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Cover Page Footnote

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Assessing the Value of Ventures: Crowd Investors vs. Sophisticated Investors

Marco Bade[1]

Abstract

Recent regulatory approaches in crowdfunding democratize capital markets. Adverse wealth effects may arise because of information asymmetry. Firoozi et al. (2017) argue that crowdfunding has wealth-reducing effects on crowd investors because they systematically assign less value to good ventures, and more to bad ventures. This paper aims to take a more differentiated perspective by incorporating two dimensions of uncertainty determining ventures' value. It further takes into account that different investor types learn different information. This yields new findings concerning the assessment of venture value by crowd investors and sophisticated investors. Crowd investors' may be able to better assess venture value, even though they have inferior information processing skills. This may enable crowd investors to make better investment decisions, compared to sophisticated investors.

Keywords: crowdfunding; crowd investors; sophisticated investors; wealth effects; information asymmetry

JEL codes: D8; G14; G28; G32

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I. Introduction

Crowdfunding is a novel way of financing new ventures. Instead of addressing a small group of sophisticated investors to raise funds, ventures try to obtain funding from a large group of (unsophisticated) investors. Each individual provides only a small amount of money (Belleflamme and Lambert, 2014). Recent regulatory approaches, such as the Jumpstart Our Business Startups (JOBS) Act of 2012 in the U.S., aim to democratize capital markets in order to facilitate access of entrepreneurs to funding from crowd investors. However, the democratization of capital markets goes hand in hand with reduced investor protection, and thus bears the risk of adverse wealth effects. In the academic debate, little consensus has been found yet given the fact that this is a very young field of research. Agrawal et al. (2013) explain that crowdfunding faces two problems related to asymmetric information: hidden information (adverse selection), and hidden action (moral hazard). Ahlers et al. (2015) provide the first empirical study in this context, and show that the provision of more detailed information about risk and uncertainty by entrepreneurs can positively affect the probability of successful funding. Courtney et al. (2017) propose that signals about project quality and founder credibility may also mitigate information asymmetry, and thus increase the likelihood of attaining funding.

To date, even less attention has been paid to adverse wealth effects among different types of investors. Firoozi et al. (2017) are the first to investigate wealth-reducing effects of crowdfunding on crowd investors, resulting from information parity. The authors argue that there is substantial private information parity between accredited traditional investors (for example, banks) and crowd investors. That is, small crowd investors have fewer financial resources and less investing experience than large accredited traditional investors do. The analysis of Firoozi et al. (2017) shows that crowd investors assign less expected value to good ventures, and more to bad ventures, compared to accredited traditional investors. This results from crowd investors' general disadvantage in processing signals disclosed by ventures.

However, this general assumption seems quite critical and may result in misleading conclusions. It is indeed conceivable that crowd investors have inferior information quality on average. Nevertheless, they may have information-related advantages in certain areas. For example, crowd investors are typically also consumers of the new product generating additional utility from community benefits, which are tied to the future consumption experience (e.g., Belleflamme et al., 2014), and social interaction realized through the participation in crowdfunding platforms or communities (e.g., Gerber et al. , 2012; Belleflamme et al., 2013, 2014). This means, crowd investors truly care for the product. Thus, they may have superior skills in assessing product quality or future demand for the product. This enables them to properly interpret signals about product-related uncertainty, even though they may be unable to interpret other signals. More sophisticated investors, such as venture

capitalists or banks, may still have better information quality, and an advantage in processing signals about other sources of uncertainty.

Therefore, in order to portray a more realistic setting, the present paper incorporates two dimensions of uncertainty, and takes into account that different types of investors (crowd investors and sophisticated investors) may learn different information. This yields new and more differentiated findings with respect to the assessment of venture value by crowd investors and sophisticated investors. Hence, this paper contributes to the emerging academic debate on (adverse) wealth effects related to crowdfunding. In addition, it helps policy makers to further develop an appropriate framework for crowdfunding.

