

Literature Review Loan Default in Peer To Peer Lending

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Abstract:

P2P lending is a relatively new way of facilitating money where individuals can lend money to or borrow from other individuals without the intervention of different financial intermediaries. A big disadvantage for the lender is the higher risk of information asymmetry. Information asymmetry makes it difficult for the lenders to assess the riskiness of the different borrowers, so a deep knowledge about the determinants of loan default can assist the lenders in making a more informed investing decision. This paper will study the different determinants of loan default and so help investors in making more informed investing decisions. .

Keywords: P2P, Loan default

1. Introduction

A P2P economy is a business model where individuals interact directly with each other without the intervention of an intermediary such as Uber, Airbnb and The LendingClub. The P2P economy, which this study is going to address, is the P2P lending market. This is an online marketplace where individuals can lend money to or borrow from other individuals without the intervention of different financial intermediaries. (Zhao, Ge, Liu, Wang, Chen, & Zhang, 2017).

Peer-to-peer ('P2P') lending has been a topic of high interest in the past few years. The U.S. Treasury (2016) expects the market to be worth around \$90 billion in 2020. As it is one of the most promising trends in the modern online banking industry, research provides some studies on various fields of P2P lending.

P2P lending consists of individuals lending money to other individuals, without the intermediation of a financial institution. P2P can be analyzed under several approaches. It can be considered as an example of financial disintermediation; as another technological disruption provoked by Internet; as a case of collaborative economy, or even as a platform to give loans to financially excluded people. Although no traditional bank is present in the process, there is an electronic lending platform that mediates between borrowers and lenders of loans, charging a fee for this service. Companies such as Prosper or LendingClub channel loans between individuals, whereas Kiva is focused on funding low-income people. P2P growth is remarkable, both in the number of loans and the number of investors, attracted by high returns expectations or socially responsible investment concerns.

P2P lending is a relatively new way of facilitating money. A lot of advantages and disadvantages go together with this new form of lending. As the use of banks is made redundant, less administrative and operational costs are involved with this type of transactions. This makes it possible for the borrower to access money at a lower interest rate, and for the investor to lend money for a higher return.

A big disadvantage for the lender is the higher risk of information asymmetry. A high level of information asymmetry will eventually lead to adverse selection and moral hazard. Adverse selection occurs when the lender is not able to get a good view of the credibility of the borrower. As the lender doesn't know the credibility of a specific borrower, he will try to protect himself against the average risk of loan default. Therefore, the lender will offer the borrower a median interest rate. The borrowers with good credibility will find this interest rate too high and will drop out of the market. The borrowers with bad credibility will find a loan at this interest rate a bargain and will accept the loan (Akerlof, 1970). This will lead to only borrowers with low-credibility being on the P2P lending market and more defaulted loans.

Moral hazard occurs in situations where the actions of the individual affect the outcome of the project. Here, the choice of the borrower to use the money for a low risk or a high-risk project will affect the probability of loan default. The lender is, due to the information asymmetry, unable to know if the borrower will pursue the high risk or the low risk project. A solution for this problem is the closely monitoring of the borrowers' behaviour. (Arnott & Stiglitz, 1988; Covitz & Heitfield, 1999). However, this is not always possible and sometimes too costly. (Emekter, Tu, Jirasakuldech, & Lu, 2015).

In the traditional lending market, the problem of information asymmetry is solved by intermediaries. Banks screen and monitor the borrowers carefully, so that they can inform the lenders better about the credibility and default risk of the borrowers. (Covitz & Heitfield, 1999). With disintermediated lending, the lenders will have to take care of the screening themselves or rely on the data of the P2P lending platform. However, it isn't always possible to access all the data where banks can rely on. (Emekter, Tu, Jirasakuldech & Lu, 2015).

As information asymmetry is still the weak spot of social lending, it is very important to have a deep and broad understanding of the mechanisms of this specific market. Information asymmetry makes it difficult for the lenders to assess the riskiness of the different borrowers, so a deep knowledge about the determinants of loan default can assist the lenders in making a more informed investing decision. Supporting the investors in this process ensures that the P2P lending market stays profitable. The investors will be able to maximize their profits by refusing loans with a high chance on loan default and accepting those with a low chance. (Emekter, Tu, Jirasakuldech & Lu, 2015).

2. Literature Review

2.1. Overview of P2P lending

2.1.1. How does P2P lending work

This paper will focus on the P2P lending platform of The LendingClub and use their statistical data on loans to investigate the determinants of loan default in the P2P lending market. The LendingClub is a P2P lending platform that has been connecting borrowers and lenders in the United States since 2011.

P2P lending is a new method of informal finance initiated in the U.K and which is also developing apace around the world. This model for loan origination uses the internet to directly connect borrowers with on-line communities. Various authors have studied the up-surge and evolution of market-place lending (Berger; Gleisner, 2009; Bachman et al., 2011).

Why is there a need for P2P lending? P2P lending has advantages for the individual and the society (Hulme, 2006). They increase the welfare of the society as they give borrowers loans at a lower cost and give lenders higher returns. The loans also focus on the market for small loans, which banks don't serve. (Dhand et al., 2008). Hereby, they reach borrowers in need of loans who haven't access to regular forms of credit. Some people, like starting entrepreneurs, won't meet the requirements to borrow money via banks but will via P2P lending platforms. In total, more loans are being served and the total welfare of the society will increase.

