The Journal of Technology Transfer (2022) 47:1737–1765
https://doi.org/10.1007/s10961-021-09897-8

Investors' industry preference in equity crowdfunding

Sofia Johan[1,2] · **Yelin Zhang**[3]

Accepted: 29 September 2021 / Published online: 19 October 2021

Abstract
Equity Crowdfunding Online Portals offer access to investors, resources and fundraising support to numerous equity crowdfunding projects from different industry sectors. In this context, we study investors' preferences of equity crowdfunding projects in different industries. We present novel empirical evidence revealing differences in startup characteristics across various industry sectors and examine how certain startup characteristics influence business valuations for representative industries in equity crowdfunding. A new business valuation method in equity crowdfunding is introduced to facilitate our analyses.

Keywords Equity crowdfunding · Industry effect · Business valuation

JEL Classification G23 · G24 · L26

1 Introduction

Industry factors have long been shown to be important in corporate development, financial management, business performance and firm valuation. For instance, Lev (1969) documented that firms periodically adjust their financial ratios to their industry means. Gupta and Huefner (1972) revealed that industry characteristics affect fixed asset turnover, current asset ratios, inventory turnover, average collection period and cash velocity. Alford (1992) observed that industry is a good surrogate for the component of risk and earnings growth related to P/E multiples. Waring (1996) demonstrated that the persistence of abnormal returns differs widely and systematically across industries. Chava and Jarrow (2004) found

We owe thanks to the Editor, Silvio Vismara, and anonymous reviewers for helpful comments and suggestions.

✉ Yelin Zhang
zhangy2@gonzaga.edu

Sofia Johan
sjohan@fau.edu

[1] College of Business, Florida Atlantic University, 777 Glades Rd, Boca Raton, FL 33431, USA

[2] University of Aberdeen Business School, Dunbar Street, Aberdeen AB24 3QY, Scotland, UK

[3] School of Business Administration, Gonzaga University, 502 E Boone Ave, Spokane, WA 99258, USA

industry effects to be an important component in bankruptcy prediction. More recently, Baird et al. (2012) suggested that industry factors significantly influence the relationship between corporate social performance and corporate financial performance. Because of its widely recognized importance, industry effects are analyzed or controlled in numerous empirical corporate finance studies. Nevertheless, most of these studies focus on larger, public companies, as these companies disclose timely information systematically, whereas due to lack of information disclosure, limited studies investigate industry factors in smaller private firms.

Entrepreneurial finance is very important for technology transfer and entrepreneurial firm growth and innovation (Audretsch et al., 2016; Colombo et al., 2016). The rising importance of equity crowdfunding in the financing of innovative ventures provides a new opportunity for analyzing smaller private firms to better understand the role of entrepreneurial finance in different industries (Allen et al., 2021; Coakley & Lazos, 2021; Konhäusner et al., 2021; Philippi et al., 2021; Rossi et al., 2021). To raise the necessary funding for business development, start-ups voluntarily disclose relatively limited business information to crowdfunding investors through online platforms or portals. This information disclosure is often comprehensive, containing qualitative business descriptions on business model, competitive strategy, product market, drivers and barriers for product/service adoption and business milestones (Johan & Zhang, 2020) and quantitative business information, i.e., accounting, and financial records. The level of disclosure however falls short of the typical disclosure by firms seeking more traditional forms of debt and equity financing via venture capital or initial public offerings.

Extant literature on equity crowdfunding mainly focuses on how different factors or campaign strategies influence investors' behavior and fundraising outcomes. For instance, Ahlers, et al. (2015) presented the first empirical examination of the effectiveness of signals that entrepreneurs use to raise funding from the crowdfunding investors. They found that retaining equity and more complete risk disclosure is associated with fundraising success. Vismara (2016) reported that more social capital possessed by entrepreneurs leads to higher probabilities of success. Hornuf and Schwienbacher (2018) revealed that investors base their decisions on information provided by the investment behavior of other crowd investors. Vismara (2018) showed that investors with a public profile increase the appeal of the offer among early investors, who in turn attract late investors. Piva and Rossi-Lamastra (2018) revealed that the human capital of an entrepreneur constitutes a set of signals of the start-up quality. Vismara (2019) further found that start-ups' sustainability orientation attracts a higher number of restricted investors. Recently, Johan and Zhang (2020) documented that the length of qualitative business descriptions is positively associated with fundraising results. Rossi et al. (2021) examined the U.S. and U.K. equity crowdfunding offerings in detail and confirmed that higher equity retention by original entrepreneurs positively affects the chances of success of the offerings and amount of capital raised in both markets. Another important finding from Rossi et al. (2021) is that entrepreneurs in financial centers set higher targets in UK markets. What is made clear by the research is that as firms seeking equity crowdfunding face high information asymmetries, these firms are increasingly taking steps to signal their quality to investors and differentiate their offerings from the numerous others on the same portals. These signals identified in prior research are potentially informative because they can reveal intuitively obvious and underlying, but possibly unobservable, firm characteristics. They include signals alluding to project or organizational complexity, capital structure and managerial skill (Ahlers et al., 2015; Ralcheva and Roosenboom, 2016; Vismara, 2016; Block et al.,

2018; Vismara, 2018; Piva & Rossi-Lamastra, 2018; Cumming et al., 2019). It must be noted though that the clarity of information disclosed by firms on the portals may still be relatively incomplete and may not necessarily alleviate investor uncertainty as crowdfunding investors are predominantly retail investors who may not necessarily be sophisticated enough sift through the signals provided by firms. We believe there is one signal that has been referred to by other research that is obvious, arguably costly to achieve by all firms and one that creates a signalling equilibrium that has yet to be investigated in crowdfunding research. This signal is Industry.

In this study, we investigate equity crowdfunding from an innovative angle by examining differences in effective signaling amongst crowdfunding start-ups based on their industry classification. We posit those investors in equity crowdfunding not only account for the primary characteristic, i.e., industry classification of the firm, but also consider the signals that may create a separating equilibrium that readily signals unobservable firm quality. We find systematic differences across start-up industry sectors in firm characteristics, i.e., age and revenue, campaign tactics, i.e., usage of video in business introduction, availability of entrepreneurs' photos, and length of qualitative business description, fundraising outcomes, i.e., percentage of fundraising plan completed, percentage of fully funded projects, and amount of capital raised and post-crowdfunding outlook, i.e., estimated investment horizons. We also find that start-ups from different industries exhibit distinct signaling equilibrium with equity crowdfunding investors. This separating equilibrium as identified by using Spence (1973, 1974, 2002) is empirically tested in this paper as we analyze firm valuation.

We believe our study contributes to extant literature as unlike many studies, our analyses focus on the effective signaling of equity crowdfunding start-ups in different industry sectors and the according start-up valuation, or the premium investors pay to a crowdfunding project in the fundraising process. We find that managerial characteristics, i.e., industry experience and educational level are important in explaining the fundraising premium for the information and culture industry, but not for professional, scientific, and technical services. Investors place emphasis on firm revenue for real estate and health care industries, but not for manufacturing industry, information and culture industry or professional, scientific, and technical services industry. Research and Development is important in determining fundraising premiums for most industries, except for the real estate industry. Our findings suggest that equity crowdfunding investors' preferences and emphasis on certain business characteristics in a given industry drive up fundraising premium.

Our research contributes to the literature in the following aspects: first, we present new empirical evidence revealing the industry differences in start-ups seeking equity crowdfunding. Second, we develop a new business valuation mechanism assessing the premiums investors paid to an equity crowdfunding project and show how this business valuation is influenced by start-up characteristics in representative industry sectors. Third, we demonstrate that investors focus on different business aspects for equity crowdfunding firms in different industry sectors.

2 Research design: a new business valuation method

Investors in equity crowdfunding face high information asymmetries, and the risk of moral hazard and adverse selection is further exacerbated by the inability for firms seeking funding to provide data such as sales or revenue records. Crowdfunding firms do however

provide sufficient details regarding their projects including, but not limited to firm characteristics, project goals, managerial skill, fundraising goals, and post-crowdfunding outlook to signal their quality to investors and differentiate their offerings from the numerous others on the same portals. While these signals alluding to project or organizational complexity, capital structure and managerial skill have been analyzed by prior research (Ahlers et al., 2015; Ralcheva and Roosenboom, 2016; Vismara, 2016; Block et al., 2018; Vismara, 2018; Piva & Rossi-Lamastra, 2018; Cumming et al., 2019), we note there is one that has yet to be studied, which is Industry.

Industry factors have long been shown to be important in corporate development, financial management, business performance and firm valuation (Alford, 1992; Baird et al., 2012; Chava & Jarrow, 2004; Gupta & Huefner, 1972; Lev, 1969; Waring, 1996) but industry effects have mainly been analyzed or controlled for in research focused on larger, public companies. We posit firm Industry as a signal that affects firm valuation for crowdfunding firms as it can reveal intuitively obvious and underlying, but possibly unobservable, firm characteristics to Investors (Spence, 1973, 1974, 2002). In view of sophistication level of crowdfunding Investors, we also believe that this signalling equilibrium can be further separated. We posit that firm Industry categorization only creates a pooling equilibrium[1] as all firms within the industry project the same costly signal and Investors may still not be able to differentiate high- and low-quality firms within the same Industry. We therefore also examine other signals projected by firms within an Industry such as firm characteristics, project goals, managerial skill, fundraising goals, and post-crowdfunding outlook that will be the separating equilibrium[2] as these signals are costly to imitate and have been shown to influence investors' behavior and fundraising outcomes. We thus hypothesize:

Hypothesis 1 Firm Industry is a factor considered by crowdfunding investors and affects firm valuation.

Hypothesis 2 Depending on start-up industry, investors refer to differing signals related to firm characteristics, project goals, managerial skill, fundraising goals, and post-crowdfunding outlook to value high quality and low-quality firms.

To measure the effects of the pooling and signaling equilibria on start-up valuation in equity crowdfunding, we develop a simple business valuation method by dividing total amount of capital raised in an equity crowdfunding campaign by the number of managers in a start-up. This method controls for human capital of a start-up, and evaluate per manager, how much capital can be raised.

