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Who are they?

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## Research Paper

# Small and medium-sized enterprises that borrow from “alternative” lenders in the United Kingdom: who are they?

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## ABSTRACT

Access to credit for small and medium-sized enterprises (SMEs) is an important condition of successful economic growth. Lending to SMEs is no longer restricted to banks: many new players (or alternative lenders) are entering the credit market. However, the research has not identified what kind of SMEs choose these alternative lenders. Are they just a random sample from the overall population of SMEs or are they different in some specific respects? Is their credit quality better or worse? This study provides a general overview of the external financing landscape for the UK SMEs and an exploratory analysis of the SME portfolio of one of the alternative lenders in the United Kingdom. The results indicate that clients of the alternative peer-to-peer lender are younger and have more debt, but they also have higher returns than a generic sample of UK SMEs. Their probability of default, as estimated by the SME Z-score, is lower. We conclude that the alternative markets for SME lending may be heterogeneous in terms of risk. At least some alternative lenders have a sound risk level and are attractive to high-quality borrowers. Therefore, they act as a substitute for traditional lending.

**Keywords:** small and medium-sized enterprises (SMEs); external finance; alternative lending; credit risk.

## 1 INTRODUCTION

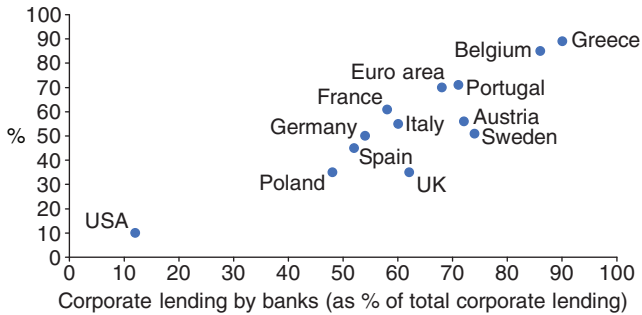
The 2008 financial crisis changed the credit landscape in terms of volume, price and distribution. Together with the regulatory concerns of capital adequacy and credit risk, the crisis led to restricted credit access for small and medium-sized enterprises (SMEs). As Figure 1 shows, firms of all sizes rely heavily on traditional bank lending. The restricted supply from this traditional channel has forced businesses to look for alternative funding.

For corporates, the bond market has offered an attractive alternative, but this market is only available to relatively large enterprises. For medium-sized companies, private debt is emerging as an important funding component that comes mainly from institutional investors, eg, funds and insurance companies (Altman *et al* 2018).

Smaller firms have also been offered some innovative opportunities. These have received the generic names “alternative finance” and “fintech lending”, terms that cover various nonbank private debt sources. These sources are rapidly growing in popularity. According to Cambridge Centre for Alternative Finance (2020), in 2018 the online alternative finance industry accounted for US\$304.5 billion of funding globally for individuals and businesses. The Chinese alternative finance market was the largest contributor, with 71% of global volumes (US\$215.4 billion). The United States (US\$61 billion) and the United Kingdom (US\$10.4 billion) were second and third, respectively. Peer-to-peer (P2P) business lending was the third most popular alternative channel in Europe, covering 13% of all European alternative finance volumes in 2018, after P2P consumer lending (38%) and balance-sheet property lending (18%).

P2P lending works as a marketplace, with a virtual platform bringing together investors that want to lend money and those that want a loan. Given the growing prominence of these sources of financing, it is important to understand what kind of SMEs are attracted to and accepted by alternative lenders, and especially the risk levels of these SME borrowers. The level of risk that alternative lenders take is linked to their potential resilience and their ability to maintain sound lending operations. This investigation becomes even more important in the current situation, in which the need for external funds has increased enormously due to the effects of the Covid-19 pandemic and lockdown. However, during 2020 nonbank lenders and fintech lending platforms have scaled down their financing (Rudegeair 2020).

The question concerning the risk level of the clients of alternative lenders has a connection with the strand of academic literature that investigates whether alter-

**FIGURE 1** Reliance on bank lending by nonfinancial corporations.

Despite decreasing substantially over the last 10 years, the level of lending by European banks remains significantly above that of banks in the United States. *Source:* adapted from European Investment Bank (2015).

native lenders complement the traditional sources of funding and therefore attract underserved or financially excluded customers. Although there is a growing body of literature in this area, it mainly focuses on the US market, and it does not compare the profiles of the alternative lenders’ SMEs to the general SME population. This study fills this gap by investigating the SME borrowers of one of the alternative P2P lenders in the United Kingdom.

In this study, we build on previous research (Altman and Sabato 2005, 2007; Altman *et al* 2010) to estimate and compare the risk level of SMEs that borrow from an alternative lender with a generic sample of SMEs by using appropriate risk assessment tools specifically developed for SMEs. In addition to creditworthiness (or risk level) we compare other characteristics of the clients of the alternative lender, such as their distribution across geographic regions and industry sectors, their age and their financial ratios. The clients of the alternative lender are younger with more debt, but they also achieve higher returns. Further, their main reason for borrowing is business expansion.

The studies on alternative financing provide mixed results as to the risk level of the clients of alternative lenders, with most arguing that alternative financing complements the traditional credit sources and targets underserved borrowers of lower quality. Contrary to this expectation, we find that the SMEs in the portfolio under analysis are better credit risks than a generic sample of UK SMEs. We regress the estimated probability of default (PD) by using an indicator of whether the SME is borrowing from the alternative lender and by controlling for financial ratios, age and regional and industry dummies. This P2P indicator is highly significant and nega-

tive, which indicates the estimated PD is lower for the SMEs that borrow from the alternative lender.

