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Peer-to-Peer Lending – A (Financial Stability) Risk Perspective

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Abstract

The aim of this paper is to discuss P2P lending, a subcategory of crowdfunding, from a (financial stability) risk perspective. The discussion focuses on a number of dimensions such as the role of soft information, herding, platform default risk, liquidity risk, and the institutionalization of P2P markets. Overall, we conclude that P2P lending is more risky than traditional banking. However, it is important to recognize that a constant conclusion would be misleading. P2P platforms have evolved and changed their appearance markedly over time, which implies that although our final conclusion of increased riskiness through P2P markets remains valid over time, it is based on different arguments at different points in time. In addition, we discuss that acting on P2P online platforms satisfies most possible definitions of shadow banking and shows significant similarities with many observed aspects of shadow banking. We thus infer that P2P lending can be considered part of the shadow banking sector.

JEL Classification:

F34, G21, G23

Keywords:

Peer-to-peer lending, crowdfunding, financial development, financial stability risk, shadow banking

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1. Introduction

Every now and then financial innovation has the potential to dislocate the equilibrium on financial markets. Unfortunately, market participants are typically uninformed about the properties of a novel investment opportunity, thus possibly overestimating returns and underestimating risks. This uncertainty applies to individual aspects of each innovation, but even more so to the aggregated consequences of an expansive use of this innovation on financial markets. Therefore, significant threats to financial stability may emerge.

A decade ago, Rajan (2005) thus asked whether financial development had made the world riskier. He argued specifically that financial development impacted on financial manager incentives and, as a result, on the risks taken by the financial system with potentially disastrous consequences. Technical change, regulatory change, and institutional change led to more arm's length lending relationships and to more transactions being carried out on financial markets. Risks were spread more widely among those markets, and market participants had to rely increasingly on their proper functioning.

Rajan's fears proved true when the financial markets were 'slapped by the invisible hand' (Gorton 2010) during the US subprime crisis. Gorton identifies the changes that have occurred on financial markets as the root of the crisis. In particular, he highlights increased arm's length lending, greater demand for safe collateral, as well as securitization as significant factors in favor of the shadow banking system. The most impressive conclusion to be drawn from those investigations is that a disastrous financial meltdown may result when most observers – even those pointing to existing risks, as Rajan (2005) did – still estimate the probability of a catastrophic event as small.

Against this background, our paper explores the (financial stability) risk implications of a new kind of financial development. Crowdfunding, in particular in the shape of internet-based peer-to-peer (P2P) lending, has shown impressive growth rates in recent years and in some respects resembles the shadow banking system that led to the subprime crisis. Having said that, its overall magnitude is still diminutive compared to the overall size of the total financial market. As a result, a few observers (see, e.g., Kirby and Worner 2014 or Wei 2015) claim that P2P lending may pose a systemic risk only if it keeps growing at the same rate. This

paper, therefore, elaborates on the general risk implications of P2P lending. In addition, it also hints at possible financial (in)stability concerns.

This paper is innovative for three reasons. First, it is one of the very few attempts to discuss P2P lending from an explicit (financial stability) risk perspective. Our discussion indicates that P2P online lending is riskier than traditional banking in a number of dimensions. Hence, it remains the task of regulatory bodies to address the risks of this kind of financial market activity in a reasonable way. Second, the discussion on risks of P2P lending also shows that a constant conclusion would be misleading. P2P platforms have evolved and changed their appearance markedly over time, which implies that although our final conclusion of increased riskiness through P2P markets remains valid over time, it is based on different arguments at different points in time. Third, it is the only paper to discuss in-depth whether P2P lending is actually part of the shadow banking system. Acting on P2P online platforms satisfies most possible definitions of shadow banking and shows significant similarities with many observed aspects of shadow banking. We thus infer that P2P lending can be considered part of the shadow banking sector.

A small number of papers resemble our research. The work of Kirby and Worner (2014) has the most similarities with our paper, because some of the possible (systemic) risk factors of crowdfunding we also elaborate on are mentioned and briefly discussed by them. Agrawal et al. (2014) and Belleflamme et al. (2015) discuss a number of aspects related to our paper, but they look at crowdfunding from a broader economic perspective without an explicit focus on risk. Finally, GAO (2011) and EBA (2015) provide policy statements on P2P lending and cluster its most prominent risks into credit risk, market risk, liquidity risk, operational risk, as well as legal and reputational risk.

The paper is structured as follows. Section two provides basic information on the P2P lending markets as well as the shadow banking system and concludes that P2P lending may indeed be attributed to the shadow banking sector. Section three represents the gist of this article and discusses several aspects of risk accompanying P2P markets. This section implicitly differentiates between the early years of P2P lending, relying on many studies that examine the impact of individual loan attributes on loan default, and the more recent years, where platform lending increasingly resembles institutionalized marketplace lending instead

of P2P lending. This implicit distinction also highlights the differing conclusions concerning risk drivers over time. Section four concludes.

2. Shadow Banking and Peer-to-Peer Lending

2.1 Peer-to-Peer Lending

Internet-based crowdfunding has gained a lot of attention in recent years. The main idea of all crowdfunding subcategories is that a fundraiser receives *funding* for his project through a large number of small amounts from a basically anonymous mass of funders, the so-called *crowd*. According to Kirby and Worner (2014), e.g., the subcategories of crowdfunding can be disaggregated into community crowdfunding and financial return crowdfunding. The former category centers on funding with a mostly social focus. Lenders provide funding as a donation for projects they would like to see realized, or in return for mostly nonfinancial benefits. The latter category centers instead on funding in return for financial benefits. Equity crowdfunding, or crowdfunding, encompasses funders acting as equity investors, i.e., they can be seen as shareholders of the funded company. The second subcategory of financial return crowdfunding – with outstanding importance for our work – is P2P lending, or crowdlending, because it strives to bypass traditional commercial banks. In general, internet-based platforms match borrowers and lenders, with lenders deciding for themselves which projects they would like to fund. As with traditional lending, borrowers have to pay interest in return for the lenders' capital. This paper focuses on P2P lending because it is the subcategory with the most similarities to the traditional, risk-sensitive lending process.

From a global perspective, the total P2P market is estimated to be in the region of USD 6.4 billion, with the US accounting for 51%, China for 28%, and the UK for 17% as of September 2013 (Kirby and Worner 2014). As one would expect, estimations concerning the size of crowdfunding in general and P2P lending in particular differ. Observers at least agree that P2P lending approximately doubles every year, both in the US and in Europe (see, e.g., Nash and Beardsley 2015 as well as Zhang et al. 2015). As of 2014, Belleflamme et al. (2015) already report the size of worldwide P2P lending to be around USD 11 billion. European P2P consumer lending was estimated to be around EUR 275 million in 2014 (excluding the UK). However, the UK is the most important crowdfunding market in Europe and accounted for three-quarters of it (Zhang et al. 2015). In sum, those estimations suggest that the overall

size of P2P lending is still negligible compared to traditional banking. Given global bank assets of around USD 127 trillion as of 2013 (IMF 2015), P2P lending is only 0.05% of the global bank sector's size. Hence, it would definitely take some time before crowdlending makes a perceptible impact as compared to traditional banking, even if it keeps doubling every year.

One of the outstanding differences between P2P lending and commercial banking is the question of who bears the risk of a loss if the debtor does not repay his loan. In traditional banking, this loss is borne by the bank. Depositors, as the creditors of the bank, are again protected by the bank being required to hold regulatory capital. If the bank nevertheless experiences severe problems, deposit insurance steps in to avoid losses for savers. P2P lending works differently. Lending platforms mediate between borrowers and lenders without incurring the risk of the loss, i.e., risk remains with the final investor instead with a potentially fragile intermediary, which makes P2P lending initially attractive from a systemic risk perspective (see, e.g., *The Economist* 2015). As a result, screening and monitoring tasks are different from commercial banking, as will be investigated in more detail in the remainder of this paper. However, distinct in-detail conclusions depend on the exact business model of the respective platform which is, in turn, strongly influenced by different national regulations concerning loan origination.