We incorporate human capital in the measurement because human capital is widely recognized as one of the most important factors in small business development. Cooper et al. (1994), Rauch and Rijsdijk (2013) both find that general human capital influences both survival and growth of a new venture; Rauch et al. (2005) argue that human resources are important factors predicting growth of small–scale enterprises. Colombo and Grilli (2005) document that the nature of the education and of the prior work experience of founders exerts a key influence on firm growth. Including human capital in measuring equity

[1] In a pooling equilibrium, investors have universal preferences for equity crowdfunding start-ups from the same industry sector.

[2] In a separating equilibrium, investors rely on different signals to differentiate start-up quality based on their industry classification.

crowdfunding outcome is crucial because prior research has established the importance of managerial skill in equity crowdfunding outcomes, all start-ups seeking equity crowdfunding provide managerial information, but many do not have other data such as sales or revenue records (Ahlers et al., 2015 and Piva & Rossi-Lamastra, 2018). In this regard, our measurement can be applied to all start-ups seeking equity crowdfunding and is free of sample selection bias.

Our business valuation measure has the following advantages over the traditional equity crowdfunding outcome measures such as fundraising target, probability of fundraising success and total amount of capital raised. First, our measurement considers the size differences across equity crowdfunding start-ups. As smaller (larger) firms employ fewer (more) managers, at the same amount of capital raised, they receive higher (lower) valuation under our measurement, whereas the traditional measures do not consider the resource constraint a start-up faces in crowdfunding, thus treat a smaller start-up's more challenging fundraising success the same as a larger start-up's less challenging fundraising success, if they raise the same amount of capital from the crowd. Second, our measurement shows the premiums investors paid to a start-up based on its current characteristics, whereas traditional measurements focus exclusively on the fundraising process itself and do not consider the valuation premium a start-up receives in equity crowdfunding. Third, our measurement is forward-looking, as high premium reflects investors' optimism on start-ups' future growth opportunities, whereas traditional measurements mainly indicate start-ups' current conditions and popularity in the crowdfunding process.

3 Data

We analyze data from EquityNet,[3] a leading equity crowdfunding platform headquartered in Salt Lake City, UT. EquityNet lists crowdfunding projects from all over the world and allows entrepreneurs to keep all capital raised from a crowdfunding campaign, even if the fundraising target is not achieved. Our sample data cover information for 6870 equity crowdfunding campaigns, ranging from January 2007 to November 2016. Start-ups in the sample are from 18 different industry sectors[4]: Manufacturing, Information and Cultural Industries, Professional, Scientific, and Technical Services, Retail Trade, Real Estate and Rental and Leasing, Health Care and Social Assistance, Other Services except Public Administration, Arts, Entertainment and Recreation, Administrative and Support, Waste Management and Remediation Services, Finance and Insurance, Construction, Transportation and Warehousing, Accommodation and Food Services, Educational Services, Wholesale Trade, Utilities, Mining, Quarrying, and Oil and Gas Extraction, and Agriculture, Forestry, Fishing and Hunting.

Figure 1 reveals the distribution of fundraising outcomes in the sample. On average, domestic (foreign) firms achieved 70% (39%) of their fundraising targets, showing investors' strong preference on domestic start-ups. Among domestic fundraising projects, Mining, Quarrying, and Oil and Gas Extraction achieved the highest average percentage of fundraising targets at 75%, whereas Accommodation and Food Services realized the lowest average percentage of fundraising target at 64%. Among foreign fundraising projects,

[3] https://www.equitynet.com/.

[4] Industry classification is based on the first two digits of North American Industry Classification System (NAICS) code.

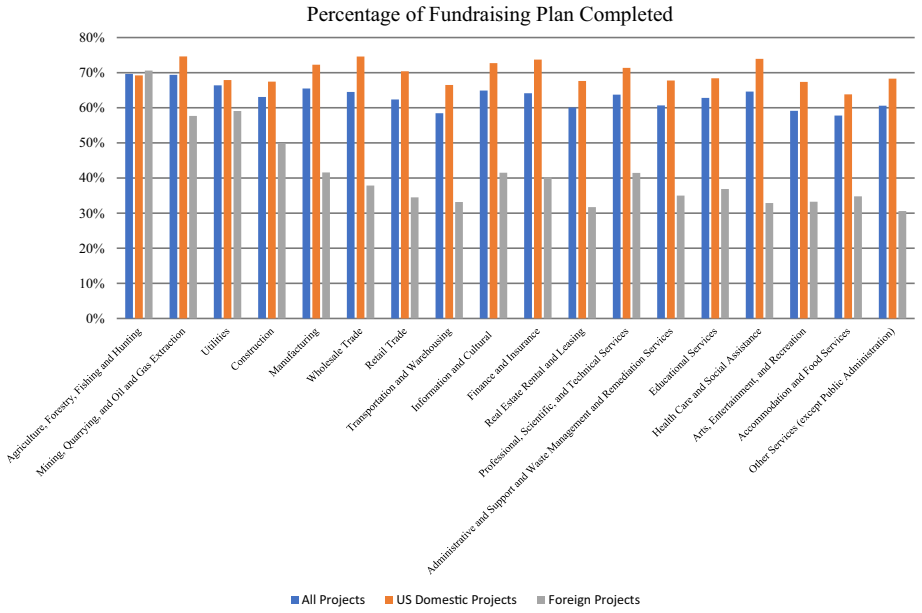

Fig. 1 Illustrates the average percentage of fundraising plan completed for each industry in equity crowdfunding campaigns through EquityNet between January 2007 and November 2016

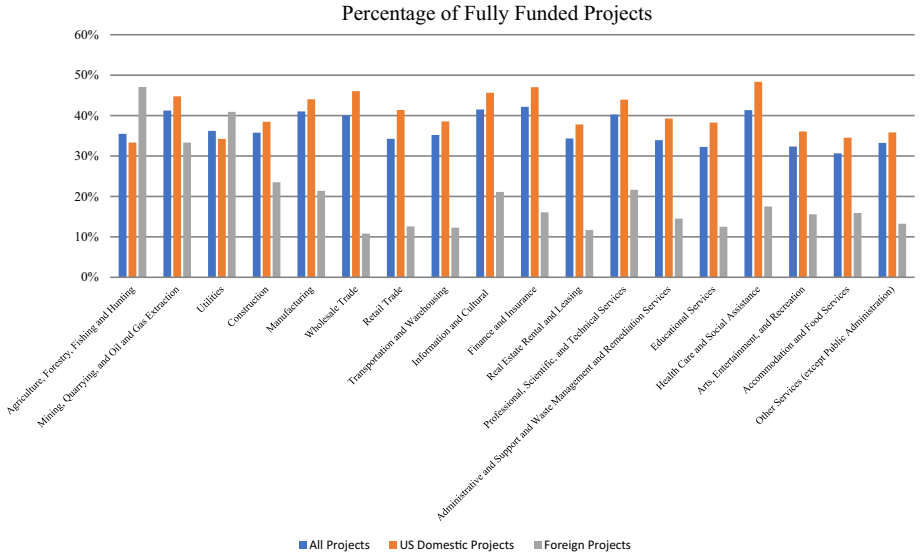

Fig. 2 Illustrates the average percentage of fully funded projects for each industry in equity crowdfunding campaigns through EquityNet between January 2007 and November 2016

Agriculture, Forestry, Fishing and Hunting achieved the highest average percentage of fundraising targets at 71%, whereas Other Services except Public Administration realized the lowest average percentage of fundraising target at 31%.

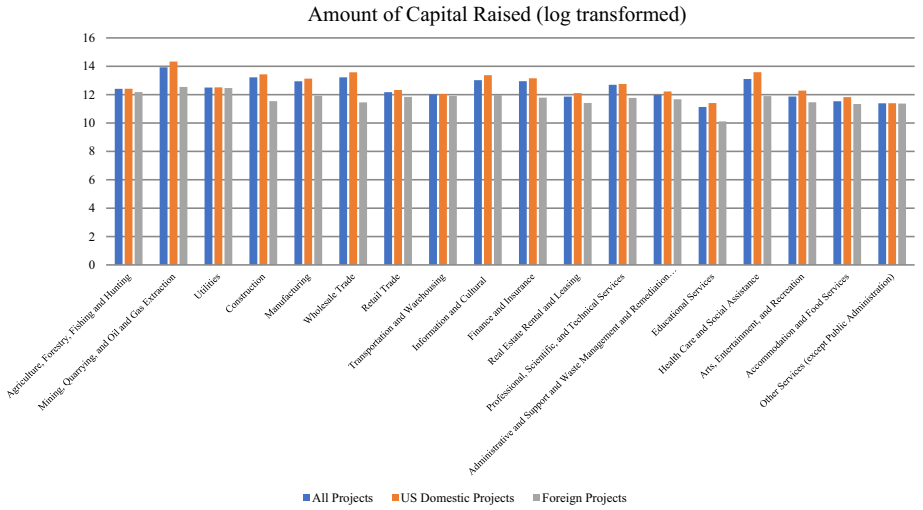

Fig. 3 Illustrates the average amount of capital raised for each industry in equity crowdfunding campaigns through EquityNet between January 2007 and November 2016

Figure 2 reveals the percentage of fully funded start-ups in each industry. On average, 42% of domestic firms have achieved their fundraising target; only 18% for foreign firms. Among domestic fundraising projects, Health Care and Social Assistance has the highest average percentage of fully funded projects at 48%, whereas Agriculture, Forestry, Fishing and Hunting has the lowest average percentage of fully funded projects at 33%. Among foreign fundraising projects, Agriculture, Forestry, Fishing and Hunting has the highest average percentage of fully funded projects at 47%, whereas Wholesale Trade has the lowest average percentage of fully funded projects at 11%.

Figure 3 reveals the amount of capital raised in each industry. On average, a domestic firm raises $315,000 through equity crowdfunding; foreign firms only $121,000. Among domestic fundraising projects, Mining, Quarrying, and Oil and Gas Extraction raised the highest average amount of capital at $1,675,000, whereas Other Services except Public Administration raised the lowest average amount of capital at $89,000. Among foreign fundraising projects, Mining, Quarrying, and Oil and Gas Extraction raised the highest average amount of capital at $281,000, whereas Educational Services raised the lowest average amount of capital at $25,000.