Our results make several important contributions. First, studies on alternative lending to SMEs are scarce, especially in the United Kingdom. Our study contributes to closing this gap and offers an exploration of the profiles of the SME borrowers of an alternative P2P lender in the United Kingdom.

Second, we compare the credit risk levels of P2P borrowers with a generic SME sample, and thus alleviate concerns that P2P lenders may be taking excessive risks because they are lending to inherently risky clients.

Third, we add to the discussion of whether alternative lenders act as complements or substitutes to traditional financing. By showing that at least one P2P lender gives credit to relatively low-risk clients, we offer evidence in support of the argument that fintech lenders are substitutes for traditional financing.

The rest of the paper is structured as follows. In Section 2, we summarize the research on the SME funding gap and the emerging alternative sources of external financing. Section 3 provides an overview of UK SMEs and their funding sources. Section 4 has a review of the literature on credit risk modeling and on the differences in credit risk assessment of SMEs compared with large enterprises. It also presents the SME *Z*-score that is used as a credit risk measure in this study. Section 5 presents the results of the empirical analysis. Section 6 concludes and outlines some policy implications and directions for further research.

## **2 SMALL AND MEDIUM-SIZED ENTERPRISES AND THEIR FUNDING GAP, PLUS ALTERNATIVE FINANCING AND ITS ROLE IN RELATION TO TRADITIONAL FUNDING**

The research often refers to SMEs as the backbone of the national economy. Their simple structure allows them to respond quickly to the needs of local markets and to react to a changing economic environment. Eventually, some of them grow into large and powerful corporations; however, many of them fail and only survive for a short time. Access to external financing is an important prerequisite of the successful survival and growth of SMEs, and its primary source has been traditional banks (Ahmed *et al* 2016; Beck and Demircuc-Kunt 2006).

However, as noted earlier, the financial crisis and the subsequent tightening of risk standards led to a shrinkage in traditional lending. For example, Chen *et al* (2017) use the Community Reinvestment Act data at the bank–county level, released by the Federal Financial Institutions Examination Council, to show that the top four US banks reduced their lending to SMEs by 50% compared with the precrisis period, while in 2014 lending by other banks had reached only 80% of its precrisis level. Further, Jagtiani and Lemieux (2016) find that smaller community banks, which had

been the most common source of SME credit, reduced the share of SME loans in their lending portfolios compared with 1997. Mills and McCarthy (2014, 2016) also find a significant lending gap for SME loans, especially for microenterprises.

Many studies have shown that the smaller the business is, the more problems it has with bank loans, with higher interest rates and more stringent collateral requirements (Ahmed *et al* 2016; European Commission 2019; Malhotra *et al* 2007). Therefore, it is not surprising that SMEs look for novel credit sources, which include mini-bonds (Altman *et al* 2018), supply-chain and trade finance products (Wandhöfer 2019), crowdfunding (Rau 2019) and P2P lending platforms (Mills and McCarthy 2014, 2016).

One of the key questions posed by the literature is whether P2P lending platforms serve as a complement to traditional bank lending or as a substitute. If they are complementary to traditional banks, we can expect them to serve the high-risk borrowers excluded from mainstream sources of funding.

There is no consensus among these studies, although most tend to find some evidence that alternative lenders improve credit access for borrowers rejected by traditional banks. We first review the studies on consumer credit, since much of the research has been conducted in this area because of data availability. Jagtiani and Lemieux (2017) explore the loans made by a large US P2P lender (LendingClub) and similar loans that originated through traditional banking channels. They find that LendingClub served areas with credit gaps, such as areas where bank offices were less available. They also find that customers with poor or limited FICO scores were not served by traditional lenders but were accepted by LendingClub. Furthermore, the comparison of FICO scores leads Jagtiani and Lemieux to the conclusion that LendingClub’s borrowers were, on average, more risky than the borrowers of traditional banks.

Tang (2019) also demonstrates a relatively high risk in LendingClub’s portfolio. However, Tang interprets this risk as evidence that P2P lenders are substitutes for banks. The argument posits that in times of a credit contraction in traditional banks, lower-quality borrowers migrate to alternative P2P lenders. Therefore, their customer base becomes riskier. Yet since P2P lenders take customers that would be served by traditional banks in normal times, they should be viewed as substitutes for banks in this situation.

Another study in support of the substitute argument is that by Freedman and Jin (2014), who use the data from Prosper (another large US P2P lender) to demonstrate that the platform gradually started to exclude more and more subprime consumers and moved to serving lower-risk consumers. Further, for the US mortgage market Fuster *et al* (2019) find no evidence that alternative lenders target risky borrowers or those with limited access to finance. Their study shows that alternative mortgage lenders have some technological advantages: for example, they are 20% quicker

in processing applications than traditional lenders, while controlling for observable characteristics, which does not come at the cost of higher defaults.

There are very few studies outside the US consumer market. There are a growing number of studies on alternative lenders in developing countries, but these mainly concentrate on risk determinants and modeling techniques rather than comparing alternative lenders with traditional ones (see, for example, Lin *et al* 2017). In the European context the literature on alternative consumer lending is also scarce. A review of the data used by alternative lenders can be found in Barci *et al* (2019). De Roure *et al* (2019) analyze the data on German P2P consumer loans and the consumer credit market. They find empirical evidence that P2P loans are riskier than bank loans and conclude that the P2P lenders are “bottom fishing”, that is, they target subprime and marginal borrowers.

