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Hans Degryse, Kent Matthews and Tianshu Zhao

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Cardiff Business School
Cardiff University
Colum Drive
Cardiff CF10 3EU
United Kingdom
t: +44 (0)29 2087 4000
f: +44 (0)29 2087 4419
business.cardiff.ac.uk

Relationship lending, Trust, and SME bank financing in the UK

Hans Degryse

(KU Leuven, CESIfo, and CEPR)

Kent Matthews

(Cardiff Business School, and Nottingham University Business School, China)

Tianshu Zhao

(Birmingham Business School, University of Birmingham)

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Abstract

It is well recognized that relationship banking helps to relieve the credit constraints faced by SMEs to access bank finance. Trust is an important part of relationship banking. However, the term trust is nebulous, and relationship banking means different things to different banks and different borrowers. How trust enables the credit market for SMEs through relationship banking is largely unexplored. Using a unique primary dataset of SMEs in the UK, we construct a measure of trust-based relationship banking from the perspective of the borrower. We examine the drivers of trust-based relationship banking in terms of organizational trust in the relationship manager, defined as the delegation of operational autonomy, along with local market and social capital factors, and the style of the bank-borrower relationship. Along with bank, firm, and market factors, trust-based relationship banking helped to reduce the credit constraints faced by SMEs in the decade following the global financial crisis.

Keywords: Trust, Relationship Banking, SME Financing, Bank Organization

JEL-codes: G21, G290, L140

"*Relationship Banking is not a concept. In a true banking relationship, one point of contact manages and understands you, your business, and your cash-flow cycle. He or she is in a position at the bank who actually make the decisions, not a computer*" - Kurt Kappa, Senior Vice-President Westfield Bank

1. Introduction

Small business lending decisions are typically based on a mix of hard, verifiable information and soft, non-verifiable information (Liberti and Mian, 2009; Hertzberg et al., 2010; Liberti and Petersen, 2019). Banks also deploy a variety of 'arm's length' transaction lending technologies to SME financing that is even supported by their professional lobby associations[1]. The question then arises, what is the unique value in relationship banking to the borrower? This was the question posed by Degryse et al. (2017) in a small-scale study for Wales. In this paper we go further and study whether, and how, the unique value in relationship banking is embedded in the mutual trust in the relationship manager-borrower relationship. This relationship raises three important questions. First, does the development of interpersonal trust between the relationship manager and the firm act as a screening mechanism? Second, to what extent does the efficacy of trust-based relationship banking in the lending decision process depend on the operational autonomy of the relationship manager? Third, to what extent does trust-based relationship banking help in alleviating the credit constraints faced by SMEs? We take these questions to the experience of UK SMEs in the post-2008 financial crisis, using a set of primary data gleaned from sample-survey of the Federation of Small Business (UK) members undertaken over the period 2015-2016. The continued tightening of credit conditions in the aftermath of the global banking crisis presents an opportune empirical setting for us to conduct this study in the context of relationship banking at a time of financial stress (Gobbi and Sette, 2013).

This paper relates to the organizational economics literature on the importance of inter-organizational trust in internal transactions. It lies at the intersection of relationship banking, SME financing, and the trust literature in organizational science. We bring together the various strands of this literature and contribute in three ways.

First, we explore the notion that a trust-based relationship facilitates the formal financial contract between the lender and the borrower (Cao and Lumineau, 2015). We construct a

[1] The Federation of Small Business in the UK encourages its members to apply online through its portal for start-up financing from bank credit through to P2P and equity crowdfunding.

measure of trust-based relationship banking from the survey responses by SME managers based on existing research on trust measurement in the bank-borrower relationship (Moro and Fink, 2013, and Hirsch et al., 2018). Here, we differ by focussing on the recipient of credit - the SME manager. Our finding suggests the mutual trust between the local relationship manager and the borrowing firm's manager is an intrinsic component of relationship banking in the banks' screening process.

Second, we examine the effect of operational autonomy of the local Relationship Manager (RM) for the relevance of the trust-based relationship for the banks' screening system. Operational autonomy of the local RM contributes to the screening process. We go further and identify the effect of the style of interaction in trust-based relationship banking. To this end, we run a horse race between the method and the frequency of communication between the RM and the borrowing firm, and the operational autonomy of the local RMs in the same regression of trust-based relationship lending. Our analysis confirms the existence of an operational autonomy effect on the efficiency of the information exchange.

Finally, we examine the impact of trust-based relationship banking on credit constraints faced by SMEs. Our finding suggests the positive impact of trust-based relationship banking in easing SMEs' access to bank finance.

This paper is organised in the following way. The next section reviews the literature of relationship banking, SME bank financing, and the role of trust. Section 3 describes the data. Section 4 presents the methodology, reports the results, and discusses various robustness tests. The discussion and conclusion are in the final section.

2. Literature Review

The importance of the role of SMEs in generating economic growth has been the consensus finding in the literature on financial development. However, the finance literature is replete with examples and findings of market frictions that impede the access of SMEs to external finance as one of the most important barriers that constrain SME growth (Fraser, 2010). There is also growing evidence that SMEs suffer disproportionately from disruptions to the supply of external finance in times of economic distress (Fraser, 2010) and the investment activities of SMEs exhibit a disproportionately volatile pattern over the credit cycle (Degryse et al., 2017)

Typically, SMEs have a shorter history and weaker collateral than other firms. They are subject to less strict information reporting requirements and are associated with more opaque information. Given the paucity of hard information from SMEs, relationship banking, rather than transactional lending is the more appropriate system for underpinning the borrower-bank relationship (Ferri and Murro, 2015). While small business lending decisions are typically based on a mix of hard, verifiable information and soft, non-verifiable information (Liberti and Mian, 2009; Hertzberg et al., 2010), the credit-screening and post-loan monitoring procedures have important implication for the easing of financial constraints faced by SMEs (Bartoli et al., 2013). Essentially, relationship banking enables the credit market for SMEs (Uzzi, 1999).

While the importance of relationship banking for lessening the credit constraints facing by SMEs is well-recognized, the empirical analysis of the mechanism of information transmission in the bank-borrower relationship is obscure (Santikian, 2012). The literature suggests that the utilization of the "lending technology" is shaped not only by the competitiveness condition of the external environment in which the bank operates (Heider and Inderst, 2012) but also by the organizational design of the bank (Stein, 2002). With the latter, information transmission —particularly when information is subjective and more nuanced in nature— becomes more difficult in more hierarchical organisations (Liberti and Mian, 2009). Relationship managers operate within the local community and collect private information on local borrowers and markets. Production 'know-how' about the SMEs is often tacit. Local RMs face implicit communication costs in transmitting soft information up the hierarchical chain where soft information has less weight in decision making (Berger et al., 2005).

The role of trust remains under-investigated in the relationship banking literature. Excluding trust from relationship models weakens the understanding of the information value of the relationship. It is not the existence or non-existence of a relationship that matters but rather the trust in the relationship (Bromiley and Harris, 2006). It is the likelihood of soft information being incorporated into the decision-making that enables the market-making for the SME credit market (Cao and Lumineau, 2015). Only a few empirical studies in banking have investigated the role of trust in nurturing informational transmission and knowledge transfer in the bank-borrower relationship (Uzzi, 1999). Trust in credit relationships between local banks and SMEs was examined by Howorth and Moro (2006), while others examined the impact of trust on the market outcome of SME lending[2]. This literature however, view trust as

[2] See Harhoff and Körting (1998); Lehmann and Neuberger, (2001); Hernandez-Canovas and Martınez-Solano (2010); Howorth and Moro (2012) and Moro and Fink (2013)

a variable independent of the bank-borrower relationship. However, if trust enables the economic-value of the bank-borrower relationship through the transference of information, we argue that trust is intrinsic to relationship banking.

Trust is an interpersonal issue, and while interpersonal trust and inter-organizational trust are inextricably linked, the former cannot be directly transferred to the latter (Currall and Judge, 1995). Inter-organizational trust is the collective trust held by the people in one organization with respect to another (Zaheer et al., 1998). The connection between interpersonal and inter-organizational trust is based on the organizational structure and the incentives and behaviours of individuals within the organization. Banks that practice greater hierarchical decision-making, impose extra frictions on the communication of soft information up the decision chain, which weakens the interpersonal trust between the RM and the SME manager.

The literature on relationship banking highlights the benefit of the geographical proximity of RMs to their borrowers. However, distance alone is not sufficient to enable trust in the bank-borrower relationship, nor the relevance of trust-based relationship lending in the lending process of the bank. It is the delegation of decision-making to local RMs that is the necessary condition for the trust-based bank-borrower relationship (Gur and Bjørnskov, 2017). The authority within the organisation incentivises the local RMs to collect and transmit soft information about the borrower[3], while the escalation of decision making to higher levels in the organisation leads to a weakening of trust, and to poor loan decisions[4]. Trust involves the sharing of private knowledge between the RM and the SME borrower, and the strength of the trust defines the strength of the information (Uzzi and Lancaster, 2003). As such, the delegation of decision-making authority to the RM aids the development of mutual trust between the two parties and reinforces the importance of trust-based relationship banking.