Figure 4 reveals average start-up age in each industry. On average, a domestic firm is 2.66 years old; a foreign firm is 3.79 years old. Among domestic fundraising projects, Mining, Quarrying, and Oil and Gas Extraction has the oldest average age at 3.84 years, whereas Educational Services has the youngest average age at 1.83 years. Among foreign fundraising projects, Wholesale Trade has the oldest average age at 5.51 years, whereas Administrative and Support and Waste Management and Remediation Services has the youngest average age at 2.45 years.

Figure 5 reveals average start-up revenue in each industry. On average, a domestic firm has an annual revenue of $500,000; a foreign firm has an annual revenue of $12,000. Among domestic fundraising projects, Wholesale Trade has the highest average annual revenue at $1,180,000, whereas Accommodation and Food Services has the lowest average annual revenue at $136,000. Among foreign fundraising projects, Utilities has the highest

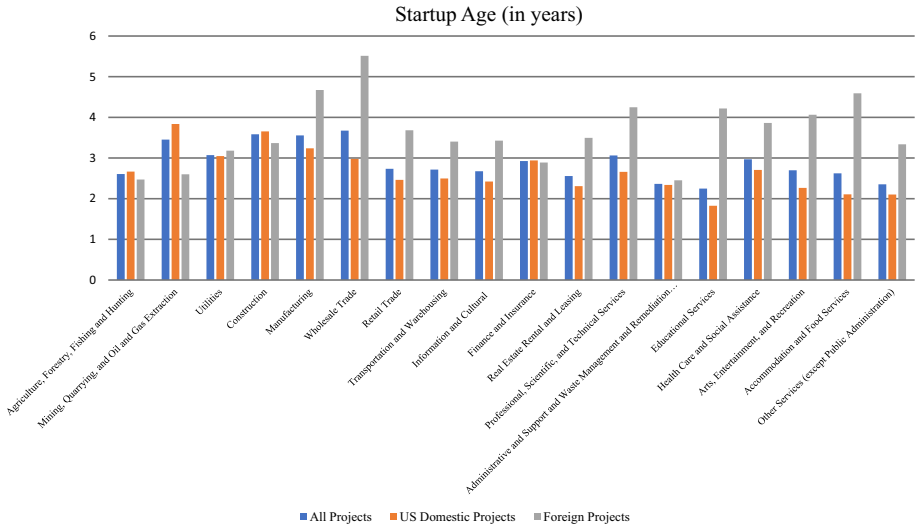

Fig. 4 Illustrates the average start-up age for each industry in equity crowdfunding campaigns through EquityNet between January 2007 and November 2016

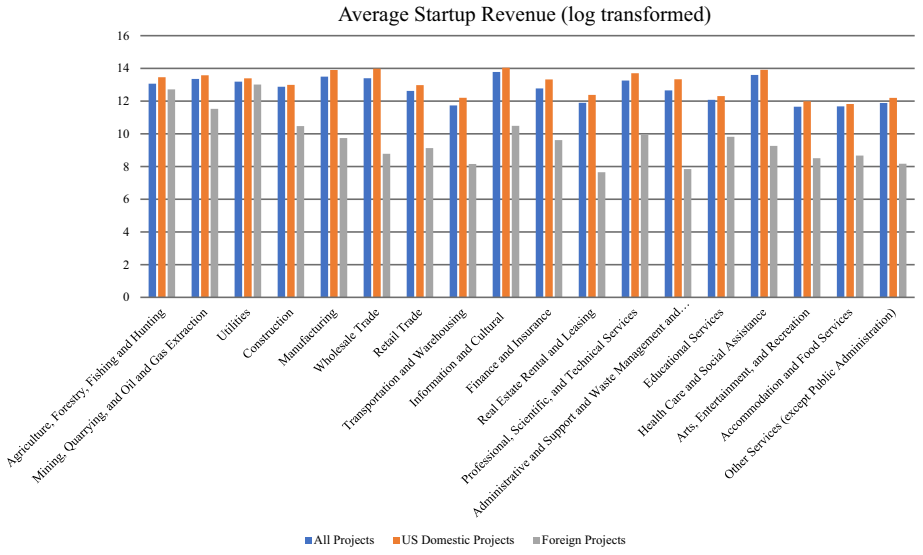

Fig. 5 Illustrates the average start-up revenue for each industry in equity crowdfunding campaigns through EquityNet between January 2007 and November 2016

average annual revenue at $450,000, whereas Real Estate Rental and Leasing has the lowest average annual revenue at $2100.

Figure 6 reveals average length of qualitative business introduction in each industry. On average, a domestic firm uses 345 words to introduce business conditions to potential investors; a foreign firm only uses 171 words. Among domestic fundraising projects,

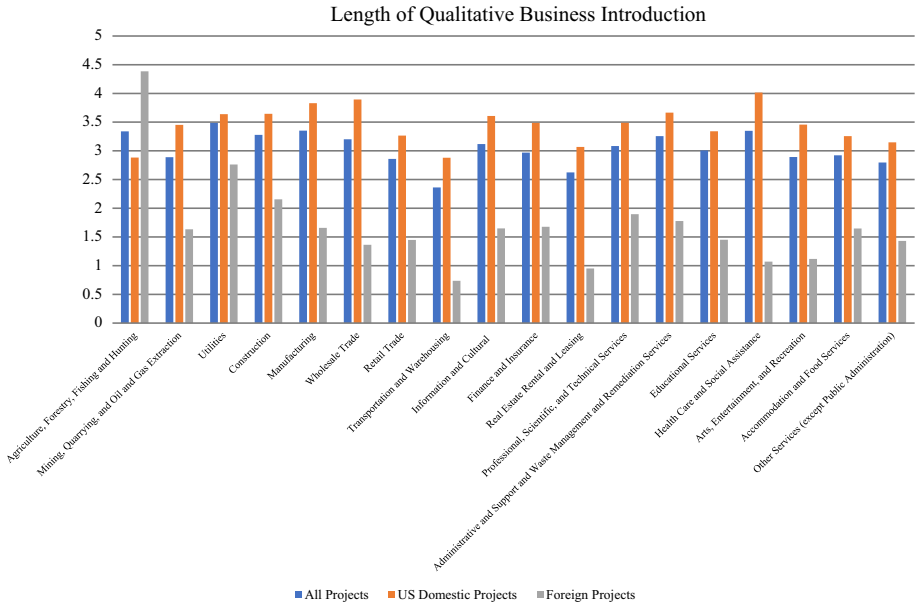

Fig. 6 Illustrates the average length of qualitative business introduction for each industry in equity crowdfunding campaigns through EquityNet between January 2007 and November 2016

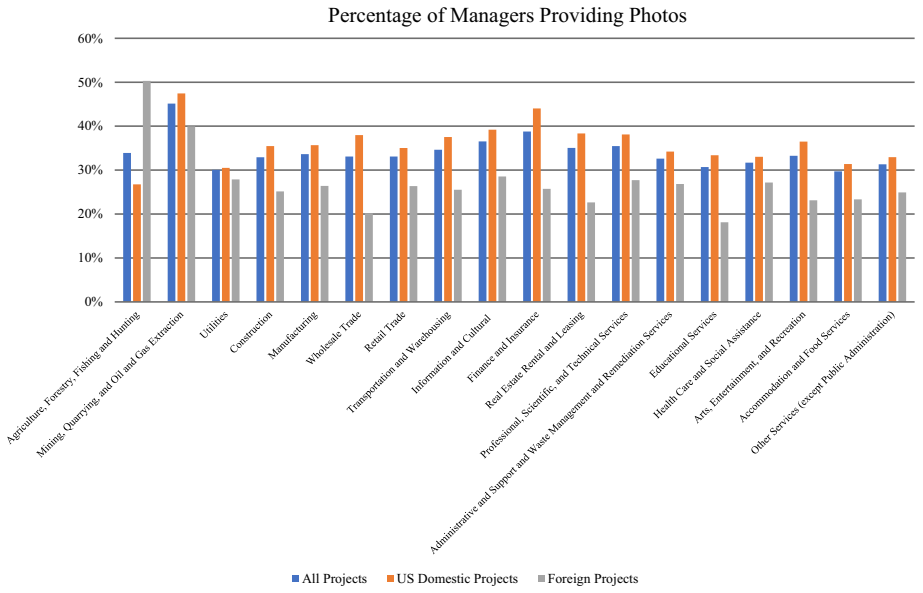

Fig. 7 Illustrates the average percentage of managers providing photos for each industry in equity crowdfunding campaigns through EquityNet between January 2007 and November 2016

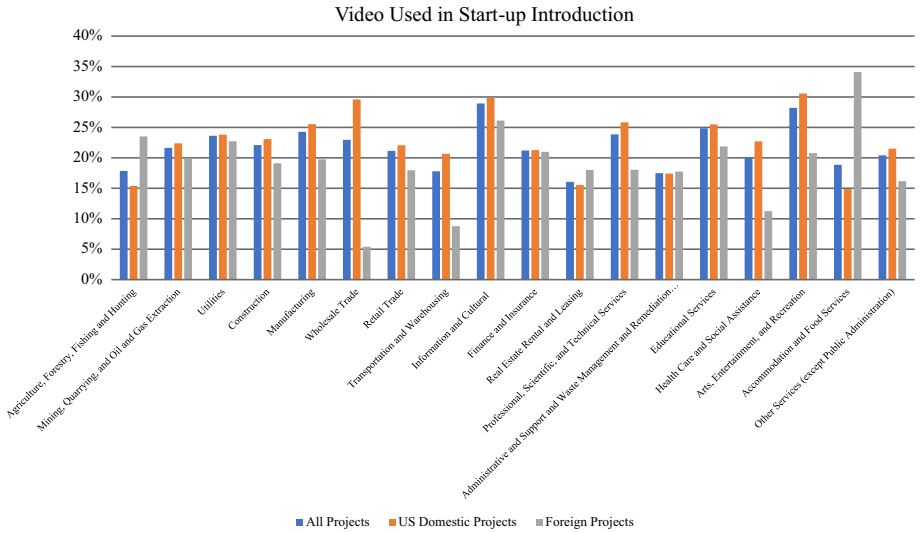

Fig. 8 Illustrates the average percentage of video used in start-up introduction for each industry in equity crowdfunding campaigns through EquityNet between January 2007 and November 2016

Health Care and Social Assistance uses the most words at 402, whereas Transportation and Warehousing uses the minimum words at 288. Among foreign fundraising projects, Agriculture, Forestry, Fishing and Hunting uses the most words at 439, whereas Transportation and Warehousing uses the minimum words at 74.

