FACTORS AFFECTING CONSUMER LOANS INTEREST RATE IN PEER-TO-PEER LENDING PLATFORMS IN LITHUANIA

A Thesis

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by

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Summary

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Peer-to-peer (P2P) consumer lending platforms play an important role in the consumer credit industry by providing credits to the borrowers, underserved by traditional financial institutions. Although P2P platforms operating in Lithuania offer lower interest rates and a longer payback period than traditional banks, they use non-disclosed loan-pricing mechanisms that impose information asymmetry in the market as borrowers are not familiar with the factors influencing the size of interest rate which they are charged by the platform operators. Therefore, this thesis aims to discover the factors that may explain the interest rate set on the loans in P2P consumer lending platforms operating in Lithuania. To reach the aim of the thesis, first, online global alternative finance market and P2P consumer lending market in the Baltics and Lithuania were overviewed and systematic analysis was performed on the academic literature which examines the factors affecting consumer loans interest rate, next, OLS regression was selected as a research method to detect the factors affecting interest rate based on the data from Finbee, SAVY, and Paskolų klubas samples. Results of the empirical research have indicated that credit rating, unemployment rate, and work experience at the recent employer are the common potential factors to affect consumer loans interest rate in Lithuania's P2P lending market. In contrast, borrower's gender or a loan purpose to refinance outstanding liabilities are not expected to drive interest rates in either of the platforms. The effect of the loan amount, maturity term, borrower's age, marital or homeowner status, number of dependents, education degree, DTI ratio, or coronavirus pandemic on the interest rate differs among the examined samples due to variations in client base and loan pricing strategies among the platforms.

Keywords: peer-to-peer lending, interest rate, consumer loans.

Words count: 13 717

Table of Contents

List of Figures

List of Tables

Introduction

Since the beginning of the 21st century, the global financial sector has faced vast disruptions caused by the sub-prime mortgage crisis in 2007 followed by the global financial crisis in 2008-2009 and a coronavirus pandemic that unexpectedly started in 2020 and is lasting until current times. The roots of the sub-prime mortgage crisis have signified careless lending models used by traditional banks, hence higher borrowers' creditworthiness and stricter capital requirements have been imposed on the post-crisis financial institutions. Twelve years later, a coronavirus pandemic has restricted usual activities worldwide - imposed national lockdowns made it impossible to provide in-person consultations on the loan contracts previously offered by traditional banks, decreasing the possibility, and increasing the waiting time of getting a loan even more. Lack of digitalization in the traditional banking system and unaffordable credits due to the elevated requirements for borrowers' creditworthiness encourage people living all around the world to search for alternative borrowing options every consequent decade.

One of the solutions for the customers, who have been underserved by the banks, is to try borrowing through the online alternative finance market, where the P2P (peer-to-peer) lending market accounts for almost a half of global transactions volume, while its largest sector, consumer lending, accounts for around thirty per cent. P2P consumer lending platforms in Lithuania such as Finbee, SAVY, and Paskolų klubas allow borrowers with different creditworthiness - from high to inferior to be accepted by traditional financial institutions - to receive a loan directly from the multiple lenders on a digital marketplace. Even though in such platforms the cost of a loan is mainly assessed based on the credit rating, the loan grading procedures and loan pricing methods are neither standardized nor publicly disclosed in the industry, leading to both different rating scales and a wide range of interest rate values within one credit risk grade. Therefore, a problem of asymmetric information has emerged as borrowers are not familiar with the factors that explain the interest rates which they are charged by P2P platform operators. Consequently, a broad range of empirical and experimental research papers has been facilitated to examine the factors affecting the interest rate, yet neither of the researchers analysed Lithuania's market.

The research problem. What factors affect the interest rate set in P2P consumer lending platforms in Lithuania?

The thesis aims to discover the factors that affect the interest rate set on the loans in P2P consumer lending platforms in Lithuania.

The following **objectives** are set to reach the aim of this thesis:

1. To examine the online alternative finance market globally and P2P consumer lending market in the Baltics and Lithuania.
2. To analyse academic literature, identifying the factors affecting consumer loans interest rates, and select a reasonable research method.
3. To overview the composition of the samples and conduct OLS regressions to detect the factors explaining interest rate in the examined platforms.
4. To determine common patterns in the market and perform a discussion on the research outcomes.
5. To propose recommendations for the borrowers in Lithuania's P2P consumer lending market and future studies.

Research methods. Ordinary least squares (OLS) regressions are conducted to determine the relationship between interest rate and possible factors affecting it; comparative analysis of three samples (Finbee, SAVY, and Paskolų klubas) is performed and variations in data are analysed. The descriptive statistics and OLS regressions have been processed in the software for econometric analysis Gretl and visualized using Microsoft Excel.

Practical value. This paper presents a systematic review of academic publications, that analyse factors affecting consumer loans interest rates in P2P or traditional lending markets and compares the empirical research outcomes with the existing studies. It expands the scope of existing academic literature with a set of factors explaining interest rates in the context of P2P consumer lending platforms in Lithuania which has not yet been analysed. The findings of this research could be valuable not only for the borrowers, but also for the investors, P2P platforms, and regulatory bodies.

Situation Analysis

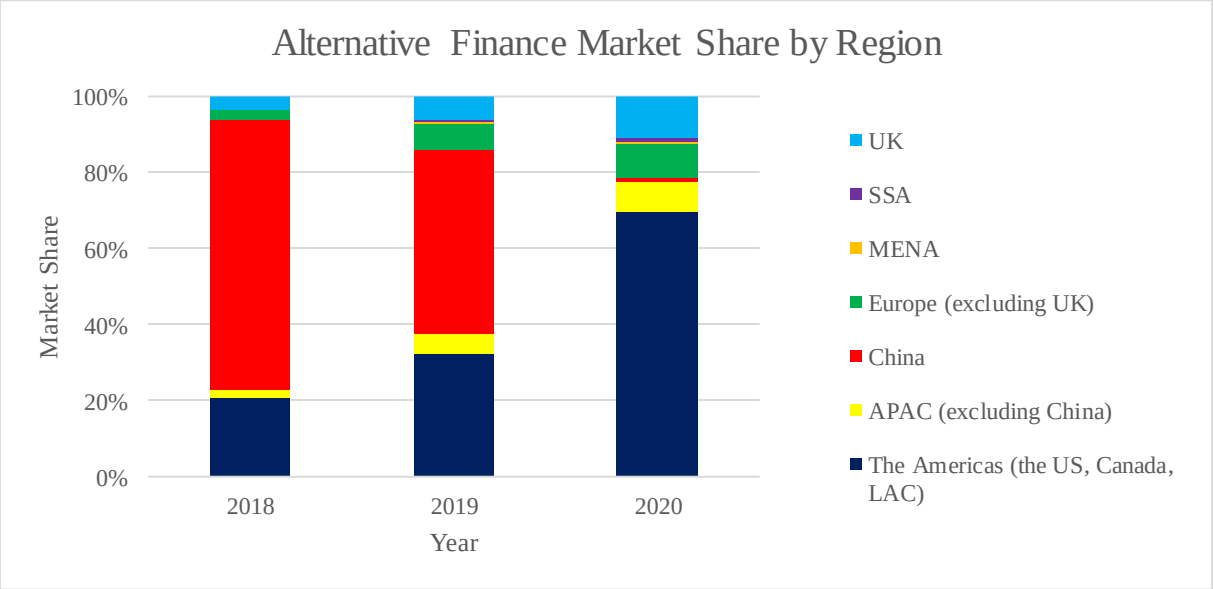
Online Alternative Finance Market

The rapid innovation in financial technologies (FinTech) during the latest decade not only brings a vast digitalization in daily life activities but also imposes inevitable fraud, cybersecurity breaches, and malpractice risks, raising challenges for the viability of long-established banking and capital markets models. Lagging innovative solutions for the digitalization of traditional banking systems and banks' precautions from taking higher risks under the strict regulations and capital requirements increase both cybersecurity threats and interest of underserved customers and creators of innovations for disintermediated financial

marketplaces as a substitute to traditional financial institutions. Such disintermediated and digital lending, non-investment, and investment solutions emerged from the traditional banking systems and capital markets are provided by the online alternative finance market, allowing individuals and businesses to raise funds online at the digital marketplace not even leaving the home (Ziegler et al., 2021). A broad overview of a global alternative finance market development is provided in Global Alternative Finance Market Benchmarking reports that examine the market growth and latest trends in this industry (Ziegler et al., 2021).

Figure 1

Market Share in Alternative Finance Market by Region, 2018-2020



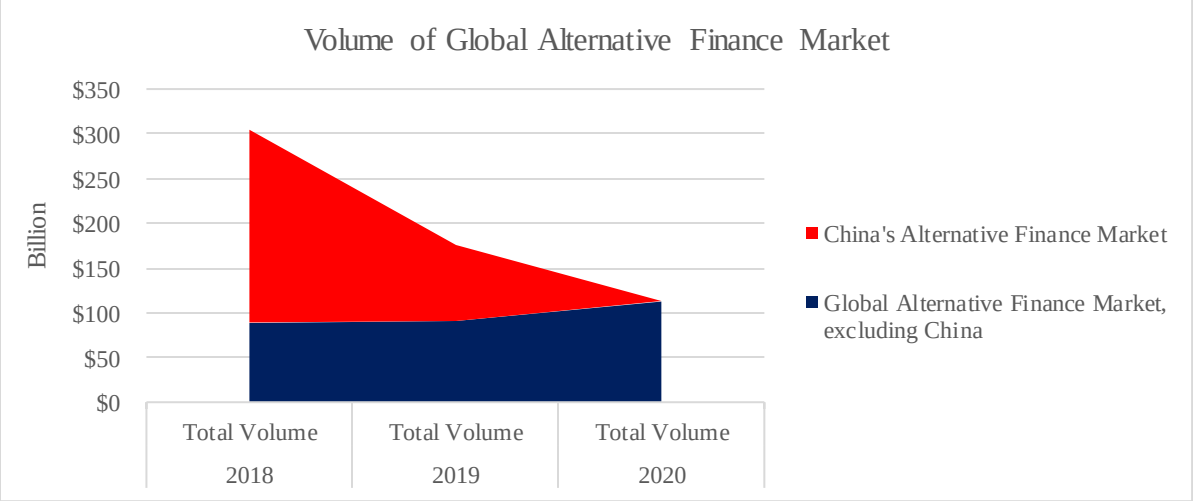
Note. Global market share is calculated by the author based on the report by Ziegler et al., 2021, p. 36. Prepared by the author.

According to the latest report prepared by Ziegler et al. (2021), there are five regional alternative finance markets - Europe, Asia Pacific (APAC), the Americas, Middle East and North Africa (MENA), and Sub-Saharan Africa (SSA), excluding two large national markets – China and the UK (Figure 1). Over the past three years, dominance in the international market has changed. A growing number of complaints regarding high levels of fraudulent activities and defaults in Chinese alternative finance platforms resulted in the stricter regulations and dissolution of inappropriately licensed platforms in the country (Ziegler et al., 2021). Consequently, China's share in the global alternative finance market significantly contracted, making the Americas the leading region in 2020, accounting for more than two-thirds of the market share (Figure 1). The UK had the second largest market share of 11.12%

which is even larger than the share of the whole European market's excluding the UK (8.75%) in 2020 (Figure 1). In the same year, the APAC market excluding China accounted for 7.84% of the market share, SSA – 1.07%, MENA – 0.52% (Figure 1). China's market volumes fell from $215 billion (70.73% of market share) in 2018 to $1.2 billion (1.02% of the market share) in 2020, causing a drop in volumes of global alternative finance market by 42% in 2019, followed by a 35% decrease in 2020 (Ziegler et al., 2021; Figure 2). However, as China had the lion's share in the market, accounting for two times higher volume in 2018 than the whole market in 2020, it is evident that the rest of the world has faced a consistent growth in alternative finance market volumes over the past three years, accounting for three per cent in 2019 and 23% - in 2020, despite the COVID–19 pandemic (Figure 2).

Figure 2

Market Share in Alternative Finance Market by Region, 2018-2020

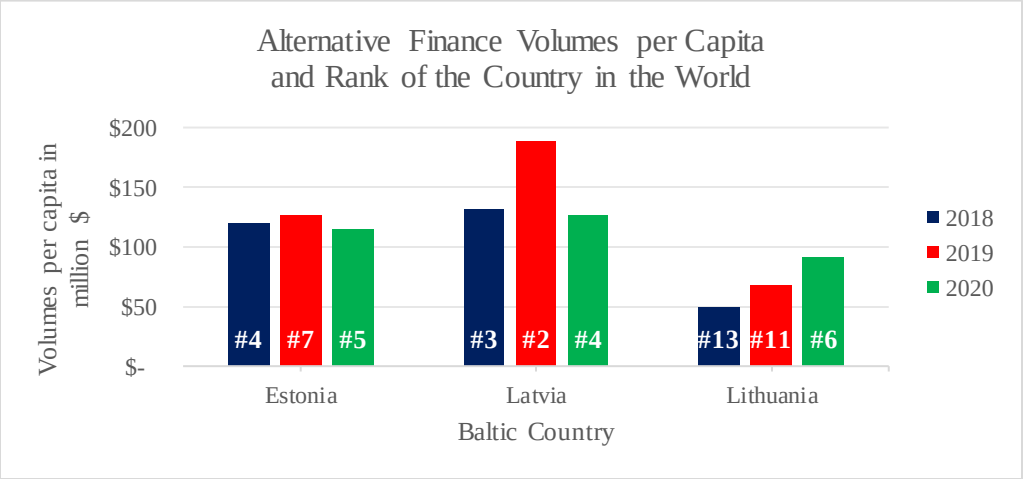


Note. Data is collected from the report by Ziegler et al., 2021, p. 41-42. Prepared by the author.

While the total volume is a valuable indicator for the assessment of the size of the market, market volumes per capita indicate the development of alternative finance markets in different countries (Ziegler et al., 2020, 2021). Although the US is a leader based on the volumes circulating in the alternative finance market and the UK volumes are higher than in the rest of Europe, over the last three years the Baltics have been proactive players in the market (Ziegler et al., 2020, 2021; Figure 3).

Figure 3

Alternative Finance Volumes per Capita in the Baltics and Rank in the World



Note. The worldwide rank of the country is marked with '#'. This data is collected from the reports prepared by Ziegler et al. (2020, 2021). Prepared by the author.

