

The role of crowdfunded debt in early stage entrepreneurial finance^{*}

Jerry Coakley[†]

Winifred Huang-Meier[‡]

Daniel Tsvetanov[§]

This version: January 2017

Abstract

In recent years, crowdfunded debt has become popular among risky and relatively early stage small, young, and privately held UK firms. This paper investigates the role of crowdfunded debt in financing decisions from 2010 to 2015 using a unique dataset of 1,014 private small firms. The results indicate that firms' debt ratios are sensitive to crowdfunded debt and to firm characteristics like firm size, asset tangibility and debt composition, but less sensitive to firm profitability. The larger target leverage deviations, the higher the probability of firms issuing or having crowdfunded debt. We find evidence that capital expansion plays an important role in explaining increases in crowdfunded debt. Our findings provide new insight into the traditional pecking order theory of capital structure that crowdfunded debt is considered to be an additional financing source for private firms. They also show that, in line with the trade-off theory, UK private firms have a higher proportion of debt to equity due to the high cost of issuing equity capital.

JEL classification: D92, G32, L20

EFM classification: 140, 800, 810

Keywords: Crowdfunded debt; Peer-to-Peer markets; Pecking order; Private firms.

^{*} Acknowledgements: 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.

[†] Business and Local Government Data Research Centre and Essex Business School, University of Essex, Wivenhoe Park, Colchester CO4 3SQ. Email: jcoakley@essex.ac.uk

[‡] Essex Business School, University of Essex, University of Essex, Wivenhoe Park, Colchester CO4 3SQ. Email: w.huang-meier@essex.ac.uk

[§] Department of Business and Management, School of Business, Management and Economics, University of Sussex, Falmer, Brighton BN1 9RH. Email: D.Tsvetanov@sussex.ac.uk

1. Introduction

This paper investigates the role of crowdfunding as a major source of outside entrepreneurial capital for small private firms. Since the seminal and comprehensive Cosh, Cumming, and Hughes (2009) study of the external funding sources for UK privately held entrepreneurial firms, crowdfunding has emerged as a novel source of outside capital. Crowdfunded debt is also known as peer-to-peer (P2P) business lending and it is growing very rapidly in both the USA and UK. Zhang, Baeck, Ziegler, Bone, and Garvey (2016) provide a comprehensive overview of crowdfunding in the UK and their analyses suggest that in 2015 P2P business lending accounted for 14% of the lending to UK small and medium enterprises (SMEs). Although it has been linked to microfinance, credit unions and other antecedents in the finance arena, the real driver is the meteoric rise of P2P markets such as eBay, Amazon and Uber that demonstrates the potential draw of electronic marketplaces over the past decade or so.¹ However, crowdfunded debt is a very distinctive and recent P2P market that, despite having its own specific characteristics, remains largely under-researched, particularly within the context of firms' capital structure. This paper aims to fill this gap in the literature and sheds new light on a specialist but growing segment of the crowdfunding market.

The paper employs a unique hand-collected dataset of 1,014 privately held small firms that have raised funds on the Funding Circle platform during the 2010-2015 period. The data are linked with company data from the FAME database to create a unique de-identified crowdfunding database. The paper's first contribution is that it sheds new light on a specialist area of for-profit crowdfunding known as debt crowdfunding or crowdlending.² Debt crowdfunding involves investors at large or the crowd funding small firms (and others)

¹ In recent years crowdfunding platforms have come to provide two main novel sources of outside entrepreneurial capital for small firms: equity and debt crowdfunding.

² See Einav, Farronato and Levin (2015) for an overview of P2P markets in general whose focus is mainly on goods and services.

via an internet portal. These investors include financial institutions that can contribute up to 30% of any crowdfunding project on Funding Circle, the main debt crowdfunding platform in the UK and indeed in Europe. This part of crowdfunded debt has some parallels with non-bank private debt but it is funded via a public internet platform. On Lending Club - the main US debt crowdfunding platform - the crowd has been squeezed out and institutions now dominate. This crowdfunded private debt market now known as P2P marketplace lending can be viewed as internet-based private placements of debt. This is pure business-to-business debt and therefore contrasts sharply with the dominant role of many small investors in crowdfunded debt in the UK. Our findings confirm that crowdfunded debt plays an increasingly important role in the external financing of small private entrepreneurial firms.

Our paper links with both the Cosh et al. (2009) study of the sources of outside entrepreneurial capital for private UK firms and the Brav (2009) study of the characteristics of UK public and private firms in 1993-2003. The Cosh et al. findings support the traditional pecking order hypothesis and indicate that smaller private firms may face a capital gap. Brav establishes that private firms depend almost entirely on debt finance, have higher leverage ratios and tend to avoid external capital markets. Debt crowdfunding platforms have emerged in the aftermath of the Cosh et al (2009) and Brav (2009) studies and can be regarded as a hybrid external debt source. Crowdfunded debt differs from conventional public debt in two respects. The first is that it economises on transaction costs – notably flotation costs – as the funds are raised via an internet platform in contrast to the public debt sold on the corporate bond market. The second and major difference is that, while conventional public debt is raised by large established corporations with strong credit ratings – with the notable exception of the junk bond market – crowdfunded debt is raised by small, young, risky, and non-listed (i.e. privately held) firms that would have difficulties in accessing medium term bank debt.

The paper's second contribution is that it investigates the drivers of the decision by the 1,014 small private UK firms to raise crowdfunded debt as opposed to alternative sources of debt financing. Indeed, this is the first study of the drivers of firms' choice to rely on crowdfunded debt during a period where the other major source of debt financing – bank lending – was heavily constrained in the UK. It focuses on two major medium-term external sources of funds available to small private UK firms: crowdfunded debt and bank debt.³ As such, it complements the path breaking study of Brav (2009) that focuses only on the external financing of private medium and large-sized SMEs. New external equity is typically not a feasible source of funding for small private firms.⁴ Thus our sample of firms is largely confined to a choice between different sources of debt or loan capital. Crowdfunded debt shares some characteristics with non-bank private debt as institutions can also invest. However, even though institutional investors contribute, the majority of funds are raised from the public (crowd) via an internet portal and as such it must be considered a new hybrid form of public debt. Our empirical results show that crowdfunded debt plays a unique role in the funding of risky and relatively early stage small private firms and is gradually considered to be an additional source of outside debt capital although it is still not the first preferred choice than bank debt. The implication of our findings is that crowdfunded debt adds a new layer of outside capital to the traditional pecking order of external funds for private firms and this is a novel finding.

The paper is organised as follows. Section 2 outlines the distinctive features of the P2P lending markets in the UK, compares crowdfunded debt and bank debt and provides the hypothesis development. Section 3 describes the data and variables used in this study and presents descriptive statistics. Section 4 analyses the empirical results. A final section concludes.

³ See Cosh et al. (2009) for a comprehensive list of the other sources of outside capital.

⁴ Crowdfunded equity may be a new source of equity for such firms but is beyond the scope of this paper.

2. Crowdfunding debt and hypothesis development

2.1 P2P lending markets

P2P markets are revolutionising or uberising⁵ traditional markets for goods or services that often are dominated by monopolistic or oligopolistic suppliers. Einav et al. (2015) view the main function of P2P markets as making it easy for buyers to find sellers and engage in convenient and trustworthy transactions. P2P markets in finance developed later than general P2P markets. However, their recent rapid growth and, in particular, the mushrooming of crowdfunding platforms has led to them being designated as leaders of the fintech⁶ (financial technology) or alternative finance sector. Other prominent examples of the latter include foreign exchange transfer platforms such as Transferwise and CurrencyFair. Interestingly, the latter shares most of the common features of P2P markets identified by Einav et al. (2015). These include lowering entry costs for sellers, engaging in spot transactions, employing technology to match buyers and sellers, doing little up-front screening, and maintaining quality using feedback mechanisms.