Based on the discussion above, we formulate three hypotheses:

H1: mutual trust between the local relationship manager and SME is intrinsic to relationship banking.

H2: the delegation of operational autonomy to local relationship managers leads to a higher level of trust-based relationship banking in the bank's screening process.

[3] Value judgements of borrower characteristics such as personal competence, integrity, quality of business.
[4] On this and an examination of the de-personalisation of UK banking at the branch level see the unpublished PhD thesis of Marthon-Vik, (2014)

H3: A higher level of trust-based relationship banking results in a lower level of credit constraints faced by SMEs.

3. Data

We conduct a survey of small firms provided by the Research Community of the Federation of Small Business (UK). While the membership of the Federation of Small Business (UK) is 200,000, a median poll sample of 2000 is the norm in its regular surveys. The survey was conducted in three waves over 2015-2017 and received a response of 1903. The range of annual turnover of the respondent firms was between GBP £1.5mill-£2.5mill. The first wave received a response of 1200, the second wave received 303, and the third wave received 400. These third waves included a sample of non-FSB member SMEs to act as a control against potential selection bias. Data were collected from questionnaires completed by the chief executive officers of the firms.

Along with basic information about location, activity, size, income etc., the survey gathered information, from the demand side perspective, on 1) the SMEs' experience of financial constraints, and the nature of the constraints; 2) the name of the SMEs' main bank; 3) the characteristics of the firm's relationship with their main bank; 4) the communication mode and frequency between SMEs and their main bank; 5) the operational autonomy of the relationship manager of SMEs' main bank; 6) the information and lending criterion considered by banks in decision-making of the outcomes of the applications; 7) the operational performance of SMEs, and 8) the postcode area of the registration address of SMEs. The survey also asks how important relationship banking is to the SME when choosing the bank provider. These survey questions have been designed to understand several facets of the external and internal institutional environment in which the bank-borrower relationship is developed. It allows us to address the value or otherwise of relationship banking in the face of an increasing trend towards 'transactional banking' in terms of reducing the financial constraints faced by SMEs in the post-2008 financial crisis.

The information from the survey helps us to focus on five areas of enquiry. First, the information on the underwriting criteria used by banks in their credit decision allows us to establish if relationship banking is the lending technology used by the bank for the provision of bank credit to SMEs, and if mutual trust is intrinsic to relationship banking in the screening process. Second, information on the operational authority of local loan officers allows us to

examine the extent to which the organizational framework in which the RM operates contributes to the relevance of trust-based relationship banking in the bank's decision-making. Third, information about the characteristics of the bank-borrower relationship, and the mode and frequency of communication, helps us to identify the path relation between the operational authority of local RMs and information sharing and knowledge transfer with the SME borrower. Fourth, information on the address of the SMEs and data regarding the branch distribution of each bank in the locality allows us to isolate the effect of local market conditions and social capital factors on the lending technology of the bank. Finally, information about the operational performance of the borrower and the financial condition of the bank allows us to control for borrower-bank factors in identifying the value of trust-based relationship banking on the credit constraints facing SMEs[5].

Of the 1903 respondents, 671 had applied for loans post-2008 and among them, 669 identified 27 different banks from which the loan application was made. 601 responded to the question regarding operational autonomy of the relationship manager with 214 answering 'YES'. 409 answered the question regarding the importance of the criteria used by their banks in granting credit. 664 answered the question "What was your bank's initial response" which we use to construct the measurement of experiencing credit constraint (CONSTRAINT1) by defining a value of zero if the answer is "obtained all amount applied for and no problem with terms and condition", and a value of one if the answer is one of, turned down, offered a smaller amount of facility than applied; there are some problems with terms and conditions) (267 (YES): 397 (NO)). Also, 656 answered the question "Have you experienced any difficulties in applying for bank finance for your business since 2008?" which we use to construct the second measure of credit constraint (i.e., CONSTRAINT2) by assigning a value of one to the answer of "Yes" and zero to the answer of "No" (230 (YES): 426 (NO)).

[5] Since this information is gathered at the level of the borrower-bank relationship at the time when the application is made, we can directly link the screening standards with the time variant and time invariant characteristics of the borrower and the bank.

4. Methodology, variables, and results

4.1.Trust-based relationship banking

In this section, we address the first of our hypotheses; H1. To identify if mutual trust is intrinsic to relationship banking, we utilise the unique features of the survey which asks the respondents to comment on the importance of the criteria banks use in their loan granting process. Out of 8 items covering the critical elements of the bank credit screening process, 7 relate to transactional hard-information and relationship soft-information lending technology[6]. The mutual trust between the local RMs and SMEs is one of these 7 items. In addition, we introduce cross-selling opportunities as an additional criterion. This is inspired by the empirical finding which suggests banks' involvement with SMEs has been strategically motivated by a combination of lending and other financial services (Zhao et al., 2013; De la Torre et al., 2010).

Respondents are asked to evaluate the 8 individual items[7] on a five-point Likert scale from 'not at all important' (1) to 'very important' (5). Out of the 671 respondents who indicated that they have applied for bank loans in the post-2008 period, 409 answered this section of the survey[8]. We perform factor analysis on these 8 items to extract factors characterising the emphasis of bank screening of a loan application. Factor analysis allows for the identification of the unobservable latent factors that banks evaluate in their screening process. It particularly suits our need since our purpose is to explore whether mutual trust is one of facets of relationship banking.

Three common factors are extracted from the Factor Analysis (the Appendix describes the details). The first factor contains the following elements: the position of my business in the market; financial statement of my business; my business's credit history and payment record with the bank; confidential information regarding the quality of management; the development

[6] These 7 items encompass the considerations in an analogous SME financing survey run in Japan by the Research Institute of Economy, Trade, and Industry (Uchida et al., 2012) and the Tenth Survey on Italian Manufacturing Firms (SIMF), run by the UniCredit banking group for 2006 (Ferri et al., 2015).

[7] The detailed items are presented in the first column in Table A2 of the Appendix.

[8] We acknowledge that the drawback of these data is that they are the perceptions of the borrowers about what their banks utilize in the lending decisions. While borrowers' perceptions of bank screening standards may be imperfect, this could be sufficient for the purpose of reflecting bank standards, processes, and procedures (Uchida et al., 2012). If the decision to answer this question was not random, there may be a self-selection bias. But it is argued that self-selection would become a real concern only if it is systematically related to the variables which have been excluded in our analysis. We undertake a battery of additional tests to handle the problem of missing variables.

plan and business strategy; and mutual trust between my business and the bank's relationship manager[9].

In the standard literature of relationship banking, the following elements, "the position of my business in the market", "my business's credit history and payment record with the bank", and "confidential information regarding the quality of management, the development plan and business strategy" are classified as private information confidential to the bank, while "financial statement of my business" is viewed as one type of verifiable hard information. However, since the annual financial statements of SMEs are not audit required, it can be argued that the level of mutual trust between the RM and the borrowers adds credence to the reliability of the financial information. In sum, the composition of the first factor is consistent with the argument that mutual trust in a relationship is a complementary facilitator in the contracting process as in Yang et al., (2012) and is the critical element in relationship banking on SME lending. To reflect the intrinsic nature of the first factor, we label this factor TRB (trust-based relationship banking).

The most important factor loadings in the second factor are the elements "my ability to assure assets to support the loan", and "guarantee(s) to act as security to support the loan", These two elements pertain to the reliance of collateral and/or guarantees to screen loan applicants (Moro and Fink, 2013; Uchida, 2011). This factor is labelled COLL (collateral factor). The third factor is primarily loaded by the element "cross-selling opportunities". This factor is in line with the product bundling practices by banks and the potential of product cross-subsidization of pricing (Zhao et al., 2013). This factor is labelled CROSS (cross-selling factor).

The factor analysis identifies three latent factors that banks use in screening loans. The results are consistent with the lending decisions to SMEs that are typically based on a mix of hard, verifiable information and soft, non-verifiable information (Liberti and Mian, 2009; Hertzberg et al., 2010). Mutual trust between the local RM and the SME has a high correlation with the same factor which lends support to our hypothesis that mutual trust is intrinsic to relationship banking. The factor analysis also shows that the mutual trust between local RM and the SME load onto the same factor as items related to the confidential and proprietary information possessed by the bank, which are the proxy for relationship banking used by the

[9] The elements 'financial statements of my business', and 'my business's credit history and payment record', are clustered with 'mutual trust between my business and the bank's relationship manager', lends support to the notion of calculative trust as in Williamson (1993).

existing literature. The mutual trust between the local RM and the SME appear to enable the financial contract in situations of incomplete of extant information regarding the capacity, credibility, and the predictability of the borrowing firms for the unforeseeable future. This indicates the mutual trust between local RM and the SME is critical element for relationship banking on SME lending, lending s support to our hypothesis that mutual trust is intrinsic to relationship banking.