Under the prevailing business model in the US, the notary model, the platform matches borrowers and lenders and transfers the loan amount to a partner bank. This bank originates a traditional consumer loan to the borrower, sells a note to the platform, and the platform sells this note to the lender. The borrowers' repayments are then collected by the platform and returned to lenders (GAO 2011, Kirby and Worner 2014). Under the client segregated account model, no bank is required and loan contracts are directly set up between borrowers and lenders. As a result, this setup leaves less room for the inclusion of and dependency on the platform (Kirby and Worner 2014). Further refined alternatives of those basic models exist, as described by EBA (2015). It is, for instance, conceivable that platforms generate loans to borrowers themselves and pay guaranteed returns to lenders (Kirby and Worner 2014). However, we believe that this kind of lending would in fact be 'real' banking with a true intermediary.

Due to its outstanding importance in the US as the largest P2P market, we illustrate the functionality of P2P lending using the example of the notary model. This business model mirrors the situation at 'Prosper', which is one of the most important US P2P platforms.¹ Successful funding projects receive a loan from 'WebBank', a Utah-chartered industrial bank. The promissory note underlying this loan is afterwards sold by WebBank to 'Prosper Funding LLC' (PFL). PFL, in turn, sells the note to the respective lenders against funds stored in accounts at Wells Fargo Bank before. The ongoing servicing of transactions like, for instance, managing loan repayments, is conducted by 'Prosper Marketplace, Inc.' (PMI), with PFL being a wholly-owned subsidiary of PMI. Concerning the claims of borrowers, the situation is as follows: Lenders have no claims against the respective borrower of their funded loan. Instead, the note structure implies a special, limited claim against PFL, but only to the extent PFL receives payments from the borrower. If the borrower stops his payments, the lender may receive nothing at all, although Prosper is committed to pursue 'reasonable collection efforts'. Moreover, the lender is not allowed to collect the outstanding amount on his own. Thus, he is dependent on the collection efforts of the platform.

As regards an example from Germany, the P2P market leader 'auxmoney' operates as a pure loan broker. After borrowers and lenders have been matched by the platform, the borrower and auxmoney agree on a credit brokerage contract.² A loan is then set up between the borrower and SWK bank, who serves as auxmoney's banking partner. Afterwards, SWK and each lender agree upon an assignment of claims, which implies that all claims against the borrower pass over to the lender in a performance upon counter-performance transaction with the lender transferring the purchasing price – which is equal to his loan share – to SWK. As opposed to the US model, the claim of the lender is against the borrower, not against the platform.³ This transaction also requires the lender to sign a servicing agreement with CreditConnect. CreditConnect is a 100% subsidiary of auxmoney and is responsible for all

¹ The information on Prosper's business model are taken from the investment prospectus as of 2016-02-15, published on: https://www.prosper.com/Downloads/Legal/Prosper_Prospectus_2016-02-15.pdf (11.03.2016)

² Information on the contracts and agreements used on auxmoney (credit brokerage contract, loan contract, assignment of claim, servicing agreement) can be found in the respective pdf-files at <https://www.auxmoney.com/agb> (08.03.2016)

³ Moreover, the claim is evidently not a 'note' in the sense of US regulation. Hence, the classification to the notary model (as derived from the properties of a note by Kirby and Worner (2014)) is debatable. However, the large number of similarities in the remaining business models of Prosper and auxmoney lead us to conclude that this classification is nevertheless justified.

administrative matters of the loans and collects payments from borrowers.⁴ This, in turn, implies that the lender is not necessarily aware of the real identity of the borrower, and he is not allowed to contact the borrower even if he does have contact information. Interestingly, the servicing agreement also mentions that the cooperation of SWK as regards the collection of payments from the borrower is still required.⁵ After the regular payment has been made, the amount is transferred to the lenders account at 'biw AG', which is another partner bank of auxmoney.⁶ Finally, CreditConnect is also authorized to instruct SWK to terminate the loan in case of non-payment by the borrower and to enforce claims by legal action. However, the main message behind those admittedly complex structures remains simple, in case of Prosper just as in case of auxmoney: investment risk rests with the lender.

Several aspects are symptomatic for P2P lending, although the details depend on the respective business model of each platform.⁷ The platform side earns by mediating and servicing loans. Thus, up-front fees like application and origination fees represent a very important revenue source to them. Moreover, platforms mainly charge annual administration fees as well as fees for late repayment (see Borello et al. 2015 or Kirby and Worner 2014). On the customer side, crowdlending relies on small amounts to fund loans. Members of the crowd can participate in a given loan with amounts as small as USD 25, thus implying that diversification is a frequently cited benefit of P2P lending. Moreover, the loans made are usually simple, fixed-rate personal loans with maturities around three to five years for a wide range of short-term private purposes like, e.g., credit card/debt consolidation, auto loans, or home improvement. Of course, peer-to-business-lending (P2B) also exists. Importantly, loans are typically unsecured, thus increasing the importance of a proper risk assessment through screening and monitoring. In the early days of P2P lending, risk assessment was largely attributed to lenders. Borrowers provide information on their credit score, income, former delinquencies, the purpose of the loan, and more personal information like pictures, ethnicity, place of residence and the like. Lenders, in turn, were required to browse through the

⁴ <http://www.creditconnect.de/site/ueberuns.php> (08.03.2016)

⁵ Both the Prosper and the auxmoney business model clarify that banks are still required for the creation of credit due to numerous regulatory requirements. Hence, although platforms strive to substitute banks, they are not yet able to replace them completely.

⁶ <https://www.auxmoney.com/infos/anlagekonto> (08.03.2016)

⁷ We pick up most of these aspects and discuss their risks in greater detail in section 3. A nice overview on the characteristics of P2P lending is provided, e.g., by Nash and Beardsley (2015). Details on the empirics of European platforms' characteristics are provided by Borello et al (2015). Unfortunately, their sample is biased through the exclusion of platforms not providing information in English.

universe of loan listings and choose a creditworthy borrower, the corresponding amount as well as the lowest interest rate they would be willing to accept. Auction bids were sorted according to their interest rates, and if enough lenders were willing to bid on a loan, the loan was made. If there were more bids than needed to fund the loan, only the lenders bidding the lowest interest rates participated in the loan. If, in contrast, the loan did not receive enough bids to reach the intended funding amount, no loan was made. However, lenders made significant mistakes in their risk evaluations under the auction model, thus resulting in very high default rates. As a consequence, many platforms, among them Prosper and Lending Club as the most important US platforms, nowadays employ a fixed rate model. Under this approach, the platforms conduct the risk evaluation through secret algorithms and assign interest rates to a given loan request. Lenders can then decide whether to invest or not.

It is worth asking why P2P lending exists at all.⁸ To begin with, technical innovation fostered financial innovation, which means that the development of the internet and the general emergence of matching-platforms in the last decade did not pass banking by. The emergence of P2P lending mainly benefited from the idea that it made both borrowing and lending more attractive by cutting out banks as middlemen and replacing them with platforms as more efficient intermediaries.⁹ This is particularly relevant for two reasons (see, e.g., Jackson 2013). First, from the lenders' perspective, gaining parts of the banks margin is especially interesting with all-time low interest rates on bank deposits. Second, from the borrowers' perspective, banks were forced to deleverage in the wake of the subprime crisis. As a result, borrowers found it difficult to obtain loans and were forced to try P2P lending as alternatives to traditional lending. Moreover, the social component also played a role in the emergence of P2P lending. Some investors are interested in allocating their money by themselves, enjoy the interaction with borrowers and other lenders, or seek to formalize lending to their friends. Crowdfunding offers them such an opportunity. Finally, the evolving character of P2P lending is attractive for some lenders in terms of regulatory arbitrage. As an example, P2P lending platforms or lenders are typically not required to hold regulatory capital, which

⁸ Several authors emphasize different factors favoring the development of crowdlending. Overviews are provided, e.g., by Kirby and Worner (2014) as well as Nash and Beardsley (2015).

