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SMEs and Access to Bank Credit: Evidence on the Regional Propagation of the Financial Crisis in the UK

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Abstract

We study the sensitivity of banks' credit supply to small and medium size enterprises (SMEs) in the UK to banks' financial condition before and during the financial crisis. Employing unique data on the geographical location of all bank branches in the UK, we connect firms' access to bank credit to the financial condition (i.e., bank health and the use of core deposits) of all bank branches in the vicinity of the firm over the period 2004-2011. Before the crisis, banks' local financial conditions did not influence credit availability irrespective of the functional distance (i.e., the distance between bank branch and bank headquarters). However, during the crisis, we find that SMEs with in their vicinity banks that have stronger financial condition face greater credit availability when the functional distance is low. Our results point to a "flight to headquarters" effect during the financial crisis.

JEL-Code: G210, G290, L140.

Keywords: financial crisis, credit supply, flight to headquarters, flight to quality, bank organization.

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1. Introduction

Small and medium enterprises (SMEs) faced increased difficulties to tap bank credit during the global financial crisis. But do all of them face increased difficulties in a similar fashion? We study the role of bank organization and banks' financial health in the propagation of shocks to the supply of credit towards SMEs. In contrast with the majority of research in this field, we take a national perspective and study whether banks implemented a "flight to headquarters" effect in the supply of credit to SMEs. In particular, using a unique hand-collected dataset containing detailed information on all bank branches in the UK and information on banks' headquarters, we study how variation in banks' financial conditions (i.e., bank health and the availability of core deposits) in the vicinity of a firm impacts on the supply of bank credit. We examine the presence of regional heterogeneity in credit constraints with respect to the experience of SMEs in the manufacturing industry in the UK during 2004-2011, four years leading up to the global financial crisis and four years after. Our focus on SMEs[1] in the manufacturing industries[2] responds to the widespread concern in the UK regarding the continued difficulty SMEs face in obtaining external finance after the 2008 financial crisis. This is in sharp contrast to the early to mid-2000s in which credit was more widely available (Armstrong et al., 2013). Our regional analysis provides an explanation for the substantial variation of SME lending across Britain's Postcode Areas as documented by the British Banker Association (BBA) in 2013[3].

It is well-known that banks specialise in overcoming informational problems and other frictions in credit markets (e.g., Diamond (1984) or Freixas and Rochet (2008)). Informationally opaque SMEs may face difficulties to substitute bank credit for alternative sources of external financing. Accordingly, the bank lending literature predicts that SMEs will suffer disproportionately from the disruption in the supply of bank credit. Moreover, the change in the supply of bank credit in reaction to a common external negative shock would be heterogeneous across banks: the financial strength of banks would influence the extent to which individual banks could withstand the shocks (Kashyap and Stein, 1995, 2000; Bernanke, 2007). Popov and Udell (2012) have shown that firms in transition economies that

[1] At the start of 2011 there were around 4.5 million SMEs forming 99.9 per cent of all businesses, accounting for over half of private sector employment and nearly half of all private sector turnover (BIS, 2012).
[2] Manufacturing is the third largest sector in the UK economy in terms of share of UK Gross Domestic Product. In 2009, it generated 11% of gross value added, represented over 8% of total UK employment, and contributed 74% of all business Research and Development and over 50% of exports (BIS, 2010; CIS, 2011).
[3] Participating lenders in the SME lending datasets published by BBA are Barclays, Lloyds Banking Group, HSBC, RBS (including NatWest), Santander UK and Clydesdale & Yorkshire Banks. Collectively, these institutions account for about 60 per cent of bank lending to SMEs.

have more healthy banks within their vicinity faced fewer credit constraints during the financial crisis. We extend this line of reasoning by focusing on how the impact of banks' financial conditions in the vicinity of a firm depends on the banks' organizational structure in that vicinity. Our focus is therefore on the impact of inherent spatial characteristics of the branch banking system and on the capacity and willingness of banks to specialize in SME lending across a large country during the advent of the financial crisis.

There is strong evidence that retail banking markets are local in nature (Degryse and Ongena, 2007; Cohen, and Mazzeo, 2007). The geographical segmentation of the credit market for SMEs is not a unique feature for unit banking; it is also relevant for branch banking systems (Dow and Rodrigues-Fuentes, 1997). Problems of asymmetric information, agency and uncertainty in relation to SME lending dictate the geographical "closeness" of banks and firms. Two types of "closeness" are hypothesized to be relevant, namely the proximity between bank branches and borrowers (operational distance) and the proximity between bank branches and the bank's headquarter (functional distance). While the importance of operational distance lies on the reduction of the principal-agent problem between local branch officers and SMEs, that of functional distance is on the mitigation of the principal-agent problem between local branch officers and senior officials at upper layers within the bank organization. All in all, the branch banking system is inherently spatial on both dimensions of closeness and the branching infrastructure. The characteristics of local markets would affect the function of nation-wide and local banks with respect to the credit creation towards SMEs, leading to the spatial differentiation of the access to bank credit.

The impact of the banks' local market characteristics on the access to bank credit of SMEs, however, would vary across normal times and crisis times. In normal times, when banks can raise funds directly and cheaply in wholesale markets, the reliance of banks on branches to raise core deposits for supply of credit may be less prominent (Dewally and Shao, 2014). The normal flow of loanable funds will depend on normal economic conditions and the risk appetite of the banks. The situation during a financial crisis could be considerably different. With the withdrawal of liquidity in the inter-bank market, banks' financial health and the availability of loanable funds are expected to play a more important role in the sensitivity of banks' provision of credit to SMEs. Increased risk perception could influence the willingness and the terms on which banks are prepared to lend. This could translate into selective deleveraging of bank lending, resulting in "flight to quality" or "flight to headquarters" effects. One version of "the flight to quality" argument is that following a negative aggregate shock banks contract their credit to smaller and riskier firms, whereas they

accommodate the increasing credit demand of larger and safer firms (Lang and Nakamura, 1995; Bernanke et al., 1996). Banks could also display a "flight to headquarters" effect even within a country. For example De Haas and Van Horen (2013) show that multi-market banks withdraw less from markets that are relatively "close" in a geographic sense or in terms of lending relationship. Since the closeness bears important implications for the intrinsic capacity of banks in handling principal-agent problems involved in lending, the prioritization toward markets which are "close" would be an effective way to overcome increased information asymmetries and uncertainty at times of crises (Cetorelli and Goldberg, 2012). Moreover, as the intrinsic capacity of banks in handling principal-agent problems involved in lending has direct implications for the sustainability of the bank-borrower relationship, such prioritization would also reflect banks' effort to minimize the negative impact of deleveraging via preserving the "franchise" value of future business in "core" markets.

In this paper, we take these issues to the data. We hypothesize that local banking market characteristics influence the credit constraints faced by SMEs. We further examine how the organizational characteristics of banks in the vicinity of the firm influence the manner through which banks' financial conditions are propagated across localities. We study whether the recent financial crisis and the subsequent recession would alter or/and magnify the impact. Finally, to investigate the extent to which "flight to headquarters" effect prevails, we test whether firms with lower likelihood of distress are less likely to suffer from the heterogeneous propagation of the financial strength of banks across localities.

Our main findings can be summarized as follows. First, a higher functional distance between branches and headquarters leads to lower credit supply during the financial crisis. Second, banks' local financial conditions (i.e., bank health and funding structure) do not influence bank credit supply in the period running up to the crisis. These results are different during the financial crisis. In particular, firms with in their vicinity banks with stronger financial conditions face a smaller bank credit constraint when the functional distance between branches and banks is small. Third, we do not find evidence for a "flight to quality" effect but document a "flight to headquarters" effect.

The character of the UK banking market is well suited for our investigation. As the result of the inter-related process of deregulation, technological innovation, and consolidation in the last two decades, the UK banking system has been transformed from a decentralized system into a centralised system (Mason, 2010). Regional and local banks have largely disappeared, and the supply of finance to SMEs is provided through the branch banking systems of a small number of major nation-wide banks. As a means of reducing operating

costs and tightening control over credit risk, large nation-wide banks have rationalized branch networks, and concentrated the decision-making in the head office (French et al., 2008; Appleyard, 2013). The large-scale bank branch rationalization during 1989-2003 has led to the shrinkage of the number of bank branches in Britain by over one-third. While this rationalization programme slowed down from 2005 onwards, it accelerated again due to Mergers and Acquisitions among some major nation-wide banks. The closure of branches bears a spatial dimension: the net drop in branches has been most pronounced in more deprived and ethnically diverse areas (Leyshon et al., 2008; French et al., 2013). Moreover, most of the authority of lending decision was withdrawn from the loan officers of remaining local branches and assigned to a few central decision-making centres. While it can be argued that such centralization is a natural outcome of competition between financial institutions and will lead to a more efficient allocation of financial resources, the counter-argument is the potential negative impact on the access to bank-lending for firms located in the peripheral areas in general and SMEs in particular. There has been a heated debate on the extent to which such centralization process would exacerbate the regional differential in the transmission of national monetary policy and serve to increase regional disparities (Dow and Montagnoli, 2007). The argument is provoked even further by the publication of BBA in 2013, which, for the first time, discloses the large dispersion of SME lending across Britain's Postcode Areas.

The analysis of the existence of regional differences in bank credit supply faced by SMEs raises the classic problem of disentangling demand and supply effects. The significant countercyclical component in credit demand would suggest an increase in the demand for short-term bank credit in an economic downturn, driven by borrowers' motivation to smooth the impact of cyclical variation in income on production through external finance (Bernanke and Gertler, 1995)[4]. However, the demand for credit could shift downwards during the financial crisis due to a worsening in economic expectations and therefore a decreased willingness to run into debt (Dow and Montagnoli, 2007)[5]. One approach to isolate demand and supply effects in credit constraints has been to use survey data containing information on whether firms need loans, loan applications and bank decisions (Popov and Udell 2012; Ongena et al., 2013; Beck et al., 2014; Presbitero et al., 2014). Another approach has been to

[4] Indeed, a small business survey carried out by the Department for Business, Innovation and Skills (BIS) documents that SMEs in the post-2008 financial crisis period exhibited an increased likelihood of applying for external funding as well as an increased need for finance for working capital and cash flow, relative to 2006-2007.