The factor pattern matrix and the mean and the standard deviation of factor scores of the three common factors are presented in the Table A2 of the Appendix. Summary statistics of the distribution of the factor TRB across the identified banks in the survey data is presented in Table A3 of the Appendix.

4.2.1 *The base line model*

We now turn to the second of our hypotheses; H2. Arguably, the initiation and evolution of mutual trust between the local relationship manager and SME manager is influenced by the length and the scope of the bank-borrower relationship. Long-term relationship duration enables more opportunities for information flows and tighter business tie allows for the multiple aspects of reciprocal testing in terms of shared values and standards of behaviour (Dekker, 2004; Juvina et al., 2013). Also, the competitiveness condition in the local credit market would affect the use of relationship lending technology by banks as the differentiation strategy to attract SME consumers (Degryse et al., 2017; Zhao et al., 2021). In addition, the social context within which the relationship is embedded is important since the quality of social environment underpins the congruence of expectations and norms (Coleman 1990; Kozlowski and Klein, 2000).

We specify the following base line model:

$$TRB_{fblt} = \alpha + \rho OPEAUTO_{fblt} + \pi LENGTH_{fbt} + \delta SCOPE_{fbt} + \gamma MARKETPOWER_{bl} + \varepsilon_{fblt} \quad (1)$$

The dependent variable in Equation (1) is the trust-based relationship banking (TRB) measure derived from the factor analysis. The subscript indicates *f* (SME firm), *b* (the bank to

which the loan application was made), *l* (the postcode area where the registered address of the SME firm is located), and *t* (the year when the loan application was made). ε_{fblt} is an idiosyncratic error term. Regarding the main variable of interest, $OPEAUTO$ refers to the autonomy of the relationship manager in decision-making which takes the value of 1 if the response to the survey question "Does your relationship manager have the autonomy to approve or reject your loan application?" is "yes", and 0 otherwise. Coming to other independent variables, $LENGTH$ denotes the duration of the relationship between the SME and the bank to which the loan application was made. It is measured as the mid-point of the range given in the responses, namely 1-3 years, 4-6 years, 7-9 years, 10-15 years, 16-20 years, and capped as 20 if the answer is "more than 20 years". $SCOPE$ indicates the breadth of business ties between the SME and the bank and is proxied by the types of services the SMEs use at the bank. It is extracted from the average responses to the question "What services does your business use at the bank?"[10]. Whenever the response to a particular service is "yes", it takes a value of 1 and 0 otherwise. $MARKETPOWER$ represents the branch penetration of the bank in the postcode area where the register address of the SME is. It is measured by the number of branches of the bank divided by total number of branches of all banks in the postcode area. The information regarding the branches of banks is derived from Experian's Shop*Point data on the location of branches of bank records for England, Scotland & Wales up to 11/04/2013[11]. There is strong evidence that retail banking markets for SMEs are local in nature (Degryse and Ongena, 2005). Higher branch penetration of the bank in the vicinity of SMEs suggests a greater physical proximity between local SMEs and the bank (Alessandrini et al., 2009), which would facilitate the collection of soft information of SME borrowers by local relationship managers. The dominant position of the bank also implies a higher likelihood of the sustainable relationship between the SME and the bank (Presbitero and Zazzaro, 2011), and thus both would have interest to make relationship-specific investment.

To test for the robustness of the estimated results from the baseline model (1), we enhance Equation (1) by introducing additional control variables:

$$TRB_{fblt} = \alpha + \rho OPEAUTO_{fblt} + \pi LENGTH_{fbt} + \delta SCOPE_{fbt} + \gamma MARKETPOWER_{bl} + \vartheta' CONTROLS + \varepsilon_{fblt} \quad (2)$$

[10] Ten services including bank loan/overdraft, current account, term deposit account, commercial mortgages, leasing/hiring-purchase, factoring/invoice discounting/stock finance, business credit cards, personal credit cards, export finance and other financial services are presented.

[11] Shop*Point gathers retail information on bank/building society and the postcode via site-surveyed Goad records plus records from data sources such as Thompson Directories and UK Companies House.

The definition and the summary of the statistical description of the variables included in Equation (1) and (2) is shown in Table 1 below.

Table 1: The definition and statistical description of variables used in the analysis of the impact of operational autonomy on the relevance of the trust-based relationship banking.

Name of the variables	Definition and measure of the variable	Date source	Mean	Std. Dev.
Dependent variables				
TRB	Measures the Trust-based relationship banking derived from the factor analysis	Survey	4.240	1.115
CONSTRAINT1	Measures the SME credit constraint post-2008. Takes the value of 0 if the answer to the question "What was your bank's initial response" is; obtained all amount applied for and no problem with terms and condition; and a value of 1 if the answer is one of, turned down; offered a smaller amount of facility than applied; there are some problems with terms and conditions.	Survey	0.402	0.491
CONSTRAINT2	Measures the SME credit constraint post-2008. Takes the value of 1 if the answer to the question; Have you experienced any difficulties in applying for bank finance for your business since 2008? is "Yes" and 0 otherwise.	Survey	0.351	0.478
Main variable of interest				
OPEAUTO	Measures the autonomy of the RM in decision-making. Takes the value of 1 if the response to the question; Does your relationship manager have the autonomy to approve or reject your loan application? is "yes", and 0 otherwise.	Survey	0.395	0.490
Other independent variables in Equation (1)				
LENGTH	Measures the duration of the bank-borrower relationship measured as the mid-point of the range given in the responses, starting 1-3 years; and capped at 20 for; more than 20 years.	Survey	11.398	6.161

SCOPE	Measures the breadth of business ties between the bank and the SME, extracted from the average responses to the question; What services does your business use at the bank?. Ten services are presented. Whenever the response to a particular service is "yes", it takes a value of 1 and 0 otherwise.	Survey	0.377	0.160
MARKETP	Measures the branch penetration of the bank for each postcode area, measured by the number of branches of the bank divided by total number of branches of all banks.	Experian's Shop*Point data	19.150	8.091
Additional control variables in Equation (2)				
Competition at the level of postcode area				
BRANCHDEN	Branch density for each postcode area calculated by the total number of branches of banks divided by the population.	Experian's Shop*Point data	0.020	0.021
HHIBANK	The HHI of the share of branches of banks for each postcode area	Experian's Shop*Point data	7.217	5.853
The quality of social capital at the level of postcode area				
VOTE	General election turnout ratio for each postcode area calculated by the number of turnouts divided by total electorates.	General Election 2010	0.665	0.031
BLOODRATE	Blood donation rate for each postcode area calculated by blood donation registration divided by total population.	NHS Blood and Transplant	1.607	0.298
HHIREG	Diversification index of religion group for each postcode area calculated as the HHI of following groups: Christian, Buddhist, Hindu, Jewish, Muslim, Sikh, Other Religion, No Religion, and Religion Not Stated.	2011 census	4346.095	722.106
HHIETH	Diversification index of ethnic group for each postcode area calculated as the HHI of following ethnic groups: White (British), Mixed/Multiple Ethnic Groups, Black/African/Caribbean/Black (British); and Other Ethnic Group.	2011 census	7940.161	1748.627

Bank-characteristics				
DIST (miles)	The driving miles between the postcode area where the SME and the bank branches are located and the headquarters of the bank.	Experian's Shop*Point data	4.892	1.142
LNTA (thousands)	Natural logarithm of the total assets of the bank when the loan application was made (=ln (total assets)).	Bankscope and Thomson One	21.028	0.927
COSTINC (%)	Cost income ratio of the bank when the loan application was made (=total cost/total income).	Bankscope and Thomson One	83.592	23.580
LOSS (%)	Loan loss reserve ratio of the bank when the loan application was made (=loan loss reserve / gross loans).	Bankscope and Thomson One	1.931	1.471
EQTA (%)	Equity total assets ratio of the bank when the loan application was made (=equity/total assets).	Bankscope and Thomson One	5.971	1.237
LIQ (%)	Liquidity ratio of the bank when the loan application was made (=liquid assets/deposit & short-term funding).	Bankscope and Thomson One	42.983	10.846
COLL	Collateral factor derived from the factor analysis	Survey	3.679	1.097
CROSS	Cross selling factor derived from the factor analysis	Survey	3.382	1.068
DEMANDRELA	A binary dummy variable for whether relationship banking is an important criterion for choosing or switching financial provider. Takes the value of 1 if the respondent states 'Yes'	Survey	0.539	0.498
SME-characteristics				
BORROW	Three categorical dummies for loan size applied; Below £24,999; £25,000-£249,999; and Above £250,000.	Survey	0.297	0.458
INTCOV	A binary variable taking the value 1 if the respondent records the status of interest coverage ratio when the loan application was made as healthy, and 0 if it is somewhat healthy, and somewhat unhealthy.	Survey	0.337	0.473
LEV	A binary variable taking the value of 1 if the respondent records the status of leverage ratio when the loan application was made as healthy, and 0 if it	Survey	1.740	0.689

	is somewhat healthy, and somewhat unhealthy.			
SALE	A binary variable taking the value of 1 for an annual turnover above £250,000, and 0 otherwise	Survey	0.682	0.466
SMETYPE	4 categorical dummies for the legal status of the SME; Sole Trader/Proprietorship/ Partnership; Private Company limited by Share (Guarantee)/Limited Liability Partnership/Limited Liability Company; Public Limited Company; and other types.	Survey	0.789	0.533
The time when the survey was conduct				
WAVE	3 categorical dummies referring to the 1st to the 3rd wave, respectively.	Survey	1.637	0.840

Note: the statistical description is calculated using the number of observations used in the regression

4.2.2. *Results*

The estimated results of the base line model are presented in Table 2.

