P2P lending and outside entrepreneurial finance*

Jerry Coakley[a] and Winifred Huang[b,1]

[a] *University of Essex, Wivenhoe Park, Colchester, CO4 3SQ, United Kingdom*
[b] *University of Bath, Claverton Down, Bath, BA2 7AY, United Kingdom*

July 2020

Abstract

Later stage, unlisted SMEs are typically too old to attract equity crowdfunding, one of the two novel sources of outside entrepreneurial finance. The other source is peer-to-peer (P2P) business lending – sometimes called marketplace lending or debt crowdfunding - where unlisted SMEs raise medium term loans from a combination of the crowd of small investors and financial institutions via internet portals. The institutions benefit from the collective wisdom of the crowd while institutional investments reduce information asymmetries for other investors and may lead to herding by the crowd. This paper studies the incremental decision to choose P2P over bank debt by means of probit and logit regressions. It establishes that firms with relatively high credit ratings, smaller assets, lower levels of prior capital expenditures, and low leverage ratios are more likely to raise P2P rather than bank debt. The conclusion is that P2P debt plays a unique role in accommodating the outside entrepreneurial capital needs of these SMEs wanting medium term funding. The empirical work employs a sample 1,249 small, private SMEs that received P2P loans with maturities of up to five years 2013-2015 from Funding Circle, the leading UK P2P business lender.

JEL classification: G32

Keywords: Debt crowdfunding; marketplace lending; bank debt

Acknowledgements: Early versions of this paper were presented at the Infiniti 2017 Conference at Valencia, the EFMA 2017 Conference at Athens, the 2017 FMA Meeting at Boston, and the Workshop on Entrepreneurship: Behavioral and Cognitive Approaches 2019 at Paris. We are grateful to the respective discussants Elod Takats (BIS), Milos Vulanovic (EDHEC Business School), Yuechan Lu (University of Massachusetts), and John H Lewis (The Citadel) for helpful comments. Coakley and Tsvetanov gratefully acknowledge support from grant number ES/L011859/1, from the Business and Local Government Data Research Centre, funded by the Economic and Social Research Council.
*We are very grateful to two anonymous reviewers whose detailed and constructive comments helped to make the results more robust, updated the references, and sharply improved the overall exposition of the manuscript.

[1] *Corresponding author. Email: w.huang@bath.ac.uk. Tel: +44(0)1225-38-3068*

1. Introduction

Crowdfunding involves the financing of projects by large numbers of individuals – the crowd – through internet platforms that serve as electronic marketplaces. Funds can be raised by individuals, third sector organisations or small and medium-sized enterprises (SMEs) and can be for community projects, rewards, or for profit. Peer-to-peer (P2P) lending is one of the two main forms of for profit crowdfunding (Coakley and Lazos 2020). It is also known by a number of other terms such as marketplace lending, crowdlending, or debt crowdfunding.[2] The other form is equity crowdfunding where typically early stage ventures raise outside equity from the crowd via an internet platform. P2P lending involves the crowd and financial institutions funding loans to small businesses or to consumers.

This paper provides novel insights into P2P debt and argues that the success of the P2P business lending market stems from the symbiotic relationship between financial institutions and small investors as the lenders. The former exploit the collective wisdom of the crowd while the latter views large institutional investments as a certification effect that reduces information asymmetries and sometimes herds in their wake. This paper focuses on P2P business debt in the UK raised via Funding Circle, the largest P2P business lending portal in the world. Zhang et al. (2018) estimate that P2P business lending accounts for 15% of UK SME lending. Outside the UK, P2P lending to individuals has grown extremely rapidly in both China and the USA where Lufax and Lending Club are leading players.

Research on equity crowdfunding has mushroomed as Mochkabadi and Volkmann (2018) demonstrate in their recent review. By contrast, there has only been limited research on P2P lending and this has been almost exclusively on PP consumer rather than small businesses lending. This partly reflects the fact that the very first crowdfunding platforms focused on P2P lending to consumers. Zopa was founded in the UK in 2004 and was closely followed by Prosper in 2006 and Lending Cluband in 2007 in the USA.. The earliest P2P

[2] See Zhang et al. (2018) for a recent and extremely comprehensive overview of crowdfunding in the UK.

business lending portals were Funding Circle and Thin Cats which were founded in the UK in 2010.[3] Despite the relatively early establishment of the latter, there has been little empirical research on P2P business lending, mainly because of the paucity of detailed data on P2P loans. However, there are notable exceptions such as the Frank et al. (2017) study of Funding Circle pricing and the Cumming and Hornuf (2017) study of the German P2P portal Zencap.[4]

One way of conceptualising P2P lending markets is using the Evans and Schmalensee (2016) matchmaker concept. Matchmakers operate multi-sided platforms and use virtual marketplaces such as internet portals to bring together and facilitate transactions between as many different groups of customers as possible. Although P2P lending has been linked to microfinance, credit unions and other antecedents in the finance arena, the real driver was the meteoric rise of matchmakers such as eBay, Amazon and Uber for goods and services and fintech startups such as Monzo, Funding Circle and Transferwise. The latter demonstrate the potential draw of electronic marketplaces over the past decade or so.[5]

P2P marketplaces provide two novel sources of external debt finance available for unlisted UK firms. On one hand, P2P business loans provide medium term finance for maturities of up to five years. On the other, invoice finance providers like MarketInvoice supply short term asset-backed loans of up to one-year maturity. This paper focuses on P2P business loans which involve both P2B and B2B elements as financial institutions could contribute up to 30% of projects on Funding Circle during our sample period. As such, Funding Circle can be regarded as a multi-sided platform involving three different groups of agents: the Funding Circle portal, SMEs, and the crowd (of investors) and financial institutions. The latter take advantage of what Mollick and Nanda (2016) call the wisdom of the crowd in evaluating projects while Asterbo et al. (2018) argue that small investors often

[3] See Moenninghoff and Wieandt (2013) for details of early P2P and other crowdfunding platforms.
[4] This was acquired by Funding Circle in late 2015.
[5] They could also be conceptualised as P2P markets. Einav, Farronato and Levin (2015) provide a great overview of P2P markets but their focus is mainly on markets for goods and services.

herd after institutional investments in equity crowdfunding. We would anticipate similar dynamics in P2P business lending.

This paper employs a unique dataset to study 1249 SMEs that raised funds on the Funding Circle platform during the 2013-2015 period when the interest rate was determined by an auction rather than the posted price system. The hand-collected Funding Circle data are linked with company data from the FAME database to create a unique deidentified database. The paper's first contribution is that it establishes that P2P debt caters to a very specific segment of small firms. More particularly, they are virtually all small and private (nonlisted) SMEs that wish to grow and engage in capital expenditures over a period of several years. They are later stage (with a median age of 9 years) and relatively risky SMEs that typically have difficulties in accessing bank term loans for maturities of 1-5 years.[6] Whilst all such firms have overdraft facilities, they struggle to raise medium term bank loans. This is because UK banks' financial statement term lending technology is geared towards publicly listed firms that publish profit and loss (P&L) accounts and cash flow statements.[7] By contrast, small, unlisted UK firms are not required to publish the latter two sets of accounts and so tend to be excluded from access to medium term bank loans. As such they face a term lending funding gap. This funding gap particularly affects high growth and innovative SMEs that wish to invest to increase their productivity and to develop or scale up new processes. In contrast to the High Street banks, P2P providers use big data and structured machine learning to evaluate the eligibility of such SMEs for loans with maturities of up to five years.

In this respect, our paper links with and complements the Brav (2009) seminal study of the characteristics of UK public and private firms 1993-2003. He focuses on medium-sized private firms only and this is due to the absence of detailed financial data for small

[6] Traditionally, UK banks have shown a preference for short term loans called overdrafts which technically are withdrawable on demand but are typically rolled over on an annual basis.
[7] See Udell (2015) for a discussion of financial statement and other bank lending technologies.

private firms. He establishes that medium-sized private firms depend almost entirely on debt finance, have higher leverage ratios, and tend to avoid external capital markets. Our paper focuses on the major external debt finance sources available to small private UK SMEs: P2P debt and bank debt.[8] P2P debt emerged in the aftermath of Brav's study and can be regarded as a hybrid external debt market since it has features of both bank loans and fixed income as it attracts fixed rate interest payments under a posted (fixed) price system.

The paper's second contribution is that it investigates which types of private SMEs are more likely to raise P2P debt by means of probit regressions on the drivers of the decision to raise P2P debt as opposed to bank debt. This is the first study of the drivers of SME P2P debt during a period where the other major source of SME debt – bank lending – was constrained in the UK in the wake of the financial crisis. Our empirical results show that that low credit quality SMEs, innovative firms (proxied by low tangible asset ratios), and those that invest to grow are more likely to raise P2P debt. In this sense, although P2P debt ranks below bank debt in the pecking order of outside debt, it plays a unique role in providing longer maturity debt to smaller, risky, unlisted firms.