Figure 7 reveals average percentage of managers providing photos in fundraising campaigns in each industry. On average, 36% of managers from a domestic firm provide photos in fundraising campaigns, only 27% of managers from a foreign firm do. Among domestic fundraising projects, Mining, Quarrying, and Oil and Gas Extraction has the highest percentage of manager photos provided at 47%, whereas Agriculture, Forestry, Fishing and Hunting has the lowest percentage of manager photos provided at 27%. Among foreign fundraising projects, Agriculture, Forestry, Fishing and Hunting has the highest percentage of manager photos provided at 50%, whereas Educational Services has the lowest percentage of manager photos provided at 18%.

Figure 8 reveals the percentage of video used in fundraising campaigns in each industry. On average, 24% of domestic firms use video when introducing businesses to potential investors; only 19% for foreign firms. Among domestic fundraising projects, Arts, Entertainment, and Recreation has the highest average percentage of video used at 31%, whereas Accommodation and Food Services has the lowest average percentage of video used at 15%. Among foreign fundraising projects, Accommodation and Food Services has the highest average percentage of video used at 34%, whereas Wholesale Trade has the lowest average percentage of video used at 5%.

Figure 9 reveals the average estimated investment horizon in each industry. On average, the estimated investment horizon for a domestic fundraising project is 7.4 years; for a foreign project, 6.9 years. Among domestic fundraising projects, Mining, Quarrying, and Oil and Gas Extraction has the longest estimated investment horizon at 8.9 years, whereas Health Care and Social Assistance has the shortest estimated investment horizon at 6.6 years. Among foreign fundraising projects, Wholesale Trade has the longest estimated

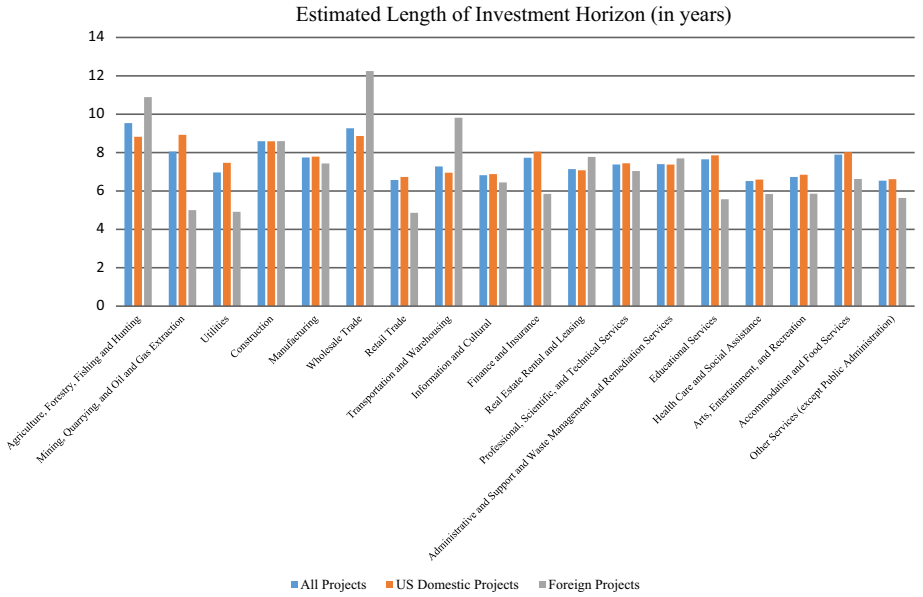

Fig. 9 Illustrates the average estimated length of investment horizon for each industry in equity crowdfunding campaigns through EquityNet between January 2007and November 2016

investment horizon at 12.3 years, whereas Retail Trade has the shortest estimated investment horizon at 4.9 years.

Table 1 presents summary statistics of all crowdfunding activities over the sample period. On average, a start-up is approximately 3 years old, with annual revenue of $385,000. The start-up has 2 to 3 managers, each with 7 years' industry experience. It uses 305 words to introduce its business model, competitive strategy, product market, drivers and barriers for product/service adoption and business milestones to crowd investors, achieves 63% of fundraising target and raises $270,000 from equity crowdfunding campaign.

To illustrate the differences across industry sectors, we focus on representative industry sectors with more than 5% of total observations and compare their characteristics across seven dimensions: percentage of fundraising plan completed, percentage of fully funded projects, amount of capital sought, entrepreneur's estimate of startup value, length of qualitative business description, estimated investment horizon, and startup age. The results are presented in Table 2.

Table 2 shows that start-ups in the real estate industry achieve a significantly lower percentage of fundraising planned than start-ups in the manufacturing industry and start-ups in the information industry. Start-ups in the health care industry have a higher chance of being fully funded than start-ups in retail trade. Start-ups in the real estate industry have a lower chance of being fully funded than start-ups in the manufacturing industry, information industry, professional services industry, and health care industry. Start-ups in the manufacturing industry seek a higher amount of capital than start-ups in the retail trade industry and the real estate industry. Start-ups in the retail trade industry seek a lower amount of capital than start-ups in the information industry and health care industry. Start-ups in the retail trade industry have a significantly lower entrepreneurs' estimation of firm

Table 1 Presents variable definitions and summary statistics for equity crowdfunding activities in EquityNet between January and November 2016

Variable Name	Definition	Min	Mean	Max	S.D	Obs
Percent of Fundraising Plan Completed	Percentage of fundraising target achieved: 1 represents 100%	0.0000	0.6305	1.0000	0.3457	6870
Amount of Capital Raised (log transformed)	Total amount of capital raised in U.S. dollar through an equity crowdfunding campaign. Data is log transformed as ln (1 + capital raised)	0.0000	12.5062	14.9141	2.3261	6870
Length of Qualitative Business Description	Number of words used in describing business model, competitive strategy, product market, drivers and barriers for product/service adoption and business milestones. 1 unit stands for 100 words	0.0000	3.0483	17.5300	3.6239	6870
Amount of Capital Seeking (log transformed)	Amount of capital a start-up seeks from investors. Data is log transformed	9.6158	13.2636	15.4250	1.2254	6870
Number of Managers	Number of managers in a start-up	1.0000	2.5265	12.0000	2.1359	6870
Average Industry Experience	Average years in corresponding industry for start-up managers	0.0000	6.9444	40.0000	9.6280	6870
Average Education Level	Average educational level for start-up managers in scale: high school 1, some undergraduate/associates 2, Completed Undergraduate 3, Some Graduate 4, Completed Graduate 5, Some Doctorate 6, Completed Doctorate 7	1.0000	3.2683	7.0000	1.4582	6870
Estimated Product Market Size (log transformed)	Estimated product market size in U.S. dollars. Data is log transformed	15.4249	25.5675	29.5301	3.2646	6870
Firm Revenue (log transformed)	Start-up revenue in U.S. dollars in the year prior to crowdfunding campaign. Data is log transformed. If no revenue is reported, log transformed value is treated as 0	0.0000	12.8610	14.4885	2.6490	6870
Equity Retention Ratio	Percentage of common shares a start-up will retain after crowdfunding	0.01458	0.3638	0.9126	0.2479	6870
Percentage of R&D Expense	Start-up R&D expense over revenue in the year prior to crowdfunding campaign. If no revenue is reported, median R&D expense ratio of corresponding industry in the sample data-set is used	0.0000	0.1003	0.5594	0.1306	6870
Difficult Level of Staffing	The scale is 1—7, where 7 indicate staffing is very difficult	1.0000	5.1307	7.0000	1.6694	6870
Planed Exit Channel Available? (Yes = 1; No = 0)	Does a start-up indicate planned exit channel in crowdfunding campaign? Yes = 1; No = 0	0.0000	0.4773	1.0000	0.4995	6870
Pre-funding Start-up Value Available? (Yes = 1; No = 0)	Does a start-up indicate estimated firm value prior to crowdfunding campaign? Yes = 1; No = 0	0.0000	0.4242	1.0000	0.4943	6870
Estimated Start-up Value (log transformed)	Estimated firm value prior to crowdfunding campaign in U.S. dollars. Data is log transformed	10.8198	14.7859	16.1181	1.4220	6870

Table 1 (continued)

Variable Name	Definition	Min	Mean	Max	S.D	Obs
U.S. Firm? (Yes = 1; No = 0)	Is a start-up incorporated in U.S.? Yes = 1; No = 0	0.0000	0.7675	1.0000	0.4224	6870
Start-up Age	Number of complete years from start-up incorporation to crowdfunding campaign	0.0000	2.9237	18.0000	4.7709	6870
Average Number of Photos per Manager	Total number of management team photos divided by number of managers	0.0000	0.3487	1.0000	0.4131	6870
Video Used in Fundraising Campaign? (Yes = 1; No = 0)	Is there a video embedded in crowdfunding campaign? Yes = 1; No = 0	0.0000	0.2256	1.0000	0.4180	6870

Table 2 Presents pairwise comparison tests on the means of startup characteristics for six representative industries: retail trade, manufacturing, information, real estate, professional service, and health care