Crowdfunded debt markets enable small firms (and consumers) to access financing from the crowd and is by far the most prevalent form of crowdfunding.⁷ These markets are characterised by three distinctive features that distinguish them from P2P markets in general. First, crowdfunded debt involves ongoing relationships between the lending platform (acting on behalf of the investors) and the borrowers (crowd) typically for periods of one to five years, depending on the term of the loan facility. By contrast, most general P2P markets like eBay or Amazon involve spot transactions only.

⁵ This refers to the disruptive effects Uber had on the taxi market potentially spreading to other markets.

⁶ See Cumming and Schwienbacher (2016) for an interesting study of fintech venture capital.

⁷ Note that most early crowdfunding projects were generally in the arts and creative industries and were reward/product based rather than for profit. See Agrawal et al. (2015), Belleflamme et al. (2014), Belleflamme et al. (2015) and Mollick (2014) for more discussion.

Second, they take advantage of technology and machine learning to aggregate or pool the savings of individual investors, as well as to screen and allocate borrowers into different risk categories. Indeed, the aggregation of “part loans” is what distinguishes debt crowdfunding from marketplace lending in the USA where financial institutions supply the whole debt.

Third, they seek to maintain quality by using market design mechanisms and reputation to continue successfully to attract investor funds. One of the most important tasks is the provision point mechanism highlighted by Agrawal et al. (2013). In this case, the SME only receives the funds if the funding target level is met or exceeded within a particular time period of time. Such a mechanism is a solution to a classic coordination and free-riding problem that arises in the provision of public goods.

One of the big issues addressed in this paper is where crowdfunded debt might fit into the pecking order of outside debt. It links with Denis and Mihov (2003) who employ an incremental approach to study 1,560 new US debt financings on the choice between bank debt, non-bank private debt and public debt. They establish a hierarchy or pecking order of debt funding and are one of the first to stress the role of credit quality in this process. They find 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.

This paper seeks to provide an answer to the question of whether crowdfunded debt ranks above or below bank debt in terms of the firms it is likely to attract. Since debt crowdfunding is often described as P2P business lending, this may give the false impression that it is similar to bank lending. It is not because crowdlending can be viewed as a form of regulatory arbitrage or disintermediation as crowdfunded debt is not subject to Basel III capital requirements under which commercial banks operate. Note that Basel III capital

requirements rise in tandem with risk and so banks were discouraged from lending to smaller (riskier) UK SMEs in the wake of the 2008 banking and financial crisis.

The implication is that lending platforms have a lending rate comparative advantage relative to commercial banks.. Thus firms that have crowdfunded debt are likely to be small firms that may also have had difficulties in or were discouraged from raising medium term bank loans. The external funding problem is particularly acute for privately held small firms as their accounts are sparse and opaque. For instance, small private firms are required by UK company law to publish balance sheet financial information with their annual reports but are not obliged to publish their profit and loss accounts. This makes risk assessment more challenging for banks. Finally, crowdfunding provides a less complicated and more rapid means for private firms to raise external debt since it is time consuming to apply for a bank loan as the evaluation process can be lengthy and complicated. Due to the ease of raising funds via the internet, more and more small and private firms have obtained crowdfunded debt in recent years.

2.2 Hypothesis development

In this paper, we are interested in private firms' financial decisions on the both traditional and unconventional capital sources – the issued capitals, bank debt and crowdfunded debt. Aforementioned, in recent years many firms, especially small private firms, consider raise capital from the public crowdfunding platform. Although the capital size of crowdfunded debt is not as large as bank debt, it cannot be ignored that crowdfunded debt is part of the firm's capital structure. While virtually all UK small firms have short run, overdraft financing from their clearing bank, more risky firms are unlikely to have access to medium-term bank debt where the latter has a maturity of 1-5 years. We conjecture that this makes small private

firms more likely to be candidates for crowdfunded debt borrowers when their credit quality is lower than that required by banks. In particular, Denis and Mihov (2003) find that firms preferring debt financing tend to have higher leverage ratios. Thus, the first empirically testable implication is

H1: Crowdfunded debt contributes to a firm's debt ratios.

Following Shyam-Sunder and Myers (1999), we use the financing deficit regression model to examine the pecking order behaviour of these small private firms in our sample. Since it is costly, particularly for small-sized firms, to raise capital externally, private firms are in general less likely to raise or retire capital. Until the internal funds are insufficient for the deficit, these private firms thus seek for external funding sources. Therefore, the next empirically testable implication is

H2: When private firms have financing deficit, they are likely to issue either debt or request more equity capital than retire debt or repurchases equity.

Most small private firms are typically owned by founder entrepreneurs and thus are unlikely to make large investment in fixed assets due to funding gaps (e.g. Fraser, 2012). If bank debt is unavailable or perceived to be unavailable as in the discouraged borrowers' hypothesis, then firms will be credit constrained and thus unable to invest. In this context, crowdfunded debt is probably the only accessible source of external financing for such firms and particularly for those pursuing growth opportunities. Then the next empirically testable implication is

H3: Small private firms are more likely to issue crowdfunded debt.

Next, we examine the relationship between firm size and crowdfunded debt. Most of prior studies focus on public firms and find that firm size matters to the pecking order theory. For instance, Frank and Goyal (2003) document that the pecking order theory applies well to large US firms but does not explain the financing decisions of small US firms well. Denis and

Mihov (2003) find that firm size is positively related to public debt than bank debt, using US public firms. Fama and French (2005) conclude that many US publicly listed firms do not follow the pecking order theory and issue equities in the first place than debt. However, these studies do not explore whether firm size influences the financing decisions of private firms. Since the vast majority of small private firms are tiny in terms of their firm size (i.e. total assets), many of them yet to have well-structured financial and accounting reports that can be provided on the web-based public funding platform. The information that is mostly available and reliable to lenders is the value of a firm's total assets. Thus, crowdfunding investors are likely to invest in relatively bigger rather than in smaller private firms because these firms are more stable in terms of their economies of scale. This leads to the hypothesis

H4: Crowdfunded debt is positively impacted by the size of small private firms.

As the pecking order theory suggests (Myers and Majluf, 1984), firms would first use internal funds to finance corporate activities before pursuing external finance. As to external finance, debt financing is preferable to equity financing as the latter is more costly and managers are reluctant to cede control of their enterprises to outsiders. As such, our next empirical testable implication is

H5: Debt (either crowdfunded debt or other debt) is preferable to issued capital.

Other debt is mainly bank debt. The main difference between bank and crowdfunded debt is the degree of information asymmetry which influences the order or sequencing in how external financing sources are chosen. Compared with other non-bank public debt providers, banks request more financial information in applications in order to better assess and monitor borrowers. As such, firms with lower asymmetric information will normally borrow from banks first and those with higher asymmetric information will tend to borrow privately (Fama, 1985). Moreover, crowdfunded debt amounts typically are much smaller than those of

bank loans. Therefore, we hypothesise that other debt (mainly bank debt) is the main debt capital alternative to crowdfunded debt for private firms.

Crowdfunded firms are at the early stage of their entrepreneurial finance life cycle and thus are unlikely to have sufficient levels of retained profits to finance their capital expenditures. These expenditures are the main reason for cash outflows for small private firms and in particular those that pursue growth opportunities. Such firms will need to fund their growth through bank debt or, more likely in the case of our sample period, crowdfunded debt. Thus, we predict that

H6: Crowdfunded debt has a larger impact than other (mainly bank) debt and equity capital on the capital expenditures of small private firms in the years following that in which debt is raised.