The paper complements the Denis and Mihov (2003) study of the choice between three external debt sources for listed US firms. They establish a hierarchy or pecking order of debt funding based on credit quality. The highest credit quality firms issue public debt in the bond markets, medium credit quality firms borrow from the banks, while the lowest credit quality firms are financed by non-bank private lenders. P2P debt shares some characteristics with non-bank private debt as institutions can also invest in up to 30% of loans via the Funding Circle portal. Moreover, even though the other 70% of funds originate from private investors - the crowd - they are raised via a public marketplace and as such P2P debt must be considered a new hybrid form of debt. The implication is that P2P debt ranks below bank lending in the pecking order of debt funding based on credit quality.

[8] Other minor sources include credit unions, credit cards, and friends and family.

There are very few studies of P2P business lending.[9] Our study complements three important recent studies. Milne and Parboteeah (2016) provide an interesting overview of the economics of P2P lending. They view the latter as directly matching borrowers' and lenders' diversification across large numbers of loans that do not appear on the platform's balance sheet. They argue that P2P lending is complementary to rather competitive with conventional banking and this is borne out by very recent developments such as Zopa (P2P consumer lender) receiving a UK banking licence in late 2018. They conclude that greater standardisation of loan, credit performance and operational metrics will be key to both addressing the risks associated with P2P lending and supporting its future development.

Cumming and Hornuf (2017) study marketplace lending to private SMEs using a dataset of 414 marketplace loans over the March 2014 to November 2015 period from the largest German portal Zencap that used auction pricing for their loans. Their data show that platform credit risk ratings for SMEs are a significantly positive determinant of SME borrowing success while competing investment opportunities on the platform have the opposite effect. They establish that borrowers' financial information and adverse selection issues exert little or no influence on marketplace lending.

The other study by Frank, Serrano-Valvede and Sussman (2016) investigates Funding Circle's move in late 2015 from a discriminating auction approach to pricing and allocation of SME loans to a posted price system where the market determines only the allocation of part loans. This study has access an outstanding dataset for the 2010-2015 period of some 34m bid details, 39.6k lenders and various details of the loans including their credit score and maturity. The data provide some fascinating insights such as the top decile of lenders contributing 82% of all loans, the top 10 lenders having a share of almost 32% of loans on average, and the median maturity of the loans being exactly three years. The study shows that auction pricing of interest rates improves the prediction of default events.

[9] See de Roure, Pelizzon, and Tasca (2016) and Morse (2015) for studies of P2P consumer lending in Germany and the USA, respectively.

However, the latter was undermined in later years by difficulties in matching changes in the demand for and supply of funds and the associated increase in interest rate volatility.

The paper is organised as follows. Section 2 outlines the distinctive features of the P2P lending markets in the UK. Section 2 analyses the loan book of Funding Circle. Section 3 describes the data used in this study and presents summary descriptive statistics. Section 4 analyses the empirical results. A final section concludes.

2. P2P business lending

2.1 Crowdfunding and P2P lending

Crowdfunding involves the financing of firms, consumers, organisations and projects by typically large numbers of investors – the crowd – each contributing small amounts. One basic distinction is that between profit-based crowdfunding and donation- or reward-based crowdfunding.[10] Within the former, Coakley and Lazos (2020) distinguish between equity and debt crowdfunding where the latter is also known as P2P or marketplace lending. Equity crowdfunding facilitates unlisted, early stage startups to access outside equity from the crowd via internet platforms such as Crowdcube and Seedrs in the UK.

P2P debt or crowdlending takes two main forms. One is P2P consumer lending where consumers raise funds from the crowd via an internet portal such as Lending Club in the US or Zopa in the UK. Indeed this was the earliest recorded form of crowdfunding that started with the establishment of Zopa in the UK in 2004. By contrast, P2P business lending started with Funding Circle in the UK in 2010 and involves later stage SMEs raising medium term funds from the crowd.

Einav et al. (2015) view the main function of P2P markets as making it easy for buyers to find sellers and engage in convenient, trustworthy transactions. Although they

[10] Note that most early crowdfunding projects were generally in the arts and creative industries and were reward/ product based rather than for profit. See Mollick (2014).

include Lending Club among their examples, their discussion of P2P markets mainly focuses on P2P markets for goods and services. Evans and Schmalansee (2016) use the broader concept of matchmakers to capture what is happening in the case of tech companies. These operate multi-sided platforms (MSPs) and they include both the largest established tech companies such as Microsoft and Facebook, unicorns such as Airbnb and Uber as well as smaller startups like crowdfunding platforms or portals. Matchmakers use physical and virtual marketplaces to bring together and facilitate transactions between as many different groups of customers as possible. Their main asset and their source of indirect network externalities is numbers of distinct types of agents that they can bring together and their data. This sharply contrasts with traditional manufacturing companies whose main assets are typically their property, plant and equipment.

A pure P2P lending market would involve a simple two-sided platform bringing together the crowd of individuals with funds to invest and SMEs in need of loans. Here the SME pays the platform a fee for organising the lending campaign but investors pay no fee. But, P2P portals increasingly attract funds from financial institutions such as banks (including the British Business Bank), mutual, pension and hedge funds, asset management firms and public bodies like local authorities. Figure 1 illustrates the involvement of institutions in P2P lending.[11]

[Figure 1 around here]

Thus, one can conceptualise P2P lending as involving multi-sided platforms bringing together small investors and financial institutions to fund startups and later stage, unlisted SMEs. This produces indirect network externalities for both sets of investors. On one hand, large investments by institutions provide a certification effect for the crowd as they do their own due diligence and monitoring. These reduce information asymmetries such as adverse

[11] Zhang et al. (2018) report that 28% of P2P business lending in 2015 was financed by institutional investors and that this rose to 40% by 2017.

selection and moral hazard problems. In turn they encourage smaller investors to invest and sometimes even to herd after the institutions.[12] On the other hand, if enough small investors contribute sufficient funds, this helps a campaign to reach its target.[13] Thus, crowd endorsement for campaigns – what Mollick and Nanda (2016) call the wisdom of the crowd – acts as an indirect network externality for the institutions. These authors find significant agreement between the crowd and experts in the funding of theatre projects and that crowd involvement lowers the incidence of false negatives.

2.2 P2P versus bank debt

The paper builds on the Denis and Mihov (2003) study of 1,560 new US debt financings on the choice between bank debt, non-bank private debt and public debt. They are the first establish a hierarchy or pecking order of debt funding and one of the first to stress the role of credit quality in this process. They found the highest credit quality firms (as indicated by credit ratings) issue public debt in the bond markets, medium credit quality firms borrow from the banks, while the lowest credit quality firms are financed by non-bank private lenders under SEC Rule 144A.

One issue addressed in this paper is whether P2P debt might fit into a similar hierarchy. More precisely, it seeks to provide an answer to the question of whether P2P debt ranks above or below bank debt in terms of the credit quality of the firms it is likely to attract. P2P business lending is often described as marketplace lending which may give the impression that it is similar to bank lending. We argue instead it can be viewed as a form of regulatory arbitrage or disintermediation since P2P portals like Funding Circle hold no

[12] The equity crowdfunding literature has highlighted the role of large investors in funding dynamics in leading to cascades or herding behaviour by other (generally smaller) investors (Hornuf and Schwienbacher 2018, Vismara 2018, Asterbo, Sierra, Lovo and Vulkan 2018). We expect similar funding dynamics in P2P lending.
[13] P2P lending operates under an all-or-nothing (AON) funding mechanism. This implies that SMEs are funded only if their campaign reaches its target. Otherwise, the funds are returned to the investors. See Cumming et al. (2019).

investor funds on their balance sheets. The implication is that P2P loans are not subject to Basel III capital requirements to which commercial banks are subject. Note that Basel III capital requirements rise in tandem with risk and so banks were discouraged from lending to riskier UK SMEs in the wake of the 2008 banking and financial crisis.

