finnish Patent and Registration Office.

Table 2: Pre-money valuation by investment year and exits by year of exit.

Year	Pre-money valuation (M€)			Exits
	N	Mean	Median	N
2013	50	4.08	0.83	0
2014	94	2.41	1.09	4
2015	161	2.40	0.99	4
2017	149	2.70	1.10	9
2018	165	5.29	1.13	6
2019	172	4.42	1.76	0
2020	218	7.08	1.47	26
Total	1009	4.36	1.24	49

3.2 Variables

A summary of the dependent, independent and control variables used in this study is presented in Table 3. This chapter presents an explanation for each variable. For descriptive statistics of each variable, see Table 6.

Because the hypothesized dependences between the dependent variables and the independent variables are not linear, the natural logarithm was taken of all continuous variables, including pre-money valuation, in all regression models in this study. Before taking the logarithm, a constant of one was added to all logged variables to avoid data losses due to zeroes in the data.

Table 3: Summary of all variables included in the regression analysis.

Variable	Metric	Definition
Dependent		
Pre-money valuation	Continuous	Eq. 4
Investment return	Ordinal	Return on the investment, reported in cash-on-cash multiple
Independent		
Education	Ordinal	Highest educational degree obtained by the angel
Companies founded	Continuous	Number of companies the angel has founded or co-founded
Years of business angel experience	Continuous	Number of years since the first angel investment
Prior angel investments	Continuous	Total number of investments at the time of investment
Portfolio size	Continuous	Size of the angel's portfolio at the time of investment
Prior business angel exits	Continuous	Total number of exits at the time of investment
Lead investor experience	Binary	Dummy variable representing if the angel has lead investor experience
Full time business angel	Binary	Dummy variable representing if the angel is a full time business angel
Control		
Revenue	Continuous	Revenue of the target company at the time of investment
Company age	Continuous	Age of the target company at the time of investment
Size of funding round	Continuous	Size of the funding round, as reported by the business angel
Initial or follow-on investment	Binary	Initial or follow-on investment, as reported by the business angel

3.2.1 Dependent variables

3.2.1.1 Pre-money valuation

The first part of the study focus on the pre-money valuation of angel-backed ventures, a continuous variable. The pre-money valuation is theoretically defined as the number of shares available prior to the angel investment times the share price and calculated as Eq. 4. Following this definition, any changes to the value of the venture the business angel bring, such as capital, networks or certification, are excluded. The mean pre-money valuation of the firms in the data set is 4.36 M€, ranging from a minimum of 1250 € to a maximum of 289 M€. Hence, there are clear outliers in both ends of the valuation spectrum. Nonetheless, the business angels in this sample invest in companies at all stages of development, ranging from the very early idea-phase to late financing rounds.

3.2.1.2 Investment returns

The second part of the study investigates investment returns. Traditionally, the standard metric to evaluate performance in the venture capital industry is the IRR of a fund, taking into account cash returns from the sale of shares, expenses of

the fund, and other cash flow, such as dividends. However, business angels do not invest by means of a structured fund and do not have a pressure to invest as venture capital funds have. Rather, business angels tend to think about their investment performance in terms of a cash-on-cash multiple for each individual investment they make. The evaluation of investment returns in this study is therefore done on a deal-by-deal basis, with the return measured very simply in terms of the multiple achieved and the length of time taken to realise the return. Hence, this calculation of IRRs do not take into account any cash flow investors might receive from dividends or other running payments. Excluding running returns may reduce the positive IRRs recorded for successful exits.

Table 4 presents the distribution of return multiples in the sample. 29 % of the investments resulted in total loss, 20 % in partial loss or break-even and 20 % produced excellent returns (>10X).

Table 4: Distribution of investment returns in the sample, measured as cash-on-cash return multiple.

	N
Lost everything	14
<1X	8
1X	2
2-4X	8
5-9X	7
>10X	10
Total	49

Table 5: Internal rate of return (IRR) for the exits in the sample.

	IRR (conservative)	IRR (Stretch)
Total loss	14	14
Partial loss or break-even	10	10
1-50 %	5	4
51-100 %	5	4
> 100 %	15	17
Total	49	49

Two methods are used to study the effect of valuation and business angel experience on investment returns. The first method only accounts for the return multiple, while the second accounts for both the return multiple and the holding time by calculating the IRR. In the survey, the return multiple for exited companies is reported as an ordinal variable where two categories have a lower and upper bound. To convert the return multiples into IRR, the IRR is calculated as the average of the lower and upper bound IRRs. For the highest category of return multiples (>10X), two different versions are used to study the robustness of the model: one conservative

model where >10X is interpreted simply as 10X return, and one stretch model where an upper bound is introduced. Based on a previous study of Finnish business angels, the return multiple can exceed 40X (FiBAN, 2017), which is used as the upper bound in this study. The IRR is then calculated in the same way as for the other categories, the average of the lower and upper bound IRRs.

Table 5 presents the resulting IRRs. Compared to previous research on IRR of business angel investments, the IRRs in this study are significantly higher: the average IRR of this sample is 45 %, compared to 26.6 % in Gregson et al. (2017) and 25 % in FiBAN (2017). Nonetheless, the sample suffices for the purposes of this study.

3.2.2 Independent variables

Eight independent variables were included in the model to quantify the experience of business angels. One variable measures the education level, another entrepreneurial experience while six measure dimensions of previous experience as business angel.

3.2.2.1 Education

The education of the business angel is included to investigate the effect it has on the valuation and investment returns. The survey asked business angels to report the highest degree they have earned from a list of alternatives. The vast majority, 73 %, had received a Masters degree as their highest degree, 13 % a Bachelors degree and 8 % a doctoral degree, while the remaining 6 % had reached either high school or vocational training. This is consistent with previous research on education of business angels, which has established that business angels are usually highly educated (Van Osnabrugge and Robinson, 2000). Thus, the education is included as an ordinal variable in the regression models.

3.2.2.2 Number of companies founded

Entrepreneurial experience of the business angels was measured as the number of companies founded at the time of the investment, which has been shown to be highly relevant for evaluating new venture opportunities (Smith et al., 2010; Hsu, 2007). The majority, 82 %, of the business angels in the sample have founded or co-founded at least one company, with the mean equalling 4 companies founded. The median number of companies founded is 2. 23 % of the respondents are serial entrepreneurs with more than 5 companies founded or co-founded.

3.2.2.3 Number of years of business angel experience

Number of years of business angel experience was used as one of the variables to quantify the experience of the business angels. The survey asked the respondents to report the year when they made their first angel investment. At the time of investment, the mean number of years of business angel experience was 9 years and the median 7. The sample includes both new business angels with less than three

years of experience (14 %) and experienced business angels with more than 10 years of experience (32 %). The variable is continuous.

3.2.2.4 Number of prior angel investments

To further test the effect of business angel experience on valuation and investment return, a measure of total investments the business angels have done at the time of the investment is used. The mean number of total investments prior to the investment was 10, while the median was 7. The total number of investments the business angels in the sample has made is well balanced. 27 % of the business angels in the sample have made 1-4 investments and 32 % have made more than 10 investments. The variable is continuous.

3.2.2.5 Number of portfolio companies

Closely related to the total number of investments but maybe more easy to report by business angels, the portfolio size was used as the third variable to measure the level of experience of the business angels. The portfolio size is influenced by both the number of investments the business angel has made and the number of exits. Presumably, the larger the portfolio size, the more experienced business angel. The distribution of portfolio sizes is also well balanced, with the largest share between one and five portfolio companies (42 %). A minority did not have a single portfolio company at the time of investment (14 %) and another minority had more than 10 portfolio companies (17 %).

3.2.2.6 Number of prior business angel exits

An integral part of the VC industry, also for business angels, are the exits: without profitable exits, a business angel cannot continue investing. The total number of exits made by the business angels, both profitable and unprofitable, are included in the study to test the effect it has on valuation and investment returns. Business angels were asked simply to report the total number of exits they have made in their career. The mean number of exits is 2.2, with a median of 1. Further, a third of the business angels in the sample had not made a single exit before the investment, 42 % had made one to three exits and a very small minority (4 %) of very experienced business angels had made more than 10 exits.

