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# FINANCIAL INNOVATION MANAGEMENT: LOAN PRICE IN THE CROWDFUNDING AND PEER-TO-PEER LENDING PLATFORMS

**Abstract**. *As an alternative to traditional bank financing, companies (especially small and medium-sized) can opt for loans from innovative financial facilities: peer-to-peer lending and crowdfunding platforms. When using these alternative financing opportunities, it is very important to identify the main factors of the business loan interest rate and properly assess the overall cost of borrowing. This paper summarizes the scientific discussion on the issue of innovative business funding sources and one of the most important ratios referred to reasonably compare the price of financing sources and the related expenses. Therefore, the main purpose of this research is to identify the internal and external factors of interest rate on business loans and determine the overall total annual rate of charge for business loans on innovative financing platforms. After the analysis of academic literature and statistical data of crowdfunding and peer-to-peer lending market, the authors used the methods of correlation-regression and factor analysis to identify the factors that determine the interest rate of business loans on crowdfunding and peer-to-peer platforms; and scenario analysis to evaluate the total annual rate of charge for business loans. According to the results of correlation-regression and factor analysis, the summarized factors of business loan interest rate are economic environment, competitive environment, and results of the platform performance. External factors appeared to have a much greater impact on the interest rate for business loans in crowdfunding and peer-to-peer lending platforms than internal. The assessment of the total annual rate of charge for business loans confirmed that the peer-to-peer and crowdfunding platforms offer a lower rate than traditional financing institutions, on the other hand, the total rate at the crowdfunding platforms is higher compared to peer-to-peer lending platforms, due to the higher administrative fees and interest rates. The outcomes of this research expanded the scope of research on the sector of financial innovation. The research revealed the peculiarities of crowdfunding and peer-to-peer lending, the factors that affect a loan interest rate, and the real price that business owners have to pay for borrowed funds. Obtained results could be relevant to both lending platforms and businesses seeking to identify and compare the real cost of traditional and alternative financing.*

**Keywords:** financial innovation, alternative financing, financial technologies, factors of interest rate, price of borrowing, the total annual rate of charge for business loans.

**Introduction.** Search for business funding sources is a complex and time-consuming process requiring considerable knowledge, though the 21st-century businesses have much more opportunities to borrow than ever before. As an alternative to traditional corporate financing sources, businesses now can opt for innovative financial facilities: crowdfunding and peer-to-peer lending platforms. When seeking to take advantage of such alternative funding sources businesses taking into account not only the interest rates and the monthly premiums but also all the other credit-related charges.

Despite a consistently increasing scope of studies in the area of peer-to-peer lending and crowdfunding, such alternative business financing is more studied from the theoretical viewpoint, specifically focusing upon benefit for an investor, the national economy. Yet there is a lack of any analytical examination of a comprehensive assessment of the benefit or the actual price paid by the entity owner or

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business in general when obtaining business credits at crowdfunding or peer-to-peer platforms, which emphasizes the relevance and the novelty of the present study.

The object of the research covered by this paper is the average interest rate and the total annual percentage rate of charge for business loans (TARCBL) at peer-to-peer lending and crowdfunding platforms. The purpose of the present study is to identify the internal and external factors of an interest rate for business loans at innovative (peer-to-peer lending and crowdfunding) platforms and evaluate the total annual percentage rate of charge for business loans.

Intending to identify interest rate factors and assess TARCBL the present study included: (i) the correlation analysis used to identify significant internal and external interest rate factors; (ii) factor and regression analysis used to systemize significant interest rate factors and evaluate their impact; (iii) and scenario analysis used to assess the TARCBL of crowdfunding and peer-to-peer lending platforms and compare it with TARCBL of traditional financing.

The external factors (the risk-free interest rate, G.D.P., government debt)) appear to be more important than internal factors (customer's credit history, expected losses, expected rates of return) in determining the interest rate of business loans provided by crowdfunding and peer-to-peer lending platforms.

The analysis carried out shows the importance of TARCBL, as this indicator summarises all the expenses related to the credit. The results confirmed that the peer-to-peer and crowdfunding platforms offer a lower rate (TARCBL) than traditional financing institutions while the rate (TARCBL) of crowdfunding platforms is higher in comparison with the rate of peer-to-peer platforms.

By identifying the key determinants of the cost of business finance provided by crowdfunding and peer-to-peer lending platforms, the results of this study complement scientific insights on crowdfunding peer-to-peer lending platforms and can be applied in practice to both alternative finance seekers and alternative lending platforms.

**Literature Review.** Small and medium-sized enterprises have a significant impact on the national economy, creating high added value. To be able to attract external funding an entity is required to meet certain specific requirements: be able to generate sufficient return, meet liquidity and stability requirements, be capable of managing risk; therefore small entities are often unlikely to be able to attract additional funding required for the attainment of their objectives by referring to traditional external business financing sources. The growth of the I.T. sector and its accelerated modernization supported the appearance of financial innovations, for example, new alternative funding sources (Bruton, 2015), as entities increasingly often search for funding opportunities at crowdfunding platforms.

Peculiarities of the operation of crowdfunding platforms. Crowdfunding is an alternative way of raising capital (Ryu et al., 2018) defined as an interaction between (i) a simplified organization (platform), (ii) different natural persons and legal entities that seek financial benefit for their ideas and capital, and (iii) a large 'crowd' of individuals inclined to invest, lend or give away funds for specific ideas or business (Nielsen, 2018). Crowdlending platforms: (i) not only fill in the gap in the market but also (ii) allow portfolio diversification, (iii) benefit the investor by helping to find new, innovative products potentially generating substantial potential return; (iv) provide to entrepreneurs feedback facilitating an assessment of the demand for the product and improvement of business ideas (World Bank, 2013; Kirby et al., 2014). The uncertainties of crowdfunding usually faced by investors are (i) default risk (as crowdfunding is used by borrowers that fail to receive funding from traditional funding sources due to excessive risks); (ii) liquidity risk (difficulty for the investor to withdraw from a transaction and recover the invested funds); (iii) fraud risk (appears in the absence of a stringent process for the identification of project developers or investors); (iv) risk of closure or bankruptcy of the platform (supervision and control are not as stringent as imposed upon other financial institutions); (v) cyber attack risk (weaker protection due to limited financial resources); (vi) money laundering risk (no stringent controls over the origin of money and its further use); (vii) legal risk (the legal acts regulating crowdfunding are still in the stage of development and improvement) (Robock,

2014; Kirby et al., 2014, European Commission, 2015). There are also other risks involved, usually characteristic of traditional funding, such as interest rate, market, exchange rate, or operational risk (Moenninghoff et al., 2013).

*Peculiarities of the operation of peer-to-peer lending platforms*. Peer-to-peer platforms use social networks to bring together entrepreneurs and investor communities and enhance the productivity and the efficiency of saving funds; such financial instruments are most often are designed for entrepreneurs that face difficulties in obtaining traditional financial services (Bruton et al.,2015). A summary of the diversity of the definitions used in the scientific literature (Mateescu, 2015; Liu et al., 2019; Lenz, 2017; Fintechnews, 2017; Zeng et al., 2017) may lead to a conclusion that peer-to-peer lending platforms bring together natural and legal persons that want to borrow and natural persons who want to lend; only natural persons may act as investors (Law on Consumer Credit of the Republic of Lithuania, 2015). The advantages of peer-to-peer platforms are the following: (i) lower interest rates and taxes as compared to banks; (ii) funding opportunities for natural persons and legal entities that cannot obtain traditional external funding; (iii) speed and quality of providing the services due to well-developed technological innovations (Milne et al., 2016). The risks related to peer-to-peer lending essentially coincide with the risks characteristic of crowdfunding facilities.