Table 2: Determinants of Trust-based relationship banking: base model

Dep: Trust-based relationship banking (TRB)	
OPEAUTO	0.296*** (0.114)
LENGTH	-0.001 (0.010)
SCOPE	1.118*** (0.402)
MARKETP	0.018** (0.007)
N	347
R-sq	0.062

Note: the definition of variables can be found in Table 1. Figures in parentheses are robust standard errors. * p<.10, ** p<.05, and *** p<.01.

The results show that operational autonomy (OPEAUTO) is positive and significant. This says that local RMs with the authority to decide the result of loan applications, increases the relevance of trust-based relationship banking in the screening process, compared to these without the authority. This result lends support to the hypothesis regarding the importance of

delegating decision-making authority to local RMs in the development of mutual trust with the SME borrower and in enabling higher level of trust-based relationship banking in decision-making.

With the other independent variables in the baseline model, we find that the impact of LENGTH on the emphasis of trust-based relationship banking is not statistically significant, possibly stemming from the fact that the average length of relationship is quite long in our dataset (11.3 years)[12]. Indeed, we argue that while long-term relationship duration enables more opportunities for information flows between the RM and the SME, the relationship duration alone carries very limited implication for the accumulation of soft information and trust development between the local RM and the SME. We argue that regular interaction between the local RM and the SME, provides the means of relationship development [13]. The variable SCOPE is positive and significant. This result is consistent with the argument that the breadth of business cooperation is important for improving understanding between cooperative parties in economic exchange. The breadth of business exchange reflects the intention and the outcome of the iterative reciprocal testing process regarding shared values and standards of behaviour between the two parties. The variable MARKETP is positive and significant which suggests that the stronger physical presence of the bank could ease the collection of soft information of borrowers. This finding is also consistent with the bank signalling its willingness to engage in relationship-specific investment at the local level.

We conduct a series of robustness tests to confirm our main results derived from the baseline model (1). First, we augment the model with variables proxying for the degree of competition and the quality of social capital at the postcode area level. Second, , we control for the self-selection bias created by the choice of bank by the SME based on the importance of relationship banking (Table 3, Column 7). In the Appendix, we go even further and introduce the additional control variables for the bank-specific characteristics (Table A4), and SME-specific characteristics and the order of the survey wave (Table A5). We estimate these

[12] While the result in Table 5 uses the number of years as the measure of LENGTH, we also use its natural logarithm as the alternative proxy. Further, we construct dummy variable which takes the value of 1 if the duration is between 1-3 years and 0 otherwise, allowing for Cole (1998) who suggests that the value of the bank-borrower relationship for mitigating the asymmetric information problem primarily relates to the existence of the relationship rather than the duration of the relationship. The results remain, i.e., the impact of duration of the bank-borrower relationship on the trust-based relationship banking is not statistically significant.

[13] The method of interaction will also matter for the quality of relationship (see Rockmann and Northcraft, 2008) and the reliance on telephone interactions diminishes closeness and trust between partners (see Przybylski and Weinstein, 2013).

augmented models using pooled OLS. Our main results of the baseline model hold in these robustness tests.

Table 3: Determinants of Trust-based relationship banking: robustness tests

Dep: Trust-based relationship banking (TRB)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
OPEAUTO	0.301*** (0.114)	0.282** (0.116)	0.289** (0.115)	0.301*** (0.113)	0.298*** (0.113)	0.296*** (0.114)	0.285*** (0.112)
LENGTH	-0.001 (0.010)	-0.001 (0.010)	-0.000 (0.010)	-0.002 (0.010)	-0.001 (0.010)	-0.001 (0.010)	-0.001 (0.010)
SCOPE	1.105*** (0.401)	1.119*** (0.401)	1.140*** (0.398)	1.104*** (0.402)	1.105*** (0.402)	1.117*** (0.401)	1.082*** (0.401)
MARKETP	0.019** (0.007)	0.019*** (0.007)	0.019*** (0.007)	0.018** (0.007)	0.019** (0.008)	0.019** (0.007)	0.018** (0.007)
BRANCHDEN	1.737 (4.319)						
HHIBANK		0.010 (0.010)					
VOTE			-1.417 (1.927)				
BLOODRATE				0.150 (0.190)			
HHIREG					-0.000 (0.000)		
HHIETH						-0.000 (0.000)	
DEMANDRELA							0.204 (0.252)
N	347	347	347	347	347	347	347
R-sq	0.063	0.065	0.064	0.064	0.063	0.064	0.065

Note: This table shows the results of Equation (2) with variables of degree of competition and that of the quality of social capital at the postcode area as controls. Column 7 shows the effect of including a binary variable that identifies the importance relationship banking in the choice of bank by the SME. The definition of variables can be found in Table 1. Notes as in Table 2.

4.2.3 *Auxiliary analysis of the channels via which the operational autonomy affects trust-based relationship banking.*

In the discussion of the insignificant effect of the duration of bank-borrower relationship on the relevance of trust-based relationship banking above, we conjectured that the result is due to the failure of duration alone to capture the behaviour of the local RM in the activity of reciprocal trust building with the SME manager. Here, we conduct an auxiliary analysis of the impact of the operational autonomy on the frequency and the method of the communication between the local RM and the SME manager.

We augment the baseline model (1) with the frequency and method of the communication:

$$TRB_{fblt} = \alpha + \rho OPEAUTO_{fblt} + \tau FREQUENCY_{fb} + \beta METHOD_{fb} + \pi LENGTH_{fbt} + \delta SCOPE_{fbt} + \gamma MARKETPOWER_{bl} + \varepsilon_{fblt} \quad (3)$$

The measure of the frequency of the interaction is drawn from the following questions in the survey: How often do you and your relationship manager get in touch? The responses were one of, daily, weekly, monthly, every 2-3 months, every 4-6 months, annually, and more than annually. Each listed choice is converted to an integer response as 1, 2, 3, 4, 5, 6, 7, respectively. A higher magnitude is associated with a lower frequency. The measure of the method of communication is based on the response to the survey question; How do you and your relationship manager usually get in touch with each other? We generate three categorical variables referring to, face-to-face; via telephone and/or email; and we do not get in touch with each other; respectively. If higher level of frequency of interactions and more personal communication methods are the drivers through which the delegation of operational autonomy to local RMs determines trust-based relationship banking, we expect the estimated coefficient on the operational autonomy of local RMs (i.e., OPEAUTO) in Equation (3) to become insignificant and decrease in magnitude.

Equation (3) is estimated using OLS and the results are presented in Table 4 below. The inclusion of the variable proxying frequency and method of communication renders the measure of operational autonomy insignificant. We find that the frequency of interactions is positively related to trust-based relationship banking (at the 10% significant level). With the method of communication, relative to the interaction via telephone and email, face-to-face

interaction is positively related to higher trust-based relationship banking, while no communication results in a lower trust-based relationship banking. The estimated coefficient on the length of bank-borrower relationship remains insignificant. The results are consistent with the argument that the delegation of operational autonomy incentivises the local RM to conduct more frequent face-to-face interaction with the SME[14]. Repeated personal interaction is effective in reinforcing the quantity and quality of information exchange and the development of mutual trust, leading to the higher importance of trust-based relationship banking in the decision-making. Looking at the estimated coefficient on SCOPE, we find that the magnitude is smaller compared with the result of Table 2. This result implies that the strength of business ties between the bank and the SME might also influence the frequency and the method of interaction between the local RM and the SME. The effect of MARKETP is unchanged, and robust to the model which is further augmented with the additional control variables as detailed in the Appendix[15].

[14] We conduct the Sobel-Goodman mediation test to examine whether the frequency and face-to-face interaction carries the influence of the operational autonomy on the relevance of the trust-based relationship banking in the screening stage of bank lending. The test was conducted for the frequency and the mode of interaction, separately. The test for the mode of interaction is coded face-to-face = 1; email and telephone = 2; and no communication = 3 and treat it as a continuous variable. The p-value of the indirect effect of the frequency of interaction on the trust-based relationship is p(0.027), and that of the mode of interaction is p(0.006). This suggests that the hypothesized causal chain in which the presence of operational autonomy of RM affects the frequency/method of interaction that, in turn, affects the relevance of trust-based relationship holds. The results of the test hold regardless of whether the length of the relationship is being controlled or not. The results are available on request.