The implication is that P2P lending portals have a lending rate comparative advantage relative to commercial banks and this increases with the riskiness of the SME. Thus, firms that have P2P debt are likely to be relatively risky SMEs that may also have had difficulties in or were discouraged from raising bank loans. From 2016, platforms like Funding Circle also received a funding boost in the UK. Investors in crowdfunding platforms will be able to offset for tax purposes losses from bad loans against other crowdfunding income. However, the downside of investing in P2P loans is that investor funds are not protected unlike bank deposits where the first £85k are guaranteed in the event of the bank getting into financial difficulties.[14]

2.3 Hypothesis development

Pecking order theory suggests that firms would first use internal funds to finance corporate activities before pursuing external finance. Within the later, debt financing is preferable to equity financing as the latter is more costly. In line with the pecking order theory, Denis and Mihov (2003) find that firms preferring debt financing have high leverage ratios. They also argue that firms with better credit ratings are likely to have bank loans and those with relatively lower grade ratings will be rejected by banks and thus seek to raise private non-bank debt. In addition, it is time consuming to obtain a bank loan as the evaluation process can be lengthy and complicated. By contrast, P2P loans provide a less complicated and more

[14] The Financial Services Compensation Scheme can pay this compensation if a bank is unable to pay claims against it.

rapid means for private firms to raise external debt. Due to the ease of raising funds via the internet, more and more small and private firms have raised P2P debt in recent years.

More risky SMEs are unlikely to have access to bank debt. We conjecture that this makes private SMEs more likely to be candidates for P2P debt financing when their credit quality is lower than that required by banks. This is because P2P debt shares some of the characteristics of non-bank private debt. Denis and Mihov (2004) find that firms placing the latter are of lower credit quality than those seeking bank debt. Thus, the first empirical testable implication is:

Hypothesis 1: High P2P debt levels are associated with lower credit ratings.

Note that this hypothesis is associated with the high P2P debt levels (or low bank debt levels) of the top quartile of sample, SMEs ranked by P2PTD relative to the low P2P debt levels (or very high bank debt levels) of the lower quartile of sample SMEs. All of the following hypotheses are also formulated in this manner.

Denis and Mihov (2003) find that firm size is positively related to public debt rather than to bank debt. Although SMEs are small firms in general, firm size proxies for their economies of scale. Therefore, banks are likely to lend to relatively larger firms than to smaller ones, especially where these firms have an established track record proxied by age. Therefore, our second empirical testable implication is:

Hypothesis 2: High P2P debt levels are associated with smaller SMEs.

Most private firms are owned by entrepreneurs and thus are unlikely to make large investment in fixed assets due to the SME funding gap identified in the literature (Fraser 2012). If bank debt is unavailable (or perceived to be unavailable as in the discouraged borrowers' hypothesis), then SMEs will be credit constrained and thus unable to invest. In this context, P2P debt is probably the only accessible source of external financing for such firms and particularly for those pursuing growth opportunities. P2P portals in their

evaluation of P2P loan applications are likely to look more favourably at applicant firms with low leverage ratios

Hypothesis 3: High P2P debt levels are associated with lower leverage levels.

Capital expenditures often imply that SMEs have to resort to retained profits as they are credit constrained. Capital expenditures are the main reason for cash outflows for small private SMEs and particularly for those that seek to expand. Such firms will need to fund their growth through external debt and P2P debt is typically the only accessible source of debt for sustained investment. Thus, we predict:

Hypothesis 4: High P2P debt levels are associated with lower capital expenditures.

Finally, we investigate the ex post use of P2P debt proceeds. We particularly focus on capital expenditures and working capital needs. P2P firms are unlisted and are unlikely to satisfy the term lending technology employed by commercial banks. They also are unlikely to have sufficient levels of retained profits to finance their capital expenditures. Such firms will therefor seek to use P2P debt to fund their growth or to fill the gap between current assets and current liabilities. Thus, we predict that

Hypothesis 5: P2P debt has a positive impact on capital expenditures in the years following that in which debt is raised.

Hypothesis 6: P2P debt has a positive impact on working capital in the years following that in which debt is raised.

3. Data sample and population

This section reports on the data for our unique sample of SMEs with outstanding P2P debt raised via the Funding Circle portal. This was chosen for two reasons. First, Funding Circle was founded in 2010 and is the UK's and indeed Europe's largest P2P business lender. By 2016, it had attracted over 42,000 investors and had lent to more than 10,000 SMEs. Below, we analyse a sample of these loans. Second, it is the only large P2P portal that specialises in

lending to SMEs in the UK. While its rival Zopa also lends to SMEs, it still primarily lends to consumers rather than SMEs.

Funding Circle makes available on its website aggregated data on its lending by risk category, interest rate, region, industry and reason for borrowing. Extant crowdfunding studies typically use such aggregated data from large, long-established reward-based platforms such as Kickstarter. The individual firm level data for the SMEs in this study were hand collected from the Funding Circle website over the Sept 2015 to Jan 2016 period. The SME postcode was used to link the sample SMEs with the Financial Analysis Made Easy (FAME) database[15] to create a deidentified data base.[16] Funding Circle debt and firm characteristics were matched with additional financial and other firm characteristics from the FAME database.

We start with an initial deidentified sample of 2,276 SMEs that had access to crowdfunding during the 2013 – 2015 period. These companies were private non-listed UK firms that are defined by Companies House as small and are only required to publish balance sheet financial information. Since they are not required to submit a profit and loss statement, we had to extract data from the balance sheet to create a mimicking income variable as a control (i.e. profitability (PROFITABILITY), see Appendix 1 for data definition) for the empirical analyses. The problem was that there were many missing observations and the data had to be filtered to include a minimum number of financial variables that were needed for our econometric analysis. Following Brav (2009), we also exclude firms in the financial sector (USSIC 6,000-6,999), the regulated utility sector (USSIC 4,900-4,939) and the public sector (USSIC 9,000-9,999) as the nature of these firms' capital structures are restricted by regulation and their accounting information is different to other firms.

[15] FAME is compiled by Bureau van Dijk (BvD). The data are collected from Jordans, a leading provider of legal information in the United Kingdom. In turn, Jordans collect the data from Companies House.
[16] The data are deidentified to avoid any confidentiality issues. Our interest is solely in the data at aggregated levels and not that of individual firms.

This filtering process resulted a balanced panel of 1,249 SMES from our initial sample of 2276 SMEs that raised P2P debt in the UK for the first time.[17] Table 1 gives the breakdown of the final sample by firm size and P2P loan characteristics.

[Table 1 around here]

Panel A shows that the overwhelming majority – some 96% - of firms were defined as small in the FAME database. These are firms that have just 10-49 employees. Some 2.5% of firms were defined as medium sized (50-249 employees) and the remainder as either micro (1.1%) or large firms (0.3%).

Since our sample is a fraction of the Funding Circle loanbook, it is interesting to see how representative is it for the purposes of our analysis. Table 2, Panel A summarises the companies' profile by industry, along with the share of the corresponding industry from the total number of loans in the Funding Circle's portfolio as of May 2016.

[Table 2 around here]

The sample includes a diverse range of companies. Overall, the sample industry percentages are quite close to the total number of funded projects. There are just two exceptions. First, the sample overweights the manufacturing and engineering industry and, second, it underweights the property and construction industry. However, the combined percentages for these two industries are very close with figures of 30% and 29% for our sample and Funding Circle total, respectively.

One of the interesting and attractive aspects of P2P debt is that, in contrast with traditional bank loans, the borrowers are not geographically constrained to borrowing from local sources only as in the case of bank lending. In principle, any SME with an internet connection can raise a P2P loan (assuming that it has the capacity to repay it) and the application process is simple and fast.

[17] We distinguish between first time P2P loans and follow-on P2P loans.

Table 2, Panel B provides the location of the sample companies by region. As a benchmark, we report the regional sample and total loan shares as well as the proportion of the population located in each region.[18] Panel B indicates that London and the South East are slightly underrepresented in our sample as compared with the Funding Circle's loan book. Our sample accounts for 34% of loans as against 37% for total loans in this region. However, the London and the South East sample share of 34% clearly exceeds the region's population share of just 27%. This is to be expected for two reasons. First, London and the South East were least affected by the post-2008 recession. Second, London has been described as the crowdfunding capital of the world. The Northern powerhouse[19] (North West and North East regions) accounted for 26% of crowdlending as against 23% of total loans and the population. This is consistent with manufacturing being overweighted in our sample. The Midland's sample share of 15% is representative relative to the total and the region's population share.

In the remaining regions like Scotland, Wales, Northern Ireland, and East of England, the proportion of sample loans is 3% to 5% and underweighted relative to the regions' population shares. This is in line with the Lee and Brown (2016) liability of distance concept applied to bank lending to innovative firms in peripheral UK regions. This concept refers to the positive impact of distance on discouraging borrowers and on the rejection probabilities of applicants in peripheral regions. By contrast, the liability of distance does not appear to affect P2P lending in the South West region where it is overweighted at 11% against a population share of 8%. The latter may reflect a higher degree of crowdfunding awareness in this region, which is the birthplace in 2011 of Crowdcube the longest established and largest UK equity crowdfunding platform.

[18] Population estimates were downloaded from the Office for National Statistics, UK, mid-2015.