	Percentage of Fundraising Plan Completed	Percentage of Fully Funded Projects	Amount of Capital Seek	Entrepreneur's Estimate of Startup Value	Length of Qualitative Business Description	Estimated Investment Horizon	Startup Age
Retail Trade vs. Manufacturing	−0.0314*	−0.0408*	−0.8861***	−1.2109***	−0.4915***	−1.1768***	−0.8206***
	(−1.90)	(−1.79)	(−2.82)	(−3.60)	(−2.90)	(−2.89)	(−3.63)
Information vs. Manufacturing	−0.0059	0.0047	0.0781	0.3032	−0.2335	−0.9258**	−0.8813***
	(−0.36)	(0.21)	(0.25)	(0.92)	(−1.41)	(−2.41)	(−3.97)
Real Estate vs. Manufacturing	−0.0540***	−0.0670***	−1.0765***	−1.8048	−0.7272***	−0.6107	−0.9979***
	(−2.93)	(−2.62)	(−3.06)	(−4.81)	(−3.85)	(−1.28)	(−3.95)
Professional Services vs. Manufacturing	−0.0174	−0.0075	−0.3479	−0.2488	−0.2676	−0.3670	−0.4926**
	(−1.07)	(−0.33)	(−1.11)	(−0.75)	(−0.59)	(−0.92)	(−2.19)
Health Care vs. Manufacturing	−0.0088	0.0234	0.1741	0.1946	−0.0031	−1.2319**	−0.5867**
	(−0.41)	(0.79)	(0.43)	(0.45)	(−0.01)	(−2.46)	(−2.01)
Information vs. Retail Trade	0.0255	0.0456*	0.9642***	1.5142***	0.2580	0.2510	−0.0607
	(1.43)	(1.85)	(2.84)	(4.17)	(1.41)	(0.58)	(−0.25)
Real Estate vs. Retail Trade	−0.0226	−0.0261	−0.1904	−0.5939	−0.2357	0.5660	−0.1773
	(−1.14)	(−0.95)	(−0.50)	(−1.47)	(−1.16)	(1.09)	(−0.65)
Professional Services vs. Retail Trade	0.0139	0.0333	0.5382	0.9621***	0.2239	0.8098*	0.3280
	(0.78)	(1.34)	(1.57)	(2.63)	(1.21)	(1.82)	(1.33)
Health Care vs. Retail Trade	0.0226	0.0642**	1.0602**	1.4056	0.4884**	−0.0551	0.2339
	(1.00)	(2.05)	(2.46)	(3.06)	(2.11)	(−0.10)	(0.76)
Real Estate vs. Information	−0.0481**	−0.0717***	−1.1546***	−2.1080	−0.4937**	0.3151	−0.1166
	(−2.46)	(−2.64)	(−3.09)	(−5.28)	(−2.45)	(0.63)	(−0.43)
Professional Services vs. Information	−0.0116	−0.0123	−0.4260	−0.5521	−0.0341	0.5588	0.3887
	(−0.65)	(−0.50)	(−1.26)	(−1.53)	(−0.19)	(1.32)	(1.60)
Health Care vs. Information	−0.0029	0.0186	0.0960	−0.1086	0.2304	−0.3061	0.2946
	(−0.13)	(0.60)	(0.23)	(−0.24)	(1.00)	(−0.59)	(0.96)

Table 2 (continued)

	Percentage of Fundraising Plan Completed	Percentage of Fully Funded Projects	Amount of Capital Seek	Entrepreneur's Estimate of Startup Value	Length of Qualitative Business Description	Estimated Investment Horizon	Startup Age
Professional Services vs. Real Estate	0.0365*	0.0594**	0.7286*	1.5559***	0.4596**	0.2438	0.5053*
	(1.85)	(2.17)	(1.93)	(3.86)	(2.26)	(0.48)	(1.86)
Health Care vs. Real Estate	0.0452*	0.0903***	1.2506***	1.9994	0.7240***	−0.6211	0.4112
	(1.89)	(2.72)	(2.73)	(4.09)	(2.94)	(−1.05)	(1.25)
Health Care vs. Professional Services	0.0087	0.0309	0.5220	0.4435	0.2645	−0.8649	−0.0941
	(0.39)	(0.99)	(1.22)	(0.97)	(1.15)	(−1.62)	(−0.31)

An industry is considered representative if it covers more than 5% of total observations in the dataset. The comparison tests examine start-up differences in the following business aspects: percentage of fundraising plan completed, percentage of fully funded projects, amount of capital seek, entrepreneur's estimate of startup value, length of qualitative business description, estimated investment horizon and startup age. Contrast values are presented in main table, T values are in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively¾

value than start-ups in the manufacturing industry, information industry, and professional service industry. Start-ups in the professional service industry have a significantly higher entrepreneurs' estimation of firm value than start-ups in the real estate industry. Start-ups in the manufacturing industry provide more qualitative business descriptions than start-ups in the retail trade industry and real estate industry. Start-ups in the real estate industry provide less qualitative business descriptions than start-ups in the information industry, professional service industry and health care industry. Start-ups in the manufacturing industry have longer estimated investment horizons than start-ups in the retail trade industry, information industry, and health care industry. Start-ups in the manufacturing industry are also significantly older than start-ups in the retail trade industry, information industry, real estate industry, professional service industry, and health care industry.

Table 3 examines the association between start-up valuation and crowdfunding success. We present pairwise comparison tests on the means of percentage of fundraising plan completed and the means of percentage of fully funded project for high valuation start-ups versus low valuation start-ups by industry classification. A start-up is classified as "high valuation" if the amount of money raised over number of managers is above industry average, and "low valuation" otherwise.

Table 3 shows that on average, start-ups receiving high valuation achieve over 90% of their fundraising targets: from 90.8% for Mining, Quarrying, and Oil and Gas Extraction Industry to 96.2% for Wholesale Trade Industry. Start-ups receiving high valuation also have a greater chance of being fully funded: the percentage of high valuation start-ups being fully funded ranges from 68.8% for Mining, Quarrying, and Oil and Gas Extraction Industry to 83.3% for Wholesale Trade Industry.

Conversely, start-ups receiving low valuation achieve less than 50% of their fundraising targets: from only 34.2% for Wholesale Trade Industry to 48.4% for Mining, Quarrying, and Oil and Gas Extraction Industry. Start-ups receiving low valuation are also unlikely to be fully funded: the percentage of low valuation start-ups being fully funded ranges from 0.0% for Wholesale Trade Industry to 14.3% for Mining, Quarrying, and Oil and Gas Extraction Industry.

Table 3 reveals variations across start-up industry sectors on the extent of association between start-up valuation and crowdfunding success, two measurements with different focuses on investors' perception of start-up quality. Overall, empirical data suggest strong positive association between start-up valuation and crowdfunding success.

The above descriptive statistics present a general picture of dataset. The following multivariate analyses further evaluate equity crowdfunding activities in different industries.

4 Multivariate analyses

Our analyses focus on the premium investors paid to equity crowdfunding projects in different industry sectors. Given the conditions and resources of a start-up, how much money can be raised from an equity crowdfunding campaign? Because different industry sectors exhibit different economic structures (Waring, 1996), we expect that investors have different preferences and emphasis when evaluating start-ups from different industries.

Table 4 presents regressions evaluating how different start-up characteristics influence the equity crowdfunding premium, measured as amount of money raised per manager in a start-up. Number of managers is included in the premium evaluation because managerial talent is one of the most important resources in start-up development (Ahlers et al.,

Table 3 Presents pairwise comparison tests on the means of percentage of fundraising plan completed and the means of percentage of fully funded project for high valuation start-ups versus low valuation start-ups by industry classification

	Percentage of Fundraising Plan Completed				Percentage of Fully Funded Projects			
	High Valuation Start-ups	Low Valuation Start-ups	Contrast	T Value	High Valuation Start-ups	Low Valuation Start-ups	Contrast	T Value
Agriculture, Forestry, Fishing and Hunting	92.5%	46.8%	0.4571***	9.55	71.4%	3.6%	0.6786***	7.22
Mining, Quarrying, and Oil and Gas Extraction	90.8%	48.4%	0.4247***	9.09	68.8%	14.3%	0.5446***	6.47
Utilities	94.2%	42.2%	0.5203***	16.22	76.3%	1.5%	0.7480***	13.76
Construction	94.5%	38.6%	0.5588***	25.49	76.9%	1.9%	0.7492***	20.67
Manufacturing	94.9%	37.9%	0.5700***	49.05	78.2%	2.2%	0.7592***	41.48
Wholesale Trade	96.2%	34.2%	0.6201***	21.19	83.3%	0.0%	0.8333***	18.44
Retail Trade	94.5%	36.6%	0.5789***	40.80	75.9%	2.2%	0.7373***	32.78
Transportation and Warehousing	94.5%	36.6%	0.5790***	21.34	80.9%	2.7%	0.7818***	21.20
Information and Cultural	94.6%	35.8%	0.5881***	41.81	76.4%	3.2%	0.7315***	31.76
Finance and Insurance	95.0%	36.0%	0.5895***	25.78	78.5%	1.4%	0.7717***	21.85
Real Estate Rental and Leasing	94.0%	37.9%	0.5608***	30.58	78.9%	1.9%	0.7707***	31.21
Professional, Scientific, and Technical Services	95.2%	36.8%	0.5844***	41.51	79.5%	2.9%	0.7663***	35.06
Admin and Support and Waste Mgmt. and Remediation Services	92.5%	36.3%	0.5620***	24.21	75.8%	1.9%	0.7395***	20.61
Educational Services	95.1%	40.0%	0.5507***	18.80	77.3%	3.8%	0.7356***	15.82
Health Care and Social Assistance	95.7%	34.4%	0.6128***	30.61	82.8%	1.1%	0.8164***	27.75
Arts, Entertainment, and Recreation	93.4%	36.5%	0.5693***	24.84	76.4%	1.6%	0.7482***	22.90
Accommodation and Food Services	93.5%	35.2%	0.5831***	21.72	76.8%	1.5%	0.7529***	19.01
Other Services (except Public Administration)	94.8%	39.2%	0.5562***	24.55	77.3%	2.4%	0.7490***	23.15

A start-up is classified as "high valuation" if the amount of money raised over number of managers is above industry average, and "low valuation" otherwise. The comparison tests examine the association between start-up valuation and crowdfunding success. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively

Table 4 Presents regressions evaluating how different start-up characteristics influence the equity crowdfunding premium, measured as amount of money raised in a campaign divided by number of managers in a start-up