⁹ The question of whether P2P platforms are indeed more efficient than banks is interesting by itself. If platforms are cheaper (which is a typical platform claim, but recently challenged by Nash and Beardsley (2015)), but more risky than banks, efficiency is hard to evaluate. Moreover, cost efficiency does not necessarily imply overall efficiency due to higher search costs in P2P lending.

stands in sharp contrast to traditional banking. Besides capital regulation, crowdlending is in general still lightly regulated, and as a result, the lack of costly regulatory compliance is one aspect that gives platforms a competitive advantage over traditional banks, leading to lower barriers to entry. At the same time, regulatory arbitrage remains limited from a global perspective due to the fact that P2P lending is typically confined to national borders. This means that, for instance, only people residing in the USA are allowed to invest on US-American P2P lending platforms with investor requirements even differing across the different US states, which leads to a regionally segmented market structure.

Interestingly, national P2P regulation is extremely heterogeneous. Thus, it would be beyond the scope of this paper to elaborate in detail on regulatory practices in individual countries.¹⁰ It is interesting to note that regulatory practices cover the whole spectrum from the absence of any regulation in countries without significant P2P markets, the application of securities regulation (USA), regulation with some similarities to banks and intermediaries (Germany, France), up to complete prohibition. However, intermediate approaches dominate in most countries, and the majority of important P2P countries (as, e.g., UK) are currently about to implement specific regulations for this new kind of lending.

2.2 Shadow Banking

The shadow banking system forms a part of the financial markets that has gained significant importance in the analysis of the US subprime crisis. There is a large number of estimations investigating its size. They usually agree on the observation that the shadow banking system is of greater importance in the US than in Europe, both in absolute and relative terms. Bak-Simon et al. (2012) estimate the European shadow banking system to be in the region of EUR 10.8 trillion in 2011, while the US shadow banking system is estimated at around USD 15 trillion in 2011. Moreover, they observe significant heterogeneity among euro area countries regarding the relative importance of the respective national shadow banking sector. The FSB (2014) estimates the global shadow banking system in 2013 to be in the region of USD 34.9 trillion, with the US representing by far the largest shadow banking sector (around USD 25

¹⁰ An extensive, but also two-year old overview on global regulatory practices is provided by Kirby and Worner (2014). The classification of regulatory regimes prevailing in different countries in this paragraph rests upon their work. An up-to-date discussion on the applicability of currently existing EU directives is provided by EBA (2015), concluding in particular that P2P lending is not adequately covered by existing EU legislation, whereas regulatory practices in individual European countries are briefly discussed by Zhang et al. (2015).

trillion). As compared to global bank assets of around USD 127 trillion as of 2013 (IMF 2015), shadow banks are definitely significant players on the financial market.

However, besides severe data limitations concerning the measurement of shadow banking, most investigations emphasize that it is far from clear which entities or activities should be counted as shadow banking.¹¹ This is also reflected by the wide range of possible definitions. The term ‘Shadow Banking’ was first coined by McCulley (2007) and covers non-banks conducting maturity transformation, i.e., funding themselves with short-term instruments to invest in longer term assets to take advantage of the yield curve’s upward slope. Building upon this first reference, a number of complementary shadow banking definitions emerged. The most commonly used definition is provided by the FSB (2014) and focuses on ‘credit intermediation involving entities and activities outside the regular banking system’. However, this – admittedly ill-suited – definition suffers from the lack of an exact demarcation, because traditional banks and shadow banks are often closely intertwined (Claessens and Ratnovski 2014). According to this definition, P2P lending presumably fits into the shadow banking sector, because from an entity-based perspective, its credit intermediation process falls outside the ‘regular’ banking system.¹² Being somewhat more concrete, Claessens and Ratnovski (2014) describe shadow banking as ‘all financial activities, except traditional banking, which require a private or public backstop to operate’. This latter definition also comprises the exclusion of traditional banking activities, but in addition, it also points to the need of external backstops provided by private or public institutions. Backstops are necessary whenever systemic risks emerge that are too large to be borne by market participants themselves, for instance, through low margins and the lack of regulatory capital requirements. As will be shown in section 3.3, Verstein (2012) suggests a limited profitability of the major platforms Prosper and Lending Club. Thus, we conclude that this property also fits the

¹¹ Bakk-Simon et al. (2012) focus on the segment of ‘other financial intermediaries’ (OFIs) in the ECB statistics, which comprises financial institutions except from ‘monetary financial institutions’ (MFIs) – traditional banks, central banks, and money market funds (MMFs) – and ‘insurance corporations and pension funds’ (ICPFs). Hedge funds are excluded by them as well, although this is as debatable as the exclusion of ICPFs, because both kinds of entities (increasingly) conduct bank-like activities. As a result, the final estimation of the shadow banking sector by Bakk-Simon et al. (2012) includes the OFI sector and MMFs.

The FSB (2014) first estimates the financial assets of OFIs (including also, e.g., hedge funds) and then performs a ‘narrowing down’ exercise and excludes entities not involved in bank-like credit intermediation, entities consolidated in a banking group, and entities whose activities do not exhibit risks.

¹² The previous subsection illustrated that the designation ‘outside the regular banking system’ fits to the P2P lending property of being outside the ‘common’ banking system. In contrast, the designation of crowdlending as being outside the ‘regulated’ banking system is only partly applicable.

definition of shadow banking, because lending platforms do not seem to be able to build up the significant reserves required for the risky intermediary business themselves. Finally, Pozsar et al. (2013) define shadow banks as ‘financial intermediaries that conduct maturity, credit, and liquidity transformation without explicit access to central bank liquidity or public sector credit guarantees’. This definition is the most concrete in two respects.

First, it examines the characteristics of public guarantees in more detail. Traditional banks have access to central bank liquidity measures as well as to deposit insurance mechanisms. Those options do not exist for shadow banks. Unlike the deposit-based funding of commercial banks, shadow bank funding is typically uninsured and as a result, is prone to runs (McCulley 2007). In turn, this definition is nevertheless compatible with that of Claessens and Ratnovski (2014), because it allows for the existence of private backstops, for instance from commercial banks.¹³ As regards the backstop aspect, P2P lending must be classified as shadow banking, because it neither has access to central bank liquidity, nor to any other kind of public sector guarantee as would be true with, for instance, deposit insurance or a too-big-to-fail status. Moreover, although the definition allows for the existence of private backstops, such mechanisms are virtually nonexistent in crowdlending as compared to the backup lines provided by banks to special purpose vehicles in the subprime crisis.¹⁴ Finally, this finding is also interesting from a financial stability viewpoint. On the one hand, it might be criticized that backstops in general are necessary to prevent crises from occurring. On the other hand, the lack of private backstops might in fact be beneficial. Although the default risk for an individual platform cannot be reduced, the absence of backstops from other financial market participants such as banks, for instance, reduces the potential for spillovers into the overall financial system.

Second, Pozsar et al. (2013) refer to the different kinds of transformation usually conducted by banks to generate returns. In addition to maturity transformation as explained above, credit intermediation also includes credit transformation and liquidity transformation. Liquidity transformation refers to the use of liquid instruments to fund higher-yielding, illiquid

¹³ However, Pozsar et al. (2013) emphasize that private backstops were less reliable than public backstops and served as a source of spillovers from the shadow banking system into the commercial banking system during the US subprime crisis.

¹⁴ The only ‘backup’ mechanism provided by some platforms is some kind of provision funds that compensate for a certain degree of lenders’ loan losses (see, e.g., Moenninghoff and Wieandt 2013 as well as Wei 2015). However, this item does not fit the characteristics of the kind of external backstops that were relevant during the US subprime crisis.

assets. The transformation of credit refers to the division of debt quality between assets and liabilities, for instance by prioritizing claims or, to put it more broadly, investing in assets with a lower quality than the funding source to generate superior returns. To begin with, there is no credit transformation in the *original* P2P lending, because the lender completely bears the default risk of the borrower. In addition, P2P loans have the same maturity on both the asset side of the creditor and the liability side of the debtor. Hence, there is also no maturity transformation in P2P lending, as will be investigated in greater detail in section 3.4. Finally, P2P lending can comprise at least a limited degree of liquidity transformation, because the introduction of (imperfect) secondary markets on a number of platforms allowed lenders to sell loans before maturity (Moenninghoff and Wieandt 2013). However, the overall situation is less straightforward in the *advanced* P2P system with institutional investors' participation as illustrated in section 3.5. Professional investors may use high-quality liabilities to invest in lower-quality P2P loans, thus conducting credit transformation. Moreover, it is easily imaginable that professional investors use short-term funding to invest in medium-term P2P loans, thus conducting maturity and liquidity transformation simultaneously.