Similar research on SMEs, covering the risk levels in the alternative lending market and the complementarity versus substitution argument, is even more limited. Jagtiani and Lemieux (2016) refer to the Joint Small Business Credit Survey Report (2015) conducted by the Federal Reserve to show that businesses not funded by traditional channels have turned to alternative lenders. Those rejected or not fully funded by traditional lenders include smaller, younger, less profitable and minority-owned businesses.

A study by Schweitzer and Barkley (2017), based on the same survey, supports the argument that businesses that are rejected by banks turn to P2P lenders. They examine the characteristics of businesses that borrow from online alternative lenders and find them similar to businesses that a bank had rejected.

Further, Jagtiani and Lemieux (2016) refer to studies conducted by the alternative P2P lenders themselves. For example, Funding Circle reports from its survey that one-fifth of its borrowers believed they would not get funding from traditional sources despite being creditworthy (Desai and Meekings 2016). Ahmed *et al* (2016) find that nearly 35% of the support from PayPal Working Capital (PPWC) went to low- and moderate-income businesses, in contrast to 21% in traditional banking, and that nearly 25% of PPWC loans were allocated to the 3% of US counties that had lost more than 10 banks since 2008.

A handful of studies have investigated the risk level of SME loans from alternative lenders compared with other loans from the same providers. For example, Mach *et al* (2014) offer a detailed investigation of SME loans by LendingClub in the period 2007–12. They find that SMEs are more likely to be charged higher interest rates compared with other loan categories, and this is explained by the higher PD even after controlling for the borrower’s characteristics. Further, Altman and Andreeva (2018) confirm that SMEs that were funded by LendingClub through its consumer platform in 2012 were riskier than other borrowers.

All these studies on SMEs refer to the US context, apart from Ahmed *et al* (2016), who provide cross-country comparisons to explore the role of technology in improving access to financing for SMEs. Since our analysis refers to SME finance in the United Kingdom, the next section will describe the state of the SME lending and alternative finance market in the country.

### 3 SMALL AND MEDIUM-SIZED ENTERPRISES AND ALTERNATIVE FINANCING IN THE UNITED KINGDOM

At the start of 2019, SMEs constituted 99.9% of all private sector businesses in the United Kingdom (Department for Business, Energy and Industrial Strategy 2019) and provided 60% of all private sector employment in the United Kingdom, with a total employment of 16.6 million. The combined annual turnover of SMEs was £2.2 trillion, constituting 52% of all private sector turnover.

Given the importance of this sector, it is not surprising that the UK government has introduced various initiatives to support SME growth and development. In fact, 2018 saw a fall of 0.5% (−27 000 businesses) in the total private sector business population, although employment continued to grow by 1.14% (+304 000). This continued growth in employment was due to the fall in total business numbers, representing a decline in the number of small nonemployers or businesses with one employee; the number of larger employers continued to rise. The decrease in business numbers was the first fall since the start of the statistic in 2000. However, in 2019 a modest growth resumed across all business sizes (Department for Business, Energy and Industrial Strategy 2019).

The UK government relies on external credit to support business growth. Table 1 shows estimates of volumes of external financing from different sources compiled by the British Business Bank (2020). It should be noted that estimates of alternative financing flows may not cover the whole market. Nevertheless, banks clearly remain the main source of financing, although the growth in their lending remained almost flat between 2015 and 2018. In 2019 it declined by 1.7% to £56.7 billion, the lowest figure in five years.

In contrast to traditional sources, alternative sources show an increasing trend in lending. Table 1 gives the values for P2P lending for three quarters in 2019. The table shows that, compared with the same period in 2018, P2P lending was 12% higher (British Business Bank 2020). At the same time, a slight slowdown of the growth rate in P2P lending is reported in comparison with previous years, with a 1% fall in the first half of 2019 from the second half of 2018, the first half-year fall since the data series began in 2010 (British Business Bank 2020).

The Cambridge Centre for Alternative Finance provides additional information in Cambridge Centre for Alternative Finance (2020). It should be noted that the Cam-



**TABLE 1** Estimates of the gross flows of external financing for UK SMEs (billions of pounds).

	2014	2015	2016	2017	2018	2019
Bank lending	53.4	57.9	59.2	57.3	57.7	56.7
Private external equity investment	2.9	4.2	3.9	6.4	6.7	5.5 (Sept)
Asset finance	14.7	16.3	17.0	19.0	19.4	20.1
P2P business lending	0.5	0.9	1.39	1.99	2.37	1.9 (Sept)

Estimates for 2019 nonbank lending are based on three quarters in 2019. *Source:* British Business Bank (2020).

bridge Centre for Alternative Finance (CCAF) and the British Business Bank (BBB) use different categories for reporting. Therefore, a direct comparison is not always possible. The CCAF estimates that in 2018 £4.8 billion of business financing was raised via UK online platforms (of which P2P is a subset), which is 7% higher than the previous year. This financing constitutes 58% of the total UK alternative financing market. (Of the businesses that compose this market, 91% are based on debt models, 8% on equity models and the remainder on noninvestment models.) Most of the businesses that receive online P2P lending are SMEs with an annual turnover of less than £2 million, and for businesses of this size the P2P lending in 2018 is estimated to be equivalent to 27.7% of all new loans, which is a slight decrease from the 29.2% reported in the previous year, but still a substantial share.