[5] Deloitte CFO Survey indicates that CFOs of the UK's largest companies demonstrate a cautious attitude toward taking additional risk onto their balance sheets in the post-2008 period.

use credit registry data in countries where multiple banking relationships are common in the SME sector and apply firm fixed-effects to control for demand (Gan, 2007; Khwaja and Mian, 2008; Jiménez et al., 2014). An alternative approach is to apply a disequilibrium model to endogenously identify credit constrained firms that have bank credit demand unsatisfied by bank credit supply (Atanasova and Wilson, 2004; Carbo-Valverde et al., 2009; Carbo-Valverde et al., 2012). In this paper, we follow a different but complementary strategy in the spirit of Kashyap et al. (1993). We measure the degree of supply-driven credit constraints by the relative changes of bank lending to non-bank sources of short-term funding of SMEs. The identification strategy rests on the insight that the monetary shock that operates through an output-induced effect on credit demand would influence the demand for all types of funding, while a monetary shock that operates through a bank lending channel affects the supply of bank debt only (Oliner and Budebusch, 1996). Consequently, the greater use of substitutes to bank credit can be interpreted as the existence of credit constraints driven by the variation in the supply behaviour of banks (Demiroglu et al., 2012). Arguably, the fraction of bank credit as the percentage of overall external funding is a better proxy for the supply status of bank credit than the interest rate on loans. This is because such a financing mix variable aggregates the overall economic cost of bank credit, relative to its alternatives, including the availability, the price and non-price terms and conditions (Kashyap et al., 1993; Sufi, 2009; Kahle and Stulz, 2013). Indeed, as indicated by Leary (2009), the linkage between bank creditmarket segmentation and funding structure may be more sharply identified by studying the differential impact of a shift in loan supply on the funding structures of firms with access to different segments of the credit market.

Our paper relates to two strands of literature. First, it links to the literature on bank organization and the spatial dimension of SME access to bank lending. SMEs' access to bank credit is often based on soft information which can neither be easily stored or transmitted over long distances, nor be easily verified by anyone else other than the person who produces it (Udell, 2009). The physical presence of bank branches in the vicinity of SMEs enables loan officers to collect soft information about their borrowers at a lower cost; facilitates loan officers to use their knowledge of the local community to better evaluate managerial skills, integrity, and strategic decision making (Udell, 2009); eases agency problems via stepping up on-site monitoring and relationship building (Pirinsky and Wang, 2010); increases the utilisation of non-price terms and conditions to firewall the emergence of default risk (Prilmeier, 2011) and allows the use of various non-contractual levers to enforce contracts

(Rajan and Zingales, 2003). In sum, physical proximity of bank branches to SMEs constitutes a necessary condition for mitigating the principal-agent problem between local branch officers and SMEs and allowing for the reduction of credit constraints (Agarwal and Hauswald, 2010)[6].

A shorter physical proximity between bank branches where the soft information could be gathered, and the headquarters of branches where the centre of decision-making on funds resides could alleviate the internal agency cost within the organization in communicating soft information. The presence of informational diseconomies of scale makes it difficult to transmit soft information to others over long distances or within large and complex banking organizations (Williamson, 1988; Stein 2002). A shorter distance between branches and headquarters could strengthen the trust and improve the quality of the communication of soft information between local branch officers and upper layers officials. This leads to higher capacity of upper layers officials to act on soft information in the provision of credit to SMEs (Liberti, 2004; Degryse et al., 2009; Alessandrini et al., 2010). As a result, local branch officers that are located closer to the headquarters are more likely to invest in gathering soft information (Canales and Nanda, 2012; Agarwal and Hauswald, 2010). This implies that regions and branches within a branch banking system do not necessarily face a horizontal supply of funds (Dow, 1992). The supply curve of credit differs across regions in the degree of inelasticity, implying that borrowers located in different regions, despite of similar characteristics, will face different bank finance premiums, bank credit rationing thresholds and bank lending standards[7].

Second, our paper also relates to the literature on the transmission of financial shocks across markets and countries in various economic circumstances. The empirical evidence shows that a shock to the financial condition of parent banks may transit into a contraction of credit supply of its subsidiaries/branches across-border or/and within a nation (Peek and Rosengren 1997; Popov and Udell, 2012). Moreover, subsidiaries/branches of different parent banks are affected differentially, depending on the capacity of their parent banks to

[6] Close proximity of bank branches to borrowers may also provide additional market power to the lending bank (Degryse and Ongena, 2005; Alessandrini et al., 2009).

[7] This does not rule out the possibility of granting some autonomy to local officers which are distant from the headquarters. Such empowering is more likely to take place in normal times when the *ex post* observation of problem loans is lower and the perceived benefit of decentralization is larger. However, rebounded centralization of decision-making may happen during a financial crisis as evidenced by The Institute of Chartered Accountants in England and Wales surveys (2009 and 2011) with senior partners in the leading UK network accountancy firms who are responsible for SME issues. The analysis shows the loss of power of SMEs' relationship managers to approve credit applications at local level in the post financial crisis period.

insulate the provision of credit supply from the shock (Ivashina and Scharfstein, 2010; Chava and Purnanandam, 2011; Jiménez et al., 2012; Iyer et al., 2014). Banks also appear to deleverage its supply of credit in a heterogeneous manner across its subsidiaries/branches (Cetorelli and Goldberg, 2012). More specifically, the multi-market bank retracts disproportionally from markets which are distant from their headquarters and from those they have no local subsidiary[8]. Popov and Udell (2012) and Beck et al. (2014) show that firms within the vicinity of healthy banks or relationship banks face fewer credit constraints during the financial crisis, respectively.

The rest of the paper is structured as follows. In section 2 we discuss our identification strategy, present our empirical model and describe the construction of variables. The data sets are described in Section 3. We present the empirical results in Section 4 and report additional robustness tests in Section 5. Finally, Section 6 concludes.

2. Empirical methodology and identification strategy

2.1. Credit constraints and local banking markets

We hypothesize that the characteristics of a local banking market capture the capacity and willingness of the branch banking system of banks to deal with soft information-intensive SME lending. We study how the impacts on SME credit constraints alter before and after the financial crisis of 2008.

To do this, we first specify the following baseline model and estimate it separately for the pre-2008 and post-2008 period:

$$\ln Y_{irt} = \alpha + \alpha_1 X_{irt-1} + \alpha_2 ECON_{rt-1} + \beta_1 LOCALBANK_{rt-1} + \lambda_r + \upsilon_t + \varepsilon_{irt} \quad (1)$$

where Y_{irt} is the degree of bank-credit constraints that firm i, operating in manufacturing, located at locality r, at time t faces. We employ the ratio of short-term bank debt over the sum of short-term bank debt and trade credit (TC) as an inverse indicator of credit constraints (for

[8] This phenomenon is recorded even in the syndicated loan market which is generally believed to be relatively informational transparent (De Haas and Van Horen, 2013)

short, FINANCING MIX)[9]. Definitions of all variables are in Table 1. X_{irt-1} is a vector of time-varying firm-specific controls[10]. We follow the literature on the determinants of firms' capital structure, on firms' access to bank credit, and on firms' access to trade credit to determine X_{irt}. Firm size (LNASSET, i.e. the natural logarithm of assets) proxies for expected bankruptcy costs, information asymmetry faced by firms and the bargaining power possessed by firms in their business relationships. We expect that larger firms face lower credit constraints and therefore show a higher FINANCING MIX (i.e. short-term bank debt to short-term bank debt + TC ratio). We include asset tangibility (TANGIBILITY, i.e. tangible assets divided by total assets) as a proxy for the availability of collateral. Higher tangible assets lowers the probability of bankruptcy, bridges the information problem and eases firms to seek bank finance. A greater interest coverage ratio (INTERESTCOVERAGE, i.e. profit before interest paid divided by interest expenses) facilities access to bank credit since it reflects the capacity of firms to generate cash flow that meets short-term obligations (Jone and Tuzel, 2013). Firms with a greater internal liquidity ratio (INTERNALFINANCING, i.e. cash flow from operations divided by the product of the duration of the firm's cash cycle (CCC)[11] and the daily total operating cost) are expected to have a higher proportion of bank credit since it not only reflects the capacity of firms to generate net cash flow to cover its working capital but also captures firm profitability (Kremp and Severstre, 2013). We further include the net-worth ratio (NETWORTHRATIO, i.e. total shareholders' funds divided by total assets) and the cash flow-to-debt ratio (CASHFLOWDEBT, i.e. the ratio of operating cash flow over total debt). Because our focus is on the short-term bank credit constraint, the impact of the net-worth ratio and cash flow-to-debt ratio cannot be determined a priori. A higher net-worth ratio and cash flow-to-debt ratio might reflect the relative higher capacity of firms to use non-debt finance and long-term debt. Therefore, they might be associated with a lower short-term debt in general (Bougheas et al., 2006). However, to the extent that a higher net-worth ratio and a higher cash flow-to-debt ratio are associated with lower default risk, they would facilitate the access to bank credit. We proxy for growth opportunities by including intangible assets (INTANGIBILITY, i.e. the ratio of intangible assets over total assets), following De Haan and Sterken (2006). Since

[9] We take the natural logarithm to account for its skewness as Demiroglu et al. (2012).

[10] The use of one period lagged values of independent variables has been recommended by literature as a more transparent method to handle the concerns over the reverse causality and simultaneity in the empirical analysis (Clemens et al., 2012).