3. Data and sample

3.1 Sample construction

This subsection reports on the data for our unique sample of small private firms with outstanding crowdfunded debt raised via the Funding Circle platform. This platform was chosen for two reasons. First, Funding Circle, founded in 2010, is the UK's and indeed Europe's largest crowdlender. It has over 42,000 investors and has lent to more than 10,000 firms. Second, it is the only large crowdlender that specialises in lending to small firms in the UK. While its rival Zopa also lends to small firms, it still primarily lends to consumers.

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 platforms such as

Kickstarter. Our approach is different from the previous work in that we hand-collect a large sample of firms with outstanding crowdfunded debt from the Funding Circle website.⁸ Financial information for these firms is obtained from the Financial Analysis Made Easy (FAME) database⁹ to create a de-identified database.¹⁰ The sample firms are overwhelmingly small private (i.e. non-listed) UK firms. They are defined by Companies House as small and so are required to submit balance sheet financial information only. Since they are not obliged to submit a profit and loss statement, income data from the balance sheet had to be extracted to create the control variables for the empirical analyses. Thus, firms not listed in FAME are excluded. We also exclude utility firms (USSIC codes 4900-4939), financial firms (USSIC codes 6000-6999), and public sector firms (USSIC codes 9000-9999) due to the regulations they are subject to and their distinct financial policies and capital sources. This filtering process results in a final sample of 2,661 firm-year observations and 1,014 firms.

Since the sample is a fraction of the Funding Circle loanbook, it is interesting to see how representative is it for the purposes of our analysis. Appendix 1a summarises the firms' 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. The sample includes a diverse range of firms. Overall, the sample industry percentages are quite close to the total number of funded projects. There are 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 the sample and total, respectively.

⁸ Available from <https://www.fundingcircle.com/uk/> [Accessed from September 18, 2015 to January 25, 2016].

⁹ 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.

¹⁰ The data are de-identified to avoid any confidentiality issues. Our interest is solely in the data at aggregated levels and not that of individual firms.

One of the interesting and attractive aspects of crowdfunded debt is that, in contrast with traditional bank debt, the borrowers are not geographically constrained to borrowing from local sources only. In principle, any firm with an internet connection can become a borrower (assuming that it has the capacity to repay the loan). Appendix 1b provides the location of the sample firms 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.¹¹ The figures suggest that London and the South East are slightly underrepresented in our sample as compared with Funding Circle's loanbook. 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% and is in line with the spatial concentration of crowdfunding highlighted in Agrawal et al. (2011).

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 powerhouse¹² (North West and North East regions) accounted for 26% of crowdfunded debt 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 debt is 3% to 5% and underweighted relative to the regions' population shares. By contrast, it is overweighted at 11% for the South West region against a population share of 8%. Overall, all sample figures are reasonably close to the percentage shares of each region from the total loanbook, suggesting that our sample is representative.

¹¹ Population estimates were downloaded from the Office for National Statistics, UK, mid-2015.

¹² 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.

3.2 Descriptive statistics

Table 1 shows the debt characteristics for the sample. It also reports summary statistics for the dependent and independent variables used in the regression models in this paper. The detailed variable definitions are summarised in Appendix 2. The table shows the sample means (and standard deviations in parentheses under the mean) of the variables for firm-year observations with no crowdfunded debt (column 2), for observations with crowdfunded debt (column 3), and all observations (column 4). The final column gives the t -statistic (and corresponding p -values in parentheses) for equality of means for columns 2 and 3.

[Table 1 around here]

Several observations can be made. First, firm-year observations with crowdfunded debt are characterised by higher leverage (in total and net terms), spend more on capital expenditures (CAPEX), are larger (proxied by total assets) and older, enjoy higher turnover (TURNOVER) and profitability (PROFIT) levels, and have a smaller deficit (less negative) (DEFICIT) gap. Second, firm-year observations with crowdfunding are indistinguishable from firm-year observations without crowdfunding in terms of both average return on assets (ROA) and tangible assets (TANGIAT). Finally, firm-year observations with crowdfunding have a lower ratio of short to long term debt (SHORT_TO_LONG) relative to firm-year observations without crowdfunding.

Table 2 presents the correlation matrices for the variables included in the econometric specifications for our full sample. The table separately presents the correlations between variables for firm-year observations with crowdfunding in the (shaded) upper triangular matrix part and the firm-year observations without crowdfunding in the lower triangular matrix part.

[Table 2 around here]

The table shows several significant correlations at the 5% critical value or better and some the coefficients are relatively low (<0.5). In the case of firm-year observations with crowdfunding, leverage is positively correlated with crowdfunded debt but negatively correlated with firm size. On the other hand, in the case of firm-year observations without crowdfunding, leverage is positively correlated with firm size. Both sub-sample groups' leverage is positively correlated with tangible assets and the deficit but negatively correlated with net working capital. Also, crowdfunded debt is significantly inversely related with capital expenditures, tangible assets, firm size, age, turnover, profitability, and the deficit.

4. Empirical results

This section analyses the determinants of debt ratios of the small non-listed firms in our sample and of their external financing choices. Following Brav (2009), we use firms' balance sheet data to quantify their leverage and differentiate between capital issuances or repurchases. In particular, we measure leverage as the sum of short-term loans and overdrafts plus long term liabilities, all divided by total assets. In the context of debt financing, we also analyse the key factors that affect firms' decision whether to crowdfund or not. To do this, we calculate the outstanding balance of each company's loan at the end of the fiscal year using an amortization schedule calculator and assuming that the monthly payments are fixed.¹³ If the firm has more than one loan, we first calculate the outstanding balance at the end of the fiscal year for each loan individually and then sum these outstanding loan amounts to obtain the total value of crowdfunding debt for this firm.

¹³ All crowdfunding loans in our sample are being amortized. For each company we assume that the accounting reference date reported by FAME is the end of the fiscal year. Given that Funding Circle provides the duration and date at which the loan was accepted, calculating the outstanding balance using an amortization schedule is a straightforward exercise.

4.1 Leverage

This section analyses the determinants of firms' debt ratios using a regression framework as in Brav (2009) and Rajan and Zingales (1995). The choice of explanatory and control variables is motivated by the previous theoretical and empirical literature of capital structure. For example, Berger and Udell (1995), Rajan and Zingales (1995), Hovakimian et al. (2001), and Petersen and Rajan (2002), among others, find that firm size, asset tangibility, growth, profitability and age are key determinants of firms' debt ratios. We also include the composition of firms' debt (SHORT_TO_LONG) to control for contracting problems (e.g. Faulkender and Petersen, 2006; Brav, 2009) and a dummy variable to help quantify the increase in leverage due to crowdfunding.

Table 3 presents pooled Ordinary Least Squares regression estimates for net leverage (or leverage) for the full sample from 2010 to 2015 and the corresponding *t*-statistics, adjusted for clustering by firm. The independent variables are lagged one period (except for the binary crowdfunding dummy variable) to avoid potential endogeneity issues and all variables are divided by total assets to mitigate for heteroskedasticity.

[Table 3 around here]

The coefficients on growth and capital expenditures are always statistically insignificant, which is consistent with Brav (2009) who posits that private firms' leverage is more sensitive to operating performance since their absolute cost of capital is high. In line with the trade-off theory of capital structure, however, leverage is positively and significantly related to the proportion of short-term debt and assets tangibility. These findings are robust regardless of whether or not we take into account bank deposits and investments when measuring leverage.

The table shows negative relations between net leverage and profitability (proxied by ROA) and between leverage and age but both are only marginally significant at the 10% level. There is also a positive and statistically significant relationship between net leverage and size. Interestingly, both leverage measures (net and total) are positively and significantly related to a crowdfunding dummy at the 1% critical value and these remain significant even when the usual control variables are added. This is a novel finding in the context of leverage. It is consistent with the fact that crowdfunded debt has a cost advantage relative to bank debt since, unlike bank debt, it is disintermediated debt and thus not subject to Basel III capital requirements.