P2P Lending Concept and Loan Models

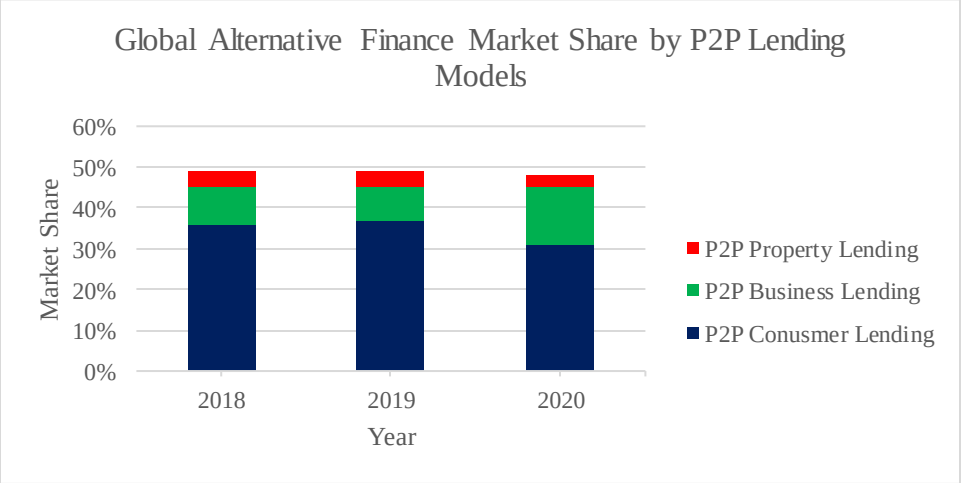
Debt-based P2P (peer-to-peer) lending is predominant in the global alternative finance market (Figure 4). P2P lending platforms provide unsecured loans to individuals and businesses by matching them directly with the network of lenders without the intermediary like a traditional bank (Ofir & Sadeh, 2020). The handling of loan requests starts when a borrower raises a request on the platform by determining loan amount and term, and in a couple of hours receives a request to provide personal and financial information for the credit risk assessment. Borrower's credit score is determined based on the provided information and if it is sufficient to receive a loan, operators assign the interest rate and list the loan with a risk-related information on the website (Ofir & Sadeh, 2020).

On the platform, lenders can select any loan to fund based on the risk perception and expected return. Multiple lenders can fund one loan, hence diversifying default risk. Once the funded amount by lenders matches the requested amount by the borrower, the loan is originated and money is transferred from lenders' accounts to a borrower's account, one or both parties pay a service fee, that is counted as a profit for a P2P platform operator, and lenders receive a credit claim in return (Ofir & Sadeh, 2020). Each borrower makes regular, usually monthly, payments including the interest rate and service fees, and a lender receives income consisting of interest and repaid principal part that declines carrying investment value (Mintos, 2021a). The investment can be liquidated before the expiration date by being sold on the secondary market of the P2P platform.

Three P2P lending models such as consumer, business, and property lending account for sharply a half of the global alternative finance market share excluding China, while the consumer lending sector is the largest based on total volume, accounting for more than 30% of the total market share (Figure 4). Consumer loans are provided to individuals either for financing personal expenditures like a purchase of a car, medical, holiday, or wedding expenses, or for paying off the outstanding debts. Business loans are provided to individuals and companies to finance business expansion or satisfy operating costs. Property loans are suitable for buying real estate and represent a collateralized type of loan.

Figure 4

P2P Share in Global Alternative Finance Market by Lending Models



Note. Data is collected from the reports prepared by Ziegler et al. (2020, 2021). Prepared by the author.

P2P Consumer Lending Market in the Baltics

Major Platforms in the Region

This section overviews dominant players in the P2P consumer lending market in each of the Baltic countries. Based on the amount invested in consumer loans since the establishment date, a Latvian platform Mintos is the largest platform in the Baltic region (Table 1). More than €7 billion invested in loans through Mintos in only 6.5 years is a result of a cooperation with 70 loan originators operating in 34 countries and a multinational poll of investors, granting the ability to finance a diverse selection of loans offered by lending companies with funds of around 440 thousand registered users (Mintos, 2021b; Table 1). The second-largest platform in the Baltics, a Latvian platform Twino, provides 11.5 years track

record with €900 million invested in loans (Table 1). Several large consumer lending platforms have been established in Estonia. Since 2009, 176 thousand investors have funded loans with around €500 million through the Bondora platform and 245 million euros through the Swaper have been invested in loans since 2016 (Table 1).

Table 1

Major P2P Consumer Lending Platforms in the Baltic Countries

Platform	Country	Founded	Total loans funded (mln EUR)	Investors	
				Registered & Active	Registered
Finbee	Lithuania	2015	40.1	21106	
Paskolų klubas	Lithuania	2015	84.8	13757	
SAVY	Lithuania	2014	42.9	5113	
Mintos	Latvia	2015	7252.1		440211
Twino	Latvia	2009	900.3		27400
Bondora	Estonia	2009	490.6		176545
Swaper	Estonia	2016	245.9	4812	

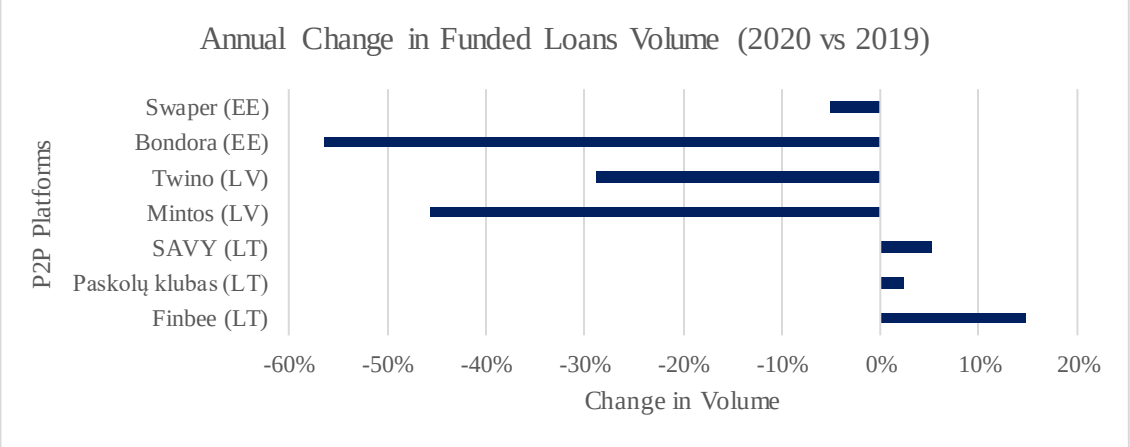
Note. Data is collected on October 15, 2021, from https://www.bondora.com, https://swaper.com, https://www.mintos.com, https://www.twino.eu, https://www.finbee.lt/en/, https://www.paskoluklubas.lt, https://mano.gosavy.com. Prepared by the author.

Funded loans' volumes through Lithuania's consumer lending platforms are the lowest in the Baltics (Table 1). The reason for a significant lag behind the neighbouring countries could be that large Latvia's and Estonia's platforms listed for comparison either operate under the variation of notary business model by offering loans' funding service to loan originators and then providing a wide and diverse pool of loans to investors, like Mintos, Twino, Swaper, or provide loans to borrowers from more than one country like Bondora that offers loans for residents of Estonia, Finland and Spain, increasing the number of borrowers and the loans to fund. As Lithuania's lending platforms serve only domestic borrowers while their investors are largely based in Europe rather than worldwide, thus larger pool of investments to be funded is currently unavailable.

On the other hand, although a rise in the global uncertainty due to the coronavirus pandemic noticeably declined volumes of funded loans volumes in the largest P2P platforms based in Latvia and Estonia, contrarily to the dominant players in the regional market, Lithuania's funded loans volumes have grown in 2020, showing the trust and interest of borrowers and investors in this alternative finance market activities (Figure 5).

Figure 5

Annual Change in Funded Loans Volume by Platform, 2020 vs 2019



Note. Data is collected from https://www.bondora.com, https://swaper.com, https://www.mintos.com, https://www.twino.eu, https://www.finbee.lt, https://www.paskoluklubas.lt, https://mano.gosavy.com. Change is calculated by the author.

Business Models

P2P lending platforms operating in Baltic countries represent several business models existing in the market. The traditional business model matches a creditworthy borrower with a network of potential investors; funds are not included on the company's balance sheet, and platform operators raise income from the loan origination, withdrawal, and other service fees (Committee on the Global Financial System and the Financial Stability Board, 2017). Many P2P lending platforms operating under this model offer free of charge early loan repayment and/or later repayment date option (Committee on the Global Financial System and the Financial Stability Board, 2017). The rate of return on investment stated on the website of the platform is not guaranteed under the pure traditional business model, therefore, P2P traditional lending platforms encourage to spread the risk by investing smaller amounts in multiple loans (Committee on the Global Financial System and the Financial Stability Board, 2017). Platforms operating under the balance sheet model keep funded loan volumes on their balance sheet (Committee on the Global Financial System and the Financial Stability Board, 2017). For instance, Bondora has started operating under this model to comply with legislations imposed on consumer loans in three locations where it operates – Estonia, Finland, and Spain - since September 2015 (Bondora, n.d.-c). The guaranteed return model promises to repay investors principal and/or specified interest rate on loans (Committee on

the Global Financial System and the Financial Stability Board, 2017). For example, Bondora states that its Go & Grow investment model allows to liquidate the investor's account at any time and assures the transfer of a full amount of withdrawal in partial payments to ensure guaranteed return up to 6.75% per year (Bondora, n.d.-a). The notary model reflects the traditional model, yet in this model, a loan originator for borrowers is a partnering bank, thus investors provide funds not directly to the borrower's account, but the bank's account (Committee on the Global Financial System and the Financial Stability Board, 2017). Besides, this business model can be slightly variated. For instance, Mintos cooperates with 70 loan originating companies that resell the loans through its platform (Mintos, n.d.), yet only lenders can be users of this P2P platform. The fifth business model is invoice trading that includes the trade of invoices or receivables of businesses at a discount (Committee on the Global Financial System and the Financial Stability Board, 2017).

P2P Consumer Lending Market in Lithuania

Operating Platforms

The beginning of P2P consumer lending in Lithuania goes back to 2014 when the first P2P lending platform SAVY started its operations in the country under the administration of UAB Bendras Finansavimas (Sadzius & Sadzius, 2018). In 2015, two more platforms Paskolų klubas, currently administered by NEO Finance, and Finbee, were established (Sadzius & Sadzius, 2018). All three platforms allow Lithuanian borrowers to apply for loans that will be funded by international investors. According to the Bank of Lithuania (n.d.), SAVY, Finbee, and Paskolų klubas are the dominant P2P consumer lending platforms in the country. These platforms are highly transparent regarding the funded loans' performance and loans' data thus their loan datasets will be used to examine the impact of loan, personal, and financial borrower's characteristics on the interest rate in Lithuania's P2P consumer lending market.

Regulations

Lithuania is the Baltic state with a regulated P2P lending market by national law (Sadzius & Sadzius, 2018). The Law on Crowd Funding of the Republic of Lithuania (2016) states that the Bank of Lithuania should publicly store the list of approved crowdfunding platforms, analyse their activities and monitor violations of the legislations, whereas operators of the platforms should have reliable measures to avoid conflict of interests

between the lenders and borrowers, to assess the creditworthiness of the borrower and financial knowledge of lender, to have an approved plan for continuous performance of the platform, and to comply with the requirements laid down by this law and Bank of Lithuania. Bank of Lithuania imposes restrictions on issuing a consumer loan if a borrower is younger than 18 years, his/ her debt-to-income ratio is more than 40%, and a major part of income consists of welfare and allowance payments (Finbee, n.d.-a). Additionally, according to the Republic of Lithuania Law on Consumer Credit (2010), to diversify the risk, lenders cannot invest more than €500 in one consumer loan. Mentioned regulations were applied to diminish investment risks in the domestic economy and attract the attention of FinTech companies, demonstrating a well-regulated crowdfunding industry that could be used as a funding channel for the domestic market players.

According to Bosaitė and Grabys (2021), a new set of regulations for crowdfunding platforms was approved in October 2020. Until then, P2P platforms as a part of crowdfunding industry were able to open the market for the borrowers only in the country they operate, unless complying with the legislations of all countries the platform functions in (Bosaitė & Grabys, 2021). In contrast, the new regime creates less costly opportunities for expansion of platforms' operations based on the possibility of providing services to all EU member states just by implying passport checks (Bosaitė & Grabys, 2021). To smooth the differences between different legal and language barriers, from now platforms can integrate messaging boards and loan portfolio services to make the platforms more user-friendly (Bosaitė & Grabys, 2021). To continue providing services, within 24 months after the regulation comes into force, platforms should reassess the current operating model to receive the EU-level licence based on the more detailed measures for transparency of information, investors' and borrowers' assessment, messaging boards and loan portfolio management as well as internal policies (Bosaitė & Grabys, 2021). Even though the new licence will be costly for the platform operators, the ability to make platforms accessible to the borrowers from other EU countries may skyrocket the growth of the P2P market of Lithuania.

Benefits for Investors and Borrowers

The P2P consumer lending industry in Lithuania is based on the actively developing FinTech market that creates digital solutions to make borrowing and lending more accessible than in the traditional banking sector. Nowadays, money deposited in the bank is not paying interest, bonds and passive investment funds usually provide a low rate of return as well. To get a higher return, people invest in stocks, yet this financial instrument puts the highest risk

on capital as significant fluctuations of investment value require following the news regarding selected stocks and being a financially literate person. Therefore, P2P platforms can be an attractive alternative way of investment as in the platform lenders can allocate their funds starting from five to ten euros to multiple investments to enjoy diversification benefits. Moreover, investors can choose loans based on the personal and financial profiles of the borrowers and expect similar returns to the stock market. For example, based on the current interest rate and historical recoveries, Finbee investors in consumer loans can anticipate earning average annual pre-tax return of 14.7%, which could be even higher if money was invested in lower credit-grade loans (Finbee, 2021). Moreover, to lower the non-repayment risk, more than 15% of the loan amount is funded by the platform itself (Finbee, n.d.-d). Fully-digitalized online P2P platforms are known for their ease of use, time-saving, transparency, and detection of potential risks. The rate of return, defaults, and growth of the platform are publicly accessible on the platforms' websites to evaluate the potential risks and benefits of the investment.

