



Amateur vs. professional investors' decision making in equity crowdfunding in Mexico

Toma de decisiones de inversionistas profesionales y amateurs en el fondeo colectivo con capital en México

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Abstract

Amateur and professional investors co-invest in nascent companies via the largest equity crowdfunding platform in Mexico, PlayBusiness. However, little is known about investment criteria that drive backers to invest in a venture, and whether the two groups of investors exhibit differences in decision-making. Based on past research on the investment behavior of investors, the study explores the extent to which three major factors impact their investment decisions. Data from 238 investors show that CERTIFICATION plays a significant role. However, MANAGEMENT TEAM and BUSINESS POTENTIAL are not quite relevant for decision-making. Within the factor CERTIFICATION, we found investors assign different importance to criteria, suggesting amateur and professional investors evaluate investment opportunities differently. Outside CERTIFICATION, amateur investors praise the importance of team-related aspects, whereas professional investors assign a higher weight to financial aspects of the project, suggesting differences in information processing and decision-making between types of investors.

JEL Code: D26, D81, L26

Keywords: business angel; crowd investor; decision-making; equity crowdfunding; investment criteria

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Resumen

Inversionistas amateurs y profesionales coinvierten en empresas nacientes a través de la plataforma de fondeo colectivo con capital más grande en México, PlayBusiness. Sin embargo, poco se sabe sobre los criterios de inversión que usan los capitalistas, y si los dos grupos de inversionistas muestran diferencias en la toma de decisiones. Basado en investigaciones anteriores sobre la forma de invertir de estos inversionistas, el estudio explora la medida en que tres factores principales EQUIPO DIRECTIVO, POTENCIAL DE NEGOCIO y CERTIFICACIÓN afectan sus decisiones de inversión. Datos de 238 inversionistas muestran que la CERTIFICACIÓN juega un papel importante. Sin embargo, el EQUIPO DIRECTIVO y el POTENCIAL DE NEGOCIO no son del todo relevantes para la toma de decisiones. Los resultados sugieren que inversionistas amateurs y profesionales evalúan las oportunidades de inversión de manera diferente, y que además procesan la información y toman decisiones de forma particular.

Código JEL: D26, D81, L26

Palabras clave: inversionista ángel; inversionista amateur; toma de decisiones; fondeo colectivo con capital; criterios de inversión

Introduction

Equity crowdfunding allows a multitude of investors with little investment knowledge to support the development of nascent companies. These individuals contribute small amounts of money for fractions of ownership in the recently created businesses (Estrin et al., 2018). This emerging entrepreneurial financing scheme supports firms that lack collateral and financial history to access traditional sources of financing (Kim & De Moor, 2017), and is becoming increasingly relevant in the funding of new ventures in Mexico. The potential to create an entirely new capital market to fund innovative ventures is disrupting the seed-stage capital market and its actors, remarkably business angels (Wiencke et al., 2019).

Business angels are professional investors who back start-ups with capital. They make investment decisions after extensive due diligence that includes face-to-face interviews with entrepreneurs and their management teams (Sudek, 2006). Business angels, once they invest in the company, contribute to the development of the company by closely monitoring its operations (Carpentier & Suret, 2015). Contrary to professional investors, individuals who invest on equity crowdfunding platforms, the crowd investors, are an imprecise group of mostly amateur investors, with limited experience, and different motives for investing in new ventures (Agrawal et al., 2014). The literature commonly depicts them as ill-informed (Estrin et al., 2018), with limited means, and with no time to discern low-quality firms from high-quality firms (Cumming et al., 2021; Walthoff-Borm et al., 2018). Since equity crowdfunding is an alternative source of entrepreneurial financing that competes with business angels, we find professional

investors investing in online funding campaigns alongside amateur investors (Shafi, 2021; Wang et al., 2019). However, we know little about how these backers make investment decisions on online platforms.

Investing in new ventures is demanding. Innovative ventures are risky, and the selection of high-quality new ventures presents severe asymmetric information problems between founders and funders (Kleinert & Volkmann, 2019). Avoiding investments in low-quality or fraudulent startups becomes a challenge. Distinct types of professional funders such as bankers, venture capitalists, and business angels look at business opportunities from different perspectives. Bankers emphasize the financial aspects of the investment. Venture capitalists stress market and financial issues, while business angels highlight the suitability of the entrepreneur (Mason & Stark, 2004). The literature documents the differentiation between amateur and professional investors. It has been found that professional investors when dealing face-to-face with founders rely on criteria related to the top management team such as its human capital (Barbi & Mattioli, 2019), its industry experience (Carpentier & Suret, 2015), and founders' commitment and integrity (Maxwell et al., 2011). They also rely on criteria related to the business potential, such as operating revenue and growth (Sudek, 2006), and its profitability, business value, and investment exit opportunities (Harrison & Mason, 2017). Meanwhile, contrary to professional investors, amateur investors in equity crowdfunding focus on aspects most related to crowd participation such as the funding goal, the number of backers, and the campaign duration (Lukkarinen et al., 2019), crowd bias (Martinez-Gomez et al., 2020), discussion boards (Kleinert & Volkmann, 2019), and signaling (Ahlers et al., 2015).

Today, both amateur and professional investors concur in equity crowdfunding, and thus the importance of further understanding about criteria used by professional investors and their investment behavior on online platforms. The present research focuses on people investing in equity crowdfunding and their investment behavior. What are the relevant investment criteria in equity crowdfunding? Are there differences in the investment decision-making among amateur and professional investors concurring in crowdfunding? We believe that insights on funding criteria and behaviors will better inform the design of online campaigns and the structuring of new business opportunities and will stimulate the funding of new ventures.