[11] The cash cycle is measured by the sum of average inventory age and average collection period minus average payment period in line with Huang et al., (2011).

intangible assets are mainly composed by firms' investment in research or development activities and goodwill acquisition, higher intangible assets would be associated with firms' confidence with deriving economic benefits from the investment. Finally, we introduce account receivables (TRADEDEBT, i.e. account receivables over total sales). The impact of trade debt on firms' bank credit constraint is an empirical issue due to the presence of two contrasting forces. Firms stand in the middle of business chain. If they sell and buy on trade credit they would incur account payables as the recipient of the trade credit provided by their suppliers and account receivables as the provider of the trade credit offered to their buyers. The empirical evidence in the trade credit literature suggests that firms are likely to match the maturities of the contract terms for their payables and receivables, and this will lead to a positive association between trade credit extension and trade credit demand (Bastos and Pindado 2013). However, account receivables would be used for invoice factoring or/and as collateral for securing bank loans, and therefore would influence firms' access to bank credit (Wu et al., 2011).

$ECON_{rt-1}$ is a vector of controls that capture time-varying economic conditions at the locality level. We use unemployment rate (UNEMPLOYMENTRATE, i.e., the ratio of the number of people claiming Jobseekers Allowance (JSA) and National Insurance credits at Jobcentre Plus local offices divided by total number of people aged 16-64), at the locality level.

$LOCALBANK_{rt-1}$ is the vector of the characteristics of local banking market, our main variables of interest. Three factors we account for are $OPDIS_{rt-1}, FUDIS_{rt-1,}$ and HHI_{rt-1}. $OPDIS_{rt-1}$ refers to time-varying locality-specific operational proximity. We calculate it using the total number of branches of individual banks in a given locality divided by the surface area of the locality. We use it to proxy for the closeness between local SMEs and local loan officers. The literature argues this indicator is a proxy for transportation and information costs borne by borrowers and lenders (Alessandrini et al., 2009). $FUDIS_{rt-1}$ indicates time-varying locality-specific functional distance denoting the closeness between local loan officers and headquarters. Following Alessandrini et al. (2009) we first calculate the average driving time of branches held by each bank in a given locality r to the headquarters of each bank. We take its natural logarithm. We then use the number of branches of each bank in locality r as percentage of total number of branches of all banks in locality r as weight to compute the weighted average of functional distance of each

locality[12]. HHI_{rt-1} is the time-varying locality-specific Herfindahl-Hirschman index (HHI). We follow the literature and compute it using the share of branches held by individual banks in each locality[13]. Finally, λ_r is a vector of locality dummies to control for time-invariant locality-specific effects. υ_t is a vector of time dummies to account for time-varying effects that commonly impact each locality. ε_{irt} is an idiosyncratic error term.

2.2. Local banking market characteristics and the transmission of banks' financial conditions

We next investigate the role of local banking market characteristics for the propagation of banks' financial conditions. We hypothesise that the access of bank credit for SMEs is affected by the financial condition of banks, and distributed unequally across localities due to the variation in the characteristics of local banking markets. We study whether the recent financial crisis and the subsequent recession introduce changes in the impacts.

We specify the following empirical models and estimate each of them over the pre-2008 and post-2008 period, separately:

$$\ln Y_{irt} = \alpha + \alpha_1 X_{irt-1} + \alpha_2 ECON_{rt-1} + \beta_1 LOCALBANK_{rt-1} + \beta_4 FIN_{rt-1} + \lambda_r + \upsilon_t + \varepsilon_{irt} \quad (2)$$

$$\ln Y_{irt} = \alpha + \alpha_1 X_{irt-1} + \alpha_2 ECON_{rt-1} + \beta_1 LOCALBANK_{rt-1} + \beta_4 FIN_{rt-1} + \beta_5 FIN_{rt-1} * LOCALBANK_{rt-1} + \lambda_r + \upsilon_t + \varepsilon_{irt} \quad (3)$$

[12] Specifically, the functional distance of locality r is measured via $\sum_{b=1}^{B} \frac{branches_{br} * \ln(\frac{\sum distance\ of\ each\ branch\ of\ bank\ b\ at\ locality\ r\ to\ the\ headquaters_b}{branches_{br}})}{\sum_{b=1}^{B} branches_{br}}$. $branches_{br}$ is the total number of branches of bank b at locality r. B is the number of banks who have branches at locality r. Notably, our measurement of the functional distance is slightly different from Alessandrini et al. (2009) since our calculation uses information on the postcode sector of branches in each locality and information on the postcode unit of the headquarters of each branch in each locality, they use information on the locality of branches and that of the headquarters of branches. As detailed later on, our definition of locality is the Nomenclature of Territorial Units for Statistics 3 level (NUTS3), their definition is the province.

[13] Since financial figures are not available at the branch level, the information on the branch distribution is used to calculate HHI, as is regularly done with regional data (e.g. Degryse and Ongena, 2005).

In addition to the covariates which we discussed in model (1), FIN_{rt-1} is a vector of time-varying locality-specific bank financial conditions. We include two indicators that have been identified to be crucial for the heterogeneous response of bank credit supply schedules in the face of a negative shock: the capitalization of banks and the use of market-based sources of loanable funds (Bonaccorsi and Sette, 2012). We use the ratio of equity over total assets to proxy for capitalization (CAPITALIZATION). To capture the extent to which banks' operation is subject to the drop of liquidity in the markets for purchased funds, we consider the proportion of consumer deposits over the sum of total deposits and short-term borrowing (COREDEPOSIT). Deposits are perceived as the reliable and stable source of funding (Berlin and Mester ,1999). Banks with a higher proportion of deposits could shield its borrowers from the effects of increases in the nondeposit finance premium in the markets for purchased funds (Black et al., 2007). Ivashina and Scharfstein (2010) document that banks with more deposit financing show a smaller decline in lending in the syndicated loan markets following the recent financial crisis. To link the financial condition of banks to the locality, we construct a locality-specific bank financial conditions index, following Popov and Udell (2012) and Ongena et al. (2013). We first determine which banks are present in a given locality and how many branches each bank has in that locality. Secondly, we collect the consolidated balance sheet information of banks from Bankscope. Finally, we compute locality-specific bank financial conditions index using a weighted average financial condition of banks in a given locality. We apply two different weighing schemes. The first employs equal weight to each bank in each locality. The assumption behind this is as long as there is a physical presence of the bank in the locality, regardless how many branches the bank has, firms located in this particular locality would have equal opportunity of doing business with this bank. In this case, the cross-locality variation in the financial conditions index is determined by the presence or absence of banks in a locality. The second weighing scheme employs information on the ratio of branches of each bank in a given locality over the total number of branches of individual banks in that locality. Banks with more branches therefore get a larger weight. The motivation is that firms have a higher probability of doing business with banks that have a wider penetration in a given locality. In this case, the cross-locality variation in the financial condition index comes not only from banks being present but also from the importance of a particular bank in a given locality. We compute the financial conditions index for each year of our sample period using year-by-year information on

branches as well as banks' financial conditions. Therefore, the locality-specific bank financial conditions index also has time-variation.

The sign and significance of coefficients for FIN_{rt-1} and its interaction terms with the characteristics of local banking market capture the impact of financial conditions of banks and its heterogeneity across markets with different characteristics. In particular, β_5 should not be significantly different from zero if banks distribute its financial strength in supplying credit equally regardless the characteristics of local banking market. Put differently, a statistically insignificant β_5 implies a horizontal supply of funds across localities in a branch banking system due to balanced intra-bank flows between bank branches and their headquarters.

2.3. "flight to quality" or "flight to headquarters"?

Finally, we investigate the extent to which the heterogeneous propagation of financial condition of banks across markets is driven by a "flight to headquarters" versus a "flight to quality" effect. Following Giannetti and Laeven (2012a), we argue that the difference between the "flight to headquarters" effect and the "flight to quality" effect is that the former arises from banks' rebalancing of their loan portfolios towards markets which are closer to the headquarters, while the "flight to quality" effect arises from banks' rebalancing of their portfolios towards borrowers with lower likelihood of financial stress. Our empirical strategy therefore is to test whether firms with lower likelihood of financial stress would be less likely to be exposed to the heterogeneous propagation of banks' local financial conditions.

We estimate:

$$\ln Y_{irt} = \alpha + \alpha_0 Z_{ir} + \alpha_1 X_{irt-1} + \alpha_2 ECON_{rt-1} + \beta_1 LOCALBANK_{rt-1} + \beta_4 FIN_{rt-1} + \beta_6 FIN_{rt-1} * LOCALBANK_{rt-1} * Z_{ir} + \beta_7 FIN_{rt-1} * LOCALBANK_{rt-1} * (1 - Z_{ir}) + \lambda_r + \upsilon_t + \varepsilon_{irt} \quad (4)$$

where Z_{ir} is a dummy variable equal to one if the firm i in locality r falls into the category of having a lower likelihood of financial stress and zero otherwise. We split SMEs into high (i.e. HIGH) and low (i.e. LOW) likelihood of distress category on the basis of

Altman's (1968) z-score[14] and total assets. If the firm has a z-score (LNASSET) which is higher than the sample median in 2007, we treat it as a one who has a low likelihood of financial stress and zero otherwise. The coefficient β_6 represents the heterogeneous impact on firms with lower likelihood of financial stress and β_7 denotes the heterogeneous impact on firms with higher likelihood of financial stress. The difference between β_6 and β_7 and the significance of the difference captures the variation between the two groups.