3.2.2.7 Lead investor experience

Finally, two binary variables are used to study two additional dimensions of business angel experience. First, respondents were asked to report whether or not they acted as a lead investor in a funding round during the previous year. If a business angel reported they acted as a lead investor in a given year, that investor is considered to have lead investor experience in all consecutive years. The majority (60 %) of the business angels in the sample have lead investor experience.

3.2.2.8 Full time angel

Second, the study includes information on if the business angels act as full time business angels, searching for and working with potential high-growth companies as their primary profession. Almost a fourth (24 %) of the business angel in the sample reported that they work as full time business angels. Both full time business angel activity and lead investor experience is captured with binary variables (1=yes, 0=no).

3.2.3 Control variables

Four control variables are introduced in the study to control for company characteristics for two reasons. First, valuations of VC-backed companies are significantly affected by company characteristics (Heughebaert and Manigart, 2012). Second, introducing well-chosen control variables can alleviate the endogeneity problem arising from the sorting mechanisms inherent to the VC market, which allows more experienced business angels to reap higher investment returns by having access to better deals. However, it is difficult to tell whether the control variables introduced completely eliminates the endogeneity problem or not. The effect of not fully eliminating the endogeneity problem may therefore be to overestimate the influence of experience on investment return. Accordingly, the results provided on investment returns in this study are likely to overestimate the effect of business angel experience on investment returns.

3.2.3.1 Revenue

The revenue of the company at the time of the investment is an indicator of how far in the development the company has reached. The revenue affects the valuation of the company, and is therefore included in this study. The data on revenue is sourced from the Bisnode database and combined with the survey results using the business identity code. The distribution of revenues of the companies in this study is skewed to the right: the mean annual revenue of all companies in this study is 921 877 €, while the median is 124 500 €. The annual revenues range from 0 € to 122 M€. The majority (53 %) of the companies have revenues between 1-500 000 € at the time of investment, while minorities have zero revenue (19 %) and more than 1 M€ revenue (18 %).

3.2.3.2 Company age

The older a company is, the more time it has had to mature and develop its business. Therefore, the age of the company may affect the valuation, and is therefore controlled for in this study. The distribution of company age in the sample is close to normally distributed with 9 % just started, 48 % age one to five and 11 % older than 10 years. On average, a company was 5 years old at the time of investment, with the oldest raising angel funding after 45 years of operations.

3.2.3.3 Size of funding round

Another indication of the quality of the company is the size of the funding round. On average, a startup that received angel funding raised 536 077 €. The median round size is 200 000 €, with a minimum of 1000 € and a maximum of 20 M€. Half of the funding rounds are between 100 000 € and 500 000 €, 28 % less than 100 000 € and 10 % larger than 1 M€.

3.2.3.4 Initial or follow-on investment

Finally, the business angels were asked to report if the investment was an 1) initial, 2) second, 3) third or 4) later investment into the company. This variable was reduced to a dummy variable measuring if the investment was an initial investment or a follow-on investment, (1=yes, 0=no), since the decision process of the business angel is fundamentally different in these two scenarios but highly similar between follow-on investments when the business angel already has chosen to invest in the company.

Table 6: Descriptive statistics of the variables included in the regression models.

	Mean	Median	SD	Min	Max	N
1. Pre-money valuation (M€)	4.36	1	15.8	0.001	290	1009
2. Education degree	3.87	4	0.80	1	5	1009
3. Companies founded	4.04	2	4.98	0	42	1009
4. Years of business angel experience	8.98	7	6.78	0	45	1009
5. Prior angel investments made	14.0	8	16.1	0	100	1009
6. Portfolio size	8.27	6	8.06	0	40	1009
7. Prior business angel exits	2.55	2	3.20	0	17	1009
8. Lead investor experience	0.65	1	0.48	0	1	1009
9. Full time angel	0.32	0	0.47	0	1	1009
10. Revenue (k€)	827	126	4380	0	120000	1009
11. Company age	5.01	4	5.08	0	45	1009
12. Size of funding round (k€)	547	200	1210	1	20000	1009
13. Initial or follow-on investment	0.43	0	0.50	0	1	1009

3.3 Methods

3.3.1 Multiple linear regression

Multiple linear regression is a statistical method that models how changes in a set of independent variables affect a selected dependent variable, which is continuous. Since the dependent variable in this study is continuous and multiple independent and control variables are included, the hypothesis of this study are empirically tested using multiple linear regression with the variables in Table 3. The multiple linear regression equation is

$$Y_i' = \beta_0 + \beta_i x_i + \epsilon, i = 1, ..., N, \tag{5}$$

where Y'_i is the prediction of the dependent variable Y_i, x_i the independent variables, β_0 the intercept of the regression line with the y-axis, β_i the regression coefficients and ϵ the error term of the model.

The goal of the regression model is to as accurately as possible estimate values for the regression coefficients β_i based on the available data. β_i represent the magnitude and direction (positive or negative) of the influence of x_i on Y'_i and are usually calculated using the ordinary least squares (OLS) method, which minimizes the sum of the squared deviations between Y'_i and Y_i:

$$\beta_1...\beta_n \text{ s.t. } \min \sum_{i=1}^{N}(Y_i - Y'_i)^2. \tag{6}$$

The error term ϵ accounts for the measurement error and the effect of exogenous variables on the regression model.

Multiple linear regression analysis is subject to four general assumptions. First, the analysis requires that the mean of Y_i is a linear combination of β_i. Second, the errors between the predicted and observed values should be normally distributed. Third, the independent variables should not show multicollinearity, which occurs when two or more independent variables are highly correlated with each other. Finally, the data needs to show homoscedasticity, or homogeneity of variance, meaning that the error term is approximately the same across all values of the independent variables. Further, linear regression is sensitive to significant outliers in the data as they have a negative effect on the regression results.

The regression coefficients β_i are the primary results of the regression analysis. The statistical significance of each β_i is tested separately by a t-test, calculating the probability of the null hypothesis, i.e. the probability that the coefficient β_i is zero, thus having no effect on Y'_i. β_i is considered statistically significant if the probability of the null hypothesis being true is less than a specific value, usually 1 %, 5 % or 10 %.

3.3.2 Clustered robust standard errors

The data points in this study are not independent of each other, since the same company may have received investment from multiple business angels in the same year and may have raised new funding rounds in consecutive years. Therefore, the sampling process is clustered at the company level.

A clustered robust standard errors method is used to counteract the heteroscedasticity in the sample. This model assumes that where observations can be grouped into clusters, model errors are uncorrelated across clusters but correlated within clusters. Grouping all observations into clusters $g = 1, ..., G$, the cluster-robust estimate of the variance matrix of the OLS estimator $\hat{\beta}$ is the sandwich estimate (Cameron and Miller, 2015)

$$\hat{V}_{clu}(\hat{\beta}) = (\mathbf{X}'\mathbf{X})^{-1}\hat{\mathbf{B}}_{clu}(\mathbf{X}'\mathbf{X})^{-1}, \tag{7}$$

where

$$\hat{\mathbf{B}}_{clu} = \sum_{g=1}^{G} \mathbf{X}'_g \hat{\epsilon}_g \hat{\epsilon}'_g \mathbf{X}_g, \tag{8}$$

and $\hat{\epsilon}_g = \mathbf{Y}_g - \mathbf{X}_g\hat{\beta}$ is the vector of OLS errors for the gth cluster.

3.3.3 Ordinal logistic regression

The measure of return multiple is an ordered categorical variable with six categories. In this study, the primary investigation of how the independent variables affect the investment return, measured by the return multiple, is done with a standard regression model. However, as the performance of a linear model suffers from the dependent variable not being continuous, a robustness test is introduced. The robustness test uses an ordinal logistic regression analysis, a regression model specifically designed for ordinal dependent variables. In this model, the coefficients of the linear combination, β_i, cannot be estimated using the OLS method. Instead, they are estimated using maximum likelihood. The mathematical form of the logistic regression model is

$$\text{logit}(\pi(x)) = \beta_0 + \beta_i x_i, i = 1, ..., N, \tag{9}$$

which gives

$$\pi(x) = \frac{e^{\beta_0 + \beta_i x_i}}{1 + e^{\beta_0 + \beta_i x_i}}, \tag{10}$$

where $\pi(x)$ is the prediction of the dependent variable, x_i the independent variables, β_0 a constant term and β_i the regression coefficients.