II. The model

Types of ventures

The economy in this model is populated by two types of ventures $i \in \{G, B\}$ and two groups of investors $j \in \{s, c\}$. One of the two ventures is good (index G), whereas the other venture is bad (index B). At date t=1, the final value V_i of venture i is determined by two sources of uncertainty:

$$V_i = \beta_1 \mu_{i,1} + \beta_2 \mu_{i,2}, \qquad (1)$$

where both ventures share common weights $\beta_{1,2} > 0$. These parameters represent the weights of the two sources of uncertainty for the overall value of the venture. In other words, $\beta_{1,2}$ captures to what extend a venture's risk depends on dimension 1 and dimension 2. Below, I will elaborate on this in more detail. Consider two ventures producing a very similar or complementary product, and thus facing a similar composition of uncertainty. $\mu_{i,n}$, where $n \in \{1, 2\}$, can be high ($H_i > 0$) or low ($L_i = 0$) with equal probability. $\mu_{i,n}$ can be interpreted as stochastic shocks determining the profitability of ventures. Each shock captures one dimension of uncertainty. The sum of all shocks determines the ventures' total risk and value. It is assumed that $H_G > H_B$, meaning that the good state of the good venture (high profitability) is better than the good state of a bad venture. This simply captures that venture G is more profitable than venture B, even though both ventures being in a good state.

The rationale of two-dimensional uncertainty is as follows. Ventures are regularly exposed to multiple sources of uncertainty, for example, demand for the firm's products, production technology, idiosyncratic developments, macroeconomic influences, management skills and experience, entrepreneurial competence, risk of fraud, etc. In the present model, I subsume these risks into two categories. It is assumed that μ_1 captures all sources of uncertainty related to the entrepreneur or entrepreneurial

team starting the venture (management-related risk), and μ_2 captures product-related risks. Depending on the specific type of product, the weights of management-related and product-related risk may differ. For example, if a venture offers a radically innovative product, the most crucial source of uncertainty may be related to realizability or implementabilty of the product, and to consumers' acceptance, and thus demand for the product. In this case, β_2 is high. In contrast, if the venture aims to position itself in a more mature market segment, the success of the venture rather depends on the experience and skills of the entrepreneur or management to gain competitiveness (high β_1).

Of course, there are many other sources of uncertainty, which cannot be collapsed under these two umbrella terms. For example, uncertainty around social trends, economic conditions, political infrastructure, legal context, etc. Nevertheless, the approach of modelling two dimensions of uncertainty is sufficient to capture the main idea of the model, which is to show that different types of investors may learn different information. Note that the considering n-dimensional uncertainty does not change the results as long as one assumes that different types of investors have information about different risk factors.

Types of investor groups

The two types of investors differ in terms of information processing skills. There is a group of sophisticated investors (index s), such as venture capitalists, who have superior skills in assessing the quality of business plans, management skills and experience, etc. Such investors, who regularly provide management-consulting services, may have high levels of expertise in terms of management. Previous research has shown that entrepreneurial or managerial experience is a crucial factor determining early performance of young ventures. Hence, it may also be the most important driver of venture capitalists' investment decisions. Traditionally, venture capitalists put much weight on entrepreneurial experience when evaluating the attractiveness of new ventures (Stuart and Abetti, 1990). Based on a survey among 100 venture capitalists, MacMillan et al. (1985) identify the criteria, which are the most important drivers of venture capitalists' investment decisions. Five of the ten most important factors are directly related to the characteristics of the entrepreneurs themselves. Consistent with this, Hsu (2007) finds evidence that prior entrepreneurial experience increases both the likelihood of venture capital funding and venture valuation. These findings stress venture capitalists' strong focus on the management/entrepreneur-related dimension of ventures, which seems to dominate dimensions related to the market, product, or strategy. This is why I assume that sophisticated investors have the exclusive ability to process information related to the ventures' management.