Although Buysere et al. (2012), Ryu et al. (2018) claim that peer-to-peer is not genuine crowdfunding, a fairly large share of researchers (Walthoff-Borm et al., (2018), Nehme (2017), Kirby et al., (2014), Hossain et al., (2015), Isac (2014), Messeni, et al., (2018)), consider that crowdfunding and peer-to-peer lending are inseparable – they operate based on the same principle, use identical processes, the same process participants, localization risk, etc., because of which such financing sources should not be considered separate. For the present paper, peer-to-peer lending is considered one of the types of crowdfunding.

*Research in the area of crowdfunding and peer-to-peer lending*. Despite being a fairly new phenomenon, crowdfunding and peer-to-peer lending are increasingly becoming a focus of researchers. Walthoff-Boom et al. (2018) analyzed the companies that applied to crowdfunding platforms for funding of their capital from the viewpoint of their risk profile, also considering financial indicators, reliability, ability to use most advanced technologies, etc. Roma et al. (2017) analyzed the sustainability of crowdfunding, its impact on the financial, economic, and social environment. Stern et al. (2017) were studying the factors that caused the appearance of peer-to-peer lending platforms in different provinces of China. Iyer et al. (2009) were assessing the process of construction of credit ratings and their values at one of the most famous peer-to-peer platforms, Prosper. Zeng et al., (2017) constructed investment solution models at peer-to-peer platforms, were studying the behavior of existing and new investors, their level confidence and a probability to grant to new loans. A study carried out by Klafft (2009) was assessing the factors affecting the investors' choice of investment projects. Zhang et al. (2017) were studying investor behavior when investing at peer-to-peer platforms. Motylska-Kuzma (2018), Ralcheva et al. (2019) were analyzing the factors determining success in financing crowdfunding projects. Gavurova et al. (2018) were examining the decision-making process exercised by investors having regard to the investment objects at the peer-to-peer platforms and their specific characteristics. Several researchers (Nehme, 2017; Kirby et al., 2014), in their papers, analyzed the legal regulation of the crowdfunding facility. Subačiūtė et al. (2019) analyzed the household lending opportunities in the consumer credit market and estimated the TARCBL of different loans at Lithuanian and foreign peer-to-peer platforms. Astrauskaitė (2017) was examining the impact of crowdfunding upon the country's macroeconomic variables.

*The interest rate of business loans at crowdfunding and peer-to-peer platforms and the factors affecting it*. Crowdfunding has quite a few similarities to traditional lending; however, not infrequently, it is much more attractive financing source for small and medium-sized enterprises, may offer higher investment returns, although, on the flip side, such financing bears more risks. When choosing between

traditional and alternative funding, an entrepreneur is required to estimate the TARCBL, which is one of the most important ratios referred to reasonably compare to the price of financing sources and the related expenses.

The peer-to-peer lending and crowdfunding are not identically regulated from the legal viewpoint on a global scale. In some countries, such lending platforms are supervised by responsible institutions, while in other countries, the platforms operate free from any legal restrictions. For that reason, borrowers in different countries may eventually encounter some hidden or unreasonable fees, fraud, or money laundering risks. Furthermore, the borrowing price on different platforms may be difficult to compare, as some platforms do not apply administrative fees, but rather impose a fixed-amount cash withdraw fee (Bondora, 2019b), some other platforms (e.g., Savy, Paskolų klubas, FinBee) – apply intermediary, contract conclusion, administration, overdue payment taxes (Savy, 2019, Paskolų klubas, 2019, FinBee, 2019). The total annual percentage rate of charge is a rate whereby the present value of the total cost of credit amounts is equalized to the present value of all the repayments of credit, together with all the applicable fees and other expenses (Bank of Lithuania, 2012). In other words, such a charge is the annual amount of all the payments related to the credit expressed in percent. It is specifically this rate that allows comparing the borrowing price; on the other hand, the rate is one of the most important factors determining the availability of capital credited to an entity. Therefore, for the entities seeking to borrow capital, it is extremely important to properly assess the factors affecting the interest rate at crowdfunding platforms.

Business credit applications at crowdfunding and peer-to-peer platforms are examined and assessed in the procedure similar to that applied by traditional financial institutions (banks). Two groups of factors affecting the interest rate may be distinguished: (i) financial factors representing the borrower's possibility to borrow: income from principal employment, additional income (benefits, pension), expenses, number of outstanding obligations, refinanced credits, financial indicators (financial leverage, EBIT, EBITDA, etc.) – they are weighted given the entity's financial statements, as this information to a large extent shape the credit rating; (ii) non-financial factors: project owner's age, education, language, nationality, gender, residence place (own or leased housing), crediting history, inquiries from third countries, arrests, judicial proceedings, etc. Furthermore, interest rates depend on the purpose of credit, credit amount, and the period. To obtain credit at peer-to-peer platforms, there is no requirement to submit the company's financial statements, and it follows that at the platforms, both natural persons and legal entities are subject to identical assessment criteria. Some crowdfunding platforms require the applicants to submit those documents. Therefore the algorithms for computing the interest rates for loans extended to natural persons and legal entities are different.

It is the credit rating that enables both traditional and non-traditional funding institutions to effectively classify data and pass the most appropriate crediting decisions, which reduces the number of non-performing loans. The lenders use several mathematical algorithms (linear and logistic regression, discriminatory analysis, Probit analysis, decision tree, expert framework, etc.) to estimate the probability of the debtor's default or an expected return (Abdou et al., 2011), thus assigning a higher credit rating to more reliable borrowers (Duarte et al., 2012).

Interest rates are set not only based on the characteristics of the borrower but also taking into account certain macroeconomic indicators and interest rates offered by competitors. Usually, the key criteria for determining interest are set out in the platform regulations (prospectus), but not all of them are made public. Since quite often the interest rate is significantly different from the total annual percentage rate of charge, not all the borrowers know well the actual value of the latter. Thus, each business needs to consider very carefully all the advantages and shortcomings of crowdfunding or peer-to-peer facilities, as well as their possible consequences, inherent risk, effective loan price, and decide whether or not entity needs one or another financing possibility. Probably the best way to make the right decision is to compare the terms of crowdfunding and peer-to-peer crediting facility against traditional financing loans.