How does it come that banks don't serve the lower end of the lending market? This is mainly due to the additional costs banks have to take into account. First of all, as will be mentioned below, trust is a very important aspect of banking. (Bertsch, Hull, Qi & Zhang, 2018). Having a high default rate will damage the reputation of a bank and lower the trust of their investors. Therefore, facilitating loans to risky borrowers brings along a reputation cost for traditional banks. Further, banks also have to take into account the costs from their capital

requirements. Too high default rates will increase the capital requirements. At last, as banks have more operational and transactional costs, the marginal costs of facilitating an extra loan is higher for a bank than for a

P2P lending platform. To conclude, the reputation costs, capital requirements and marginal costs make it more interesting for banks to not serve the riskiest borrowers or smaller loans. (De Roure, Pelizzon, Tasca, 2016).

What drives investors and borrowers towards P2P lending instead of traditional lending? In a recent paper, that investigated the drivers of the P2P market, the researchers found three specific reasons that facilitated the growth of the P2P lending market. A first driver of the expansion of the P2P lending market was the financial crisis. It is known that the lending volumes of the traditional lending market are negatively related with the lending volumes of the P2P lending market. This trend can be explained by the fact that borrowers resort to P2P lending platforms to fulfil their financial needs from the moment they are underserved by banks. (De Roure, Pelizzon, Tasca, 2016). During the financial crisis, however, banks decreased their credit supply even more. This fall in credit supply drove the borrowers that became underserved towards online lending platforms and gave the P2P lending platforms a boost. (Havrylchyk, Mariotto, Rahm, & Verdier, 2018). An additional explanation for increase in P2P lending during the financial crisis can be found in the paper of Bertsch, Hull, Qi and Zhang (2018). They also found that the lending volumes of the traditional lending market are negatively related with the lending volumes of the P2P lending market. A second reason for this trend could be the trust of the borrowers. A decline of the trust in traditional banks increases the amount of P2P lending as a drop of confidence in traditional banks will move borrowers away from the traditional banking market to the online lending market. This especially happened after the financial crisis. The effect of this trend is found to be bigger for borrowers with a lower credibility. Which means that more borrowers with lower credibility will be attracted to the P2P lending market. Correspondingly, an increase in interpersonal trust will move borrowers from P2P lending towards traditional banking as traditional banking is much more personal. The same trends were found for the investors. A decrease in the trust in traditional banks, increases the investments in online lending. (Bertsch, Hull, Qi & Zhang, 2018).

A second driver of the growth of P2P lending are the entry barriers and competition of traditional banks. The more banks in a town, the higher the entry barriers for P2P lending platforms and the lower their growth. However, borrowers that aren't close to a brick-and-mortar store or have a bad experience with banks will resort to online lending. Areas with a low density of banks are thus a growth opportunity for P2P lending platforms. Consequently, P2P lending platforms profit from the current trend of banks shutting down their brick-and-mortar branches. (Havrylchyk, Mariotto, Rahim, & Verdier, 2018).

The last driver, found in the paper, is the density, age and educational level of the population. The paper found that places with a higher population density experienced a higher expansion of P2P lending platforms. Further, the younger the people and the higher the educational level of the population, the stronger the expansion of the P2P lending platforms. (Havrylchyk, Mariotto, Rahim, & Verdier, 2018).

Additionally, there exist other reasons why investors decide to invest through a P2P lending platform instead of through a traditional bank. One of the motivations for investors to sign up at a P2P lending platform is that the platforms give the lenders the opportunity to invest in consumer credit and so earn a higher interest rate. (Herzenstein, Andrews, Dholakia, & Lyandres, 2008).

A second motivation is the higher return. Due to their lower intermediation costs, P2P platforms can give borrowers a lower interest rate and lenders higher revenue. The main reason for the lower intermediation costs is that P2P platforms don't collect deposits, and so don't have to meet certain regulations. (Serrano- Cinca, 2015). This means that they can decrease the spread on interest rates. Therefore, borrowers can take out a loan at a lower interest rate than would be possible with a bank, and investors can receive a higher interest on their investments. The interest rate on the investments is indeed higher for loans from a P2P lending platform than loans from a traditional lending market, but this is mainly due to the higher risk associated with P2P loans. Borrowers on the P2P lending platform are on general riskier than borrowers from traditional banks. If we take the risk-adjusted interest rate, the interest rate of the P2P lending platforms is equivalent with the interest rate on the traditional lending market. (De Roure, Pelizzon, Tasca, 2016).

A last motivation is that P2P lending platforms give the individual investors control over their investments. They can indicate the rate of return they would like to gain and decide on the purpose of the loan they want to invest in. This wasn't always possible for the smaller investors, they often had to rely on the investment products their banks have to offer.

Information and communication technologies have enabled new business models of financial intermediation, such as P2P lending platforms. P2P lending platforms are online intermediaries that match lenders (i.e., individuals, investors) with borrowers (i.e., individuals and SMEs). First P2P lending platforms (Zopa, Prosper and LendingClub) have been launched in 2005-2007 in the UK and the US. As the market expanded, a large part of loans has been funded not by individual lenders, but institutional investors. Hence, in the US, the term P2P lending has evolved into marketplace lending. In this paper, we continue to use the term of P2P lending because we study the emergence of this new business model. The volume of P2P lending has been growing rapidly. In 2015, the flow of P2P/marketplace consumer credit was equivalent to 11% of traditional consumer lending in the US (Wardrop et al., 2016).

There exist two different systems to facilitate loans on a P2P platform. The first system is called an auction-based system and was used by the lending platform Prosper in the first years of its existence. The second system, the fundraising-based system is used by The LendingClub and since 2010 also by Prosper. (Renton, 2010).

For the first system, an auction-based system, the borrower needs to specify a loan amount and maximum interest rate he is willing to borrow for. The lenders will then make bids wherein they specify how much they are willing to invest and the minimum interest rate they would like to receive. The bids of the lenders with the lowest interest rates are then used to fund the loan. The interest rate, the borrower has to pay, is the highest interest rate of the bids used to fund his loan offer. (Burkhardt et al., 2011).