Besides the sophisticated investors, there is a group of unsophisticated investors (the crowd, indexed by c) with inferior information processing skills, but

better sense of product quality. Crowd investors' activities are much more driven by the product-related dimension. They actively engage in product development, quality reassurance, experience sharing, and joint consumption (Ouwersloot and Oderkerken-Schroder, 2008). Hence, crowd investors interact, share their contributions, and observe others' contributions and experiences. They build up their own contributions using other crowd investors' suggestions to end up with better overall solutions (Lévy, 1997; Surowiecki, 2004; Brabham, 2008a, 2008b; Schwienbacher and Larralde, 2010).[2] This facilitates learning of product quality (Gerber et al., 2012; Belleflamme et al., 2013, 2014). Hence, I assume that crowd investors are superior in processing product-related information.

At date t=0, ventures signal whether they are good or bad, and disclose information regarding management, information about technology and the product, marketing and industry-specific information, and other relevant operational and financial strategies within the business plan. Thus, all investors receive a set of public signals about the two dimensions of uncertainty. Given different experience and skills to process these signals, the two groups of investors update their beliefs with different precision. Based on the discussion above, it is assumed that sophisticated investors are only able to process public information (set of signals Y_s) about management-related risks (μ_1), whereas the crowd only learns product-related information, that is, a set of signals Y_c about μ_2. Information quality of sophisticated investors is defined as follows:

$$Prob\left(Y_s = H_i \middle| \mu_{i,1} = H_i\right) = Prob\left(Y_s = 0 \middle| \mu_{i,1} = 0\right) = \gamma_s, \qquad (2)$$

where $\gamma_s \in \left[\frac{1}{2}, 1\right]$. If information quality is low ($\gamma_s = \frac{1}{2}$), the probability of having a correct signal is 50 percent. If $\gamma_s = 1$, this means that the accuracy of information processing is 100 percent. Analogously, crowd investors' information quality is given by:

$$Prob\left(Y_c = H_i \middle| \mu_{i,2} = H_i\right) = Prob\left(Y_c = 0 \middle| \mu_{i,2} = 0\right) = \gamma_c. \qquad (3)$$

Note that, in order to nest this model in previous literature (e.g., Firoozi et al., 2017), I assume:

$$\gamma_s > \gamma_c. \qquad (4)$$

[2] In the literature, this mechanism creates the so-called "wisdom of crowds".

This captures that sophisticated investors have fundamentally superior skills in processing information in general, compared to less experienced average crowd investors.

III. Results

Investor expectations

After receiving signals at date t=0, investors try to assess the ventures' future value, which eventually guides investment decisions. Note that these investments are not explicitly modeled in this paper. The expectations of sophisticated and crowd investors about the good venture's future value are given by:

$$E_s(V_G) = \beta_1 \cdot \underbrace{\gamma_s H_G}_{\substack{Expecation \\ about\ \mu_1}} + \beta_2 \cdot \underbrace{\frac{H_G}{2}}_{\substack{Expecation \\ about\ \mu_2}} = \frac{H_G}{2}(2\beta_1\gamma_s + \beta_2), \tag{5}$$

$$E_c(V_G) = \beta_1 \underbrace{\frac{H_G}{2}}_{\substack{Expecation \\ about\ \mu_1}} + \beta_2 \underbrace{\gamma_c H_G}_{\substack{Expecation \\ about\ \mu_2}} = \frac{H_G}{2}(\beta_1 + 2\beta_2\gamma_c). \tag{6}$$

In determining expectations about ventures' future value, investors use all information available to them, and their skills to process information. Recall that, typically, different types of investors have different skills to process information, and focus on different types of information. Hence, in this model, these skills only affect the expectation of one of the two sources of uncertainty because each type of investor only has information about one source of uncertainty. For example, sophisticated investors' expectation of the good venture's future value $E_s(V_G)$ is determined by two components: The first component represents their expectation about management risk (μ_1) conditional on their (positive) information about μ_1. Given a positive signal, in expectation, this component is in a good state H_G with probability γ_s, which represents the skills to process information about management-related uncertainty of sophisticated investors. In other words, given positive information about venture G, sophisticated investors expect the good venture to have a good management with probability γ_s. This component is weighted by β_1 measuring the impact of management-related factors. The second component is the unconditional expectation about the other source of uncertainty (μ_2), weighted by β_2. Given sophisticated investors have no information about product-related factors, they expect μ_2 to be in a