**Methodology and research methods**. *Research model*. The research consists of the following stages:

1. *Analysis of the trends of crowdfunding and peer-to-peer lending*: the data collected in the market is summarized using a descriptive statistics method to assess the popularity of the platforms, the cash flows circulating therein, types, and the purpose of the loans, the interest rate, etc.
2. *Analysis of the operation of crowdfunding and peer-to-peer lending platforms*: (1) the criteria underlying the selection of study objects defined based on the systematized information on the areas of operations of crowdfunding and peer-to-peer platforms, their specifics, financing policy, and other important aspects; (2) analysis of the specificity of peer-to-peer lending and crowdfunding platforms in the Baltic states and the world considering the applicable taxes, interest rates and other expenses related to such lending; (3) identification of the aspects underlying the assessment of the total credit price and selection of the most rational borrowing option.
3. *Identification of the crowdfunding and peer-to-peer lending platforms to be studied*: two platforms selected based on the criteria as defined below: (i) the platforms have to be different (crowdfunding and peer-to-peer lending platforms); (ii) the platforms are used to provide credit to businesses; (iii) at least one of the platforms is operating in the Baltic states; (iv) the platforms bear medium risk, i.e., R.O.I. fluctuates within a range of 8-11 percent.
4. *The assessment of the factors affecting the interest rate at selected crowdfunding and peer-to-peer lending platforms*: (1) correlation analysis of the variables describing the loans and the borrowers (i.e., internal factors); (2) correlation analysis of the variables that according to the regulations of the platform can affect the interest rate of business loans (i.e., external factors); (3) factor analysis of external factors used to: (i) systematize significant factors; (ii) determine the impact of the factors upon the interest rates of the business loans issued within the platform and the direction of such impact (regression analysis).
5. *Determination of the TARCBL at selected peer-to-peer lending and crowdfunding platforms*: (1) the significant variables collected using the method of a correlation analysis allows a scenario analysis method, involving: (i) constructing an optimistic, realistic and pessimistic scenarios; (ii) calculation of the interest rate using multivariate regression equations for each such scenario; (iii) calculation of the TARCBL for each such scenario; (2) comparison of the results of the platform with each other and with the consumer loans quotes from banks and other consumer credit providers.

The formula (Equation 1) used for the calculations:

$$TARCBL = P + (P \times i \times n) + T \quad (1)$$

Where: $P$ – initial loan amount, $i$ – interest rate, $n$ – period, $T$ – taxes.

The formula is accordingly adjusted for the taxes and their payment frequency of each platform: (i) TARCBL is calculated without applying a one month deferral period; (ii) the interest payments and loan repayments are spread evenly over the period; (iii) the total charge of the loan is calculated without considering the late interest (periodic penalty payments): it is a factor dependent on the solvency of the borrower and may differ on a case-by-case basis; (iv) the account servicing fees are excluded, as when borrowing at a platform there is no requirement to open a new account.

According to the TARCBL calculation rules approved by the Bank of Lithuania, the ratio is computed according to formula (Equation 2) (Bank of Lithuania, 2012):

$$\sum_{k=1}^{m} C_k(1+X)^{-t_k} = \sum_{l=1}^{m'} D_l\,(1+X)^{-s_l} \quad (2)$$

Where: $X$ – total annual percentage rate of charge for consumer credit, $m$ – the number of the last drawdown of the consumer credit, $k$ – the number of the consumer credit drawdown, $1 \le k \le m$, $C_k$ – the amount of the consumer credit paid to the borrower by k drawdown, $t_k$ – the interval, expressed in years and fractions of a year, between the date of the first drawdown and the date of each subsequent drawdown, thus $t_1 = 0$, $m'$– the number of the last repayment or the payment of charges or other expenses, $l$ – the number of the repayment of the total consumer credit amount, or the number of the payment of taxes or other charges, $1 \le l \le m'$, $D_l$ – the amount of repayment of the consumer credit or the payment of other charges, $s_0$ – is the interval, expressed in years and fractions of a year, between the date of the first drawdown and the date of each repayment or payment of charges.

*Data*. To evaluate the factors affecting the interest rates of Bondora business credits, a total of 54 variables (Appendix 1, Table A1) presented by the platform (for the period from Q1 2009 to Q1 2019) were considered; 2003 business credits examined. Fifty-seven variables were considered with a view to determining the factors affecting the interest rate imposed upon the borrowers of Lendingclub, covering the period from Q1 2018 until Q1 2019 (Appendix 1, Table A2) and examining total 4,610 business credits.

For factor analysis, the independent variables are selected based on the results of research (see the Literature review section), also having analyzed the taxation framework and the pricing systems inherent to the selected platforms. While referring to the information provided in the regulations (prospects) and related to the criteria used to calculate the interest rate, 20 variables were selected for each platform (Appendix 2, Table A3, Table A4). The variables analyzed for the present study include (i) macroeconomic variables (G.D.P., unemployment rate, inflation, interbank interest rate, discount rate, risk-free interest rate, public debt); (ii) market variables (stock indices, average housing sale price); (iii) performance indicators of selected platforms (granted credits, non-performing loans, the average return on investment); (iv) performance indicators of the platforms' competitors (household and business loans issued by banks, interest rates of the loans issued by other platforms).

A dependent variable is the interest rate of business loans issued at the platforms.

**Results**. *1.* In 2012-2017, the alternative financing market in Europe increased by EUR 9.95 million, i.e., up by 30.3 % (Statista, 2019a); the growth trends have been observable not only in Europe but also globally (OECD, 2019). According to the data of 2017 (Statista, 2019b) in Europe, the peer-to-peer consumer credit transactions amounted to EUR 1,392.38 million, and business loans were recorded at EUR 466.6 million, the volumes of reward equity crowdfunding reached EUR 158.8 million.

It is projected that: (i) by 2022, and the peer-to-peer lending market will be rapidly growing; (ii) the volumes of business loans will be increasing, (iii) the amounts of issued consumer loans will be increasing too, however, at a slower pace; it may be assumed that the volumes of business funding from alternative sources will be increasing.

*2.* Table 1 summarises the relevant information about the most important peer-to-peer and crowdfunding platforms in the U.S.A. and Europe.

Despite the rapid growth of the alternative funding market, its share in the global crediting market is still very small, as the market is in the early stages of its development. Furthermore, the alternative funding market is in intensive competition with traditional crediting institutions that seek to reduce interest rates to retain their clients. On the other hand, the peer-to-peer platforms have been finding it more difficult than traditional crediting institutions to ensure a timely return of credits, which means that such platforms apply a less conservative system for the assessment of financial performance or solvency of potential borrowers. Based on the criteria described in Section 2, the following platforms were selected for a more in-depth analysis of the study: Bondora and LendingClub.

**Table 1. Descriptive information of the most important crowdfunding and peer-to-peer lending platforms, 2019**

| | Platform | R.O.I. (%) | Minimum investment amount | Guarantee of redemption | Loan type | Country |
|---|---|---|---|---|---|---|
| | | | **Crowdfunding** | | | |
| 1. | „Grupeer“ | 13 | 10 E.U.R. | + | Business, real estate | P.L. |
| 2. | „Mintos“ | 11 | 10 E.U.R. | + | Consumer, business | LV |
| 3. | „Crowdestate“ | 16 | 100 EUR | - | Business, real estate | EE |
| 4. | „Envestio“ | 17 | 1 EUR | - | Business, real estate, cryptocurrencies | EE |
| 5. | „Fast invest. “ | 12 | 10 E.U.R. | + | Consumer | G.B. |
| 6. | „Crowdestor“ | 17 | 100 EUR | - | Business, real estate, cryptocurrencies | PL |
| 7. | „Hoursers“ | 8 | 50 EUR | - | Real estate | ES |
| 8. | „Robocash“ | 12 | 10 E.U.R. | + | Consumer, business | P.L. |
| 9. | „Bondora“ | 10 | 1 EUR | - | Consumer, business | EE |
| 10. | „Property Partner“ | 7 | 50 £ | - | Real estate | GB |
| | | | **Peer-to-peer lending** | | | |
| 1. | „LendingClub“ | 8 | 25 USD | + | Consumer, business, refinancing | U.S. |
| 2. | „Prosper“ | 10 | 25 USD | + | Consumer, business | U.S. |
| 3. | „Funding Circle“ | 4 | 1 GBP | + | Business, real estate | G.B. |
| 4. | „Zopa“ | 4 | 10 GBP | + | Consumer, cars | G.B. |
| 5. | „Upstart“ | 8 | 100 USD | - | Consumer | US |
| 6. | „Peerform“ | - | 100.000 USD | - | Consumer | US |
| 7. | „Grupeer“ | 14 | 10 E.U.R. | + | Business, real estate, consumer | LV |
| 8. | „PeerBery“ | 11 | 10 EUR | - | Consumer | LV |
| 9. | „Lenndy“ | 12 | 10 E.U.R. | + | Business, consumer, cars | LV/LT |
| 10. | „Blend“ | 12 | 1000 GBP | + | Real estate | G.B. |