3.3.4 Heckman selection model

The sub-sample that includes investment returns ($N = 49$) in subject to three major sources of sample-induced endogeneity. First, investment returns are only available for investments that have actually been exited. This data set covers a limited time period from 2013-2020, while investments usually require 5-6 years to mature for exit in Finland. Hence, investments done in the earlier part of the study has a higher probability of recorded investment returns. Second, for both the valuation and investment returns to be recorded in this study, the business angel have responded to the survey at least twice with possibly many years apart. This biases the sample to include more experienced business angels. Third, the voluntary nature of the survey may bias respondents to only report returns they are comfortable with reporting. Therefore, the data set of the sub-sample that also includes investment returns cannot be considered to be selected randomly.

Heckman (1979) introduced a two-stage process to correct sample-induced endogeneity. In the first stage, a probit model estimates the probability of an observation entering the sample. The probit model is described by the utility function (Sartori, 2003)

$$d_i = a + \beta w_i + u_i, \tag{11}$$

where d is the utility of company i being included in the sample, w a vector of variables that determine the likelihood of the observation entering the sample, and u the error term. The observation enters the sample when d exceeds a specified threshold. This process thus creates a selection parameter, called the inverse Mills ratio.

The second stage uses OLS (Eq. 6) to predict the ultimate dependent variable. The inverse Mills ratio is included in Eq. 6 and referred to as λ to account for potential sample selection bias. For the Heckman model to be effective, the first stage should include at least one variable that does not appear in the second stage (Sartori, 2003). These variables are called exclusion restrictions and influence the probability of an observation being included in the sample without influencing the ultimate dependent variable in the second stage OLS model.

Following the discussion above, the probability of an observation of investment returns being included in the study is correlated with three factors. First, the newer the investment, the less likely it is to be included in the sample. In other words, year of investment is such a factor to be included in the selection equation (Eq. 11). Second, more experienced business angels are more likely to have answered the survey multiple times, so variables measuring the experience are also included in the selection equation. Finally, company characteristics can be an indicator of growth potential, which, in turn, indicates return potential. As business angels probably are more keen to report successful returns, the control variables are included in the selection equation. Year of the investment is the exclusion restriction in the selection model.

3.3.5   Winsorization

Outliers in the variables included in the regression model have a negative effect on the performance of the model. The purpose of winsorization is to limit the extreme values of a variable, therefore alleviating the problem of outliers. In this study, the valuation data includes some extreme cases on both ends of the spectrum: the smallest valuation is 1250 €, while the largest is 289 M€. Hence, a modest 1 % and 99 % winsorization is performed on the dependent variable, meaning that the smallest 1% of the values in the dependent variable are set to the 1st percentile (4146 €) and the values above the 99th percentile are set to the 99th percentile value (43.7 M€). Using this method, 4.6 % of the data points on valuation are modified.

4 Results

4.1 Correlation analysis

Table 7 presents the Pearson correlation matrix of pre-money valuation and all variables included in the full models, excluding investment returns. Correlation coefficients are generally low or very low, with three exceptions that are above 0.5. First, pre-money valuation is correlated to size of the funding round. This is intuitive, since the later stage of development the company has reached, the higher valuation and the more capital is needed to grow the business further. Second and third, number of prior business angel investments made before the investment is correlated to both portfolio size and prior business angel exits. Consistent with previous studies, pre-money valuation is positively correlated with the control variables revenue, company age, size of the funding round and investment round number. Among all independent variables measuring business angel experience, only one variable is negatively correlated to pre-money valuation: number of companies founded, consistent with Collewaert and Manigart (2016). The strongest positive correlation between pre-money valuation and the independent variables is 0.215, which occurs between pre-money valuation and number of prior angel investments made. All correlations mentioned are statistically significant ($p < 0.05$). The highest variance inflation factor among all regression models is 2.42, suggesting no multicollinearity problems (Table 9).

Table 7: Pearson correlation matrix for the full sample.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Pre-money valuation												
2. Education degree	0.10*											
3. Companies founded	-0.15*	-0.30*										
4. Years of business angel experience	0.01	0.08*	0.25*									
5. Prior angel investments made	0.21*	-0.10*	0.22*	0.30*								
6. Portfolio size	0.10*	-0.12*	0.22*	0.20*	0.55*							
7. Prior business angel exits	0.06	0.07*	0.28*	0.45*	0.62*	0.36*						
8. Lead investor experience	0.02	-0.09*	0.19*	0.28*	0.37*	0.28*	0.38*					
9. Full time angel	0.15*	0.06*	-0.08*	0.06*	0.34*	0.21*	0.18*	0.29*				
10. Revenue	0.24*	0.02	-0.03	0.03	0.10*	0.11*	0.06	0.09*	0.06			
11. Company age	0.33*	0.03	0.12*	0.19*	0.04	0.14*	0.09*	0.05	0.38*			
12. Size of funding round	0.66*	0.13*	-0.16*	0.04	0.17*	0.02	0.11*	0.05	0.14*	0.22*	0.28*	
13. Initial or follow-on investment	-0.16*	-0.05	0.05	-0.10*	-0.12*	-0.10*	-0.10*	-0.16*	-0.07*	-0.24*	-0.34*	-0.14*

* $p < 0.05$. $N = 1009$.

To check the representativeness of the sub-sample that also include investment returns, Table 8 presents a separate Pearson correlation matrix of return multiple and all variables included in the investment return models. For this sub-sample, only one correlation is above 0.5, which occurs between number of prior business angel exits and number of companies founded. One potential reason for this correlation could be that the business angels in the sub-sample might have reported their exits from companies they founded as exits done as a business angel. The corresponding correlation for the full sample is 0.28. Comparing correlations between Table 7 and Table 8, a few of the correlations above 0.5 in the full sample are not as strong in the sub-sample. In particular, the largest differences are observed for the correlations

between years of business angel experience and the other independent variables measuring experience, where the correlations in the sub-sample are not as strong nor statistically significant as in the full sample. In general, however, most of the statistically significant correlations are in the same direction.

Table 8: Pearson correlation matrix for the sub-sample including investment returns.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Return multiple												
2. Education degree	0.44*											
3. Companies founded	0.07	-0.11										
4. Years of business angel experience	-0.06	0.00	0.32*									
5. Prior angel investments made	0.26	0.23	0.40*	0.12								
6. Portfolio size	-0.06	-0.04	0.01	-0.06	0.36*							
7. Prior business angel exits	0.32*	0.07	0.59*	0.24	0.42*	-0.06						
8. Lead investor experience	0.26	-0.11	-0.03	-0.18	0.17	0.05	0.16					
9. Full time angel	-0.03	-0.04	-0.05	-0.24	0.20	0.16	0.03	0.31*				
10. Revenue	0.21	-0.01	-0.02	-0.20	0.09	-0.18	0.11	0.29*	0.08			
11. Company age	-0.30*	-0.07	0.06	-0.04	-0.01	-0.18	-0.02	0.13	0.05	0.09		
12. Size of funding round	0.14	0.41*	-0.13	-0.06	0.00	-0.27	0.13	0.15	-0.04	0.20	0.29*	
13. Initial or follow-on investment	0.06	-0.12	-0.01	0.05	0.09	0.11	-0.05	-0.12	0.11	-0.11	-0.54*	-0.34*

* $p < 0.05$. $N = 49$.

Table 9: Variance inflation factors in model 2 and 5.