[15] The model specification is: $TBR_{fblt} = \alpha + \rho OPEAUTO_{fblt} + \tau FREQUENCY_{fb} + \beta METHOD_{fb} + \pi LENGTH_{fbt} + \delta SCOPE_{fbt} + \gamma MARKETPOWER_{bl} + \vartheta' CONTROLS + \varepsilon_{fblt}$. The detailed information regarding the additional controls can be found in the Section 4.2.2. We omit the results to save the space. The results are available upon request.

Table 4: Determinants of Trust-based relationship banking: frequency and method of interaction

Dep: Trust-based relationship banking (TRB)	**1**	**2**
OPEAUTO	0.178 (0.116)	0.178 (0.116)
FREQUENCY	-0.072* (0.038)	-0.072* (0.038)
METHOD (reference category: Telephone/email)		
METHOD: Face-to-face communication	0.297** (0.119)	0.297** (0.119)
METHOD: No communication	-0.826** (0.415)	-0.828** (0.417)
LENGTH	0.001 (0.010)	-
SCOPE	0.799** (0.407)	0.810** (0.389)
MARKETP	0.017** (0.007)	0.017** (0.007)
N	347	347
R-sq	0.119	0.119

Note: This table presents the results of the Equation (3). The frequency is coded as 1, 2, 3, 4, 5, 6, 7 for the response that daily, weekly, monthly, every 2-3 months, every 4-6 months, annually, and more than annually, respectively, to the survey question "How often you and your relationship manager get in touch?". The method of communication are three categorical variables for the response that face-to-face, via telephone and/or email, and we don't get in touch, respectively, to the survey question "How do you and your relationship manager usually get in touch with each other?". Column (1) contains the estimated results of model (1) to facilitate the comparison of the results. The definition of all other variables can be found in Table 1.

4.2.4 Trust-based relationship banking and SME credit constraints

In this section we address H3 of our hypotheses: the effect of trust-based relationship banking on the credit constraint faced by SMEs. The modelling basis is the probit model, where the *CONSTRAINT* indicates the experience of the SME *f*, in the post-2008 financial crisis period, in the access to the credit from bank *b*:

$$CONSTRAINT_{fbt} = \alpha + \varphi TBR_{fbt} + \mu' Bankcontrols_{bt} + \omega' Firmcontrols_{ft} + \alpha COLL_{fbt} + CROSS_{fbt} + \sigma' WAVE + \varepsilon_{fbt} \quad (4)$$

Bank controls capture the financial and non-financial characteristics of the bank associated with the bank's business policy regarding financial intermediation and/or SME lending. Firm controls refer to the liquidity risk of the firm in honouring the repayment obligation. ε_{fbt} is the random error term.

The dependent variable in Equation (4) is constructed from the survey results. SMEs are grouped as being credit constrained if they had applied for bank credit in the post-2008 financial crisis and the bank's response was either to reject, offer a smaller amount, or raise problems with the terms and conditions. *CONSTRAINT* takes the value of 1 for firms reporting difficulties in obtaining credit as per our definition above, and 0 otherwise. For robustness, we use an alternative measure stemming from the response to the survey question "Have you experience any difficulties in applying for bank finance for your business since 2008?", and code =1 if the answer is "yes" and 0, otherwise. As bank controls, we account for the loan loss reserve ratio (LOSS), equity to total assets ratio (EQTA), liquid assets to liquid liability ratio (LIQ), the natural logarithm of total assets (LNTA), and the bank's branch penetration in the vicinity of the SME (MARKETP). These measures have been used widely in the banking literature to denote the risk-taking tendency of the bank (e.g., LOSS and EQTA), the capacity of the bank to diversify risk (e.g., LNTA), and the ability of the bank to exploit its position in the local credit market (MARKETP). Firm controls relating to the liquidity risk and financial stress, is measured by the self-judgement of SME on the status of its leverage ratio being healthy when the loan application was made (LEV). We also consider an alternative measure which is based on the self-judgement of SMEs on the status of the interest coverage ratio being healthy when the loan application was made (INTCOV)[16].

The average marginal effects of the independent variables of the probit regression for Equation (4) are reported in Table 5[17]. We begin the discussion of the estimated result of the main variable of interest, i.e., trust-based relationship banking (TBR) (see Table 5, Column 3). It shows that higher relevance of trust-based relationship banking used in the screening reduces the likelihood of being credit constrained (at 1% significant level). The result supports the hypothesis regarding the value of trust-based relationship banking in easing the access of bank finance for SMEs. This result is consistent with other empirical evidence suggesting the value of relationship banking on the firms' access to bank credit in the post-2008 crisis period (Gobbi and Sette, 2014; Degryse et al., 2017). Also, the positive impact is numerically significant, as a one standard deviation increase of TBR will lead to a 16.73 percentage point. decrease in the probability of credit constraint for SMEs. The results hold, both quantitatively and

[16] We also allow for the loan size applied and the annual turnover of the SME, which are eventually dropped out since these were not statistically significant.

[17] The average marginal effect of categorical variables indicates the change in probability when the independent variable switches from the reference category to the category in question. For continuous variables, the average instantaneous change in probability when the independent variable increases by one unit, leaving all other independent variable values as it is.

qualitatively, regardless of the use of the alternative measure of credit constraint (Column 9) and the alternative measure of the liquidity risk of the borrower (Column 6 and 12).

With respect to the other independent variables in the Equation (4), we find that SMEs that applied for loans from a bank with higher capitalization has a higher likelihood of experiencing a credit constraint (EQTA). This is in line with the presumption that well-capitalized bank would be prudential in taking risk (Altunbas et al., 2019). Also, the result shows that SMEs with a healthy leverage ratio face a lower likelihood of being constrained (LEV) as in Cathcart et al. (2020)[18]. We also find that higher collateral consideration (COLL) in the bank's screening is associated with a higher likelihood of credit constraint. This result supports the report on the Business Environment and Enterprise Performance Survey which reveals that a collateral requirement is one of main obstacles for SMEs when accessing finance (OECD, 2017). It also echoes the empirical findings relating to the limitation of 'arm's length' transaction lending technologies in handling the asymmetric information problem associated with SME lending (Santikian, 2012).

Finally, we find that the likelihood of experiencing credit constraint of the 2nd and 3rd wave survey seems to be smaller compared to the 1st wave. This reflects the policy-driven gradual easing of bank credit constraints in the post-crisis period. Again, these results hold, both quantitatively and qualitatively, in the case when the alternative measure of credit constraint (Column 9) and/or the alternative measure of the liquidity risk of the borrower (Column 6 and 12) are used.

[18] They find that financial leverage has a greater impact on the probability of default of SMEs than of large corporations, using a large EU sample composed by six countries (i.e., Belgium, Spain, France, the United Kingdom, Italy, and Portugal) over the period 2005–2015.

Table 5: Trust-based relationship banking and SME credit constraints (Columns 1-6 CONSTRAINT1, Columns 7-12 CONSTRAINT2)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
TBR	-0.087*** (0.020)	-0.131*** (0.028)	-0.151*** (0.027)	-0.089*** (0.020)	-0.135*** (0.028)	-0.153*** (0.027)	-0.082*** (0.019)	-0.104*** (0.028)	-0.127*** (0.024)	-0.084*** (0.019)	-0.109*** (0.028)	-0.130*** (0.024)
LEV	-0.208*** (0.049)	-0.196*** (0.048)	-0.225*** (0.046)				-0.128*** (0.047)	-0.126*** (0.046)	-0.149*** (0.042)			
INTCOV				-0.180*** (0.051)	-0.164*** (0.051)	-0.204*** (0.047)				-0.095* (0.049)	-0.089* (0.049)	-0.133*** (0.044)
LOSS	0.012 (0.018)	0.013 (0.017)	0.003 (0.016)	0.010 (0.018)	0.011 (0.017)	0.002 (0.016)	0.032** (0.016)	0.035** (0.016)	0.020 (0.015)	0.031* (0.016)	0.033** (0.016)	0.018 (0.015)
EQTA	0.055*** (0.021)	0.054*** (0.021)	0.043** (0.020)	0.053** (0.022)	0.051** (0.020)	0.038** (0.020)	0.056*** (0.020)	0.054*** (0.020)	0.028 (0.019)	0.055*** (0.021)	0.053*** (0.020)	0.024 (0.019)
LIQ	0.002 (0.003)	0.002 (0.003)	0.001 (0.002)	0.002 (0.003)	0.003 (0.003)	0.002 (0.002)	0.006** (0.003)	0.007*** (0.003)	0.005* (0.003)	0.007** (0.003)	0.007*** (0.003)	0.005* (0.003)
LNTA	-0.044 (0.034)	-0.039 (0.032)	-0.034 (0.027)	-0.046 (0.035)	-0.041 (0.032)	-0.036 (0.028)	-0.101*** (0.037)	-0.101*** (0.035)	-0.073** (0.033)	-0.101*** (0.038)	-0.100*** (0.036)	-0.073** (0.034)
MARKETP	0.002 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.005* (0.003)	0.005* (0.003)	0.005* (0.003)	0.005* (0.003)	0.005* (0.003)	0.005** (0.003)
COLL		0.126*** (0.031)	0.098*** (0.030)		0.126*** (0.032)	0.097*** (0.031)		0.142*** (0.030)	0.095*** (0.027)		0.143*** (0.032)	0.094*** (0.028)
CROSS		-0.038 (0.036)	0.022 (0.038)		-0.037 (0.036)	0.025 (0.038)		-0.085** (0.033)	0.010 (0.033)		-0.082** (0.034)	0.015 (0.033)
Wave (reference category: the first wave)												
2nd.wave			-0.115* (0.066)			-0.123* (0.067)			-0.223*** (0.059)			-0.230*** (0.060)
3rd.wave			-0.247*** (0.052)			-0.253*** (0.054)			-0.366*** (0.041)			-0.375*** (0.042)
N	361	361	361	361	361	361	357	357	357	357	357	357

