Efficiency of crowdfunding as institution of global market for venture capital

V N Rutskiy, R Y Tsarev and I A Titov
Siberian Federal University, 79, Svobodny pr., Krasnoyarsk, 660041, Russia

E-mail: tsarev.sfu@mail.ru

Abstract. The paper discusses the effectiveness of crowdfunding institution. Crowdfunding is the result of evolutionary institutional changes in the global venture capital market. The crowdfunding institution has lower transaction costs and allocates risks more evenly in comparison with the institutions of business angel and venture fund. Regression models of the effectiveness of global fundraising campaigns with the help of three types of institutions were designed. Comparison of models makes it possible to conclude that crowdfunding as an effective mechanism for organizing venture transactions, which significantly expands the audience of investors and projects that attract investments in the early stages.

1. Introduction
Accelerating technological progress and high expectations from new technologies in the global economy require faster and less risky ways to organize venture investments. The development of the global venture capital market depends on the engagement of the investor community, investment risks management and the development of institutions as standard mechanisms for organizing transactions.

The crowdfunding institution in economic literature is interpreted as the collective collaboration of people who voluntarily pool their money or other resources, usually via the Internet, to support the efforts of other people or organizations [1]. Initially, crowdfunding was used for non-profit (often charity) projects as fundraising for a few network characters who tried to save up money for treatment or study [2]. Currently, crowdfunding has established itself as a full-fledged financial instrument – a source of investment at the seed stage. Crowdfunding is able to change the rules of the game in the field of financing innovation, and thereby in the competition that is going on in each of the industries and among developed countries of the world. At its core, crowdfunding is an institution for bringing some democracy to the world of financial transactions.

Crowdfunding, as a financing mechanism radically changes the situation on the entire market of direct and venture investments, including the gradual leveling, and in the future, the disappearance of funds as intermediaries in the investing process where investors provide capital to issuers of securities that are non-tradable assets [3].

Crowdfunding as a financial tool may be more interesting for large investors in venture capital funds than managed investments in the same startups because the remuneration of index funds is an order of magnitude lower than the management fee adopted in the venture industry (2% of the total assets under management at average) and normal success fee (20% of the increase in invested capital at average) [4]. Capital that is allocated by institutional investors among venture funds could be
redistributed to crowdfunding platforms and derivatives thereof, i.e. will be invested directly without intermediaries.

2. Trends of global venture capital market with regard to fundraising
The global venture capital market has gone through three stages of development. Initial transactions were made between private investors and project initiators in national markets until the beginning of the twentieth century. In the period until the mid-twentieth century a global market began to form where there was a transition from private forms of investment to collective institutions of venture capital funds and business angels. The third stage is related with the emergence of the crowdfunding institution which has made the market much more global and transparent.

The reasons for the transition to the third stage of the development of the venture capital market:

- Traditional venture capital funds and business angels cannot manage the liquidity of their portfolio from the moment of investment to the moment of exit from the project [5].
- The fundamental problem of traditional venture capital funds is the 2/20 model, which traditionally forms the structure of the venture capital fund operations. This leads to an increase in transaction costs for investors, a decrease in liquidity of assets and an increase in the duration of the investment cycle.
- The widespread dissemination of information and communication technologies and digital economy technologies (in particular, blockchain technology) reduces the transaction costs of investing and gradually destroys entry barriers for micro-investors with independent asset management. This reduces the risk level of a transaction per investor due to diversification of funds among micro-investors, and the portfolio of each investor among assets of different projects.

Key features of crowdfunding institution forming our hypothesis (high importance of institution for development of global venture capital market) are the following:

- Reducing the asymmetry of information in the framework of solving the problem of “principal–agent” due to the public openness of companies conducting a campaign to raise funds on a crowdfunding platform, as well as reducing the transaction costs of searching for information and monitoring due to publicity.
- The presence of a signaling mechanism that reduces the information asymmetry between the investor and the project – if someone has already invested in the project, then other investors will see it.
- The ability to raise funds before the start of the project. A preliminary fundraising shows how successful the project will be. If people are reluctant to finance it – either something is wrong with the project either project owner need to change the concept or to cut the costs.
- The risks are lower for the average investor. The total risk of the capital invested may be higher, although the risk per investor is lower than in case of venture capital funds and business angels.
- Responsibility of an intermediary agent (crowdfunding platform) is reduced and limited compared to the analytic group of a business angel or venture fund managers with regard to project information, its processing, risk allocation and responsibility allocation among actors of an investment transaction.
- Transition to a new qualitative level of automation and standardization. The crowdfunding institute erases borders, standardizing project analysis, investor decision-making on the transaction, so that the differences between projects are gradually smoothed out.
3. Comparative efficiency of crowdfunding institution on global venture capital market

In order to assess efficiency of three major types of fundraising institutions we collected three samples consisting of 308 venture projects in all. These project were running fundraising campaign all over the world in 2015 and were selected according to the maximum amount of the funds raised with the help of relevant institution. Given the specifics of the sample, 308 transactions were sorted into 3 samples by three investment institution institutions: “crowdfunding platform” (113 projects), “investment fund” (96 projects) and “business angels” (99 projects).

We have collected statistics on a number of independent variables (factors) for the same period, which, theoretically, affected the size of investments.

We compiled, evaluated and analyzed an econometric model (correlation and regression analysis) for each type of institution to assess the statistical significance (insignificance) of the selected variables’ (factors’) impact on the effectiveness of fundraising campaigns (amount of funds raised).

Using application package Gretl 1.9.92 we analyzed a large number of model types. As a result exponential type was selected for all three regression models by the adequacy indicators.

Thus, the general view for all three models of the regression equation looks like (1):

\[ Y_i = e^{\alpha_0 + \alpha_1 X_{i1} + \alpha_2 X_{i2} + \alpha_3 X_{i3} + \alpha_4 X_{i4} + \alpha_5 X_{i5} + \alpha_6 X_{i6} + \alpha_7 X_{i7} + \alpha_8 X_{i8} + \alpha_9 X_{i9} + \alpha_{10} X_{i10} + \varepsilon_i}, \quad i = 1, n, \]

where \(\alpha_0\) is the proxy of the equation;
\(\alpha_1, \alpha_2, ..., \alpha_{10}\) - estimates of the model parameters;
\(\varepsilon_i\) - model error (residuals);
\(n\) – number of observations;
\(Y\) – funds raised by the project using one of institutions, USD;
\(X_{11}\) (Tech) – a dummy variable for level of technology of a startup industry (1 – tech industry, 0 – classic);
\(X_{12}\) (Stage) – a dummy variable of the startup stage at which it received funds (1 – stages to the “breakeven point”, 0 – stages after the “breakeven point”);
\(X_{13}\) (ExRev) – dummy variable of coincidence of actual and expected profitability (1 – actual is greater than expected, 0 – actual is less than expected);
\(X_{14}\) (SameReg) – a dummy variable of coincidence of the project region and the region where the instrument is nominally located (1 – region coincides, 0 – region does not coincide);
\(X_{15}\) (ToFFund) – the period in days in which the project funds were raised (from the first to the last tranche);
\(X_{16}\) (Daysstart) – the period in days between the start of the project and the receipt of the first investment;
\(X_{17}\) (PDI) – Hofstede’s “Distance of Power” index variable in the project country;
\(X_{18}\) (IDV) – Hofstede’s “Individuality” index variable in the project country;
\(X_{19}\) (MAS) – Hofstede index variable “Masculism” in the project country;
\(X_{20}\) (UAI) – Hofstede index variable “Avoiding Uncertainty” in the project country;

Variable \(Y\) – dependent (endogenous), variables \(X_{11}, X_{12}, ..., X_{20}\) – independent (exogenous).

Datasets for endogenous variable \(Y\) and exogenous variables \(X_{11}, X_{12}, X_{13}, X_{14}, X_{15}, X_{16}\) where collected from Orbis statistical database of the international analytical company Bureau van Dijk (https://orbis.bvdinfo.com). Datasets for exogenous variables \(X_{17}, X_{18}, X_{19}, X_{20}\) where collected from G. Hofstede’s research project database on national culture dimensions (https://www.geert-hofstede.com).