[19] This term is used as shorthand for proposals to boost economic growth in the North of England by the 2010-15 coalition government and 2015-20 Conservative government in the United Kingdom, particularly in the core cities of Manchester, Liverpool, Leeds, Sheffield and Newcastle.

Figure 2 presents the share of firms within the different risk bands used by Funding Circle to classify borrowers' credit worthiness.[20]

[Figure 2 around here]

All companies that raise external finance through Funding Circle are classified into six risk bands ranging from A+ (very low risk) to E (highest risk). Figure 1 indicates that the crowd is prepared to lend across the SME risk spectrum and this is good news for companies seeking external finance, especially those that are characterised by above average risk. It shows that low risk firms are underweighted and high-risk firms are overweighted in our sample. The lowest risk firms (A+ and A) are underrepresented in our sample with a total of 39% as against 52% for total loans. The shares for sample and total firms with credit rating B are very similar (23% and 22%). However, the combined shares of the riskier sample companies in bands C and D exceed their corresponding total counterpart by a good margin (36% as against 24%). Overall, our sample of companies seems to be quite diverse and matches the borrowing patterns that may be observed by analysing the total loan portfolio of Funding Circle.

Funding Circle publishes the ex-ante purposes of their loans given by their borrowers in their loan applications. This is depicted in Figure 3.

[Figure 3 around here]

It suggests that the majority of our sample companies aims to attract funds primarily for growth or expansion purposes as these firms account for 52% of the total. This is consistent with firms seeking outside medium term funding. The other main purpose of loans is for working capital. These make up 36% of the total.

[20] To manage the credit risk, Funding Circle classifies each borrower within a risk band based on financial information supplied by the borrowing company and credit agencies such as Experian. Risk bands are assessed by taking into account some 1,500 factors such as (1) director's commercial track record and consumer information; (2) financial trend information; (3) commercial invoice payment performance; (4) size and age of business; (5) industry sectors and geographical region; (6) County Court judgements and bankruptcies (current and historical); (7) loan purpose.

4. Empirical results

This section presents an analysis of the determinants of firms' decision on the levels of P2P debt to raise in the context of outside debt financing. To do this, we distinguish between firms that use high levels P2P debt relative to total outstanding external debt and those that use low levels P2P debt (or high levels of bank debt) relative to total external debt.[21] Our sample consists only of SMEs that have already raised P2P debt through Funding Circle as well as bank loans.[22] Our approach is similar to Denis and Mihov (2003) in studying the incremental choice among competing forms of debt financing. However, whereas they study the choice between three long-established sources of debt financing – public debt, bank debt and non-bank private debt – we investigate the choice between P2P debt and bank debt.

Following Brav (2009), the change in total debt (sum of short-term debt and long term liabilities) between two consecutive years is taken as an indication of a firm's debt issuing activity. Therefore, a high ratio of P2P debt over the change in total debt (P2PTD, hereafter) is an indication that the company prefers P2P debt as the main source of debt financing. Alternatively, a low value of this ratio indicates that the company prefers bank loans.[23] One question in this context is the threshold level to be used to distinguish between these two competing debt categories. In our empirical analysis, we decide to focus on those companies that fall within the top and bottom quartile of the P2PTD distribution.

4.1 Descriptive statistics

Table 3 displays the descriptive statistics for all the baseline variables.

[Table 3 around here]

[21] Other sources of debt could include credit card borrowing and credit union loans but we refer to them collectively as bank debt.
[22] The lack of appropriate data constrains our study. Our sample consists of successful Funding Circle P2P loans only as we were unable to obtain data on unsuccessful P2P loans. We were unable to construct a matching sample of firms with similar debt levels but with no P2P loans as SME balance sheet debt data do not distinguish between bank and P2P loans.
[23] The assumption is that, among alternative sources, the most likely form of debt is bank overdrafts or loans.

The table shows the sample mean, median, standard deviation, minimum and maximum values for all firms (Panel A), for the top P2PTD quartile of firms (Panel B), and the bottom quartile (Panel C). The mean P2PTD ratio across all firms is 0.223 and the corresponding median is 0.172, indicating relatively low levels of P2P debt relative to bank debt overall. The mean of 0.471 for the top P2PTD quartile of firms (Panel B) indicates that the split between P2P and bank debt is almost equal but the median of 0.427 indicates that bank lending is the main source of debt financing for the median firm. This is not surprising since bank loans have traditionally been the main source of external finance for SMEs (Brav, 2009) and since P2P lending is a relatively new phenomenon.

Given the above, the SMEs in the top P2PTD quartile cannot be classified as those that prefer P2P debt but those in the bottom P2PTD quartile can classified as those with a clear preference for bank debt. Hereafter, we shall refer to Panel B firms as high P2P debt firms as their median P2P debt levels are 2.5 those of the full sample median firm. Correspondingly, we call firms in Panel C low P2P debt firms since their median P2P debt level of 0.057 is just one third of the full sample median firm. Our sample provides an excellent laboratory setting for studying the incremental choice between these two competing sources of debt financing for both high and low P2P debt level SMEs.

The top quartile or high P2P debt firms are significantly smaller than the bottom quartile or low P2P debt firms in terms of both mean and median SIZE (total assets) at the 1% significance level. For instance, they have mean values of total assets of £0.229m versus £1.832m, respectively. The implication is that smaller SMEs are more likely to have high P2P debt levels. The high P2P debt firms enjoy significantly lower levels of CPX than low P2P debt firms in terms of both mean and median measures.

The high P2P debt firms have a significantly lower LEVERAGE level than the low P2P debt (high bank debt) firms and these high P2P debt firms are also significantly older. Nonetheless, all these sample firms are considerably older than the successful equity

crowdfunding firms in the UK that typically are early stage firms with an average age of around 3 years.[24] The tangible assets ratio (TNG) data indicate that high P2P debt firms are significantly smaller than their low P2P debt counterparts. Both the mean and median differences are significant at the 1% level. The PROFITABILITY results suggest that high P2P debt firms are significantly less profitable than those preferring bank debt in terms of both mean and median measures at the 1% significance level. This is consistent with lower levels of retained earnings for high P2P debt firms.

Finally, high P2P debt firms exhibit significantly lower credit quality (as indicated by lower RATING levels) than do their low P2P debt counterparts. The respective means and median differences are highly statistically significant at better than the 1% significance levels. Recall that the RATING variable gives a credit limit proxy so that, the higher the risk, the lower the value of RATING. This result implies that online P2P lending is likely to be a more viable alternative source of financing for firms with high levels of risk or weak (low) credit ratings

Overall, the descriptive statistics indicate that high and low P2P debt firms have distinctive firm characteristics. The top quartile firms are relatively smaller in total assets, younger and less profitable than the bottom quartile. Ceteris paribus, they also appear to suggest that private SMEs seeking external financing may enjoy easier access (as measured by financial indicators) to P2P debt than they do to bank debt. In particular, small firms with weak credit ratings are more likely to use P2P debt rather than bank debt and they need the latter to fund capital expenditures.

Table 4 reports the correlations between variables used in the main regression.

[Table 4 around here]

[24] See Coakley and Lazos (2020).

The correlation coefficients show that all variables are weakly correlated which indicates a low probability of multicollinearity issues.

4.2 Modelling the preference for high versus low P2P debt levels

We face a tradeoff here between the sample size employed and the level of P2P debt in the sample. For example, if we were to model a clear preference for P2P debt relative to bank debt, then we would have to restrict our sample to the decile of firms whose P2P debt levels is at least 50% of total debt. This approach would utilise only a small fraction of our sample and the results may not be robust. Thus, we have decided to compromise by analysing the top quartile of firms whose median P2P debt level is 42.7%. We classify top and bottom quartiles of firms based on their P2P debt scaled by total debt (P2PTD, see Appendix 1 for data definitions). We refer to these as high (relative to the median sample firm) P2P debt level firms.

The decision on P2P debt level is modelled within a probit and logit regression framework. The choice of explanatory and control variables is motivated by the theoretical and empirical literature of capital structure and by the Denis and Mihov (2003) study. For example, Rajan and Zingales (1995), Havakimian et al. (2001), among others, find that size, asset tangibility, growth, and profitability are key determinants of companies' debt ratios, whereas Brav (2009) relates these variables to the funding behaviour of large private firms. Moreover, we include the Denis and Mihov (2003) determinants of the sources of new debt insofar as they are available.[25] Thus, we use total assets (SIZE) and tangible assets (TNG) as information asymmetry proxies, growth (GROWTH), profitability (PROFITABILITY) and a measure of the company's credit quality (RATING) as well several control variables including capital expenditures (CPX), leverage (LEVERAGE), and firm age (LNAGE) for

[25] One obvious difference is that the Denis and Mihov (2003) sample typically includes much larger publicly quoted companies that have much wider data availability such as credit and commercial paper ratings and management stock ownership data.

our analyses. Appendix 1 provides a detailed data definition. Specifically, we estimate the following probit regression:

$$y_j = X_{j-1}\beta + u_{j-1} \quad (1)$$

where y_j is a binary variable that takes the value of 1 for firms in the P2PTD upper quartile and 0 for those in the lower quartile, X_{j-1} is our vector of controls lagged in one period (SIZE, CPX, LEVERAGE, LNAGE, GROWTH, TNG, PROFITABILITY, RATING), and $u \sim N(0,1)$. The logistic regression uses as dependent variable the log odds of the event ln(p/(1-p), where p is the probability of the top quartile P2PTD event and the error term is not normally distributed.