Area under ROC curve	0.714	0.731	0.764	0.700	0.723	0.758	0.6957	0.7443	0.8273	0.691	0.7371	0.8214
The Hosmer-Lemeshow test (p-value)	0.213	0.271	0.432	0.273	0.174	0.284	0.3826	0.1906	0.339	0.3817	0.078	0.2372

Note: This table presents the results of Equation (4). We estimate robust standard errors of the coefficients on the independent variables of the latent presentation of the probit model (4). The dependent variable used for the results in Column 1-6 (CONSTRAINT1) is extracted from the response to the survey question "what was the initial response of the bank?", it takes the value of 1 if the answer is one of, turning it down, offering a smaller amount of facility than applied, there are some problems with terms and conditions, and 0 otherwise. The dependent variable used for the results in Column 7-12 (CONSTRAINT2) is extracted from the response to the survey question "Have you experience any difficulties in applying for bank finance for your business since 2008?", it takes the value of 1 for "yes" and 0 otherwise. TBR, COLLATERAL and CROSSSELL are three factors derived from the factor analysis of the banking screening and refers to Trust-based relationship banking, Collateral, and Cross-selling. The definition of other variables can be found in Table 1. Figures in parentheses are Delta-method standard errors. * p<.10, ** p<.05, and *** p<.01.

Further robustness tests of Equation (4) follow the approach of Angrist and Pischke (2009) in the linear probability model (LPM), as an alternative, that produces a good approximation for the non-linear Conditional Expectation Function (CEF). Along these lines, we first re-estimate Equation (4) with OLS and with 2-stage Least Squares (2SLS) to deal with potential endogeneity of the measure of trust-based relationship banking in Equation (4). Such a possibility may exist if we have not fully controlled for all variables related to the business orientation of the bank (including observable and unobservable ones) which simultaneously drive the importance of trust-based relationship banking in screening loan applications of SMEs and the credit constraint facing SMEs. We consider external instrumental variables for the trust-based relationship banking, namely, OPEAUTO (whether the local relationship manager has the decision making autonomy (Y/N), FREQUENCY (the frequency of interactions between the local relationship manager and the SME), SCOPE (the strength of the business ties between the bank and the SME), the frequency of interactions between the local relationship manager of the same main bank and other SME borrowers, and the strength of the business ties between the same main bank and other SME borrowers . The results are shown in Table 6[19]. Our main result that trust-based relationship banking lowers SMEs credit constraints continues to hold.

Table 6: Trust-based relationship banking and SME credit constraints: Instrumental Variables and Linear Probability Model (CONSTRAINT1)

	2-stage Least Squares (2SLS)	**linear probability model (LPM)**	**Probit model average marginal effect**
Variable	**1**	**2**	**3**
TRB	-0.865**	-0.155***	-0.151***
	(0.343)	(0.028)	(0.027)
LEV	-0.032	-0.225***	-0.225***
	(0.115)	(0.048)	(0.046)
LOSS	-0.044	0.005	0.003
	(0.037)	(0.017)	(0.016)
EQTA	0.001	0.046**	0.043**
	(0.041)	(0.020)	(0.020)
LIQ	-0.005	0.002	0.001
	(0.005)	(0.002)	(0.002)
LNTA	0.102	-0.037	-0.034

[19] In the estimation of the Equation (4) using 2SLS, the Hansen J statistic for overidentification suggests that the external instrumental variables jointly fail to reject exogeneity while it fails to pass the weak instrument test. We thus conduct weak instrument robust tests for linear IV with robust VCE and report the confidence intervals of the minimum distance version of the Anderson-Rubin (AR) test, the minimum distance versions of the conditional likelihood ratio (CLR) test, and a combination of the LM and overidentification tests (LM-J), respectively.

	(0.096)	(0.025)	(0.027)
MARKETP	0.008	0.003	0.003
	(0.006)	(0.003)	(0.003)
COLL	0.153**	0.099***	0.098***
	(0.060)	(0.029)	(0.030)
CROSS	0.551**	0.023	0.022
	(0.265)	(0.038)	(0.038)
2nd.wave	-0.271**	-0.115*	-0.115*
	(0.129)	(0.068)	(0.066)
3rd.wave	-0.521***	-0.267***	-0.247***
	(0.153)	(0.059)	(0.052)
N	341	361	361
Prob > F	0.002	0.000	0.000
Hansen J statistic for overidentification (p-value)	0.493		
CLR[a]	[d][-2.21004,-.634336]		
AR[b]	[e][-2.21004,-.525666]		
LM-J[c] (H0: estimated coefficient on TBR is zero rejected at 5% level)	[f][-2.21004,-.607168]		

Note: [a] The Anderson-Rubin (AR) test statistic. [b] the conditional likelihood ratio (CLR) test. [c]a combination of the LM and overidentification tests (LM-J). [d]The Confidence Interval (C.I) based on AR. [e]The CI based on CLR. [f]The CI based on LM-J. The dependent variable used is extracted from the response to the survey question "what was the initial response of the bank?", it takes the value of 1 if the answer is one of, turning it down, offering a smaller amount of facility than applied, there are some problems with terms and conditions, and 0 otherwise (CONSTRAINT1). Column (1) contains the estimated results via 2SLS, Column (2) reports the estimated results via LPM. Column (3) presents the average marginal effects estimated from the probit model. Figures in parentheses of Column (1) and (2) are robust standard errors and that in Column (3) are Delta-method standard errors. The external instrumental variables for trust-based relationship banking are OPEAUTO (whether the local relationship manager has the decision making autonomy (Y/N), FREQUENCY (the frequency of interactions between the local relationship manager and SME), SCOPE (the strength of the business ties between the bank and the SME), the frequency of interactions between the local relationship manager of the same main bank and other SME borrowers, and the strength of the business ties between the same main bank and other SME borrowers * p<.10, ** p<.05, and *** p<.01.

5. Conclusion

The importance of relationship banking for the easing of SME credit constrains is well-recognized in the literature. But the empirical analysis of the origin, development and evolution of the information-value of bank-borrower relationship is limited (Santikian, 2012). While a few papers focus on trust in credit relationships between banks and SMEs (e.g., Uzzi, 1999, and Howorth and Moro, 2006), trust is typically perceived as independent of the bank-borrower relationship. Moreover, there is little effort to distinguish the interpersonal trust between the local relationship manager and SME manager and the inter-organizational trust between the bank and the borrowing firm. The critical issue regarding the importance of the organizational arrangement of the bank on promoting the interpersonal trust and connecting interpersonal with inter-organizational trust for lending processes and outcomes remains largely unexplored.

This study aims to fill the gap. Three hypotheses were articulated in this paper. The first hypothesis stated that mutual trust between the relationship manager (RM) and the SME is intrinsic to relationship banking. Using a set of primary data gleaned from sample-survey relating to the experience of UK SMEs in accessing bank finance following the financial crisis, we present evidence showing that the mutual trust between the local relationship manager and the borrowing firm is an intrinsic component of relationship banking in the screening of loan application. The second hypothesis stated that the delegation of operational autonomy to the RM leads to a higher level of trust-based relationship banking. We find that the operational autonomy processed by the local RM leads to higher relevance of trust-based relationship banking in the screening. Moreover, we show that the contributing impact of operational autonomy is not to be simply explained by the decision-making authority alone but through, the incentive effect of operational autonomy on the frequency of interactions and the use of personal communication method between the local RMs.

The third hypothesis stated that the higher the level of trust-based relationship banking, the lower the level of credit constraints by SMEs. We show that trust-based relationship banking has a positive impact in easing the credit constraints of SMEs. These results are robust to several tests including different methods of extracting trust-based relationship banking, different measures of credit constraint, as well as different specifications of empirical models and additional estimations using alterative estimator. Drawing the evidence together, our findings show that the informational value of relationship banking is embedded in the mutual trust between the local relationship manager and SME and the operational autonomy granted to the local relationship manager is the enabling organizational arrangement via which

interpersonal mutual trust can develop, be incorporated into the lending process and eventually be materialized into the beneficial effect of mitigating credit constraints facing SMEs.