In its survey, CCAF asked the participating platforms to rank different risks in terms of importance. In 2018, “notable increase in default” was ranked as the highest risk by the UK alternative lenders. It is not surprising that the following year saw two alternative lenders (Lendy and FundingSecure) go into administration, following concerns about their levels of arrears and defaults. Established lenders, eg, Funding Circle, also had to cut their forecast revenue growth and tighten their lending criteria (Megaw and Georgiadis 2019).

These changes in risk dynamics emphasize the timeliness and relevance of our investigation, and offer more support to the expectation that borrowers from alternative lenders will be higher risk than borrowers from traditional lenders. One final argument in support of this expectation comes from the bank referral scheme adopted in the United Kingdom. Under this scheme, the largest nine UK banks must supply information about rejected SMEs (with the SME’s consent) to platforms that match the SMEs to alternative lenders. Since its launch in 2016, nearly 30 000 small businesses have been referred and almost 1700 businesses have secured a total of over £32 million in loans (HM Treasury 2019). Although the scheme relies on the fact that

different finance providers have different business models and risk appetites, there is an implicit assumption that clients of alternative lenders are too risky to be accepted by traditional lenders.

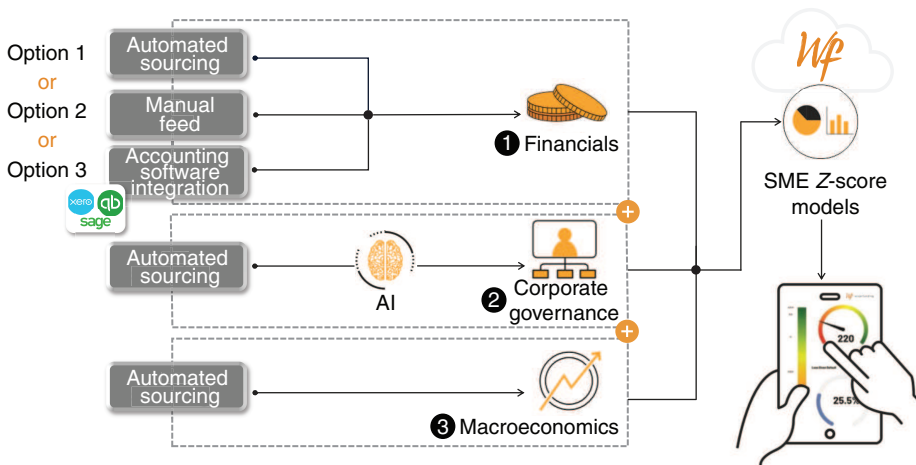
In order to test this assumption we will estimate the risk of borrowers from an alternative lender and compare it with a representative sample of UK SMEs. This will require the use of an appropriate risk model, and the next section reviews risk modeling for SMEs.

#### **4 CREDIT RISK ASSESSMENT FOR SMALL AND MEDIUM-SIZED ENTERPRISES**

There are numerous studies that have suggested many different models to predict corporate default, bankruptcy or insolvency. The most notable examples are the structural models by Merton (1974), models based on stochastic hazard rates (Jarrow and Turnbull 1995) and models based on analyzing financial statements that go back to the *Z*-score of Altman (1968). The original *Z*-score model used a multiple discriminant analysis (MDA) and contained five financial ratios: working capital/total assets, retained earnings/total assets, EBIT/total assets, market value equity/book value of total debt, and sales/total assets. Since its development, many different versions and updates have been proposed, and the model remains one of the most successful applications of modeling in finance. More on the history of the *Z*-score can be found in Altman (2018). A detailed overview of credit risk modeling can be found in Altman and Saunders (1997) and Allen *et al* (2004).

However, a number of authors have argued that SMEs are different from large enterprises in many respects, including credit risk. For example, Dietsch and Petey (2004) show that SMEs are riskier than large enterprises. Altman and Sabato (2005) prove that applying a default prediction model developed for large enterprises to SMEs has a lower prediction power, which demonstrates the need for separate models. Altman and Sabato (2005, 2007) and Altman *et al* (2010) have shown that the original Altman *Z*-score models could be improved by transforming several of the key variables of that model and by adding nonfinancial and macroeconomic information in order to apply it to SMEs.

To put the model into practice, Altman and Sabato developed a fintech startup (Wiserfunding Ltd) in 2016. They used the *Z*-score as the starting point, building on its advantages such as simplicity and consistency, and adapting it to SME markets by utilizing additional information and advanced algorithms. The model was developed on a sample of over 5.8 million accounts of unlisted UK SMEs using a logistic regression. In line with other studies, failure or default was defined as entry into liquidation, administration or receivership. The predictor variables consisted of firm demographics, accounting, audit data and information on the timeli-

**FIGURE 2** SME Z-score components.

Source: adapted from Wisefunding Ltd.

ness of account filing available from Companies House, a government register of all UK businesses. Additional information on “derogatory events” was obtained from a dedicated government agency. We use this SME Z-score model in our study.

There are versions for different industry sectors and countries (all European countries and some in North America and Asia), but they follow a similar structure with the same three components: standard financial ratios (but with inputs predictive of SME defaults); a qualitative governance and management step with inputs that describe the structure, ownership and management quality; and a macroeconomic component that models the effect of the economic context (see Figure 2).