Overall, the results indicate that firms' debt ratios are sensitive to crowdfunded debt as predicted in hypothesis H1 and to firm characteristics like firm size, asset tangibility and debt composition, but less sensitive to firm profitability. These findings depart in important respects from those of Brav (2009) for his sample of medium and large private firms. He establishes that leverage is highly sensitive to performance variables like ROA in line with traditional trade off theory. However he also finds highly significant coefficients for all his other independent variables including growth, capital expenditures, tangible assets, firm size, age, and debt composition. By contrast, our findings indicate that ROA is significant in just one regression at the 10% level and, apart from tangible assets, firm size, and debt composition, the other variables are mostly insignificant.

4.2 Decision to raise or retire capital

This subsection examines how access to capital markets affects the decisions of small private firms on whether to raise or retire capital. Brav (2009) argues that private firms tend to rely more on debt than on equity since their cost of equity is higher for two reasons. One is that

the owner managers (and other large shareholders) in private firms are reluctant to cede or dilute their control. The other is that the equity of private firms will be less attractive to outside investors due to the high degree of information asymmetry between insiders and outsiders. These two factors combine to raise the cost of equity for private firms. In the context of this paper, crowdfunding offers new sources of external debt and equity capital to private firms that are less expensive than their traditional counterparts but this paper focuses on crowdfunded debt only.

We explore the capital issuance and retirement decisions of firms within our sample using a multinomial logit model as in Brav (2009). The dependent variable takes the values of 0 if the firm takes no action (the base category), 1 if it issues either debt or equity, and 2 if it either retires debt or repurchases equity. A firm is defined as issuing (repurchasing) equity if the percentage change of its shareholders' funds (the face value of total outstanding shares) is larger (smaller) than 5% (-5%). Similarly, we define a firm as issuing (retiring) debt if the percentage change in the sum of short-term debt and long term liabilities is larger (smaller) than 5% (-5%). Following Leary and Roberts (2006) and Brav (2009), a firm's deficit and net working capital (NWC) are used as control variables.

The multinomial model results are presented in Table 4. In interpreting the results, note that the sign on the reported coefficient estimates shows whether a small change in the explanatory variable increases or decreases the odds ratio of the indicated alternative relative to the baseline case of taking no action. Model (1) includes all the explanatory variables (excluding Z-score) employed by Brav (2009) and, similarly, a firm's deficit and net working capital (NWC) are used as control variables. The differences between this and Models (2) and (3) is that the latter successively add leverage and profitability, respectively, as explanatory variables.

[Table 4 around here]

The results are interesting. Small private firms are more likely to raise capital when they have a deficit and to retire capital when they have a surplus. The results support our hypothesis H2. The implication is that private firms are likely to raise external capital only when they have to, which is consistent with the higher cost of capital they face. The results indicate that the larger the firm size, the less likely it is to raise or retire capital, possibly due to economies of scale in cash management. Both of these findings are consistent with those of Brav (2009) for his sample of private firms. However, growth opportunities in our sample have an insignificant impact unlike in Brav (2009) where the probability that private firms issue (retire) capital is positively (negatively) related to an increase in growth opportunities, consistent with firms raising capital to finance future investments.

Our results show that small firms with higher levels of net working capital are more likely both to raise and to retire capital, possibly using the new capital to retire debt. By contrast, Brav (2009) finds that his sample of private firms with higher levels of net working capital is less likely to retire capital. Our Model (2) adds leverage as an explanatory variable while our Model (3) adds profitability as well as leverage. These have no impact on our previous results with one exception in Models (2) and (3). Including leverage (and profitability) has the effect of rendering insignificant the impact of net working capital on the probability of raising capital but not on retiring capital. The Model (2) results indicate that the higher the leverage levels, the lower the probability of both raising new capital and retiring existing capital. The Model (3) results also show that the higher the profitability levels, the higher the probability of raising new capital. These two sets of results are novel.

To sum up, our results on the decision to raise or retire capital are highly consistent with those of Brav (2009) for his medium and large private firm sample. Our findings produce two novel results. First, the higher the leverage levels of small private firms, the

lower is the probability both of raising new capital and retiring existing capital. Second, high profitability levels boost their probability of raising new capital.

4.3 Crowdfunding and external financing choices

This subsection presents results on the decision of small private firms to crowdfund or not to crowdfund. The crowdfunding decision is interesting as it can shed light on the aversion of private firms to external financial markets that is well documented in the literature. It is tested within a Probit regression framework where the response binary variable assumes a value of one for firms that prefer crowdfunding as the source of debt financing and zero for firms that take no action on issuing crowdfunded debt. The choice of general explanatory and control variables is motivated by Brav (2009) and the theoretical and empirical literature on capital structure. For example, Rajan and Zingales (1995) and Hovakimian et al. (2001) find that firm size and profitability (among others) are key determinants of firms' debt ratios. Building on Brav (2009), we model the decision to crowdfund in the spirit of Hovakimian et al. (2001) using the predicted debt ratios from the leverage regressions (in columns (2) and (4) of Table 3) as proxies for the target debt ratios. The independent variables include the target adjustment of leverage, ROA, and firm size. The target adjustment of (net) leverage, TMA_LEV (TMA_NET_LEV), is the difference between the predicted (net) leverage ratios from the leverage regression models of Table 3 column (2) (4) and the actual (net) leverage ratio in the previous year. The results from the Probit regression are reported in Table 5.

[Table 5 around here]

The target adjustment hypothesis of the static trade-off theory posits that, the larger the target

leverage distance relative to the starting-period leverage and the more profitable the firm, the more likely the firm will choose debt in the issuance decision. The results in Table 5 offer support for our hypothesis H3. The coefficients on both the target leverage proxies are significantly positive for both crowdfunding dummy variables. These indicate that the larger target leverage deviations, the higher the probability of firms issuing more crowdfunded debt in regressions (1) and (2) and of having crowdfunded debt in regressions (3) and (4). This is consistent with the trade-off theory of capital structure.

Table 5 shows that profitability levels are inversely related to the probability of raising crowdfunded debt at the 1% significance level in all specifications. It is possible that low ROA levels imply low retained earnings and thus a need to raise external capital. This contrasts with the Brav (2009) finding of an insignificant coefficient on this variable for the private firms in his sample. Finally, we include firm size measured by taking the natural log of total assets in our Probit regressions. The results indicate that the larger the firm size, the higher is the probability of issuing crowdfunded debt at the 1% significance level. The results are in line with the hypothesis H4 that larger firms face lower costs of asymmetric information and thus are more likely to have crowdfunded debt.

Table 6 presents Probit regression results on financing choices for the full sample from 2010 to 2015. The choice between debt and equity results are given in the first and second columns where the dependent variable is equal to one if the firm issued debt (including crowdfunded) only and zero if issued equity capital only.