As mentioned above, The LendingClub is working with the second method, a fundraising-based system. (Zhao et al., 2017). In this case, the borrower has to fulfil some requirements. After he has given some information about his income, employment and identification, The LendingClub determines the creditworthiness of the borrower and decides to issue the loan or not. Based on the credit rating, The LendingClub will give the borrower a loan offer with a fixed interest rate. (The LendingClub, 2018f). This loan offer contains the loan amount, interest rate, installment and grade of the loan. The borrower can decline or accept the offer. When the borrower accepted the proposal, The LendingClub will place the loan on the platform and investors can start investing in the loan. There is a possibility that the loan won't be fully backed by investors, but this possibility is small. (The LendingClub, 2018g). In the database we only found that 1597 loans (0,35%) were not fully funded between 2010 and 2014. If this happens, the borrower is able to cancel the loan or sign up for the partial amount.

The LendingClub provides different products for the borrowers. One of those products are personal loans. These loans can amount up to 40.000 dollar and are paid back on a monthly basis. The borrower can choose between a loan term of 36 months or 60 months. (The LendingClub, 2018h). For businesses, The LendingClub also offers business loans up to 300.000 dollars that can be paid back in one to five years. Businesses also have to opportunity to go for a credit line. (The LendingClub, 2018i). At last, The LendingClub also provides the option to refinance a car loan and to finance medical bills. (The LendingClub, 2017a).

The LendingClub is not only interesting for borrowers, but also for investors. Investors can sign up for an account of minimum 1.000 dollars and use this money to invest in notes of minimum 25 dollars. The different accounts The LendingClub offers to the investors are individual accounts, retirement accounts, a joint account, trust account, custodial account or a corporate account.

The investor is able to invest in the notes manually or opt for an automated investing strategy that is facilitated by The LendingClub. (The LendingClub, 2018j). The most interesting about investing through a P2P lending

platform is that they open up a whole new investment market for individual investors. Till now, consumer credit had been reserved for banks only. According to The LendingClub, investing in consumer credit has historical return rates of 3-8%. (The LendingClub, 2018j).

As stated in the introduction, the P2P lending market has a problem of information asymmetry. The P2P platforms are able to decrease the information asymmetry in the market by providing services that support the transfer of information between the borrower and the lender. First of all, the P2P lending platform can increase the quality and amount of information exchanged between the borrower and the lender by analysing the borrowers and providing the information to the lenders. The LendingClub collects information from the borrower and his credit file during the application process. This information is provided to the lenders with the use of the investment platform. (The LendingClub, 2018f). Additionally, The LendingClub also provides the loan offers with a loan grade that is based on the FICO score, credit score and behavioural data of the borrower. The loan grades go from A to G and have an impact on the interest rate of the loan offer. (The LendingClub, 2018k). The higher the loan grade, the higher the interest rate of the loan offer and the higher the credit risk. The loan grade can be used by the investors for their funding decision. This makes that The LendingClub evaluates the borrowers by giving each loan offer a loan grade. The final funding decision, however, still lies with the investors.

Secondly, the study of Nowak, Ross and Yench (2017) illustrate that lending platforms can decrease the information asymmetry by giving the borrowers the chance to add extra information to their loan offer. They found that the number of words or characters in the loan description decreases the information asymmetry and has a positive effect on the funding decision of the investors. More words or characters in the loan description decrease the probability of funding at first, but this relationship becomes positive in the end. Additionally, the paper also concluded that misspellings in the description decrease the likelihood of funding. (Nowak, Ross, & Yench, 2017). Until mid 2014, the borrowers of The LendingClub could lower the information asymmetry by providing additional information to their loan offer. At the moment, it is not possible anymore to add a loan description.

At last, to lower the risk of investing, The LendingClub also tries to enhance the liquidity of their notes by giving the lenders the opportunity to sell their notes through a secondary market. This secondary market is run by Folio Investing, an online brokerage company. Through this market, lenders can sell and buy notes with a shorter investment term and diversify their portfolio. (The LendingClub, 2017b)

Asymmetric information arises because borrowers are better informed than lenders of their ability and willingness to repay. In consequence, lenders are at a disadvantage. This is one of the main concerns in credit markets. Leland and Pyle Campbell and Kracaw and Myers and Majluf suggest that informational asymmetries may be a primary reason to explain financial institutions' existence. It is not easy for an individual lender to distinguish borrowers with a high probability of default from solvent ones. In consequence, a risk expert is needed and this would justify the existence of banks. The bank, at least, has historical information on its clients, or even knows them personally; whereas an individual P2P lender, screening on his computer, hardly gets a profile with some borrower's data. Information asymmetry leads to adverse selection, where lenders cannot discriminate between borrowers with different credit risks. Adverse selection may be mitigated with quality information. If P2P lending companies just put lenders and borrowers into contact with each other, the information asymmetry problem would imply that few lenders would join the P2P credit market, and these companies would have disappeared by the lack of lenders. But P2P lending sites offer information on loan quality. While disintermediation is a primary characteristic of online P2P lending, these companies are in partnership with credit rating agencies to reduce the information asymmetry problem. Miller empirically finds that providing more information improves lender screening and dramatically reduces the default rate for high-risk loans, but has little effect on low-risk loans. P2P lending sites make an effort towards transparency in their lending process. They do not only provide detailed public information about each available loan, but they also

allow downloading of historical information with all the loans funded, their characteristics and their status of being solvent or failed. This contrasts with common traditional bank practices.