good state H_G with probability $\frac{1}{2}$. Analogously, the two groups of investors expect the bad venture's value to be:

$$E_s(V_B) = \beta_1(1-\gamma_s)H_B + \beta_2\frac{H_B}{2} = \frac{H_B}{2}(2\beta_1(1-\gamma_s) + \beta_2), \quad (7)$$

$$E_c(V_B) = \beta_1\frac{H_B}{2} + \beta_2(1-\gamma_c)H_B = \frac{H_B}{2}\big(\beta_1 + 2\beta_2(1-\gamma_c)\big). \quad (8)$$

The idea is that investors today seek to invest into ventures with good prospects and high expected future value. With the same initial value, the venture with the higher expected future value represents the more attractive investment. In the absence of further information, investors can mostly only make their investment decisions on the basis of expectations and perceived risk.

Benchmark case

Before presenting the main results, I consider the case $\beta_1 = \beta_2$ as a benchmark, which yields results consistent with previous literature. Given $\beta_1 = \beta_2$, investors' expectations about the good venture's value can be rewritten as follows:

$$E_s(V_G) = \frac{H_G}{2}(1 + 2\gamma_s), \quad (9)$$

$$E_c(V_G) = \frac{H_G}{2}(1 + 2\gamma_c). \quad (10)$$

Crowd investors have less optimistic expectations about the value of the good venture than sophisticated investors, that is:

$$E_s(V_G) > E_c(V_G) \quad (11)$$

$$\frac{H_G}{2}(1 + 2\gamma_s) > \frac{H_G}{2}(1 + 2\gamma_c), \quad (12)$$

because $\gamma_s > \gamma_c$. On the other hand, however, crowd investors are more optimistic in forecasting the value of bad ventures:

$$E_s(V_B) = \frac{H_B}{2}\big(\beta(3 - 2\gamma_s)\big), \quad (13)$$

$$E_c(V_B) = \frac{H_B}{2}\big(\beta(3 - 2\gamma_c)\big), \tag{14}$$

and thus:

$$E_s(V_B) < E_c(V_B) \tag{15}$$

$$\frac{H_B}{2}\big(\beta(3 - 2\gamma_s)\big) < \frac{H_B}{2}\big(\beta(3 - 2\gamma_c)\big), \tag{16}$$

because $\gamma_s > \gamma_c$.

In this benchmark case, the two dimensions of uncertainty have equal weights. Thus, information about μ_1 and μ_2 is equally valuable, and information advantages of sophisticated investors solely arise from information quality ($\gamma_s > \gamma_c$). Given that sophisticated investors have superior information processing skills, they have an overall advantage over crowd investors in assessing the ventures' value. This results in adverse wealth effects for crowd investors because they assign a smaller expected value to good ventures, and a larger expected value to bad ventures, compared to sophisticated investors. Thus, crowd investors tend to invest less than sophisticated investors in good ventures and more in bad ventures (Firoozi et al., 2017).

Key results

In this subsection, I present the main results of the model by showing that, depending on $\beta_{1,2}$, crowd investors may assign more expected value to good ventures, and less expected value to bad ventures, even though having inferior information processing skills. Regarding the good venture, comparison of expectations of sophisticated and crowd investors yields the following condition:

$$E_s(V_G) < E_c(V_G) \tag{17}$$

$$\frac{H_G}{2}(1 + 2\gamma_s) < \frac{H_G}{2}(1 + 2\gamma_c), \tag{18}$$

if and only if:

$$2\beta_1\gamma_s + \beta_2 \; < \beta_1 + 2\beta_2\gamma_c \tag{19}$$

$$\frac{\beta_1}{\beta_2} < \frac{2\gamma_c - 1}{2\gamma_s - 1}. \tag{20}$$

Compared to sophisticated investors, crowd investors assign more expected value to good ventures if and only if the relative weight of β_1 is sufficiently small. Given $\gamma_c < \gamma_s$, the right hand side of the above condition is smaller than one. This implies that β_1 necessarily needs to be smaller than β_2. Similarly, in the case of assessing the bad venture's value, it can be shown that $E_s(V_B) > E_c(V_B)$, if and only the above condition is satisfied. Hence, crowd investors have less optimistic expectations about the bad venture's value if β_1 is sufficiently small.