Source: systematized by the authors based on (P2PMarketData, 2019; Asecurelife, 2018; Crowdfunding platforms, 2019)

*3.* Bondora provides loans in Finland (33.09 %), Spain (9.75 %) and Estonia (56.8 %), i.e., the eurozone countries that because of their size, such as Finland or Estonia, or some adverse macroeconomic developments (Spain) did not create competitive credit markets (Bondora, 2019a). The interest rate is set concerning the credit rating (Bondora, 2019b). Until 2019 Bondora had total issued EUR 213,096,466 in loans, the average amount of one loan is EUR 2,370, with an interest rate of 34.9%, the average term being 49 months. The R.O.I. of the platform is 10.5%. The platform grants loans for a variety of purposes and business loans account for 4% of the total lending volumes.

LendingClub is a peer-to-peer platform operating in the U.S.A.; until 2019, LendingClub had granted more than USD 47 million in loans, the average value being USD 13,000, the average term – 48 months, average interest rate 12.67 %, the platform's R.O.I. – 8% (LendingClub, 2019a). The interest rate levied on the loans is set forth concerning the credit rating. LendingClub operates a specialized program for business loans accounting for about 1% of all loans.

One of the most important aspects of obtaining a loan is the total price of the loan that is comprised not only of the interest but also includes other fees applied by the relevant platform (Table 2).

**Table 2. Fees and charges applied by Bondora and LendingClub platforms**

| | „Bondora“ | „LendingClub“ |
|---|---|---|
| **Contract drawing up fee** | 5.96 percent | 1-6 percent |
| **Administrative fee** | 4 percent/year | - |
| **Interest rate** | 5.71-19.92 per cent | 6.95-35.89 per cent |
| **Late interest (periodic penalty payments)** | 14.99 EUR | Max. (15 $; 5 per cent) |
| **The fee of a reminder about the debt** | Max. 5, E.U.R. | - |
| **Additional charges** | 10 E.U.R. / month | - |

Source: systematized by the authors based on (Bondora, 2019c; Moneycheck, 2019)

*4*. In case of Bondora, the results obtained from correlation analysis of internal factors (Table 3) demonstrated: (i) weak relationship between the interest rate and the borrower's language ($Xi_2$), expected rate of return ($Xi_7$) and credit score ($Xi_9$), (ii) moderate relationship between the interest rate and the rating ($Xi_1$) of the borrower's residence country ($Xi_4$) expected loss ($Xi_5$), and (iii) a strong relationship between the default probability ($Xi_6$) and the interest rate. The $Xi_9$ dependency is reversed.

**Table 3. Correlation between Bondora interest rate and selected (significant) internal variables**

| **Y** | **$Xi_1$** | **$Xi_2$** | **$Xi_3$** | **$Xi_4$** | **$Xi_5$** | **$Xi_6$** | **$Xi_7$** | **$Xi_8$** | **$Xi_9$** |
|---|---|---|---|---|---|---|---|---|---|
| **Interest rate** | Rating | Language | Gender | Country | Expected loss | Default probability | Expected rate of return | Loss in case of default | Credit score |
| **Correlation coefficient** | 0.65 | 0.48 | 0.28 | 0.53 | 0.70 | 0.77 | 0.46 | 0.30 | -0.34 |
| **Significance** | 38.16 | 23.86 | 12.59 | 27.68 | 43.69 | 52.64 | 22.70 | 14.10 | 16.08 |
| **Critical value** | | | | | 1.96 | | | | |

Source: developed by the authors

Since the indicators strongly related to the interest rate were computed using different algorithms, further variables that could affect the total price of the loan are identified. Therefore 20 variables were selected based on the description for credit pricing published on the website of Bondora (BondoraSupport, 2019) (Appendix 2, Table A3) to be used for correlation analysis.

Factor analysis is performed to systemize the correlating variables. The explained dispersion part of variables $Xe_5$ and $Xe_{20}$ is smaller as compared with other variables; therefore, they were eliminated from further analysis. Kaiser-Meyer-Olkin Measure of Sampling Adequacy value is 0.853 (>0.5), i.e., the identified factors can explain 85.3% of the dispersion in the variables; Bartlett's Test of Sphercity materiality level <0.0001 (<0.05); the hypothesis that the variables are unrelated is rejected. Two factors were distinguished, the eigenvalue of the first is 8.20, and the second is 3.83, jointly account for 92.5 % of the total dispersion of the variables (after rotation, respectively, 55.78% and 36.73%). The obtained results are reflected in the Rotated component matrix (Figure 1, panel on the left): the factors of interest rates of business loans granted at Bondora platform are: (i) economic environment of the states (variables $Xe_1$, $Xe_2$, $Xe_3$, $Xe_9$, $Xe_{10}$, $Xe_{14}$, $Xe_{18}$, $Xe_{19}$) (positive effect); (ii) Bondora platform performance indicators that are closely related to risk-free interest rate ($Xe_7$, $Xe_{11}$, $Xe_{12}$, $Xe_{16}$, $Xe_{17}$) (negative effect).

The variables characterized by a significant correlation with the interest rates of business loans (Appendix 2, Table A3) are used in regression analysis. Having tested all the possible combinations of the variables and having regard to statistical characteristics ($R^2$, t statistics, p-value) a model best explaining the variation of a dependent variable ($R^2$ = 0,47, p-value: < $5.888 \times 10^{-5}$ <0,05,F(18,97) > 3,24) is provided (Equation 3):

$$Y = 21.86 - 1.95 \times Xe_{16} - 0.024 \times Xe_{20} \quad (3)$$

where: *Y* – interest rate for business loans, *Xe16* – 10-year Spain government bond yield, per cent, *Xe20* – Finland government debt, mln. EUR.

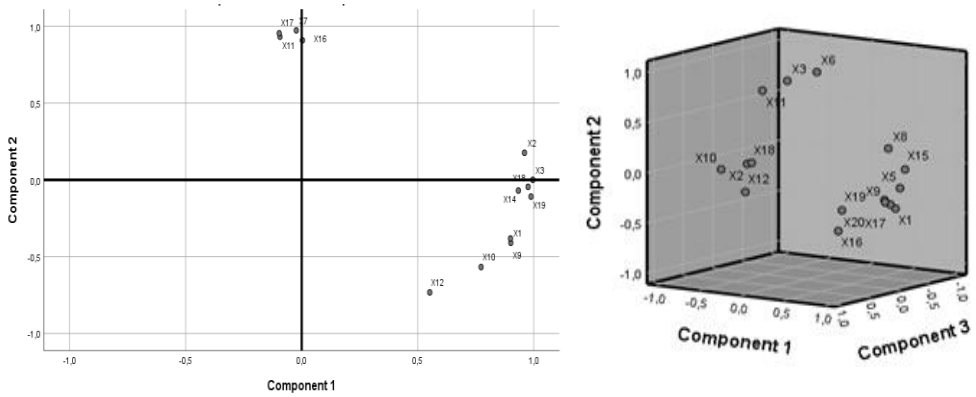


**Figure 1. Rotated component matrixes for Bondora (left) and LendingClub (right)**

Source: developed by the authors

The model thus designed demonstrates that: (i) the interest rates set by Bondora were affected by economic indicators of Finland and Spain, (ii) observable fairly strong correlation with a risk-free interest rate which could be considered as an alternative to the borrowing/lending opportunities analyzed for the present study.