The depiction of the crowd investor in the literature portrayed as a non-professional investor simplifying investment decisions, the low stake involved in equity crowdfunding investments, and the importance of the behavior of the crowd in decision-making hint that investment decisions in equity crowdfunding may not be entirely rational. Based on literature-supported investment criteria, bounded rationality theory assumes that individuals do not always take part in extensive information gathering and cognitive processing to identify optimal choices (Simon, 2000), and signaling theory is used for describing behavior in situations where two parties have access to different information (Connelly et al., 2011), this research examines the weights both types of investors, amateur and professional, place on three defined

factors or dimensions of investment criteria, and the investment behavior of both types of investors when making investment decisions. Two of the used dimensions receive the most attention in the literature: MANAGEMENT TEAM¹ (also known in the literature as “The Jockey”), referring to the capability of the people driving the development effort of the new venture, and BUSINESS POTENTIAL (also known in the literature as “The Horse”), the profitability and growth potential of the venture to become a big company (Harrison & Mason, 2017; Kaplan et al., 2009; Mitteness et al., 2012; Shafi, 2021). A third category, CERTIFICATION, is proposed for this study because the cost of performing due diligence is high and the crowd investor benefit is low (Agrawal et al., 2014). As used in other studies, this latter dimension comprises new venture milestones accomplished to date and recommendations made by third parties (Ahlers et al., 2015; Kang et al., 2016; Kleinert et al., 2020; Ralcheva & Roosenboom, 2020).

Most of the research on equity crowdfunding investment decision-making commonly relies on data provided by online platforms and projects. Characteristics of successful and unsuccessful campaigns and investment projects are used by researchers to study investment selection and investor behavior in equity crowdfunding (see for example research based on data from campaigns in Correia et al. (2019), Lukkarinen et al. (2016), Martinez-Gomez et al. (2020), Ralcheva and Roosenboom (2020), and Shafi (2021), and research based on data from investment projects in Kleinert et al. (2020)). For the present study, data were collected directly from investors of the largest equity crowdfunding in Mexico to differentiate investment decisions among amateur and professional investors. An online survey was directly sent to investors on the platform, and 238 of them took part in the survey. Eleven commonly used investment criteria were used to collect the views of investors (Astebro et al., 2019; Barbi & Mattioli, 2019; Correia et al., 2019; Gompers et al., 2020; Harrison & Mason, 2017; Maxwell et al., 2011; Mitteness et al., 2012; Mohammadi & Shafi, 2018; Mollick, 2014; Piva & Rossi-Lamastra, 2018; Signori & Vismara, 2018; Wessendorf et al., 2019). The Likert-type statements started with “I invest in the company because ...” followed by the investment criteria.

Investment criteria were pre-grouped into the two dimensions regularly used by professional investors: the MANAGEMENT TEAM and the BUSINESS POTENTIAL as found in (Harrison & Mason, 2017; Kaplan et al., 2009; Mitteness et al., 2012). A third proposed category CERTIFICATION was further incorporated in the study to account for signals related to the quality of the venture, including recommendations from trusted third parties and the venture’s achievement to date. Signaling has been extensively used in past research to study investment decisions in equity crowdfunding (Ahlers et al., 2015; Block et al., 2018; Kleinert et al., 2020; Piva & Rossi-Lamastra, 2018; Vismara, 2016). These three

¹ For clarity purposes, throughout the document, we use SMALL CAPS to refer to factors or dimensions, and italics to refer to investment criteria used in the analysis.

dimensions were validated by factor analysis, and logistic regression models were used to understand the importance of the dimensions and individual investment criteria in the investor's decision-making process.

Our results show that is neither "The Horse," - the business potential of the investment opportunity -, nor "The Jockey," - the management team driving the venture development effort- the important condition upon deciding whether to invest in a specific venture, but the certification signals available for prompt decision-making. Amateur and professional investors rely on different certification criteria to make investment decisions. Finally, based on signaling and bounded rationality theory, it can be argued that the results suggest amateur investors seek easier-to-evaluate criteria related to the management team, and professional investors analyze conditions that demand more cognitive resources related to financially attractive investments.

We believe that our study offers a deeper and more precise understanding of the decision-making of professional and amateur investors in equity crowdfunding in Mexico and complements previous research on the investment decisions of amateur and professional investors around the world.

Literature review and hypothesis development

Our literature review focuses on the investment decision-making of amateur and professional investors to understand the differences between these two types of investors when deciding which venture to back in equity crowdfunding. We discuss investment criteria and behavioral decision-making theories.

Investment criteria

Three major dimensions of investment criteria stand out in the literature that investors consider when investing in newly created companies. Two of the dimensions are the management team driving the growth of the business, and the potential of the business to become a large company. These two dimensions are used to understand what professional investors consider when investing in a new venture, such as venture capitalists (Kaplan et al., 2009) and business angels (Mitteneß et al., 2012). The third category includes signals that certify the quality of the venture and that are commonly studied in equity crowdfunding (Ahlers et al., 2015).

The MANAGEMENT TEAM is key to the performance and success of a new venture (Eisenhardt, 2013). The human capital of the team is the most important selection criterion for professional investors (Barbi & Mattioli, 2019). In equity crowdfunding, investors place great value in business education and entrepreneurial experience (Piva & Rossi-Lamastra, 2018), and in the team experience in the industry in which the venture operates (Carpentier & Suret, 2015). Several empirical studies highlight the correlation

between experience and education and funding success (Barbi & Mattioli, 2019; Mitteness et al., 2012). Team size and team composition are also important criteria for investors. Investors perceive the size of the team is as a signal of the venture's ability to cope with market uncertainty (Vismara, 2016). Experimental studies highlight that the number of team members is positively related to the venture's funding success (Correia et al., 2019). Having diverse functional experience within the team makes a venture more attractive to external investors (Vismara, 2016), and gender diversity plays a role in characterizing more successful campaigns (Barbi & Mattioli, 2019). Last, founders' motivation and commitment are also strongly related to fundraising success (Shafi, 2021).