Overall, those findings suggest that both institutional and functional definitions of shadow banking, as suggested by the FSB (2014), can be employed to identify shadow banking.¹⁵ Those definitions illustrate that shadow banking is a complex business with a multitude of characteristics. Of these, securitization is of particular importance, because shadow banking is centered on securitization and market-based funding, implying that loans and mortgages become increasingly tradable instruments through a vertical slicing of the traditional intermediation process (Pozsar et al. 2013). Securitization indicates the practice of pooling a multitude of loans and selling them to a special purpose vehicle which funds this purchase by issuing tranches of different credit ratings. Moreover, securitization was one of the critical factors during the US subprime crisis and is also gaining importance for P2P lending, as will be shown in section 3.5.¹⁶

¹⁵ See, Claessens and Ratnovski (2014) as well as the IMF (2014) for further discussions on the functional and institutional identification of shadow banking.

¹⁶ We refrain from delving deeper into the different shapes of shadow banking due to space limitations. A wide range of shadow banking issues has been discussed extensively in the aftermath of the US subprime crisis. Excellent in-depth overviews on the functioning of securitization are provided by, among others, Gorton (2010), Gorton and Metrick (2012), and Pozsar et al. (2013).

A number of reasons explain why shadow banking exists at all. First, from the funding perspective, financial innovation resulted in new kinds of financial activities, allowing for efficiency gains to be made through specialization and cheaper funding for market participants (Pozsar et al. 2013). Second, from the funders' perspective, historically low interest rates left investment managers aggressively searching for yield. Apparently, complex securitized products offered them opportunities to invest in high-yield, though seemingly low-risk products (Turner 2012). Third, and in addition to yield considerations, there was an increasing demand for safe assets. Institutional investors are often required to invest in predetermined asset classes. The absence of deposit insurance due to their high investment amounts as well as the insufficient supply of short-term government bonds led institutional investors to search for highly rated, short-term securitization tranches as generally accepted investment opportunities (Pozsar 2013). Fourth, regulatory arbitrage under the Basel II regime enabled capital-constrained banks to set up special purpose vehicles and provide them with guarantees instead of satisfying capital requirements (Acharya et al. 2013). As a result, investors have been able to lever up their investments at a given level of capital endowments, thus effectively increasing their risk exposure.

Finally, it is crucial for this paper to understand that the nature of shadow banking is varying over time. As a result, a small number of authors identify P2P lending as a subcategory of the 'new' shadow banking prospects (see, e.g., IMF 2014, Jackson 2013, Nash and Beardsley 2015, as well as Wei 2015). We agree with this finding and conclude that although the original P2P lending comprises only a limited degree of the kinds of transformation required to count as shadow banking, the participation of institutional investors enables the utilization of P2P lending to conduct shadow banking activities. In other words, P2P lending is actually shadow banking.¹⁷ Borrowing from the proposed denomination of web-based financial innovation as 'Finance 2.0' (Moenninghoff and Wieandt 2013), we instead suggest designating P2P lending as 'Shadow Banking 2.0'.¹⁸

Provided that financial markets experience ongoing financial development, new possible kinds of shadow banking will also be able to pose new kinds of risks not yet properly ad-

¹⁷ This assessment is not shared by Moenninghoff and Wieandt (2013), but their (more narrow) focus is exclusively on the role of transformation in the original P2P system.

¹⁸ To be even more precise, we may instead consider the original P2P lending as 'Shadow Banking 2.0', while the more recent, institutionalized P2P system deserves to be denominated 'Shadow Banking 2.1'.

dressed by financial regulation (see, e.g., Cedillo Lazcano 2013 or Claessens and Ratnovski 2013). As a consequence, it is of outstanding importance for regulatory bodies to keep pace with this development and not trail behind market developments before imbalances arise which threaten the stability of the financial markets. Recent publications such as those from the EBA (2015) or the FCA (2015) indeed address P2P lending issues from a regulatory perspective, but most of those publications are essentially opinions, and only some of those papers actually result in concrete regulatory initiatives. Further efforts from regulatory bodies are therefore essential.

3. (Financial Stability) Risks of Peer-to-Peer Lending

3.1 Replacement of traditional soft information

For hundreds of years, the banking business has been about the resolution of information asymmetries (see, e.g., Leland and Pyle 1977). Borrowers have informational advantages over lenders on their ability and willingness to repay loans. Following Akerlof (1970), this may lead to moral hazard and adverse selection. In our context, moral hazard refers to the danger of borrowers using the funds for other purposes than has been agreed upon with lenders. Adverse selection instead describes the danger of lenders being unable to differentiate between borrowers with different risk levels. Therefore, lenders set the risk premium at an average level, which leads better borrowers to drop out of the market if the loan is cheaper for them elsewhere. As a result, only bad borrowers with high credit risk remain, thus potentially leading to market failure.

Due to the anonymity of online transactions and the relative risk management inexperience of private lenders as compared to banks, information asymmetries in crowdlending are initially elevated by nature. At this point, we observe the first similarity with the reasoning of Rajan (2005). One of his pivotal conclusions is the increasing use of anonymous arm's length lending at the expense of traditional relationship banking. This development resulted from diverse driving forces – technical change, regulatory change, and institutional change – that ex post proved to promote financial instability. Hence, the crucial question is whether the specific design of P2P lending can contribute to the resolution of information asymmetries,

and whether this promotes financial (in)stability. This subsection is devoted to this question.¹⁹

As regards moral hazard, no tests are conducted to check whether borrowers used the loan in the promised way. However, this problem is not different from small bank loans. As regards adverse selection, few studies indeed estimate whether it is elevated in P2P lending. Freedman and Jin (2008) show that lending under Prosper's auction model of P2P's early years indeed leads to additional adverse selection as compared to banking. Prosper uses broader categories of credit grades instead of exact credit scores (as they are used in traditional banking). Because lenders normally price the loan according to the average creditworthiness of this imprecise grade, this primarily attracts the less creditworthy borrowers inside that grade. As a consequence, the distribution of borrowers is skewed towards the lower end of each credit grade. This finding of adverse selection on Prosper is also supported by Iyer et al. (2010). Finally, Emekter et al. (2015) show that although riskier borrowers are charged higher interest rates than better borrowers, the risk premium is still not large enough to compensate for the elevated credit risk. The most profitable risk-return-relationship for lenders is achieved at the best rating grades, which may again lead to adverse selection because it implies that better borrowers are charged a comparatively high risk premium.

However, judgments on 'the typical creditworthiness' of a borrower on online lending platforms are doomed to failure, because loans are made in a wide solvency spectrum. For instance, Zopa, a UK-based P2P lender, shows actual default rates from as high as 4.67% of the amount lent in 2008 to as small as 0.13% of the amount lent in 2015.²⁰ US-based Lending Club also emphasizes the high quality of borrowers, with the average borrower earning more than USD 74,000 and a debt-to-income ratio of less than 20%.²¹ Moreover, charge-off ratios in the period from the first quarter of 2007 to the third quarter of 2015 differ between 1.03% of the total funding amount for the best credit grade and 11.66% in the worst grade.²² Finally, the German P2P market leader auxmoney also emphasizes that returns strongly

¹⁹ A comparable discussion to this subsection concerning the role of (soft) information in crowdlending is provided by Morse (2015).