We have reviewed the difficulties SMEs face in getting external financing. Apart from credit contraction, the lack of information on SMEs is often mentioned as an additional difficulty in evaluating their risk profile (Berger *et al* 2005). A related reason may also be the inability of smaller lenders to process the relevant information and produce powerful risk assessment models. The SME Z-score combined with appropriate credit management systems can be a suitable solution to this problem (Messina 2019).

## 5 COMPARISON OF BORROWER PROFILES OF AN ALTERNATIVE LENDER TO GENERIC SMALL AND MEDIUM-SIZED ENTERPRISES

### 5.1 Data description

The sample was obtained directly from an anonymous UK alternative P2P lender. The platform does not prescreen prospective SME borrowers; applicants are screened only after they apply online for the first time. The first screening is mainly based on policy rules rather than credit risk models. If applicants pass this step, then they are asked to provide management accounts and their last three bank statements before progressing to a credit decision. All applicants are assessed for fraud against blacklists. Then, in line with the UK regulations on anti-money laundering, they progress into know-your-customer (KYC) checks, including those on being politically exposed persons (PEP) and their company structure. The financial data are verified by reconciling some of the invoices against the bank statements during the due diligence phase.

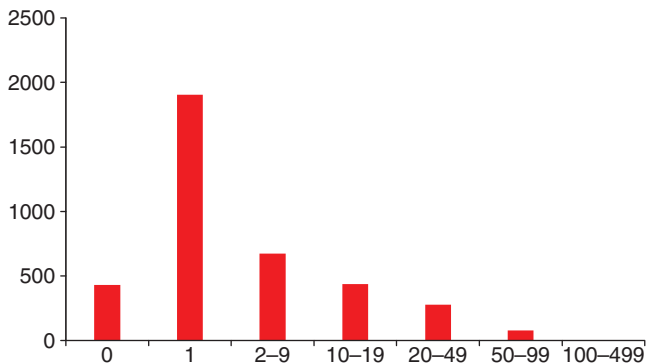
The P2P lender sets the interest rate between 4% and 23.9%, depending on the customer profile. Applicants can choose their maturity, which ranges from 6 to 60 months. The loan amounts differ between £5000 and £515 000.

In our analysis we use a sample of 3897 unsecured loans granted between 2015 and 2018. As seen in Figure 3, the borrowers are small companies. In fact, only two firms have more than 100 employees, and almost 98% have fewer than 50 employees, of which 61.47% have either no employees or just one employee. They are predominantly limited companies (92% of the sample), and the other types are limited partnerships (4%) and limited liability partnerships (1%).

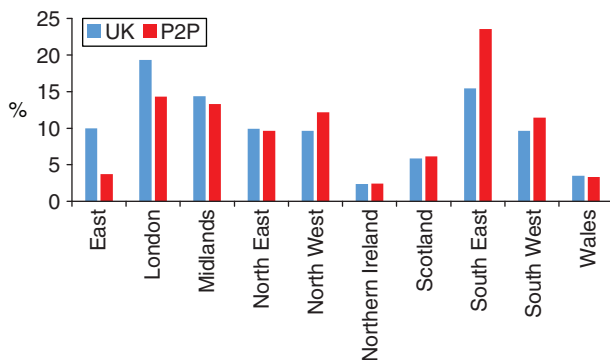
In terms of geography, the borrowers are all from the United Kingdom, as shown in Figure 4. In order to understand how it compares with the distribution of UK SMEs as a whole, we use the statistics provided by the Department for Business, Energy and Industrial Strategy (2018). In most regions there are very small differences between the generic UK SME population and our P2P sample. However, P2P borrowers are underrepresented in London.

Figure 5 shows the distribution of different industry sectors funded by the alternative lenders, again in comparison with the general population of UK SMEs. The largest sector is wholesale and retail trade, followed by construction and then professional, scientific and technical services. However, the share of construction in the P2P lender’s portfolio is much lower than the United Kingdom in general, while wholesale and retail trade is almost twice as high. There is also substantially higher lending to the information and communication sector (being the fifth largest sector in the P2P sample) and manufacturing. Other sectors with a higher share in the P2P lender’s portfolio than in the UK population include administrative activities; accom-

**FIGURE 3** Frequency distribution of the number of employees in the P2P sample.



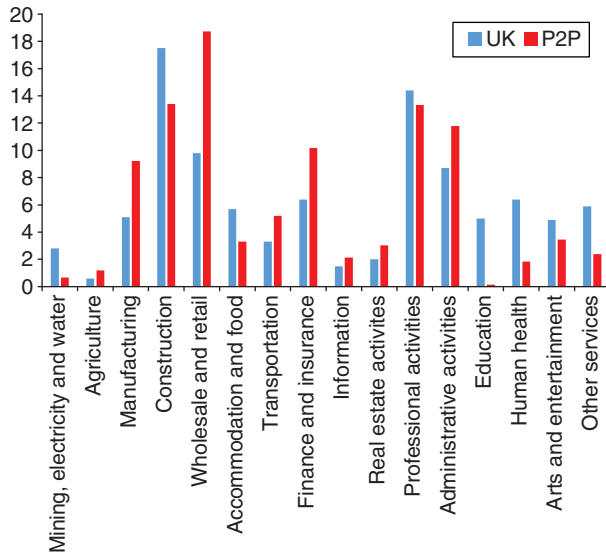
**FIGURE 4** Percentage distribution across UK regions.



Source: Department for Business, Energy and Industrial Strategy (2018).

modation and food; real estate activities; finance and insurance; and mining, electricity and water. Industries that receive less P2P lending are agriculture; transportation; education; arts and entertainment; and other services.