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Appendix

This Appendix presents supplementary data and robustness results. Table A1 shows the distribution of the SME bank loans in the sample.

Table A1: Distribution of bank loan applications

Name	Freq.	Percent	Cum.
ABN	1	0.15	0.15
Aldermore Bank Plc	1	0.15	0.3
Allied Irish Bank	1	0.15	0.45
Bank of Ireland UK	1	0.15	0.6
Barclays Bank Plc	113	16.89	17.49
Citibank	1	0.15	17.64
Clydesdale Bank Plc	15	2.24	19.88
Danske	1	0.15	20.03
Finance for enterprise	1	0.15	20.18
First Direct	1	0.15	20.33
Fredericks Foundation	1	0.15	20.48
HSBC Holdings Plc	132	19.73	40.21
Handelsbanken	6	0.9	41.11
Hitachi Capital (UK) Plc	1	0.15	41.26
Investec Bank Plc	1	0.15	41.41
Kingdom Bank Limited	1	0.15	41.55
Lloyds Banking Group Plc	132	19.73	61.29
Metro Bank PLC	1	0.15	61.43
Nationwide Building Society	12	1.79	63.23
Precise Mortgages	1	0.15	63.38
Royal Bank of Scotland Group Plc	191	28.55	91.93
Santander UK Plc	24	3.59	95.52
Skipton Building Society	1	0.15	95.67
The Co-Operative Bank Plc	25	3.74	99.4
Ulster Bank	2	0.3	99.7
Unity Trust Bank Plc	1	0.15	99.85
Funding circle	1	0.15	100
Total	669	100	

The factor pattern matrix, the mean, and the standard deviation of factor scores of the three common factors are presented in the Table A2 below. The Bartlett Test of Sphericity rejects the null hypothesis that the correlation matrix is an identity matrix and suggests it is appropriate to apply factor analysis to the data. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy provides the support of sizeable sampling adequacy for an effective factor analysis. The scale reliability coefficient indicates the strength of internal consistency of individual items for each factor for the same underlying concept.

Table A2: Factor analysis

Items	**Trust-based relationship banking (TRB)**	**Collateral (COLL)**	**Cross-selling (CROSS)**	**Uniqueness**
1. Financial statement of my business	0.722			0.350
2. The position of my business in the market	0.466			0.369
3. My business's credit history and payment record with the bank	0.901			0.312
4. Confidential information regarding the quality of management, the development plan and business strategy	0.412			0.335
5. My ability to assure assets to support the loan			0.685	0.344
6. Guarantee(s) to act as security to support the loan			0.730	0.403
7. Mutual trust between my business and the bank's relationship manager	0.770			0.316
8. Cross-selling opportunities		0.638		0.509
Scale reliability coefficient	0.851			
Bartlett test of sphericity	0.000			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.845			
Mean	4.205	3.382	3.679	
Std. Dev.	1.126	1.068	1.097	
N				409

Note: to facilitate the presentation, the table shows loadings with absolute values larger than 0.41 only.

We undertake factor rotation using the oblique rotation[20] with Horst normalization[21], from which we extract three common factors[22]. The first factor has the highest eigenvalue (4.06791) which explains 89.62% of the total variance. The rotated factors show that the elements "the position of my business in the market", "financial statement of my business", "my business's credit history and payment record with the bank", "confidential information regarding the quality of management, the development plan and business strategy", and "mutual trust between my business and the bank's relationship manager", load onto this factor. The factor loadings are between 0.412 and 0.901, suggesting the high correlation of the first factor to each criterion[23]. The elements "the position of my business in the market", and "confidential information regarding the quality of management, the development plan and business strategy", indicates the strength of the competitive advantages of the borrower in the market. The element "financial statement of my business" signals the operational outcome of the borrowing firm. The element "my business's credit history and payment record with the bank" relates to the predictability of borrower's behaviour the bank could infer from the history and cash flow record possessed by the bank. The finding that these elements simultaneously cluster with the element "mutual trust between my business and the bank's relationship manager" lends support to the argument that the capacity, credibility, and predictability are important calculative trust facets of inter-organizational trust in commercial relationships.

Table A3 presents summary statistics on the relevance of TRB for the decision-making for each bank whose name has been identified in the survey. As seen, TRB varies within a given bank. Our observation unit is at the bank-borrower pair matching at the postcode area of the registration address of the borrower at the time when the decision regarding the loan application is made.

[20] Tabacnick and Fidell (2012) recommend using oblique rotation in the case of .32 or higher inter-factor correlations. The average inter-factor correlations in our case is 0.55.

[21] As a robustness test, we also conduct factor rotation via orthogonal rotations (e.g. varimax with horst normalization), although the assumption of orthogonal rotations that factors are independent from each other is hardly justifiable in practice. Our main results regarding all research hypotheses are qualitative same.

[22] The three factors are further confirmed via a scree plot in which the eigenvalues are clearly levelling off since the fourth factor onwards, suggesting 3 factors should be generated by the analysis.

[23] In factor analysis, common factors are interpreted and labelled based on the observed variables to which they make high contributions.

Table A3: the statistical description of trust-based relationship banking factor (TRB) by bank

Name of bank	Obs	Mean	Std. Dev.	Min	Max
Barclays Bank Plc	77	4.280	1.191	1.099	5.646
Clydesdale Bank Plc	10	3.438	1.356	1.077	5.562
HSBC Holdings Plc	80	4.164	1.101	1.269	5.576
Lloyds Banking Group Plc	80	4.429	0.959	1.099	5.666
Nationwide Building Society	7	4.526	0.695	3.702	5.539
Royal Bank of Scotland Group Plc	116	4.164	1.203	1.099	5.564
Santander UK Plc	16	4.103	0.756	2.199	5.273
The Co-Operative Bank Plc	9	3.296	1.344	1.099	5.497
Ulster Bank	2	3.747	2.193	2.196	5.298
N	409	4.205	1.126	1.077	5.666

Note: Out of the 671 respondents who indicated that they have applied for a bank loan in the post-2008 period, 409 answered the question regarding the use of criterion by the bank in the loan screening process. While 12 answer the question regarding the lending criterions used by their banks, they did not reveal the name of the bank.

To test for the robustness of the estimated results from the baseline model, we enhance Equation (1) in the text by introducing additional control variables:

$$TBR_{fblt} = Constant + \rho OPEAUTO_{fblt} + \pi LENGTH_{fbt} + \delta SCOPE_{fbt} + \gamma MARKETPOWER_{bl} + \vartheta' CONTROLS + \varepsilon_{fblt}$$

Four categories of variables are specified as $CONTROLS$ in Equation (2). First, variables relating to the degree of competition and the quality of social capital environment defined at the level of the postcode area where the SME and the bank branches reside. The results for this are reported in the text under Table 3. Second, variables indicating the financial and non-financial characteristics of the bank. Third, variables reflecting the liquidity risk and the information opacity of the SME. Fourth, the time order of the conduct of the survey. Variables in each category were included in a step-by-step manner and were retained according to conventional statistical criteria before moving to the next category.

A full list and definition of the data used is in Table 1 of the text. The degree of competition is proxied by two measures. We first use the total number of branches of banks divided by population (BRANCHDEN). We also use the Herfindahl-Hirschman Index based on the share of branches of banks as the alternative measurement (HHIBANK). Both are defined at the

postcode area level. The data regarding the branch location of banks is derived from Experian's Shop*Point data referring the information by 11/04/2013. The registered address of SME is gathered from the response in the survey.

The quality of social capital at the level of postcode area is measured in four alternative ways. First, we use voter participation rate in general election calculated by the ratio of the number of turnouts over total electorates (VOTE). Second, we use blood donation rate measured by blood donation registration divided by total population (BLOODRATE). Third, we use the diversification index of religion group (HHIREG)[24]. Finally, we use the diversification index of ethnic group (HHIETH). All data of social capital environment are defined at the postcode level. We obtain data regarding religious and ethnic groups in each postcode area from the 2011 census, data on voter turnout in each postcode area from the general election in 2010, and data regarding the blood registration in each postcode area from NHS Blood and Transplant in 2013.