2.1.2. Bank regulation and the P2P market

This part of the paper will describe the institutional environment of P2P lending in the USA, the differences in credit reporting, regulation and deposit insurance between the traditional lending market and the P2P market. The last paragraph will also analyse the impact of the SEC regulation on the P2P lending platforms.

Online lenders connect individuals or businesses wishing to obtain a loan with individuals and institutions willing to fund this loan. Online lenders encompass P2P lending platforms, which offer lending-based crowdfunding for consumers and small businesses (LendingClub, Prosper, Funding Circle) and balance sheet lenders (e.g., SoFi, OnDeck Capital, Kabbage).

In our paper, we focus on P2P lending platforms, on which multiple lenders lend small sums of money online to consumers or small businesses with the expectation of periodic repayment. Prosper Marketplace and LendingClub launched the first online P2P lending platforms in the US, respectively in 2006 and 2007, followed by other companies such as Upstart, Funding Circle, CircleBack Lending or Peerform. At the end of 2008, the Securities and Exchange Commission (SEC) issued a "cease and-desist" order against Prosper since the sale of unregistered securities represented a violation of Section 5 of the Securities Act of 1933. A month earlier, LendingClub registered its loans as securities with the SEC and induced the latter to impose such registration on all other platforms (Mariotto, 2016). LendingClub took advantage of the period during which Prosper and the other platforms were inactive while registering the loans as securities, and conquered the majority of the American market share. In December 2014, LendingClub became the first publicly traded online P2P lending platform in the US, after its Initial Public Offering on the New York Stock Exchange. As of September 2017, LendingClub has intermediated \$28 billion of loans, while Prosper issued \$10 billion of loans, about one third of its rival's volume.

Consumer loan amounts vary between a minimum loan \$500 for LendingClub and a maximum loan of \$35,000 (\$300,000 for businesses). They fund various types of projects ranging from credit card debt consolidation to home improvement, short-term and bridge loans, vehicle loans or engagement loans.

As in many other two-sided markets (Rysman, 2009), online lending marketplaces try to attract two different groups of users, namely borrowers and investors, by choosing an appropriate structure of fees that depends on the magnitude of cross-network externalities. On the borrower side of the market, both companies compete with banking institutions, credit unions, credit card issuers and other consumer finance companies. They also compete with each other and with other online marketplaces such as Upstart or Funding Circle. Platforms claim that their prices are lower on average than the ones consumers would pay on outstanding credit card balances or unsecured installment loans funded by traditional banks. Online marketplaces perform the traditional screening function of banks by defining various criteria that must be met by borrowers. Any U.S. resident aged at least 18 with a U.S. bank account and a social security number may apply and request a credit, provided that the platform is authorized in her/his state. Platforms collect online some information about the applicant (i.e., FICO score, debt-to-income ratio, credit report...), which is used to compute a proprietary credit score. Some additional enquiries may also be performed offline (e.g., employment verification). Consumers are divided into several rating segments, which correspond to different fixed interest rates ranging from 6% to 26% for LendingClub in 2014. Origination fees paid to the platform depend on the consumer's level of risk.

On the investor side, investment in online loans on P2P platforms faces potential competition from investment vehicles and asset classes such as equities, bonds and commodities. Prosper claims to offer an asset class that has attractive risk adjusted returns compared to its competitors. Investors can be divided into two different populations: individuals and institutions. Both populations are subject to different requirements. Individual investors must be U.S. residents aged at least 18, with a social security number, and sometimes a driver's

license or a state identification card number. Institutional investors must provide a taxpayer identification number and entity formation documentation. Investors' annual income must exceed a floor defined by platforms' rules. Prosper and LendingClub issue a series of unsecured Notes for each loan that are sold to the investors (individual or institutional), and recommend that each investor diversifies his/her portfolio by purchasing small amounts from different loans.

Each investor is entitled to receive pro-rata principal and interest payments on the loan, net of a service charge paid to the platform. In addition to the "Note Channel", the lending market in the United-States is subject to many regulations, which are changing continuously (e.g., State Usury Laws, State Securities Laws, Dodd-Frank Wall Street Reform and Consumer Protection Act, Truth-in-Lending Act...). Online lending platforms need to obtain a license to operate in a given state and comply with all existing regulations on consumer lending. For example, currently, LendingClub does not facilitate loans to borrowers in Idaho, Iowa, Maine, Nebraska and North Dakota, but has obtained a license in all other jurisdictions. Furthermore, state and local government authorities may impose additional restrictions on their activities (such as a cap on the fees charged to borrowers) or mandatory disclosure of information. In some states, platforms are opened to borrowers but not to investors, or vice versa. Authorizations can also differ for different suppliers.

Unlike other countries (e.g., UK, France), P2P lending platforms do not have the right to originate loans and need to have a partnership with a bank to do so. Prosper and LendingClub rely on a partnership with WebBank, an FDIC-insured, Utah-chartered industrial bank that originates all borrower loans made through their marketplaces.

An important issue is the potential violation of states' usury laws. The interest rates charged to borrowers are based upon the ability under federal law of the issuing bank that originates the loan (i.e., WebBank) to "export" the interest rates of its jurisdiction (i.e., Utah) to other states. This enables the online marketplace to provide for uniform rates to all borrowers in all states in which it operates. Therefore, if a state imposes a low limit on the maximum interest rates for consumer loans, some borrowers could still borrow at a higher rate through an online marketplace since the loan is originated in Utah. Some states have opted-out of the exportation regime, which allows banks to export the interest rate permitted in their jurisdiction, regardless of the usury limitations imposed by the borrower's state.

