Equity Incentive Model of Crowdfunding in Different Types of Projects

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Abstract — As a new financing tool for start-ups on the Internet, crowdfunding based on equity incentive model is beginning to take shape in Europe and the United States. And it is increasingly apparent that equity crowdfunding has effects on the active economy and prosperity market. The paper investigates an equity incentive model of crowdfunding in creative and high-tech projects. It is shown that investors in creative projects focus on consumer preference and the quality of products, while investors in high-tech projects pay more attention to the value of projects and investment preferences. The prime investors care focus on the share stakes from financiers. The amount of funds that each investor contributes and the total number of investors are critical for financiers, however, the investment in platforms is also important to high-tech projects. In platforms, they try their best to prompt the transactions between financiers and investors and provide them with other services to realize profit maximization. Incentive mechanism exists among participants but a good atmosphere for equity incentive model of crowdfunding is needed.

Keywords - Equity incentive model, crowdfunding, financing channel, different types of projects, utility maximization

I. INTRODUCTION

Equity-based Crowdfunding is originated in the United States, unlike non-equity-based crowdfunding, it is a longer-term investment behavior with higher risks. It means financiers present the details about financing projects on crowdfunding platforms, such as introductions, financing needs, transfer shares and so on. Then investors subscribed shares to support the development of entrepreneurial projects, and investors get a stake in return[1]. And this financing channel is common for start-ups or the start of the small and medium-sized enterprises, especially in the software, network, computer and communication, media and other enterprises[2].

As an innovative financing mode, equity-based crowdfunding reduces the cost of financing, improve the efficiency of the financing, however, there are many uncertainties due to the lack of overall system, and the equity-based crowdfunding is still in the stage of germination test. Fortunately, financial markets are in a stage of vigorous development in our country, relevant legislations are about to implement, thus the equity-based crowdfunding will have great development in the future. According to the crowdfunding report from the world bank, China will be the largest market of all over the world with a super size over 50 billion dollars[3]. In this paper, we’re going to discuss the operation model and incentive principle of equity-based crowdfunding in section two. Section three and section four are main parts of the article, we discuss equity incentive model in creative projects and high-tech projects from crowdfunding investors, capital seeking ventures and crowdfunding platforms respectively. Section five is conclusion.

II. THE OPERATION MODEL AND INCENTIVE PRINCIPLE OF EQUITY-BASED CROWDFUNDING

A. The Operation Model of Equity-Based Crowdfunding

There are at least three participants in the operation model of equity-based crowdfunding: capital seeking ventures, crowdfunding investors, crowdfunding platforms, sometimes there may be escrow institutions as well. In Fig. 1, the operation model has illustrated.

Figure 1. The operation model of equity-based crowdfunding.

People who has rich investment experience and strong ability of bear risks usually designated by crowdfunding platforms to act as investment leaders and coordinators, and other investors followed. Both kind of investors are company ’ s shareholders, but leaders participate in the management
while followers have voting rights of major matters but not
to participate in the general affairs management. This model
is common in our country, for example, Angelcrunch,
Dajiatou, and so on.

B. The Incentive Principle of Equity-based Crowdfunding

Public investors are those people who have registered on
crowdfunding platforms, they need to be approved by the
qualification of the platforms before investment. They
support the projects within the prescribed limit of investment
and obtain corresponding shares, enjoy the rights of ordinary
shareholders even affect decisions of entrepreneurs.
Sometimes investors provide funds on purpose of witness
successful entrepreneurship. Investors pursue utility
maximization during the process of consume, experience
products or join in investment[4].

Capital seeking ventures are generally small micro
enterprises who lack of funds to put their originalities into
practice. Usually the projects are presented with high and
new technology, innovative business model and features like
high market growth. At the same time, the project financiers
must set up the company, following the modern corporate
governance system, and they begin to financing after
examined by platforms. As enterprises, financiers produce or
sell products, these situations involving benefit interests, so
their ultimate goal is to maximize profits.

Crowdfunding platforms are Internet terminals, they are
reviewers, supervisors to financiers, and provide both
financiers and investors with technical consulting and other
services. They act as enterprises so they strive for more
transactions as much as possible in order to maximize
profits. The objectives of three participants in equity-based
crowdfunding can be listed in Fig. 2.