A final comment about the dependent variable FINANCIHG MIX is that while the change in the composition of external funding is helpful for distinguishing the credit constraint driven by the variation in the supply behaviour of banks, Oliner and Rudebusch (1996) emphasizes that such identification requires: 1). the potential substitution for bank credit has to be practically available for SMEs; and 2). the potential substitution for bank credit has to be a suboptimal choice relative to bank credit[15]. TC is an option to obtain short-term credit provided by suppliers in conjunction with product sales. The manufacturing sector is most likely to use bank credit as well as trade credit as it purchases a large part of intermediate goods from their suppliers (Cunat, 2007)[16]. Therefore, TC can be treated as the predominantly available informal non-institutional external finance[17]. However, several disadvantages[18] make TC unattractive relative to bank loans, *ex ante* (Nilsen, 2002). Since TC is lower down the pecking-order of finance than formal institutional bank credit (Petersen and Rajan, 1997), buyers will not exercise TC disproportionally if they do not face serious credit constraints. While large public firms can raise liquidity externally from capital markets,

[14] We follow Sufi (2009) and calculate z-score using the following formula: z-score=((3.3* operating profit+ total sales+1.4* retained profit+1.2* working capital)/total assets)

[15] Another implicit assumption to serve our identification strategy is that trade credit has no spatial dimension. Given that the sample is of manufacturing companies, and manufacturing is in the tradable sector the assumption of the non-existence of a locality-specific supply of trade credit is not implausible.

[16] In the United Kingdom, 70% of the total short-term debt (credit extended) and 55% of the total credit received by firms consists of trade credit (Kohler et al., 2000). In 2004 it was 37% of total business assets (Paul and Wilson, 2006). 60.8% of firm's outstanding credit was from suppliers (Aaronson et al., 2004). Similarly, 87% of UK companies sold between 80% and 100% of their goods on credit, with one third granting credit on every business transaction (Paul and Wilson, 2006). For the population of manufacturing companies in the UK, TC, on average, exceeds the primary money supply by a factor of two over the period 1977 to 2004, while the 'trade creditors to current liability' ratio exceeded 75% in 2004 (Wilson, 2008; Paul and Wilson, 2007).

[17] The result from the SME Finance Monitor survey in the third quarter of 2011 shows that half of SMEs in the UK use trade credit and retained earnings as source of finance, the other half who use at least one form of external finance most commonly use banking funding, either loans, credit cards or overdrafts (BDRC, 2011).

[18] The disadvantages include the restriction of the use of financing (TC is tied with the purchases of goods from the suppliers), its short-term nature (the normal maturity of trade credit is 30 days after delivery), the significant later payment penalties, the opportunity cost associated with a possible damage to the business relationship if the payment is made after the due date, and a possible increase in the selling price set by the supplier. 30 days, 31 to 45 days and 60 days are the most common number of credit days of TC for UK firms (Paul and Guermat 2009). Late payment penalties include an interest rate of 8% above the bank rate (Cunat, 2007).

the literature on debt structure and trade credit suggests that TC is the most important alternative sources of liquidity for informationally opaque SMEs when bank credit is insufficient to satisfy firms' demand for credit[19] (Sufi, 2009; Demiroglu et al., 2012; Garcia-Appendini and Montoriol-Garriga, 2013). Indeed, the empirical literature suggests that the demand for trade credit for finance is positively related to credit constraints (Nilsen, 2002; Carbo-Valverde et al., 2012). Moreover, the substitution relationship between information-motivated bank credit rationing and trade credit appears to become stronger once credit market conditions deteriorate (Biais and Gollier, 1997; Petersen and Rajan, 1997; Nilsen, 2002; Mateut et al., 2006; Guariglia and Mateut, 2006; Yang, 2011; Demiroglu et al., 2012; Huang et al., 2011).

4. Data and descriptive statistics

Following the convention used by Eurostat and other European Union bodies, we use NUTS3 as our definition of locality[20]. The construction of locality is based on the classification of NUTS3 in 2003[21]. The number of NUTS3 in 2003 in Scotland, England and Wales was 128. We construct our dataset from several data sources. Our information about firm-specific annual financial statements and the postcode of registered address is collected from Financial Analysis Made Easy (FAME). We follow UK's Companies Act 2006 and define SMEs as entities that have an annual turnover not exceeding £25.9 million and that have fewer than 250 employees by 2008. By doing so, we ensure firms we include in our

[19] The literature has identified several reasons that incentivise suppliers to extend credit to bank rationed firms. Firstly, suppliers would collect and employ information which is not available for institutional lenders in their provision of trade credit (Petersen and Rajan 1997). Secondly, suppliers would gain a ''liquidation advantage'' through industrial knowledge and networks, which put them in an advantage to banks in liquidating firm's collateral (Fabbri and Menichini 2010). Also, suppliers may possess an advantage over banks by mitigating the exposure to customers' opportunism since trade credit is tied to specific good and services (Burkart and Ellingsen, 2004). Furthermore, suppliers would finance the growth of their customers with trade credit to ease the constraint on their own growth (Schwartz, 1974). If suppliers incur sunk costs in establishing business relationships, they would provide trade credit in order to keep their customers in business (Petersen and Rajan, 1997). Maintaining the customer–supplier relationships and promoting sales would become even more crucial for suppliers during an economic downturn (Bougheas et al., 2009). If suppliers require cash payments and reduce trade credit to their main customers, these customers may switch their transactions to other suppliers who offer more trade credit (Tsuruta, 2014). Therefore, a supplier may extend trade credit to its customers, even if they are credit constrained or suffering from a liquidity crisis.

[20] The Nomenclature of Units for Territorial Statistics (NUTS) is a hierarchical classification of spatial units that provides a breakdown of the European Union's territory for the purposes of producing comparable regional statistics. NUTS identifies geographical areas at a series of nested levels, with NUTS level 1 being the largest units, typically regions in the range 3-7m population, NUTS 2 being in the range 800,000-3m population and NUTS 3 in the range 150,000-800,000 population.

[21] There were adjustments in the NUTS3 classification in the UK in 2010.

analysis were SMEs when the financial crisis started. We use primary UK SIC (2007) code as criterion for the classification of firms in the manufacturing industry. We limit our sample to SMEs in the manufacturing industry with primary trading address or registered office address in England, Scotland and Wales. We use the registered address of firms to identify their physical location. To ensure the consistency of the information we cross-check the registered address of SMEs in FAME with that of the official UK government register.

Data on the annual consolidated financial statement of banks in the UK is gathered from Bankscope. We include banks incorporated in the UK, guided by the list annually published by the Financial Services Authority (FSA). To avoid double counting, we exclude those that appear to be the subsidiary of Major British Banks[22,23]. In the case of merger[24], we replace the annual consolidated financial statement of the target bank with that of the acquiring bank[25]. The information on the postcode of the headquarters of each bank included in our analysis relies on information on the registered address of each bank. We cross-check the registered address of each bank in Bankscope with that in the official UK government register to ensure the consistency of the information.

We collect the information on the location of branches of Major British Banks from the Annual UK Clearings Directory[26]. The Clearings Directory contains information provided by clearing banks on the lists of offices which participate in the UK clearing system. This includes the geographical area of the branch, the sort code of the branch, the title of the branch, and the postal address of branches. The combination of the four pieces of information is sufficient to identify the physical location of branches. In addition, since we have the yearly clearings directory over our entire sample period, we trace back information from the previous annual clearings directory when there is ambiguity in the information published in

[22] With reference to the Abstract of Banking Statistics published by BBA, our definition of Major British Banks encompasses Abbey national, Alliance & Leicester, Bradford & Bingley, Woolwich, Barclays, Lloyds TSB, Lloyds TSB Scotland, Cheltenham & Gloucester, Halifax, Bank of Scotland, Royal bank of Scotland, NatWest, HSBC, Yorkshire bank, Clydesdale bank, Cooperative bank, and Northern Rock.

[23] The concern over double-accounting relates to the construction of the financial condition of Major British Banks. With respect to branches, we include all identified branches of Major British Banks,

[24] We rely on Ashton (2012), the list of mergers cases listed by Office of Fair Trading and history of banks contained in Bankscope to identify mergers.

[25] The exceptional treatment is the case of Lloyds TSB and Royal bank of Scotland. With respect to the former, the consolidation financial statement for Lloyds TSB Scotland, Halifax, bank of Scotland, and Cheltenham & Gloucester are available even after being acquired; With respect to the latter, the same situation is applicable for the consolidated financial statement for NatWest. To avoid double counting, we use the unconsolidated financial statement for those two banks.

[26] Since all Major British Banks are clearing banks, the use of the Clearings Directory allows us to identify the locations of their branches at yearly-basis sufficiently. For banks that are not in the category of Major British Banks, we assume the bank has one branch which is located at the same location as its headquarters. Experian's Shop*Point data verified during the period 2011-2013 indicates that 97.5% of branches of banks in England, Scotland and Wales belong to Major British Banks.

the directory in a later period. We cross-check by comparing the yearly total number of branches of each clearing bank identified with the statistics on the aggregated number of UK branch network published by the BBA. We further cross-check the physical location of branches with the branch locator service in the website of each clearing bank and information on the location of branches of Major British Banks provided by SNL financial. While these two sources only provide the information in 2011, they confirm the validity of our method in locating the branches of Major British Banks. In the case of merger, we classify the branches of the target bank as that of the acquiring bank and also adjust the location of the headquarters from the merger onwards accordingly. While we have full postcode of the registered address of firms and the full postcode of the headquarters of banks, we do not always have full postcode of the physical location of branches. We look up the postcode sector of the name of the geographical area where the branches are located via Geocoder and postcode lookup tool from oCo Carbon[27]. To match the postcode with NUTS3, we use GeoConvert, an online geography matching and conversion tool created by Mimas[28] at the University of Manchester. To find the driving distance in minutes and miles between the physical location of branches and the headquarters of banks, we rely on Bing map UK. We obtain information on the surface area of each NUTS3 measured in square kilometres from Eurostat. Data on unemployment rate is obtained from Labour Market Statistics (Nomis). Since the data is available at Local Authority District level (LAD) and not at NUTS3 level, we use GeoConvert to look up the corresponding NUTS3. The total number of observations is 9713. The data set is an unbalanced panel[29] over the period 2004-2011[30]. The observation unit is at firm-year-locality level. The largest number of firms at yearly level is 2630. The number of NUTS3 included in our analysis is 125[31].