	VIF	
	Model 1	Model 5
Prior angel investments	2.26	1.78
Prior business angel exits	1.95	2.22
Portfolio size	1.50	1.49
Company age	1.46	1.60
Lead investor experience	1.36	1.37
Years of business angel experience	1.32	1.36
Initial or follow-on investment	1.31	1.68
Full time angel	1.25	1.44
Companies founded	1.24	1.98
Revenue	1.22	1.31
Size of funding round	1.18	2.42
Education	1.04	1.34

4.2 Hypotheses testing

4.2.1 The effect of experience on valuation

Table 10 presents the estimates for the relationship between business angel experience and pre-money valuation. Three models are developed: model 1 is a control model,

model 2 the main model and model 3 a robustness check. The prefix "L" denotes continuous variables that are transformed by taking the natural logarithm.

Model 1 presents the relationship between the control variables and the pre-money valuation. The model is significant and explains 46 % of the variation in angel-backed companies' pre-money valuation for this sample of 1009 observations. Pre-money valuation correlates with two of the control variables. First, on a significance level of $p < 0.01$, pre-money valuation is moderately positively correlated to company age. Older companies are intuitively worth more, as they have had more time to develop their business. Further, from a survivor bias point of view, passing of time in the market sorts out companies that are fundamentally inferior, sparing companies that are worth more. Second, pre-money valuation is strongly correlated to size of the funding round at a significance level of $p < 0.0001$. This is consistent with the phenomenon that higher amounts, indicated by the size of the funding round, are usually invested in companies with higher growth opportunities, indicated by pre-money valuation.

Both the correlation between pre-money valuation and size of the funding round and company age remains statistically significant across all models. In this sample, pre-money valuation is neither correlated to revenue of the company nor initial or follow-on investment in a statistically significant way.

Model 2 tests the hypothesized effects of business angels' experience on pre-money valuation. The model is significant and explains 49 % of the variation in angel-backed companies' pre-money valuation. Pre-money valuation correlates to three of the independent variables at a significance level of $p < 0.05$. Two of the three significant correlations provide a low or moderate positive correlation between business angel experience and pre-money valuation, while one provide a moderate negative correlation. In general, the results provide stronger support for hypothesis H1b (the stewardship view) than for H1a (the economic view).

In particular, pre-money valuation is positively correlated to number of prior angel investments made ($p < 0.01$) and number of portfolio companies ($p < 0.05$): consistent with Collewaert and Manigart (2016), business angels with many prior angel investments tend to act more as stewards than rational investors, sharing the value created through their experience and involvement in the company with the entrepreneurs. In contrast, pre-money valuation is negatively correlated to the number of prior business angel exits made ($p < 0.01$). This indicates that business angels who have made numerous exits act more as rational investors and appropriate more value, similar to VC investors. Finally, number of companies founded, years of business angel experience, lead investor experience and full time angel activity has no statistically significant effect on pre-money valuation.

4.2.1.1 Robustness checks

Two additional analyses was performed to test the robustness of the results. In the primary model (model 2), the standard errors of the model are clustered on the company-level, which results in 507 clusters. This approach groups the same company in the same cluster, independent of how many consecutive funding rounds

the company has made over the years covered in this study. However, an argument can be made that as an early-stage company develops over time and raises more funding, the fundamental characteristics of the company can change, such as the business model, management or even the product. Hence, a company on a late financing round may look fundamentally different from what it looked like in its initial funding round, and thus also its prospects for growth.

To test the effect of clustering and check the robustness of the results in model 2, model 3 clusters the standard errors on a company financing round level. This entails that investments into the same company in the same year are clustered. This approach results in 780 clusters. Table 10 (model 3) shows that the results are consistent with the results of the main analysis (model 2). All relationships are in the same direction and of the same magnitude and have similar significance. The significance of number of prior angel investments improves. Previous results remained robust.

Finally, the results of the relationship between number of prior angel investments made and number of prior business angel exits made on one hand and pre-money valuation on the other were tested using individual regression models to test if the results remain consistent (Appendix A). The relationship between pre-money valuation and number of prior angel investments made remains positive and statistically significant ($p < 0.0001$), as Table A1 shows. However, the relationship between pre-money valuation and number of prior business angel exits made changes from negative to positive and does not remain significant (Table A2). Hence, this result should be considered with care.

4.2.2 The effect of experience and valuation on investment returns

Table 11 presents estimates of the coefficients describing the relationship between business angel experience, pre-money valuation and investment returns. Six regression models were used for the study: model 4-6 measures investment returns by return multiple, thus not taking the holding time into account. Model 7-9 measures investment returns by IRR, therefore accounting for the holding time. All models cluster the standard errors at the company level.

4.2.2.1 Investment returns measured by cash-on-cash return multiple

Table 11 (model 4) presents the relationship coefficients between investment returns, measured by cash-on-cash return multiple, and the control variables. The model is significant and describes 19 % of the variation in investment returns in this sample. Investment returns correlates with one of the control variables on a significance level of $p < 0.01$: company age. The correlation is negative, suggesting that investment returns are generally lower for investments in older companies. As older companies have had more time to mature, the relative growth potential of these companies seem to be lower than those of young companies. On the other hand, investments in older companies involve less risk than investments into young companies. In this model, investment returns is not correlated in a significant way to revenue, size of the funding round or initial or follow-on investment.

Table 10: Regression analysis: The effect of business angel experience on valuation.

Dependent variable: L Pre-money valuation	Model 1	Model 2	Model 3
L Revenue	0.0152	0.0124	0.0124
	(0.112)	(0.173)	(0.136)
L Company age	0.261**	0.255**	0.255***
	(0.000)	(0.000)	(0.000)
L Size of funding round	0.659***	0.636***	0.636***
	(0.000)	(0.000)	(0.000)
Initial or follow-on investment	-0.0464	-0.0355	-0.0355
	(0.580)	(0.668)	(0.653)
Education degree		0.0627	0.0627
		(0.244)	(0.176)
L Number of companies founded		-0.0770	-0.0770
		(0.127)	(0.117)
L Years of business angel experience		-0.0371	-0.0371
		(0.552)	(0.534)
L Number of prior angel investments made		0.246**	0.246***
		(0.000)	(0.000)
L Number of portfolio companies		0.110*	0.110*
		(0.021)	(0.015)
L Number of prior business angel exits made		-0.217**	-0.217**
		(0.002)	(0.001)
Lead investor experience		-0.143	-0.143
		(0.127)	(0.106)
Full time angel		0.0719	0.0719
		(0.460)	(0.407)
Constant	5.430***	5.177***	5.177***
	(0.000)	(0.000)	(0.000)
F-value	132.4	53.01	59.64
R-squared	0.462	0.487	0.487
N	1009	1009	1009

The regression models include data from 1009 business angel investments in 507 companies by 258 business angel between 2013 and 2020, gathered from annual member surveys of FiBAN. The dependent variable for all models is the natural logarithm of the pre-money valuation. All variables of which the natural logarithm was taken are denoted with "L" as a prefix. The p-values (in parenthesis) for models 1 and 2 are based on robust standard errors clustered at the company level while model 3 clusters the robust standard errors on the financing round level.

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.0001$

Model 5 tests the effects of business angel experience and pre-money valuation on investment returns, measured by cash-on cash return multiple. The model is significant and explains 50 % of the variation in investment returns. According to this model, return multiples are positively correlated to education degree and lead investor experience, suggesting that business angels with higher education and experience as lead investor receive higher return multiples. The negative correlation to the control variable company age remains statistically significant ($p < 0.05$). In this model, returns are not statistically significantly correlated to pre-money valuation.

4.2.2.2 Investment returns measured by IRR

Table 11 (model 7) tests the hypothesized effect of business angel experience and pre-money valuation on investment returns, measured by IRR. The model is significant and explains 52 % of the variation in IRR. IRR is statistically significantly correlated to two of the four control variables and two independent variables. In general, the model exhibits strong support for H2a, the economic view on value distribution.

In particular, IRR is negatively correlated to initial or follow-on investment ($p < 0.1$) and pre-money valuation ($p < 0.05$). According to this model, investments done at a lower valuation and as initial investment receives higher returns, providing support for H2a. Further, IRR is positively correlated to revenue ($p < 0.1$) and education degree ($p < 0.1$). This indicates that business angels reap better returns for investments in companies that already have some traction in terms of revenue at the time of investment and that business angels with higher education degrees receive better returns, consistent with the results of model 5. Finally, company age, size of the funding round, number of companies founded, years of business angel experience, number of prior angel investments made, number of portfolio companies, number of prior exits made, lead investor experience and full time angel activity has no statistically significant effect on IRR of business angel investments.