Equity investments in entrepreneurial ventures are a risky form of investing because it is challenging to assess reliably their BUSINESS POTENTIAL and future performance (Signori & Vismara, 2018). The attributes related to business potential are the size of the market, its growth, and the venture's financial attractiveness considered in its business model (Angerer et al., 2017). The size of the market informs the attainable market by the venture and the venture's growth potential (Lukkarinen et al., 2016). A promising growth potential affects the financial return for investors, and the financial return rate is a major incentive for investors to fund a new venture (Cholakova and Clarysse, 2015). Evaluating growth potential is subjective, and more dependent on qualitative measures related to the founder than on quantitative measures such as revenues, but just as crucial to making good investment decisions. When an investor buys the equity of a venture, he or she believes the venture has strong growth potential. Investors seek businesses that show growth potential and have a management team with the capability to realize that potential (Feeney et al., 1999). The financial aspect of the business opportunity is also used by investors to decide whether to invest in a venture. Despite different motives for investing in equity crowdfunding, investors seek future potential financial returns and thus are financially motivated (Cholakova & Clarysse, 2015). The venture's ability to generate future cash flows and the business valuation dominate the investor's decision to become a shareholder (DeGennaro & Dwyer, 2014). The valuation of early-stage ventures represents a difficult and often subjective process characterized by risk and uncertainty (Wessendorf et al., 2019). In equity crowdfunding, even when investors can value the business, they cannot negotiate the valuation (Kleinert & Volkmann, 2019), thus a need for investors to seek information elsewhere to address the financial attractiveness of the project.

The third and last category, CERTIFICATION, plays an important role in equity crowdfunding and is even considered as an important determinant of funding success in equity crowdfunding (Ralcheva & Roosenboom, 2020). It is difficult to distinguish between low- and high-quality opportunities in equity crowdfunding because of stressed information asymmetries (Vismara, 2016). Thus, investors rely on effective signals from accredited external agents to provide a business with legitimacy and to certify the quality of the firm (Megginson & Weiss, 1991). Previous studies found that ventures that get funded by

professional investors, secure grants, and make use of experts, advisors, and mentors experience greater funding success (Ralcheva & Roosenboom, 2020). In the absence of reliable recommendations from third parties, the approval signals sent by the crowd become essential for investment decision-making. To save efforts to process information of a particular investment, investors in equity crowdfunding rely on the decisions of others. This herding behavior is a notable feature of collective investment markets (Colombo & Franzoni, 2015). Literature highlights the importance that the company achieves certain goals or milestones which have the effect of certifying the quality of the business that it is being developed (Ahlers et al., 2015). Quality cues, such as the venture having a finished product, prior funding achieved by the venture, and venture with actual sales influence funding decisions and determine funding success (Mollick, 2014). Operating sales show the commercialization of the company's goods or services and are therefore an important milestone for investors (Mollick, 2014). Raising more money for the next milestones is justified only when milestones are reached by the company (Mochkadi & Volkmann, 2020). Companies that send signals of certification are more likely to be successful in funding campaigns (Ralcheva & Roosenboom, 2020).

Because the three dimensions are relevant in the extant equity crowdfunding literature, we expect:

Hypothesis 1: Professional and amateur investors in equity crowdfunding use selection criteria related to MANAGEMENT TEAM, BUSINESS POTENTIAL, and CERTIFICATION when deciding on which venture to invest.

Because professional investors have more experienced than amateur investors, we expect that they rely on different criteria when deciding on which venture to invest.

Hypothesis 2: Professional and amateur investors in equity crowdfunding use different investment criteria when deciding on which venture to invest.

Behavioral decision-making

We rely on behavioral theories of decision-making as our theoretical framework to better understand how equity crowdfunding investors make investments. Investors in equity crowdfunding back new ventures with large information asymmetries inherent to entrepreneurial finance (Ralcheva & Roosenboom, 2020), and with limited information about the quality of the venture (Vismara, 2016). Potential investors seek to evaluate the unobserved venture quality by inferring from credible quality signals sent by entrepreneurs and venture attributes (Connelly et al., 2011), and by third parties (Kleinert et al., 2020). The ability of the venture to signal high quality to potential investors is important in acquiring finance (Vismara, 2016). The theory of certification introduces the role of effective signals that address adverse selection problems

by certifying the quality of the venture (Megginson & Weiss, 1991). Certification and signaling theory are related (Megginson & Weiss, 1991). Signaling theory is used to resolve the large information asymmetries inherent to purchasing equity in a venture (Ralcheva & Roosenboom, 2020). According to the signaling theory, certain quality cues are effective at conveying high quality to potential investors and increasing the likelihood that the venture successfully raises capital (Vismara, 2016). The signaling effect is stronger when less information about the quality of the venture is available, and when ventures appear more uncertain (Kleinert et al., 2020).

Signaling comprises a signaler sending quality signals to a receiver who observes and interprets the signals, chooses a person, product, or firm, and sends feedback to the signaler (Connelly et al., 2011). According to modern financial theory, a professional investor faced with an investment decision engages in a rational decision-making process. The rational process seeks to optimize the investment decision and comprises several stages involving analysis that require a lot of information and demands time (Paul et al., 2007). In equity crowdfunding, however, the crowd investor is characterized as an amateur investor backing ventures for the first time, with motives for investing in equity crowdfunding other than financial (Estrin et al., 2018), and becoming a venture's stakeholder with small ticket sizes (Block et al., 2018). These characteristics advance the view that decision-making in equity crowdfunding may not be entirely rational. The investor who invests in online platforms rather seeks to save time when making investment decisions, simplifying investment strategies, and using shortcuts (Shafi, 2021). Utility maximization is replaced by satisfaction (Kahneman, 2003). Investors seek to reduce analysis time and the cost of the decision by using simple general rules that simplify decision-making and avoid cognitive overload induced by complex choices (Hervé et al., 2019). As a coherent alternative framework to the utility maximization process, we too rely on the theory of bounded rationality (Simon, 2000), and on heuristic behavior to understand the decision-making of investors in equity crowdfunding. Simon's proposition is that people satisfy rather than optimize decision-making, so the chosen decision path is one that satisfies the most important needs of the investor despite the decision being optimal, ideal, or appropriate. The theory of bounded rationality is important in the development of behavioral finance and is used to explain investment behavior in equity crowdfunding (Shafi, 2021). The theory of bounded rationality assumes that the information available to investors and the cognitive limitations of their minds constrain the rationality of individuals (Simon, 2000). Bounded rationality is a more relaxed version of standard expected utility theory and is also more realistic than its traditional counterpart, as it incorporates the limitations of human judgment.