The results from the probit and logit regressions are reported in Table 5.

[Table 5 around here]

The variables on credit quality yield interesting results. The coefficient on the credit rating variable, RATING, is significantly positive at the 1% level in both the probit and logit specifications. The implication is that firms with a high rating or credit limit (low risk) have a higher probability of raising P2P debt rather than bank debt. This novel empirical finding in the context of new outside entrepreneurial capital for SMEs rejects Hypothesis 1. It implies that Funding Circle is willing to offer medium term finance across the risk spectrum and so contrasts with the Denis and Mihov (2003) finding for non-bank debt in the USA. It is also consistent with the Cumming and Hornuf (2017) finding that rating is also a highly significant determinant of success in raising P2P loans for a sample of Germain SMEs. These findings are consistent with the fact that small firms even with high credit ratings may be discouraged from seeking or have been refused medium term bank loans (see McNamara et al. 2019 on credit rationing and Papanikolaou (2019) on the impact of the global financial crisis).[26]

[26] As an additional robustness test for firms with higher levels of P2P, we re-run the probit and logit regressions (equation (1)) using the top and bottom decile groups which contain 125 observations each. The top decile has a clear preference for high P2P debt over bank debt as its mean (median) value of P2PTD is 0.629 (0.58) while

The Table 5 results show that firm size (SIZE), measured by the natural log of total assets, is significantly and negatively related to the probability of issuing P2P debt relative to bank debt at the 1% significance level. The implication makes intuitive sense. Larger firms are more likely to prefer and be able to raise bank debt and this supports our Hypothesis 2. The debt ratio (LEVERAGE) is negatively related to the probability of choosing P2P lending as the main source of debt financing in both specifications, albeit the coefficients are statistically significant at the 10% level only. This provides some support for Hypothesis 3. In addition, there is an insignificant, both economically and statistically, relation between the choice of debt source and a company's growth, similar to the Denis and Mihov (2003) finding (albeit with a different proxy) in their US study.[27]

Table 5 indicates that capital expenditures (CPX) is significantly and negatively related to the probability of issuing P2P debt relative to bank debt at the 5% significance level. This is consistent with the main purpose of the debt being stated as the pursuit of growth opportunities from low levels of capital expenditures. This supports Hypothesis 4. Finally, the table shows that both the firm age (LNAGE) and tangible assets ratio (TNG) are not significant determinants of seeking P2P debt.

To sum up, our empirical results suggest that private firms that are characterised by high credit ratings, smaller firm size, and lower levels of capital expenditures and leverage are more likely to choose P2P debt financing over bank loans. In our sample, P2P debt is probably the only feasible alternative for external medium term debt for firms denied or discouraged from applying for bank loans. One could draw a parallel with the study of Denis

the mean (median) value of P2PTD for the bottom decile group is 0.03 (0.03). The unreported results are similar to those in Table 5. These results shed light on SMEs that have a clear preference for P2P debt and the probit and logit results are qualitatively similar to those reported in Table 5. So we can conclude that the Table 5 results for the top quartile of high P2P debt firms remain valid and this justifies the use of a larger sample size in this table.

[27] In unreported regression, we have also used an industry dummy and a loan purpose dummy. None of these dummies however turned out to be significant.

and Mihov (2003) where non-bank private debt was the only feasible source of external debt for low credit quality listed US firms.

To gain further insights into our results, we calculate the changes in the implied probability of choosing P2P over bank debt, using the estimates from the probit model in Panel A of Table 5. Consistent with the analysis of Denis and Mihov (2003), we assume that each independent variable changes from its value at the 25th percentile to its value at the 75th percentile, whereas all other independent variables remain constant at their average values. The results are reported in Panel B of Table 5.

The probability of choosing P2P debt as the main source of debt financing is most sensitive to changes in SIZE and LNAGE, PROFITABILITY and RATING. The likelihood of choosing bank debt is much higher if the company is characterized by high credit quality and profitability. The results also indicate that tangibility (TNG) and GROWTH, albeit statistically significant, have a modest impact on the choice of debt financing relative to CPX.

As a robustness test, in case the size of P2P debt (P2PTD) drives the results, we re-run the same regressions (equation (1)) and include the lagged value of P2PTD as a control. The results are both quantitatively and qualitatively similar to those Table 5.[28] Thus, we conclude that the size of P2P debt does not affect our econometric findings.

4.3 Funding capital expenditures

Given the significant role of capital expenditures in the probability of choosing P2P debt as the main source of debt financing, it is interesting to analyse the link between the capital raised and the subsequent investments by the firm. The main purpose for P2P debt given on applications on the Funding Circle portal is for capital expansion. Therefore, we use a regression model similar to that employed by Kim and Weisbach (2008) and relate capital

[28] Given the results are statistically similar to Table 5, we do not report them in the paper.

expenditures to the three competing sources of funding for the 2013-2015 sample period. The dependent variables are (i) the total amount of capital expenditures (CAPEX) and (ii) the total amount of working capital needs (WC) in one and two years after the base year in which the funds are raised. Given the data availability requirement of capital expenditures for one year and two years after the base year, there are only 409 (295) and 71 (53) observations left for the regression analysis of capital expenditures (working capital). The reason we observe the following two years is because over two thirds of firms raised P2P debt only in 2014 and 2015. The funding independent variables include P2P debt, other (mainly bank) debt and the change in issued capital.

The results are summarised in Table 6.

[Table 6 around here]

They indicate that both capital expenditures and working capital needs are positively and significantly related to each of the three funding variables. The impact of P2P debt on capital expenditures is statistically significant at the 10% level in year 1 following the funding year but insignificant in year 2 while the impact of other debt is insignificant in both years. More importantly, the relation between P2P funding and working capital needs is significantly high in 2 years after the year in which P2P funds are raised. The results also show that capital expenditures (working capital needs) are insignificantly related to other sources of debt and equity capital in one (two) years after the funding year as the p-values are significant. These results imply a rejection on the null hypotheses that the coefficients on P2P funds are equal to the coefficients on other sources of debt and equity capital.

In the spirit of Kim and Weisbach (2008), we also calculate the implied change in the dependent variable when each source of funds is increased by one pound (£1) for a median-sized firm in 2014 in the two-digit SIC code 73 (Business Services). The results of these calculations are also presented in Table 6. The implied change per pound raised by P2P financing is positive for the first two years after the base year during which capital is raised.

The allocation of P2P funds for capital expenditures is decreasing in the first two years but is increasing for working capital needs. In numbers, for every pound raised, capital expenditures rise by 14 pence for the first year after P2P debt funding and by 9 pence in year 2. Similarly, an increase of 1 pence in working capital needs results from every £1 raised in P2P debt in the first year after the funding base year. However, this effect is substantially changed in year 2 when working capital needs rise by 47 pence. In stark contrast, other debt financing and equity capital are not significantly used for the changes in investments and working capital in the first two years after the funding base year.

Overall, these findings suggest that firms use some of their P2P debt to engage in capital expenditures and working capital needs over the subsequent period of 2 years. In contrast, the implied changes per pound raised by other sources of debt and by issuing equity capital decrease over the subsequent 2 years.

5. Conclusions

P2P or marketplace lending differs from bank lending because it is funded via an internet portal and, as disintermediated debt, is not subject to Basel III and other formal banking regulations. It constitutes a novel form of outside entrepreneurial finance and, moreover, one that has been little researched to date. This paper provides novel insights into P2P debt by analysing a unique sample of 1,249 private UK SMEs 2013-2015 gleaned from the world's leading P2P business lending portal - Funding Circle. It argues that the success of the P2P business lending market stems from the symbiotic relationship between financial institutions and small investors as the lenders. The former exploit the collective wisdom of the crowd while the latter views large institutional investments as a certification effect that reduces information asymmetries and sometimes herds in their wake. Both contribute to mitigating

adverse selection problems whilst the involvement of financial institutions may mitigate against moral hazard problems.