4.2.2.3 Robustness checks

Four robustness tests were performed to test the reliability of the results. First, to test the results of using return multiples, model 6 is otherwise similar to model 5, but uses a logistic regression model instead of a normal regression model. The correlation between investment returns and lead investor experience does not remain statistically significant. Hence, this result should be interpreted with care. No other differences are observed between the models. All other previous results remained robust.

Second, in order to check for the effect of interpreting ">10X" simply as a 10X return in the conversion from return multiple to IRR, an alternative conversion from return multiple to IRR is made where the upper limit is set to 40X. Accordingly, ">10X" is interpreted as "10-40X". Model 8 tests this scenario. The results are consistent with those of the main analysis (model 7) in that all but one relationships are in the same direction. In particular, the significance of the relationship between IRR on one hand and number of companies founded, number of prior angel investments made and full time activity increases to become statistically significant ($p < 0.1$), while

revenue and initial or follow-on investment does not remain statistically significant. The negative correlation between IRR and pre-money valuation remains robust.

Third, the number of variables in the model is relatively large compared to the sample size. This can lead to overfitting. Therefore, the effects of all variables were individually tested against IRR, analogous to model 7. The results are presented in Appendix B. The negative correlation between pre-money valuation and IRR does not remain statistically significant (Table B2). The only independent variable that significantly correlates to IRR is number of exits made (Table B8). The correlation is positive. Thus, overfitting cannot be ruled out.

Finally, a Heckman selection model was performed to account for the sample selection bias of the sub-sample. IRR calculated with the maximum return multiple of 10X was used as dependent variable, same as in model 7. In the selection stage of the model, four variables significantly contribute to the probability of an observation being included in the sample: year ($p < 0.05$), education degree ($p < 0.05$), number of companies founded ($p < 0.05$) and initial or follow-on investment ($p < 0.1$). Hence, observations for the inclusion restriction (year) are available when observations for IRR are not and it is statistically significant. λ for the Heckman model is $\lambda = -0.41$ while $\rho = -0.34$. This implies that little correlation between the error terms of the selection and structural equations exist, but the existence of a sample selection bias cannot be ruled out.

Table 11 (model 9) presents the results from the Heckman model. The statistical significance of pre-money valuation improves to $p < 0.01$. While the primary model (model 7) suggest that only two independent variables are significantly correlated to IRR, the Heckman model suggests that six independent variables correlate to IRR. The Heckman model suggests that education degree ($p < 0.1$), number of prior angel investments ($p < 0.1$) and lead investor experience ($p < 0.05$) correlates positively to IRR, while pre-money valuation ($p < 0.01$), number of companies founded ($p < 0.05$) and full time angel activity ($p < 0.1$) correlates negatively to IRR. The results from the Heckman model are consistent with the results of the primary model, and thus previous results remain robust.

4.2.3 Summary of the hypotheses tests

Based on the results of the hypotheses tests presented in Table 10 and Table 11, it can be concluded that the results provide robust evidence for H1b (the stewardship view on value distribution) and moderate support for H2a (the economic view on value distribution).

The results provide robust evidence that business angels with more experience tend to value their portfolio companies higher. In particular, business angels with more angel investments made and more portfolio companies tend to value their investments higher, after accounting for the control variables. However, the results also provide some signals of contradiction: business angels who have made more exits might use their negotiation power to negotiate lower valuations of their startups, thus acting more like rational investors, similarly to VCs. This result is not robust in one robustness test. Hence, the results provide more evidence for H1b than H1a.

Table 11: Regression analysis: The effect of business angel experience and valuation on investment returns.

Dependent variable:	Cash-on-cash multiple			IRR			
	Model 4	Model 5	Model 6	Model 7	Model 8	Selection	Model 9
L Revenue	0.0818	0.0433	0.0838	0.0715^+	0.0790	0.0243	0.0658^*
	(0.324)	(0.507)	(0.342)	(0.086)	(0.273)	(0.273)	(0.032)
L Company age	-0.911^{**}	-0.684^*	-0.701^+	-0.335	-0.0697	0.101	-0.376^+
	(0.009)	(0.031)	(0.074)	(0.177)	(0.889)	(0.467)	(0.088)
L Size of funding round	0.219	-0.0608	-0.290	0.150	0.551	0.0257	0.146
	(0.300)	(0.780)	(0.479)	(0.489)	(0.281)	(0.736)	(0.376)
Initial or follow-on investment	-0.296	0.00276	-0.189	-0.620^+	-0.920	0.271^+	-0.740^*
	(0.605)	(0.995)	(0.807)	(0.060)	(0.147)	(0.063)	(0.024)
L Pre-money valuation		-0.0842	0.0296	-0.326^*	-0.770^*	-0.108	-0.303^{**}
		(0.654)	(0.939)	(0.037)	(0.023)	(0.192)	(0.006)
Education degree		1.961^*	3.509^+	0.962^+	1.989^+	0.292^*	0.836^+
		(0.037)	(0.100)	(0.062)	(0.055)	(0.016)	(0.067)
L Number of companies founded		0.0313	-0.443	-0.679	-1.871^+	0.242^*	-0.771^*
		(0.959)	(0.739)	(0.146)	(0.077)	(0.024)	(0.047)
L Years of business angel experience		-0.246	-0.317	-0.0181	-0.128	-0.0889	0.0538
		(0.296)	(0.266)	(0.926)	(0.682)	(0.347)	(0.768)
L Number of prior angel investments made		0.284	0.272	0.584	1.211^+	-0.0383	0.598^+
		(0.660)	(0.778)	(0.113)	(0.076)	(0.763)	(0.052)
L Number of portfolio companies		-0.330	-0.294	-0.0862	0.249	-0.135	-0.00722
		(0.421)	(0.687)	(0.787)	(0.738)	(0.338)	(0.981)
L Number of prior business angel exits made		0.491	1.182	0.462	0.858	0.0627	0.451
		(0.361)	(0.407)	(0.159)	(0.157)	(0.620)	(0.104)
Lead investor experience		1.216^+	1.667	0.665	1.216	-0.221	0.718^*
		(0.087)	(0.211)	(0.111)	(0.139)	(0.283)	(0.042)
Full time angel		-0.543	-0.702	-0.626	-1.544^+	0.186	-0.694^+
		(0.403)	(0.489)	(0.159)	(0.094)	(0.323)	(0.056)
year						-0.122^*	
						(0.034)	
Constant	1.365	-2.872		-1.431	-4.522	244.3^*	-0.389
	(0.523)	(0.494)		(0.591)	(0.394)	(0.035)	(0.877)
Lambda							-0.407
F-value	4.701	3.617		4.057	3.523		83.76
R-squared	0.190	0.500		0.517	0.492		
N	49	49	49	49	49	1009	1009

Regression models 4-8 include data from 49 business angel investments and exits from 36 companies between 2013 and 2020, gathered from annual member surveys of FiBAN. Model 9 is a Heckman selection model. The dependent variable for models 4-6 is the cash-on-cash return multiple and the dependent variable for models 7-9 is the IRR. All variables of which the natural logarithm was taken are denoted with "L" as a prefix. The p-values (in parenthesis) for all models are based on robust standard errors clustered at the company level.
$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.0001$