Regarding category (2), we consider the bank-specific characteristics which might influence the propensity of the bank in empowering the decision-making authority to the local relationship manager and the lending orientation of the bank to SMEs. We include the functional distance (DIST), measured by the natural logarithm of the average driving distance in miles between the branches of the bank in each postcode area to the headquarters (HQ) of banks, using Bing Map UK. The shorter headquarter-to-branch distance makes it easier for officials at headquarters to monitor the actions of local branch officers and enforce a lending policy designed at the bank's headquarters. Therefore, the local branches closer to the HQ might be more likely to have decision-making authority on SME lending. The HQ-to-branch distance also has implication for bank organizational diseconomies from hierarchy. The closer the physical distance is, the higher level of shared value and relational capital between local branch officers and officials at headquarters would be. Hence, the local branch officer with shorter functional distance from HQ might face less difficulty in communicating soft information to the upper levels of the bank. Further, we allow for the size of the bank (LNTA) measured by the natural logarithm of the total assets. According to the literature, organisational diseconomies is also shaped by size and smaller banks can emphasize relationship banking to a greater degree due to their simple organizational structure (Berger et al., 2005). In addition, we control for the cost to income ratio to capture the managerial efficiency of the bank (COSTINC), loan loss reserve to total loan ratio to capture the quality of risk management of

[24] Calculated as the HHI of the following groups: Christian, Buddhist, Hindu, Jewish, Muslim, Sikh, Other Religion, No Religion, and Religion Not Stated

the bank (LOSS), equity to total assets ratio to proxy for the regulatory capture pressure facing the bank in engaging in SME lending (EQTA) and liquid assets to deposit and short-term funding ratio (LIQ) to denote the liquidity risk of the bank. The functional distance (DIST) is based on the information of the location of branches and that the headquarters of the bank as in 2013. Other bank-specific characteristics in the category (2) are measured at the year when the bank received the loan application, using the financial statement of banks obtained from Bankscope and Thomson One.

With category (3), we include the borrowing firm-specific characteristics which reflect the riskiness and the information opacity of the firm, using the response to the survey questions. Indeed, the bank might place higher emphasis on soft information of a borrower in the decision-making might when the borrower is more informational opaque (Uchida, 2011). We control for loans applied (BORROW) via three categorical dummies for the loans below £24,999, in the range £25,000-£249,999, and above £250,000, respectively. We allow for the healthy status of the borrowing SME in terms of the interest coverage (INTCOV) and leverage ratio (LEV). The survey asks the respondents to remark on the status of the interest coverage and leverage ratio of the SMEs when the loan application was made. Three choices are provided: healthy, somewhat healthy, and somewhat unhealthy. We assign a value of 1 if the response classifies the status of interest coverage as healthy and 0 otherwise.

We also consider the size of the firm (SALE) since it is closely linked with the firm's visibility and has been widely used in the literature to proxy for the degree of informational opaqueness. A dummy variable takes the value of 1 for the firm having an annual turnover above £250,000, and 0 otherwise. Finally, we include the legal form of the SME (SMETYPE) as it carries an important implication for the quantity and the quality of information that interested parties could derive from firms' financial statement[25]. We derive 4 categorical dummies for the legal status of the SME, namely, "Sole Trader/Proprietorship/ Partnership", "Private Company limited by Share (Guarantee)/Limited Liability Partnership/Limited Liability Company",

[25] In the UK, many of the International Financial Reporting Standards (IFRS) for recognising and measuring assets, liabilities, income, and expenses for SMEs are simplified. Moreover, significantly fewer disclosures are required. While there is no need for a sole trader to register or file accounts and returns with Companies House, the Limited Company and Limited Liability Partnership (LLPs) are required to register and file accounts and annual returns at Companies House. In the absence of transparent disclosure, SMEs are less able to send credible signals to banks. Moreover, unaudited statements have a much higher risk of material misstatement.

"Public Limited Company", and other types. Regarding category (4), we generate three discriminating variables (WAVE) indicating the time when the survey was conducted[26].

Table A4 and A5 presents the results. None of the additional control variables relating to bank characteristics are statistically significant. Exceptions are the three SME-specific characteristics: LEV (column 2 and column 4) and INTCOV (column 6 and column 8 in Table 8), and the size of annual turnover (column 2, 4, 6, and 8 in Table A5). As shown, the self-judgement of having a healthy leverage ratio (LEV) and interest coverage (INTCOV), compared to somewhat healthy, and somewhat unhealthy, is related to a higher level of emphasis of the bank in trust-based relationship banking, so is the case if the SME has an annual turnover above £250,000, relative to otherwise. Upon initial inspection, this is unexpected if one argues that the bank would place higher emphasis on soft information of a borrower in the decision-making if firms are characterised by higher likelihood of financial stress (i.e. lower debt ratio and higher interest coverage) and/or with lower visibility (i.e. smaller size). However, the results are explicable when we consider the fundamental role of mutual trust in evaluating the information of the SME for the credit riskiness of the firms. The mutual trust between the local RM and the SME manager originates from the professional role they play in the economic exchange between the two organizations. The development of trust depends on desire, need and interest of both parties. A stronger mutual trust contributes to shared standard of behaviour, which reduces the concern over material window dressing of the information exchanged. It would also result in shared confidence, which enhances the predictability of the behaviour in the face of uncertainty (Kramer, 1999). It is plausible that larger SMEs with more optimistic self-judgement of their capacity to fulfil financial obligations would have a stronger desire to develop the mutual trust with the local RM.

[26] The dependent variable, trust-based relationship banking, and the main variable of interest, the presence of the operational authority of the local relationship manager in decision-making, both are based on the perception of the respondents. We expect the variables in the category (3) and the category (4) could also help, to control for the perception bias which might be subject to the influence of the characteristics of the borrowing firm and the time when the survey was conducted.

Table A4: Determinants of Trust-based relationship banking: robustness tests – control for bank characteristics.

Dep: TRB	**1**	**2**	**3**	**4**	**5**	**6**
OPEAUTO	0.301***	0.299***	0.293**	0.284**	0.301***	0.295***
	(0.114)	(0.114)	(0.114)	(0.114)	(0.115)	(0.113)
LENGTH	-0.000	-0.001	-0.000	0.000	-0.001	-0.001
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
SCOPE	1.135***	1.120***	1.112***	1.092***	1.122***	1.122***
	(0.407)	(0.405)	(0.404)	(0.406)	(0.406)	(0.405)
MARKETP	0.018**	0.018**	0.019**	0.020**	0.019**	0.019**
	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)	(0.008)
DIST	-0.036					
	(0.049)					
LNTA		0.015				
		(0.055)				
COSTINC			-0.003			
			(0.002)			
LOSS				-0.041		
				(0.042)		
EQTA					0.029	
					(0.047)	
LIQRATIO						-0.001
						(0.005)
N	345	346	346	346	346	346
R-sq	0.063	0.062	0.065	0.064	0.063	0.062

Note: the definition of variables can be found in Table 1. Notes as in Table 2.

Table A5: Determinants of Trust-based relationship banking: robustness tests – control for SME-specific characteristics

Dep: TRB	1	2	3	4	5	6	7	8	9
OPEAUTO	0.34*** (0.11)	0.35*** (0.12)	0.33*** (0.12)	0.34*** (0.12)	0.36*** (0.11)	0.36*** (0.11)	0.35*** (0.12)	0.35*** (0.12)	0.34*** (0.11)
LENGTH	-0.004 (0.01)	-0.006 (0.01)	-0.007 (0.01)	-0.006 (0.01)	-0.004 (0.01)	-0.006 (0.01)	-0.007 (0.01)	-0.006 (0.01)	-0.004 (0.01)
SCOPE	0.876** (0.40)	0.770* (0.41)	0.780* (0.41)	0.770* (0.41)	0.872** (0.40)	0.740* (0.41)	0.749* (0.41)	0.739* (0.41)	0.849** (0.40)
MARKETP	0.02** (0.01)	0.02** (0.01)	0.02** (0.01)	0.02** (0.01)	0.02** (0.01)	0.02** (0.01)	0.02* (0.01)	0.02** (0.01)	0.02** (0.01)
LEV	0.287** (0.13)	0.245* (0.13)	0.244* (0.13)	0.247* (0.13)					0.213 (0.16)
INTCOV					0.261**	0.238*	0.232*	0.245*	0.123
The amount of loan applied (reference category: below £25,000									
BORROW "£25,000-£249,999	0.109 (0.13)	0.041 (0.14)	0.054 (0.14)	0.039 (0.14)	0.080 (0.13)	0.007 (0.14)	0.019 (0.14)	0.002 (0.14)	0.101 (0.13)
BORROW £250,000+	0.328* (0.18)	0.244 (0.19)	0.272 (0.19)	0.240 (0.19)	0.289* (0.18)	0.197 (0.19)	0.224 (0.19)	0.189 (0.19)	0.312* (0.18)
SALE		0.244* (0.15)	0.231 (0.15)	0.245* (0.15)		0.274* (0.14)	0.259* (0.15)	0.276* (0.15)	
Legal form (reference category: Sole Trader/Proprietorship/ Partnership)									
SMETYPE: Private Limited Company			-0.045 (0.135)				-0.035 (0.134)		
SMETYPE:Public Limited Company			-0.128 (0.375)				-0.100 (0.364)		
SMETYPE: Other type of legal form			-1.112 (0.903)				-1.103 (0.919)		
Wave (reference category: the first wave)									
WAVE 2nd				0.022 (0.187)				0.028 (0.188)	
WAVE 3rd				0.019 (0.129)				0.036 (0.134)	
N	335	330	326	330	335	330	326	330	335
R-sq	0.089	0.099	0.103	0.099	0.086	0.098	0.102	0.098	0.091

Note: the definition of variables can be found in Table 1. Notes as in Table 2.

References

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