We present the summary statistics and definitions of variables used in the empirical analysis in Table 1. The summary statistics of locality-specific time varying variables is provided in Table 2. As seen in Table 2, all three characteristics of local banking markets show a certain degree of variability at a given point in time. Moreover, the mean and standard deviation change over time. In particular, the average value of HHI and the average value of

[27] http://oco-carbon.com/
[28] http://mimas.ac.uk/
[29] An unbalance panel serves to handle the concern over the problem of selection and survivorship bias.
[30] The sample period starts from 2003, but since a one-period lag of the independent variables is used the dependent variable refers to the period 2004-2011.
[31] The total number of NUTS3 included in our analysis (i.e.125) is smaller than the total number of NUTS3 in 2003 (i.e. 128) is the combined outcome of the absence of SMEs in manufacturing industry as defined in the first paragraph of section 4, the missing value of financing mix and the missing value of the one-period lag of the independent variable.

functional distance measured either in travelling time or traveling miles increase in the post-2008 period compared to pre-2008 period. However, the opposite is true for the operational proximity, possibly due to the change in the distribution of branches of banks. Also, several Mergers and Acquisitions which took place in the post-2008 contributed to the change[32].

We also present the mean of the characteristics of local banking markets, our main variables of interest, by NUTS1[33] level for the pre-crisis (2004-2007), for post-crisis (2008-2011) and the whole sample period (2004-2011) separately. Chart 1 shows the full sample regional distribution of operational proximity (*OPDIS*), *HHI* and functional distance (*FUNDIS*). The three regions with the highest density of branches per square kilometre are London, North West of England, and South East of England; and the lowest three are North East of England, Scotland and Wales. The chart shows that the least concentrated markets are Yorkshire and Humber, London and North West of England, while the most concentrated markets are South West of England, Wales and Scotland. In the case of functional distance (*FUNDIS*), the markets with the closest distance to the headquarters are London, East of England and South East of England, while those with longest distance are North West of England, South West of England and Wales. Data on regional gross value added as a percentage of UK indicating the top four regions are London (21.9%), South East of England (14.7%), North West of England (9.4%) and East of England (8.7%), while the bottom three are North East of England (3.2%), Wales (3.6%) and East Midland (6.1%). Therefore, regions with higher economic development have a less concentrated local banking market, higher branch density and closer functional distance, *vice versa.*

5. Empirical Results

5.1.Baseline results

The credit channel literature argues that a negative monetary shock alters banks' lending standards (Bernanke and Gertler, 1989), and the economic uncertainty during the time of stress might change the characteristics of firms' demanding for external finance. The estimation of model (1) is over the period 2004-2007 and 2008-2011, two sub-periods with equal length, respectively. By doing so, we allow for the variation in the estimated

[32] In particular, Alliance & Leicester and Bradford & Bingley were acquired by Santander UK; Bank of Scotland, and Halifax were acquired by Lloyds TSB; and Britannia Building Society was acquired by Cooperative bank.

[33] NUTS level 1 is the largest units of NUTS. NUTS3 are nested in NUTS1. In the UK, NUTS 1 corresponds to the Government Office Region.

coefficients on our main variables of interest as well as on the control variables. The results are presented in Table 3.

We begin our discussion on the estimated results of firm-specific characteristics. We find that firms with higher tangibility have higher financing mix (i.e. higher short-term bank debt to short-term bank debt + TC ratio) suggesting that the higher availability of collateral reduces firms' credit constraints as it facilitates the use of bank credit as a source of external finance. Moreover, our results suggest that firms with a higher intangible asset ratio also have a higher financing mix. This is consistent with the presumption that a higher intangible asset ratio would be associated with higher growth opportunities of firms, therefore leading to higher likelihood of firms being supported by formal and institutionalized external financing (De Haan and Sterken 2006). These results are statistically significant and hold for both 2004-2007 and 2008-2011 periods. Other firm-specific variables provide a mixed mixture over the two periods. Specifically, in the latter period firms with larger size, with higher internal financing capacity and with higher profit to cover the interest cost have better access to bank credit. Size and interest coverage ratio have been used as main indicators for the presence of financial constraints in literature. Higher internal financing capacity is an indicator of the company's efficiency in managing its important working capital assets and reflects a company's ability to pay off its current liabilities. The results echo the argument that banks have, in the post financial crisis period, adopted a more restrictive policy regarding the supply of credit to SMEs. It also concurs with the finding that size is the main contributor to the different degree of access to bank credit of firms during the recent economic recession period in the UK (Cowling et al., 2012). Regarding the cash-flow-to-debt ratio, we find that firms with a higher cash-flow-to-debt ratio have a lower short-term bank debt ratio. This could reflect the intention of firms to reduce the exposure to external debt in the post-crisis period. Presumably, higher cash flow from operations facilitates the materialization of such intention. Also, the results are explicable if one takes into account the substitution between short-term debt and long-term debt. A higher cash flow-to-debt ratio may reflect relative higher capacity of firms to use long-term debt. Therefore, higher cash flow-to-debt ratio might be associated with a lower short-term debt from banks. Additionally, in the case where the debt level is high enough relative to cash flow so as to trigger the banks' concern over firms' viability, the bank would replace long-term debt for the short term debt to strengthen the power of a repayment call (Barclay and Smith, 1995). If significant, we also see a negative association between the cash flow debt ratio and short-term bank debt ratio. It is reasonable to argue that such an exercise is more likely to take place in the post-crisis

period[34]. Finally, we find that a lower net-worth ratio is related to a higher short term bank debt ratio. The result only exists in the period 2004-2007. In part, this might reflect the situation leading up to the financial crisis, where it is widely accepted that risk was wrongly priced by banks and bank credit too available, and often provided where equity would have been more appropriate (Breedon, 2012).

We next move to the results on our main variables of interest. With respect to the period of 2004-2007 (column 1), we find that a higher operational proximity (*OPDIS*) has a significantly positive impact on financing mix (i.e. short-term bank debt to short-term bank debt + TC ratio). This result suggests that SMEs in a local banking market with higher branch density per square kilometres seem to face a lower degree of credit constraint. The magnitude of the effect is also economically important. Based on column 1 in Table 3, a one standard deviation decrease of *OPDIS* decreases the ratio of short-term bank debt over the sum of short-term bank debt and trade credit of SMEs in the manufacturing industry by 91%[35], *ceteris paribus*. The result is in line with the empirical finding on the positive impact of physical proximity between branches of banks and borrowers on financial constraints of firms (Benfratello et al., 2008). In addition, we find that a lower *HHI* index in the local banking market would be associated with a higher short-term bank debt ratio. Therefore, our result suggests that SMEs located in banking market with a lower concentration ratio have lower degree of credit constraints. The finding lends support to the argument that competition in the market place would mitigate credit constraint for informational sensitive SMEs. The magnitude of the effect is also economically important. Based on column 1 in Table 3, one standard deviation increase of *HHI* would have 23% decrease[36] in the ratio of short-term bank debt over the sum of short-term bank debt and trade credit of SMEs in manufacturing industry, *ceteris paribus*. As far as the distance between the local branches and the headquarters of branches (i.e. *FUNDIS*) is concerned, the result is not statistically significant.

Turning to the results with respect to the period 2008-2011 (column 2), we find *OPDIS* and *HHI* are no longer significantly associated with the ratio of short term bank debt. The insignificant result of the *HHI* index is consistent with the view that competition for the provision of bank credit at times of financial crisis is muted. The heightened uncertainty in the business environment would weaken the responsiveness of local credit to the strength of competition. In sharp contrast with the results on *OPDIS* and *HHI*, the significantly negative

[34] The findings from the SME Finance Monitor suggests that during the Q3, 2010-Q3, 2011, 10% of SMEs that have a term loan facility in place, experienced a loan renegotiation or cancellation.
[35] The calculation is as 100*{exp[2.6623*-0.907]-1} percent.
[36] The calculation is as 100*{exp[-8.3081*0.032)]-1} percent.

coefficient on *FUNDIS* suggests that SMEs located in the locality where the banking system is less (more) functionally distant appears to have lower (higher) degree of credit constraints. UK banks seem to retrench from localities which are more distantly located away from the headquarters when they experience a banking crisis. Based on column 2 in Table 3, SMEs in the manufacturing industry, *ceteris paribus*, would have a 32% decrease in the ratio of short-term bank debt over the sum of short-term bank debt and trade credit if they are located in location with a one standard deviation longer *FUNDIS* [37]. Our result is consistent with the "flight home" bias of banks in the post-crisis period suggested by Presbitero et al. (2014)[38].

Overall, our findings suggest that our three main variables of interest relating to the characteristics of local credit market, namely, operational proximity, concentration ratio and functional distance, are relevant for the degree of credit constraints faced by SMEs. However, their impact is different between the pre-crisis and post-crisis period. While a shorter operational proximity and lower degree of concentration seems to reduce the credit constraints of SMEs in the pre-crisis period, their impact is insignificant in the post-crisis period. The analysis on functional distance between the local credit markets where banks have branches and the headquarters of these banks, on the other hand, indicates a longer distance is associated with higher credit constraints of SMEs in the post-crisis period but not in the pre-crisis period. The result on functional distance may reflect the fragile trust between local loan officers and senior management team in the headquarters during the crisis.

5.2.The characteristics of local banking market and the transmission of banks' financial conditions

To evaluate the transmission of the financial condition of banks on the credit constraints of SMEs across localities, we augment model (1) with time-varying locality-specific bank financial conditions (i.e. FIN_{rt-1}) and allow the interaction term between FIN_{rt-1} and the characteristics of local credit markets. We first report the results of a specification with FIN_{rt-1} but without the interaction term (model (2)) and then report the results of a specification with FIN_{rt-1} and the interaction term (model (3)). Model (2) also addresses the possible omitted variable bias in model (1) due to the possibility that local credit markets with certain characteristics (such as higher operational proximity, lower

[37] The calculation is as 100*{exp[-0.7565*0.509]-1} percent.