Using Gretl 1.9.92 we have constructed our model with the help of the least-squares method and have analyzed the data.

The final versions of statistically significant models take the forms (2), (3), (4):

\[ Y_i = e^{(12.559+0.146X_{1}+0.857X_{2}+1.15X_{3}+0.008X_{4}+0.15X_{5}+0.403X_{6}+0.004X_{7}+0.1113}), \quad i = 1, 113 \]
\[ Y_i = e^{(12.333+0.129X_{1}+0.724X_{2}+0.02X_{3}+0.424X_{4}+0.004X_{5}+0.001X_{6}+0.198X_{7}+0.002X_{8}+0.196)}, \quad i = 1, 196 \]
\[ Y_i = e^{(12.642+0.04X_{1}+0.11X_{2}+0.02X_{3}+0.341X_{4}+0.004X_{5}+0.018X_{6}+0.027X_{7}+0.005X_{8}-0.004X_{9}+0.199)}, \quad i = 1, 199 \]
All models have rather high values of $R^2$: $R^2=0.835$ for (2), $R^2=0.822$ for (3) and $R^2=0.851$ for (4). Main results of regression analysis are presented in figure 1, describing high, low or not significant positive or negative interrelation between $Y$ and exogenous variables.

|        | Crowdfunding | Funds | Business angels |
|--------|--------------|-------|-----------------|
| X1(Tech) | ✓             | High  | ✓               |
| X2(Stage) | ✓             | High  | High            |
| X3(ExRev) | ✓             | High  | ✓               |
| X4(SameReg) | ✓             | ✓     | High            |
| X5(TofFund) | ✓             | High  | ✓               |
| X6(Daysstart) | ✓             | High  | ✓               |
| X7(PDI) | ✓             | High  | High            |
| X8(IDV) | Medium       | Low   | Low             |
| X9(MAS) | ✓             | Low   | ✓               |
| X10(UAI) | ✓             | High  | Low             |

**Figure 1.** Results of regression analysis of venture fundraising institutions.

On the basis of regression analysis, we can state crowdfunding institution to be one of the important mechanisms determining development of the modern global venture market:

- Crowdfunding specializes in technology startups, the probability of raising a larger amount of funds from a high-tech startup is higher than that of a startup from classical industries.
- The presence of the initial stage of the project will bring more funds for a startup using the crowdfunding institution.
- Crowdfunding as a newly established institution has formed a new class of investors and startups.
- The crowdfunding institution promotes the flow of capital from one macro-region to another.
- The amount of funds raised thanks to the crowdfunding tool are directly dependent on the time (duration) of the fundraising campaign.
- The crowdfunding institution has no influence on the duration of the period between the date of start of the project and the receipt of the first investment on the amount of funds raised.
- The presence of a strong inverse relationship between the index of the distance of power in the country (PDI), which is the homeland of the project, and the amount of funds raised by the project.
- A positive relationship was found between the individuality index in the country and the amount of funds raised in a county which is the homeland of the project.
- The inverse relationship between the uncertainty avoidance index and project funds. The level of risk acceptance among subjects at the crowdfunding institution is significantly higher.

**4. Conclusion**

Thus, we can conclude that crowdfunding is a newly formed but promising institution of a global venture capital market, with its own features. According to the trends of the venture capital market the development of the venture investment industry will be connected to these tools in the coming years.
We can confidently say that crowdfunding has potential to destroy the monopoly of venture funds on capital spillover among industries and countries, and could increase market transparency significantly. The brisk spreading of crowdfunding could lead to the emergence of derivative financial tools such as public index funds, rightfully investing in all, without exception, startups that meet certain minimum criteria of the global investment community.

In order not to be left behind of the transformation processes in the world venture capital market, it is necessary for any country to coordinate the actions of legislative bodies and the government in order to form favorable financial, economic and regulatory conditions for the rapid development of crowdfunding institution at the national level. Otherwise the country risks staying away from large flows of capital while not engaging its own population and business in the global financial processes, which may affect the level of welfare and innovative capabilities of the country.

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