III. EQUITY INCENTIVE MODEL IN CREATIVE
PROJECTS

According to statistics from ChuangTou website, there
are 20 industries in all, such as entertainments, electronic
products, IT services and so on. Although the classification
of start-up industries is numerous, most of projects in equity-
based crowdfunding are technology, media, high-tech and
creative projects in our country. So we divided crowdfunding
projects into two parts based on different types, and one of
them is creative projects, the other is high-tech projects. And
in this section, we are going to discuss incentive mechanism
in equity-based crowdfunding on creative projects, investors,
financiers and platforms are considered separately.

A. Incentives of Crowdfunding Investors

Motivations of investors are heterogeneous, investors
engage in crowdfunding for distinct incentives, for example,
access to investment, early access to new product, community
participation, support for a product, service, or idea, etc[5]. Investors can choose projects which has
potential market and in line with the future development, and
become original shareholders by participate in equity-based
crowdfunding. Compared to traditional financing ways,
scattered small stakeholders can also undertake choosing
projects they preferred according to their own judgment.

As for investors on creative projects, they pay attention
to the originality of the projects, and they become
shareholders through pay a certain number of funds, and they
may participate in the process of designing or making
products. Here we consider two kinds of situations.

Case 1 Investors only enjoy equity stakes as a return of
investment.

Investors are individuals who pooled their money to
support the projects of their approval with the aid of network
platform, and they only accept an equity stake as a return of
their investment, so investors’ utility ($U_{1i}$) can be described
as follows:

$$
U_{1i} = G_0 + \theta Q - P + E + \text{Normal}(\alpha, \beta) + r_1
$$

where,

- $G_0$ --- the basic value which can be obtained from the
  product;
- $\theta$ --- the preference of consumers;
- $Q$ --- the quality of products;
- $P$ --- the price of the product;
- $E$ --- the equity stake that investors gained from the
  financiers;
- $r_1$ --- the losses under the risk of uncertainty of the
  projects and anything else.

Normal($\alpha, \beta$) means factors which also may have an
impact on investors’ utility, for example, there may be
gains or losses from other activities which consumers put
their funds into, access to other investments through equity-
based crowdfunding, and so on. Actually, they are not
specific and can’t be quantified. We assume that the
function is normal distribution, and take it into account.

Case 2 Investors enjoy equity stakes as a return of
investment, participate in the process of designing or making
projects and enjoy other returns as well.

So the utility of investors can be described as follows:

$$
U_{1/2} = G_0 + \theta Q - P + E + \text{Normal}(\alpha, \beta) + \sigma + r_2
$$

$\sigma$ --- the other social utilities that investors obtained from
participating in the process of designing or making products.

Here we take a movie equity-based crowdfunding project
as example. Investors who pool more funds may have the
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opportunity to take photos with main characters or get the
signatures. Actually it can be afforded for most of
individuals compare to concerts or greetings. So there may be a large utility for investors to behave like this.

From what have discussed above, the incentives of equity-based crowdfunding investors are related to consumer preference, the quality of products and the share stakes from financiers. Other social utilities also have an effect on investors’ utilities. Anyway, we shouldn’t ignore the risks that investors take when they participate in equity-based crowdfunding.

**B. Incentives of Capital Seeking Ventures**

Crowdfunding has been used by financiers to demonstrate demand for a proposed product, which can lead to funding from more traditional sources[6]. Companies make use of the crowd mainly for cost-reduction reasons[7], and they present the projects on crowdfunding platforms in order to seeking funds to realize their goals. Compared to bank loans or other traditional financing ways, crowdfunding is more convenient.

Taking part in based-equity crowdfunding allows the capital seeking ventures to reduce the length of new product development as well as its costs, have a better customer acceptance, and increase the customers’ perception of product newness. What is more important, capital seeking ventures need the funds to implement the projects, and they can improve the projects gradually because investors are participate in equity-based crowdfunding.