In case of LendingClub, the results obtained from correlation analysis of internal factors demonstrated (Table 4): (i) only five variables – credit limit turnover ($Xi_2$), timeliness of the payment of installments ($Xi_3$), the ratio between the total obligations and credit limit ($Xi_4$), total unused credits ($Xi_5$) and term of the loan ($Xi_6$) – demonstrate a weak relationship with the interest rate, (ii) one variable – sub-rating ($Xi_1$) – holds a very strong relationship with the interest rate. The dependency of $Xi_4$ and $Xi_5$ is reverse.

The previously mentioned variables hold only weak relation to the dependent variable; therefore, those variables cannot be used to perform regression analysis. The platform and the agencies that provide data to LendingClub about clients and their credit history use specific FICO calculations to determine sub-ratings and the interest rate. The variables that affect interest rates were identified by selecting total 20 different variables that according to the prospect of LendingClub (LendingClub, 2019b) could be linked to the interest rate of the platform, and by performing a correlation analysis (Appendix 2, Table A4)

**Table 4. Correlation between LendingClub interest rate and selected (significant) internal variables**

| Y | $Xi_1$ | $Xi_2$ | $Xi_3$ | $Xi_4$ | $Xi_5$ | $Xi_6$ |
|---|---|---|---|---|---|---|
| **Interest rate** | Sub-rating | Credit limit turnover | Timeliness of the payment of installments | Total obligations/ Credit limit | Total unused credits | Term of the loan |
| **Correlation coefficient** | 0.99 | 0.32 | 0.23 | -0.25 | -0.36 | 0.25 |
| **Significance** | 456.71 | 22.57 | 15.85 | 17.75 | 26.51 | 17.38 |
| **Critical value** | 1.96 | | | | | |

Source: developed by the authors

Factor analysis is performed assessing 16 variables to systematize the variables that affect the dependent variable (i.e., interest rate). The Kaiser-Meyer-Olkin Measure of Sampling Adequacy value is 0.737 (> 0,5); thus, 73.7% of the dispersion can be accounted for by the factors identified. Bartlett's Test of Sphercity materiality level is <0,0001 (<0,05), therefore the hypothesis that the variables are unrelated is rejected. Three factors exist the eigenvalue of which is 8.423 (after the rotation account for 49 % of the full dispersion of the variables), 3.210 (20.85% of the dispersion), and 1,698 (14.761% of the dispersion), respectively; jointly the factors account for 85% of all the dispersion of the variables. The obtained results are reflected in the Rotated component matrix (Figure 1, panel on the right): the main factors affecting the interest rates of the loans granted at the LendingClub platform: (i) economic environment (micro and macro) (variables $Xe_1$, $Xe_2$, $Xe_8$, $Xe_9$, $Xe_{15}$, $Xe_{16}$, $Xe_{20}$) (positive impact), (ii) indicators of the competitors (other financial institutions) (variables $Xe_3$, $Xe_5$, $Xe_6$), (iii) performance indicators of the platform (variables $Xe_{17}$, $Xe_{19}$) (negative impact).

The variables characterized by a significant correlation with the interest rates of business loans at LendingClub (Appendix 2, Table A4) are used in regression analysis. Having tested all the possible combinations of the variables and having regard to statistical characteristics ($R^2$, t statistics, p-value) a model best explaining the variation of the dependent variable ($R^2$ = 0,94, p-value: $2.2e^{-16}$ <0,05, F(118,23) > 3,20) is constructed (Equation 4):

$$Y = 1.95 + 0.0012 \times Xe_1 - 0.012 \times Xe_9 \quad (4)$$

where: *Y* – interest rate for business loans, $Xe_1$ - G.D.P. of the U.S.A., bln. USD, $Xe_9$ - average housing sale, th. USD.

The model thus designed demonstrates that: (i) there is a link to a risk-free interest rate; (ii) an important role is being played by the national macroeconomic environment, and macroeconomic ratios have much more influence. Thus, it may be concluded that although the two platforms are operating in different countries, different ratios were selected for the analysis. Still, the factors affecting the price of the loan and shaping the price determination policy are very similar.

*5.* Three possible scenarios for the interest rates at the platforms were identified based on the obtained regression equations, and the total credit price is computed by adjusting the TARCBL calculations according to the taxation system of each platform. A realistic scenario is compiled based on economic forecasts, and optimistic and pessimistic scenarios are designed applying opposite values (Table 5).

Based on the taxes paid about Bondora platform (Table 2), the following TARCBL formula is produced (Equation 5):

$$TARCBL = P + (P \times i \times n) + (P + 0.0596) + (P \times 0.04 \times n) + (10 \times m) \quad (5)$$

where: *i* – annual interest rate, *P* – loan amount, *n* – period (in years), *m* – period (in months).

**Table 5. Assumptions of realistic, optimistic and pessimistic scenarios**

| | Bondora | | LendingClub | |
|---|---|---|---|---|
| | **Spain 10-Year bond yield, %** | **Finland government debt, mln. EUR** | **USA GDP, bln. USD** | **Average housing selling price, th. USD** |
| **Realistic scenario** | 0.81 | 10620.6 | 21048.8 | 377.0 |
| **Optimistic scenario** | 1.71 | 10261.4 | 22120.0 | 395.9 |
| **Pessimistic scenario** | 0.36 | 10805.4 | 19996.4 | 358.2 |

Source: developed by the authors based on (authors' compilations; Trading Economics, 2019a; Statista, 2019; Gordcollins, 2019)

For computing TARCBL, late interest or the fees of a reminder about the debt are disregarded. In Q1 2019, an interest rate of 10-year maturity bonds in Spain was 1.26 %, the public debt of Finland amounted to EUR 104,431 million, and the average interest rate of the loans issued by Bodora was 35,10 %. The interest rates for business credits of a platform computed according to individual scenarios and using the regression equation and the TARCBL to be charged on a customer borrowing EUR 5,000 are presented in Table 6. Adjusted for the taxes charged by the LendingClub platform, the following TARCBL formula is compiled (Equation 6):

$$TARCBL = P + (P \times i \times n) + (P \times f) \quad (6)$$

where: *f* – contract drawing up fee, *i* – annual interest rate, *P* – loan amount, *n* – period.

In Q1 2019, the G.D.P. of the U.S.A. was USD 21,048,839 bn, and the average housing sale price was USD 377,000, the average interest rate applied by LendingClub was 19.67%. For comparison purposes, the amount sought to be borrowed by a borrower is converted into an equivalent loan of EUR 5,000. The results of the calculations when applying a maximum contract conclusion charge are shown in Table 6.