Signaling theory implies that informational cues are noticed and appreciated consistently by investors. We argue that this may not be the case in equity crowdfunding, where amateur and professional investors coexist. Certain information cues may be less likely to be acted upon by amateur and professional

investors. In addition, investors in equity crowdfunding rather seek to save time when making investment decisions, to simplify investment strategies, and use shortcuts (Shafi, 2021). When people must decide, especially decisions with uncertain outcomes, they rely on heuristics (Kang et al., 2016). The study by Harrison et al., (2017) reveals differences between the speed with which decisions are made and the emphasis given to different investment criteria by different types of investors. Amateur investors will explore criteria that require less cognitive capacity, seeking to reduce the time to decide which venture to fund, and professional investors will rely on criteria like the ones they use outside online platforms. Therefore, we propose the following hypothesis:

Hypothesis 3: The very nature of amateur and professional investors makes them behave differently among themselves when investing in equity crowdfunding ventures.

Data and method

Sample

We chose Mexico City as the site of this empirical investigation because it represents the leading equity crowdfunding market in Mexico. To gather the data required for this research, a survey of equity crowdfunding investors was conducted in cooperation with the largest equity crowdfunding platform in Mexico. The platform has a pure equity crowdfunding model with small ticket sizes and crowd participation. Respondents can therefore ensure a strong representation of investments in equity crowdfunding. As of 2021, the platform informed over 30,000 investments.

Instead of trying to discover investors' preferences based on the results of investment campaigns, investors were asked to reveal their investment preferences. Individuals who already invested in equity crowdfunding projects were invited to take part in the survey. Participation was entirely voluntary. We designed an online survey that was pretested with 20 investors and consequently adapted to reflect the needs of the target audience. The survey structure and related variables are shown in Table 1. The survey captures the feelings and beliefs of investors when selecting investments through the respondents' self-reporting. 11 investment criteria were used to study the willingness of investors to invest in a new venture. Participants reported the relevance of each criterion in making an investment decision. All the 11 measures use a five-point Likert-type response format, with "strongly disagree" and "strongly agree" as the anchors to reduce the common method bias. In addition, general investors' characteristics were collected for control.

Table 1
 Survey structure and related variables

Question / Statement	Related Variable
How many new ventures have you funded via this online platform?	returning investor
I invest in the venture because ...	
... the venture has a finished product.	<i>finished product</i>
... I perceive that there is a large market for its product.	<i>market size</i>
... the team can grow the venture.	<i>capable team</i>
... the venture makes financial sense.	<i>financially attractive</i>
... the entrepreneur founded another business in the past.	<i>serial entrepreneur</i>
... the venture operates in a certain industry.	<i>type of business</i>
... I see many people investing in the venture.	<i>crowd participation</i>
... the venture has sales.	<i>venture with prior sales</i>
... the venture raised capital in the past.	<i>prior financing</i>
... the management team has two or more founders.	<i>team size</i>
... one founder has experience in the industry.	<i>industry experience</i>
Investor's Profile	
How old are you?	age
What is your gender?	gender
What is your maximum level of studies?	education level
Have you created your own business in the past?	former entrepreneur
What is the name of the city where you live?	lives in Mexico City
What is the primary motivation for investing in equity crowdfunding?	financial motivation
Are you a business angel?	type of investor

Note: Investors responded to 11 items using a five-point Likert scale ranging from 1 = "Totally Disagree", 2 = "Disagree", 3 = "Not Agree nor Disagree", 4 = "Agree" to 5 = "Totally Agree".

The platform invited one-third of the 2,000 registered investors randomly with at least one venture funded to take part in the survey. The platform sent by e-mail to each investor a link to the online survey. The participants completed the survey online. In the five-week survey period, 238 usable questionnaires were received, representing a 31% response rate.

Variables

Our dependent variable is returning investor (Astebro et al., 2019). It is a dichotomous variable equal to one if the investor has invested in over one venture using the platform and zero otherwise. 76% of investors in our sample are returning investors.

We used 11 investment criteria commonly referred to in the literature. Each criterion represents an exploratory variable. Four independent variables are related to the dimension MANAGEMENT TEAM: *industry experience* (Barbi & Mattioli, 2019; Mitteness et al., 2012), the working experience of team members in the industry in which the venture operates; *serial entrepreneur* (Kleinert et al., 2020), founders of venture created ventures in the past; *capable team* (Correia et al., 2019), the ability of the team to

develop the company; and team size (Martinez-Gomez et al., 2020; Wessendorf et al., 2019), the number of members in the top management team. Two other independent variables are grouped in the dimension of BUSINESS POTENTIAL: market size (Maxwell et al., 2011; Piva & Rossi-Lamastra, 2018), the addressable market that relates to a venture's growth potential; and financially attractive (Maxwell et al., 2011), the venture's capability to generate economic returns. The other five independent variables correspond to the dimension CERTIFICATION: crowd participation (Martinez-Gomez et al., 2020), the number of investors taking part in a funding campaign; prior financing (Barbi & Mattioli, 2019; Kleinert et al., 2020), whether the venture received debt or equity funds in the past; venture with prior sales (Correia et al., 2019), venture generating income from sales of a product or service; type of business (Harrison & Mason, 2017), the industry or segment in which the venture operates; and finished product (Lukkarinen et al., 2019), venture with a marketable product.

We use several control variables that are potentially correlated with the financing decision. The control variables refer to investors' characteristics. We consider the most frequently used demographic characteristics in the literature. The variable age is how old the investor is in years. The variable gender is a dichotomous variable and represents whether the investor is male (=1) or female (=0). Investors registered their highest level of education achieved at the variable education level and were coded ranging from 0=" No Degree", 1=" Bachelor's Degree", 2=" Master's Degree", 3=" Ph.D. Degree" to 4=" Post-Doctoral Degree". In addition, we looked at whether the investor had been an entrepreneur, whether he lived in Mexico City, and whether his primary motivation for investing in crowdfunding was financial. The variable former entrepreneur is one if the investor created a company in the past, and zero otherwise. If the investors live in Mexico City, the dummy variable lives in Mexico City is one, otherwise is zero. The dichotomous variable financial motivation is one if the investor's primary motivation is financial, and zero otherwise. Finally, we asked investors whether they were business angels. Those self-reporting that they were business angels are considered professional investors in our study. The variable type of investor is 1 if the investor is professional and 0 if the investor is amateur.