This implies that, even though having worse information quality, crowd investors tend to invest more than sophisticated investors in good ventures, and less in bad ventures, if the impact of product-related sources of uncertainty, measured by β_2, is high. Thus, if the ventures' value depends on the product-related dimension, rather than the management-related dimension, crowd investors may have an information advantage over sophisticated investors having better information quality.

IV. Concluding remarks

Startups are a leading source of economic growth and job creation. For example, the Business Dynamics Statistics show that startups create most of the new net jobs in the US. Startups are responsible for all net job creation during most years considered in the statistics. Young (aged less than one year) of existence add an average of 3 million jobs per year. Existing firms (aged one year and older) create one-tenth the jobs created by startups. Considering the job destruction rates, existing firms are usually net job losers (e.g., Kane, 2010; Haltiwanger et al., 2013). Yet, startups still face many difficulties. This is why policy makers around the world are currently updating existing regulations, and developing and implementing new regulatory frameworks for startups (e.g., Belleflamme and Lambert, 2014). One recent regulatory approach is the JOBS Act of 2012, which aims to incorporate smaller investors, such as crowd investors, into capital markets. However, the democratization of capital markets bears the risk of adverse wealth effects at the expense of crowd investors. As shown by Firoozi et al. (2017), and in the benchmark case in this model, crowd investors with inferior information processing skills may inefficiently invest less in good ventures, and more in bad ventures, compared to sophisticated investors. This calls for more protection of crowd investors.

However, the findings from the extended setting in this paper suggest that this is not generally valid. Therefore, policy makers need to take a more differentiated perspective before implementing hasty investor protection measures. The present model demonstrates that the exact opposite is also possible as crowd investors may have an information advantage over sophisticated investors, for example, in terms of the product-related factors, which enables crowd investors to better assess ventures'

expected value, even though they have inferior information quality. This may enable crowd investors to make better investment decisions, compared to sophisticated investors. This is consistent with the hypothesis that markets (in this paper represented by the crowd) may be superior to intermediaries (in this paper represented by sophisticated investors) in evaluating projects (Allen and Gale, 1999). To be clear, this paper assumes crowd investors to have inferior skills to process information, but to be superior to sophisticated investors if they simply learn information about factors, which are more relevant for venture value. Thus, the present paper suggests that the hypothesis is true if, for example, the product-related dimension dominates the management-related dimension of the venture.

The present paper thus argues against the proposition that crowdfunding may be wealth-reducing only for crowd investors due to inferior information processing skills. However, it would go too far to recommend that crowd investors should not be protected based on this finding. It does not matter who benefits at what cost. Instead, in order to avoid adverse wealth effects among different types of investors, regulators should promote precise and reliable disclosure of all venture-related information in order to level the playing field among investors (e.g., Hazen, 2012; Heminway, 2014). The disclosing firms need to take into account the different experiences and skills to process public information (as also featured in the present model) among investors. Furthermore, regulators should obligate crowdfunding platforms to make available and maintain communication channels for investors in order to facilitate information flows among investors. Funding portals offer excellent regulatory access. In addition, the establishment of minimum standards for due diligence by the crowdfunding portals would make sense. Such due diligence could provide background checks on the entrepreneurial team of the venture, the competitive situation in the respective market, or simply the product quality. This could help investors with inferior skills to assess multiple dimensions of venture value. Lastly, better investor education and tests with the aim to clarify for investors the risks of investing in young ventures could reduce the gap in terms of both accessing and processing information relevant for investments (Kloehn et al., 2016). All of these measures might reduce information asymmetry and thus help avoid adverse wealth effects. For a deeper understanding of the issues emerging from the findings in this paper, future research should endogenize, for example, the information production of investors, and the allocation of weights of the different dimensions determining ventures' payoff and risk structure.

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