Each consumer has a credit reporting file that contains his personal and financial information. Every financial institution is required to provide information about the lending behaviour of its client to the reporting agencies. The information, they have to report, contains the loan amount, outstanding amount and defaults of the borrower. P2P platforms have the duty to report loans as well. (Braswell, Chernow, s.d.). The difference between financial institutions and P2P platforms is that banks also have to report the inquiry for a loan. This means that if an individual asks for credit at a financial institution, a transcript will appear on the credit reporting file. The FICO score of the individual will be affected by this transcript for 2 years, even if their loan inquiry gets turned down. (United States Government, 2016). P2P platforms promise their users to only report the loan request to the credit reporting agency after the loan is fully funded. (The LendingClub, 2017c). As unsuccessful loan inquiries will not appear on the credit file, this is a big advantage for individuals with a low credit score.

Next to the credit reporting regulation, traditional banks also have to comply to capital requirements. These requirements are set by the Basel Committee on banking supervision. The Committee was founded by the group of 10 in 1974. The group of 10 consists out of 11 different industrialised countries that collaborate together on financial, economic and monetary level. (Bank for International Settlements, 2018). Today, already 45 members joined the Basel Committee and created together the Basel I, II and III rules for capital requirements. The Basel III rules were developed after the financial crisis of 2008 and ensure that banks are more resistant to shocks in the economy and to financial distress. Countries are implementing the Basel III requirements on a gradual basis with full implementation required by 2019. The Basel III regulation obliges banks to have a minimum Tier 1

capital, a minimum liquidity coverage ratio and a minimum net stable funding ratio. (Bank for International Settlements, 2016). The goal of Basel III is to reduce the risk-taking behaviour in the banking sector and so avoid bank activities that harm the financial markets.

The first condition of the Basel III rules is the minimum Tier 1 capital. The high leverage of banks before the financial crisis has been classified as the main antecedent of the event. Therefore, Basel III forces financial institutions to maintain a minimum non-risk-based leverage ratio. The leverage ratio is composed as Tier 1 capital, which is shareholders equity and retained earnings, over total exposure. (Bank for International Settlements, 2017). This ratio constraints the level to which the institutions can leverage their equity. Empirical research by the European Central Bank indicates that the leverage ratio leads to financially stable banks. (European Central Bank, 2015).

The second requirement set by Basel III is the liquidity coverage ratio and requires banks to hold enough high liquid assets to cover its cash flows over thirty days. High liquid assets consist out of cash or assets that can be easily liquidated at low or no costs. The bank is required to hold enough of these assets to cover a liquidity stress scenario of 30 days. The Basel Committee assumes that 30 days is enough time for the banks to take the necessary actions to solve a stress situation. The ratio should not be lower than 100% in financial healthy situations. If there is a financial crisis, banks are allowed to lower the ratio below 100%, as such a high ratio can produce negative effects in crises. (Bank for International Settlements, 2013).

The third and last requirement is the minimum net stable funding ratio. Financial institutions are required to have a net stable funding ratio higher than one. The ratio is computed as the available amount of stable funding on the required amount of stable funding and obligates banks to choose its sources of funding in relation to its asset structure and off-balance sheet activities. This regulation reduces the chances that the funding of the bank will lead to a higher probability of failure and distress. The net stable funding ratio lowers the dependence on short-term funding and stimulates the banks to think about their funding risks. (Bank for International Settlements, 2014).

To conclude, the Basel III rules have quite some advantages and disadvantages. Since P2P lending platforms are not obliged to meet these requirements, they will not benefit from those advantages. Therefore, P2P lending platforms will be more vulnerable to shocks in the financial markets and to financial distress. However, not applying the Basel III rules has also some advantages. Cosimano and Hakura (2011) have found that the Basel III requirements imply higher marginal costs of funding for financial institutions as banks are required to hold more equity and equity is more expensive than debt. Consequently, banks increased their lending rates, which has led to a decline in the total amount of issued loans. This made that lenders, who couldn't obtain a loan anymore, looked for alternative financing like P2P lending. P2P lending decreases the credit rationing. The fact that P2P platforms don't need to comply with the Basel III rules, means they have lower marginal costs than banks and can give their lenders and borrowers more competitive interest rates. Investors are thus able to earn a higher rate of return by investing through a P2P lending platform. However, the absence of capital and liquidity requirements for P2P lending platforms makes that the credit and liquidity risks are transferred from the financial institution or P2P lending platform to the investors. Whenever the borrower or the lending platform goes bankrupt, the investor has to bear the costs. (Davis, Murphy, 2016).

In addition to the Basel III rules, there also exists a deposit guarantee scheme to prevent bank runs. A bank run happens when depositors withdraw their money from the bank because they believe the bank will fail. In fact, the bank run can cause a bank to fail, as the bank has to liquidate its assets very quickly in order to fulfil the withdrawals. The Diamond and Dybvig model proposes a deposit insurance scheme, provided by the government, as a solution to prevent bank runs from happening. (Diamond & Dybvig, 1983; Diamond, 2007). This model has been implemented in the USA and most banks joined the federal deposit insurance corporation (FDIC) after the great depression. The FDIC is an independent agency of the federal government that insures the deposits of bank clients up to 250.000 dollars. (FDIC, 2017). The FDIC analyses banks for operational

safety and legal compliance. Whenever a bank fails, the FDIC reimburses the deposit up to the insurance limit by either selling the deposits to another bank or issuing a check to the deposit holder. (FDIC, 2014). Such guarantees exist in most other countries as well. As P2P platforms aren't recognised as financial intermediaries and therefore cannot join such a program, they cannot give their clients a deposit insurance. This deposit insurance makes it more interesting for investors to place a deposit at a regulated banking institution instead of at a P2P lending platform. In the specific case of The LendingClub, the not yet invested cash is placed at an 'in trust for' fund at Wells Fargo Bank, an FDIC insured banking institution. This makes that the deposits of the investors are insured through a passthrough insurance of the FDIC. This means that whenever The LendingClub goes bankrupt, the deposits are still owned by the investors (The Federal Deposit Insurance Corporation, 2008). The invested notes, however, are not insured by a deposit insurance. (The LendingClub, 2017c).