[Table 6 around here]

A firm is defined as debt issuer if its change in total debt (ΔDEBT) exceeds 5%. ΔDEBT is defined as the difference between the total of short term loans and overdrafts and long term liabilities in the current year and the corresponding total in the previous year, scaled by the latter total. Similarly, a firm is defined as an equity capital issuer if the change

in its issued capital between a given year and the previous year, divided by the issued capital in the previous year, exceeds 5%. The column (1) results indicate an increased probability of issuing debt when firms' net leverage deviations from target increase but this is significant at the 10% level only. The dependent variable in the third and fourth columns is equal to one if the firm issued other non-crowdfund debt (most likely bank debt) only and zero if issued equity capital only. The results in column (3) show an increased likelihood of issuing other debt when net leverage deviations increase and this also significant at the 10% level. The final four columns of Table 6 present results on the choices between the decision to raise crowdfunded debt versus other financing choices. The dependent variable in the fifth and sixth columns is equal to one if firms issued crowdfunded debt only and zero if they issued equity capital only. In the last two columns the dependent variable is equal to one if the firms issued crowdfunded only and zero if they issued other debt. A firm is defined as a crowdfund issuer if the change in crowdfunded debt between a given year and its previous year is greater than zero. The TMA_LEV independent variable is the deviation of the predicted leverage ratios from the leverage regression models of Table 3 column (4) and the actual leverage ratios in the previous year. The results in columns (5) and (6) indicate an increase in the probability of issuing crowdfunded debt (rather than equity) both net leverage and leverage deviations from target, respectively. Both coefficients are significant at the 5% level. This is plausible as private firms are more likely to prefer crowdfunded debt to equity for both cost and control reasons. These results and those in columns (1) to (4) indicate our preference for debt over equity receives strongest support from crowdfunded debt (hypothesis H5).

The results in columns (7) and (8) indicate a lower likelihood of raising crowdfunded debt (rather than other debt) if the firm experience increases in both net leverage and leverage deviations from target, respectively. Both coefficients are significant at the 5% level. Finally, the results indicate an inverse relation between the probability of raising crowdfunded debt

and profitability and the coefficients are significant at the 5% level. The implication from these results is that small private firms have a better chance of raising crowdfunded debt if their leverage deviations from target are decreasing and their profitability is low.

4.4 Funding capital expenditures

The main purpose for crowdfunding given on applications shown on the Funding Circle platform is for capital expansion. It is therefore interesting to analyse the link between the raised capital and the subsequent investments by the firm. Using a regression model similar to the one employed by Kim and Weisbach (2008), capital expenditures are related to the three competing sources of funding for the 2010-2015 sample period. The dependent variable is the total amount of capital expenditures (CAPEX) in years 1, 2, 3, and 4 after the base year in which the funds are raised. The funding independent variables include crowdfunded debt, other (mainly bank) debt and the change in issued capital. The results are summarised in Table 7.

[Table 7 around here]

The results indicate that capital expenditures are positively and significantly related to both crowdfunded and other debt but not to equity funding. This is consistent with the view that small private firms mainly rely on debt rather than equity funding in early stage entrepreneurial finance (hypothesis H6). The positive impact of crowdfunded debt on capital expenditures is significant at the 5% level in years 1 and 2 following the funding year and at the 10% level in year 3. The drop in significance level may be explained by the fact that crowdfunded debt is a very recent phenomenon as one can deduce from the declining sample size (N) from 2,075 in year 1 to 569 in year 4 following the funding year. The results also show that capital expenditures are positively and significantly related to other (mainly bank)

debt in years 1 to 4. The coefficients are significant at the 5% level in years 1 to 3 following the funding year and at the 10% level in year 4.

One can use the results to perform some tests on pecking order theory. First, while both debt and the equity capital (at the 10% level only) coefficients are significant in years 1 and 2 after the capital is raised, those on debt are significantly larger than those on equity. Second, the crowdfunded debt coefficients are all economically significant and are numerically larger than the corresponding other debt coefficients. However, unreported results indicate that these two coefficients are not statistically different.¹⁴

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 2011 in the two-digit SIC code 73 (Business Services). The results of these calculations are also presented in Table 7. The implied change per pound raised by either crowdfunded or other debt financing is positive and increasing for the first three years after the base year during which capital is raised but decreases in the fourth year. In number, for every pound raised, capital expenditures rise by 53 pence for the first year after crowdfunding. Over a 2-year and 3-year horizons, capital expenditures rise by 65 and 71 pence. These findings suggest that firms do not exhaust their crowdfund at once. In contrast, the implied change per pound raised by issuing capital is negative over all years.

5. Conclusions

Crowdfunded debt or P2P business lending is a novel form of external debt financing for small young entrepreneurial firms in which funds are raised from the crowd via internet

¹⁴ The results were not reported in order to preserve space, however, they are available upon request. We also perform a test that all three coefficients are equal and this hypothesis is rejected only for the first two years after the capital is raised and at the 10% significance level.

platforms This paper investigates a unique sample of 1,014 small private UK firms financed by Funding Circle over the 2010-2015 period. This is the largest crowdfunding platform in Europe and specialises solely in raising debt for small firms. The platform data are supplemented by financial data from FAME to analyse crowdfunded debt in the context of theories of capital structure.

The results indicate that small private firms' debt ratios are sensitive to crowdfunded debt and to firm characteristics like firm size, asset tangibility and debt composition, but less sensitive to firm profitability. Small firms are more likely to raise capital when they have a deficit and to retire capital when they have a surplus. These results are highly consistent with those of Brav (2009) for his medium and large private firm sample. The Probit regression results show that the larger target leverage deviations, the higher the probability of firms issuing or having crowdfunded debt which is consistent with the trade-off theory of capital structure. Finally, the results indicate that crowdfunded and other debt has a larger positive impact on capital expenditures than equity capital in the years following that in which the external funds were raised. This result is intuitive because the main crowdfunding purpose given on the funding applications is for capital expansion. We document that, in the first year after having crowdfunded debt (other non-crowdfunded debt), capital expenditures increase by 53 (47) pence for every pound raised.

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* 14, 63 – 97, University of Chicago Press/ NBER.
- Agrawal, A., C. Catalini, A. Goldfarb. 2015. Crowdfunding: geography, social networks, and the timing of investment decisions. *Journal of Economics & Management Strategy* 24, 253-274.
- Belleflamme P., Lambert. T., Schwienbacher, A. 2014. Crowdfunding: Tapping the right crowd. *Journal of Business Venturing* 29, 585–609.
- Belleflamme P., Omrani, N., Peitz, M. . 2015. The economics of crowdfunding platforms. *Information Economics and Policy* 33, 11-28.
- 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.
- Cosh, A, Cumming, D., Hughes, A. 2009. Outside entrepreneurial capital. *The Economic Journal* 119, 1494–1533.
- 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.
- Einav, K., Farronato, C., Levin, J. 2015. Peer-to-peer markets. NBER Working Paper 21496.
- Einav, K., Levin, J. D. 2013. The data revolution and economic analysis. NBER Working Paper 19035.
- Fama, E.F., 1985. What's different about banks?. *Journal of Monetary Economics* 15(1), 29-39.

- Fama, E.F., French, K.R., 2005. Financing decisions: who issues stock?. *Journal of Financial Economics* 76(3), 549-582.
- Frank, M.Z., Goyal, V.K., 2003. Testing the pecking order theory of capital structure. *Journal of Financial Economics* 67(2), 217-248.
- 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, S. A. 1997. An empirical analysis of the determinants of the corporate debt ownership structure. *Journal of Financial and Quantitative Analysis* 32, 47-69.
- Myers, S.C., Majluf, N.S. 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* 13(2), 187-221.
- Mollick, E. 2014. The dynamics of crowdfunding: Determinants of success and failure. *Journal of Business Venturing* 29, 1–16.
- Rajan, R.G., Zingales, L. 1995. What do we know about capital structure? Some evidence from international data. *Journal of Finance* 50, 1421–1460.
- Shyam-Sunder, L., Myers, S.C., 1999. Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics* 51(2), 219-244.
- Zhang, B., Baek, P., Ziegler, T., Bone, J., Garvey, K. 2016. Pushing boundaries: The 2015 UK alternative finance industry report. Cambridge Centre for Alternative Finance (CAFE) and NESTA. The CAFE-NESTA Report.