The empirical results indicate that private companies with high credit ratings (low risk), low leverage ratios, smaller assets, and those with low levels of capital expenditures (those planning to pursue growth opportunities) are more likely to have a preference for high P2P debt levels. In our sample, P2P debt is probably the only feasible alternative source of outside entrepreneurial finance for even low risk firms denied or discouraged from applying for medium term bank loans. The probability of choosing P2P debt as the main source of debt financing is most sensitive to changes in firm size and credit ratings. By contrast, the likelihood of choosing bank debt is much higher for firms characterized by high credit ratings and high asset tangibility.

Whilst our sample of 1,269 SMEs is large by comparison with the samples employed in equity crowdfunding, it still remains small. Moreover, a more recent sample would probably contain a higher proportion of firms with a clearer preference for P2P debt as P2P lending has continued to grow rapidly in the UK. This would help in the analysis of the choice between P2P and bank debt. These are the main limitations of this study that unfortunately are not easy to overcome since data on P2P business debt remain notoriously difficult to access.

There is a considerable amount of research on P2P or marketplace lending to individuals (see e.g. Breuer et al. 2020; Wang et al. 2020). By contrast, research on P2P lending to SMEs is in its infancy due to the paucity of relevant data (exceptions are Cumming and Hornuf 2017; Franks et al. 2016). We see two interesting areas for future research. One of the main characteristics of P2P lending is that it is disintermediated debt that is not subject to Basel III regulations. The basis of the latter is to protect banks in sharp economic downturns. It will be interesting to see how non-Basel III regulated platforms like Funding Circle deal with the recession brought about by the Covid-19 pandemic. This is one major

topic for future research. Another is investigating the growing influence of financial institutions in the funding of SMEs on P2P lending platforms. Zhang et al. (2018) estimate that the institutions accounted for 40% of P2P business lending in the UK in 2017. This raises the possibility of the potential dilution of the wisdom of the crowd and its implications for potential adverse selection problems.

References

Agrawal, A., Catalini, C., Goldfarb, A. 2011. The geography of crowdfunding. NBER Working Paper No. w16820. Available at SSRN: http://ssrn.com/abstract=1770375

Available at SSRN: doi:10.2139/ssrn.1692661.

Agrawal, A., C. Catalini, A. Goldfarb. 2014. The simple economics of crowdfunding in J. Lerner and S. Stern eds. Innovation Policy and the Economy, Volume 14, pp. 63 – 97, University of Chicago Press/ NBER.

Agrawal, A., C. Catalini, A. Goldfarb. 2015a. Crowdfunding: Geography, social networks, and the timing of investment decisions. Journal of Economics & Management Strategy 24, 253-274.

Agrawal, A., C. Catalini, A. Goldfarb. 2015. Are syndicates the killer app of equity crowdfunding? MIT Sloan Research Paper No. 5126-15; Rotman School of Management Working Paper No. 2569988. Available at SSRN: http://ssrn.com/abstract=2569988 or http://dx.doi.org/10.2139/ssrn.2569988

Asterbo, T.B., Sierra, M.F., Lovo, S., Vulkan, N., 2018. Herding in equity crowdfunding. eLibrary SSRN.

Belleflamme P, Lambert T, Schwienbacher A., 2014. Crowdfunding: Tapping the right crowd. Journal of Business Venturing 29, 585–609.

Blackwell, D., Kidwell, D., 1988. An investigation of the cost differences between public sales and private placements of debt. Journal of Financial Economics 22, 253–278.

Brav, O. 2009. Access to capital, capital structure, and the funding of the firm. Journal of Finance 64, 263-308.

Breuer, W., Soypak, C.K., & Steininger, B.I., 2020. Magnitude effects in lending and borrowing: Empirical evidence from a P2P platform. The European Journal of Finance. DOI: 10.1080/1351847X.2019.1709525.

Cosh, A, Cumming, D., Hughes, A. 2009. Outside entrepreneurial capital. The Economic Journal 119, 1494–1533.

Coakley, J., Lazos, A. 2020. Recent developments in equity crowdfunding: A survey. Review of Corporate Finance, Forthcoming.

Cumming, D. and Hornuf, L. 2017. Marketplace lending of SMEs. Available at SSRN http://dx.doi.org/10.2139/ssrn.2894574 .

Cumming, D., Leboeuf, G., Schwienbacher, A., 2019. Crowdfunding models: Keep-It-All vs. All-Or-Nothing. Financial Management, Forthcoming

Denis, D.J., Mihov, V.T. 2003. The choice among bank debt, non-bank private debt and public debt: Evidence from new corporate borrowings. Journal of Financial Economics 70, 3-28.

de Roure, C. Pelizzon, L. and Tasca, P. 2016. How does P2P lending fit into the consumer credit market? Available at SSRN: https://ssrn.com/abstract=2756191

Einav, L. Farronato, C. and Levin, J. 2016. Peer-to-Peer markets. Annals of Economics 8, 615-630.

Evans, D.S., Schmalansee, R. 2016. Matchmakers. the new economics of multisided platforms. Boston MASS.: Harvard Business Review Press.

Franks, J., Serano-Vallverde, N. and Sussman, O. 2016. Marketplace lending, information aggregation and liquidity. Available at SSRN: https://ssrn.com/abstract=2869945 or http://dx.doi.org/10.2139/ssrn.2869945

Hornuf, L., Schwienbacher, A., 2018. Market mechanisms and funding dynamics in equity crowdfunding. Market mechanisms and funding dynamics in equity crowdfunding. Journal of Corporate Finance 50, 556-574.

Houston, J., James, J. 1996. Bank information monopolies and the mix of private and public debt claims. Journal of Finance 51, 1863-1889.

Hovakimian, A., Opler, T., Titman, S. 2001. The debt-equity Choice: An Analysis of Issuing Firms. Journal of Financial and Quantitative Analysis 36, 1–24.

Johnson, Shane A. 1997. An Empirical Analysis of the Determinants of the Corporate Debt Ownership Structure. Journal of Financial and Quantitative Analysis 32, 47-69.

Lee, N., Brown, R. 2016. Innovation, SMEs and the Liability of Distance: the Demand and Supply of Bank Funding in UK Peripheral Regions. Journal of Economic Geography 17, 233-260.

McNamara, A., O'Donohoe, S., & Murro, P., 2019. Lending infrastructure and credit rationing of European SMEs. European Journal of Finance, DOI: 10.1080/1351847X.2019.1637357

Milne, A. and Parboteeah, P. 2016. The Business Models and Economics of Peer-to-Peer Lending. European Credit Research Institute, No. 17.

Mochkabadi, K., Volkmann, C.K., 2018. Equity crowdfunding: a systematic review of the literature. Small Business Economics 1-44.

Moenninghoff, S. C., Wieandt, A., 2013. The future of peer-to-peer finance (May 20, 2012). Zeitschrift für Betriebswirtschaftliche Forschung, August/September, 466-487. Available at SSRN: https://ssrn.com/abstract=2439088

Mollick, E. 2014. The dynamics of crowdfunding: Determinants of success and failure**.** Journal of Business Venturing 29, 1–16.

Mollick, E., Nanda, R. 2016. Wisdom or Madness? Comparing crowds with expert valuation in funding the arts. Management Science 62, 1533-1553.

Morse, A. 2015. Peer-to-peer crowdfunding: Information and the potential for disruption in consumer lending. Annual Review of Financial Economics 7, 463-482.

Papanikolaou, N.I., 2019. How changes in market conditions affect screening activity, credit risk, and the lending behaviour of banks. European Journal of Finance 25, 856-875. DOI: 10.1080/1351847X.2018.1548367

Rajan, R.G., and Zingales, L. 1995. What do we know about capital structure? Some evidence from international data. Journal of Finance 50, 1421–1460.

Vismara, S., 2018. Information cascades among investors in equity crowdfunding. Entrepreneurship Theory and Practice, 42, 467-497

Wang, T., Zhao, S. & Shen, X., 2020. Why does regional information matter? Evidence from peer-to-peer lending. European Journal of Finance, DOI: 10.1080/1351847X.2020.1720262

Zhang, B., Ziegler, T., Mammadova, L., Johanson, D., Gray, M., Yerolemou N., 2018. The 5th UK Alternative Finance Industry Report. Centre for Alternative Finance (CAFE), Judge Business School, University of Cambridge.