The results provide evidence that pre-money valuation is negatively correlated to investment returns, supporting the argument that a lower negotiated valuation at the investment stage will correlate to higher investment returns. This supports H2a (the economic view). However, the correlations between business angel experience and IRR combined with the results on how experienced business angels value startups provide some indirect insights into the relationship between valuation and investment returns. In particular, the results indicate that business angels with more angel investments made both value their startups higher and receive higher IRR from their investments. This indicates that a higher negotiated valuation at the investment stage correlates to higher investment returns, supporting H2b. This result is only marginally significant in two of the six models, so it is not considered robust. Hence, the results provide support for H2a, with some weak support also for H2b. Fig. 4 presents a visual summary of the key results from the regression models.
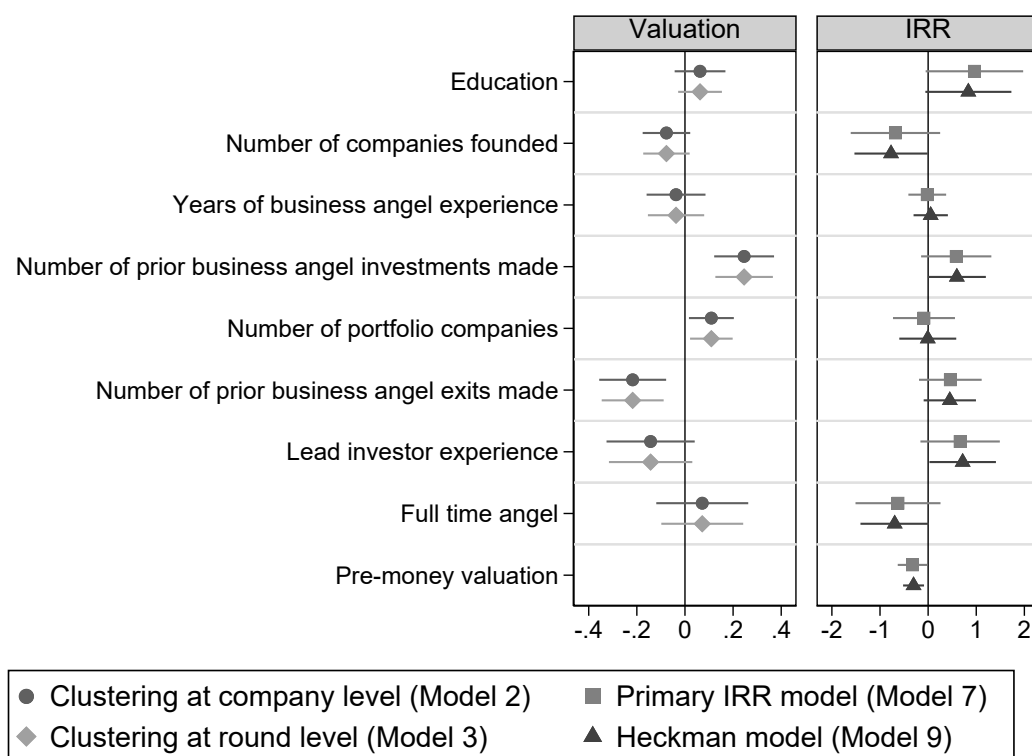
Figure 4: The marginal effects from the main regression models with 95 % confidence intervals. The results provide robust support for the stewardship view regarding how business angels approach the valuation negotiation, but mainly support the economic view regarding investment performance. The type of experience is an important factor in how the business angels approach the valuation negotiation and what investment returns they ultimately receive.

5 Discussion

5.1 Discussion of the results

Despite valuation being a key determinant of return for both investors and entrepreneurs at the time of investment, very little is understood about which valuation strategy business angels should adopt from the perspective of an exit-centric approach of investing, which seeks to maximize returns. The goal of this study was to explore which approach to the valuation negotiation produce higher investment returns for business angels. This study theorized, based on the literature review, that business angels with more investment experience, higher education and more companies founded would perceive higher value-creating potential in investment opportunities, which would correlate to higher investment returns. The hypotheses were tested on a data set of 1009 investments into 507 Finnish angel-backed companies, collected in the annual survey of FiBAN conducted between 2013 and 2020. The findings suggest that while business angels with more investments done and larger portfolios tend to act more as stewards, the economic view of value distribution produces higher investment returns. Contrary to other variables measuring experience, business angels that have made many exits at the time of investment value their portfolio companies lower, thus acting in accordance with the economic view on value distribution. The results suggests that as business angels gather experience from exits, their motivations shift from non-financial towards financial considerations.

The literature review established that even though valuation is one of the main determinants of return for investors at the time of investment, valuation of pre-revenue companies is poorly understood, inherently difficult and thought of as more of an art than science. The valuation process is a misconceived part of the investment process, frequently leading to relationships between the entrepreneur and investor getting off on the wrong foot. While VCs are forced to negotiate lower valuations to maximize their returns, more experienced business angels act more as stewards than rational investors and accept higher valuations to share the value created with the entrepreneur. As a company proceeds from raising pre-seed funding rounds from business angels to seed and later stage rounds from VCs, the contradiction in valuation strategies might lead to sub-optimal investment returns both for business angels, VCs and entepreneurs. However, the literature review demonstrates that the effect of sorting in the VC market is significant, and even though this and other studies have made a rigorous attempt to account for unobserved heterogeneity, the effects of sorting cannot be completely discarded.

Further, the literature review found that business angels continuously learn from both failed and successful investments and that the valuation of opportunities is affected by investor characteristics. However, most studies on the effect of experience on the investment decision making process of business angels seem to have focused on the initial screening stage of the investment decision making process, while the effect of business angels experience in later stages of the investment decision making process have largely been neglected in literature.

In general, there are few studies on the exit stage of the business angel investment

process. The literature review of the few studies that exists establishes that business angels fail to adopt an exit-centric approach to investing but that the professionalization of angel investing implies that angels should adopt an exit-centric approach to investing in order to maximize their probabilities to be able to continue investing in startups long-term. Business angels need to be aware of how to optimally plan for the exit throughout the investment decision making process, but literature does not cover this area of research.

The empirical part of the study tested the hypotheses the literature review developed, namely how business angels' experience affect the valuation of their portfolio companies and how this valuation is linked to investment returns.

The findings of the first part of the analysis suggests that company valuations are positively associated with business angels' previous experience and education, consistent with the research by Collewaert and Manigart (2016) but contradictory to findings from the VC industry (Hsu, 2004).

Specifically, the robust positive correlations between pre-money valuation on one hand and the number of prior business angel investment made and number of portfolio companies on the other support the argument that business angels act as stewards in their relationship to the entrepreneur. Consequently, they do not appropriate all of the value created resulting from their value-adding potential and hence do not maximize the economic value of their investments. This is in accordance with research indicating that business angels are not solely investing for financial reasons, but have altruistic motivations as well (Sullivan, 1994; Madill et al., 2005; Benjamin and Margulis, 1996). The findings of this study thus provide further support for the fact that business angel behaviour differ significantly from VC investor behaviour (Collewaert and Manigart, 2016; Mason and Stark, 2004).

In direct contradiction to other variables measuring business angel experience, the results indicate that business angels who have made more exits before the investment tend to act more like rational investors and appropriate value by negotiating lower valuations. Even though these results are not robust, they have important implications, especially since they are contradictory to the effect of number of angel investments made. Business angels that have experience from many exits have a good understanding of what it requires to exit a company, in contrast to business angels that have made many investments but still have not exited from many. Any possible over-optimism regarding future exit valuations they had as they made the investment have had to face reality. Exits thus provide an anchoring mechanism for the expectations of business angels. Having experience of exits as a business angel is very valuable, and it seems to have a sobering effect on how business angels approach the valuation negotiation in future investments. Business angels with many exits made thus take a portfolio-oriented approach and act more like venture capital investors, appropriating the expected value creation from their experience instead of sharing it with the entrepreneur.

This study shows no significant correlation between revenue and pre-money valuation. This supports the argument that valuing pre-revenue companies is notoriously difficult, and more a process of accounting for inputs rather than outputs. The implication of this result for business angel researchers is that revenue, as a quantitative

company characteristics variable, is a weak indicator of value in a business angels' eyes, since many companies they invest in are pre-revenue.

The findings of the second part of the empirical analysis show that pre-money valuation is negatively correlated to investment returns, supporting the argument that a lower negotiated valuation at the investment stage will correlate to higher investment returns. This result support the economic view on value distribution. The results in this study thus indicate that for optimal financial benefit of their investment, business angel should adopt a portfolio-oriented, rational approach to their investments, similar to that of VCs (Hsu, 2004).