Table 1 Variable descriptive statistics

The table shows the debt characteristics for the sample that that raised crowdfunded debt on the Funding Circle platform between 2010 and 2015. It also reports summary statistics for the dependent and independent variables used in the regression models. The definitions are given below and also summarized in Appendix 1 (FAME data item is in italics). CHANGE_DEBT is the difference between the total of *Short Term Loans Overdrafts* and *Long Term Liabilities* in the current year and the total of *Short Term Loans Overdrafts* and *Long Term Liabilities* in the previous year, scaled by the total of *Short Term Loans Overdrafts* and *Long Term Liabilities* in the previous year. NET_LEVERAGE is the total of *Short Term Loans Overdrafts* and *Long Term Liabilities* minus the sum of *Bank Deposits* and *Investments Current Assets*, scaled by *Total Assets*. LEVERAGE is the total of *Short Term Loans Overdrafts* and *Long Term Liabilities*, scaled by *Total Assets*. CROWDFD is the amount of crowd fund loan (in thousands), scaled by *Total Assets*. The loan and interest data for crowdfunded debt is collected from the website site Funding Circle. We then calculate the remaining crowd fund loan every year. PROFIT is the difference between *Profit Loss Account* in the current year minus *Profit Loss Account* in the previous year. ROA is PROFIT, scaled by the average of current *Total Assets* and *Total Assets* in the previous year. TURNOVER is the difference between *Shareholders Fund* in the current year and *Shareholders Fund* in the previous year. GROWTH is the percentage change of TURNOVER between current and previous years. CAPEX is the difference between *Fixed Assets* in the current year and *Fixed Assets* in the previous year, scaled by *Total Assets*. TANGIAT is the sum of *Tangible Assets* and *Investments Fixed Assets*, scaled by *Total Assets*. SIZE is a natural log of *Total Assets*, inflation adjusted in 2015 pounds. SHORT_TO_LONG is *Short Term Loans Overdrafts* divided by the total of *Short Term Loans Overdrafts* and *Long Term Liabilities*. AGE is a natural log of firm years of incorporation. NWC is the sum of *Stock WIP*, *Trade Debtors* and *Other Current Assets*, minus *Trade Creditors*, then the total scaled by *Total Assets*. DEFICIT is the difference between *Fixed Assets* in the current year and *Fixed Assets* in the previous year, minus the sum of *Bank Deposits* and *Investments Current Assets* in the previous year, plus PROFIT, the total scaled by *Total Assets*. ROA, GRWOTH, CAPEX, TANGIAT, SIZE, SHORT_TO_LONG, AGE, TURNOVER, NWC, and PROFIT are lagged one year.

Observations	No Crowdfunded debt	Crowdfunded debt	Total	t-test on means
	Mean (SD)	Mean (SD)	Mean (SD)	t-value (p-value)
ΔDEBT	0.834 (5.029)	2.543 (8.702)	1.299 (6.290)	-6.280*** (0.000)
NET_LEVERAGE	0.147 (0.233)	0.196 (0.206)	0.161 (0.227)	-4.962*** (0.000)
LEVERAGE	0.214 (0.196)	0.268 (0.175)	0.229 (0.192)	-6.427*** (0.000)

CROWDFD	0.000 (0.000)	0.162 (0.131)	0.044 (0.099)	-54.364*** (0.000)
ROA	0.023 (0.128)	0.025 (0.109)	0.024 (0.123)	-0.347 (0.729)
GROWTH	-0.627 (1.602)	-0.509 (1.596)	-0.595 (1.601)	-1.701 (0.089)
CAPEX	0.006 (0.102)	0.018 (0.095)	0.009 (0.100)	-2.758** (0.006)
TANGIAT	0.303 (0.260)	0.296 (0.250)	0.301 (0.257)	0.623 (0.533)
SIZE	5.732 (1.132)	5.958 (1.068)	5.793 (1.119)	-4.655*** (0.000)
SHORT_TO_LONG	0.062 (0.199)	0.032 (0.135)	0.054 (0.184)	3.847*** (0.000)
AGE	2.139 (0.642)	2.301 (0.595)	2.183 (0.633)	-5.895*** (0.000)
TURNOVER	11.539 (44.969)	17.879 (46.620)	13.264 (45.503)	-3.205** (0.001)
NWC	0.549 (0.269)	0.581 (0.263)	0.557 (0.268)	-2.753** (0.006)
PROFIT	11.154 (44.515)	17.19 (45.864)	12.796 (44.958)	-3.087** (0.002)
DEFICIT	-0.083 (0.167)	-0.035 (0.149)	-0.07 (0.164)	-6.716*** (0.000)
N	1,937	724	2,661	

Table 2 Variables Correlation Matrix

The table presents a correlation matrix of all variables under this study. The sample period is between 2010 and 2015. The upper matrix is for the sub-sample of firm-years having crowdfunded debt and the lower matrix is for the sub-sample of firm-years without crowdfunded debt. Definitions for all variables can be found in Table 1 and Appendix 1.

	Observations with Crowdfunded Debt (Upper Matrix) N=724														
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)
a. ΔDEBT	1	0.01	-0.076*	0.136***	0.043	-0.02	-0.078*	-0.120**	-0.098**	-0.038	-0.05	0.043	0.046	0.048	0.03
b. NET_LEVERAGE	0.02	1	0.850***	0.091*	0.003	0.046	0.038	0.394***	0.043	0.078*	0.059	0.001	0.003	-0.270***	0.337***
c. LEVERAGE	0.04	0.90***	1	0.249***	0.013	0.055	0.051	0.381***	-0.137***	0.083*	-0.046	-0.053	-0.05	-0.389***	0.169***
d. CROWDFD	0	0	0	1	-0.039	-0.05	-0.158***	-0.168***	-0.633***	0.007	-0.289***	-0.227***	-0.224***	0.024	-0.105**
e. ROA	0.07**	-0.06**	-0.02	0	1	0.275***	0.149***	-0.017	0.076*	-0.02	-0.069	0.597***	0.605***	0.011	0.082*
f. GROWTH	0.01	-0.02	-0.01	0	0.15***	1	0.076*	0.056	0.073*	0.02	-0.015	0.288***	0.276***	-0.027	0.048
g. CAPEX	-0.03	0.11***	0.11***	0	0.09***	0.03	1		0.127***	-0.033	-0.029	0.137***	0.106**	-0.145***	0.066
h. TANGITA	-0.08***	0.44***	0.45***	0	-0.07**	-0.02	0.16***	1	0.145***	-0.027	0.118**	0.067	0.064	-0.767***	0.131***
i. SIZE	-0.05*	0.16***	0.06**	0	0.04	0.07**	0.13***	0.15***	1	0.017	0.437***	0.404***	0.402***	-0.018	0.057
j. SHORT_TO_LONG	-0.05*	0.06**	0.04	0	-0.01	-0.02	0.02	-0.08***	-0.01	1	-0.021	-0.039	-0.035	-0.067	0.033
k. AGE	-0.03	0.05*	-0.03	0	-0.10***	-0.01	-0.06**	0.06**	0.35***	-0.01	1	0.132***	0.147***	0.041	0.042
l. TURNOVER	0.03	-0.01	0	0	0.61***	0.20***	0.11***	-0.02	0.26***	0.05*	-0.01	1	0.977***	-0.018	0.052
m. PROFIT	0.03	-0.02	0	0	0.64***	0.21***	0.10***	-0.02	0.25***	0.04	-0.02	0.94***	1	-0.016	0.049
n. NWC	0.07**	-0.28***	-0.39***	0	0.02	-0.02	-0.08***	-0.74***	-0.02	0	0.11***	-0.02	0	1	0.088*
o. DEFICIT	0.12***	0.33***	0.14***	0	-0.09***	0.01	0.09***	0.12***	0.18***	0.08***	0.13***	-0.02	-0.03	0.15***	1