²⁰ <http://www.zopa.com/lending/risk-data> (31.01.2016)

²¹ <https://www.lendingclub.com/public/steady-returns.action> (31.01.2016)

²² <https://www.lendingclub.com/info/demand-and-credit-profile.action> (31.01.2016)

depend on individual scoring classes and that, in sum, less than 3% of its loans default.²³ Valuation results for traditional banks are typically smaller on average. For the average of all German banking groups from 2008 through 2014, for instance, negative valuation results range between 0.05% and 0.44% of the balance sheet total (Deutsche Bundesbank 2015).²⁴

To check for the success of P2P platforms in reducing information asymmetries, additional tests should be utilized. A familiar way to do this is to test whether the different kinds of information provided in the P2P lending process are indicative of the default probability of borrowers. Just as commercial banks, lending platforms try to overcome information asymmetries by a mix of hard and soft information. While definitions of hard and soft information diverge, hard information usually comprises quantifiable data such as, e.g., credit score, income, and information on former delinquencies. Soft information in P2P lending, in contrast, comprises nonfinancial information like pictures, ethnicity, listing texts, borrower's self-reported attributes, place of residence and the like. Another possible distinction of information can be drawn along the lines of verified versus unverified information (see, e.g., Michels 2012). This distinction is particularly important, because it is part of the platforms' business model to put less effort in the screening of borrower information than traditional banks do. Usually, they only verify information concerning borrowers' credit score, credit history, and bank account information. As is the case for traditional banking, a large number of studies find a significant role for hard information to explain default probabilities in P2P lending. Serrano-Cinca et al. (2015), for instance, show that factors explaining default on Lending Club are credit grades, loan purpose, annual income, housing situation, credit history, and indebtedness. This finding suggests that lenders are provided with information enabling them to infer borrower creditworthiness. Beyond that, Iyer et al. (2010) even find that lenders on Prosper deduce the larger part of borrowers' creditworthiness from hard information, but the explanatory power of soft information increases at lower levels of borrower creditworthiness. Overall, they conclude that although lenders are indeed able to infer future borrower default (as reflected in their interest rate bids), this inference is incomplete.

²³ <https://www.auxmoney.com/infos/rendite-und-gebuehren> (31.01.2016)

²⁴ This comparison is admittedly rough because the valuation result of German banks, which represents the sum of write-downs and write-ups, also includes banks' own business, not only their customer business. Moreover, customer business is heterogeneous across banking groups with different shares related to retail customer banking and corporate banking, which might differ from the more retail-banking focused P2P lending.

However, the other – and certainly more interesting – question is how the users of P2P platforms process soft information. As mentioned above, the emergence of P2P lending may result in the loss of soft information built through long-lasting banking relationships. At the same time, it is interesting to investigate whether the specifics of P2P lending – social networks and the opportunity for borrowers to decide by themselves which information to provide to lenders – can contribute to new ways of resolving information asymmetries.

The first special feature of P2P lending is that borrowers have better opportunities to decide by themselves which information they would like to offer their potential lenders. Traditional bank lending, in contrast, requires borrowers to walk into a bank branch and let bank employees decide on whether they are creditworthy or not, given their actual appearance. But why should borrowers be tempted to provide false information at all, thus weakening the quality of soft information? The answer is simple: because personal characteristics such as ethnicity, gender, age, or appearance may influence the outcome of the loan request.²⁵ In particular, Pope and Sydnor (2011) show from analyzing borrowers' pictures that blacks, on average, pay 60-80 basis points higher interest rates, receive funding 34 percent less often, and default 36 percent more often than whites on Prosper. Moreover, younger people receive funding more often than old people, and attractive persons are funded more frequently than unattractive persons (see also Ravina 2012). In addition, Duarte et al. (2012) show that perceived borrower trustworthiness on Prosper increases funding probability and lowers interest rates.²⁶ Hence, it is rational for borrowers to pretend to be white, young and attractive by uploading flattering pictures of other people. To summarize, even if the kind of borrower *discrimination* described here might also be prevalent with conventional branch banking, the chance to *pretend* to be somebody else is definitely larger in P2P lending.

The second special feature of P2P lending is the inclusion of social networks in the lending process. Borrowers can form friendships with other participants or join different kinds of groups. As regards friends, the term is heterogeneous in most studies (and unfortunately not always made clear). While some platform friendships mean no more than knowing each other's email address, sometimes even real offline friends invest in each other's P2P loans.

²⁵ A few authors (see, e.g., Michels 2012) additionally emphasize the role of narratives to influence the outcome of the lending process. However, we believe that this opportunity for moral hazard, i.e. telling a false story, does not differ significantly from unsecured small-scale traditional bank lending.

²⁶ Interestingly, Duarte et al. (2012) also show that seemingly trustworthy people are indeed more creditworthy, as expressed in ratings and default probabilities.

This social network character of P2P lending strives to provide two advantages: First, it is assumed that friends are better informed about the true creditworthiness of a borrower. Thus, the investment of friends can be interpreted as a signal of the borrower's quality to other lenders. Indeed, Lin et al. (2013) show that borrowers with investments from friends are less likely to default. Second, the fear of social stigma is seen as another benefit of social relationships in P2P lending. Nobody likes to admit to his friends to be in default, especially not if they invested in the defaulted loan, thus resulting in stronger repayment incentives. However, Lu et al. (2012) show that the default of a friend's loan increases a borrower's own default probability on China's largest P2P platform PPDai. Their study implies that if social stigma is a relevant concern, it is weakened as soon as other friends default. From a financial stability viewpoint, this leaves room for dangerous knock-on effects.

Lenders and borrowers on P2P platforms can also form groups. In these groups, lenders conduct a common monitoring to discover additional soft information through interaction. Sometimes, borrowers are even directly asked to send or verify additional information. Most studies find that group membership is indeed able to reduce default rates, but only if they account for the heterogeneous characteristics of the group.²⁷ In general, only groups with serious monitoring or close social ties seem to be able to reduce default rates, again pointing to the social stigma concerns reported with investments by friends (see, e.g., Everett 2015 or Freedman and Jin 2008). Inside the groups, group leaders are responsible for recruiting new borrowers, providing assistance for borrowers' listings, demanding additional information from borrowers, and monitoring the borrowers' loan performance within the group. Hence, group leaders are sometimes seen as 'new intermediaries' performing tasks that were formerly attributed to banks (see, e.g., Everett 2015). As a consequence, Everett equalizes groups with relationship lending and P2P lending outside groups with arm's length lending. Initially, group leaders on Prosper were rewarded with a premium for every new loan that was made in the group. However, Hildebrand et al. (2010) show that the existence of group leader rewards distorted their incentives and led to higher default rates among the loans group leaders bid on.²⁸ Most interestingly, their results resemble the originate-to-distribute model pursued in the run-up to the US subprime crisis. The abolition of group leader re-

²⁷ Everett (2015) classifies group characteristics as: friend, small business, company, alumni, geographic, hobby, ethnic, occupation, religious, low-risk, high-risk, lending purpose, growth purpose, and other.

²⁸ The authors show that the amount of group leader rewards can be large enough to compensate for the higher default risk to their own investment in that loan.

wards on Prosper in 2007 is then used to show that default rates decreased afterwards, albeit at the cost of significantly reducing the importance of group leader participation. Seen on the whole, the group leader problem suggests that the 'platform business model' of letting someone other do the screening and monitoring work is flawed.

Finally, the previous analysis affects questions concerning enforcement in crowdlending. Verstein (2012) argues that P2P lending suffers from problems to enforce claims against borrowers with loans that are either late or in default. Usually, the loan amount as well as every individual lender's investment is too small to justify the effort of a costly lawsuit. Moreover, because loans are unsecured, there are typically no assets to confiscate. Against this background, the mixed results pertaining to social stigma as a means of punishment challenge whether P2P indeed offers enough incentives for borrowers to repay their loans. Hence, although the comparison seems obvious, crowdlending is not completely comparable to microfinance, which is predominantly practiced in developing countries. Although there is certainly consensus on common attributes between P2P lending and microfinance (such as, for instance, small loan amounts to less creditworthy borrowers, social group formation, or delegated monitoring), the lack of joint liability inside P2P lending groups and the limited importance of repeated borrowing in crowdlending make their repayment incentives differ (Everett 2015, Michels 2012). Due to the fact that P2P lending is a recent phenomenon, repeated borrowing (and the resulting risk implications) is not yet an issue, which implies that crowdlending should currently be seen as a nonrecurring financing decision. However, this might change if P2P lending proves its value, for instance, as a reliable source of regular debt refinancing.