Panel A full sample

	Manufacturing	Information	Professional Services	Retail Trade	Real Estate	Health Care
Industry average crowdfunding success rate in prior month	0.832*	0.623	1.468***	1.199**	−0.351	0.896
	(1.79)	(1.14)	(2.80)	(2.21)	(−0.57)	(1.33)
Length of Qualitative Business Description	0.238***	0.320***	0.150***	0.218***	0.259***	0.166***
	(7.15)	(7.37)	(3.54)	(5.09)	(4.65)	(2.85)
Average Industry Experience	0.0233*	0.0460***	−0.00782	0.0296*	0.00610	0.0230
	(1.95)	(2.94)	(−0.51)	(1.74)	(0.33)	(1.04)
Average Educational Level	0.182**	0.361***	0.157*	0.241***	0.250**	0.386***
	(2.56)	(4.36)	(1.90)	(2.61)	(2.47)	(3.28)
Estimated Product Market Size (log transformed)	0.0369***	0.0387**	−0.0234	0.00301	0.0236	0.0183
	(2.61)	(2.28)	(−1.41)	(0.18)	(1.24)	(0.72)
Firm Revenue (log transformed)	0.0142	0.0158	0.0293	0.00277	0.0883***	0.134***
	(0.62)	(0.59)	(1.00)	(0.10)	(2.72)	(3.54)
Growth Rate of Operating Income	0.0233	0.0469	0.0438	0.0759	0.0256	−0.0532
	(0.56)	(1.01)	(0.92)	(1.31)	(0.30)	(−0.79)
Research and Development Expense (log transformed)	0.109***	0.0720***	0.0854***	0.102***	0.0546	0.125***
	(4.75)	(2.60)	(3.00)	(3.30)	(1.35)	(3.19)
Difficult Level of Staffing	0.0167	−0.0419	0.00354	−0.0211	0.0370	0.0749
	(0.35)	(−0.74)	(0.06)	(−0.40)	(0.63)	(0.95)
Pre-funding Start-up Value Available? (Yes = 1; No = 0)	0.664*	0.183	1.429***	0.340	1.583***	1.807**
	(1.72)	(0.40)	(2.97)	(0.82)	(3.01)	(2.58)
U.S. Firm? (Yes = 1; No = 0)	−0.144	0.190	−0.167	−0.429	−0.280	−0.540
	(−0.62)	(0.70)	(−0.60)	(−1.51)	(−0.80)	(−1.24)
Start-up Age	0.0203	−0.0470*	−0.0123	−0.0313	0.0199	−0.00521
	(1.13)	(−1.95)	(−0.53)	(−1.31)	(0.67)	(−0.15)

Table 4 (continued)

Panel A full sample

	Manufacturing	Information	Professional Services	Retail Trade	Real Estate	Health Care
Average Number of Photos per Manager	1.762***	1.997***	1.488***	1.675***	2.273***	1.788***
	(5.81)	(5.95)	(4.26)	(4.51)	(5.44)	(3.11)
Control for Equity Retention Ratio?	Yes	Yes	Yes	Yes	Yes	Yes
Control for Video Used in Fundraising Campaign?	Yes	Yes	Yes	Yes	Yes	Yes
Control for Amount of Capital Seeking?	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−0.0867	0.0702	−0.0248	0.467*	0.0454	0.117
	(−0.36)	(0.27)	(−0.09)	(1.71)	(0.14)	(0.31)
r2	0.578	0.609	0.600	0.654	0.721	0.601
Number of obs	1124	794	762	746	528	352

Panel B Subsample—fully funded firms only

	Manufacturing	Information	Professional Services	Retail Trade	Real Estate	Health Care	
Industry average crowdfunding success rate in prior month	−0.0558	0.602	1.671	1.355	−0.136		0.455
	(−0.05)	(0.49)	(1.21)	(0.89)	(−0.09)		(0.32)
Length of Qualitative Business Description	0.309***	0.418***	0.172**	0.316***	0.320***		0.199**
	(5.69)	(6.65)	(2.54)	(4.59)	(3.13)		(2.35)
Average Industry Experience	0.0387**	0.0815***	−0.0156	0.0451	−0.00105		0.0629*
	(2.00)	(3.33)	(−0.58)	(1.53)	(-0.03)		(1.71)
Average Educational Level	0.144	0.00618	0.0725	0.227	−0.0185		0.139
	(1.10)	(0.04)	(0.44)	(1.14)	(−0.08)		(0.66)
Estimated Product Market Size (log transformed)	−0.00827	0.0622	0.108**	0.00683	0.00972		0.0856
	(−0.21)	(1.48)	(2.17)	(0.14)	(0.15)		(1.36)
Firm Revenue (log transformed)	−0.0576	−0.0174	0.115**	0.0937*	0.0686		0.206***
	(−1.35)	(−0.36)	(2.01)	(1.74)	(1.00)		(2.93)

Table 4 (continued)

Panel B Subsample—fully funded firms only						
Growth Rate of Operating Income	0.0458	0.0481	0.0427	0.0742	0.0211	−0.0815
	(0.78)	(0.73)	(0.60)	(0.89)	(0.16)	(−0.90)
Research and Development Expense (log transformed)	0.0959***	0.0752*	0.0981**	0.111**	0.0413	0.0961*
	(2.75)	(1.81)	(2.25)	(2.30)	(0.59)	(1.73)
Difficult Level of Staffing	0.216*	−0.0876	0.0386	−0.184	−0.0884	0.0759
	(1.72)	(−0.68)	(0.27)	(−1.20)	(−0.39)	(0.39)
Pre-funding Start-up Value Available? (Yes = 1; No = 0)	0.737	0.130	−0.179	−0.264	0.862	1.536
	(−0.92)	(0.15)	(−0.19)	(−0.31)	(0.80)	(1.19)
U.S. Firm? (Yes = 1; No = 0)	−0.114	0.565	−0.405	−0.942	−1.393	−1.197
	(−0.20)	(0.89)	(−0.60)	(−1.01)	(−1.10)	(−1.12)
Start-up Age	0.0297	−0.0880	−0.0916*	−0.0857	0.0377	0.0494
	(0.68)	(−1.53)	(−1.66)	(−1.09)	(0.47)	(0.62)
Average Number of Photos per Manager	1.565***	1.830***	1.114*	1.343**	2.302***	0.951
	(3.20)	(3.58)	(1.89)	(2.17)	(2.91)	(1.06)
Control for Equity Retention Ratio?	Yes	Yes	Yes	Yes	Yes	Yes
Control for Video Used in Fundraising Campaign?	Yes	Yes	Yes	Yes	Yes	Yes
Control for Amount of Capital Seeking?	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4.014**	5.259***	4.533**	5.993***	3.301	8.535***
	(2.36)	(3.21)	(2.49)	(3.13)	(1.30)	(3.36)
r2	0.248	0.367	0.266	0.298	0.300	0.373
Number of obs	439	314	292	261	171	146

Number of managers is included in the premium evaluation because managerial talent is one of the most important resources in start-up development. Given all start-ups provide managerial information in equity crowdfunding campaigns, number of managers can be used as a proxy for the size of a start-up. Six representative industries, each contains more than 5% of total observations, are analyzed: Manufacturing, Information and Cultural, Professional, Scientific, and Technical Services, Retail Trade, Real Estate Rental and Leasing, and Health Care and Social Assistance. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively

2015 and Piva & Rossi-Lamastra, 2018). As all start-ups provide managerial information in equity crowdfunding campaigns, number of managers can be used as a selection-bias free proxy for the size of a start-up. Six representative industries, each contains more than 5% of total observations, are analyzed: Manufacturing, Information and Cultural, Professional, Scientific, and Technical Services, Retail Trade, Real Estate Rental and Leasing, and Health Care and Social Assistance.

Table 4 shows that investors indeed emphasize on distinct business aspects when evaluating start-ups in different industry sectors. Panel A presents analyses results based on full sample, including the campaigns that missed fundraising targets. Panel B presents analyses results based on subsample, including fully funded campaigns only.

Table 4 Panel A shows that, length of qualitative business introduction is universally important for all representative industry sectors. In general, the more detailed the information disclosure, the higher the amount of money raised per manager. However, the marginal impacts of qualitative business introduction on business valuation varies across different industry sectors. On average, a 100 words increase in qualitative business introduction increases the amount of money raised per manager by 7.0%, 8.9%, 4.4%, 6.1%, 6.9% and 5.1% for Manufacturing Industry, Information and Cultural Industry, Professional, Scientific, and Technical Services Industry, Retail TradeIndustry, Real Estate Rental and Leasing Industry, and Health Care and Social Assistance Industry respectively.

Industry experience is considered important for Information and Cultural Industry, such that on average, an one-year increase in managerial industry experience increases the amount of money raised per manager by 1.3%. The result is statistically significant at 1% level. Industry experience also exhibit a moderate positive influence on amount of money raised per manager for Manufacturing Industry and Retail Trade Industry, but not for Professional, Scientific, and Technical Services Industry, Real Estate Rental and Leasing Industry, or Health Care and Social Assistance Industry.

Managerial education level is considered important for Manufacturing Industry, Information and Cultural Industry, Retail Trade Industry, Real Estate Rental and Leasing Industry, and Health Care and Social Assistance Industry. On average, an one-level increase in managerial education level increases the amount of money raised per manager by 5.3%, 10.0%, 6.7%, 6.6%, and 11.8% for Manufacturing Industry, Information and Cultural Industry, Retail Trade Industry, Real Estate Rental and Leasing Industry, and Health Care and Social Assistance Industry, respectively. The results are at least statistically significant at 5% level. Managerial education level also exhibits a moderate positive influence on amount of money raised per manager for Professional, Scientific, and Technical Services Industry.

Table 4 Panel A also shows that estimated product market size is considered important for Manufacturing Industry and Information and Cultural Industry. Firm revenue is considered important for Real Estate Rental and Leasing Industry and Health Care and Social Assistance Industry. Research and development expense is considered important for all representative industries except Real Estate Rental and Leasing Industry. Providing start-up valuation information helps increase the amount of money raised per manager for Professional, Scientific, and Technical Services Industry, Real Estate Rental and Leasing Industry, and Health Care and Social Assistance Industry. Providing management team photos is critical to equity crowdfunding firm valuation such that on average, start-ups that provide photos for all managers raise 51.6%, 55.3%, 43.3%, 46.8%, 60.4% and 54.5% more capital per manager than start-ups without managerial photos for Manufacturing Industry, Information and Cultural Industry, Professional, Scientific, and Technical Services Industry, Retail Trade Industry, Real Estate Rental and Leasing Industry, and Health Care and Social Assistance Industry, respectively.

Table 4 Panel A further shows strong peer effect in Professional, Scientific, and Technical Services Industry and Retail Trade Industry, in which success of recent peers in same industry drives subsequent successes. Peer effect is also observed in Manufacturing Industry, but not in Information and Cultural Industry, Real Estate Rental and Leasing Industry, or Health Care and Social Assistance Industry.