[38] Using survey information on loan applications and lending decision with respect to Italian manufacturing firms, their study indicates longer functional distance of local credit market leads to higher likelihood of local firms being credit rationed, which exists exclusively in the post Lehman Brothers period.

concentration ratio and shorter functional distance) might be populated with banks with stronger financial condition. The estimated results on the specification without the interaction term (model (2)) for the period 2004-2007 and the period 2008-2011 are presented in Table 4.1 and Table 4.2, respectively. The estimated results on the specification including the interaction term (model (3)) for the period 2004-2007 and the period 2008-2011 are reported in Table 5.1 and Table 5.2, respectively.

Looking first at Tables 4.1 and 4.2, we find similar results for both control variables and our main variables relating the characteristics of local credit market as that in Table 3. The only exception is the estimated coefficient on HHI index for the period 2004-2007 in the case when we construct local financial condition by weighting the financial condition of banks by their share of branches in the locality (Column 2 in Table 4.1). As seen, while the coefficient is negative, it is not statistically significant. With respect to the local financial condition, the estimated coefficient on FIN_{rt-1}, no matter whether local financial condition of banks is measured by capitalization or core deposit ratio and how it is weighted, suggests its first-order impact is not significantly different from zero.

Next we turn to the question whether the transmission of the financial condition of banks is heterogeneous across local credit markets with different characteristics. To avoid the imposition of constraints *ex ante*, we first allow for the interaction terms of locality-specific financial condition of banks with all three variables of the characteristics of local credit market. The results are reported in the odd-numbered columns of Table 5.1 for the period 2004-2007 and Table 5.2 for the period 2008-2011, respectively. Looking at the result for 2004-2007, we find that locality-specific financial condition of banks are not significantly associated with the degree of credit constraints faced by SMEs. Moreover, none of the interaction terms (i.e., $FIN_{rt-1} * FUNDIS_{rt-1}$, $FIN_{rt-1} * OPDIS_{rt-1}$ and $FIN_{rt-1} * HHI_{rt-1}$) is statistically different from zero. This finding holds regardless of our proxy for the financial condition of banks as well as the weighing procedure. By contrast, we find a significantly positive impact of core deposit ratio on the short-term bank debt ratio in the estimated results with respect to the period 2008-2011 (columns (5) and (7) in Table 5.2). This suggests that SMEs located in a local market which is more densely populated by the physical presence of banks with smaller exposure to the sudden dry-up of liquidity in the wholesale market face less credit constraints in the post-crisis period. Moreover, while the coefficient on the interaction term between core deposit ratio and operational proximity and that on the interaction term between core deposit ratio and HHI index are not significantly different from

zero, the coefficient on the interaction term between core deposit ratio and functional distance ($FUNDIS_{rt-1}$) is negative and statistically significant. This indicates that the positive impact of having a physical presence of banks with more stable sources of loanable funds on easing local SMEs to get access to bank credit is diminishing if the market is more distant from the headquarters of branches. Furthermore, although the estimated positive coefficient on capitalization is statistically insignificant (columns (1) and (3) in Table 5.2), the coefficient on the interaction term between capitalization and functional distance ($FUNDIS_{rt-1}$) is statistically significantly negative. This, again, suggests that the reduction of credit constraints faced by SMEs in a local market having physical presence of banks with higher capitalization ratio (i.e. smaller degree of capital constraint) is dying out if the market is further away from the headquarters of branches.

Given the finding that the coefficient $FIN_{rt-1} * OPDIS_{rt-1}$ and $FIN_{rt-1} * HHI_{rt-1}$ are not significantly different from zero for both sub-periods, we remove those two interaction terms from our specification. We keep the interaction term $FIN_{rt-1} * FUNDIS_{rt-1}$ and concentrate our analysis on the impact of functional distance on the heterogeneous transmission of the financial condition of banks across localities. The results of this new specification are reported in the even-numbered columns of Table 5.1 for the period 2004-2007 and in the even-numbered columns of Table 5.2 for the period 2008-2011. These results for 2004-2007 reveal a statistically insignificant coefficient on FIN_{rt-1} and statistically insignificant interaction term $FIN_{rt-1} * FUNDIS_{rt-1}$. This result is robust regardless of the indicator of financial condition we use and the weighing procedure we apply. This restates what we have found in the specification with the three interaction terms. First, the variation in the locality-specific financial condition of banks does not appear to have an impact on credit constraints faced by local SMEs. Second, whether the local credit market is populated with branches of banks that are in longer distance from the headquarters does not seem to matter for the transmission of financial condition of banks, and no effect on the degree of credit constraints of local SMEs.

Turning to the results for the period 2008-2011, we find that the first-order impact of the locality-specific financial condition of banks, for either CAPITALIZATION or COREDEPOSITS, is positive and statistically significant. This suggests that SMEs located in a credit market with physical presence of banks with stronger financial conditions, in terms of either lower capital constraint or lower exposure to the fluctuation in the market for

purchased funds, have a higher short-term bank debt ratio, the evidence of a lower degree of credit constraint. Thus, branches of banks that are financially stronger seem to be able to protect themselves from negative disruption in the provision of bank credit, suggesting the internal capital market is at work (Campello, 2002). However, such positive impact appears to be biased toward markets with shorter distance to the headquarters of branches, as evidenced by the negative and statistically significant coefficient on the interaction term between the locality-specific financial condition and functional distance. The presence of such bias survives regardless of the indicator we use to measure the financial condition of banks and the weighing procedure we apply to compute the locality-specific financial condition of banks. Notably, in the specification including the interaction term between the locality-specific financial condition of banks and the functional distance only, the estimated negative coefficient on the operational proximity (OPDIS) becomes statistically significant, presumably capturing banks' attempt in the post-crisis to utilize the market power granted by the shorter operational proximity to recoup losses during the crisis[39].

To conclude our analysis, we find that SMEs encounter less credit constraints if they are located in the market where banks with stronger financial strength have branches. However, such positive effect appears to be attenuated if those branches are at a longer distance from their headquarters. Furthermore, such phenomenon only exists in the post-crisis period. It is worth emphasizing that we are not intending to explain the insignificant results for the pre-crisis period as the absence of internal capital market via which intra-bank flows between branches and their headquarters take place. But rather, we argue the results reflects lower friction for the headquarters to tap into external capital markets, and speedier response of the bank headquarters (HQ) in smoothing out the funding need of branches to *satisfy the local demand for credit*. We rephrase the same line of reasoning to interpret the significant results in the post-crisis period: HQs with stronger financial conditions would be in a better position to shed their *credit supply schedule* from the general increase in the constraint in accessing external capital market in the post-crisis period. Nevertheless, the increased caution toward taking risk in crisis times leads them to reshuffle the priority to localities which are close to the headquarters.

[39] The analysis on Credit Default Swap (CDS) premiums suggests the cost of funding for the major banks in the UK increases in the post-crisis period. Data on the indicative interest rates on lending to SMEs during 01/2009-03/2014 shows that the smaller SMEs and loans of smaller size pay higher interest rate compared to medium SMEs. Credit Conditions Survey (CCS) suggests that banks pass on the increase of cost of funding to borrowers a heterogeneous manner according to the size of firms. SMEs appear to bear the majority of the increase in the cost of funding of banks.

Our results are consistent with the presence of waves across good time and bad time in the extent to which banks take part in credit markets with longer functional distance (Giannetti and Laeven, 2012a, 2012b). Our results are also consistent with Beck et al., (2014) who find that firms with in their vicinity of relationship banks face fewer credit constraints during the crisis. A higher functional distance could be seen as an inverse indicator of relationship banking.

5.3. "Flight to quality" or "flight to headquarters"?

Having established the finding that the financial condition of banks is heterogeneously propagated across markets with differing functional distance, we go one step further by testing to what extent the result is driven by a "flight to headquarters" rather than a "flight to quality" effect. Our assessment on whether the heterogeneous propagation of financial conditions of banks is different for the borrowers with lower likelihood and borrowers with higher likelihood of financial stress is reported in Table 6. Columns (1)-(4) give the results where we define lower likelihood of financial stress on the basis of Altman's (1968) z-score. Columns (5)-(8) present the results where we define lower likelihood of financial stress on the basis of firm size, i.e. the natural logarithm of total assets.

The coefficient on the interaction term on $FIN_{rt-1} * FUNDIS_{rt-1} * high_{ir}$ and that on $FIN_{rt-1} * FUNDIS_{rt-1} * low_{ir}$ both are negative and significant. Moreover, although the absolute magnitudes of the two coefficients are different from each other, the difference is not statistically significant in six out of eight cases. The two exceptions are in column (3) where we define lower likelihood of financial stress using natural logarithm of total assets and construct locality-specific core deposit ratio of banks using equal-weight and in column (5) where we define lower likelihood of financial stress using Altman's z-score and construct a locality-specific capitalization ratio of banks using equal-weight. Even in those two cases, SMEs with lower likelihood of financial stress are even more exposed to the heterogeneous transmission of the financial condition of banks. Our examination therefore indicates that the impact of longer functional distance on reducing the positive impact of stronger financial conditions of banks on the credit constraints of SMEs are not smaller for borrowers with lower likelihood of financial stress. This suggests that the "flight to headquarters" effect is the main driving force for the heterogeneous propagation of the financial condition of banks across localities at different functional distance.