From the borrower's perspective, P2P lending platforms allow faster and disintermediated borrowing compared to traditional banking as after the quick online registration and verification of the profile, a borrower may raise the funds without the requirement of in-person applications. Operating costs of the online platforms are significantly lower compared to traditional banks as fewer human resources and renting space is needed to be financed, thus service fees are lower as well (Finbee, n.d.-b). For instance, Luminor bank in Lithuania, even with a special offer, places a five per cent service fee on consumer loans that cannot be lower than €60 per loan (Luminor, n.d.). So, if the amount of the loan is up to €600, it is worth checking the service fees provided by Paskolų klubas, which vary from 4.9% to 9.9% based on the creditworthiness of the borrower (Paskolų klubas, n.d.-c). The main feature of P2P platforms is the issuance of loans for the borrowers who were not eligible to get a loan from the bank based on the financial characteristics or too little amount. Back to the example of Luminor, consumer credits are not provided for the smaller amounts than €500 in this bank, while in SAVY platform (https://gosavy.com/) and Finbee platform (https://www.finbee.lt/en/) people can borrow starting from €300 (Luminor, n.d.). In Paskolų klubas people can start borrowing even from €100 yet with beneficial interest rates starting from five per cent, when the average rate in the consumer lending market for credits up to €290 has been about 45% in 2021 (Paskolų klubas, n.d.-c; Table A3). Also, in some of the platforms, for example, Finbee, the loans can be consolidated to get a lower interest rate, longer maturity period, and a unified payback system (Finbee, n.d.-b).

Effect of Pandemic

Six years after the first P2P consumer lending platform was established in Lithuania, in 2020, never witnessed before coronavirus pandemic created an additional edge for P2P lending platforms. Even though the overall consumer lending market in Lithuania had started shrinking a couple of years before the virus has spread, the pandemic only added to a further contraction. First, the uncertainty caused by pandemic and restricted activities during the national lockdown discouraged from taking loans. Next, the traditional banking system was not prepared for the national lockdowns, resulting in inaccessible credits due to impossible in-person applications. Consequently, Lithuania's consumer lending market issued 36% fewer consumer loans, for a 25% smaller amount, comparing 2020 to 2019 (Table A4). Though the pandemic reminded that fully digitalized online P2P platforms suggest easy application process, online verification and provision of legal loan contracts, presenting a quick and affordable way to invest or borrow money without the pre-registered visits to the branches of the banks. According to the latest report on Lithuania's consumer loan market, the P2P consumer lending market is the only consumer credit issuer that faced the increase in the volume of loans provided by 3.8%, even though the number of loans provided decreased by 6.3% comparing the 2020 data to 2019 (Table A4). Besides, the number and amount of loans funded in the first half of 2021 account for more than 50% of the same indicators value in 2020, signalling the increased sector's growth (Table A4). The uncertainty caused by the pandemic decreased employment and consumption levels, thus it was necessary to diminish the interest rates and extend loan terms to make consumer loans more appealing to take. Providing the outlook on the interest rates in the consumer lending market in Lithuania, P2P platforms charged the lowest interest rate on average, accounting for 16.7% in 2019, 16.4% in 2020 and 14.7% in the first half of 2021 (Table A4). In comparison, in the consumer lending industry that does not incorporate leasing and credit cards activities but includes P2P lending consumer lending platforms the average interest rate on loans was 24.5% in 2019, 23.7% in 2020, and 20.1% in the first half of 2021 (Table A4). One more advantage of P2P platforms over traditional borrowing for personal purposes are higher maturity terms accounting for 44 months on average for one loan, while the part of the industry without leasing and credit card payments, provides an average 39-months term for a loan issued in 2021 (Table A4). Consequently, borrowers can benefit not only from the lower interest rate but also from a longer payback period while applying for credit through P2P platforms.

Loans Risk and Pricing Models

One of the main differences among P2P lending platforms is the implementation of non-disclosed mechanisms for assigning loan grades and interest rates. SAVY and Finbee conduct a weighted loan risk assessment based on the personal risk criteria such as age, gender, marital, residential and employment status, education, number of dependents, use of a loan, etc., and financial risk criteria such as salary, income type, outstanding liabilities, records of repayment of financial obligations (Finbee, n.d.-a; SAVY, n.d.-b). To minimize the risk of collected information being falsified, Finbee validates borrowers' provided information with the databases of SoDra (The State Social Insurance Fund Board), credit bureau - CreditInfo, Bank of Lithuania, and State Enterprise Centre of Registers (Finbee, 2021). SAVY compares information provided by a borrower with data from CreditInfo, Bank of Lithuania, and State Data Protection Inspectorate, then aggregates all the collected data into the probability of borrower's default and assesses credit rating based on the latter (SAVY, n.d.-a). Paskolų klubas collects similar information about the borrowers as Finbee and SAVY from CreditInfo but assesses the creditworthiness of clients using artificial intelligence (Paskolų klubas, n.d.-a, 2019).

After the credit score of the borrower is set and a person is determined to be creditworthy, it is time to price a loan. For the efficient functioning of the platform, according to Davis and Murphy (2016), there are three price-setting approaches. First, under the reverse auction pricing method, a borrower sets the maximum interest rate for the loan, investors bid on interest rate within the bounds of the minimum risk-related rate set by platform operators and maximum rate set by the borrower, and the lower bid wins (Davis & Murphy, 2016). The second approach is similar to the stock market orders - after the borrower receives the indicative loan rate, both borrower and lender set the rates they are willing to pay or receive, respectively, and the platform operator matches similar ask and bid rates (Committee on the Global Financial System and the Financial Stability Board, 2017).

However, earlier discussed loan rate-setting methods are not popular in Lithuania, instead, a posted-price approach based on credit grades assigned to borrowers is used by Finbee, SAVY, and Paskolų klubas. Due to non-uniformed loan grading procedures, rating scales differ, besides loan rates assigned to a certain borrower's credit rating vary from platform to platform as well, indicating non-standardized loan pricing models (Committee on the Global Financial System and the Financial Stability Board, 2017; Table 2).

Table 2

Loan Rates Based on Credit Ratings

SAVY credit rating	Interest rate	Finbee credit rating	Interest rate	Paskolų klubas credit rating	Interest rate
A	7% - 19%	A+	7% - 10%	A+	5% - 74%
B	8% - 24%	A	11% - 18%	A	6% - 74%
C	12% - 33%	B	11% - 33%	B	9% - 75%
D	16% - 56%	C	13% - 28%	C	16% - 60%
E	56%	D	13% - 28%	C-	21% - 25%

Note. The interest rate ranges are calculated for the loans listed from 2019.01.01 – 2021.09.30 and collected from SAVY (n.d.-c), Paskolų klubas (n.d.-b), and Finbee (n.d.-c). For SAVY platform A to D ratings account for three subcategories like A1, A2, A3, etc.; E stands only for E1-categorized loans. Prepared by author.

The high variation of interest rates within the credit grades (Table 2) implies that interest rates set on consumer loans in Lithuania's P2P platforms are calculated based on the additional factors, besides the credit rating, which are not publicly disclosed to borrowers. Therefore, to reduce information asymmetry, this thesis aims to identify the impact of borrowers-provided information and macroeconomic factors on consumer loans interest rate in three platforms and define the common patterns in Lithuania's P2P market.

Theoretical Justification and Research Methods

Concept of Interest Rate

P2P lending platforms operate as financial intermediaries that connect borrowers with lenders based on the risk perception of the latter (Havrylchyk & Verdier, 2018). Generally, there are two types of loan costs described in the borrower's contractual obligation. First, the annual interest rate is a certain percentage of principal that is repaid during a year together with scheduled principal repayments by a borrower to a lender as a cost of obtaining credit. Second, the annual percentage rate (APR), is a total annual cost of borrowing combining the annual interest rate and additional fees charged by platform operators like loan origination, closing, or underwriting fees (Lee & Hogarth, 1999). Although according to Lee and Hogarth (1999), APR assists borrowers with the true cost of the loan they apply for, it is problematic to use this rate as a measurement for the analysis of consumer credit cost in this research as additional fees vary between platforms based on the internal platform operators' strategy. Therefore, further discussion refers to the annual interest rate rather than APR.

Problem of Non-Standardized Loan Pricing Models

For more than a decade, non-standardized loan pricing models of P2P lending platforms have been an emerging issue. A posted-price mechanism, widely used by consumer lending platforms not only in Lithuania but also internationally, generally determines loans' interest rate based on credit ratings of the borrowers (Committee on the Global Financial System and the Financial Stability Board, 2017). Bias in this price-setting model implies that interest rates for similar credit risk levels differ among the platforms and show variations even within one credit grade (Iyer et al., 2009). Additionally, the findings by Pope and Sydnor (2011) and Duarte et al. (2012) indicate the existence of discrimination theories in the P2P lending market as "soft" information like borrower's race, gender, and appearance result in different loan interest rates. As the size and direction of the effect of loan's and borrower's information on the interest rates are not publicly disclosed by platforms, it leads to the problem of asymmetric information where market participants, borrowers, are not familiar with the set of characteristics which could improve their cost of a loan that is reviewed or set by the platforms' operators.

A publicly disclosed data by P2P lending platforms on loan and borrowers' personal and financial information has facilitated a broad range of empiric and experimental research papers that partially reduced information asymmetry in this online alternative finance market. An overview of the following academic publications introduces possible factors affecting interest rates in P2P lending platforms and the traditional lending industry worldwide.

Factors Affecting Interest Rate in P2P and Traditional Lending Markets

Loan's Characteristics

To begin with, researchers find an ambiguous impact of the loan amount on the interest rate. Santoso et al. (2019) have examined the data of three online lending platforms in Indonesia, two of which offer P2P lending services, and empirically confirmed that a larger loan amount either does not affect or decreases the interest rate. After the analysis of first-time and repeated borrowing models conducted on the Chinese PPDAI platform, Cai et al. (2016) have stated that it is hard to evaluate the creditworthiness of the borrowers who do not have a credit history. For such borrowers, a higher loan amount indicates a higher probability of successful funding, therefore P2P lending platforms tend to assign a lower interest rate on the larger loan (Cai et al., 2016). In contrast, the empirical results from Berger and Gleisner (2009) and Herzenstein et al. (2011) studies conducted on the American P2P lending platform

Prosper indicate that people who borrow higher loan amounts receive higher interest rates. Dietrich and Wernli (2016), analysing loan, borrower, and macroeconomic factors that determine interest rates in Swiss P2P lending platform Cashare, have shared similar findings that an increase in loan amount by CHF 10,000 is expected to raise the loan's interest rate by 0.35%. Dorfleitner et al. (2016) may explain the conclusions made by the three latter studies by arguing that a higher loan amount incorporates a greater difficulty to repay the loan, increasing the borrower's default risk that might be supplemented by a higher interest rate offering a higher return to investors.

The impact of longer-term loans on the interest rate differs among studies. The research by Dietrich and Wernli (2016) indicates that extra ten months in the loan duration increase the loan's interest rate by 0.41% as borrowers who face difficulties with the loan amount repayment may prefer a prolonged payback period (Dorfleitner et al., 2016). In contrast, Santoso et al. (2019), have found that loans with longer maturity terms may be less costly for the borrowers. Longer loan terms could be associated with well-planned hence less risky projects, therefore, interest rates may be lower for loans with a longer payback period (Santoso et al., 2019).

Borrower's Characteristics

P2P lending platforms gather people from all around the world, creating social networks based on the same geographical or education area, religion, and other aspects (Gaigalienė & Česnys, 2018). To figure out how an interest rate is determined by Israeli P2P platforms, Klein et al. (2021) conducted several interviews with senior executives who claimed that screening procedures of the borrowers incorporate the analysis of financial data provided by individuals together with the information collected from social networks. Behavioural signals such as public endorsements on Prosper forums, which provide qualitative information about the borrower, presence of the borrower's profile photo as well as the stated purpose of loan, income, expenses, and other personal data reduce asymmetric information and create an opportunity for low-rated borrowers to obtain a reduced interest rate (Collier & Hampshire, 2010). Likewise, the research by Chen et al. (2016) shows that borrowers who add personal photos as user pictures receive lower interest rates, besides endorsement from the group members living in a similar geographic region increases the probability that loan will be funded and lowers the interest rate. Exploring the phenomena of the impact of borrowers' attractiveness or beauty on the lending conditions, Jin et al. (2017)

and Ravina (2019) find that the dishonest behaviour of attractive borrowers is more tolerable, however, they pay similar interest rates to the regular-looking borrowers.

Many researchers have analysed borrowers' age as a factor affecting consumer loans interest rates. Gonzalez and Loureiro (2014), Chen et al. (2018), and Han et al. (2018) have empirically supported the fact that older individuals are more successful in getting a loan funded that signals the importance of borrowers' experience and competence. Contrarily, Santoso et al. (2019) have analysed the sample involving borrowers from 22 to 60 years old and found that an older person is likely to receive higher interest rates. The latter result indicates market discrimination against older people, complementing the study by Pope and Sydnor (2011). On the other hand, Chen et al. (2018) presented the results of OLS regression that indicates age as a factor that cannot explain variations in interest rate.

The existence of gender discrimination in the P2P lending market has been broadly examined in academic publications. Chen et al. (2018) have analysed the data of one of the largest Chinese P2P lending platforms Renrendai and determined that men pay 25 basis points higher interest rates than women. A slightly higher interest rate on the loans borrowed by men is associated with a higher default risk that men possess, and which could be compensated by paying higher interest to investors (Dorfleitner et al., 2016). In contrast, women are found to pay slightly higher interest rates than men in Italy based on the findings by Alesina et al. (2013). This conclusion has been supported with the argument of weaker skills at bargaining for better deals possessed by women or existing gender discrimination in some sectors of the entrepreneurship in the country (Alesina et al., 2013). Santoso et al. (2019) complement previous study results by arguing that women receive a slightly higher interest rate compared to men on Indonesian P2P platforms as in this Muslim country women are responsible for taking care of children, and men are working to satisfy the financial needs of the family, thus work experience combined with basics of financial literacy which men possess could result in lower interest rates they get. On the other hand, findings presented by Barasinska and Schäfer (2014) and Dietrich and Wernli (2016) indicate that gender does not affect the interest rate. Marital status can influence borrowers' financial characteristics, thus it has attracted the attention of researchers recently. On the one hand, family members can combine their funds to repay a loan thus lowering the default risk, resulting in lower interest rates (Santoso et al. 2019). The research by Chen et al. (2018) may support this statement with the result of 17 basis points lower interest rates for married people. On the other hand, married people usually spend a major part of their monthly income on family needs rather than on personal needs and liabilities, increasing the probability of late loan repayment or

even default. Han et al. (2018) have argued that it is easier to get a loan funded for single or divorced individuals, thus married people may aim to accept higher interest rates to get their loans funded. Furthermore, Dietrich and Wernli (2016) indicate the higher interest of 1.04% for the borrowers who have three or more children. Consequently, it is expected that a presence of dependents, who rely on the borrower as a primary income source, lowers the ability to repay the loan, thus increasing the interest rate.