The results obtained and presented in Table 6 show that: (i) irrespective of the selected scenario the total amount paid by the borrower is larger at the Bondora platform; (ii) the TARCBL at the Bondora platform is on average by 47% larger than at the LendingClub platform; (iii) the total amount of the loan of EUR 5,000 for five years at Bondora platform increases on average by 62%, and by about 42 % at LendingClub; (iv) the main factors responsible for the higher final amount are the higher administrative fees applied by Bondora, and the interest rate higher by 22.23 %.

**Table 6. Comparison of Bondora and LendingClub TARCBL**

| | Bondora | | | | LendingClub | | | |
|---|---|---|---|---|---|---|---|---|
| | Average interest rate | | TARCBL | | Average interest rate | | TARCBL | |
| | Regression equation | % | E.U.R. | % | Regression equation | % | E.U.R. | % |
| **Realistic scenario** | $Y=25.85*0.94^{0.81}*1.0001^{10620.6}$ | 47.75 | 14690.63 | 81.27 | Y=1.9521+0.0012 *22212 – 0.0123*395.85 | 24.72 | 9056.22 | 32.12 |
| **Optimistic scenario** | $Y=25.85*0.94^{0.45}*1.0001^{10805.4}$ | 42.37 | 13999.37 | 74.62 | Y=1.9521+0.0012 *19995 – 0.0123*358.15 | 22.53 | 8676.33 | 29.24 |
| **Applying minimum interest rate** | | 9.32 | 8172.20 | 21.72 | | 5.32 | 6005.46 | 8.63 |
| **Pessimistic scenario** | $Y=25.85*0.94^{0.45}*1.0001^{10805.4}$ | 47.32 | 15016.5 | 84.44 | Y=1.9521+0.0012 *23226 – 0.0123*415.64 | 25.85 | 9225.52 | 33.63 |
| **Applying maximum interest rate** | | 62.21 | 18237.96 | 117.59 | | 30.99 | 10189.24 | 40.71 |

Source: developed by the authors.

The results thus obtained are best interpreted by comparing them with the outcomes of other platforms and the traditional financial institutions that provide comprehensive information required for the calculation of TARCBL. The paper presents the results of calculation and an analysis of the TARCBL ratio of Lithuanian peer-to-peer lending, also crowdfunding, consumer credit providers, commercial banks, and of foreign peer-to-peer lending and crowdfunding platforms (Figure 2) assuming the lowest interest rates of best-rated borrowers.

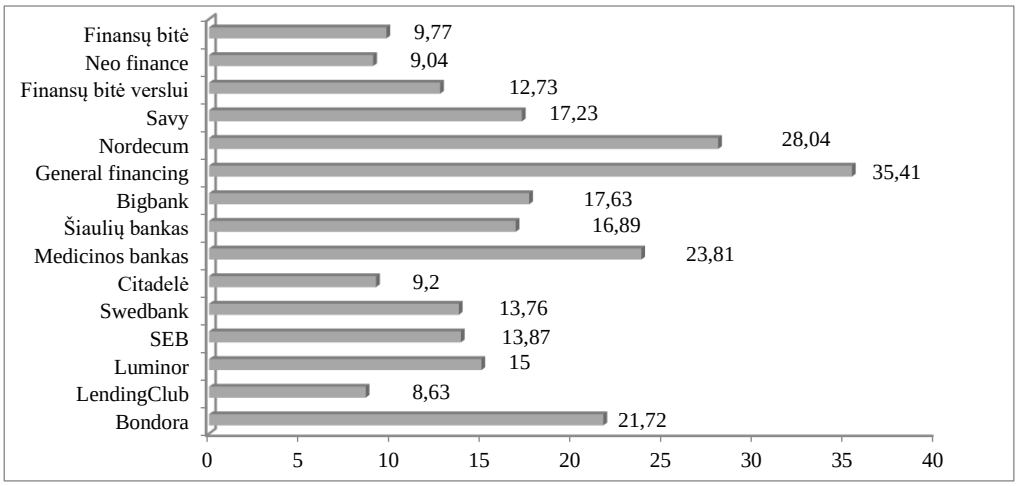


**Figure 2. Comparison of TARCBL in the Lithuanian financial sector, November 2019, per cent.**

Source: developed by the authors on the basis of (Citadelė, 2019; Finbee, 2019; Luminor, 2019; Savy, 2019; S.E.B., 2019; Paskolų..., 2019; Nordecum, 2019; G.F., 2019; Bigbank, 2019; Šiaulių..., 2019; Medicinos ..., 2019; Swedbank, 2019)

A comparison analysis performed in Lithuania revealed that: (i) among the commercial banks the most expensive loans are provided by Medicinos bank, although the bank declares that loans are provided at an interest rate of 9 %, the actual TARCBL is 23.81%; (ii) the rate offered by the major Scandinavian banks (Luminor, Swedbank, S.E.B.) is 14-15%, (iii) the price of credits granted by major commercial banks are on average very similar to the rates levied by crowdfunding platforms (Savy, Finansų bitė verslui); (iv) the peer-to-peer platforms provide loans at a rate lower than the TARCBL of the major commercial banks; (v) there is an observable intensive competition with Citadelė bank whose TARCBL is slightly lower than that of the peer-to-peer lending platforms; (vi) the TARCBL of consumer credit providers (BigBank) has become very close to that applied by crowdfunding platforms.

Furthermore, it may be concluded that: (i) the TARCBL at peer-to-peer lending platforms is significantly lower not only in Lithuania but also throughout the world (the TARCBL of Finansų bitė or Neofinance differed from LendingClub by about 1%); (ii) the interest rates of crowdfunding platforms are higher both in Lithuania and abroad (the TARCBL of Lithuanian crowdfunding platforms differs from that of Bondora by on average 6.4 %). The analysis carried out as part of the study shows the importance of TARCBL, as this indicator summarizes all the expenses related to the credit.

**Conclusions.** Over the past decade, the alternative financing market substantially increased not only in Europe but also globally; moreover, it is projected that the alternative lending market will be rapidly growing in the future, and the volumes of business funding from alternative sources will be increasing.

The alternative funding platforms compete intensively with traditional financing institutions reducing interest rates and applying a less conservative system for the assessment of financial performance or solvency of potential borrowers. The best way to make the right financing decision is to compare the price or TARCBL of crowdfunding and peer-to-peer crediting facility against traditional financing loans.

The results of the study show that the crowdfunding and peer-to-peer lending platforms rely on ratings based on the customer's credit risk to determine the borrower's interest rate. The most important internal

factors of the interest rate for business loans are the customer's credit history, expected losses, expected rates of return.

Although the two analyzed platforms are operating in different countries, different ratios were selected for the analysis, the external factors affecting the interest rate of business loan and shaping the price determination policy are very similar: the most important them are such external factors as the risk-free interest rate and national macroeconomic environment (G.D.P., government debt).

External factors appeared to have a much greater impact on the interest rate for business loans in crowdfunding and peer-to-peer lending platforms than internal factors.

Irrespective of the scenario selected, the total amount paid by the borrower (TARCBL) is larger at the crowdfunding platforms compared to peer-to-peer lending platforms, due to the higher administrative fees and interest rates. The global comparison allows to state that the TARCBL at peer-to-peer lending platforms is significantly lower not only in Lithuania but also throughout the world. In contrast, the interest rates of crowdfunding platforms are higher both in Lithuania and abroad.

The comparison results of the TARCBL ratio of Lithuanian peer-to-peer lending, crowdfunding platforms, consumer credit providers, commercial banks, and foreign peer-to-peer lending and crowdfunding platforms revealed that the peer-to-peer platforms provide loans at a rate lower than the TARCBL of the major commercial banks.