Table 2 shows the descriptive statistics for the full sample (N = 238) and grouped by amateur (N = 126) and professional (N = 112) investors. On average, investors in new ventures are 33.4 years old with a range of 19-84 years old, are mostly male (84%), and with a bachelor's degree (57%) followed by a master's degree (34%). Most of the investors have entrepreneurial experience (59%) and live in Mexico City (43%), where the equity crowdfunding platform operates. 1% of investors are investing from abroad, and 58% of investors have a primary motivation to invest in new ventures other than financial. There were no significant differences between amateur and professional investors, but in one regard, their entrepreneurial experience. Professional investors have been entrepreneurs in a larger proportion than amateur investors ($p < 0.05$).

Table 2
 Descriptive statistics

Dimension / variable	All Investors N = 238		Amateur Investors N = 126		Professional Investors N = 112		t-test [MW- test]
	Mean [Median]	SD [IQR]	Mean [Median]	SD [IQR]	Mean [Median]	SD [IQR]	
returning investor	0.76	0.43	0.72	0.45	0.81	0.39	0.09*
MANAGEMENT TEAM	3.48	0.79	3.37	0.85	3.60	0.70	0.23**
industry experience	[4.00]	[2.00]	[4.00]	[2.00]	[4.00]	[2.00]	[0.00]
serial entrepreneur	[3.00]	[2.00]	[3.00]	[2.00]	[3.00]	[1.75]	[0.00]
capable team	[5.00]	[1.00]	[4.00]	[1.00]	[5.00]	[1.00]	[1.00]**
team size	[3.00]	[2.00]	[2.00]	[2.00]	[3.00]	[1.00]	[1.00]
BUSINESS POTENTIAL	4.50	0.59	4.45	0.63	4.56	0.54	0.11
market size	[5.00]	[1.00]	[5.00]	[1.00]	[5.00]	[1.00]	[0.00]
financially attractive	[5.00]	[1.00]	[5.00]	[1.00]	[5.00]	[1.00]	[0.00]
CERTIFICATION	3.03	0.78	3.02	0.78	3.05	0.78	0.03
crowd participation	[3.00]	[2.00]	[3.00]	[2.25]	[3.00]	[2.00]	[0.00]
prior financing	[3.00]	[2.00]	[3.00]	[2.00]	[3.00]	[2.00]	[0.00]
venture with prior sales	[4.00]	[2.00]	[4.00]	[2.00]	[4.00]	[2.00]	[0.00]
type of business	[3.00]	[2.00]	[3.00]	[2.00]	[3.00]	[2.00]	[0.00]
finished product	[2.00]	[2.00]	[2.00]	[2.00]	[2.00]	[2.00]	[1.00]
Investor's Profile							
age	33.38	8.56	33.85	8.95	32.86	8.10	-0.99
gender	0.84	0.37	0.83	0.37	0.85	0.36	0.02
education level	1.30	0.67	1.28	0.63	1.32	0.71	0.04
former entrepreneur	0.59	0.49	0.52	0.50	0.66	0.48	0.14**
lives in Mexico City	0.43	0.50	0.40	0.49	0.46	0.50	0.06
financial motivation	0.42	0.49	0.44	0.50	0.39	0.49	-0.05

Note: Values for Likert-type variables are in brackets. SD = Standard Deviation; IQR = Inter-Quartile Range; MW = Mann-Whitney; Differ. = Mean or median difference between groups, Professional - Amateur; ** p<0.05, *p<0.10.

The mean for the factor MANAGEMENT TEAM is significantly higher for professional investors (p<0.05), and the mean for the capable team in this factor is significantly higher for professional investors (p<0.05). However, there is no significant difference between amateur and professional investors in terms of BUSINESS POTENTIAL and CERTIFICATION and their related investment criteria. Table 2 shows that professional investors are classified as returning investors in a larger significant proportion than amateur investors (p<0.10).

Method

We present in Figure 1 the proposed research method that introduces the design of the study. The model emerged out of the observations of the theoretical part and illustrates the venture selection criteria as

independent variables and its relationship to the number of investments as a dependent variable. We discriminate between types of investors, amateur and professional, to discover investment decisions differences between the two groups of investors.

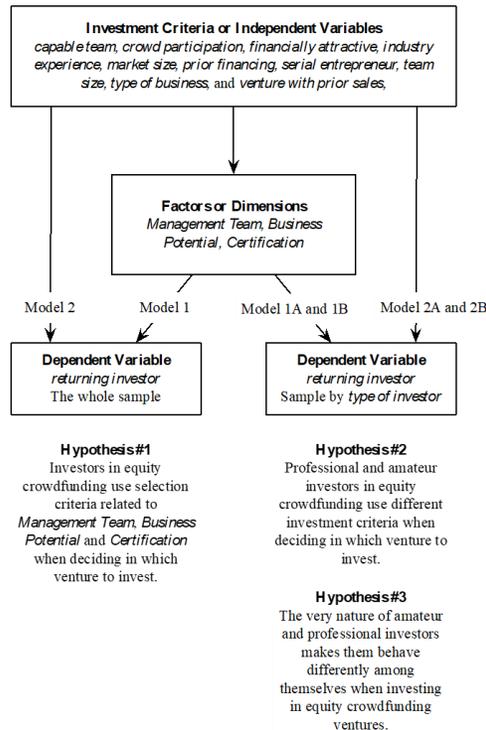


Figure 1. Research method. Model 1 considers factors and Model 2 relies on investment criteria. Both models are used to analyze the whole sample, and to test Hypothesis 1. Models 1A and 1B and models 2A and 2B are used to study the sample by type of investor, the letter A is for amateur investors and the letter B is for professional investors., and to test Hypothesis 2 and Hypothesis 3. Models 1A and 1B considers factors and models 2A and 2B uses investment criteria. In addition, all logistic regression models include all control variables.

Source: Own illustration.