P2P borrowers are required to provide the reason for their loan application; this information is shown in Figure 6. Expansion is the most common purpose (57%), followed by working capital (32%). Refinance, which would normally indicate some debt problems, constitutes only 3%. The fact that most of P2P borrowers use their loans for business growth means that they are growth-oriented, and this may be linked to better managerial ability. The awareness of alternative financing sources

**FIGURE 5** Percentage distribution across the United Kingdom’s major industry sectors.

Source: data from Department for Business, Energy and Industrial Strategy (2018) and UK Standard Industrial Classification (SIC) 2007 (URL: <https://bit.ly/3yFkNOF>).

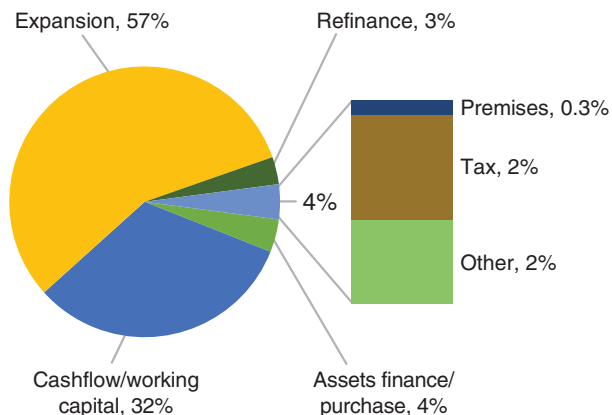
is not so widespread (albeit growing), with British Business Bank (2019) reporting that 52% of SMEs are aware of P2P lending (up from 47% in 2017). The fact that the SMEs in our sample applied to a P2P lender may also be interpreted as them having better management, or at least as indicating that they are better informed of the different financing opportunities.

## 5.2 Comparison of financial profiles

In this and the following subsections we perform the analysis at the company level in order to compare the level of risk and financial ratios available from annual accounts of P2P borrowers with a generic sample of UK SMEs. The generic sample is representative of the SMEs in manufacturing and services from across the United Kingdom.

The law in the United Kingdom requires companies to file annual financial accounts with Companies House. Its website makes this information publicly available.<sup>1</sup> We partition the population of the UK limited SMEs with nonmissing accounts for 2017 (the year used in modeling) into a grid of services and manufacturing in the

<sup>1</sup> URL: [www.companieshouse.gov.uk](http://www.companieshouse.gov.uk).

**FIGURE 6** Loan purpose for the P2P sample.

The panel on the right is an expansion of the 4% slice.

major UK regions (England, Scotland, Wales and Northern Ireland). From this grid, we draw random samples of 1%. The variables were selected to match those available for the P2P sample.

From this subsection onward, we concentrate on limited liability companies. There are 3802, or 92% of the original number of P2P borrowers in the comparative analysis with a generic sample. For the generic sample, we select 5481 SMEs that match the legal form, industry and region of the P2P sample. There are different types of industries, but manufacturing and services dominate both samples. Both samples cover the same period of time.

We explore the information available from the annual financial accounts that are common to both samples. However, for the P2P sample there are only a limited number of financial variables recorded, and this restricts the possibilities for analysis. There are no missing values, since this information is mandatory to get lending from the P2P lender.

We can calculate the standard measures of

- solvency,

$$\text{debt ratio} = \frac{\text{current liabilities} + \text{noncurrent liabilities}}{\text{total assets}};$$

- short-term solvency,

$$\text{current ratio} = \frac{\text{current assets}}{\text{current liabilities}};$$

**TABLE 2** Pearson correlation coefficients for financial ratios and the P2P indicator.

	Age	Current ratio	Debt ratio	LTDR	ATR	ROE	ROA	P2P
Age	1	0.20	-0.20	-0.06	-0.21	-0.18	-0.22	-0.42
Current ratio	0.20	1	-0.38	-0.01	-0.16	-0.12	-0.07	-0.26
Debt ratio	-0.20	-0.38	1.00	0.35	0.40	0.11	0.19	0.26
LTDR	-0.06	-0.01	0.35	1	-0.10	-0.04	-0.12	0.02
ATR	-0.21	-0.16	0.40	-0.10	1	0.18	0.53	0.35
ROE	-0.18	-0.12	0.11	-0.04	0.18	1	0.37	0.30
ROA	-0.22	-0.07	0.19	-0.12	0.53	0.37	1	0.40
P2P	-0.42	-0.26	0.26	0.02	0.35	0.30	0.40	1

- long-term solvency,

$$\text{long-term debt ratio (LTDR)} = \frac{\text{noncurrent liabilities}}{\text{total assets}};$$

- asset efficiency,

$$\text{asset turnover ratio (ATR)} = \frac{\text{turnover}}{\text{total assets}};$$

and

- profitability,

$$\text{return on equity (ROE)} = \frac{\text{profit after tax}}{\text{shareholder funds}},$$

$$\text{return on assets (ROA)} = \frac{\text{profit after tax}}{\text{total assets}}.$$

We also include the age of the SME.

These ratios are used to estimate the probability of borrowing from the alternative lender ( $Y = 1$ ). In order to limit the effect of outliers, the ratios and their components are winsorized at the 99th percentile separately for each sample. In addition, we perform the correlation analysis to understand the level of association between different predictors. The correlation analysis does not exhibit any excessive correlations, as shown in Table 2. Although some of the ratios are related, they still measure different aspects of financial performance. The results for the ratios are reported in Table 3.