In 2008, the US Securities and Exchange Commission (SEC) issued a cease- and-desist proceeding against Prosper. The SEC decided that P2P loans were securities and therefore had to comply with Section 8A of the Securities Act of 1933. (SEC, 2008). This means that it is forbidden to sell P2P loans without an approved registration and a regularly updated prospectus. The SEC regulation brings a huge cost and complexity for the platforms and is also a big entry barrier for future start-ups. Only Prosper and The LendingClub managed to survive the transition in the US P2P market. This is mainly because they already had been operating for a few years before the filing and were backed up by venture capital. They had enough money to survive the transition period. No start-up will ever have the chance to be operating and profitable before they have to comply to the SEC filing. This SEC filing increases the start-up costs for a P2P lending platform as the platforms have to pay the costs of doing a public offering without the capital advantages. For start-ups, it is particularly hard to fulfil these costs before doing business. They haven't had the time to build up a user's base and trust from venture capitals. Unlike the US, such a regulation does not yet exist in Europe. (Slattery, 2013). The SEC filing might not be the best solution for the P2P platforms, but regulation was needed. Before the SEC filing, lenders could access risky loans without having decent information. However, too strict regulation can decrease the growth of the industry. (Magee, 2011).

To conclude, not being a traditional bank has three advantages. Firstly, P2P lending platforms don't need to fulfil capital requirements that increase the cost of funding. Secondly, they do not require a big infrastructure network that comes with huge fixed costs. Lastly, there is no need for required legal administration processes. However, all this comes with the disadvantages of being more prone to shocks in the financial economy and not being able to offer the investors a deposit insurance. In the USA, it also comes with the obligation to comply with the rules of the Security Act and so with extra costs.

2.2. Default risk

The most relevant risk in lending for lenders is always default one. P2P lending is accompanied with some unique risks compared to traditional lending that make it riskier for lenders to invest. For example, platform default, fraudulent activities and cybercrime can decrease profitability due to loan default (Kirby & Worner, 2014). Some papers suggest more regulation as well as bank involvement for P2P platforms in order to decrease potential risks (e.g. Galloway, 2009). P2P lending also differs from traditional lending in terms of monitoring of borrowers. While banks and other financial intermediaries can observe bank account activities somehow (Gorton & Winton, 2003), P2P platforms do not. Information asymmetry in moral hazard increases and must be handled by investors. This construct is expected to influence the ex-post risk of loan success and default.

P2P lending is risky for investors, because loans are not secured. A chance to get a more profitable outcome out of every investment, therefore, is to decrease the information asymmetry between borrowers and investors and use loan specific information and borrower characteristics as provided by the P2P lending platform. LendingClub, for example, delivers a wide range of data concerning the borrowers and their credit history. Furthermore, every borrower is categorised into a credit grade ranging from A to G with the expected lowest

risk in credit grade A. Lenders use this information to estimate the default probability of a specific loan and decide on whether the loan is attractive to fund or not.

Most of research in this area is based on the data from the United States' or China's p2p market. For ex., R. Emekter et al. (2015) studied credit risk and loan performance in "LendingClub" p2p platform (USA). Authors revealed that the credit rating given by the platform operator predicts possibility of borrower's default (positive effect). While DTI and number of open credit positions had a statistically significant negative effect. The effect of open credit positions shows that, the more open positions borrower has, the lower his probability to default. It can be partly explained that those open positions can be loans for refinancing of previous ones. DTI effect on default probability can be interpreted as out of scope result, because the higher the DTI (which is bad signal), should be related with higher probability of default. Similar results achieved by the C. Serrano-Cinca et al. (2015). M. Malekipirbazari and V. Aksakalli (2015) examined default probability in "LendindClub" platform. Y. Guo et al. (2016) evaluated that the ownership status has a biggest and positive impact on default probability, meaning that if debtors do not own real estate but rent it, the credit risk is higher ("LendingClub" and "Prosper" data).

Iyer et al. (2009) found credit score, number of current delinquencies, total delinquencies, debt-to-income ratio and loan amount as significant determinants. Furthermore, some non-standard variables like membership in a group were explored as influential predictors for loan default. Everett (2015) stated credit score, borrower age, home ownership, endorsements as well as loan amount as significant for predicting the default risk of P2P loans. Guo, Zhou, Luo, Liu and Xiong (2016) used kernel regression for finding the risk determinants of FICO score, number of inquiries in the last six months, loan amount, homeownership and debt-to-income ratio. However, Iyer et al. (2009) and Everett (2015) used data from P2P lending platform Prosper.com while Guo et al. (2016) focused on a relatively small sample of only 2,016 LendingClub loans and 4,128 loans from Prosper.com. Since Prosper.com uses a Dutch auction mechanism in order to fund loans, the studies, samples and determinants of loan success seem inappropriate to compare with the data gathered from LendingClub.

Studies that focus on LendingClub data and analysed the determinants of loan default are Emekter et al. (2015), SerranoCinca, Gutiérrez-Nieto, and López- Palacios (2015), Carmichael (2014) and Li, Yao, Wen and Yang (2016). They all used similar approaches and logistic regressions, however, results differ and the determinants of default vary. In all papers, except of Li et al. (2016), credit grade is the most predictive determinant. Furthermore, debt-to-income ratio, FICO score and revolving credit line utilisation are mentioned in three studies. The discrepancy between such studies can be explained on the basis of three factors. Not all studies used the same variables and control variables as coefficients for the regression models. Small differences in the used research methods also bear reasons for various outcomes. Serrano-Cinca et al. (2015) used a survival analysis with 33 Cox regressions, followed by a logistic regression whereas Emekter et al. (2015) only focuses on a binary logistic regression. The third aspect why determinants of loan default differ is data itself. Different loan maturities, time frames and loan status are used which can lead to diverse outcomes.