Employment in a certain company, graduation from a particular university, or residence in a specific geographical region might signal the creditworthiness of the borrower (Collier & Hampshire, 2010). The research conducted on the data from the Prosper platform confirmed that if such structural signals are recognized by the market as top-notch, borrowers receive a lower interest rate (Collier & Hampshire, 2010). Prystav (2016, as cited in Huang & Liu, 2018) has conducted an experimental study on the investors' behaviour and concluded that investors favour those borrowers who are transparent regarding their employment, education, and other personal information. Han et al. (2018) and Chen et al. (2018) conclude that a higher education degree increases loan funding success. Additionally, Chen et al. (2018) share the results that higher education levels reduce loan's interest rate, for instance, third-year college students get lower interest rates than high school graduates. Although the higher education degree reduces the interest rate, Serrano-Cinca et al. (2015) find that in the American platform Lending Club, length of employment does not affect loans' default rates thus it may not affect the interest rate as well.

The financial status and credibility of the borrower could be assessed based on the homeownership, debt-to-income (DTI) ratio, previous loans performance, and credit rating. Greiner and Wang (2010) suggest that listed components can be used to assess borrowers' perceived risk by evaluating the ability to repay the loan. First, homeownership incorporates contradictory opinions on the borrower's creditworthiness. On the one hand, the person who owns a property has been already trusted by another institution that provided him/ her a mortgage or a borrower is a wealthy person if he/she has bought a house without taking credit. If a borrower wants to receive a lower interest rate, the property he owns can be used as collateral reducing the investment risk for the lenders. On the other hand, if this mortgage has not been repaid yet, it significantly increases borrower's debt-to-income ratio at the same time lowering the disposable income together with the ability to repay a loan. Greiner and Wang (2010) have found no effect of the presence of homeownership on the interest rate, supporting it with the fact that both mentioned consequences of being a property owner are present in the Prosper platform. Oppositely, Dietrich and Wernli (2016) have indicated that

for the homeowners, the interest rate has been 0.73% lower. Chen et al. (2018) have concluded that homeowners receive six basis points lower interest rates. Borrowers who have credit history meaning that at least one loan is or was listed on their behalf is a positive characteristic according to Greiner and Wang (2010), for instance, the borrowers who have a mortgage pay 27 basis points less for obtaining a loan (Chen et al., 2018). However, the outstanding financial obligations increase the debt-to-income ratio and lower borrower's disposable income. The researchers have indicated that a one per cent increase in the debt-to-income ratio is expected to lead to an increase of six basis points in the interest rate (Greiner & Wang, 2010). Credit rating is used by platforms to present the evaluation of the borrowers to the investors, eliminating the need to analyse personal borrowers' information, yet the weighted risk evaluation mechanisms are not standardized within the industry. What is common among the platforms, is that higher credit rating is assigned to the more reliable borrowers (Duarte et al., 2012), who get lower interest rates in return for better creditworthiness. Klafft (2008) states that only high-creditworthy borrowers can exploit the benefits of low interest rates on the Prosper platform. Empirical evidence by Berger and Gleisner (2009) indicates that a drop in credit rating by one grade increases the interest rate by around 270 basis points. The study by Chen et al. (2018) complements previous findings, indicating the increase of 90 basis points in the loan interest rate if the credit rating of the borrower falls by one grade.

Macroeconomic Factors

During the period from March to May 2020, when the first lockdown was introduced in the European countries to manage the coronavirus pandemic, the number of issued consumer loans has sharply declined due to the high uncertainty in the market (Gębski, 2021). In many EU countries, the consumer credit market has faced a decline in range of 11%-17%, comparing the first half of 2020 to 2019 (Gębski, 2021), that indicated the shrinking demand for consumer loans. The pandemic has changed the usual way of living. Restricted social activities and travelling, millions of euros invested in the vaccines and healthcare sector have raised the debt levels and stagnated economic growth in almost every European country. To avoid the sharp recession, countries and financial institutions have reduced interest rates on consumer loans to encourage consumption by making loans cheaper thus more attractive to the borrowers (Gębski, 2021).

The intense increase in unemployment levels was faced together with the second wave of the pandemic that forced the countries to enter the second and even longer lockdown

in 2020 late autumn/ early winter (Gębski, 2021). The seasonally-adjusted unemployment rate has inflated as the economic downturn caused by the pandemic reduced the demand for goods and services, thus businesses laid off workers to cut the costs. The empirical analysis by Hada et al. (2020) indicates that one per cent higher unemployment rates lead to up to a five per cent increase in non-performing loans (NPL) that are subject to late or not full repayment by the borrower. Therefore, increased unemployment levels may inflate interest rates to compensate for the greater risk that invested principal amounts will not be collected by investors. The study by Dietrich and Wernli (2016) confirms the existing relationship between unemployment rates and interest rates on consumer loans funded through P2P platforms, indicating the increase in loan's interest rate if unemployment levels in the country, where the examined platform is located, increase.

All things considered, loans' interest rate determinants in P2P lending and traditional financial markets have already been overviewed by many researchers, yet the results differ among the studies due to the difference in the composition of analysed samples, timeslots, platforms, and locations. As P2P lending platforms are relatively new in Lithuania's online alternative finance market, to my best knowledge, this is the first research paper analysing factors affecting consumer loans interest rates on P2P lending platforms in Lithuania, thus it will expand the scope of existing literature in this field. Additionally, this study will develop already existing research models by including the timeslot of coronavirus pandemic restrictions and loan purposes to be examined as the factors that are expected to explain the interest rates set through P2P lending platforms.

Research Methods

To reach the aim of this thesis, the empirical study is performed to examine several factors - the loan's, borrower's, and macroeconomic characteristics - that are expected to affect consumer loans interest rates. Lithuania's P2P consumer lending industry is represented by three dominant platforms Finbee, SAVY, Paskolų klubas, yet their interest rate setting methods are not publicly disclosed, so expected to be different as well as the client base. As a result, three separate OLS regressions will be conducted and compared to indicate factors affecting interest rate in each of the operating platforms and common patterns in Lithuania's P2P consumer lending market.

The empirical research method has been selected based on the following argument. Most studies assume that there is a linear relationship between the interest rate and the factors affecting it. Therefore, similarly to the studies by Dietrich and Wernli (2016), Chen et al.

(2018), Santoso et al. (2019) and other, Ordinary Least Squares (OLS) regressions will be used as the main research method to reach the aim of the thesis. This linear type of regression shows the relationship, but not causality, between independent and dependent variables, holding the remaining variables in the model constant (Studenmund, 2014).

Studenmund (2014) argues that the main advantage of the OLS regression model is that it is easy to conduct and interpret. The beta-coefficients explain the size and direction of the change in the dependent variable if any of the independent variables increases by one unit, holding other variables constant. P-value indicates whether this relationship between the dependent and independent variable exists ($p < 0.1$). Adjusted R^2, provides the percentage of variation in the dependent variable that is explained by the regression equation adjusted for the degrees of freedom (Studenmund, 2014). Additionally, according to the Gauss–Markov theorem, OLS is the best linear unbiased estimator (BLUE) of the regression coefficients, if it does not hold certain conditions that are described in the limitations section. The main disadvantage of the OLS regression model is that it needs a large sample of data to obtain reliable results. Though, the size of datasets collected to conduct the empirical analysis for this thesis is large enough to use this type of research method.

According to Studenmund (2014), the general multivariate OLS regression equation is $Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots \beta_K X_{Ki} + \epsilon_i$, where:

- Y - a dependent variable,
- $X_{1i}, X_{2i}, \dots, X_{Ki}$ - independent variables,
- β_0 - a constant term showing the value of the dependent variable when independent variables and error term have zero values,
- β_K - a coefficient measuring the change in the dependent variable if independent variable X_{Ki} increases by one unit, holding other variables constant,
- ϵ_i - a stochastic error term that describes the variations in the model that are not explained by the independent variables.

To investigate the impact of different factors on consumer loans interest rate, the following OLS regression equation is formed

$$RATE_i = \beta_0 + \beta_1 AMOUNT_i + \beta_2 MATURITY_i + \beta_3 REF_i + \beta_4 AGE_i + \beta_5 FEMALE_i + \\ + \beta_6 MARRIED_i + \beta_7 DEPENDENTS_i + \beta_8 EDUCATION_i + \beta_9 EMPLOYMENT_i + \\ \beta_{10} HOMEOWNERSHIP_i + \beta_{11} DTI_i + \beta_{12} CREDITRATING_i + \beta_{13} COVID_i + \\ \beta_{14} UNEMPLOYMENT_i$$

where $RATE_i$ is a dependent variable. Table A5 and Appendix B describe the independent variables and their measurement.

The expected signs of the coefficients in the model are based on the results from previous studies, several trends in Lithuania affecting the perception of borrower's characteristics, and the author's opinion (Table A5). Firstly, a higher amount of loan or longer payback term may increase the risk of borrower's default as there is a higher probability that his/ her earnings may variate in the long run. A "refinancing" loan purpose may indicate inability to repay outstanding liabilities. In Lithuania, pensions received from the state are significantly lower compared to salaries, thus lowering the income levels of older individuals. Although the concept of gender equality is highly promoted in international corporations operating in Lithuania, in many companies men still get paid more than women, showing gender and earnings discrimination in favour of men.

Married people frequently borrow for family needs, yet the loan repayment may be covered by two people, lowering the default risk if one of the partners starts facing financial difficulties. A child allowance received by a family from the state covers only a small part of child expenses and does not cover the expenses for other dependents like elderly parents, diminishing disposable income of the borrower used to repay the loan. In Lithuania, higher education levels are appreciated in both financial and labour markets and longer work experience at the recent employer may make conditions of getting a loan more favourable. Since 2019, real estate prices in Lithuania have skyrocketed, thus homeownership, most often incorporating the fact of a twenty per cent prepayment and received mortgage, may indicate a person's financial stability. Commonly in the lending markets, a lower credit rating of the borrower and a higher DTI ratio indicate a higher risk that a borrower may default. Lastly, similarly to conclusions based on Gębski (2021) and Hada et al. (2020) findings, to increase the demand for loans during economic uncertainty, financial institutions lower interest rates, while higher unemployment rates could lead to decreased borrowers' earnings and increased number of late loan repayments, thus putting a risk on investments that could be compensated by the borrowers.

Therefore, the following hypothesis is raised (Table A5). The factors like a higher amount of loan, longer loan term, determined use of a loan to refinance outstanding liabilities, being older, being a female, having more dependents, having higher DTI ratio, or borrowing in times of higher unemployment in the country are expected to increase the interest rate in Lithuania's P2P consumer lending platforms, and the factors like being married, having higher education degree, more years of employment at the recent employer,

owning a property, better credit rating, or borrowing since the first COVID-19 lockdown in Lithuania are expected to decrease the interest rate in Lithuania's P2P consumer lending platforms. This hypothesis assumes that those listed factors that may impose higher loan default risk are expected to be compensated by higher interest rates and vice versa.

Limitations

There are several limitations for OLS regression model. Firstly, the model cannot display a serial correlation problem, in other words, certain trends in the error term (Studenmund, 2014). The presence of serial correlation is usual in the time-series models, and it is rare in the cross-sectional models unless error terms are correlated in terms of a specific behaviour in certain geographical regions or social groups, however, it is not expected to be the case for the examined samples. Next, the variance of the error term should be constant or homoscedastic (Studenmund, 2014). One more limitation states that the mean of residuals should be equal to zero meaning that the error term should account for the unexplained variance in the dependent variable, yet this issue can be solved by adding the constant (Y-intercept) in the regression model (Studenmund, 2014). Moreover, as the OLS model cannot distinguish two perfectly correlated variables from each other, thus multicollinearity problem, when one variable is a multiple of another, should be solved by dropping one or more of perfectly correlated variables (Studenmund, 2014). Error term should be normally distributed to generate reliable confidence intervals (Studenmund, 2014). Lastly, a misspecification error may occur if a potential explanatory variable is excluded from the model. The stated issues will be observed while making the empirical analysis and the proper measures will be taken to decrease their negative impact on the results, if possible.

Empirical Research

Data Sources and Samples

The data for the empirical research has been collected from Finbee, SAVY, and Paskolų klubas platforms and is limited to the period from January 1, 2019, to September 30, 2021. If missing values have been detected for any of the variables to be analysed further, those observations have not been included in the datasets. Financed loans dataset by Finbee platform, including 8945 observations for the selected period, has been received upon the request from the platform operators with the description of the encoded variables and the approval to use the data, yet this data is public and can be accessed on the Finbee (n.d.-c)

website. The data on financed loans through SAVY and Paskolų klubas is publicly available and the platforms' operators allowed to use the data for the research purposes (SAVY, n.d.-c; Paskolų klubas, n.d.-b). For Paskolų klubas, 17493 observations have been collected from the primary market for the financed loans. The information for all financed loans is not available on the SAVY platform, thus for the selected period, the initial loan information has been collected for the loans outstanding in the secondary market, containing 1392 observations. The data for the SAVY platform is the same as could have been collected from the primary market if publicly available, although the sample is smaller as not all the investors sell their investments on the secondary market. From the extracted datasets, loan's and borrower's characteristics, described more in detail in Appendix B, were selected for further analysis.

Although the data collected contained the date when the loan was issued, this attribute was removed from the dataset as it was not continuous due to the national celebrations or weekends, and, usually, more than one loan was issued on a particular day. Instead, two macroeconomic variables have been added to the model based on the loan issue date to account for the changes in economic stability in the country. The coronavirus pandemic has caused an economic downturn, thus all the loans issued since the first coronavirus pandemic lockdown started on the 16th of March 2020 and till now were marked as 1 in the COVID variable meaning that they were issued during the coronavirus pandemic period which brought uncertainty in people daily lives thus is expected to affect interest rates as well (My Government, 2020). Monthly data on seasonally-adjusted unemployment rates in Lithuania has been collected from Official Statistics Portal (n.d.) and added to the datasets based on the month when the loan was issued. Consequently, the macroeconomic factors have been added to the datasets, making the composition of samples complete (Appendix B).

Descriptive Statistics

The descriptive statistics extracted using the Gretl software and visualised using Excel will be used to examine and compare the composition of the samples. Table A6 presents descriptive statistics for the most numerical variables from the selected samples and the composition of categorical variables is visualised in Appendix C.

The distribution of interest rate values in all three samples is rather positively skewed with a few outlier loans that cost more, as the mean or average value in each sample is slightly greater than the medians (Finbee – 18.94%, Paskolų klubas – 14.1%, SAVY – 17.64%) (Table A6). The minimum interest rates paid on loans in Finbee and SAVY samples are equal to seven per cent, while Paskolų klubas offers only a five per cent rate on the

lowest-risk loans (Table A6). In contrast, the maximum interest rates charged are significantly different among the platforms that may be explained by the variation in the platforms‘ service fees that are included in addition to the interest rate to the annual cost of the loan. It is possible that Finbee, charging approximately twice as low maximum interest rate (33%) as Paskolų klubas (75%) or SAVY (56%), set higher service fees for customers thus the total cost of the loan may be similar among the platforms (Table A6).