Consequently, a contradiction between the approach to investing that produces higher returns (the economic view) and the approach experienced business angels take in the valuation negotiation (the stewardship view) exists. Business angels that have made many investments do not follow the approach to investing that produces higher returns. This supports the argument that business angels are partly motivated by non-financial considerations. Interestingly, business angels that have made many exits and thus have extensive experience of angel investing seem to follow the rational approach to investing, which produces higher returns, and use their negotiation power to negotiate lower valuations. Consequently, the results suggest that business angels with little experience of exits are more motivated by non-financial considerations, but as business angels gather experience from exits, their motivations shift more towards financial considerations. From an exit-centric point of view, experience of exits is necessary for the business angel to maximize his or her financial benefit from the investments.

The results also provide some contradictory indications. In particular, the results weakly indicate that business angels with more angel investments made both act as stewards in the valuation negotiation and receive higher returns from their investments. This indicates that a higher negotiated valuation at the investment stage correlates to higher investment returns, supporting the argument that the stewardship approach to business angel investing produce higher returns. However, these results are not robust.

The findings suggest that business angels with higher levels of education receive higher returns from their investments, which is consistent with previous research both from the business angel setting (Collewaert and Manigart, 2016) and the VC setting (Dimov and Shepherd, 2005). The positive effect of education on investment returns seems to be a rare commonality between two otherwise different types of investors (Mason and Stark, 2004).

Finally, the lack of significant correlation between pre-money valuation and years of business angel experience on one side and investment returns on the other support the argument that experiential learning theory applies to the context of business angel investing. The results suggest that business angels learn by founding companies, making investment, building a portfolio and making exits (both failed and successful), while accumulating years of business angel experience has no significant effect on the approach to investing.

5.2 Contributions

This study contributes to the entrepreneurship literature in four ways. First, it confirms the findings by Collewaert and Manigart (2016) that business angels with more experience act as stewards in the relationship with the entrepreneur also in a different institutional setting, providing robustness to the results. It also continues from the study by Collewaert and Manigart (2016) by investigating the relationship between valuation and investment returns. It provides more details on what type of experience influences valuations in a positive or negative direction: contrary to the main result, business angels with experience from exits, who have stronger networks, more knowledge and provides more certification to the venture, negotiate lower valuations as thus act similarly to VCs (Hsu, 2004).

Second, the scarce literature on business angels that exist shows that business angels are partially motivated by non-financial considerations. This study suggests that the level of experience of business angels has an effect on to what extent they are motivated by such non-financial motivations: business angels with the most experience are primarily motivated by financial considerations. Thus, it contributes to previous literature by providing more details on business angel motivations.

Third, this study contributes to literature on the exit stage of business angel investing, which, despite its importance for investing and startup ecosystems, have largely been neglected in literature. The studies that have been made have generally focused on investment returns. This study complements these studies as it provides a deeper understanding of what drives returns. It confirms the result by Gregson et al. (2017) that there exists little correlation between deal size and investment returns.

Finally, following the research by Mason et al. (2019), this study provides a basis for how to develop an exit-centric approach to business angel investing, although tentative. Considering the importance of adopting an exit-centric approach to investing as angel investing professionalizes, this study hopes to spark future studies in this line of research.

The study also suggests contributions for industry practitioners, primarily for business angels and entrepreneurs. First and most importantly, this study suggests that for optimal investment returns, business angels should adopt an economic view of value distribution in the valuation negotiation. More specifically, business angels that want to maximize their financial benefit from their investments should strive to use some of the superior negotiation power that comes with their experience to thoughtfully negotiate lower valuations in the early financing rounds. Based on the results, this approach should produce better investment returns in the long run by aligning the valuation strategy with VCs and lowering the risk of down-rounds compared to sharing the expected value creation with the entrepreneur. A limit exists, however. A too low valuation will dilute the founders' equity stakes, which impacts the founder's sense of ownership and decrease the attractiveness of the venture's cap table in subsequent funding rounds. This result is particularly important considering that adopting an exit-centric approach to investing has been shown in previous studies to be difficult for business angels, even though various angel communities identify the struggle to achieve exits as a pressing problem for business angels.

Second, the study has positive implications for new or aspiring business angels as it shows that making investments and being active has a significant educational effect to investing, while years of business angel activity has no effect on either valuation or investment returns. In other words, any active business angel can receive profitable returns.

Third, as high returns for business angels generally correlate to high returns for entrepreneurs, this study implicates that entrepreneurs should be ready to receive funding at low valuations in the first funding rounds if they want to maximize their financial returns from the complete life-cycle of the venture. High valuations in the early stages may block future funding rounds. On the other hand, a too low valuation dilutes the founders' ownership of the venture, which decreases the attractiveness of the venture in subsequent funding rounds.

The findings have one major implication for Finnish policy-makers. The evidence shows that business angels learn by actively making investments, building a portfolio and ultimately exiting companies. As business angels gather experience and learn, their returns increase, which is a key indicator of a vibrant startup ecosystem that creates economic growth and attracts international funding. The findings support the argument that the institutional environment in Finland should motivate business angels to make as many investments as possible in unquoted startups. The present capital gain taxation for business angels varies between 30-34 %, which is higher than for other forms of investing in Finland. The taxation structure thus decreases the attractiveness of angel investing compared to other forms of investing and does not encourage business angels to make new investments in unquoted companies. The recent move to reduce the capital gain taxation of investments in publicly listed companies through a special securities account could, for example, be expanded to also include investments in unlisted companies. The Seed Enterprise Investment Scheme (SEIS) in UK provide another successful benchmark for offering tax efficient benefits to business angels that boost national economic growth.

5.3 Reliability and validity

In this study, the reliability of the results mainly concern whether the variables consistently quantify the intended outcome. The first dependent variable, pre-money valuation, is a consistent, widely used metric for quantifying the value of a venture. Thus, the results considering pre-money valuation can be reliable. The second dependent variable, investment returns measured by both return multiple and IRR, are also industry-wide performance metrics that assesses the financial performance of an investment. Hence, the results are replicable if the same dependent variables are being used. Further, the precision of the methods and the development of the independent variables are reported using the best of available resources. The same results should, in theory, be reproducible by anyone with access to the same data. The variables used in this study do not constitute any limitations for the replicability of the study.

The main concerns in terms of reliability is posed by the availability of data on investment returns due to the voluntary nature of reporting. However, as was done

in this study, the existence of potential selection bias in the sample can be accounted for using statistical methods. Therefore, the availability of data should not pose a threat to the reliability of the results of this study.

The internal validity of this study is supported by the choice of independent and control variables, which have been used in similar studies to quantify business angel experience and company characteristics (Collewaert and Manigart, 2016). However, the valuation process and investment returns of business angel investing are complex processes influenced by many societal, human, economical and institutional factors. Consequently, sources of possible endogeneity most likely exist and internal validity cannot be confirmed.

The external validity of this study is subject to three sources of risk. First, the concern for sample selection bias is identified in section 3.3.4 and an attempt is made to account for it using verified statistical methods. Second, the concern for time dependency is valid in this study. Even though the study spans eight years, this time period saw a sharp increase in the popularity and maturity of the business angel market in Finland. As the practices of business angel investment in Finland is in a state of development, it is possible that future studies might lead to different results.

Finally, the institutional setting of the study constitutes a final risk for the external validity of this study. Finland is rather similar to other European countries (eg. Belgium, Denmark and Austria) in terms of socioeconomic indicators such as entrepreneurship rate, high-growth enterprises rate and business expenditure on R&D (Eurostat, 2021), which provide external validity to the study. However, with regards to the Finnish angel market in specific, the scarce information that is available suggests that the institutional setting of business angel investing in Finland differs from many other European countries. In Finland, business angels do not have access to any tax incentives and are thus taxed on their business angel investments in the same way as on all capital gains. This significantly decreases the attractiveness of business angel investing in relation to other types of investing in Finland.

5.4 Limitations

This study is not without its limitations. First, business angel investing is highly influenced by the institutional setting of the country in which the investments are made. As the scope of this study was limited to Finland and given the unfavourable tax incentives of business angel investing in Finland, the results may not be directly generalizable to other regions. Given the higher degree of development in the UK and US compared to Finland, this might be particularly true for these markets. It would be interesting to replicate and expand this research in other institutional settings.