Another part of studies analyses borrowers' default risk in China's p2p platforms. For example, X. Lin et al. (2017) examined relationship between credit risk factors and debtor's default in "Yooli" platform.

2.3. Borrower characteristics

The first category is the borrower characteristics. This information is provided by the borrower and is used, by The LendingClub and the investors, to assess the credibility of the borrower. The main variables in this category are the 'annual income', 'employment length', 'homeownership', 'verification status' and the control variable 'state'. With these variables the investor can assess the repayment capacity of the borrower. Therefore, these variables will be included into the regression to see if the repayment capacity and the characteristics of the borrower have an impact on the probability of loan default.

The variable 'annual income' contains the amount of annual income the borrower reported during the registration process. The values of the variable annual income range from 3.000 to 240.000 in the dataset. (The LendingClub, 2018d).

The variable 'employment length' contains the years of working experience the borrower reported. The values in Employment length range from the value '<1 year' to the value '10+years'.

The variable 'homeownership' contains information whether or not the borrower owns, rents or has a mortgage on his house. This variable is also considered in the assessment of the loan grade and credibility of the borrower. The value of the variable will be '1' when the borrower owns its house or has a mortgage on his house and will be '0' for all the other options.

After the information about the 'annual income', 'employment length' and 'homeownership' has been provided. The LendingClub asks the borrower to verify this information with official documents. If the information is verified the value of the variable 'verification status' will be '1' if not it will be '0'.

Next to homeownership, The LendingClub also asks information about the 'US state' where the borrower lives. This is important as The LendingClub has to comply with the laws and regulations in every state. They are not allowed to issue loans everywhere. Further, they also need the address of the borrower to access their credit file. This variable will be used as a control variable in the regression.

Serrano-Cinca, Gutiérrez-Nieto & Lopez-Palacios (2015) reinforce the findings of Emekter and Carmichael with their study. They also found that 'the loan grade', 'interest rate', 'purpose' and 'annual income' are significant determinants of loan default. Additionally, their study discovered that 'credit history', 'homeownership' and 'borrower indebtedness' have a meaningful impact on the loan performance. Regarding the loan purpose, it is clear that loans for a 'wedding' are the least risky. Loans for 'small business' are the riskiest. (Serrano-Cinca et al.,2015).

Dietrich and Wernli (2016) showed that borrower-specific factors such as its economic status significantly influence lender evaluations of the borrower's credit risk and thus the interest rates offered.

2.4. Loan characteristics

The second category is the loan characteristics. The main variables in this category are the 'loan amount', 'purpose', 'loan grade', 'loan term' and 'year'. These variables contain information about the specific loan request and are computed by The LendingClub out of the information provided by the borrower. After all these variables has been specified, The LendingClub will give the borrower a loan offer. This offer contains the loan amount, loan term, loan grade, interest rate and installment.

The first variable is 'loan amount'. The borrower needs to specify the total amount he wants to borrow. Borrowers can lend up to 40.000 dollars and businesses can lend up to 300.000 dollars. Based on these variables and the computed credit score, The LendingClub sets an interest rate and installment for the loan offer.

The following loan characteristic in the dataset is 'purpose'. After the loan amount has been determined, the borrower has to specify his reason to apply for a loan. The variable purpose has 14 different values. The possible loan purposes are: 'car', 'credit card', 'debt consolidation', 'education', 'home improvement', 'house', 'major purchase', 'medical', 'moving', 'renewable energy', 'small business', 'vacation', 'wedding' and 'other'.

The next loan characteristic is the 'loan grade'. To lower the information asymmetry on the platform, The LendingClub has made a grading system for their loans. Every loan gets a grade from 'A' to 'G'. Loans with the grade A are loans with a low risk and have therefore a low interest rate. Loans with grade G have a high risk and a higher interest rate. The value of the loan grade depends on the borrower characteristics and loan characteristics of the loan offer.

Additionally, the borrower also has to define the 'loan term' he prefers. The borrower can choose between a loan term of 36 months and a loan term of 60 months. The variable 'loan term' will have the value '0' if the loan term is 60 months and '1' if the loan term is 36 months. This variable will be used to split the dataset into 2 subsamples. A subsample of loans with a term of 36 months and a subsample of loans with a term of 60 months.

At last, there is also a variable 'id' and 'issued'. The 'id' is a unique number allocated to each loan by The LendingClub. This makes it possible to see if a loan occurs more than once in the dataset.

As this is not the case, there is no need to control for clustering. The variable 'issued' contains the date of issuing of the loan. This variable will be used to compute a new variable 'year' that contains the year wherein the loan is issued and is used as a control variable in the regression.

Some researches discussed the determinants of the default risk at the p2p lending business. According to Emekter, R. (2014) and Serrano-Cinca C. (2015), the credit rate giving by p2p lending platforms themselves has the most definite impact of the default risk of loans. Other variables such as loan amount, the purpose of the borrower, household ownership, loan amount, purpose... also have an impact of default risk (Serrano-Cinca C. et al., 2015).

Majority of authors revealed that loan term, education level and years of experience has a negative effect on probability of default. It is in line with the theory, because the more experience or the higher education person has, the bigger is the probability, that a person's income will be higher, or in case of employment, return to the labour market would be quicker. For borrower's personal characteristics, such as gender and age, the effect is still uncertain, because of contradictory study outcomes. Same uncertain effect is for the financial determinants like loan amount and interest rate or DTI (debt-to-income ratio).