An exploratory Factor Analysis using the principal components method and an orthogonal Varimax rotation with Kaiser normalization was conducted. Eleven selected Likert items encoded in the survey resulted in three major factors. Initial tests favored the adequacy of the factor analysis. The Composite Reliability Indices for the three factors exceeded the recommended threshold of 0.7. The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) was 0.76, above the commonly recommended

value of 0.6, suggesting that the sample was factorable. At the $p < 0.001$ level, Bartlett's test for sphericity was very significant. Table 3 shows that the three extracted components represent 50.2% of the total variance. The three-factor solution fits the original classification criteria derived from the literature review.

Table 3
 Exploratory factor analysis (N=238)

Original Variable	CERTIFICATION	MANAGEMENT TEAM	BUSINESS POTENTIAL
crowd participation	0.70		
prior financing	0.64		
venture with prior sales	0.65		
type of business	0.57		
finished product	0.56		
industry experience		0.76	
serial entrepreneur		0.69	
capable team		0.67	
team size		0.66	
market size			0.79
financially sound			0.69
Eigenvalues	2.89	1.45	1.20
Variance	19.95	18.60	11.60
Composite Reliability Index	0.76	0.78	0.71

Note: FactorsFor interpretative purposes, variables with factor loadings lower thanbelow 0.5 were suppressednot included in the report. Extraction method: Principal component analysis. Rotation Method: Varimax with Kaiser normalization.

Second, we used factors and investment criteria to run regressions to identify the weights assigned to each variable for the whole sample and for each type of investor to test our hypothesis. Models 1 and 2 are used to test Hypothesis 1 and include data from the whole sample. Models 1A and 1B are used to test Hypothesis 2 and include data for each group of investors, amateur and professional, respectively. Models 2A and 2B are used to test Hypothesis 3 and include data for each group of investors, amateur and professional, respectively. Models 1, 1A, and 1B use factors and all control variables. Models 2, 2A, and 2B use components and all control variables. All models use returning investor as the dependent variable.

Main results

Table 4 reports logistic regression coefficients of returning investor, including point estimates, and robust standard errors to account for assumption violations of homoscedasticity. Model 1 shows negative coefficients for the three factors MANAGEMENT TEAM, BUSINESS POTENTIAL, and CERTIFICATION. These results contradict the notion that higher ratings increase the number of investments. We attribute these

results to the lack of actual campaign data we can relate to the ratings of investors. Since our primary interest is understanding whether the two types of investors assign different importance to investment criteria rather than predicting whether an investor will invest in a venture, we should observe the significance of each factor and investment criteria to understand investment behavior. Model 1 reveals a significant coefficient for factor CERTIFICATION ($p < 0.01$). We find no evidence of significant coefficients for factors of MANAGEMENT TEAM and BUSINESS POTENTIAL. Model 2 includes for the factor MANAGEMENT TEAM the investment criteria of industry experience, team size, capable team, and serial entrepreneur. Among these, a capable team correlates significantly with return in investors ($p < 0.05$). We find no significant coefficients for industry experience, team size, and serial entrepreneur. Investment criteria of factor BUSINESS POTENTIAL, market size, and financially attractive, do not have significant coefficients. The highly significant factor CERTIFICATION includes prior financing, crowd participation, venture with prior sales, type of business, and finished product. The investment criteria prior financing and finished product have highly significant coefficients ($p < 0.01$) and the investment criteria type of business has a significant coefficient ($p < 0.05$). We find no significant coefficients for investment criteria crowd participation and venture with prior sales. The correlations between factors and investment criteria and returning investors show a similar pattern. Table 5 includes correlations among variables.

Table 4
 Logistic regression models for repeating investor - All investors

	Model 1		Model 2	
	β	SE	β	SE
Constant	1.78	1.80	2.22	2.22
MANAGEMENT TEAM	-0.05	0.24		
industry experience			0.36*	0.22
team size			-0.18	0.17
capable team			-0.61**	0.27
serial entrepreneur			0.21	0.18
BUSINESS POTENTIAL	-0.11	0.31		
market size			0.10	0.27
financially attractive			-0.21	0.26
CERTIFICATION	-0.77***	0.25		
prior financing			-0.52***	0.19
crowd participation			-0.16	0.17
venture with prior sales			-0.10	0.21
type of business			0.29*	0.16
finished product			-0.44***	0.16
Investor's Profile				
age	0.02	0.02	0.06**	0.03
gender	1.49***	0.41	1.39***	0.46
education level	0.19	0.25	0.15	0.26
former entrepreneur	0.02	0.35	-0.17	0.38
lives in Mexico City	0.75**	0.36	0.89**	0.39

financial motivation	-0.15	0.35	-0.35	0.38
Observations	238		238	
Pseudo R2	0.13		0.22	
LR Chi ²	32.70		58.32	

Note: β = Coefficient; SE = Standard Error; *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.10$. LR = Likelihood Ratio.

Table 5
Correlations Table – Factors and Investment Criteria

Dimension / variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 repeat investor	1.000														
2 CERTIFICATION	-0.232	1.000													
3 crowd participation	0.000	0.000	1.000												
4 prior financing	-0.164	0.671	0.011	1.000											
5 venture with sales	-0.208	0.691	0.001	0.361	1.000										
6 type of business	0.001	0.000	0.000	0.000	0.264	1.000									
7 finished product	-0.129	0.621	0.047	0.317	0.264	0.000	1.000								
8 MANAGEMENT TEAM	-0.004	0.647	0.949	0.293	0.298	0.271	1.000								
9 industry experience	-0.244	0.590	0.000	0.199	0.283	0.227	0.173	1.000							
10 serial entrepreneur	0.000	0.000	0.002	0.000	0.000	0.000	0.008	0.005	1.000						
11 capable team	-0.067	0.380	0.001	0.205	0.408	0.195	0.227	0.181	0.073	1.000					
12 team size	0.043	0.234	0.130	0.203	0.161	0.187	0.073	0.752	1.000						
13 BUSINESS POTENTIAL	0.506	0.000	0.046	0.002	0.013	0.004	0.263	0.000	0.442	1.000					
14 market size	0.010	0.325	0.174	0.368	0.175	0.183	0.143	0.747	0.442	0.000	1.000				
15 financially sound	0.881	0.000	0.007	0.000	0.007	0.005	0.028	0.000	0.000	0.000	0.000	1.000			
	-0.141	0.061	-0.029	0.118	0.001	0.054	0.046	0.574	0.363	0.184	1.000				
	0.030	0.351	0.654	0.068	0.988	0.404	0.479	0.000	0.000	0.004	0.004	1.000			
	-0.119	0.390	0.253	0.405	0.178	0.193	0.222	0.732	0.344	0.375	0.259	1.000			
	0.068	0.000	0.000	0.000	0.006	0.003	0.001	0.000	0.000	0.000	0.000	0.000	1.000		
	-0.057	0.106	0.031	0.058	0.157	0.066	0.041	0.170	0.167	0.142	0.152	0.039	1.000		
	0.381	0.103	0.632	0.377	0.016	0.313	0.532	0.008	0.010	0.029	0.019	0.551			
	-0.031	0.102	0.007	0.055	0.138	0.023	0.113	0.066	0.108	0.037	0.089	-0.025	0.744	1.000	
	0.635	0.117	0.914	0.395	0.033	0.719	0.083	0.308	0.097	0.572	0.169	0.703	0.000		
	-0.056	0.066	0.039	0.036	0.109	0.076	-0.039	0.191	0.150	0.175	0.144	0.078	0.815	0.220	1.000
	0.386	0.307	0.544	0.580	0.093	0.245	0.554	0.003	0.021	0.007	0.026	0.229	0.000	0.001	