Observations without Crowdfunded Debt (Lower Matrix) N=1,937

Table 3 Determinants of Leverage (OLS models)

The table presents Ordinary Least Squares regression results for net leverage (or leverage) for the full sample from 2010 to 2015. The independent variables are lagged one period, except for the dummy variable (Dummy_CROWDFD). Dummy_CROWDFD is defined as one if the firm has crowd fund loan in a given year, zero otherwise. Other control variables (not reported in the table) are year and two-digit SIC code industry dummies. Definitions for other variables can be found in Table 1 and Appendix 1. The *t*-statistics adjusted for clustering by firm are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

DEP. VARIABLE MODEL	NET_LEVERAGE		LEVERAGE	
	(1)	(2)	(3)	(4)
Dummy_CROWDFD	0.047*** (3.241)	0.044*** (3.428)	0.043*** (3.485)	0.049*** (4.392)
ROA		-0.066* (-1.763)		-0.002 (-0.072)
GROWTH		-0.002 (-0.647)		-0.000 (-0.025)
CAPEX		0.049 (1.101)		0.060 (1.461)
TANGIAT		0.386*** (12.846)		0.332*** (11.496)
SIZE		0.013** (1.972)		-0.007 (-1.256)
SHORT_TO_LONG		0.111*** (3.662)		0.080*** (3.171)
AGE		-0.003 (-0.335)		-0.015* (-1.650)
Constant	0.372*** (37.501)	0.109** (2.541)	0.368*** (44.094)	0.313*** (8.459)
Observations	2,661	2,661	2,661	2,661
Adjusted R-squared	0.062	0.230	0.066	0.223

Table 4 Decisions to Issue or Retire (Logit Models)

The table presents Multinomial Logit regression results for the full sample from 2010 to 2015. The dependent variable zero for firms that take no action of issuing equity or debt, nor retiring debt or repurchasing equity, one for firms that issue either debt or equity, and two for firms that either retire debt or repurchase equity. Definitions for other variables can be found in Table 1 and Appendix 1. All independent variables are lagged one period, except DEFICIT. Other control variables (not reported in the table) are year and two-digit SIC code industry dummies. The z-statistics adjusted for clustering by firm are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

MODEL VARIABLE	(1)		(2)		(3)	
	ISSUE	RETIRE/ REPURCHASE	ISSUE	RETIRE/ REPURCHASE	ISSUE	RETIRE/ REPURCHASE
DEFICIT	2.372*** (5.089)	-2.106*** (-5.415)	3.021*** (6.135)	-1.911*** (-4.738)	3.166*** (6.321)	-1.921*** (-4.663)
SIZE	-0.321*** (-4.606)	-0.229*** (-3.368)	-0.296*** (-4.135)	-0.216*** (-3.211)	-0.381*** (-5.050)	-0.224*** (-3.143)
GROWTH	0.001 (0.034)	-0.047 (-1.144)	-0.012 (-0.286)	-0.056 (-1.355)	-0.050 (-1.160)	-0.060 (-1.438)
NWC	1.179*** (3.621)	1.485*** (4.588)	-0.048 (-0.144)	1.169*** (3.533)	-0.047 (-0.140)	1.174*** (3.557)
LEVERAGE			-4.065*** (-9.481)	-0.754** (-2.064)	-4.042*** (-9.554)	-0.754** (-2.068)
PROFIT					0.006*** (3.771)	0.000 (0.230)
CONSTANT	2.205*** (4.112)	1.210** (2.314)	4.534*** (7.282)	1.662*** (2.779)	5.064*** (7.880)	1.698*** (2.753)
N	2,661	2,661	2,661	2,661	2,661	2,661
Pseudo R-squared	0.0993	0.0993	0.135	0.135	0.141	0.141

Table 5 The Choice of Issuing Crowd Fund Debt or not (Probit Models)

The table presents Probit regression results for the full sample from 2010 to 2015. The dependent variable for Columns (1)-(2) is the dummy variable CROWDFUND_ISSUES, zero for firms that take no action on issuing crowd fund loan and one for firms that issue crowd fund loan. A firm is defined as crowd fund issuer if the difference between CROWDFD in the current year and CROWDFD in the previous year is greater than zero. The dependent variable for Columns (3)-(4) is the dummy variable Dummy_CROWDFD, zero for firms that do not have crowd fund loan in a given year and one for firms having crowd fund loan in a given year. TMA_NET_LEV is the difference between the predicted leverage ratios from the leverage regression models of Table 3 Column 2 and the actual net leverage ratio in the previous year. TMA_LEV is the difference between the predicted leverage ratios from the leverage regression models of Table 3 Column 4 and the actual net leverage ratio in the previous year. Definitions for other variables can be found in Table 1 and Appendix 1. Other control variables (not reported in the table) are year and two-digit SIC code industry dummies. The z-statistics adjusted for clustering by firm are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

VARIABLES MODEL	CROWDFD_ISSUES		Dummy_CROWDFD	
	(1)	(2)	(3)	(4)
TMA_NET_LEV	0.611*** (3.639)		0.504** (2.555)	
TMA_LEV		1.048*** (4.878)		0.851*** (3.504)
ROA	-1.123*** (-3.324)	-1.107*** (-3.253)	-0.895** (-2.388)	-0.883** (-2.345)
SIZE	0.149*** (5.261)	0.153*** (5.336)	0.229*** (6.257)	0.233*** (6.318)
CONSTANT	-4.068*** (-10.511)	-4.095*** (-10.515)	-5.195*** (-11.817)	-5.222*** (-11.812)
N	2,638	2,638	2,638	2,638
Pseudo R-squared	0.320	0.325	0.454	0.456

Table 6 Financing Choices (Probit Models)

The table presents Probit regression results for the full sample from 2010 to 2015. In the first and second columns the dependent variable is equal to one if the firm issued debt (including bank and crowdfunded debt) only and zero if issued equity capital only. In the third and fourth columns the dependent variable is equal to one if the firm issued other debt (i.e. mainly bank debt, excluding crowdfunded debt) and zero if issued equity capital only. In the fifth and sixth columns the dependent variable is equal to one if the firm issued crowd fund only and zero if issued equity capital only. In the last two columns the dependent variable is equal to one if the firm issued crowd fund only and zero if issued other debt excluding crowd fund. A firm is defined as debt issuer if its change in total debt (Δ DEBT) larger than 5%. Δ DEBT is the difference between the total of short term loans overdrafts and long term liabilities in the current year and the total of short term loans overdrafts and long term liabilities in the previous year, scaled by the total of short term loans overdrafts and long term liabilities in the previous year. A firm is defined as equity capital issuer if its change in its issued capital between a given year and the previous year, divided by the issued capital in the previous year, larger than 5%. A firm is defined as crowd fund issuer if the change in CROWDFD between a given year and its previous year is greater than zero. The loan and interest data for crowd fund loan is collected from the website site Funding Circle. TMA_NET_LEV is the difference between the predicted leverage ratios from the leverage regression models of Table 3 Column 2 and the actual net leverage ratio in the previous year. TMA_LEV is the difference between the predicted leverage ratios from the leverage regression models of Table 3 Column 4 and the actual net leverage ratio in the previous year. Definitions for other variables can be found in Appendix 1. Other control variables (not reported in the table) are year and two-digit SIC code industry dummies. The z-statistics adjusted for clustering by firm are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