To conclude, it is not obvious from empirical studies whether the replacement of traditional soft information actually increases moral hazard and adverse selection or, in other words, risk. Even without traditional intermediaries, soft information exists, albeit in another way (Lin et al. 2013). In our opinion, P2P lending does not in general offer either 'more' or 'less' soft information than traditional banking does. Instead, what seems crucial is that more *unverified* information exists, i.e., borrowers have better opportunities to provide false information. At the same time, P2P lenders do not seem to be able to verify enough information in a way that banks are. Seen on the whole, loan screening in crowdlending is thus less reliable. We believe the problem is particularly severe against the background that

enforcement opportunities are presumably weaker than in traditional banking. From this perspective, we conclude that P2P lending is indeed more risky than traditional banking.

3.2 Herding

The previous investigation concerning the role of soft information in P2P lending largely assumed that lenders would be willing to invest resources on the judgment of individual borrowers' creditworthiness. However, given the challenges mentioned before as well as the variety of requests for loans, this assumption deserves a closer look. In particular, if loan screening is transferred from intermediaries to lenders, this also shifts search costs. Thus, instead of distributing the bank's margin through P2P lending, it is in fact partly traded off against more effort by the participants. From an economic point of view, the lenders' decision is influenced by marginal analysis. They will spend time until the expected marginal costs equal the expected marginal gain from a closer investigation of the borrowers' creditworthiness. In addition to pure time costs, the longer lenders have to search for attractive loans to invest in, the longer it takes until their funds earn any interest at all. As a result, the very small investment amounts of P2P lending reduce the damage of an individual loan's potential default and thus shift the equilibrium towards very limited investments of time. With some exaggeration, it may be a promising strategy for lenders to forgo screening and monitoring completely and rely on the judgment of other investors instead, i.e., to follow the herd.

The idea of opportunity costs has been picked up by a number of researchers that conducted studies on herding in P2P lending. Among them, Herzenstein et al. (2011) show evidence for herding on Prosper. Auctions with more previous bids have a higher probability of receiving additional bids, but only up to the amount the loan needs to be granted. In other words, while lenders want to benefit from saving search costs, they abstain from bidding the interest rate down after the required funding amount is reached, suggesting that herding is strategic. In addition, the loans benefiting from herding also performed better ex post. Zhang and Liu (2012) show herding by documenting the importance of previous funding amounts for prospective bids. Moreover, they show that herding is rational in the sense that lenders also learn from loans' observational features and that herding leads to better loan performance. In addition to lenders learning from observing borrowers and listing attributes, investor experience (as measured by their number of bids) also tends to diminish herding

effects (Greiner 2013). Those latter results, in turn, imply that herding is to a certain extent attributable to investor uncertainty and hence does not only result from opportunity cost calculations.

In sum, we suppose that herding behavior challenges one basic idea of the crowd, i.e., the idea that collective intelligence (if one understands collective intelligence as the sum of every individual acting intelligent by their own) provides favorable results compared to individual opinions.²⁹ We consider the existence of herding in P2P lending as critical, irrespective of the true degree of learning and the details on lenders' motivation. The problem is particularly severe when herding is accompanied by higher default rates, but even in case of (occasionally) 'successful' herding, the concomitant abandonment of screening remains critical. If loans are made on a large scale without thoroughly checking for the borrowers' creditworthiness, then financial instability is just a stone's throw away. At the same time, this does not necessarily imply that herding in P2P lending is actually more severe than in traditional banking. As Rajan (2005) emphasizes, herding has been a development in financial markets in general that applies to traditional bank managers as well, so it is no specific by-product of P2P lending. Although Rajan centers on herding motivated by managers' incentives to stick to investment benchmarks to comply with their peer's performance, the effect of large scale, undifferentiated loan creation is no different in crowdlending. Asset prices are being moved away from their fundamentals and the larger the effect is, the more costly are the corrections that may occur.

3.3 Risk of platform default

Another prominent risk in crowdlending is the risk of a platform default. If intermediaries default and as a result disappear, the execution of transactions like the repayment of loans is hampered. This danger basically applies to every intermediary structure, but it is particularly severe with more anonymous, technology-based internet platforms as compared to traditional banks. In contrast to banking, insolvency of P2P platforms is a relatively new phenomenon, and the effectiveness of emergency plans still remains to be tested.

²⁹ One should not confuse herding with a form of collective intelligence. Any herding tendency is rooted in few individual opinions. Thus, herding implies following few people instead of a great number of people reaching the same favorable conclusion on a particular loan. As regards the possible causes of herding on a loan, Luo and Lin (2013) show that bids from the borrower's friends are significant drivers of herding. This, in turn, gives rise to the fear that friend investments are misused in a strategic manner to attract additional bids.

In our opinion, P2P platforms are particularly susceptible to default due to the lack of sophisticated regulation. Although, as mentioned above, different regulatory approaches exist, there is still a general lack of regulation agreed upon for P2P platforms as compared to banking regulations (e.g., the Basel banking regulation). As regards capital regulation, banks experience increasingly tailor-made capital requirements, while equivalent guidelines for platforms are still underdeveloped (see, e.g., FCA 2015 as well as Nash and Beardsley 2015). As a result, lending platforms are on average poorly capitalized (see, e.g., Wei 2015). This deficiency, in turn, makes them particularly fragile.

One might object that capital requirements are unnecessary for platforms due to their role as intermediaries not taking credit risk of their own. However, this reasoning is incomplete. On the one hand, heterogeneous business models comprise a different susceptibility to platform default risk (Price and Abou-Jaoude 2014). Verstein (2012) impressively illustrates how the US model of P2P regulation in fact *increases* risk for lenders. In the US, P2P platforms are seen as issuers of securities, with the Securities and Exchange Commission (SEC) being responsible for their regulation. According to him, and as expressed in section 2.1, the legal nature of the securities issued under the US model leads to lenders having claims against the platform instead of the borrower. As a consequence, lenders not only have to evaluate the creditworthiness of the borrower but that of the platform as well. Verstein (2012) argues that investors will lose money if either the borrower or the platform default, a problem that is ignored by most P2P lenders in the US and makes P2P lending in fact more risky than traditional banking.³⁰ Indeed, even Prosper acknowledges the chance of a platform default in its prospectus, although arrangements have been made to minimize this danger.³¹ Finally, even without claims against the platform itself – as in the case of aux-money – the business models explained in section 2.1 depend on a complex structure of platforms, banks, and service providers. The default of any member of this chain poses unforeseeable risks concerning the clearing and settlement of payments. Hence, P2P platforms (as well as their holdings) need to be financially sound to overcome this problem. On the other hand, even without taking any credit risk, the platform still has to cover operational expenses. As mentioned above, different kinds of fees are charged, with up-front fees for

³⁰ Verstein (2012) also emphasizes that this risk-shift from borrowers to platforms contradicts the idea of cutting out banks as middlemen.

³¹ See footnote 1.

application and origination of loans accounting for the lion's share. If, however, P2P platforms' earnings structures are dominated by up-front fees, then sudden drops in loan origination activity immediately impact on the survivability of the platforms.³² Thus, against the background of insufficiently capitalized platforms, insolvency is a constant concern. As an example from China, Wei (2015) states that 115 P2P platforms defaulted in 2014, and 1,438 remained in the market. This implies a platform default rate of around 7.4%. As a counterexample, the Federal Deposit Insurance Corporation (FDIC) reports an ongoing listing that only 541 banks failed in the US from October 2000 through 2015.³³ In the same timeframe, the number of US commercial banks declined from 8,314 to 5,309.³⁴ Given the much longer timeframe and the larger number of banks, the average annual P2P platform default rate seems to be much higher than the annual bank default rate.³⁵

In this respect, P2P lending is very sensitive to reputational concerns. The problem is particularly severe because crowdlending is a comparatively new industry. The default of a well-known platform has the potential to shake confidence among the universe of lenders and spill over to other platforms (Magee 2011). In an extreme situation, additional platform defaults and decreasing loan origination may result.³⁶ In a broader sense, this represents a renewal of traditional bank run concerns. Although there is no maturity transformation in the original P2P lending, the uncertainty which platform might be affected resembles traditional bank run fears. However, default concerns are not the only cause of reputational risk. By nature, P2P lending is susceptible to fraud or cybercrime, driven by anonymity and the dependency on information technologies (see, e.g., Kirby and Worner 2014).