6. Extension and robustness tests

We conduct a battery of additional robustness tests that confirm the veracity of our results. We drill down our estimates to disaggregate the manufacturing sector for industry sub-sector heterogeneity by introducing a vector of dummies, each representing one SIC 2-digit level. We redo the estimation for the post-crisis period excluding the observations for the year of 2008 to allow for the increase in drawdowns of revolving credit facilities undertaken by low credit quality firms concerned about their access to funding during the peak period of the financial crisis as documented in Ivashina and Scharfstein (2010). We further change the reference date for the crisis year from 2008 to 2007 giving two sub-samples of 2002-2006 and 2007-2011 respectively, taking into account the argument that the warning sign of the financial crisis appeared in early 2007. We further re-estimate all the functions using traveling miles rather than traveling time as the measurement of functional distance. For all those exercises, our main results hold[40].

So far, our analysis has assumed that the presence of branches of banks in local credit market is exogenous. As suggested by French et al. (2013), the location of branches of British banks and building society during 1995-2012 are conditioned on the demographic variation of the population. Arguably, demographic conditions would also influence the supply of local bank deposits (Cremera et al., 2010) and the demand for bank financial services. Indeed, the empirical analysis of the US bank loan market by Becker (2007) suggests that the proportion of seniors (i.e., 65 years or older) in each locality is positively related to the volume of bank deposits of local banks. The Life-Cycle Hypothesis suggests that seniors consume less, and hold higher levels of bank deposits than other groups both in absolute terms and as a fraction of portfolios. Furthermore the stronger preference of seniors for traditional "Bricks and Mortar" branches over new technology-driven channel of service provision due to their relatively lower physical outreach and relatively weaker technology skills might generate a stronger demand for the physical presence of branch network at the local area. Banks might be incentivized to maintain a physical presence in areas that have a higher proportion of seniors, being driven by the joint consideration of raising core deposit and selling fee-based bank product and service (Becker, 2007). Branches of UK banks are not subject to the prescription of a common credit to deposit ratio at the local level, the status of local supply of deposit would not necessarily be related to local supply of bank credit. Our supposition is that

[40] For brevity, the results are not reported. They are available from the authors on request.

this would be more likely if the headquarters of branches has constraints in tapping the external capital market (Cremers et al., 2010) and core deposits plays important role for funding credit supply, as the case at the time of crisis. Arguably, a stronger and more stable supply of core deposits at the locality level might lead to a higher bargaining power of local branches in the headquarters' internal capital allocation process.

To allow for potential endogeneity in the location of branches and thereby its impact on the characteristics of the local credit market and on the supply of credit, we augment model (2) with the proportion of senior population at locality level and model (3) with the proportion of senior population at locality level and its interaction term with the locality-specific financial condition of banks. These results are shown in Tables 7, 8 and 9 respectively. As seen, our main results survive in all tests. The results are qualitatively the same.

In a further robustness test to deal with potential endogeneity of the characteristics of local credit market, we fix the characteristics of the local credit market of each locality to their 2003 values for the analysis of the pre-crisis period (i.e. 2004-2007) and the 2007 values for the post-crisis period (i.e. 2008-2011). In effect, the characteristics of the local credit market at year 2003 and at year 2007 are used as instruments for the characteristics of local credit market for pre and post financial crisis period, respectively. We conduct this robustness test on the parsimonious version of model (3) (i.e. the results reported in the even columns of Table 5.1 and 5.2) and (4). The results are reported in Table 10 and 11. Again, the pre- and post-2008 results shown in Tables 5.1, 5.2 and 6 hold.

7. Conclusion

Lack of external financing for SMEs has been a long concern in the UK but particularly so since the 2008 financial crisis. Motivated by the recent finding of wide dispersion of SME lending provided by major UK retail banks across Britain's Postcode Areas, we study the impact of the characteristics of the local credit market in the vicinity of the firm on the variation in SMEs' access to bank finance. We hand collect information on the location of branches of British banks and match it with the location and firm-specific information of SMEs in the manufacturing industry during 2004-2011, four years leading up to the financial crisis and four years afterwards. Before the crisis, SMEs had greater access to bank credit when the banking system in their vicinity was less concentrated and the operational proximity was higher (i.e., the distance between bank branch and firm was lower). We find that during and after the financial crisis the distance between bank branches

and headquarters plays a significant role, suggesting the presence of a “flight to headquarters” effect of banks in rebalancing their loan portfolio across different local markets in the post-crisis period. SMEs located in credit markets with branches with shorter distances from their headquarters seem to face a lower degree of credit constraints. Furthermore, SMEs within the vicinity of their banks that are financially stronger face a lower degree of credit constraints, an effect that decreases when the functional distance (i.e., distances between branches and headquarters of banks) is larger. Finally, SMEs with different degrees of financial stress are similarly exposed to the negative impact of functional distance on the propagation of financial condition of banks.

Our results have important policy implications. It lends support to the importance of the organizational and financial conditions of local banks for the supply of bank credit towards SMEs. It further highlights the presence of an unstable pattern in regional credit availability around the business cycle. In particular, it suggests a more volatile credit cycle in peripheral areas across good times and crisis times. Compared to the banking system in other developed countries, which own a richer and more varied “financial ecology”, the UK banking system is notoriously thin and centralized, exposing more peripheral areas to greater variation in the supply of bank credit. The banking crisis has prompted a policy debate on the development of a geographically decentralized financial system with sizeable and well-embedded regional clusters of institutions and networks. Our research provides support for such policy initiatives.

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Table 1: Definition of variables and summary statistics

Variable Name	Measurement	Mean	Std. Dev.
Dependent variables (t)			
FINANCING MIX	ln((overdraft/(overdraft + trade credit))*100)	3.039	1.297
Independent variables (t-1)			
Firm-specific time varying variables			
LNASSETS	ln(total assets)	15.430	1.096
TANGIBILITY	Tangible assets/total assets (%)	30.131	19.659
INTERNALFINANCING	Operating cash flow/(daily operating cost*duration of cash cycle (CC))(days)[1,2]	17.536	997.228
INTERESTCOVERAGE	Profit before interest paid/interest paid (%)	1550.107	146141.900
NETWORTHRATIO	Total shareholders' funds/ total assets (%)	25.654	45.229
CASHFLOWDEBT	Operating cash flow/(short term debt +long term debt) (%)	22.551	58.289
INTANGIBILITY	Intangible assets/total assets (%)	6.156	14.236
TRADEDEBT	Account receivables/ total sales	0.204	0.244
Locality-specific time varying variables			
UNEMPLOYMENTRATE	NO. Claimants/NO. People (ages 16-64) (%)	2.552	1.238
OPDIS	Total number of branches/ the surface area of localities in square kilometres	0.399	0.907
FUNDIS	Ln(Travelling mile away from the headquarters)	4.727	0.678
FUNDIS(1)	Ln(Travelling minutes from the headquarters)	4.993	0.509
HHI	Herfindahl-Hirschman index branch-based	0.181	0.032
CAPITALIZATION	Equity/total assets (%) (equally-weighted)	6.693	4.054
COREDEPOSIT	Deposit/(deposit + short-term borrowing) (%) (equally-weighted)	50.287	6.483
CAPITALIZATION(1)	Equity/total assets (%) (branch-weighted)	4.784	1.950
COREDEPOSIT(1)	Deposit/(deposit + short-term borrowing) (%) (branch-weighted)	51.370	8.265
SENIOR POPULATION	People aged above 65/total population (%)	16.098	2.734
Total NO. observation	9713		

[1]Daily operating cost=(cost of sale + Interest paid + administration cost)/365

[2]CC=[(inventory/ cost of sale)+(account receivable /total turn over)-(account payable/total turn over)]*365

Table 2: Summary statistics of locality-specific time varying variables at locality-year level

Variables	**Year**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
FINANCING MIX	Mean	3.047	3.090	3.035	3.013	3.090	3.103	2.975	2.939
	Std.Dev	1.341	1.225	1.344	1.383	1.294	1.278	1.218	1.274
OPDIS	Mean	0.241	0.238	0.240	0.269	0.238	0.240	0.236	0.225
	Std.Dev	0.461	0.457	0.456	0.581	0.456	0.454	0.460	0.448
FUNDIS	Mean	4.846	4.883	4.881	4.917	4.936	4.938	4.971	4.951
	Std.Dev	0.561	0.559	0.562	0.595	0.570	0.565	0.612	0.585
FUNDIS(1)	Mean	5.088	5.122	5.121	5.157	5.171	5.174	5.199	5.178
	Std.Dev	0.476	0.471	0.474	0.496	0.478	0.475	0.502	0.461
HHI	Mean	0.177	0.184	0.185	0.183	0.185	0.185	0.227	0.221
	Std.Dev	0.038	0.035	0.035	0.036	0.037	0.036	0.049	0.0519
CAPITALIZATION	Mean	12.315	5.510	3.967	4.086	5.422	4.554	5.434	7.164
	Std.Dev	3.908	1.795	1.946	2.155	2.075	2.005	2.254	2.454
COREDEPOSIT	Mean	59.754	58.670	49.099	47.447	48.181	42.237	46.626	51.368
	Std.Dev	3.611	3.313	3.058	2.847	2.912	3.184	2.948	3.249
CAPITALIZATION(1)	Mean	8.443	5.463	3.683	3.697	4.088	3.112	4.060	5.319
	Std.Dev	2.426	0.578	0.340	0.484	0.576	0.567	0.586	0.869
COREDEPOSIT(1)	Mean	62.741	60.454	50.526	50.152	48.307	41.568	44.439	47.151
	Std.Dev	6.628	5.586	4.462	6.716	3.081	3.215	3.285	3.815
SENIOR POPULATION	Mean	16.515	16.546	16.631	16.494	16.681	16.888	17.048	17.374
	Std.Dev	2.537	2.623	2.692	2.739	2.766	2.927	3.026	3.215
UNEMPLOYMENTRATE	Mean	2.335	2.105	2.292	2.368	2.020	2.997	3.981	3.605
	Std.Dev	0.932	0.861	0.910	0.915	0.853	1.057	1.2821	1.206

Note: figures for FINANCING MIX refer to time t, others refer to one-period lag of each indicator measured at NUTS3-year level. Definitions of all variables are in Table 1.