VARIABLES	DEBT or EQUITY		OTHER DEBT or EQUITY		CROWDFD or EQUITY		CROWDFD or OTHER DEBT	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TMA_NET_LEV	0.696* (1.857)		0.754* (1.940)		1.244** (2.513)		-0.598*** (-2.636)	
TMA_LEV		0.679 (1.601)		0.721 (1.588)		1.126** (1.997)		-0.643** (-2.332)
ROA	0.198 (0.274)	0.242 (0.341)	0.548 (0.654)	0.606 (0.741)	-0.358 (-0.404)	-0.394 (-0.441)	-1.097** (-2.411)	-1.110** (-2.462)
SIZE	-0.106 (-1.562)	-0.101 (-1.497)	-0.083 (-1.181)	-0.078 (-1.101)	0.051 (0.437)	0.072 (0.624)	0.044 (1.179)	0.041 (1.091)
Constant	1.892*** (3.900)	1.865*** (3.857)	1.603*** (3.183)	1.569*** (3.119)	-1.118 (-0.974)	-1.248 (-1.104)	-3.046*** (-6.751)	-3.020*** (-6.643)
N	864	864	589	589	305	305	1,153	1,153
Pseudo R-squared	0.0774	0.0743	0.0832	0.0792	0.378	0.371	0.261	0.260

Table 7 Proceeds for Capital Expenditures (OLS models)

This table shows the results of the OLS regression models for the examination of the distribution of capital raising to capital expenditures. The sample period is from 2010 to 2015. The dependent variable is the total amount of capital expenditures (CAPEX) in 1, 2, 3, and 4 years after the base year that the capital is raised. The independent variables are crowd fund debt (CROWDLOAN), other total debt (OTHERDEBT), the difference of issued capitals between a given year and its previous year (EQUITYCAP), and firm size measured by total assets (ASSETS) in a natural log form as the equation below. CAPEX, CROWDLOAN, OTHERDEBT and EQUITYCAP are scaled by total assets. All regression models control for year and two-digit SIC code industry dummies. Definitions for all variables are presented in Appendix 1. 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% level, respectively. Pounds changes are the implied change in the dependent variable when each type of sources of funds is increased by one pound for a median-sized firm in 2011 in the two-digit SIC code 73 (Business Services).

$$\ln \left[\frac{\sum_{i=1}^t CAPEX_i}{ASSETS_0} + 1 \right] = \beta_1 \ln \left[\frac{CROWDLOAN_0}{ASSETS_0} + 1 \right] + \beta_2 \ln \left[\frac{OTHERDEBT_0}{ASSETS_0} + 1 \right] + \beta_3 \ln \left[\frac{EQUITYCAP_0}{ASSETS_0} + 1 \right] + \beta_4 \ln[ASSETS_0] + \sum_{i=2010}^{2015} \theta_i Year Dummy + \sum_{j=1}^{53} \lambda_j Industry Dummy + \varepsilon$$

<i>t</i>	N	$\ln \left[\frac{CROWDLOAN}{ASSETS} + 1 \right]$		$\ln \left[\frac{OTHERDEBT}{ASSETS} + 1 \right]$		$\ln \left[\frac{EQUITYCAP}{ASSETS} + 1 \right]$		<i>p</i> -value $H_0: \beta_1 = \beta_3$	£ Change			Adjusted R-squared
		β_1	<i>t</i> -stat	β_2	<i>t</i> -stat	β_3	<i>t</i> -stat		CROWDFD	OTHERDEBT	EQUITYCAP	
1	2,075	0.580***	(3.992)	0.521***	(7.164)	-0.237	(-0.712)	0.020**	0.527	0.472	-0.202	0.072
2	1,515	0.678***	(2.768)	0.551***	(5.227)	-0.811	(-1.298)	0.022**	0.652	0.525	-0.694	0.059
3	1,000	0.689*	(1.922)	0.639***	(3.488)	-0.607	(-1.007)	0.051*	0.709	0.655	-0.565	0.056
4	569	0.429	(0.283)	0.521*	(1.773)	-0.350	(-0.500)	0.638	0.494	0.604	-0.379	0.021

Appendix 1 Data characteristics relative to Funding Circle's overall loans portfolio

Appendix 1a Sample characteristics by industry

The first column (Sample) reports the share of firms 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.

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

Appendix 1b Sample characteristics by regions

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.

Industry	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

Appendix 2 Variable Definitions

Variables	Definitions (FAME data item in italics)
Δ DEBT	The difference between the total of <i>Short Term Loans Overdrafts</i> and <i>Long Term Liabilities</i> in the current year and the total of <i>Short Term Loans Overdrafts</i> and <i>Long Term Liabilities</i> in the previous year, scaled by the total of <i>Short Term Loans Overdrafts</i> and <i>Long Term Liabilities</i> in the previous year.
NET_LEVERAGE	The total of <i>Short Term Loans Overdrafts</i> and <i>Long Term Liabilities</i> minus the sum of <i>Bank Deposits</i> and <i>Investments Current Assets</i> , scaled by <i>Total Assets</i> .
LEVERAGE	The total of <i>Short Term Loans Overdrafts</i> and <i>Long Term Liabilities</i> , scaled by <i>Total Assets</i> .
CROWDFD	Crowd fund loan (CROWDLOAN, in thousands), scaled by <i>Total Assets</i> . We calculate the outstanding balance of each company's loan 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 loan individually and then sum these outstanding loan amounts to obtain the total value of crowdfunding debt for this company. The loan and interest data for crowd fund loans is collected from the website Funding Circle.
Dummy_CROWDFD	A dummy variable equals to 1 if CROWDFD is greater than 0.
CROWDFD_ISSUES	A dummy variable equals to 1 if a firm is defined as crowd fund loan issuer if the difference between CROWDFD in the current year and CROWDFD in the previous year is greater than zero.
DEBT_ISSUES	A dummy variable equals to 1 if a firm had the change in total debt (CHANGE_DEBT) larger than 5%.
EQUITY_ISSUES	A dummy variable equals to 1 if a firm had the change in its issued capital between a given year and the previous year, divided by the issued capital in the previous year, larger than 5%.
PROFIT	The difference between <i>Profit Loss Account</i> in the current year minus <i>Profit Loss Account</i> in the previous year.
ROA	PROFIT, scaled by the average of current <i>Total Assets</i> and <i>Total Assets</i> in the previous year.

TURNOVER	The difference between <i>Shareholders Fund</i> in the current year and <i>Shareholders Fund</i> in the previous year.
GROWTH	The percentage change of TURNOVER between current and previous years.
CAPEX	The difference between <i>Fixed Assets</i> in the current year and <i>Fixed Assets</i> in the previous year, scaled by <i>Total Assets</i> .
TANGIAT	The sum of <i>Tangible Assets</i> and <i>Investments Fixed Assets</i> , scaled by <i>Total Assets</i>
SIZE	A natural log of <i>Total Assets</i> , inflation adjusted in 2015 pounds.
SHORT_TO_LONG	<i>Short Term Loans Overdrafts</i> divided by the total of <i>Short Term Loans Overdrafts</i> and <i>Long Term Liabilities</i> .
AGE	A natural log of firm years of incorporation.
NWC	The sum of <i>Stock WIP</i> , <i>Trade Debtors</i> and <i>Other Current Assets</i> , minus <i>Trade Creditors</i> , then the total scaled by <i>Total Assets</i> .
DEFICIT	The difference between <i>Fixed Assets</i> in the current year and <i>Fixed Assets</i> in the previous year, minus the sum of <i>Bank Deposits</i> and <i>Investments Current Assets</i> in the previous year, plus PROFIT, the total scaled by <i>Total Assets</i> .
OTHERDEBT	The total of <i>Short Term Loans Overdrafts</i> and <i>Long Term Liabilities</i> minus the sum of <i>Bank Deposits</i> and <i>Investments Current Assets</i> , then minus Crowd fund loan (CROWDLOAN).
EQUITYCAP	The difference between <i>Issued Capital</i> 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%.