One of the largest current changes in the angel market is the increased syndication activity (Mason et al., 2019). This implies that the valuation negotiation dynamics changes from a two-party negotiation process (the investor on one side and the entrepreneur on the other) to a setting that resembles a three-party negotiation process: the lead investor, who takes the primary responsibility for negotiating the terms, the entrepreneur and the passive investors, who communicate through the lead investor. In this setting, the experience of the lead investor might have

a disproportionate effect on the valuation and the investment returns. Since this study considers every deal individually, not accounting for syndication activity is a limitation of this study.

As previous research shows that human and social capital of the founders of a venture are positively related to the valuation of a venture (Hsu, 2007), not accounting for these variables in this study provides a potential endogeneity problem. This limitation biases the effect of the business angels' experience on valuation upwards relative to the actual influence. This bias is particularly relevant in early-stage startups, where the human and social capital of the founders have not yet translated to more tangible measures of success, such as revenue or profit.

The methodology of this study is open to three potential sources of bias. First, there may be a problem with selection bias, even though statistical methods are used to counteract this problem. For example, business angels that have been very active or made profitable exits may be more inclined towards reporting their investment activity in the voluntary survey. Business angels that actively follow FiBAN:s communication channels and participate in activities are also more inclined to answer the survey, which means that the responses might be inherently biased towards active business angels. However, this is difficult to test due to the lack of information on the investment activities of nonrespondents, but statistical methods, like the Heckman model, can be used to compensate for this bias. Second, even though FiBAN is the only angel network in Finland and one of the largest in Europe, the business angels that choose to be a member of FiBAN may not be typical of the overall population of business angels. The invisible part of the angel market is, by definition, difficult to account for, and might even be unknowable (Wetzel, 1983). Third, the use of self-reported data comes with concerns. The main concern regards the ability of respondents to accurately recall the financial details of their investments made months ago: the survey is sent out in early spring and asks respondents to report on their activity during the previous calendar year. A final concern originates in the trait of humans to desire to present themselves in favourable light, which might lead respondents to exaggerate their successes and downplay their failures.

5.5   Avenues for future research

Based on the results and limitations of this study, there are several avenues for future research. First, replicating this study in a different institutional setting would be interesting to test the validity of the results. More specifically, it would be interesting to understand the effect of different institutional settings on investment returns of business angel investing. Presumably, tax incentives and other institutional initiatives that increase the attractiveness of business angel investing would benefit the early-stage startup ecosystem, but the nature and implications of such incentives is poorly understood in Finland.

Second, following the discussion of syndication activity and the professionalization of angel investing, the effect of syndication on valuation and investment returns require more understanding for practitioners to be able to adopt an exit-centric approach to investing. This study provide explanatory variables for valuations and

investment returns along the business angel experience dimension, while syndication activity would provide a complementary dimension. How does syndicates form? What characteristics of a syndicate drive valuations and investment returns? How should business angels investing in a syndicate approach the valuation negotiation for optimal financial benefit?

Third, as in previous research made on valuation in business angel and venture capital deals (eg. Collewaert and Manigart (2016); Heughebaert and Manigart (2012)), the contractual data observed in this study were limited to valuations. Normally, the shareholder agreement contains a broad array of clauses (Kelly and Hay, 2003). Therefore, there might be a trade-off between higher valuations and stricter contract terms in the shareholder agreement that this study was unable to observe. It would require further research to investigate the effects of other contract terms on valuation and, more interestingly, investment returns. From an exit-centric approach to investing, which contract terms positively affects the investment returns for the investor? From a financial perspective, do these terms create a win-win, win-lose or lose-lose relationship between the investor and the entrepreneur?

Fourth, from a practitioner point of view, it would be interesting to understand the effect of the founder's equity stake on the success rate of raising subsequent funding rounds from professional VCs. This study shows that entrepreneurs should accept low valuations in the first funding rounds for optimal financial returns, but how low? Ventures where founders' equity stakes are highly diluted after the first round are hardly attractive for later stage investors.

Finally, this study suggests that different types of experience have different effects on how business angels appropriate value from their investments. It would be interesting to understand the underlying mechanics of why, for example, business angels who have done many investments value their startups higher while those who have done exits value their startups lower. What kind of expectations does business angels have on investment returns at the time of investment? How do they understand the valuation from an exit-centric point of view compared to those that have made many exits? Are business angels over-confident about their investments that changes as they experience more exits, which alters their approach to investing? What other factors drive this change of behaviour?

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A Individual effects of experience variables on valuation

Table A1: Regression analysis robustness check: The individual effect of number of investments made on valuation.

	Pre-money valuation
L Number of prior angel investments made	0.367***
	(0.000)
F-value	34.58
R-squared	0.0461
N	1009

p-values in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.0001$

Table A2: Regression analysis robustness check: The individual effect of number of exits on valuation.

	Pre-money valuation
L Number of prior business angel exits made	0.114
	(0.124)
F-value	2.375
R-squared	0.00344
N	1009

p-values in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.0001$

B   Individual effects of experience variables on IRR

Table B1: Regression analysis robustness check: The effect of the control variables on IRR.

	IRR
L Revenue	0.0901**
	(0.004)
L Company age	-0.546**
	(0.006)
L Size of funding round	0.138
	(0.485)
Initial or follow-on investment	-0.796
	(0.104)
F-value	4.853
R-squared	0.170
N	49

p-values in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.0001$

Table B2: Regression analysis robustness check: The effect of pre-money valuation on IRR.

	IRR
L Pre-money valuation	-0.152
	(0.273)
F-value	1.242
R-squared	0.0303
N	49

p-values in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.0001$

Table B3: Regression analysis robustness check: The effect of education on IRR.

	IRR
Education degree	1.365
	(0.137)
F-value	2.316
R-squared	0.133
N	49

p-values in parentheses
$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.0001$

Table B4: Regression analysis robustness check: The effect of number of companies founded on IRR.

	IRR
L Number of companies founded	-0.213
	(0.726)
F-value	0.125
R-squared	0.00848
N	49

p-values in parentheses
$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.0001$

Table B5: Regression analysis robustness check: The effect of number of years as business angel on IRR.

	IRR
L Years of business angel experience	0.0536
	(0.770)
F-value	0.0865
R-squared	0.000939
N	49

p-values in parentheses
$^+$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.0001$

Table B6: Regression analysis robustness check: The effect of number of prior business angel investments on IRR.

	IRR
L Number of prior angel investments made	0.660
	(0.102)
F-value	2.823
R-squared	0.0737
N	49

p-values in parentheses
[+] $p < 0.10$, [*] $p < 0.05$, [**] $p < 0.01$, [***] $p < 0.0001$

Table B7: Regression analysis robustness check: The effect of portfolio size on IRR.

	IRR
L Number of portfolio companies	0.0433
	(0.898)
F-value	0.0168
R-squared	0.000494
N	49

p-values in parentheses
[+] $p < 0.10$, [*] $p < 0.05$, [**] $p < 0.01$, [***] $p < 0.0001$

Table B8: Regression analysis robustness check: The effect of number of exits made on IRR.

	IRR
L Number of prior business angel exits made	0.586[**]
	(0.007)
F-value	8.199
R-squared	0.0743
N	49

p-values in parentheses
[+] $p < 0.10$, [*] $p < 0.05$, [**] $p < 0.01$, [***] $p < 0.0001$

Table B9: Regression analysis robustness check: The effect of lead investor experience on IRR.

	IRR
Lead investor experience	0.833
	(0.120)
F-value	2.538
R-squared	0.0621
N	49

p-values in parentheses
[+] $p < 0.10$, [*] $p < 0.05$, [**] $p < 0.01$, [***] $p < 0.0001$

Table B10: Regression analysis robustness check: The effect of full time angel activity on IRR.

	IRR
Full time angel	-0.437
	(0.353)
F-value	0.887
R-squared	0.0157
N	49

p-values in parentheses
[+] $p < 0.10$, [*] $p < 0.05$, [**] $p < 0.01$, [***] $p < 0.0001$