In case of positive effect to borrower's default, these results would signalize rational behaviour. For example, higher loan amount and higher interest could be related with the higher borrower's expenses, which, in times of recession, would be the reason of default. For DTI, positive effect shows, that the borrower's disposable income is reduced by existing loan(s) repayments. In addition, if person has dependents (children), this residual value of income is tightened even more.

REFERENCES

- i. Akerlof, A. (1970). *The Market for "Lemons": Quality Uncertainty and Market*
- ii. *Mechanism. The Quarterly Journal of Economics*, 30(3), 488-500.
- iii. Arnott, R., Stiglitz, J. (1988). *The Basic Analytics of Moral Hazard. The Scandinavian Journal of Economics*, 90(3), 383-413.
- iv. *Bank for International Settlements. (2013). Basel III: the liquidity coverage ratio and liquidity risk monitoring tools. Retrieved March 27, 2020, from <https://www.bis.org/publ/bcbs238.pdf>*
- v. *Bank for international Settlements. (2014). Basel III: the net stable funding ratio. Retrieved April 20, 2020, from <https://www.bis.org/bcbs/publ/d295.pdf>*
- vi. *Bank for International Settlements. (2016). History of the Basel Committee. Retrieved April 20, 2020, from <https://www.bis.org/bcbs/history.htm>*
- vii. Bertsch, C., Hull, I., Qi, Y., Zhang, X., (2018). *The role of trust in online lending. Retrieved April 19, 2020, from https://cepr.org/sites/default/files/BHQZ_2018_CEPR.pdf*
- viii. Bewick, V., Cheek, L., Ball, J., (2005). *Statistics Review 14: Logistic regression. Critical Care*, 9(1), 112-118. Doi: 10.1186/cc3045.5
- ix. *Braswell, G., Chernow, J. Consumer Credit Law & Practice in the U.S. Burkhardt, F., Bachmann A., Becker, A., Buerckner, D., Hilker, M., Kock, F.,*
- x. *Tiburcios, P., (2011). Online Peer-to-Peer lending: A literature review. Journal of internet banking and commerce*, 16(2).
- xi. *Carmichael, D. (2014). Modeling Default for Peer-to-Peer loans. Retrieved*

- xii. March 27, 2020, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2529240
Cosimano, T., Hakura, D., (2011). *Bank Behavior in Response to Basel III: A Cross-Country Analysis*. (IMF Working Paper no. WP/11/119). Retrieved from <https://www.imf.org/external/pubs/ft/wp/2011/wp11119.pdf>
- xiii. Covitz, D., Heitfield, E., (1999). *Monitoring, Moral Hazard and Market Power: A Model of Bank Lending*. (FDES Working Paper No. 99-37). Available at SSRN: <https://ssrn.com/abstract=186150>
- xiv. Davis, K., Murphy, J. (2016). *Peer to Peer lending: structures, risks and regulation*. <http://kevindavis.com.au/secondpages/acadpubs/2016/JASSA%20Paper%20-%20P2P%20Lending%20-%20Davis%20and%20Murphy%20-%20final.pdf>
- xv. Dhand, H., Mehn, G., Dickens, D., Patel, A., Lakra, D., McGrath, A., (2008). *Internet based social lending*. *Communications of the IBIMA*, 2, 109-114.
- xvi. Diamond, D. (2007). *Banks and Liquidity creation: A simple exposition of the Diamond-Dybvig Model*. *Economic Quarterly*, 93(2), 189-200.
- xvii. Diamond, D., Dybvig, P. (1983). *Bank runs, Deposit Insurance, and Liquidity*. *The Journal of Political Economy*, 91(3), 401-419.
- xviii. Emekter, R., Tu, Y., Jirasakuldech, B., Lu, M. (2015). *Evaluating credit risk and loan performance in online peer-to-peer (P2P) lending*. *Applied Economics*, 47(1), 54-70. doi:10.1080/00036846.2014.962222
- xix. Federal Deposit Insurance Corporation. (2014). *Deposit insurance FAQ*. Retrieved March 28, 2020, from <https://www.fdic.gov/deposit/deposits/faq.html>
- xx. Federal Reserve. (2018). *Consumer Credit – G.19*. Retrieved April 4, 2020, from <https://www.federalreserve.gov/releases/g19/current/>
- xxi. Herzenstein, M., Andrews, R., Dholakia, U., Lyandres, E., (2008). *The democratization of personal consumer loans? Determinants of success in online peer- to-peer lending communities*. *Boston University School of Management Research Paper*, 14(6).
- xxii. Herzenstein, M., Dholakia, U., Andrews, R., (2010). *Strategic Herding Behavior in Peer-to-Peer Loan Auctions*. *Journal of Interactive Marketing*, 25(1), 27-36.
- xxiii. Hölmstrom, B. (1979). *Moral Hazard and Observability*. *The Bell Journal of Economics*, 10(1), 74-91.
- xxiv. Hulme, K., Wright, C., (2006). *Internet based social lending: past, present and future*. *Social Futures Observatory*. 115.
- xxv. Magee, J. (2011). *Peer-to-peer lending in the United States: Surviving after Dodd-Frank*. *North Carolina Banking Institute*, 15(1),
- xxvi. McMillan, J. (2014). *The end of banking: money, credit, and the digital revolution*. Zurich: Zero/OneOn
- xxvii. Nowak, A., Ross, A., Yench, C. (2017). *Small business borrowing and peer-to-peer lending: evidence from LendingClub*. *Contemporary Economic Policy*. Doi: 10.1111/coep.12252