It is important to pay due attention to fees applied by the platforms, as they often significantly increase the total rate of charge for loans and are not always clearly stated.

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## Appendixes.

**Table A1. Internal variables for Bondora interest rate correlation analysis**

| Number | Variable | Correlation coefficient |
|---|---|---|
| $Xi_1$ | Rank | 0.65 |
| $Xi_2$ | Language | 0.475 |
| $Xi_3$ | Gender | 0.274 |
| $Xi_4$ | Country | 0.53 |
| $Xi_5$ | Expected loss | 0.70 |
| $Xi_6$ | Loss in case of default | 0.30 |
| $Xi_7$ | Expected return | 0.457 |
| $Xi_8$ | Probability of default | 0.766 |
| $Xi_9$ | Credit score | -0.34 |
| $Xi_{10}$ | The loan amount lent in a primary market | -0.13 |
| $Xi_{11}$ | Loan term | -0.067 |
| $Xi_{12}$ | Education | -0.12 |
| $Xi_{13}$ | Marital status | 0.095 |
| $Xi_{14}$ | Number of dependents | -0.10 |
| $Xi_{15}$ | Employment type | -0.029 |
| $Xi_{16}$ | Income from employment contract | -0.008 |
| $Xi_{17}$ | Other income | 0.008 |
| $Xi_{18}$ | Total income | -0.005 |

**Continue table A1**

| | | |
|---|---|---|
| $Xi_{19}$ | Existing obligations | -0.075 |
| $Xi_{20}$ | Payable liabilities (per month) | 0.032 |
| $Xi_{21}$ | Refinanced liabilities | -0.01 |
| $Xi_{22}$ | DTI | 0.013 |
| $Xi_{23}$ | Cash | -0.02 |
| $Xi_{24}$ | Pay day of the loan | -0.16 |
| $Xi_{25}$ | Interest receivable on schedule | -0.04 |
| $Xi_{26}$ | Area of occupation | 0.019 |
| $Xi_{27}$ | Housing type (own. rented. etc.) | -0.011 |
| $Xi_{28}$ | Number of days delayed | 0.20 |
| $Xi_{29}$ | Amount of interest delayed | 0.193 |
| $Xi_{30}$ | Application time (hour) | -0.023 |
| $Xi_{31}$ | Application time (weekday) | -0.006 |
| $Xi_{32}$ | Age | -0.088 |
| $Xi_{33}$ | Loan amount | -0.041 |
| $Xi_{34}$ | Recovery method | 0.27 |
| $Xi_{35}$ | Rating method | 0.091 |
| $Xi_{36}$ | Credit history on Bondora platform | 0.014 |
| $Xi_{37}$ | Main payments received | -0.038 |
| $Xi_{38}$ | Interest recovered | -0.16 |
| $Xi_{39}$ | Payments written off | -0.004 |
| $Xi_{40}$ | Interest written off | -0.01 |
| $Xi_{41}$ | Outstanding loan | -0.02 |
| $Xi_{42}$ | Unpaid interest and late interest | 0.244 |
| $Xi_{43}$ | Loans received. number | -0.13 |
| $Xi_{44}$ | Loans received. amount | -0.19 |
| $Xi_{45}$ | Amount of loans repaid | -0.05 |
| $Xi_{46}$ | Amount of loans repaid in advance | -0.08 |
| $Xi_{47}$ | Number of early repayments | -0.059 |
| $Xi_{48}$ | Beginning of grace period | -0.25 |
| $Xi_{49}$ | End of grace period | -0.26 |
| $Xi_{50}$ | Number of payments according to the schedule | -0.02 |
| $Xi_{51}$ | Debt collection costs | 0.0025 |
| $Xi_{52}$ | Interest and late interest collection costs | -0.01 |
| $Xi_{53}$ | Number of days since last payment | 0.05 |
| $Xi_{54}$ | Manual investment suggestions | -0.018 |

Source: developed by the authors on the basis of (Bondora, 2019b)

**Table A2. Internal variables for LendingClub interest rate correlation analysis**

| Number | Variable | Correlation coefficient |
|---|---|---|
| $Xi_1$ | Sub-ranking | 0.99 |
| $Xi_2$ | Credit limit turnover | 0.32 |
| $Xi_3$ | Timeliness of the payment of instalments | 0.23 |
| $Xi_4$ | Total obligations/ Credit limit | -0.25 |
| $Xi_5$ | Total credits unused | -0.36 |
| $Xi_6$ | Loan term | 0.25 |

**Continue table A2**

| | | |
|---|---|---|
| $Xi_7$ | Loan amount | -0.11 |
| $Xi_8$ | Payment amount | 0.09 |
| $Xi_9$ | Work experience | -0.078 |
| $Xi_{10}$ | Housing type (own. rented. etc.) | 0.062 |
| $Xi_{11}$ | Income | -0.10 |
| $Xi_{12}$ | DTI | -0.049 |
| $Xi_{13}$ | Existing obligations. number | -0.047 |
| $Xi_{14}$ | Bankruptcies | 0.017 |
| $Xi_{15}$ | Existing obligations. amount | -0.041 |
| $Xi_{16}$ | Total liabilities | -0.10 |
| $Xi_{17}$ | Payments from debtors | -0.05 |
| $Xi_{18}$ | Payments from investors | -0.015 |
| $Xi_{19}$ | Gross balance in accounts | 0.028 |
| $Xi_{20}$ | Gross balance in payment accounts | 0.34 |
| $Xi_{21}$ | Balance of credit limit | 0.34 |
| $Xi_{22}$ | Number of investor views | 0.08 |
| $Xi_{23}$ | Amount of financial transactions | -0.04 |
| $Xi_{24}$ | All payments received | -0.23 |
| $Xi_{25}$ | Maximum amount of credits/credit limits | 0.15 |
| $Xi_{26}$ | Number of transactions in 12 months | 0.10 |
| $Xi_{27}$ | Number of transactions in 24 months | 0.11 |
| $Xi_{28}$ | Maximum balance of current account | -0.014 |
| $Xi_{29}$ | Number of personal finance requests | 0.08 |
| $Xi_{30}$ | Number of financial transactions | -0.04 |
| $Xi_{31}$ | Number of credit requests in 12 months | 0.15 |
| $Xi_{32}$ | Number of financial transactions in 24 months | 0.10 |
| $Xi_{33}$ | Average balance of accounts disponed | -0.13 |
| $Xi_{34}$ | Reserved fund on bank cards | -0.36 |
| $Xi_{35}$ | Number of payments in 12 months | 0.053 |
| $Xi_{36}$ | Accounts payable | -0.005 |
| $Xi_{37}$ | Months since the oldest current account opened | -0.095 |
| $Xi_{38}$ | Months since the oldest credit account opened | -0.18 |
| $Xi_{39}$ | Months since the oldest mortgage account opened | -0.09 |
| $Xi_{40}$ | Number of mortgage accounts | -0.16 |
| $Xi_{41}$ | Months since the last bank card opened | -0.07 |
| $Xi_{42}$ | Months since last request | -0.15 |
| $Xi_{43}$ | Number of unpaid transactions | 0.09 |
| $Xi_{44}$ | Number of bank cards >75 per cent of limit | 0.06 |
| $Xi_{45}$ | Number of publicly declared bankruptcies | 0.044 |
| $Xi_{46}$ | Total balance of credits except mortgage loans | 0.006 |
| $Xi_{47}$ | Bank card commitments/ credit limits | -0.29 |
| $Xi_{48}$ | Commitment payments/ credit limits | -0.006 |