Note. Shaded values are the significance of each correlation (p-value).

For hypothesis validation, Models 1 and 2 are considered appropriate. For Model 1, the overall significance measured through the value of the likelihood ratio LR Chi2 with 9 degrees of freedom is 32.7 with a probability $> \text{Chi2}$ of 0. For Model 2, the overall significance measured through the value of the likelihood ratio LR Chi2 with 17 degrees of freedom is 58.3 with a probability $> \text{Chi2}$ of 0. In both cases, a possible misspecification using the linktest command in STATA™ proved not significant at the 5% level. In the case of variables, Model 1 has a mean VIF of 1.10 and a condition index of 1.65, and Model 2 has a mean VIF of 1.25 and a condition index of 2.65, excluding violations of the multicollinearity assumption. With respect to serial correlation, a run test was conducted on the equation residuals. In Model 1 there were 103 runs and a $\text{Prob}>|z| = 0.03$, and in Model 2 there were 9 runs with a $\text{Prob}>|z| = 0$. In both models, a possible violation of the serial correlation assumption is ruled out.

Table 6 reports logistic regressions of returning investors, including point estimates and robust standard errors, for amateur investors and professional investors. Model 1A accounts for amateur investors. We find a significant coefficient for factor CERTIFICATION ($p < 0.10$), and no significant coefficients for the factors MANAGEMENT TEAM and BUSINESS POTENTIAL. We find in Model 1B that accounts for professional investors, the stronger significant coefficient for factor CERTIFICATION ($p < 0.05$), and no significant coefficients for factors MANAGEMENT TEAM and BUSINESS POTENTIAL. These results are in line with what we find when we do not differentiate among types of investors as shown in Table 4. Model 2A and Model 2B show the weights and significance of coefficients for investment criteria. Model 2A accounts for amateur investors and Model 2B for professional investors. Model 2A reveals significant coefficients for investment criteria in factors of MANAGEMENT TEAM and CERTIFICATION. The investment criteria capable team and the investment criteria serial entrepreneur related to MANAGEMENT TEAM have significant coefficients ($p < 0.05$ and $p < 0.10$, respectively). In the factor CERTIFICATION, the investment criteria finished product has a stronger significant coefficient ($p < 0.01$). Model 2B shows that for professional investors, five investment criteria have significant coefficients, one in factor BUSINESS POTENTIAL and four in factor CERTIFICATION. The investment criteria financially sound in factor BUSINESS POTENTIAL has a significant coefficient ($p < 0.05$). All but the investment criteria BUSINESS POTENTIAL in factor CERTIFICATION have significant coefficients. The investment criteria prior to financing have a stronger significant coefficient ($p < 0.01$), followed by crowd participation and type of business with significant coefficients ($p < 0.05$). The investment criteria venture with prior sales has a weaker significant coefficient ($p < 0.10$).

Table 6
 Logistic regression models for repeating investor - Amateurs vs. Professionals

	Model 1A		Model 1B		Model 2A		Model 2B	
	Amateurs	Professionals	Amateurs	Professionals	Amateurs	Professionals	Amateurs	Professionals
	β	RSE	β	RSE	β	RSE	β	RSE
Constant	0.30	2.12	5.21	3.18	0.83	2.55	10.76*	4.67
MANAGEMENT TEAM	-0.27	0.27	-0.61	0.47				
industry experience					0.00	0.26	0.66	0.77
team size					-0.13	0.25	-0.03	0.33
capable team					-0.92***	0.31	-0.81	0.70
serial entrepreneur					0.48*	0.24	-0.22	0.41
BUSINESS POTENTIAL	0.11	0.32	-0.61	0.60				
market size					-0.04	0.35	0.17	0.38
financially attractive					0.27	0.35	-1.98**	0.66
CERTIFICATION	-0.55*	0.31	-1.04**	0.50				
prior financing					-0.14	0.23	-1.44***	0.49
crowd participation					-0.07	0.22	-1.33**	0.57
venture with prior sales					-0.17	0.26	0.99*	0.68
type of business					0.16	0.20	0.91**	0.43
finished product					-0.61***	0.22	-0.38	0.37
Investor's Profile								
age	0.06*	0.03	-0.02	0.09	0.11***	0.05	0.00	0.05
gender	1.17**	0.56	1.85***	0.71	0.75	0.61	3.12***	1.04
education level	0.02	0.38	0.45	0.53	0.30	0.42	0.79	0.71
former entrepreneur	-0.39	0.46	0.54	0.65	-0.78	0.49	0.56	0.99
lives in Mexico City	0.70**	0.50	1.03*	0.61	0.83*	0.52	2.02**	0.71
financial motivation	-0.10	0.47	-0.23	0.60	-0.47	0.52	-0.46	0.80
Observations	126		112		126		112	
Pseudo R2	0.11		0.21		0.24		0.51	
Wald Chi ²	13.70		16.72		27.63		41.25	

Note: β = Coefficient; RSE = Robust Standard Error; *** $p < 0.01$, ** < 0.05 , and * $p < 0.10$. Wald Chi² = Wald Ratio.