The average loan amounts are similar in Finbee and Paskolų klubas samples, contrastingly, the SAVY dataset shows twice as large average loan amount compared to other P2P consumer lending platforms in Lithuania, yet this value might be inflated as the data for the SAVY sample has been collected from the secondary market, where many large-amount loans might be placed by investors due to delay in repayments affected by borrower's inability to repay sizeable liabilities (Table A6). The large values of standard deviation that are slightly less than the means are present in all three samples, indicating that loan amounts are widely spread within the bounds of minimum amounts of €300 (Finbee, SAVY) and €100 (Paskolų klubas), and maximum amounts of €22,735 (Finbee) and €25,000 (SAVY, Paskolų klubas) (Table A6). The lowest loan amount borrowed of €100 confirms that Paskolų klubas is the only P2P consumer lending platform in Lithuania that provides the most expensive and riskiest type of consumer loans, credits below €290, that could justify the highest maximum interest rate among three platforms as well.

Among three samples, Paskolų klubas has the widest selection of loan payback period, ranging from only 1 month, which may be chosen to repay low-amount loans, to even 120 months, while the median of loan duration is 36 months, likewise in the Finbee sample, yet the shortest period for which loan has been funded through Finbee platform is 7 months and the longest – 84 months. In SAVY the median loan duration is 51 months, while the maturity of loans is ranging from 3 to 101 months. Even though the average loan payback period differs between the platforms, substantial standard deviation indicates that the values of loan duration are not clustered around the mean but rather are spread out within the sample bounds. The 'Loan Purpose' chart in Appendix C presents that in SAVY and Paskolų klubas a major part of funded loans indicate a future use of the loan to refinance outstanding liabilities, while in Finbee this use of loan was specified in one-fourth of the observations and the purpose of more than a half of loans is barely known and described as 'other' that could involve similar uses of loan as 'consumer loan' and 'other' categories in SAVY and Paskolų klubas samples. Additionally, the loans have been requested and funded to cover personal expenses from travelling, car purchase, and wedding to home repair.

The medium age of the borrower at the time of borrowing is similar among the platforms and varies from 34 to 37 years, the youngest borrowers are 18 or 19-years-old that complies with the regulations of the Bank of Lithuania, and the oldest from 69 to 74-years-old (Table A6). The distribution between male and female borrowers is almost equal in the Finbee sample, while in SAVY and Paskolų klubas samples almost 6 out of 10 loans have been issued and funded to men (Appendix C). In every sample around one-third of the borrowers were married at the time of applying for a loan and at least a half of borrowers did not have dependents, although the minority had even six or seven dependents (Table A6).

Forty per cent of the borrowers have had only high school education in each of the samples, 26% in Finbee or SAVY, and 38% in Paskolų klubas sample have had vocational education degree, moreover, up to 5% of borrowers in samples of SAVY and Paskolų klubas even have not finished high school (Table A6). Aggregating the results, it seems that seven out of ten borrowers from the samples representing Lithuania's P2P consumer lending platform do not have tertiary education. The possible reason of such an outcome is that people with higher education are not aware of such a source of financing as P2P platforms as they are creditworthy enough to borrow from the traditional banks. However, the new advertising campaigns targeting undergraduates and graduates may increase the pool of borrowers with well-educated people from, perhaps, a higher-income social group, consequently, boosting the volumes of transactions and reducing investment risks thus increasing the pool of investors as well with new, risk-averse users. A work experience at the current employer, showing borrower's financial stability and the existence of independent income source to cover outstanding liabilities, is on average four years in Finbee sample. Although half of the borrowers were employed at the current employer for less than 25 months at the time of a loan application process, other borrowers were working for the same employer for up to 30 years. Similarly, the analysis conducted on SAVY and Paskolų klubas samples shows that four out of ten borrowers have more than three years of work experience at the most recent employer that may indicate loyal individuals with a stable source of income.

In SAVY, Paskolų klubas, and Finbee samples 38%, 35% and almost 50% of the borrowers, respectively, are owners of residential property, while around a quarter of borrowers through SAVY and Finbee stated living in a family house and slightly less than one fifth - renting a property. A median for DTI ratio was different between the samples - 28% for a Finbee, 31.98% for Paskolų klubas, and 34% for SAVY. The SAVY platform is strict to the crowdfunding market regulations and provides loans only to those borrowers who

have a DTI ratio of around 40% or less. However, this boundary can be expanded if there are valid reasons to lend the money to a riskier borrower. Since 2019, Paskolų klubas and Finbee platforms have justified and accepted several loan requests that were successfully funded by the investors afterwards with a DTI ratio of even 72.4% and 109%, respectively, indicating the fact that these two platforms accept exceptionally risky borrowers that might provide superior returns to risk-tolerant investors.

In the three samples, the most common credit rating that borrowers have is 'B' (Appendix C). It is not surprising that the second-largest credit rating category for the Finbee borrowers is 'D' – the lowest or most risky, as this platform serves customers with especially high DTI ratios and customers with zero months' work experience at the current employer that could even not have a direct source of income. On the other hand, around one-third of Paskolų klubas loans have been provided to A-rated borrowers, and of SAVY loans to C-rated. On the SAVY platform each loan category of A, B, C, D, and E has up to three subcategories, showing that almost two-thirds of funded loans fall under the rating in B1, B2, B3 and C1 categories, characterizing medium risk borrowers.

The macroeconomic indicator of the presence of a coronavirus pandemic shows that more than half of the loans from Finbee and Paskolų klubas have been provided since the first COVID lockdown in Lithuania (Appendix C). The SAVY sample includes less than 3% of the loans issued before the pandemic since data has been collected from the secondary market, and many of the older than 1.5-year loans have been already sold, thus not outstanding in the market anymore. As the samples have been extracted for the same period, the seasonally-adjusted unemployment rate varied from 6% to 9.9% in every sample (Table A6). The average unemployment rate is around 7.3% for Finbee and Paskolų klubas samples, and 7.56% for a SAVY sample as the dominant part of the information collected to create a dataset include the transactions performed during the pandemic.

Results and Discussion

Appendix D shows the results of OLS regressions indicating the expected effect of loan's, borrower's characteristics, and macroeconomic factors on the interest rate based on Paskolų klubas, SAVY, and Finbee samples. The results are summarized and compared with the raised hypothesis in Table 7A. The descriptions of the variables are presented in Appendix B.

Although all the models have shown a heteroskedasticity problem, it has been corrected by using the "robust" standard errors technique that makes standard errors of OLS

coefficients unbiased. The loan purpose variable consisting of several categories was reconstructed into dummy variables where 1 stands for the selected category and 0 for the rest of the categories, and the rule for the dummy variables, stating that if *k* is a number of categories, *k – 1* variable should be included in the regression, has been applied to avoid multicollinearity problem. Consequently, the least descriptive loan purpose 'other' was not included in the OLS regressions based on Finbee and Paskolų klubas samples, and a 'consumer loan' purpose in the SAVY sample. The error term is not normally distributed in all the samples and the misspecification issue is present in all three models, due to the limited number of publicly disclosed variables or macroeconomic factors included in the model that could affect the interest rate, thus the results may provide bias.

The sample consisting of Paskolų klubas issued loans explains approximately 64% of the consumer loan interest rate and presents most of the variables as significant or, in other words, associated with changes in the loan's interest rate (Appendix D). Higher loan amount, similarly to the findings of Dietrich and Wernli (2016), Berger and Gleisner (2009), and Herzenstein et al. (2011) studies, leads to an expected rise in the borrower's interest rate as it may be harder to repay a larger loan if the financial stability of the borrower collapses. Complementing the empirical results by Dietrich and Wernli (2016), a longer loan maturity term is expected to inflate interest rate as borrowers may prefer longer repayment periods if they expect to face financial difficulties during the payback period. Although the use of a loan to refinance the outstanding liabilities is not expected to affect the interest rate in Paskolų klubas sample, the loans described to be used for either car purchase, travel, home repair, or real estate purchase are expected to have lower interest rates compared to the loans where another loan purpose was stated. In contrast to studies by Serrano-Cinca et al. (2015) and Pope and Sydnor (2011) yet similarly to Collier & Hampshire (2010) and Chen et al. (2018) findings, an increase in either age, education level, or the work experience at the most recent employer is expected to lead to the decreased interest rate in Paskolų klubas sample, indicating the importance of the personal development experience that comes with the age by constantly gaining knowledge from the surrounding environment. Ownership of residential property, showing that a person is financially capable to buy a house/flat or was accepted as a potential borrower to get a mortgage, is anticipated to decrease the interest rate in Paskolų klubas sample. This result is in line with the findings of Chen et al. (2018) and Dietrich and Wernli (2016). A higher debt-to-income ratio, indicating a lower percentage of income that may be used to repay the loan, is anticipated to increase interest rate, similarly to the results of Greiner and Wang (2010). Finally, as expected in the hypothesis and described in the

studies by Duarte et al. (2012), Klafft (2008), Berger and Gleisner (2009) and Chen et al. (2018), the better credit rating borrower gets, the lower interest rate he/she may expect to receive in Paskolų klubas as it shows better creditworthiness, or ability to repay the credit by the borrower, and may indicate a lower default risk. Similarly to the findings from the Gębski (2021) study, the uncertainty caused by the pandemic is expected to lower interest rates in Paskolų klubas model. Paskolų klubas regression results show the expected positive relationship between the seasonally-adjusted unemployment rate and interest rate, similarly to the findings by Dietrich and Wernli (2016), that can be associated with the increase in non-performing loans as described by Hada et al. (2020) leading to the increased rates of loan default that are compensated by the borrower. Lastly, similarly to the findings of Barasinska and Schäfer (2014) and Dietrich and Wernli (2016), gender is expected to have no effect on the interest rate that may be explained by the fact that during the recent years gender equality may be present among executive positions, for instance, in the composition of the minister's cabinet in Lithuania, thus gender may not be a factor based on which people are discriminated in Lithuania. In contrast to studies by Chen et al. (2018) and Dietrich and Wernli (2016), which found that married people pay less interest rate while people having more dependents pay higher loan rates, respectively, these two variables are not anticipated to affect the interest rate based on the OLS regression results for Paskolų klubas sample. The insignificant results may show that it is hard to determine whether marital status or number of dependents significantly change the ability to repay a loan, as the diversification of financial resources between the partners is unknown and received subsidies for raising children may impose immaterial changes on a borrowers' disposable income.

The SAVY sample explains 77% of the variation in the dependent variable - interest rate (Appendix D). Contrarily to the raised hypothesis (Table A7), but similarly to the findings by Santoso et al. (2019) and Cai et al. (2016), borrowers are expected to pay a lower interest rate on the SAVY platform if the loan amount is higher. This relationship could be explained by the better risk diversification as according to the Republic of Lithuania Law on Consumer Credit (2010), lenders cannot invest more than €500 in one consumer loan, therefore funding a higher loan amount increases the minimum number of investors to fund one loan. Complementing the findings of Santoso et al. (2019), a longer loan payback period in the SAVY model is expected to result in lower interest rates that may seem attractive for the borrowers who want to be charged with lower monthly payments, yet a longer loan term accumulates more interest payments over time which result in a higher interest repayment in total. The change in the loan's interest rate is associated with only one of the existing loan

purposes – business loan – which makes interest rate lower, compared to other purposes. Although this type of loan purpose is present in the consumer loans category in the SAVY model, a business loan may be based on a well-planned project idea, it is expected to generate additional funds that may increase the disposable part of income thus lowering the default risk together with interest rate. The changes in the interest rate could be explained by only two variables from the borrower's characteristics section such as work experience at a most recent employer or credit rating of the borrower. Similarly to the findings from the Paskolų klubas sample and as it was hypothesized, longer most recent work experience and better credit rating are expected to reduce the interest rate as they may indicate either income stability or higher individual creditworthiness that may impose lower risks on investors. The rest of the borrower's characteristics such as age, gender, education level, DTI ratio, being married, having dependents, or owning a residential property are not expected to explain the interest rate in the SAVY model. Even though the coefficient sign for the COVID variable is as hypothesized, the regression results could not indicate the relationship between this variable and interest rate due to a very small part of a sample containing loans issued before the pandemic. The increase in the unemployment rate in Lithuania is expected to raise the interest rate in the SAVY model.

The Finbee sample (Appendix D) explains 90.4% of the interest rate set on consumer loans. Complementing the findings by Santoso et al. (2019) and Cai et al. (2016) but differently from the hypothesis, a higher loan amount is expected to decrease loan interest rate in the Finbee model, yet longer maturity term is anticipated to increase the loan rate, complementing the hypothesis and empirical study by Dietrich and Wernli (2016). Two loan purposes such as home repair and holiday are attributed to explain the possible changes in the interest rate. Loans issued to be used for a holiday purpose may be cheaper compared to other loans due to a lower amount borrowed that may make this loan easier to repay. A home repairment is usually a costly activity that may require more funds to be borrowed that may result in higher monthly payments or longer term of repayment that increase the default risk if the income level of a borrower drops. Analysing the borrower-related characteristics, the result that older borrowers may receive higher interest rates complements the findings of older borrowers' discrimination presented by Santoso et al. (2019) and Pope and Sydnor (2011). This expected positive relationship between interest rate and borrower's age may be explained by the fact that the Finbee platform considers whether a person is getting close to the retirement age as, consequently, his/ her income may decrease shortly, raising the concern of non-sufficient earning to repay the loan. Therefore, the interest rate may be higher for

older people to reduce the possible risks raised from the reduced income levels. Contrarily to the hypothesis and findings by Chen et al. (2018) and Dietrich and Wernli (2016), the results of Finbee model indicated that married people are expected to pay higher interest rate while people having more dependents - lower. These findings show that the ability to support more dependents financially may be associated with credible income levels and not married people may seem more attractive to the lenders as it is less common for them to spend a major part of the income on the family needs that may change from one month to another. Similarly to empirical findings from Paskolų klubas and SAVY samples, but as opposed to the findings by Serrano-Cinca et al. (2015), the longer work experience at the current employer, associated with the stable source of income, may reduce borrower's interest rate. Complementing the raised hypothesis and the results from two other samples, in the Finbee model, a better credit rating of the borrower or presence of coronavirus pandemic are expected to lower interest rates, while higher debt-to-income ratio of the borrower or unemployment rate – to make the interest rate higher, for similar reasons as described for the Paskolų klubas model. Lastly, borrowers' gender, education levels, or residential property ownership are not anticipated to affect the interest rate in the Finbee model.