Finally, Rajan (2005) concluded that the increasing use of arm's length lending comes along with a greater reliance on the functioning of the market. From a purely technical perspective, an environment where few large platforms provide the market infrastructure increases the risk for the market to be 'switched off overnight' by this intermediary suddenly discontinuing operations. If there is no regulation that prescribes and controls safety mechanisms

³² See also the comment of Baker (2015).

³³ <https://www.fdic.gov/bank/individual/failed/banklist.html> (14.03.2016)

³⁴ <https://research.stlouisfed.org/fred2/series/USNUM> (14.03.2016)

³⁵ Of course, a comparison between Chinese P2P platforms and US banks seems somewhat arbitrary. Unfortunately, we are lacking the data for a more consistent comparison.

³⁶ Interestingly, Wei (2015) reports that although a significant number of P2P platforms in China experienced problems such as default or fraud in 2013, P2P lending grew remarkably in the same year. Hence, reputational problems must not necessarily result.

like, e.g., 'living wills',³⁷ the dependency on this platform is in fact huge. As regards market concentration, Kirby and Worner (2014) emphasize that concentration in many countries' P2P lending is already remarkably high, and in our opinion, lending business in the highly competitive online environment may presumably experience even further concentration. However, we do not believe in a total global concentration for three reasons. First, the potential for international concentration seems limited in the near future due to strongly differing regulatory requirements. Second, P2P investments are usually restricted to national borders with, for instance, only US-American residents being allowed to invest on US-American platforms.³⁸ Third, instead of imagining one global peer-to-peer platform, we believe in the necessity of close monitoring, so in the long run, it seems more likely that lending platforms will be seen to be specializing on certain market segments such as, for instance, consumer lending.

To sum up, reputation is an important concern for P2P platforms, but this concern is not different from traditional banking, although the motivation differs. Crowdlending platforms depend on a good reputation to generate new loans while the major concern for banks' reputation is to prevent bank runs. Instead, market complexity and concentration seem already elevated in P2P lending as compared to traditional banking. Most of all, we consider regulation to be the distinguishing factor. While traditional banking has accumulated numerous safety mechanisms that (try to) prevent runs and intermediary defaults from occurring (like, e.g., deposit insurance), almost no such backstops exist in P2P lending. Hence, from the intermediary risk view, we conclude that P2P lending is riskier than traditional banking.

3.4 Liquidity risk and secondary markets

While the previous subsections focused on credit risk and also some operational risk, other risk types are of importance in P2P lending as well. This subsection deals with liquidity risk. One important feature of P2P lending, caused by the fact that lenders directly invest in loans, is that there is no maturity transformation. The liability of the borrower has the same

³⁷ This suggestion is made, e.g., by EBA (2015) as well as Verstein (2012). Kirby and Worner (2014) state that some platforms already own this kind of resolution plans. Coupled with segregated accounts, those plans can reduce the impact of a platform default.

³⁸ This feature is interesting from a financial stability viewpoint, because global spillovers are less likely in such an isolated system.

maturity as the asset of the lender, which is usually between three and five years.³⁹ This differs from traditional banking, where banks use short-term deposits to fund longer-term loans.

Although maturities in crowdlending are short-term or medium-term, some lenders may wish to liquidate their investments during the lifespan of the loan. However, secondary markets were not present from the beginning of platform lending: For instance, Prosper did not offer investors a secondary market until 2009, and Lending Club established secondary markets in 2008. Unfortunately, the impact of secondary market introduction is almost completely unexplored from a scientific perspective.⁴⁰ The few observers that elaborate on this topic state that liquidity in P2P lending remains limited. On the one hand, the opportunity to sell bad loans is still restricted. As usual, financial transactions require a seller and a buyer, and P2P markets with less sophisticated investors provide fewer opportunities to deal with junk investments. If bad loans are traded at all, this is done with significant discounts (see, e.g., Kirby and Worner 2014 or Price and Abou-Jaoude 2014). On the other hand, the existing secondary markets are still segregated. This means that there is no global market like, e.g., in case of bonds. Instead, most loans can only be traded on the platform they were made on (Price and Abou-Jaoude 2014).

Seen on the whole, there are advantages and disadvantages from the current liquidity structure of P2P lending. A considerable benefit is the fact that the absence of maturity transformation prevents the danger of run risks (Verstein 2012). With maturity transformation representing a significant driver of financial instability, the absence of this feature makes P2P lending initially less risky than traditional banking. At the same time, a clear weakness regarding P2P lending's liquidity perspective is that the lack of fully developed secondary markets hinders individual lenders from adjusting their positions to their preferences all the time. In addition, as Rajan (2005) pointed out, not the mere existence but the reliability on the proper functioning of secondary markets is crucial, in particular in times of financial

³⁹ Of course, deviations exist. For instance, Wei (2015) states that most P2P loans in China have a short maturity of one to three months.

⁴⁰ To the best of our knowledge, Reher (2014) is the only empirical work investigating P2P secondary markets. His idea is that the introduction of secondary markets makes P2P assets more liquid. This may either make P2P loans cheaper due to higher market liquidity or make them more expensive when higher liquidity leads to less screening. He shows that the introduction of Lending Club's secondary market on average lowered primary market risk and interest rates, while the individual effects depend on whether investors previously own a high-risk or a low-risk portfolio.

stress. But this reliability does not seem superior relative to traditional financial markets that collapsed during the US subprime crisis. Finally, the lack of maturity transformation limits the growth potential of P2P lending because only a small minority of private investors is assumed to be willing to lend money over a longer maturity of, for instance, 10 years and more. This, in turn, explains the dominance of the more risky, unsecured short-term funding segments described above. In sum, however, the lack of maturity transformation leads us to conclude that P2P lending has not clearly increased risk with respect to liquidity.

Very recently, there has been evolutionary progress on lending platforms' secondary markets. In the summer of 2015, LendingRobot, an automated robo-advisor, was implemented on Lending Club. Using investment algorithms and a high degree of automatic diversification, robo-advisors intend to help investors by automating (re-)investments. This option also applies to secondary market transactions and, in turn, strives to improve liquidity for P2P markets. However, automated investments are not only able to reduce lenders' search costs. They also allow private investors to compete with fast-acting institutional investors, a problem we elaborate on in the next subsection.

3.5 Institutionalization of P2P markets

Another recent development on P2P lending markets is the increasing participation of institutional investors. Detailed estimations diverge, but they agree that institutional investors now make up the majority of P2P lenders. While authors such as Wei (2015) state that their share is around two-thirds of all P2P loans, some estimations report an institutional investor share of more than 80% (Cortese 2014). The same authors recognize that the term 'P2P' lending is thus in fact no longer appropriate, and Prosper, for instance, express their intent to create a balanced investor base among retail lenders, wealth managers, and institutions. Hence, the term 'marketplace lending' is gaining importance.

Among the main drivers of P2P institutionalization is the increasing use of securitization practices. This development is far from being accidental. P2P lending, especially under the US regulation as securities, always comprised the securitization of loans and the sale to lenders (see, e.g., Verstein 2012). As a consequence, the use of this well-established instrument in P2P lending by financial market professionals was only a matter of time. To be more specific, capital market players acquire large bundles of P2P loans from the platforms and

run then through the securitization process,⁴¹ thus further distributing securitized P2P loans into the financial system.⁴² As a consequence, the liquidity of P2P investments might be improved, but the entry of institutional investors also potentially opens the system to advanced transformation. As mentioned in the section on P2P lending and shadow banking, professional investors may use high-quality liabilities to invest in lower-quality P2P loans, thus conducting credit transformation. Moreover, it is easily imaginable that professional investors use short-term funding to invest in medium-term P2P loans, thus conducting maturity and liquidity transformation simultaneously.