Source: developed by the authors on the basis of (LendingClub, 2019a)

**Table A3. External variables for Bondora interest rate factor analysis**

| Number | Variable | Correlation coefficient | Significance |
|---|---|---|---|
| $Xe_1$ | GDP of Estonia (mln. EUR) | 0.45 | 3.13 |
| $Xe_2$ | GDP of Spain (mln. EUR) | 0.56 | 4.27 |
| $Xe_3$ | GDP of Finland (mln. EUR) | 0.49 | 3.49 |
| $Xe_4$ | Estonia short term interbank offered rate (per cent) | -0.29 | 1.86 |
| $Xe_5$ | Average monthly income in Estonia (EUR) | 0.41 | 2.80 |
| $Xe_6$ | Average return on investment on Bondora platform (per cent) | 0.13 | 0.81 |
| $Xe_7$ | Long term euro zone bond interest rate | -0.54 | 4.01 |
| $Xe_8$ | CPI in Estonia | -0.09 | 0.55 |
| $Xe_9$ | Housing price in Finland (2015=100) | 0.55 | 4.16 |
| $Xe_{10}$ | Housing price in Estonia (2015=100) | 0.53 | 3.90 |
| $Xe_{11}$ | Bondora coverage ratio | -0.47 | 3.28 |
| $Xe_{12}$ | Number of loans on Bondora platform | 0.48 | 3.43 |
| $Xe_{13}$ | Interest rate on consumer loans in Estonian banks (per cent) | -0.27 | 1.73 |
| $Xe_{14}$ | Loans to households (mln. Eur.) | 0.33 | 2.16 |
| $Xe_{15}$ | PPI in Estonia | 0.20 | 1.29 |
| $Xe_{16}$ | 10-year Spain government bond yield | -0.65 | 5.3 |
| $Xe_{17}$ | 10-year Finland government bond yield | -0.48 | 3.44 |
| $Xe_{18}$ | „LendingClub“average interest rate | 0.42 | 2.87 |
| $Xe_{19}$ | Spain government debt (mln. EUR) | 0.54 | 4.02 |
| $Xe_{20}$ | Finland government debt (mln. EUR) | 0.63 | 5.10 |
| | Critical value | | 2.02 |

Source: developed by the authors on the basis of (OECD, 2019; FRED, 2019; Statistics Estonia, 2019; Eesti Pank, 2019; Finants…, 2019)

**Table A4. External variables for LendingClub interest rate factor analysis**

| Number | Variable | Correlation coefficient | Significance |
|---|---|---|---|
| $Xe_1$ | GDP in USA. bln. (USD) | 0.90 | 13.55 |
| $Xe_2$ | Unemployment (per cent) | -0.49 | 3.76 |
| $Xe_3$ | 10-year USA government bond yield (per cent) | -0.56 | 4.52 |
| $Xe_4$ | Average interest rate on bank loans (per cent) | -0.03 | 0.22 |
| $Xe_5$ | Non-mortgage loans from financial institutions (trln. USD) | 0.83 | 9.92 |
| $Xe_6$ | Mortgage loans from financial institutions (trln. USD) | -0.39 | 2.78 |
| $Xe_7$ | Federal funds discount rate (per cent) | -0.19 | 1.29 |
| $Xe_8$ | Income – median (USD) | 0.54 | 4.28 |
| $Xe_9$ | Average housing price (thousands USD) | 0.77 | 7.95 |
| $Xe_{10}$ | Credit limits issued by financial institutions (mln. USD) | -0.63 | 5.40 |
| $Xe_{11}$ | Business loans and leases from financial institutions (mln. USD) | -0.74 | 7.41 |
| $Xe_{12}$ | Consumer loans and leases from financial institutions (mln. USD) | -0.37 | 2.62 |
| $Xe_{13}$ | Business situation index | 0.16 | 1.06 |

**Continue table A4**

| | | | |
|---|---|---|---|
| $Xe_{14}$ | CPI | -0.03 | 0.18 |
| $Xe_{15}$ | Number of loans on LendingClub platform | 0.81 | 9.12 |
| $Xe_{16}$ | Amount of delayed loans on LendingClub platform (USD) | 0.42 | 3.07 |
| $Xe_{17}$ | Number of loans on LendingClub platform (USD) | 0.74 | 7.33 |
| $Xe_{18}$ | Ratio of total loans to delayed loans on LendingClub platform | -0.39 | 2.77 |
| $Xe_{19}$ | Nominal return on loans on LendingClub platform (per cent) | 0.56 | 4.58 |
| $Xe_{20}$ | S&P 500 | 0.82 | 9.62 |
| | Critical value | | 2.01 |

Source: developed by the authors on the basis of (OECD, 2019; FRED, 2019; LendingClub, 2019a; Federal.... 2019; Trading Economics, 2019)

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**Фінансовий інноваційний менеджмент: вартість кредиту на платформах краудфандингу та краудлендінгу**

*У статті систематизовано аргументи та контраргументи у рамках наукової дискусії щодо інноваційних джерел фінансування бізнес діяльності. Встановлено, що підприємства (особливо малі та середні) можуть обирати інноваційні фінансові інструменти, такі як взаємне кредитування та краудфандингові платформи, як альтернативу традиційному банківському фінансуванню. Зазначен, що використання альтернативних можливості фінансування потребує визначення основних складових ставки позики та правильно оцінити її загальну вартість. Головна мета даної статті полягає у висвітленні внутрішніх та зовнішніх складових відсоткової ставки за кредитом підприємства та визначення сукупної річної ставки кредитування підприємств на інноваційних фінансових платформах. Вихідні данні для дослідження були сформовані на основі аналізу наукових публікацій та статистичних даних ринку краудфандингу та краудлендінгу. Для визначення складових відсоткової ставки за кредитом на досліджуваних платформах застосовано методи кореляційно-регресійного та факторного аналізів. У свою чергу, аналіз сценаріїв використаний для оцінки сукупної річної ставки бізнес кредитування. За результатами кореляційно-регресійного та факторного аналізів встановлено, що узагальненими складовими бізнес кредиту є економічна ситуація, конкурентне середовище та особливості платформи. При цьому автори зазначили, що зовнішні складові мають сильніший вплив на відсоткову ставку за кредитом на платформах краудфандингу та взаємного кредитування. У свою чергу, за результатами аналізу сукупної річної ставки за кредитом встановлено, що платформи взаємного кредитування та краудфандингу пропонують нижчу ставку, порівняно із традиційними фінансовими організаціями. Більше того, ставка на платформі краудфандингу є вищою порівняно із платформою взаємного кредитування через вищий адміністративний збір та відсоткову ставку. За отриманими результатами дослідження висвітлено особливості краудфаундингового та взаємного фінансування, а також складові, які впливають на відсоткову ставку та реальну ціну, яку власники підприємств повинні заплатити за користування кредитними коштами. Дане дослідження сприяє подальшим дослідженням у галузі фінансових інновацій та може бути використане як фінансовими платформами, так і підприємствами, які прагнуть визначити та порівняти реальну вартість традиційного та альтернативного фінансування.*

**Ключові слова:** фінансові інновації, альтернативне фінансування, фінансові технології, відсоткова ставка, ціна позики, сукупна річна ставка кредитування бізнесу.

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