Table 4 Panel B presents subsample analyses on start-ups that achieved their fundraising targets. Overall, the subsample analyses generate consistent results as the full sample analyses: more detailed information disclosure, measured by length of qualitative business introduction, increases the amount of capital raised per manager. Managers' industry experience is important for Manufacturing Industry and Information and Cultural Industry. Research and Development expenses the amount of capital raised per manager for most industries except Real Estate Rental and Leasing Industry. Providing photos of the management team increases the amount of capital raised per manager for most industries except Health Care and Social Assistance Industry.

Table 5 presents regressions evaluating how different start-up characteristics influence the equity crowdfunding premium, measured as amount of money raised in a campaign divided by the most recent revenue of a start-up. Start-up revenue is included in the premium evaluation because it shows a start-up's profitability in the concurrent period. However, only start-ups with revenue information are included in the analyses. Consequently, only 44.7%, 45.6%, 43.3%, 40.6%, 36.6%, and 45.2% of start-ups from the six representative industries—Manufacturing Industry, Information and Cultural Industry, Professional, Scientific, and Technical Services Industry, Retail Trade Industry, Real Estate Rental and Leasing Industry, and Health Care and Social Assistance Industry, each contains more than 5% of total observations, are analyzed in Table 5. Panel A presents analyses results based on full sample, including the campaigns that missed fundraising targets. Panel B presents analyses results based on subsample, including fully funded campaigns only.

Table 5 Panel A shows that, among start-ups that provide revenue information, management industry experience is considered important only for Health Care and Social Assistance Industry. Estimated product market size is considered important for Information and Cultural Industry, Professional, Scientific, and Technical Services Industry, Retail Trade Industry, and Real Estate Rental and Leasing Industry. Growth rate of operating income is considered important for Information and Cultural Industry and Professional, Scientific, and Technical Services Industry. Research and development expense is considered important for start-ups with revenue information in all six representative industries. Providing pre-funding valuation is helpful for start-ups in Manufacturing Industry, Retail Trade Industry, and Real Estate Rental and Leasing Industry. Older start-ups are favored in Information and Cultural Industry, whereas younger start-ups are favored in Retail Trade Industry. Providing management team photos is considered important for Professional, Scientific, and Technical Services Industry. Peer effect, in which success of recent peers in same industry drives subsequent successes, is only observed in Health Care and Social Assistance Industry.

Table 5 Panel B shows that among start-ups that provide revenue information, subsample analyses on fully funded start-ups generate similar results as the full sample analyses. The interpretation for the subsample analyses results is thus not included for conciseness.

Table 5 Presents regressions evaluating how different start-up characteristics influence the equity crowdfunding premium, measured as amount of money raised in a campaign divided by the most recent revenue of a start-up

Panel A Full Sample						
	Manufacturing	Information	Professional Services	Retail Trade	Real Estate	Health Care
Industry average crowdfunding success rate in prior month	0.0468	0.0518	0.0294	0.0634	−0.0129	0.114***
	(1.62)	(1.45)	(0.94)	(1.54)	(−0.28)	(2.67)
Length of Qualitative Business Description	0.00243	0.000113	0.00212	0.00160	0.00164	0.00373
	(1.52)	(0.06)	(1.11)	(0.66)	(0.50)	(1.24)
Average Industry Experience	0.000101	0.000536	0.00106	0.00153	0.000612	0.00325**
	(0.16)	(0.69)	(1.38)	(1.51)	(0.52)	(2.61)
Average Educational Level	0.00334	−0.000388	0.00124	0.00352	−0.00423	0.00625
	(0.82)	(−0.08)	(0.27)	(0.54)	(−0.58)	(0.88)
Estimated Product Market Size (log transformed)	0.00153	0.00457***	0.00531***	0.00574***	0.00371**	0.00224
	(1.39)	(3.70)	(3.92)	(3.99)	(2.09)	(1.31)
Growth Rate of Operating Income	0.00288	0.00683***	0.00409**	0.00460	0.00641	0.00534*
	(1.63)	(3.52)	(2.16)	(1.61)	(1.49)	(1.80)
Research and Development Expense (log transformed)	0.00397***	0.00606***	0.00726***	0.00708***	0.00873***	0.00612***
	(3.94)	(5.19)	(6.32)	(4.34)	(4.25)	(3.42)
Difficult Level of Staffing	0.00497	−0.00403	−0.0000989	0.00765	−0.0149**	0.00506
	(1.27)	(−0.96)	(−0.02)	(1.51)	(−2.24)	(0.76)
Pre-funding Start-up Value Available? (Yes = 1; No = 0)	0.0486**	0.0195	0.0249	0.0663***	0.121***	0.0505
	(2.25)	(0.76)	(1.00)	(2.62)	(3.77)	(1.19)
U.S. Firm? (Yes = 1; No = 0)	0.0161	0.00386	−0.00647	−0.000365	−0.00454	−0.0399
	(0.88)	(0.20)	(−0.34)	(−0.01)	(−0.09)	(−1.12)
Start-up Age	0.000769	0.00526***	−0.00205	−0.00534**	−0.000924	0.00249
	(−0.60)	(2.85)	(−1.33)	(−2.06)	(−0.34)	(0.97)
Average Number of Photos per Manager	−0.0112	0.0201	0.0490***	−0.00677	0.0260	−0.0208
	(−0.72)	(1.20)	(2.90)	(−0.31)	(1.08)	(−0.65)
Control for Equity Retention Ratio?	Yes	Yes	Yes	Yes	Yes	Yes

Table 5 (continued)

Panel A Full Sample						
	Manufacturing	Information	Professional Services	Retail Trade	Real Estate	Health Care
Control for Video Used in Fundraising Campaign?	Yes	Yes	Yes	Yes	Yes	Yes
Control for Amount of Capital Seeking?	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.112***	0.211***	0.179***	0.152***	0.220***	0.188***
	(2.86)	(4.85)	(4.20)	(2.90)	(3.19)	(2.76)
r2	0.728	0.822	0.809	0.768	0.826	0.815
Number of obs	502	362	330	303	193	159
Panel B Subsample-Fully Funded Firms Only						
	Manufacturing	Information	Professional Services	Retail Trade	Real Estate	Health Care
Industry average crowdfunding success rate in prior month	0.0367	0.0973**	−0.0129	0.0414	0.00620	0.0580
	(1.04)	(2.31)	(−0.31)	(0.70)	(0.12)	(1.26)
Length of Qualitative Business Description	0.000879	−0.000582	0.00290	0.000360	−0.00218	0.00200
	(0.54)	(−0.28)	(1.39)	(0.13)	(−0.65)	(0.74)
Average Industry Experience	0.000637	0.000893	0.00195**	0.00129	0.0000216	0.00281**
	(1.01)	(1.06)	(2.24)	(1.07)	(0.02)	(2.40)
Average Educational Level	0.00673	0.00339	0.00784	0.00790	−0.00934	0.00527
	(1.62)	(0.59)	(1.45)	(0.97)	(−1.12)	(0.73)
Estimated Product Market Size (log transformed)	0.00305**	0.00662***	0.00731***	0.00716***	0.00602**	0.00361*
	(2.36)	(4.19)	(4.06)	(3.53)	(2.42)	(1.79)
Growth Rate of Operating Income	0.00331*	0.00578***	0.00482**	0.00382	0.00392	0.00453
	(1.92)	(2.73)	(2.25)	(1.21)	(0.93)	(1.64)
Research and Development Expense (log transformed)	0.00293***	0.00790***	0.00756***	0.00634***	0.00925***	0.00489***
	(2.81)	(6.01)	(5.71)	(3.36)	(4.25)	(2.90)

Table 5 (continued)

Panel B Subsample-Fully Funded Firms Only						
Difficult Level of Staffing	0.00486	−0.00486	−0.00267	0.0113*	−0.00636	0.00352
	(1.20)	(−1.10)	(−0.57)	(1.82)	(−0.78)	(0.55)
Pre-funding Start-up Value Available? (Yes = 1; No = 0)	0.00997	−0.0195	0.00223	0.0379	0.0578	−0.0722
	(0.35)	(−0.60)	(0.07)	(1.06)	(1.57)	(−1.42)
U.S. Firm? (Yes = 1; No = 0)	0.0158	0.000363	0.00369	−0.0591	−0.00489	−0.0357
	(0.85)	(0.02)	(0.17)	(−1.58)	(−0.11)	(−1.03)
Start-up Age	0.000404	0.00525***	−0.000665	−0.00418	−0.00144	0.00110
	(0.30)	(2.72)	(−0.38)	(−1.37)	(−0.52)	(0.43)
Average Number of Photos per Manager	−0.0128	0.00236	0.0455**	0.00551	0.0402	−0.0419
	(−0.82)	(0.13)	(2.39)	(0.21)	(1.52)	(−1.35)
Control for Equity Retention Ratio?	Yes	Yes	Yes	Yes	Yes	Yes
Control for Video Used in Fundraising Campaign?	Yes	Yes	Yes	Yes	Yes	Yes
Control for Amount of Capital Seeking?	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.324***	0.448***	0.337***	0.378***	0.308***	0.410***
	(5.65)	(7.81)	(5.44)	(4.54)	(3.42)	(4.86)
r2	0.512	0.737	0.701	0.488	0.606	0.677
Number of obs	390	279	263	230	147	128

Start-up revenue is included in the premium evaluation because it shows a start-up's profitability in the concurrent period. However, only start-ups with revenue information are included in the analyses. Six representative industries, each contains more than 5% of total observations, are analyzed: Manufacturing, Information and Cultural, Professional, Scientific, and Technical Services, Retail Trade, Real Estate Rental and Leasing, and Health Care and Social Assistance. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively

5 Discussion

Empirical analyses in Table 4 Panel A and Table 5 Panel A focus on different start-up groups: Table 4 Panel A covers all start-ups in the dataset, while Table 5 Panel A examines a subgroup of start-ups with revenue information provided. Arguably, start-ups analyzed in Table 5 Panel A are more mature than start-ups in the general group. With business tracking records provided, they are more likely to achieve fundraising targets. The percentages of fully funded equity crowdfunding projects in the subsample analyzed in Table 5 Panel A (general sample analyzed in Table 4 Panel A) are 77.7%, 77.1%, 79.7%, 75.9%, 76.2% and 80.5% (39.1%, 39.5%, 38.3%, 35.0%, 32.4% and 41.5%) for Manufacturing Industry, Information and Cultural Industry, Professional, Scientific, and Technical Services Industry, Retail Trade Industry, Real Estate Rental and Leasing Industry, and Health Care and Social Assistance Industry, respectively. Nevertheless, because most start-ups seeking equity crowdfunding do not have sales or revenue, the interpretation of results should mainly be based on the general sample analyses.