This process, at best coupled with ratings assigned by the large rating agencies, allows even more traditional institutional investors to participate in P2P investments. However, although some tranches already received favorable ratings (Devasabai 2014), the rating agency Standard and Poor's (2014) is still hesitant to regularly assign ratings for P2P tranches. They point out that some premises such as loan performance data over complete economic cycles as well as assessments concerning the sustainability of their business models have to be fulfilled. Overall, the development towards institutional participation might significantly impact upon the equilibrium of supply and demand. From the general finding of the literature that most crowdlending projects did not receive funding at all, we conclude there has always been excess demand for funds. If the current development instead leads to excess supply of P2P loans for securitization purposes, then questions concerning a potential weakening of lending standards in P2P lending may be justified. This finding is particularly severe because it exacerbates the general finding of the subprime crisis that securitization already led to lower lending standards (see, e.g., Verstein 2012).

The desire to invest in new asset classes is particularly pronounced in times of low interest rates, where investors face strong incentives to search for yield. Interest rates have been extraordinary low in the years following the US subprime crisis and the European sovereign debt crisis. Hence, private investors, but even more so financial managers required to invest in interest-bearing assets, have come under increasing pressure to gather appropriate returns, for instance by sharing the banks' margins. P2P lending with its double-digit returns provided them with the opportunity. Today's low interest level resembles the situation Rajan

⁴¹ See footnote 16 on literature concerning the functionality of securitization.

⁴² See Devasabai (2014) for an overview on securitized P2P deals with an aggregated volume of several hundreds of millions USD.

(2005) described a decade ago. Decreasing interest rates on assets in the face of expected target returns or fixed-rate liabilities force professional investors to accept tail risks in exchange for attractive returns. Initially, the tail risk argument might sound questionable, given that the P2P lending volume is still small and P2P investment amounts are usually extremely diversified. Nevertheless, problems can emerge in the presence of correlated fundamentals as they might be present when large shares of P2P loans are used for the same purpose as, e.g., credit card consolidation. If P2P centers on few borrowing purposes and one of those market segments experiences stress, this may suffice to trigger dangerous chain reactions.⁴³ A crunch in a particular P2P loan segment might shake the confidence in platforms being specialized on this kind of loan, thus shaking loan generation and eroding earnings of those platforms as outlined in our subsection on platform risk. A subsequent collapse of a few platforms in this segment might shake overall confidence in P2P lending, with the potential for further platforms to collapse. The resulting funding shortage might then, for instance, impact on borrowers that rely on P2P loans to refinance their debt and spread the vulnerability further into the financial system (The Economist 2015). Even more perverse, the automatic diversification might turn hazardous in such situations, which mirrors another finding of Rajan (2005): Although risks may be better diversified, they can be larger in sum, and the better diversification is, the smaller is the knowledge on individual participants' exposures to certain risks.

Finally, another main driver for P2P institutionalization is the general rise of algorithmic banking. Enormous default rates in the early years led platforms like Prosper and Lending Club to abolish bidding auctions, perform credit risk evaluation through their secret algorithms and set interest rates by themselves. However, institutionalization adds another perspective on the meaning of algorithmic banking (Cortese 2014, Devasabai 2014). Due to the presence of nowadays high frequency trading, institutional investors have an edge as regards quick investments, i.e., they employ own algorithms to pick their investments automatically. This leads to velocity advantages compared to small peer lenders and explains

⁴³ We have to admit that the initial stress susceptibility of P2P loans is ambiguous. On the one hand, P2P loans should be more susceptible due to their unsecured character. On the other hand, this feature might also make them less prone to crises. Because no underlying collateralized asset exists, there is no dependency on the value of any such security for liquidity and leverage cycles (Adrian and Shin 2010).

institutional investors' significant share in P2P loans.⁴⁴ But the terrifying commonality of all those algorithms is that no outsider knows exactly what every single algorithm includes (Devasabai 2014). Even though it might sound consoling that at least platforms and institutional investors should be aware of the individual algorithm's properties, it seems all the more alarming that private lenders probably have no idea how the algorithm that manages their money works. And if everybody knew how the relevant algorithms worked, they might in fact be concerned. Inferring a borrower's quality from 'big data' approaches analyzing their overall online behavior, as suggested for instance by Yan et al. (2015), seems highly questionable. What we ask ourselves is what the number of Facebook friends, the way of completing the loan request form, the speed of mouse movements, or the length of time using the same email address is supposed to tell us about somebody's creditworthiness? As a consequence, the general conclusion among observers that no one can predict P2P loans' performance in an economic downturn (see, e.g., Standard and Poor's 2014) does not come as a surprise.

All of the aspects mentioned in this subsection suggest that today's P2P lending has experienced significant re-intermediation into previous structures of the financial markets. This implies that the prior idea of individual lenders bearing the risk of their investment dwindles at the cost of once again spreading risk among financial markets, thus possibly resulting in systemic risk (see, e.g., Wei 2015). Overall, some authors notice a dangerous similarity to the run-up of the US subprime crisis (see, e.g., Devasabai 2014 as well as Price and Abou-Jaoude 2014). Large investors searching for yield, securitization, unclear exposures and loan originators without skin in the game – all this was present one decade ago. We mentioned several times that the size of P2P lending is still diminutive. The fact that P2P's unsecured loans, poorer screening and monitoring capacities, as well as the overreliance by all participants on opaque algorithms might have added risk to the financial system could nevertheless be cause for concern.

4. Conclusions

The aim of this paper was to discuss P2P lending, a subcategory of crowdfunding, from a (financial stability) risk perspective. The discussion focuses on a number of dimensions such

⁴⁴ The development of robo-advisors described in the previous section strives to catch up this comparative disadvantage of private lenders.

as the role of soft information, herding, platform default risk, liquidity risk, and the institutionalization of P2P markets. Overall, we conclude that P2P lending is more risky than traditional banking. However, it is important to recognize that a constant conclusion would be misleading. P2P platforms have evolved and changed their appearance markedly over time, which implies that although our final conclusion of increased riskiness through P2P markets remains valid over time, it is based on different arguments at different points in time. In addition, we discuss that acting on P2P online platforms satisfies most possible definitions of shadow banking and shows significant similarities with many observed aspects of shadow banking. We thus infer that P2P lending can be considered part of the shadow banking sector.

The implicit assumption of this paper is that P2P lending poses a truly systemic risk only if it keeps growing at the same velocity as in recent years. Yet, this assumption deserves a closer look. The potential for crowdlending to roughly double its size every year by private lenders joining the market would appear unlikely. We suppose that the large majority of people are not willing to lend money in an unsecured and uninsured manner in the long term without having pronounced opportunities to liquidate their investments. However, this is not the whole story. The appearance of institutional investors substitutes private lenders and facilitates growth perspectives even above the previous rates. From the borrowers' perspective, it is less important who provides them with loans. In addition, given that the majority of loan requests have so far been rejected, there seems to be enough demand for P2P loans. Hence, the opportunity for crowdlending to keep growing definitely exists. Nevertheless, it is open to debate whether it will ever become as important as the traditional financial system. If it indeed keeps growing significantly, then it is doubtful that much will remain of the original idea of P2P lending as an instrument 'from the people, for the people', and presumably the description 'marketplace lending' would be more appropriate nowadays (The Economist 2015).

The evolution of P2P lending will continue, which also challenges the regulatory authorities. Recent publications such as by the EBA (2015) or the FCA (2015) seem to be a promising start, but many of them are essentially opinions only, and only a few result in concrete regulatory initiatives. Moreover, they largely focus on the original P2P business and thus neglect the important trend towards institutionalized marketplace lending as well as the increasing

use of algorithms and big data. It is critical that regulatory bodies keep pace and do not trail behind market developments. After all, the US subprime crisis showed how disastrous it was for the financial markets to neglect the emergence of shadow banking.

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