Based on the empirical research results of Paskolų klubas, SAVY, and Finbee models, only three factors have a common potential effect on the interest rate in Lithuania's P2P consumer lending platforms (Table A7). Better credit ratings and longer work experience at the recent employer are expected to make interest rates lower, while higher unemployment rates are expected to increase interest rates set on consumer loans in Lithuania's P2P lending market (Table A7). An expected effect of either of the loan amount, maturity term, borrower's age, marital or homeowner status, number of dependents, education degree, or DTI ratio on the interest rate differs among platforms in terms of the coefficient signs and significance (Table A7). This deviation from the expected results may be influenced by the variation in loan pricing strategies, that are neither standardized in the industry nor publicly disclosed, and different client base (Appendix C) among the platforms. Although the presence of coronavirus pandemic is not expected to explain the interest rate in SAVY sample due to biased composition of coronavirus variable, which has been collected from the secondary market thus includes very few loans issued before the pandemic started, the effect of COVID on the interest rate is negative and significant in other two samples, indicating the lower interest rates set on the loans to attract the borrowers in times of uncertainty and restrictions. According to the regressions results, the factors like gender and refinancing loan purpose are not anticipated to explain interest rate in the examined models. The deviation

from the hypothesized results may arise from the fact that recently Lithuania faces decreased gender inequality that may be presented by the fact that half of the current minister‘s cabinet is represented by women and the gender equality concept is highly promoted in the large corporations located in the country; lastly, the interest rate for loans with refinancing purpose may be based on the DTI ratio that incorporates the value of liabilities to be repaid in the future, thus provides more information than refinancing loan purpose alone. All results considered, the raised hypothesis has been partially confirmed (Table A7).

Although a credit rating has the strongest effect on the interest rate (Table A8), meaning that all P2P consumer lending platforms in Lithuania are expected to price the loans based mainly on the credit rating, differences in the interest rate within a credit grade may be explained by additional loan, personal, or even macroeconomic factors, depending on the platform (Table A7). Therefore, to receive lower interest rates, first borrowers are recommended to improve their credit rating. For instance, repaying outstanding liabilities or increasing earnings will decrease borrower’s DTI ratio, which is used as a general guideline in the consumer lending industry to determine risky borrowers. Next, commonly for every platform in Lithuania‘s P2P market, if a person is planning to apply for a credit in the future, he or she should pay attention that employment length at the recent employer may point out person’s financial stability and lower default risk resulting in lower interest rates. Even though factors affecting the interest rate differ among the platforms, the results from Table A7 may be used by future borrowers to review the possible characteristics that influence interest rate in each of Lithuania‘s P2P consumer lending platforms.

The recommendations for future researchers are as follows. Since the credit rating determination mechanism is different among the platforms, future studies may examine the factors affecting borrowers‘ credit rating to determine certain borrowers’ characteristics that improve creditworthiness resulting in lower interest rates. Next, interest rate setting procedures are non-standardized among the platforms, thus more variables associated with borrower‘s default risk or macroeconomic indicators might be included to improve the examined models. Finally, heteroskedasticity, misspecification, and non-normality of residuals are present in all three models, and although many researchers relied on the results from OLS regressions to check a similar kind of relationship, it would be beneficial trying to perform data modifications or use machine learning techniques, like a random forest, that may solve outstanding problems and confirm the effect of the examined factors on the interest rate.

Conclusions

1. The volumes of online global alternative finance market (excluding China), providing disintermediated and digitalized financial services, are constantly growing. Based on the latest data, Baltic countries account for fourth, fifth, and sixth largest volumes per capita in the global alternative finance market. Although Lithuania's P2P consumer lending platforms – Finbee, SAVY, and Paskolų klubas – show the lowest volumes in the Baltics, in contrast to other platforms in the Baltic P2P consumer lending market and Lithuania's consumer lending industry, annual loan volumes funded through Lithuania's P2P consumer lending platforms in 2020 were higher than in 2019, showing the trust and interest of borrowers and investors in this alternative finance market despite the global uncertainty caused by the pandemic. Moreover, a new set of regulations for crowdfunding platforms approved in October 2020, allowing less costly solutions for expansion of the platform operations, is expected to elevate the growth of the P2P market of Lithuania.

P2P consumer lending platforms have an edge over the traditional banking industry in Lithuania by suggesting lower interest rates and a longer payback period. However, the composition of Finbee, SAVY, and Paskolų klubas loan datasets complements the problem of a non-standardized loan pricing mechanism that makes interest rates widely distributed within one credit grade and even overlapping between different credit ratings, limiting borrowers knowledge about the factors affecting interest rates they are charged.

2. Analysed academic publications address the issue of a non-disclosed relationship between loan's characteristics, borrower's characteristics, or macroeconomic factors and the interest rate, presenting asymmetric information and borrowers' discrimination problems. However, the findings differ among studies as they were conducted in different years, using different samples of loan data, provided by the platforms located in different regions. Similarly to the analysed academic publications, OLS regression has been selected as a research method to reach the aim of the thesis, yet it incorporates several limitations that could affect the robustness of the results.

3. The main insights from the comparative analysis indicate that platforms like Finbee and Paskolų klubas accept exceptionally risky borrowers with twice as high DTI ratios as required by the Bank of Lithuania. Moreover, more than two-thirds of borrowers in neither of the examined platforms have higher education, therefore it is suggested for the platforms to target the undergraduate and graduate audience to reach the pool of well-educated and

perhaps a higher-income social group that may boost the volumes of loans funded, reduce default risks, and attract new, risk-averse investors,

Conducted OLS regressions based on Paskolų klubas, SAVY, and Finbee samples can explain from 64% to 90.4% of the variation in the dependent variable - interest rate. However, the limitations like heteroskedasticity (corrected with "robust" standard errors technique), non-normality of residuals, and misspecification may affect the robustness of results.

4. Results of OLS regressions indicate that credit rating, unemployment rates, or work experience at the most recent employer are the common potential factors that explain the interest rate set on consumer loans in Lithuania's P2P lending market. Contrarily to the academic literature and raised hypothesis, factors such as gender and refinancing purpose are not expected to affect the interest rate in either of the platforms. The possible effect of the loan amount, maturity term, borrower's age, marital or homeowner status, number of dependents, education degree, DTI ratio, or coronavirus pandemic on the interest rate differed among the samples. The deviations are reasonable and may be caused by the differences in client base among the platforms and different loan pricing strategies.

5. Even though credit rating has the strongest effect on the interest rate, the differences in interest rate within credit risk grades may be additionally explained by loan's, borrower's, or macroeconomic characteristics. Therefore, borrowers are recommended to get familiar with the determinants of interest rate that are common in this industry and distinct for the platforms, and consider some of the risk-related factors like their DTI ratio or length of the work experience before applying for credit.

It would be beneficial to increase the scope of this research by either examining the explanatory factors of the credit rating that could be improved to increase borrowers' creditworthiness resulting in lower interest rates or by adding additional risk-related or macroeconomic factors to improve the fit of the existing models. To solve econometric problems and avoid possible bias in the results, data modification or machine learning techniques are suggested to be used by future researchers.

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https://www.jbs.cam.ac.uk/wp-content/uploads/2021/06/ccaf-2021-06-report-2nd-global-alternative-finance-benchmarking-study-report.pdf

Ziegler, T., Shneor, R., Wenzlaff, K., Wang, W. B., Kim, J., Odorovi, A., de Camargo Paes, F. F., Zhang, B. Z., Johanson, D., Lopez, C., Mammadova, L., Adams, N., & Luo, D. (2020). *The global alternative finance market benchmarking report*. Cambridge Centre for Alternative Finance. https://www.jbs.cam.ac.uk/wp-content/uploads/2020/08/2020-04-22-ccaf-global-alternative-finance-market-benchmarking-report.pdf

Appendix A. Tables

Table 3

Average Interest Rate on Consumer Loans Less than EUR 290, 2019-2021

		Year		
		2019	2020	2021 Q1&Q2
Average interest rate, %	Consumer lending, loan amount < EUR 290	51.7	46.9	45.0

Note. Annual average interest rate is calculated by author based on average of sum of quarterly average interest rates. Retrieved from https://www.lb.lt/lt/vkd-veiklos-rodikliai, 2021 H1 report. Prepared by author.

Table 4

Consumer Loans in Lithuania, 2019-2021

		Year			
		2019	2020	2021 Q1&Q2	2020 vs 2019, change
Consumer loans issued (units)	P2P platforms	12136	11373	6500	-6.3%
	Consumer lending, excluding leasing and credit cards	237855	160106	73277	-32.7%
	Consumer lending, including leasing and credit cards	438293	278668	111165	-36.4%
Total amount of issued consumer loans, million EUR	P2P platforms	34.142	35.440	25.314	3.8%
	Consumer lending, excluding leasing and credit cards	277.233	197.116	126.626	-28.9%
	Consumer lending, including leasing and credit cards	520.234	390.748	222.344	-24.9%
Average interest rate, %	P2P platforms	16.7	16.5	14.7	-1.4%
	Consumer lending, excluding leasing and credit cards	24.5	23.7	20.1	-3.4%
Average loan maturity, months	P2P platforms	37	40	44	8.2%
	Consumer lending, excluding leasing and credit cards	35	36	39	0.4%

Note. Annual amounts of interest rate and loan maturity are calculated by author based on average of sum of quarterly average amounts. Retrieved from https://www.lb.lt/lt/vkd-veiklos-rodikliai, 2021 H1 report. Prepared by author.

Table 5

Variables and Their Expected Effect on the Interest Rate

Variable	Description	Academic publication	Conclusion	Expected effect on interest rate/ coefficient
Dependent variable:				
RATE	Annual interest rate borrower pays on loan, excluding fees			
Loan's characteristics - independent variables:				
AMOUNT	Loan amount the borrower applied for and received through the platform, ascending	Santoso et al. (2019); Cai et al. (2016)	interest rate (-)	+
		Berger & Gleisner (2009); Herzenstein et al. (2011); Dietrich & Wernli (2016)	interest rate (+)	
MATURITY	The payback period of the loan, ascending	Dietrich & Wernli (2016)	interest rate (+)	+
		Santoso et al. (2019)	interest rate (-)	
PURPOSE	Purpose for which loan will be used	refinancing (+), as may show borrower's inability to repay outstanding loans = risk, otherwise - no effect		
Borrower's characteristics - independent variables:				
AGE	Age at the time of applying for a loan, ascending	Gonzalez & Loureiro (2014); Chen et al. (2018); Han et al. (2018)	older individuals = higher loan funding success	+
		Santoso et al. (2019), Pope & Sydnor (2011)	interest rate (+)	
		Chen et al. (2018)	no effect on interest rate	
FEMALE	Borrower's gender: if borrower is a female	Chen et al. (2018)	interest rate (-)	+
		Alesina et al. (2013); Santoso et al. (2019)	interest rate (+)	
		Barasinska & Schäfer (2014), Dietrich & Wernli (2016)	no effect on interest rate	
MARRIED	If borrower is married	Chen et al. (2018)	interest rate (-)	-
		Han et al. (2018)	not married people = higher loan funding success	
DEPENDENTS	Number of dependents borrower has, ascending	Dietrich & Wernli (2016)	interest rate (+)	+
EDUCATION	Education level, from lowest to highest	Collier & Hampshire (2010), Chen et al. (2018)	interest rate (-)	-
		Han et al. (2018); Chen et al. (2018)	higher degree = higher loan funding success	
EMPLOYMENT	Years/ months working for the recent employer, ascending	Serrano-Cinca et al. (2015)	no effect on loan default	-
HOMEOWNERSHIP	If borrower owns a residential property	Greiner & Wang (2010)	no effect on interest rate	-
		Dietrich & Wernli (2016); Chen et al. (2018)	interest rate (-)	
DTI	Borrower's debt-to-income ratio, ascending	Greiner & Wang (2010)	interest rate (+)	+
CREDITRATING	Borrower's credit rating, from the worst to the best	Duarte et al. (2012)	better credit rating = more reliable borrower	-
		Klafft (2008); Berger & Gleisner (2009); Chen et al. (2018)	interest rate (-)	
Macroeconomic factors - independent variables:				
COVID	Loan was issued since the first COVID lockdown in Lithuania	Gębski (2021)	reduced interest in European consumer lending market	-
UNEMPLOYMENT	Unemployment rate in the month when loan was issued, ascending	Hada et al. (2020)	higher degree = more NPL	+
		Dietrich & Wernli (2016)	interest rate (+)	

Note. Prepared by author.

Table 6

Descriptive Statistics

Variable	Paskolų Klubas (n = 17493)					SAVY (n = 1392)					Finbee (n = 8945)				
	Mean	Median	Std. D.	Min	Max	Mean	Median	Std. D.	Min	Max	Mean	Median	Std. D.	Min	Max
RATE	14.1	13	6.116	5	75	17.64	16	5.966	7	56	18.94	18	5.152	7	33
AMOUNT	3.291	2.2	3.285	0.1	25.000	6.602	5.2	4.797	0.3	25.000	2.855	2.17	2.469	0.3	22.735
MATURITY	41.97	36	23.82	1	120	51.55	51	18.77	3	101	37.16	36	19.03	7	84
AGE	36.34	34	10.61	18	74	37.1	35	11.77	19	72	38.3	37	11.18	18	69
DEPENDENTS:						0.629	0	0.833	0	6	0.718	0	0.925	0	7
None	0.602	1	0.489	0	1										
One	0.219	0	0.414	0	1										
Two	0.136	0	0.342	0	1										
Three	0.032	0	0.176	0	1										
Four or more	0.011	0	0.105	0	1										
DTI	29.5	31.98	9.742	1.65	72.4	31.17	34	8.32	2	40.43	27	28	10.46	1	109
UNEMPLOYMENT	7.307	6.8	1.205	6	9.9	7.559	7.2	1.144	6	9.9	7.343	6.8	1.233	6	9.9

Note. This table presents descriptive statistics for the variables appearing in the majority of examined datasets as numerical. For a better view, composition of categorical variables and one numerical (Work experience – Finbee) is described in the form of charts in Appendix C.