Assume that the formula for total utility of financiers by equity-based crowdfunding is:

\[ U_f = \sum F_a N_a - C - \partial P + F_a N_a - C_a + \eta + \text{Normal}(\theta, f) + \epsilon _3 \]

where,
- \( F_a N_a \) --- the funds that financiers obtained;
- \( F_a \) --- the price that investors paid on a certain way of return;
- \( N_a \) --- the amount of investors who invest in this way; it means:
\[ \sum F_a N_a = F_1 N_1 + F_2 N_2 + F_3 N_3 + \ldots \]

\[ C \] --- the cost of the products which the financiers incline to implement through equity-based crowdfunding;

\( \partial \) --- the percentage of the profits that financiers will distribute to investors, usually 0 ≤ \( \partial \) < 1;

\( V_a \) --- the value of information obtained from each investor;

\( N_a \) --- the amount of investors;

\( C_p \) --- the amount of fees which pays to crowdfunding platforms, usually 5% or more of total financing amount of projects;

\( \eta \) --- the utility which increases due to the choice of investors in equity-based crowdfunding;

\( \epsilon _3 \) --- the risks of being copied or anything else which needed to bear after projects have been presented on platforms.

\[ \text{Normal}(\theta, f) \] means all of the social utilities financiers gained by presenting produces on platforms. For example, presenting the projects on crowdfunding platforms may play a propaganda role in crowdfunding, thus there would be more attentions to the projects or the companies.

It is clear from (3) and (4), that financiers can adopt measures to maximize \( \sum F_a N_a \). \( \theta \) is an important variable for entrepreneurs to set, because it affects individuals invest or not. Maximize \( V_a N_a \) may lead to \( U_f \) maximization, because the amount of \( C_a, C_p \) is difficult to change. Under the objective of profit maximization, financiers always try their best to realize \( \sum F_a N_a \) and \( V_a N_a \) maximization.

Definitely, \( \partial \) is critical for both financiers and investors. In this way, capital seeking ventures are also take part in incentive mechanism.

**C. Incentives of Crowdfunding Platforms**

Crowdfunding platforms are intermediary between project sponsors and crowdfunding investors, these platforms weaken the information asymmetry and save the cost of transactions[8]. Also Crowdfunding platforms are independent enterprises who purse profit maximization. Platforms always obtain profits through charging a certain proportion of the amount of successful projects’ funds as commission, and we define the rate as \( \theta \), usually \( \theta \) is higher in creative projects compared to other kinds of projects, because they have a large uncertainty during the whole process. As is known, Kickstarter charges 5% of the total amount of funds while Dian Ming Time charges 10% initially.

Crowdfunding platforms charge fees according to total financing funds of the projects, the primary objective for them will be maximized the number of projects[5], so it can be denoted as follows:

\[ U_p = \theta \sum M_j N_j + F - C_i + u + \text{Normal}(\theta, \mu) + \epsilon _5 \]

where,
- \( M_j \) --- the actual amount of funds each project obtain;
- \( N_j \) --- the amount of projects; and the total value of transactions is:
\[ \sum M_j N_j = M_1 N_1 + M_2 N_2 + M_3 N_3 + \ldots \]

\( F \) --- the fees from other support services that platforms provided, such as financial audit, technical consulting, transaction matching, and so on;

\( C_i \) --- the total cost for platforms to operate;

\( u \) --- the social utility that platforms obtained from equity-based crowdfunding;
\( r_i \) --- the risk that platforms should be take like verification of the qualification; 
\( \mu \) --- the residual error term.

\( \text{Normal}(g, h) \) represents other social utilities when crowdfunding platforms work as intermediary between sponsors and investors, for example, there will be more attentions on the platform with its high credibility.

Platforms try their best to prompt the transactions between financiers and investors, usually they claim that investors qualified all have rich experience in investment[9]. Thus they attain their target profit and realize profit maximization.

IV. EQUITY INCENTIVE MODEL IN HIGH-TECH PROJECTS

With a good growth in high-tech projects, they attract more attention on the crowdfunding platforms. And more and more high-tech projects are presented to financing; the plans are feasible due to mature support of technology and broad market prospects. However, the amount of financing in high-tech projects is relatively large. We also discuss incentive mechanism of these projects along three dimensions: investors, financiers and platforms.

A. incentives of crowdfunding investors

Most of investors choose high-tech projects to invest attributes to the recognition of the high speed of development with its technology, high value-added ability, and in front of contemporary economics. The utility of investors can be denoted as follows:

\[
U_i = V_0 + \varphi P + S + \text{Normal}(i, j) + \delta - l + \varepsilon_i
\]  

(7)

where, 
\( V_0 \) --- the basic value of projects that investors recognized; 
\( \varphi \) --- the preference of investors based on the feasibility with project itself; 
\( P \) --- the funds that investors paid; 
\( S \) --- the shares and other rewards obtained from the entrepreneurs.