Figure 1. P2P lending as a multi-sided platform

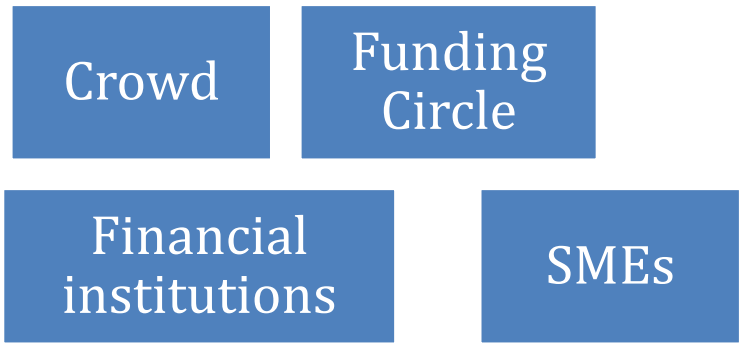

Figure 2. Company characteristics by credit band

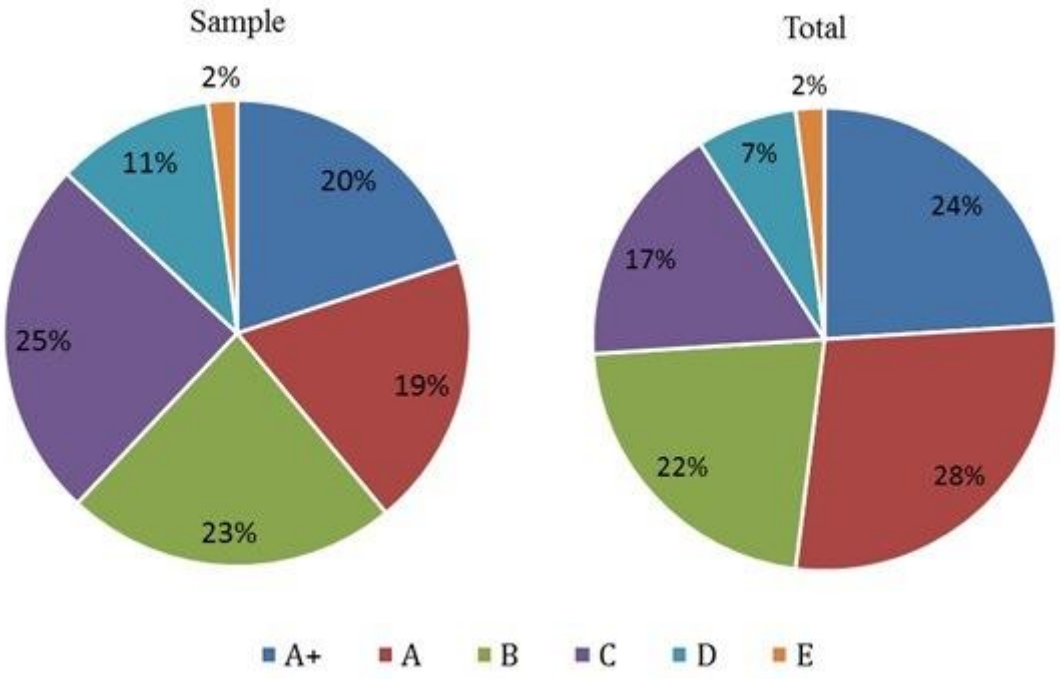

Figure 3. Loans characteristics by purpose

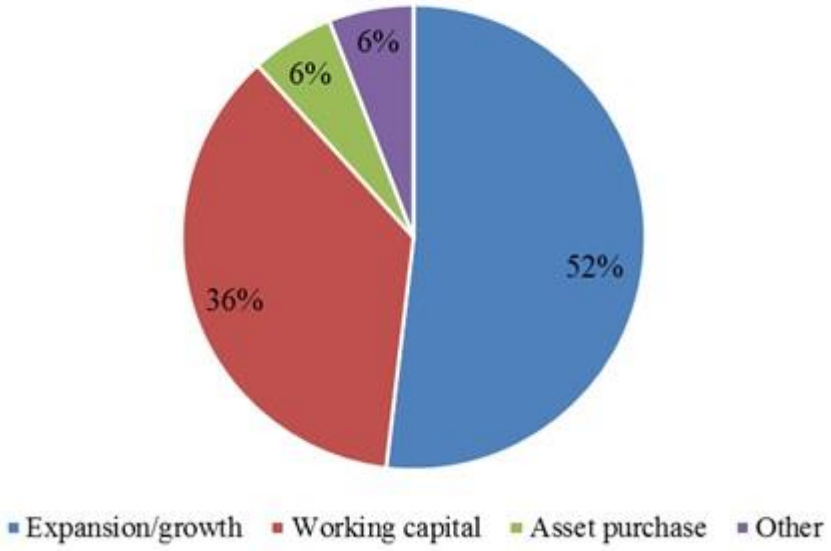

Table 1. Sample characteristics

This table reports the sample size distribution. Micro is for 0-9 employees, Small is for 10-49 employees, Medium is for 50-249 employees, and Large is for 250 or more employees. The size distribution is taken from the FAME database:

Size	Share (%)
Micro	1.1%
Small	96.1%
Medium	2.5%
Large	0.3%

Table 2. Lending characteristics

In Panel A, the first column (Sample) reports the share of companies within the sample from the corresponding industry. The last column (Total) reports the share of each industry from the total number of loans raised through the Funding Circle platform. The total number of loans at the time these figures were calculated was 18,444. All numbers are percentages. In Panel B, the first column (Sample) reports the share of companies within the sample from the corresponding region. The second column (Total) reports the share of each region from the total number of loans raised through the Funding Circle platform. The final column (Population) reports the population of each region as a share of the total population in UK. According to the Office for National Statistics mid-2015 estimates that total population of UK is 65,110,034. All numbers are percentages.

Panel A: P2P lending by industry	Sample	Total	
Manufacturing and engineering	18	12	
Retail	12	12	
Property and construction	12	17	
Professional and business support	10	11	
I.T and telecommunications	7	8	
Other	7	6	
Leisure and hospitality	6	8	
Transport and logistics	5	3	
Automotive	5	4	
Healthcare	5	5	
Wholesale	4	4	
Education and training	3	3	
Agriculture	2	2	
Consumer services	2	2	
Finance	2	3	
Panel B: P2P lending by region	Sample	Total	Population
South West	11	11	8
South East	22	23	14
London	12	14	13
East	4	4	10
Midlands	15	14	16
North East	13	11	12
North West	13	12	11
Wales	3	3	5
Scotland	5	6	8
Northern Ireland	2	2	3

Table 3. Descriptive statistics

Panel A reports descriptive statistics of variables across all 1,249 companies. Panel B reports descriptive statistics of variables across the top P2PTD quartile companies while Panel C reports those for the bottom P2PTD quartile companies. P2P is the value of the P2P debt, whereas TD is the total debt defined as the sum of long and short term debt. TOTAL ASSETS is in £ millions. Definitions of variables are provided in Appendix 1. Apart from P2PTD, all other variables are lagged one period. All variables are winsorized at the 1% and 99% levels to mitigate the influence of outliers. *, **, *** in Panel C are the 10%, 5%, and 1% level of significance, respectively, for the equality of mean and median tests between Panels B and C.

	Mean	Median	STD	Min	Max
Panel A: All companies (N = 1,249)					
P2PTD	0.223	0.172	0.175	0.013	0.875
ASSETS (in £ thousands)	776.0	354.4	1260.7	28.6	9090.4
SIZE	5.875	5.87	1.233	3.354	9.115
CPX	0.025	-0.002	0.118	-0.283	0.514
LEVERAGE	0.235	0.179	0.209	0.002	0.946
LNAGE	2.247	2.197	0.606	1.099	3.784
AGE	11.472	9	8.063	3	44
GROWTH	0.8	-0.7	17.2	-63.4	121.8
TNG	0.289	0.194	0.262	0.002	0.956
PROFITABILITY	19.9	6.6	67.9	-165.9	399.0
RATING	8.131	7.983	1.589	6.215	12.148
Panel B: Top 25% (obs. = 313)					
P2PTD	0.471	0.427	0.151	0.301	0.875
ASSETS (£thousands)	229.4	128.2	429.0	28.6	6822.6
SIZE	4.946	4.853	0.917	3.354	8.828
CPX	0.003	-0.009	0.115	-0.283	0.514
LEVERAGE	0.214	0.16	0.199	0.002	0.946
LNAGE	2.056	1.946	0.553	1.099	3.784
AGE	9.246	7	6.411	3	44
GROWTH	0.8	-0.8	18.5	-63.4	121.8
TNG	0.231	0.155	0.227	0.002	0.956
PROFITABILITY	8.3	2.7	36.1	-165.9	257.6
RATING	7.53	7.253	1.387	6.215	12.095
Panel C: Bottom 25% (obs. = 313)					
P2PTD	0.057***	0.057***	0.022	0.013	0.093
ASSETS (in £000)	1832.3***	1138.4***	1965.4	59.0	9090.4
SIZE	6.989***	7.037***	1.083	4.078	9.115
CPX	0.04***	0.004***	0.117	-0.283	0.514
LEVERAGE	0.299***	0.24***	0.237	0.002	0.946
LNAGE	2.476***	2.485***	0.635	1.099	3.784
AGE	14.489***	12***	9.485	3	44
GROWTH	-0.09	-0.678	16.5	-63.4	121.8
TNG	0.374***	0.316***	0.307	0.002	0.956
PROFITABILITY	42.347***	21.903***	100.1	-165.9	399.0
RATING	8.897***	8.794***	1.721	6.215	12.148

Table 4. Correlation matrix

The table reports the correlations between all variables used in the baseline regressions. Coefficient statistically significant at *, **, *** denoting statistical significance at 10%, 5%, and 1% level, respectively.