In order to correct for the potential clustering of accounts in the two samples, we use the generalized estimating equation (GEE). This approach is used in place of



**TABLE 3** Parameter estimates for the probability of borrowing from the P2P lender.

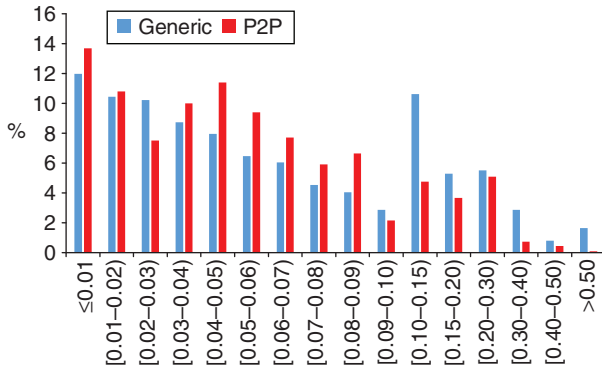
Parameter	Estimate	Standard error	Z
Intercept	-1.9	1.04	-1.83
Age	-0.06	0.01	-6.61***
Asset turnover ratio	0.36	0.04	9.80***
Debt ratio	1.44	0.14	10.03***
Current ratio	-0.31	0.04	-7.95***
Long-term debt ratio	0.86	0.14	6.07***
ROA	5.34	0.26	20.73***
ROE	0.05	0.01	4.16***

Logistic regression with the GEE estimation with clustering on the P2P indicator. We have performed robustness checks by removing some of the ratios that may be considered redundant (ROE, long-term debt ratio, current ratio). The signs and the levels of statistical significance do not change, and these results are available on request. The significance level is represented by the following notation: \*  $p < 0.0001$ , \*\*  $p < 0.001$ , \*\*\*  $p < 0.05$ .

standard regression approaches in situations where errors are clustered or correlated, which may be the case in our analysis (as pointed out by an anonymous referee) because we have two samples obtained from two different sources.

The correlated data are modeled using the same logit link function and linear predictors, but the covariance structure of the correlated measurements is also estimated by iteratively choosing the best  $\beta$  to describe the relation between the predictors and the responses. This modeling leads to more robust standard errors (Liang and Zeger 1986; Hubbard *et al* 2010). In our case, the observed changes to the originally used logistic regression were minor.

The results reported in Table 3 show that the clients of the P2P lender are more likely to be younger. Higher leverage (debt ratio) appears to make P2P borrowing more likely, and this borrowing comprises both short-term solvency (current ratio) and long-term solvency (long-term debt ratio). However, both profitability ratios are also positively associated with the P2P indicator and this suggests that P2P borrowers have higher returns. They also manage to produce higher turnover relative to assets. Thus, the P2P borrowers are more efficient in managing the resources available to them, despite being younger. However, the latter interpretation should be taken with caution, as we only observe a snapshot of one year. Besides, the credit histories of the SMEs in our samples are not known. It is possible that traditional banks may have rejected these borrowers because of high leverage (or these SMEs may have thought they would be rejected), and this rejection made them turn to alternative financing. It is also possible that P2P lenders prefer such borrowers. These propositions can be tested by further research.

**FIGURE 7** PD for the generic UK and P2P samples.

P2P: mean PD, 0.064; median PD, 0.046. Generic: mean PD, 0.089; median PD, 0.051.

### 5.3 Comparison of risk

First, we estimate the PD for the two samples using the SME  $Z$ -score model. The inputs into the original model and the enhanced current version (as illustrated in Figure 2) do not include the source of external funding. In fact, such detailed information is not available, so there is no bias toward any lender, traditional or alternative.

As Figure 7 shows, the distribution of PD shifts more toward zero for the P2P sample as compared with the generic UK one. The major part of the distribution in the P2P portfolio is in fact in the lowest decile, with very few accounts being above 0.3. The lower risk of the P2P lender’s clients is also confirmed with the summary statistics: the average PD for the generic sample is 0.089, which is higher than that of the P2P sample (0.064); the corresponding medians are 0.064 and 0.046. The  $t$ -test for the differences between the two means from the Cochran and Cox (1950) approximation for unequal variances is highly significant. Given the nonnormal shape of the PD distributions, as a robustness check we also perform a Wilcoxon nonparametric test (Van Elteren 1960), and it also confirms that the difference between the two samples is highly significant. These results show that clients of alternative lenders are less risky.

Second, we perform the regression analysis of the PD by using the indicator variable for whether the SME borrows from the P2P lender together with a set of controls. The objective is to test whether the difference in risk levels between P2P borrowers and generic SMEs holds when controlling for the information available to us.

**TABLE 4** Parameter estimates from the beta regression to model the PD.

Effect	Estimate	Standard error	<i>t</i> -value	Pr > <i>t</i>
Intercept	-2.2524	0.1340	-16.81	<0.0001
Age	-0.0011	0.0006	-1.66	0.0969
Asset turnover ratio	-0.0049	0.0045	-1.1	0.2702
Debt ratio	0.5398	0.0282	19.17	<0.0001
Current ratio	-0.1353	0.0076	-17.79	<0.0001
Long-term debt ratio	-0.0851	0.0438	-1.94	0.052
ROA	-0.6517	0.0366	-17.8	<0.0001
ROE	0.0034	0.0010	3.56	0.0004
P2P indicator	-0.3394	0.0270	-12.59	<0.0001
Scotland	0.0380	0.0386	0.98	0.3253
Northern Ireland	-0.0724	0.0719	-1.01	0.3145
Agriculture	0.1347	0.1883	0.72	0.4744
Construction	0.1295	0.1555	0.83	0.405
Manufacturing	-0.1303	0.1329	-0.98	0.3268
Transport	-0.0241	0.1317	-0.18	0.8547
Services	0.0005	0.1314	0	0.9973
Administrative activities	-0.1718	0.1424	-1.21	0.2276
Scale	13.1278	0.2164	—	—

P2P indicator is a dummy variable equal to one if the SME borrowed from an alternative lender and zero otherwise. Region and industry are series of dummy variables, where "England" and "other industries" are corresponding reference categories.