Table 7

Comparison of Empirical Results with Hypothesized

Variable	Results from OLS regressions			Expected effect on interest rate
	Paskolų klubas (n = 17493)	SAVY (n = 1392)	Finbee (n = 8945)	
Loan's characteristics - independent variables:				
AMOUNT	+	-	-	+
MATURITY	+	-	+	+
PURPOSE (dummy)	REF - no effect; CAR, TRA, HOM, REP (-)	REF - no effect; BUS (-)	REF - no effect; HOL (-), HOM (+)	REF (+), otherwise - no effect
Borrower's characteristics - independent variables:				
AGE	-	no effect	+	+
FEMALE	no effect	no effect	no effect	+
MARRIED	no effect	no effect	+	-
HOMEOWNERSHIP	-	no effect	no effect	-
DTI	+	no effect	+	+
DEPENDENTS	no effect	no effect	-	+
EDUCATION	-	no effect	no effect	-
EMPLOYMENT	-	-	-	-
CREDITRATING	-	-	-	-
Macroeconomic factors - independent variables:				
COVID	-	no effect	-	-
UNEMPLOYMENT	+	+	+	+

Note. Prepared by the author. The table summarizes the results of OLS regressions (Appendix D) and compares them with the expected effect (Table A5; Appendix B). The results in grey are in line with the raised hypothesis, in other words, with the expected effect on the interest rate.

Table 8

Effect of Credit Ratings on the Interest Rate

Paskolų klubas Model: OLS, using observations 1-17493
Heteroskedasticity-robust standard errors variant HC1

Variable	Coefficient	P-value	
const	29.7652	0.0000	***
CREDTRATING	−4.9066	0.0000	***
Adjusted R-squared	0.597		

SAVY Model: OLS, using observations 1-1392
Heteroskedasticity-robust standard errors variant HC1

Variable	Coefficient	P-value	
const	36.2033	0.0000	***
CREDTRATING	−2.21409	6.15E-171	***
Adjusted R-squared	0.632		

Finbee Model: OLS, using observations 1-8945
Heteroskedasticity-robust standard errors variant HC1

Variable	Coefficient	P-value	
const	30.5638	0.0000	***
CREDTRATING	−5.05216	0.0000	***
Adjusted R-squared	0.879		

Note. Prepared by the author based on the results of OLS regressions that examine the relationship between interest rate and credit rating only for each platform.

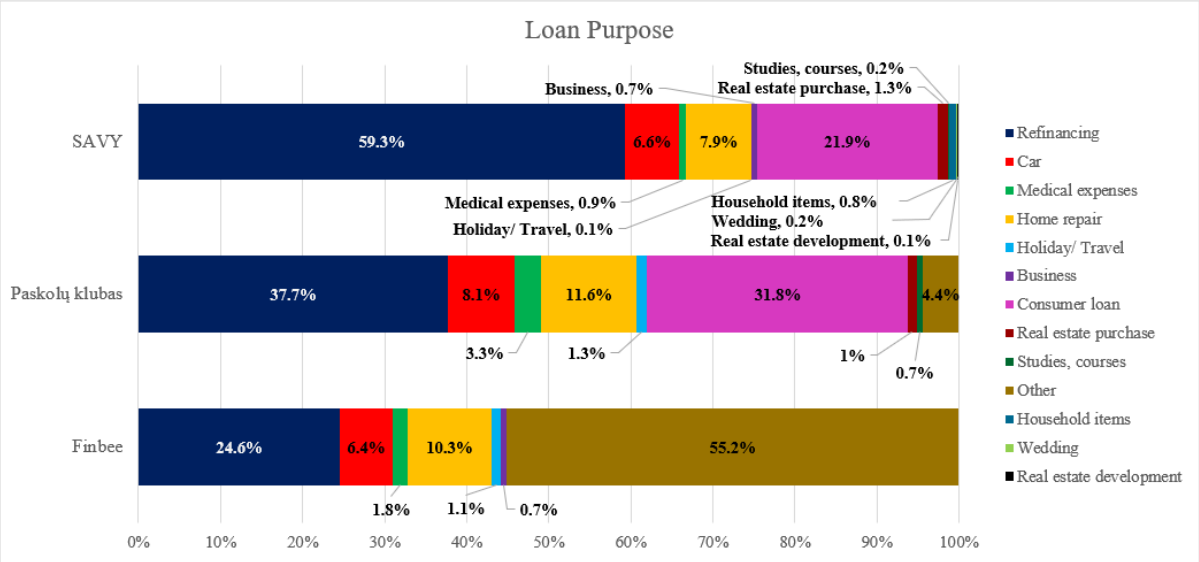
Appendix B. Composition of Samples

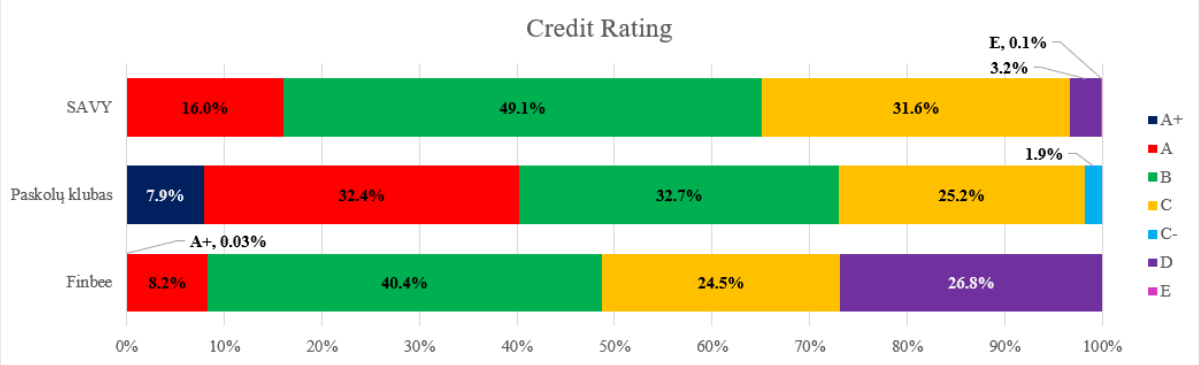
Description of the samples used for comparative analysis and OLS regressions.

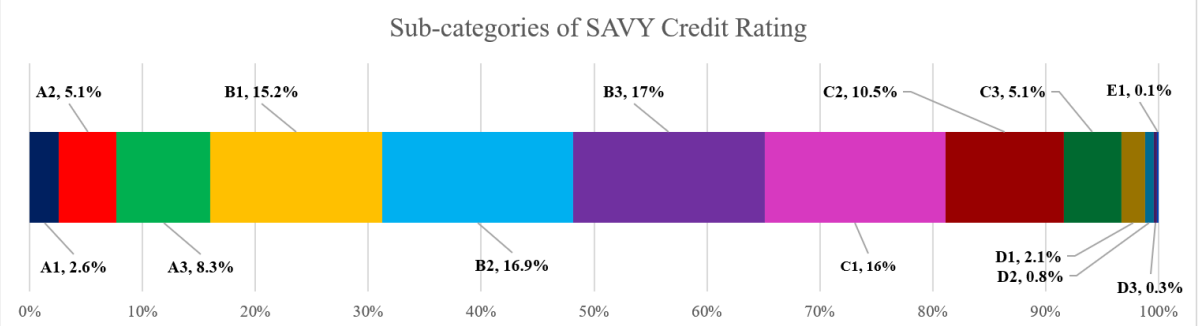
Variable	Description			Expected sign of coefficient
	Paskolų klubas (n = 17493)	**SAVY (n = 1392)**	**Finbee (n = 8945)**	
Dependent variable:				
RATE	Annual interest rate (%) borrower pays on loan, excluding fees			
Loan's characteristics - independent variables:				
AMOUNT	Loan amount (th. €) the borrower applied for and received through the platform			+
MATURITY	The payback period of the loan, in months			+
PURPOSE (dummy)	Use of loan: CAR - car purchase, CON - consumer loan, HOM - home repair, MED - health costs, OTH - other, REP - real estate purchase, REF - refinancing, STU - studies, TRA - travel	Use of loan: BUS - business, CAR - car purchase, CON - consumer loan, HI - household items, HOM - home renovation, MED - medical expenses, RED - real estate development, REF - refinancing, REP - real estate purchase, STU - studies, TRA - travel, WED - wedding	Use of loan: BUS - business, CAR - car purchase, HOL - holiday, HOM - home repair, MED - medical expenses, OTH - other, REF - refinancing	refinancing (+), otherwise - no effect
Borrower's characteristics - independent variables:				
AGE	Age at the time of applying for a loan			+
FEMALE	Borrower's gender: 1 - female, 0 - male			+
MARRIED	Marital status: 1 - married, 0 - otherwise			-
HOMEOWNERSHIP	1 - borrower owns a property; 0 - otherwise			-
DTI	Borrower's debt-to-income ratio (%)			+
DEPENDENTS	Number of dependents borrower has: 0 - none, 1 - one, 2 - two, 3 - three, 4 - four or more	Number of dependents borrower has	Number of dependents borrower has	+
EDUCATION	Education level from lowest to highest: 1 - unfinished high school, 2 - vocational, 3 - high school, 4 - college, 5 - bachelor's degree, 6 master's degree, 7 - doctor's degree	Education level from lowest to highest: 1 - school, 2 - vocational, 3 - high school, 4 - college, 5 - university	Education level from lowest to highest: 1 - vocational, 2 - high school; 3 - undergraduated; 4 - graduated	-
EMPLOYMENT	Work experience at the latest workplace: 1 - from 4 to 12 months; 2 - from 1 to 2 years; 3 - from 2 to 3 years; 4 - from 3 to 4 years; 5 - from 4 to 5 year; 6 - over 5 years	Work experience at curremt workplace: 1 - 1 to 4 months; 2 - 4 to 12 months; 3 - 1 to 2 years; 4 - 3 to 4 years; 5 - over 5 years	Work experience at curremt employer (months)	-
CREDITRATING	Borrower's credit rating, from the lowest to highest; C- - 1, C - 2, B - 3, A - 4, A+ - 5	Borrower's credit rating, from the lowest to highest; E1, D3, D2, D1, C3, C2, C1, B3, B2, B1, A3, A2, A1 from 1 to 13, respectively	Borrower's credit rating, from the lowest to highest; D - 1, C - 2, B - 3, A - 4, A+ - 5	-
Macroeconomic factors - independent variables:				
COVID	Loan was issued since the first COVID lockdown in Lithuania - 1, otherwise - 0			-
UNEMPLOYMENT	Seasonally-adjusted unemployment rate (%) in Lithuania in the month when loan was issued			+

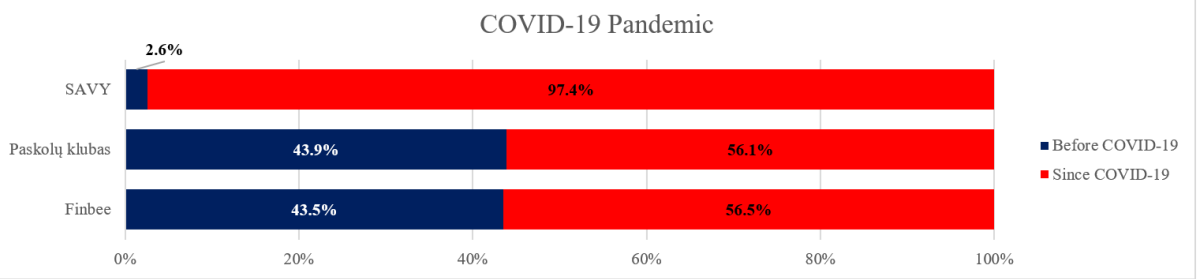
Appendix C. Visualizations of Descriptive Statistics

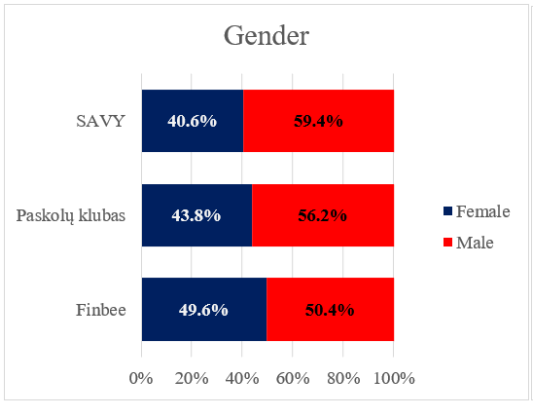
Visualizations for categorical variables and a numerical variable of work experience.