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
(a) P2PTD	1								
(b) SIZE	-0.57***	1							
(c) CPX	-0.13***	0.11***	1						
(d) LEVERAGE	-0.10***	0.04	0.09**	1					
(e) LNAGE	-0.24***	0.37***	-0.02	0.04	1				
(f) GROWTH	0.00	-0.02	0.10***	-0.01	-0.03	1			
(g) TNG	-0.18***	0.17***	0.29***	0.40***	0.12***	0.00	1		
(h) PROFITABILITY	-0.16***	0.38***	0.05	0.00	0.14***	0.07*	0.08**	1	
(i) RATING	-0.30***	0.66***	0.13***	-0.05	0.29***	0.00	0.10***	0.33***	1

Table 5. Regression analysis

Panel A reports coefficient estimates and associated t-statistics from a probit (left panel) and logit (right panel) model, where the response binary variable assumes a value of one for companies with a high (relative to the median company) P2P debt preference and zero for companies with a clear debt bank preference. The sample thus includes only top and bottom P2PTD (P2P debt to Total Debt) quartile groups, in which there are 626 observations. Panel B reports implied probabilities estimated using the probit and logit models where for each row, the independent variable in column 1 changes from its value at the 25th percentile to its value at the 75th percentile (i.e. the difference between the mean values from the Top quartile in Panel B and Lower quartile in Panel C from Table 3), while all other independent variables remain constant at their average sample values from Panel A. To mitigate the influence of outliers, all variables are winsorized at the 1% and 99% levels. *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively. Definitions of variables are provided in Appendix 1.

Panel A: Coefficient estimates (626 observations)

	Probit		Logit	
Variables	Coef.	z-stat	Coef.	z-stat
SIZE	-1.474***	-11.826	-2.654***	-10.718
CPX	-1.533**	-2.679	-2.833**	-2.839
LEVERAGE	-0.896*	-2.378	-1.644*	-2.311
LNAGE	-0.039	-0.272	-0.049	-0.188
GROWTH	-0.003	-0.633	-0.007	-0.679
TNG	-0.339	-0.939	-0.661	-1.032
PROFITABILITY	0.002*	2.041	0.004	1.954
RATING	0.343***	4.913	0.604***	4.737
Constant	6.324***	10.106	11.496***	9.235
Pseudo R-squared	0.548		0.550	

Panel B: Implied changes in probability

		Assumed change from Q1 to Q4 of the full sample of Panel A of	Implied changes in probability	
Variables	Mean of 626 obs.	Table 3	Probit	Logit
SIZE	5.967	2.043	5.725	10.339
CPX	0.022	0.037	-0.082	-0.118
LEVERAGE	0.256	0.085	0.094	0.206
LNAGE	2.266	0.42	0.013	0.015
GROWTH	0.355	-0.889	-0.055	-0.067
TNG	0.303	0.143	-0.005	0.030
PROFITABILITY	25.308	34.078	-0.041	-0.040
RATING	8.213	1.367	-2.407	-4.211

Table 6. Proceeds for capital expenditures

This table shows the results of OLS regression models for the examination of the distribution of capital raising to capital expenditures. The sample period is from 2013 to 2015. The dependent variables are: (i) the total amount of capital expenditures (CAPEX) and (ii) the amount of working capital needs (WC) in 1 and 2 years after the base year that the capital is raised. The independent variables are P2P debt (P2PTD), other debt (OTHERDEBT), the difference in issued capitals between a given year and he previous year (EQUITYCAP), and firm size measured by total assets (ASSETS) in natural log form as in the equation below. CAPEX, P2PDEBT, OTHERDEBT and EQUITYCAP are scaled by total assets. The regression models control for year and two-digit SIC code industry dummies. The definitions for all variables are presented in Appendix 1. The results for firm size and the two fixed effects dummies are not reported in the table. Standard errors are clustered by firm. The *t*-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

$$\ln\left[\frac{\sum_{i=1}^{t} DV_i}{ASSETS_0}+1\right] = \beta_1 \ln\left[\frac{P2PDEBT_0}{ASSETS_0}+1\right] + \beta_2 \ln\left[\frac{OTHERDEBT_0}{ASSETS_0}+1\right] + \beta_3 \ln\left[\frac{EQUITYCAP_0}{ASSETS_0}+1\right] + \beta_4 \ln[ASSETS_0] + \sum_{i=2010}^{2015} \theta_i Year\ Dummy + \sum_{j=1}^{53} \lambda_j Industry\ Dummy + \varepsilon$$

t	DV	$\ln\left[\frac{P2PDEBT}{ASSETS}+1\right]$		$\ln\left[\frac{OTHERDEBT}{ASSETS}+1\right]$		$\ln\left[\frac{EQUITYCAP}{ASSETS}+1\right]$		Obs.	Adj. R-squared
		β_1	*t*-stat	β_2	*t*-stat	β_3	*t*-stat		
1	CAPEX	0.154*	(1.807)	-0.025	(-1.149)	-0.135*	(-1.953)	409	-0.032
2	CAPEX2	0.092	(0.590)	-0.157	(-1.068)	-0.725	(-1.036)	71	-0.295
1	WC	0.009	(0.108)	-0.010	(-0.165)	-0.189	(-0.509)	295	0.093
2	WC2	0.571*	(1.843)	-0.027	(-0.091)	1.067	(1.260)	53	-0.083
		P-value	P-value	P-value	P-value	£ Change			
		b1=b2	b1=b3	b2=b3	b1=b2=b3	P2PDEBT	OTHERDEBT	EQUITYCAP	
1	CAPEX	0.08**	0.04**	0.07*	0.10*	0.14	-0.02	-0.12	
2	CAPEX2	0.25	0.26	0.32	0.49	0.09	-0.14	-0.66	
1	WC	0.83	0.60	0.64	0.86	0.01	-0.01	-0.18	
2	WC2	0.095*	0.58	0.07*	0.00***	0.47	-0.02	0.93	

Appendix 1. Data definitions

Variables	Definitions (FAME data item in italics)
DEBT	The total of *Short Term Loans Overdrafts*, *Other Current Liabilities*, *Long Term Debt* and *Other Long Term Liabilities.*
P2PTD	The value of P2P debt (from the website Funding Circle, in thousands), scaled by the total of *Short Term Loans Overdrafts*, *Other Current Liabilities*, *Long Term Debt* and *Other Long Term Liabilities*. We calculate the outstanding balance of each company's P2P debt at the end of the fiscal year using an amortization schedule calculator and assuming that the monthly payments are fixed. If the company has more than one loan, we first calculate the outstanding balance at the end of the fiscal year for each debt individually and then sum these outstanding debt amounts to obtain the total value of P2P debt for this company. The interest data for P2P debt is collected from the website Funding Circle.
SIZE	A natural log of *Total Assets (£ in thousands)*, inflation adjusted in 2015 pounds.
CPX	The difference between *Fixed Assets* in the current year and Fixed Assets in the previous year, scaled by *Total Assets*.
LEVERAGE	The total of *Short Term Loans Overdrafts* and *Long Term Liabilities*, scaled by *Total Assets.*
LNAGE	A natural log of firm years of incorporation.
GROWTH	The percentage change of TURNOVER between the current and previous years, where TURNOVER is the difference between *Shareholders Fund* in the current year and *Shareholders Fund* in the previous year, inflation adjusted in 2015 pounds.
TNG	The sum of *Tangible Assets* and *Investments Fixed Assets*, scaled by *Total Assets*
PROFITABILITY	The difference between *Profit Loss Account* in the current year minus *Profit Loss Account* in the previous year.
RATING	The natural log of the credit limit of a company provided by FAME. It is developed and maintained by CRIF Decision Solutions Limited in conjunction with Jordans. This is the maximum credit limit that is recommended to be given to the company at any one time.
OTHERDEBT	The difference between DEBT and P2PDEBT.
CAPEX	The difference between *Fixed Assets* in the current year and Fixed Assets in the previous year.
WC	The working capital needs (*WorkingCapitalneeds*).
EQUITYCAP	The difference between *Issued Capital* in a given year and that in a previous year if the change in its issued capital between a given year and the previous year, divided by the issued capital in the previous year, is larger than 5%.