We have used the same predictors as in Section 5.2 and have also added the set of dummies that represent the major UK regions and industry sectors as controls. We use a beta regression that is a flexible approach appropriate for a dependent variable distribution of (0,1). The results of a beta regression model have a similar interpretation to the logistic regression (Kieschnick and McCullough 2003).

Table 4 presents the results. None of the industry or region dummies are significant. Asset turnover is not significant either. Age and long-term debt ratio are significant at the 10% level with negative signs, which means older SMEs and higher values of long-term debt relative to assets are associated with lower PDs. The other financial ratios are highly significant. Current ratio (current assets to current liabilities) also has a negative sign; therefore, lower values of short-term debt are associated with lower risk. Further, the overall level of debt has a positive effect on PD, as given by the sign of the debt ratio. ROA is negative, which means that the effective management of assets is linked to lower risk. In contrast, ROE is positive, but this sign may be linked to high values of debt that could lead to a lower ROE.

The P2P indicator is highly significant and negative. Therefore, the P2P borrowers

are still less risky even after adding the available controls. However, the P2P indicator represents the additional variables that are included in the SME *Z*-score model but are not available to us (these variables may include information on the timeliness of account filings, public derogatory events or governance variables, as suggested by Figure 2). In other words, P2P borrowers may possess some unobserved qualities that make their estimated PD lower than the generic sample. Unfortunately, our data do not allow us to determine which unobserved qualities these may be. However, we regard this result as deserving further investigation and more research with broader and more detailed data.

## 6 CONCLUSIONS AND FURTHER RESEARCH

Undoubtedly, after the 2008 financial crisis, the funding options available to SMEs beyond bank lending have significantly increased. This development has led to the popularity of P2P or marketplace lending as sources of external financing for SMEs. However, concerns are also growing regarding the level of risk the new P2P lenders are taking, and whether they compete with traditional banks or complement their services.

The previous research offers mixed results as to the risk of the borrowers of P2P lenders. However, the literature on P2P lending to SMEs is scarce, particularly in the United Kingdom. Our study contributes to closing this gap and offers an exploration of the risk profiles of the SME borrowers of one of the alternative P2P lenders in the United Kingdom.

We have shown that the borrowers are micro and small limited companies. Their main reason for borrowing is expansion, and only a very small share of firms indicate that the main reason is to refinance. According to UK government statistics, the P2P borrowers are underrepresented in London but overrepresented in the South East. They are more from the wholesale and retail sector and information and communication industries.

To extend our comparison to a company level, we select a generic UK sample of SMEs that is representative of services and manufacturing. The SME clients of the P2P lender are likely younger with higher levels of debt but also with higher returns. We can interpret these characteristics as SME clients borrowing more but managing the debt more efficiently.

In order to compare risk levels, we estimate the PD with the SME *Z*-score model. The PDs are lower for the P2P sample than for the generic UK sample. Finally, we apply the regression analysis to explain the PD by using an indicator of whether the SME borrows from the P2P lender while controlling for financial ratios, age, region and industry. The P2P indicator is highly significant and negative, which means the estimated risk level of P2P borrowers is lower than for the generic sample of UK

SMEs. Therefore, SME borrowers from at least one P2P lender are relatively good credit risks. We do not find evidence that the P2P lender in our analysis targets under-served SMEs. This finding lends support to the argument that P2P lenders act as substitutes for traditional banks by competing with the banks for low-risk customers.

Our results have important implications for policy and further research. For governments and regulators, we provide evidence that the SME P2P market may be heterogeneous in terms of risk and its complementarity to traditional banks. At least one P2P lender has a sound risk level and is attractive to high-quality borrowers. The policy interventions should distinguish between different segments of the P2P lending market.

Our study is not without limitations. However, these limitations offer further directions for research. Our data do not establish the nature of unobserved factors represented by the P2P indicator, and this can be a possible extension should the appropriate data become available. Further, we have investigated only one P2P lender, and a broader investigation of the UK fintech market would establish different segments within it and corresponding risk levels and appetites.

One more limitation is our reliance on self-reported reasons for borrowing. A corresponding extension can obtain the balance-sheet data for the period after receiving a loan to check the extent to which self-declared motivations are true. This extension leads to one more recommendation (or rather, request) to regulators and lenders. As noted in Section 2, most of the research on alternative lending is from the United States, which is not surprising given the data available for research there; for example, the data from LendingClub or the data at the bank–county level from the Community Reinvestment Act. Sharing the data from other countries would naturally lead to more research in these countries.

Finally, we draw attention to the need to increase awareness among SMEs of different sources of funding. Investing in financial education for SMEs is critical to help small businesses become more financially conscious, more aware of the different types of lending available to them and better able to manage their businesses and risks.

## **DECLARATION OF INTEREST**

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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