Empirical evidence from the general sample analyses suggests some universally important factors for all start-ups seeking equity crowdfunding, regardless of their industry. These factors include effective communication with investors, indicated by length of qualitative business introduction and providing managers' photos; and managerial qualification, indicated by education level and years of industry experience. More specifically, in support of Piva and Rossi-Lamastra (2018), managers' education level is more important than their years of industry experience to crowdfunding investors. One possible explanation is that education shapes entrepreneurs' mindset while industry experience shows their understanding on the field. As mindset determines entrepreneurs' business vision and influences start-ups' future development, it is more important to crowd investors than industry experience, which can be learned over time. Another possible explanation is that educational level is a relatively clean measurement of managerial talent, whereas industry experience is a vague measurement with a lot of noise: working in the field for 5 years with no improvement is no better than making progresses in the area over 3 years. In this regard, education level more efficiently signals managerial quality.

Estimated product market size is important for Manufacturing Industry and Information and Cultural Industry as crowd investors in these industries need entrepreneurs' guidance to determine businesses' growth potential, whereas investors in Professional, Scientific, and Technical Services Industry, Retail Trade Industry, and Health Care and Social Assistance Industry are more likely to rely on their own knowledge and experience to evaluate start-ups' future growth opportunities.

Current firm revenue is only important for Real Estate Rental and Leasing Industry and Health Care and Social Assistance Industry, showing that investors are more willing to choose more mature businesses in the industry sectors, whereas for other industries, a start-up with no revenue is not considered a disadvantage.

Investors do not care about R&D in Real Estate Rental and Leasing Industry, a traditional business sector with conventional business models. For the resource-based industry, investors focus on metrics such as firm revenue, pre-funding firm valuation, managerial qualification, and effective communication to investors, i.e., photo provided, qualitative business introduction is comprehensive. For other industries, R&D is believed to be the driving force for future business growth.

Entrepreneurs' self-evaluation on business provides important reference for investors in most industries except Information and Cultural Industry and Retail Trade Industry,

in which investors mainly rely on their own judgement for the business value. Peer effect is prevalent in Professional, Scientific, and Technical Services Industry and Retail Trade industry, showing that investors in these industries are more likely to herd.

Empirical evidence further suggests that despite of a higher chance of being fully funded, domestic firms do not receive a more favorable business valuation than foreign firms, showing that investors are not necessarily biased against foreign firms; the inferior fundraising outcome of foreign projects are mainly attributed to their insufficient preparation, e.g., ineffective information disclosure and poorer business quality in general.

6 Conclusion

In this study, we investigate industry differences in private business valuation in the context of equity crowdfunding. We hypothesized that firm Industry is a factor considered by crowdfunding investors and effects firm valuation. We further posit that exacerbated information asymmetry in crowdfunding suggests both pooling and separating equilibria of Industry signals as Investors refer to differing signals related to firm characteristics, project goals, managerial skill, fundraising goals, and post-crowdfunding outlook to value high quality and low-quality firms. We proposed a new business valuation method based on human resource of a start-up—a well-recognized important factor for business development and selection-bias free indicator for start-up size and examine how much capital can be raised per manager in a start-up. We divide start-ups based their industry and analyze how various business attributes from different industry sectors influence start-up valuation.

Empirical data suggest that start-ups in different industry sectors are systematically different in age, revenue, pre-crowdfunding business valuation, adoption of video introduction, usage of qualitative business introduction, availability of managers' photos, amount of capital seek, and estimated investment horizon. Their fundraising outcomes are also different in percentage of fundraising plan completed and in percentage of fully funded projects.

We analyze start-ups from representative industry sectors with more than 5% of total observations. Empirical analyses show that investors focus on different business aspects when contributing capital to start-ups from different industry sectors. For example, managers' industry experience is very important for start-ups in Information and Cultural Industry, but not as important for start-ups in Professional, Scientific, and Technical Services Industry, Real Estate Rental and Leasing Industry, or Health Care and Social Assistance Industry. Entrepreneurs' estimate on product market size provides useful reference for investors focusing on Manufacturing Industry and Information and Cultural Industry, but not for investors interested in Professional, Scientific, and Technical Services Industry, Retail Trade Industry, Real Estate Rental and Leasing Industry, or Health Care and Social Assistance Industry. Firm revenue is important for Real Estate Rental and Leasing Industry, and Health Care and Social Assistance Industry, but not for Manufacturing Industry, Information and Cultural Industry, Professional, Scientific, and Technical Services Industry, or Retail Trade Industry. Research and development are considered important for most industries except Real Estate Rental and Leasing Industry. Length of qualitative business introduction and managers' educational level are important for all industry sectors under investigation, but their marginal impacts on business valuation vary across different industry sectors.

We document that investors in Professional, Scientific, and Technical Services Industry and Retail Trade Industry are influenced by industry average crowdfunding success rate in prior month, showing that they are more likely to herd than investors focusing on other industry sectors.

Overall, we provide the first empirical analysis on equity crowdfunding investors' preferences based on their industry focuses. Due to the limitation of dataset, our analysis only discloses investors' decision-making process in the recent period; whether and how equity crowdfunding investors' decision-making process will evolve over time can be an interesting topic for future studies.

References

Ahlers, G. K. C., Cumming, D., Günther, C., & Schweizer, D. (2015). Signaling in equity crowdfunding. *Entrepreneurship Theory and Practice, 39*(4), 955–980.

Alford, A. W. (1992). The effect of the set of comparable firms on the accuracy of the price-earnings valuation method. *Journal of Accounting Research, 30*(1), 94–108.

Allen, F., Gu, X., & Jagtiani, J. (2021). A survey of fintech research and policy discussion. *Review of Corporate Finance, 1*(3–4), 259–339.

Audretsch, D. B., Lehmann, E. E., Paleari, S., & Vismara, S. (2016). Entrepreneurial finance and technology transfer. *The Journal of Technology Transfer, 41*, 1–9.

Baird, P. L., Geylani, P. C., & Roberts, J. A. (2012). Corporate social and financial performance re-examined: industry effects in a linear mixed model analysis. *Journal of Business Ethics, 109*, 367–388.

Block, J., Hornuf, L., & Moritz, A. (2018). Which updates during an equity crowdfunding campaign increase crowd participation? *Small Business Economics, 50*, 3–27.

Chava, S., & Jarrow, R. A. (2004). Bankruptcy prediction with industry effects. *Review of Finance, 8*(4), 537–569.

Coakley, J., & Lazos, A. (2021). New developments in equity crowdfunding: A review. *Review of Corporate Finance, 1*(3–4), 341–405.

Colombo, M. G., Cumming, D. J., & Vismara, S. (2016). Governmental venture capital for innovative young firms. *The Journal of Technology Transfer, 41*, 10–24.

Colombo, M. G., & Grilli, L. (2005). Founders' human capital and the growth of new technology-based firms: A competence-based view. *Research Policy, 34*, 795–816.

Cooper, A. C., Gimeno-Gascon, F. J., & Woo, G. Y. (1994). Initial human and financial capital as predictors of new venture performance. *Journal of Business Venturing, 9*, 371–395.

Cumming, D., Meoli, M., & Vismara, S. (2019). Investors' choices between cash and voting rights: Evidence from dual-class equity crowdfunding. *Research Policy, 48*, 103740.

Gupta, M. C., & Huefner, R. J. (1972). A cluster analysis study of financial ratios and industry characteristics. *Journal of Accounting Research, 10*(1), 77–95.

Hornuf, L., & Schwienbacher, A. (2018). Market mechanisms and funding dynamics in equity crowdfunding. *Journal of Corporate Finance, 50*, 556–574.

Johan, S., & Zhang, Y. (2020). Quality revealing versus overstating in equity crowdfunding. *Journal of Corporate Finance, 65*, 101741.

Konhäusner, P., Thielmann,M., Campian, V., Dan-Cristian, D 2021 "Crowdfunding for Independent Print Media: E-Commerce, Marketing, and Business Development" Sustainability, forthcoming

Lev, B. (1969). Industry averages as targets for financial ratios. *Journal of Accounting Research, 7*(2), 290–299.

Philippi, S., Schuhmacher, M., & Bastian, N. (2021). Attracting investors in initial coin offerings: The relationship between signals and fundraising success. *Review of Corporate Finance, 1*(3–4), 455–485.

Piva, E., & Rossi-Lamastra, C. (2018). Human capital signals and entrepreneurs' success in equity crowdfunding. *Small Business Economics, 51*, 667–686.

Rauch, A., Frese, M., & Utsch, A. (2005). Effects of human capital and long-term human resources development and utilization on employment growth of small-scale businesses: A causal analysis. *Entrepreneurship Theory and Practice, 29*, 681–698.

Rauch, A., & Rijsdijk, S. A. (2013). The effects of general and specific human capital on long-term growth and failure of newly founded businesses. *Entrepreneurship Theory and Practice, 37*, 923–941.

Rossi, A., Vanacker, T., & Vismara, S. (2021). Equity crowdfunding: New evidence from US and UK Markets. *Review of Corporate Finance, 1*(3–4), 407–453.
Spence, M. (1973). Job market signaling. *Quarterly Journal of Economics, 87*, 355–379.
Spence, M. (1974). *Market signaling: Informational transfer in hiring and related processes*. Harvard University Press.
Spence, M. (2002). Signaling in retrospect and the informational structure of markets. *American Economic Review, 92*, 434–459.
Vismara, S. (2016). Equity retention and social network theory in equity crowdfunding. *Small Business Economics, 46*, 579–590.
Vismara, S. (2018). Information cascades among investors in equity crowdfunding. *Entrepreneurship Theory and Practice, 42*, 467–497.
Vismara, S. (2019). Sustainability in equity crowdfunding. *Technological Forecasting and Social Change., 141*, 98–106.
Waring, G. F. (1996). Industry Differences in the Persistence of Firm-Specific Returns. *The American Economic Review, 86*(5), 1253–1265.