\( \text{Normal}(i, j) \) means other utilities which affect the total utility, and some unexpected factors are considered here. Also, investors participate in a certain high-tech project in equity-based crowdfunding can witness the growth of enterprise, this may induce an utility for investors, this can be described as \( \delta \), \( I \) is losses for investors that they should undertake under the risks. \( \varepsilon_i \) is a residual error term.

Here we can see that the incentives of investors based on high-tech projects are related to investment preference, the recognition of the value of projects and the share stakes from financiers. Other social utilities and risks are also have an effect on investors’ utilities.

B. incentives of capital seeking ventures

As for high-tech projects, the amount of financing is large relatively, so capital seeking ventures present their projects on crowdfunding platforms in order to get more funds. On the basis of high rate of return, investors are more incline to invest rather than consume, then assume that individuals are homogeneous with respect to benefits under profit sharing[10]. So the utility of financiers in equity-based crowdfunding based on high-tech projects can be presented as follows:

\[
U_f = \sum M_n N_n + G_p - C_0 - \lambda P - C_p + \text{Normal}(k, l) - I_f + \varepsilon_j
\]  

(8)

\[ \sum M_n N_n \] means funds that financiers obtained from individuals, and
\[ \sum M_n N_n = M_1 N_1 + M_2 N_2 + M_3 N_3 + \cdots \]  

(9)

where,
\( G_p \) --- the funds from platforms, here we assume that platform can invest in high-tech project as an independent organization;
\( C_0 \) --- the cost of the project itself;
\( C_p \) --- the amount of fees paid to platforms, this involves not only commissions, but also fees for strategic guidance and other services that platforms provided. generally it is lower than creative projects’ ;
\( \lambda \) ---the rate of share profit that financiers set to marked as a return to investors, usually lower than \( \delta \) of creative projects , and \( 0 \leq \lambda < 1 \), usually around 10% from present crowdfunding platforms like DaJiaTou[11].

\( \text{Normal}(k, l) \) means all of the social utilities financiers gained by presenting produces on platforms. \( I_f \) is losses under technical risks and \( \varepsilon_j \) is also a residual error term.

C. incentives of crowdfunding platforms

As intermediary, crowdfunding platforms are independent organizations that they can invest in projects they preferred. They pursue profit maximization so they provide various services, especially off-line matching, to attain successful transactions as much as possible. Here platforms charging a lower proportion of the amount of successful projects’ funds as commission, compared to creative projects. And the utility of platforms can be expressed as follows:

\[
U_P = \pi \sum B_n N_n + S_p - I_p - C_i + \text{Normal}(m, n) + u - I_r + \varepsilon';
\]   

(10)

\[ \sum B_n N_n \] means the total fees of financing funds in equity-based crowdfunding, \( \pi \) is a coefficient of commission. And
\[ \sum B_n N_n = B_1 N_1 + B_2 N_2 + B_3 N_3 + \cdots \]  

(11)
where, 
\[ p_S \] --- the share of profits from financiers; 
\[ I_p \] --- the investment corresponded; 
\[ U \] --- the revenues from other services provided; 
\[ I_r \] --- the losses under the risk that platforms should be take;  
\[ \varepsilon_o \] --- the residual error term;  
\[ C_t \] --- the total cost for platforms to operate. 

\( Normal(m, n) \) represents other social utilities when crowdfunding platforms work as intermediary between sponsors and investors. 
Crowdfunding platforms charge fees for funs so they pursue transactions maximization, at the same time, they act as investors, preference and the ratio of shares are also considered. In this way, incentive mechanism is applied to platforms. 

V. CONCLUSIONS 
This paper sheds light on the equity incentive model of crowdfunding in creative projects and high-tech projects from investors, financiers and platforms respectively. The results show that investors focus on consumer preference, the quality of products and the utility of participating to maximize utility in creative projects, while pay attention to the value of project and investment preference in high-tech projects. All investors care about the share stakes from financiers. The amount of funds that each investor invests in and the total number of investors is critical for financiers, however, the crowdfunding platforms is also important for high-tech projects. As for platforms, they try their best to prompt the transactions between financiers and investors and provide them with other services to realize profit maximization. 
The results also indicate that every participant should take risks or losses into account, and incentive mechanism is spread to all of them in order to realize their own objectives, in other words, incentive mechanism exists among each participant. The results will be useful for developing a good atmosphere for equity-based crowdfunding. 

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