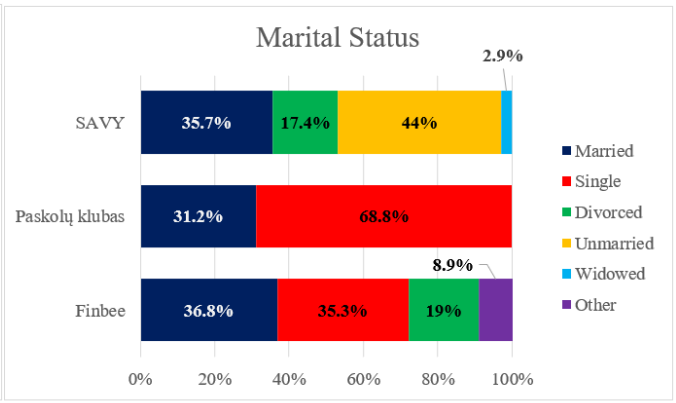


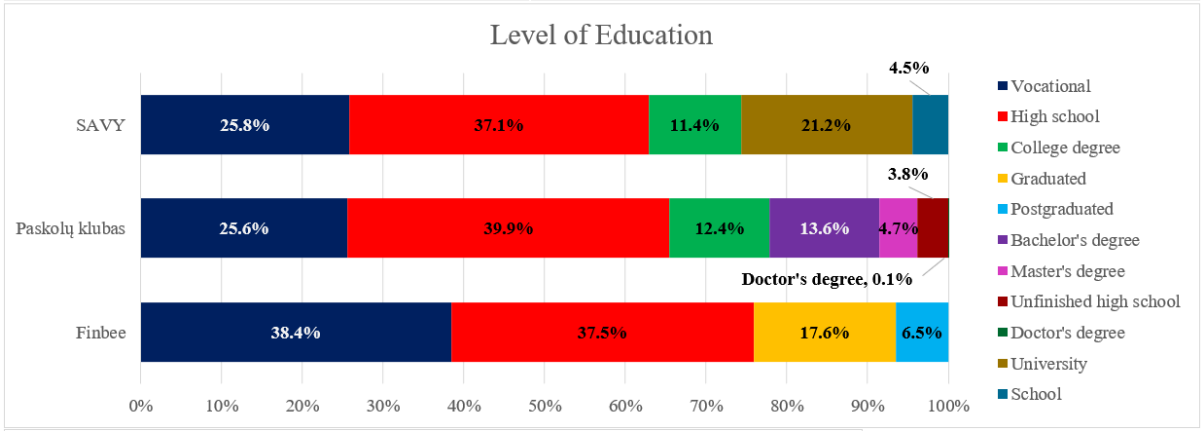


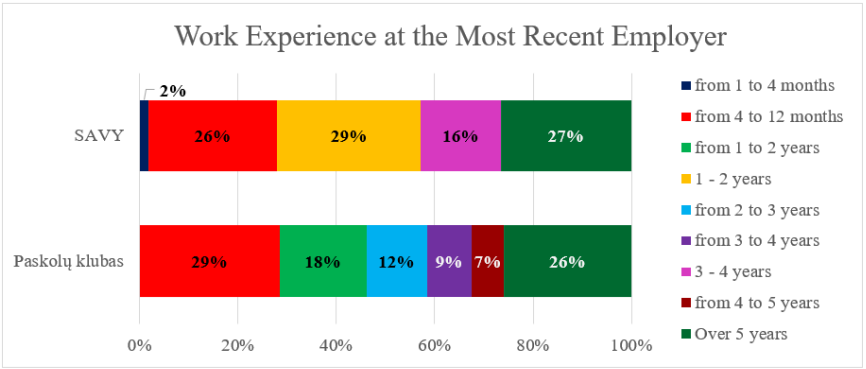


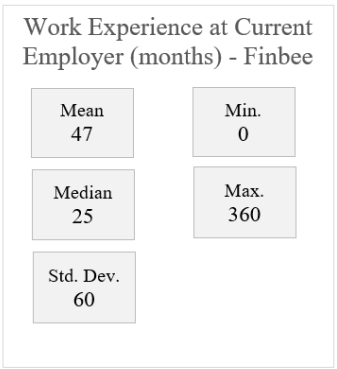


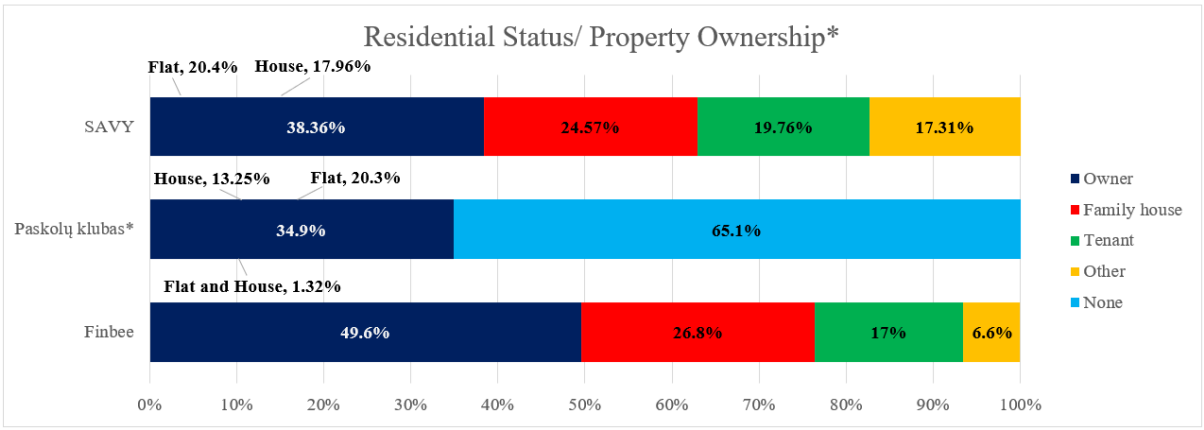

Gender
SAVY
Paskolų klubas
Finbee
40.6%
59.4%
43.8%
56.2%
49.6%
50.4%
Female
Male
0%
20%
40%
60%
80%
100%


Marital Status
SAVY
Paskolų klubas
Finbee
35.7%
17.4%
44%
2.9%
31.2%
68.8%
36.8%
35.3%
19%
8.9%
Married
Single
Divorced
Unmarried
Widowed
Other
0%
20%
40%
60%
80%
100%


Level of Education
SAVY
Paskolų klubas
Finbee
25.8%
37.1%
11.4%
21.2%
4.5%
25.6%
39.9%
12.4%
13.6%
4.7%
3.8%
Doctor's degree, 0.1%
38.4%
37.5%
17.6%
6.5%
Vocational
High school
College degree
Graduated
Postgraduated
Bachelor's degree
Master's degree
Unfinished high school
Doctor's degree
University
School
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%


Work Experience at the Most Recent Employer
SAVY
Paskolų klubas
2%
26%
29%
16%
27%
29%
18%
12%
9%
7%
26%
from 1 to 4 months
from 4 to 12 months
from 1 to 2 years
1 - 2 years
from 2 to 3 years
from 3 to 4 years
3 - 4 years
from 4 to 5 years
Over 5 years
0%
20%
40%
60%
80%
100%


Work Experience at Current Employer (months) - Finbee
Mean
47
Min.
0
Median
25
Max.
360
Std. Dev.
60


Residential Status/ Property Ownership*
SAVY
Paskolų klubas*
Finbee
Flat, 20.4%
House, 17.96%
38.36%
24.57%
19.76%
17.31%
House, 13.25%
Flat, 20.3%
34.9%
65.1%
Flat and House, 1.32%
49.6%
26.8%
17%
6.6%
Owner
Family house
Tenant
Other
None
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

Appendix D. OLS Regressions and Limitations Checks

OLS regressions performed by author on the Paskolų klubas, SAVY, and Finbee samples using Gretl software. The data is collected from Paskolų klubas (n.d.-b), SAVY (n.d.-c), and Finbee (n.d.-c).

The levels of P-value significance for each coefficient are:

* significant at the ten-percent level ($p < 0.1$);

** significant at the five-percent level ($p < 0.05$);

*** significant at the one-percent level ($p < 0.01$).

F-statistics and P-value (F) show all three models being significant or reasonable to be analysed.

Paskolų klubas Model: OLS, using observations 1-17493
Dependent variable: RATE
Heteroskedasticity-robust standard errors variant HC1

Variable	Coefficient	Std. Error	T-ratio	P-value	
const	25.9531	0.3100	83.7272	0.0000	***
AMOUNT	0.1951	0.0074	26.4199	0.0000	***
MATURITY	0.0141	0.0019	7.5652	0.0000	***
AGE	-0.0065	0.0027	-2.3810	0.0173	**
FEMALE	0.0237	0.0600	0.3953	0.6927	
MARRIED	0.0345	0.0665	0.5189	0.6039	
DEPENDENTS	-0.0286	0.0299	-0.9573	0.3385	
EDUCATION	-0.0903	0.0231	-3.9077	0.0001	***
EMPLOYMENT	-0.0620	0.0142	-4.3593	0.0000	***
HOMEOWNERSHIP	-0.3493	0.0560	-6.2355	0.0000	***
DTI	0.0156	0.0033	4.6905	0.0000	***
CREDITRATING	-4.5641	0.0356	-128.0409	0.0000	***
UNEMPLOYMENT	0.4908	0.0344	14.2841	0.0000	***
COVID	-2.5604	0.0798	-32.0744	0.0000	***
CAR	-0.6813	0.1932	-3.5274	0.0004	***
TRA	-1.2027	0.3077	-3.9092	0.0001	***
CON	-0.1371	0.1872	-0.7324	0.4640	
MED	-0.2801	0.2752	-1.0175	0.3089	
HOM	-0.7781	0.1824	-4.2664	0.0000	***
REF	-0.1290	0.1708	-0.7555	0.4499	
REP	-0.4820	0.2451	-1.9665	0.0493	**
STU	-0.6044	0.4162	-1.4520	0.1465	

Mean dependent var	14.1023	S.D. dependent var	6.1164
Sum squared resid	235621	S.E. of regression	3.6724
R-squared	0.640	Adjusted R-squared	0.640
F(21, 17471)	1654.616	P-value(F)	0.000
Log-likelihood	−47566.10	Akaike criterion	95176.2
Schwarz criterion	95347.13	Hannan-Quinn	95232.49

SAVY Model: OLS, using observations 1-1392
Dependent variable: RATE
Heteroskedasticity-robust standard errors variant HC1

Variable	Coefficient	Std. Error	T-ratio	P-value	
const	36.7165	0.9410	39.0171	0.0000	***
AMOUNT	-0.3565	0.0218	-16.3515	0.0000	***
MATURITY	-0.0294	0.0057	-5.1711	0.0000	***
AGE	-0.0067	0.0073	-0.9093	0.3634	
GENDER	0.1733	0.1503	1.1525	0.2493	
MARRIED	-0.0786	0.1738	-0.4521	0.6513	
DEPENDENTS	-0.0239	0.1009	-0.2371	0.8126	
EDUCATION	-0.0794	0.0781	-1.0154	0.3101	
EMPLOYMENT	-0.1613	0.0730	-2.2091	0.0273	**
HOMEOWNERSHIP	0.1280	0.1802	0.7100	0.4778	
DTI	0.0077	0.0110	0.7052	0.4808	
CREDITRATING	-1.9896	0.0651	-30.5833	0.0000	***
COVID	-0.7609	0.4681	-1.6253	0.1043	
UNEMPLOYMENT	0.4198	0.0724	5.7943	0.0000	***
REF	-0.3437	0.2188	-1.5710	0.1164	
CAR	0.0969	0.3205	0.3022	0.7626	
HOM	-0.0610	0.3649	-0.1672	0.8672	
BUS	-1.5739	0.8539	-1.8433	0.0655	*
REP	-0.1583	0.6914	-0.2289	0.8190	
TRA	-0.1392	0.3355	-0.4149	0.6783	
HI	-0.7177	0.6464	-1.1104	0.2670	
WED	1.2871	1.0063	1.2790	0.2011	
RED	-1.2454	0.8627	-1.4437	0.1491	
STU	-1.3510	1.0238	-1.3196	0.1872	
MED	-0.2407	0.7120	-0.3381	0.7353	

Mean dependent var.	17.6444	S.D. dependent var.	5.9657
Sum squared resid.	11037.56	S.E. of regression	2.8415
R-squared	0.777	Adjusted R-squared	0.773
F(24, 1367)	588.474	P-value(F)	0.000
Log-likelihood	−3416.274	Akaike criterion	6882.547
Schwarz criterion	7013.510	Hannan-Quinn	6931.518

Finbee Model: OLS, using observations 1-8945
Dependent variable: RATE
Heteroskedasticity-robust standard errors variant HC1

Variable	Coefficient	Std. Error	T-ratio	P-value	
const	25.1519	0.1328	189.3274	0.0000	***
AMOUNT	-0.0846	0.0123	-6.8899	0.0000	***
MATURITY	0.0396	0.0014	28.7857	0.0000	***
AGE	0.0036	0.0019	1.8838	0.0596	*
GENDER	-0.0521	0.0353	-1.4731	0.1408	
MARRIED	0.1802	0.0397	4.5452	0.0000	***
DEPENDENTS	-0.0881	0.0191	-4.6020	0.0000	***
EDUCATION	-0.0172	0.0202	-0.8492	0.3958	
EMPLOYMENT	-0.0008	0.0004	-2.2757	0.0229	**
HOMEOWNERSHIP	-0.0269	0.0399	-0.6742	0.5002	
DTI	0.0068	0.0017	3.9755	0.0001	***
CREDITRATING	-5.0153	0.0196	-255.9296	0.0000	***
COVID	-1.1291	0.0511	-22.0756	0.0000	***
UNEMPLOYMENT	0.6149	0.0175	35.1541	0.0000	***
REF	-0.0355	0.0476	-0.7451	0.4562	
CAR	0.0505	0.0676	0.7467	0.4553	
MED	-0.0021	0.1172	-0.0181	0.9856	
BUS	0.2642	0.1742	1.5170	0.1293	
HOM	0.1252	0.0599	2.0885	0.0368	**
HOL	-0.3514	0.1547	-2.2717	0.0231	**

Mean dependent var	18.9367	S.D. dependent var	5.152
Sum squared resid	22667.08	S.E. of regression	1.5937
R-squared	0.905	Adjusted R-squared	0.904
F(19, 8925)	5131.673	P-value(F)	0.000
Log-likelihood	−16851.02	Akaike criterion	33742.04
Schwarz criterion	33884.02	Hannan-Quinn	33790.37

Checks for limitations, that have impact on the results of OLS regressions, are conducted for Paskolų klubas, SAVY, and Finbee samples using the Gretl software.

Limitations Checks

Collinearity - Variance Inflation Factors

Minimum possible value = 1.0

Values > 10.0 may indicate a collinearity problem

Paskolų klubas		SAVY		Finbee	
AMOUNT	1.926	AMOUNT	2.049	AMOUNT	1.954
MATURITY	1.949	MATURITY	2.113	MATURITY	1.732
AGE	1.433	AGE	1.65	AGE	1.667
FEMALE	1.111	GENDER	1.126	GENDER	1.099
MARRIED	1.555	MARRIED	1.408	MARRIED	1.244
DEPENDENTS	1.242	DEPENDENTS	1.246	DEPENDENTS	1.101
EDUCATION	1.083	EDUCATION	1.111	EDUCATION	1.037
EMPLOYMENT	1.235	EMPLOYMENT	1.299	EMPLOYMENT	1.228
HOMEOWNERSHIP	1.354	HOMEOWNERSHIP	1.408	HOMEOWNERSHIP	1.308
DTI	1.273	DTI	1.163	DTI	1.201
CREDITRATING	1.337	CREDITRATING	1.296	CREDITRATING	1.379
COVID	2.16	COVID	1.068	COVID	2.196
UNEMPLOYMENT	2.069	UNEMPLOYMENT	1.073	UNEMPLOYMENT	2.105
CAR	2.626	REF	1.842	REF	1.361
TRA	1.295	CAR	1.258	CAR	1.065
CON	5.602	HOM	1.342	MED	1.024
MED	1.696	BUS	1.035	BUS	1.012
HOM	3.265	REP	1.08	HOM	1.105
REF	6.179	TRA	1.014	HOL	1.012
REP	1.248	HI	1.034		
STU	1.163	WED	1.022		
		RED	1.018		
		STU	1.014		
		MED	1.043		

White's test for heteroskedasticity

Null hypothesis: heteroskedasticity is not present

Paskolų klubas		SAVY		Finbee	
df	213	df	197	df	184
test statistic	1526.12	test statistic	530.866	test statistic	1111.748
p-value	5.44E-197	p-value	1.90E-32	p-value	2.12E-132

Test for normality of residual

Null hypothesis: error is normally distributed

Paskolų klubas		SAVY		Finbee	
df	2	df	2	df	2
test statistic	15892.1	test statistic	458.706	test statistic	2062.404
p-value	0	p-value	2.47E-100	p-value	0

RESET test for specification (squares and cubes)

Null hypothesis: specification is adequate

Paskolų klubas		SAVY		Finbee	
F (2, 17469)	719.564	F(2, 1365)	280.520	F(2, 8923)	987.65
p-value	5.05E-301	p-value	8.79E-103	p-value	0