For hypothesis validation, the regression Models 1A and 1B, by groups of investors, are considered appropriate. For Model 1A, the overall significance measured through the value of the Wald ratio Wald Chi² with 9 degrees of freedom is 13.70 with a probability $> \text{Chi}^2$ of 0.13. For Model 1B, the overall significance measured through the value of the Wald ratio Wald Chi² with 9 degrees of freedom is 16.72 with a probability $> \text{Chi}^2$ of 0.04. The Pseudo R² is 0.11 for Model 1A and 0.21 for Model 1B. In both cases, a possible misspecification using the link test command in STATA™ proved not significant at the 5% level. With respect to serial correlation, a run test was conducted on the equation residuals. There were 95 runs with a $\text{Prob} > |z| = 0$, ruling out a possible serial correlation assumption.

Models 2A and 2B, by groups of investors, are also considered appropriate. For Model 2A, the overall significance measured through the value of the Wald ratio Wald Chi² with 17 degrees of freedom is 27.63 with a probability $> \text{Chi}^2$ of 0.05. For Model 2B, the overall significance measured through the value of the Wald ratio Wald Chi² with 17 degrees of freedom is 41.25 with a probability $> \text{Chi}^2$ of 0.04. The Pseudo R² is 0.24 for Model 2A and 0.51 for Model 2B. In both cases, possible misspecification

using the `linktest` command in STATA™ proved not significant at the 5% level. A possible serial correlation assumption violation was ruled out by a run test with 97 runs and a $\text{Prob}>|z| = 0$.

Discussion

This paper contributes to the literature by differentiating investment behaviors in equity crowdfunding by amateur and professional investors backing ventures on the largest Mexican equity crowdfunding online platform. It provides initial insights into the investment decision-making of both types of investors co-investing in equity crowdfunding. The study examined the interplay between the investment decisions of business angels and crowd investors and found that professional and amateur investors assign different importance to evaluation criteria and display different investment behavior in equity crowdfunding.

First, it can be observed that contrary to common knowledge that professional investors favor selection criteria related to the `MANAGEMENT TEAM` and the `BUSINESS POTENTIAL`, in equity crowdfunding professional investors support information that signals the quality of the venture and certifies the development effort, a criterion related to `CERTIFICATION`. For amateur investors too, certification of the quality of the venture is also more important than the investment criteria related to the people driving the effort and the potential of the venture to become a large company. Hypothesis 1 is partially supported by these results. Only one of the three main investment criteria factors is important for both types of investors. These findings also suggest that professional investors in equity crowdfunding behave like amateur investors, favoring signals of the quality of the venture instead of focusing on information to address the financial attractiveness of the project. The small investment ticket sizes and the stressed information asymmetries may explain professional investors behaving like crowd investors. This view opposes past assessments, proposing that amateur investors behave like professional investors because they focus on business-related and financial information as decision criteria for their investments (Block et al., 2018). Evidence is provided that amateur investors, given that they lack the experience, capability, and time to analyze investments, rely on criteria that require less cognitive capability and time to analyze when deciding on which venture to invest. These results support the outcomes from other studies that arrived at the same conclusion from the project perspective (Shafi, 2021), as opposed to the investor's perspective used in this study.

Second, as the first paper to analyze investor-level behavior in the Mexican equity crowdfunding market and elsewhere, support is given to the notion that amateur and professional investors rely on different investment criteria when investing in new ventures in equity crowdfunding. While both types of investors pinpointed the importance of the criteria related to the `CERTIFICATION`, there are differences between the two groups of investors at the items level. Four out of five selection criteria are relevant for

professional investors, and only one is relevant for amateur investors. For the amateur investor, it is important that the company has a finished product, while for the professional investor, the important criteria are prior financing, crowd participation, type of business, and venture with prior sales. These findings support Hypothesis 2. Despite the small investment required to back ventures in equity crowdfunding, which could induce the same investment behavior for anyone investing in equity crowdfunding, results show that amateur and professional investors use different criteria to choose which venture to back. The findings support what other studies had thought that amateur investors may place different weights on investment criteria than professional investors (Shafi, 2021).

Last, results show that the very nature of investors determines their investment behavior in equity crowdfunding. Amateur and professional investor behave differently because amateur investor prefers criteria that are easy and require less time to evaluate, as proposed by Shafi (2021), such as the people behind the project, and professional investors are financially motivated (Cholakova & Clarysse, 2015) and focus on the financial attractiveness of the project that demands more cognitive capacity and experience. Besides criteria related to CERTIFICATION, results show that for amateur investors a capable team is important, and for professional investors a financially attractive investment opportunity is important. These findings support Hypothesis 3 that amateur and professional investors behave differently when investing in equity crowdfunding ventures and respond to Mochkabadi and Volkmann (2020)'s call to study whether professional and amateur investors exhibit different behaviors in equity crowdfunding.

Conclusion

The growth of equity crowdfunding attracted professional investors to online platforms to invest in new ventures (Wang et al., 2019). Today, they co-invest in new ventures with amateur ones. The present study examined the interplay between the investment decisions of business angels and crowd investors. We found that professional and amateur investors assign different importance to evaluation criteria and display different investment behavior. Overall, our research contributes to the entrepreneurial funding literature by providing new insights into how investors back up new ventures via equity crowdfunding in Mexico.

Our study is not empty of limitations. Our experimental approach focused only on the investor side of the equity crowdfunding investment equation. Investors told us what they looked for when investing without having information on whether the factors were present in each of their investments. This seemed reasonable because most studies draw conclusions about the importance of investment criteria based on the results of investment campaigns and on the description of the projects. The research could have benefited if, in addition to investors' information, project, and campaign information would

have been available. We could have confirmed that what investors were looking for was indeed informed in the project or during the investment campaign. The approach is also a strength of our study because, to our knowledge, very little research on the topic is done using data provided by investors. Future research would benefit if comprehensive data were used to study investors' decisions: project description, investment campaign data, and the reasons behind the investor's decision.

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