Table 3: Credit constraints and local banking markets

	1	2	3	4
Firm-specific time varying characteristics				
LNASSETS	-0.0011 (0.0242)	0.0657** (0.0261)	-0.0011 (0.0242)	0.0657** (0.0261)
TANGIBILITY	0.0051*** (0.0016)	0.0056*** (0.0014)	0.0051*** (0.0016)	0.0056*** (0.0014)
INTERNALFINANCING	-0.0007 (0.0013)	0.0014** (0.0006)	-0.0007 (0.0013)	0.0014** (0.0006)
INTERESTCOVERAGE	0.0000 (0.0000)	0.0000** (0.0000)	0.0000 (0.0000)	0.0000** (0.0000)
NETWORTHRATIO	-0.0017** (0.0007)	-0.0011 (0.0010)	-0.0017** (0.0007)	-0.0011 (0.0010)
CASHFLOWDEBT	0.0001 (0.0003)	-0.0026*** (0.0009)	0.0001 (0.0003)	-0.0026*** (0.0009)
INTANGIBILITY	0.0063*** (0.0018)	0.0071*** (0.0015)	0.0063*** (0.0018)	0.0071*** (0.0015)
TRADEDEBT	0.2226 (0.3526)	0.2446 (0.2903)	0.2225 (0.3525)	0.2453 (0.2900)
Locality-specific time varying economic conditions				
UNEMPLOYMENTRATE	0.1739 (0.1259)	0.0036 (0.0624)	0.1745 (0.1255)	0.0020 (0.0624)
Locality-specific time varying characteristics of credit market				
OPDIS	2.6623** (1.3255)	-0.7064 (0.5352)	2.6687** (1.3233)	-0.7398 (0.5321)
FUNDIS	0.0967 (0.3814)	-0.7565*** (0.2608)	0.0769 (0.3122)	-0.5573*** (0.1988)
HHI	-8.3081*** (2.7746)	0.5381 (1.8818)	-8.2766*** (2.8158)	0.5580 (1.8583)
Number of Obs.	4829	4884	4829	4884
Time span	2004-07	2008-11	2004-07	2008-11
Prob > F	0.0001	0.0000	0.0001	0.0000
Adj R-squared	0.0351	0.0626	0.0351	0.0626
Root MSE	1.3022	1.2268	1.3022	1.2269

Note: Dependent variable: FINANCING MIX (i.e., ln((overdraft/(overdraft + trade credit))*100). Figures in brackets are robust standard errors clustered at locality level. * significance at 10%, ** significance at 5%, and *** significance at 1%. Constant, year dummies and locality dummies are included in the estimation, but not reported for the sake of brevity. Column (1) and (2) are the estimated result of model (1) for period 2004-2007 and 2008-2011 respectively, using the traveling time as the measurement of functional distance (FUNDIS); Column (3) and (4) are the estimated result of model (1) for period 2004-2007 and 2008-2011 respectively, using the traveling miles as the measurement of functional distance (FUNDIS(1)). All variables are defined in Table 1.

Table 4.1: Credit constraints and local banking markets for the period 2004-2007

	1	2	3	4
	FIN=CAPITALIZATION		FIN=COREDEPOSIT	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Firm-specific time varying characteristics				
LNASSETS	-0.0011 (0.0242)	-0.0011 (0.0242)	-0.0013 (0.0242)	-0.0008 (0.0243)
TANGIBILITY	0.0051*** (0.0016)	0.0051*** (0.0016)	0.0051*** (0.0016)	0.0051*** (0.0016)
INTERNALFINANCING	-0.0007 (0.0013)	-0.0007 (0.0013)	-0.0007 (0.0013)	-0.0007 (0.0013)
INTERESTCOVERAGE	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
NETWORTHRATIO	-0.0017** (0.0007)	-0.0017** (0.0007)	-0.0017** (0.0007)	-0.0017** (0.0007)
CASHFLOWDEBT	0.0001 (0.0003)	0.0001 (0.0003)	0.0000 (0.0003)	0.0001 (0.0003)
INTANGIBILITY	0.0063*** (0.0018)	0.0063*** (0.0018)	0.0062*** (0.0018)	0.0062*** (0.0018)
TRADEDEBT	0.2197 (0.3527)	0.2191 (0.3519)	0.2247 (0.3526)	0.2217 (0.3526)
Locality-specific time varying economic conditions				
UNEMPLOYMENTRATE	0.1707 (0.1236)	0.1637 (0.1199)	0.1475 (0.1256)	0.1678 (0.1279)
Locality-specific time varying characteristics of credit market				
OPDIS	2.8044* (1.5097)	2.6968** (1.3129)	2.4448** (1.1775)	2.6114** (1.2961)
FUNDIS	0.1063 (0.3882)	0.0250 (0.4008)	0.1455 (0.3950)	0.0684 (0.4165)
HHI	-7.8518*** (3.0206)	-3.6053 (5.3052)	-8.1300*** (2.7817)	-8.1690*** (2.7946)
FIN	0.0057 (0.0116)	0.0271 (0.0247)	-0.0139 (0.0135)	0.0034 (0.0051)
Number of Obs.	4829			
Prob > F	0.0002	0.0000	0.0001	0.0001
Adj R-squared	0.0350	0.0351	0.0351	0.0350
Root MSE	1.3023	1.3022	1.3022	1.3023

Note: Dependent variable: FINANCING MIX (i.e., ln((overdraft/(overdraft + trade credit))*100). Functional distance (FUNDIS) is measured by the traveling time. Banks' financial condition (FIN) is measured by capitalization and core deposit ratio (as indicated in the second row), respectively. The weight used to construct the locality-specific financial condition of banks is indicated in the third row. Figures in brackets are robust standard errors clustered at locality level. * significance at 10%, ** significance at 5%, and *** significance at 1%. Constant, year and locality dummies are included in the estimation, but not reported for the sake of brevity. All variables are defined in Table 1.

Table 4.2: Credit constraint and local banking markets for the period 2008-2011

	1	2	3	4
	FIN=CAPITALIZATION		FIN=COREDEPOSIT	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Firm-specific time varying characteristics				
LNASSETS	0.0657** (0.0261)	0.0657** (0.0261)	0.0658** (0.0261)	0.0657** (0.0261)
TANGIBILITY	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)
INTERNALFINANCING	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)
INTERESTCOVERAGE	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)
NETWORTHRATIO	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)
CASHFLOWDEBT	-0.0026*** (0.0009)	-0.0026*** (0.0009)	-0.0026*** (0.0009)	-0.0026*** (0.0009)
INTANGIBILITY	0.0071*** (0.0015)	0.0071*** (0.0015)	0.0071*** (0.0015)	0.0071*** (0.0015)
TRADEDEBT	0.2439 (0.2905)	0.2443 (0.2904)	0.2438 (0.2900)	0.2443 (0.2903)
Locality-specific time varying economic conditions				
UNEMPLOYMENTRATE	0.0061 (0.0632)	-0.0086 (0.0643)	0.0059 (0.0631)	0.0032 (0.0630)
Locality-specific time varying characteristics of credit market				
OPDIS	-0.8233 (0.6689)	-0.6522 (0.5338)	-0.7160 (0.5359)	-0.6881 (0.5417)
FUNDIS	-0.7441*** (0.2659)	-0.8054*** (0.2639)	-0.7658*** (0.2599)	-0.7495*** (0.2732)
HHI	0.4860 (1.9165)	0.6654 (1.8820)	0.5010 (1.8911)	0.3494 (2.0415)
FIN	0.0126 (0.0412)	-0.0616 (0.0763)	0.0052 (0.0126)	-0.0047 (0.0200)
Number of Obs.	4884			
Prob > F	0.0000	0.0000	0.0000	0.0000
Adj R-squared	0.0624	0.0625	0.0625	0.0624
Root MSE	1.2269	1.2269	1.2269	1.2269

Note: Dependent variable: FINANCING MIX (i.e., ln((overdraft/(overdraft + trade credit))*100). Functional distance is measured by the traveling time (FUNDIS). Banks' financial condition (FIN) is measured by capitalization and core deposit ratio (as indicated in the second row), respectively. The weight used to construct the locality-specific financial condition of banks is indicated in the third row. Figures between brackets are robust standard errors clustered at locality level. * significance at 10%, ** significance at 5%, and *** significance at 1%. Constant, year dummy and locality dummy are included in the estimation, but not reported for the sake of brevity. All variables are defined in Table 1.

Table 5.1: The characteristics of local banking markets and the transmission of the financial condition of banks: 2004-2007

	1	2	3	4	5	6	7	8
	FIN=CAPITALIZATION				FIN=COREDEPOSIT			
	Equally-weighted	Equally-weighted	Branch-weighted	Branch-weighted	Equally-weighted	Equally-weighted	Branch-weighted	Branch-weighted
Firm-specific time varying characteristics								
LNASSETS	-0.0012 (0.0242)	-0.0011 (0.0242)	-0.0010 (0.0242)	-0.0010 (0.0242)	-0.0015 (0.0242)	-0.0012 (0.0242)	-0.0010 (0.0243)	-0.0008 (0.0243)
TANGIBILITY	0.0051*** (0.0016)	0.0051*** (0.0016)	0.0051*** (0.0016)	0.0051*** (0.0016)	0.0051*** (0.0016)	0.0051*** (0.0016)	0.0051*** (0.0016)	0.0051*** (0.0016)
INTERNALFINANCING	-0.0007 (0.0013)	-0.0007 (0.0013)	-0.0007 (0.0013)	-0.0007 (0.0013)	-0.0007 (0.0013)	-0.0007 (0.0013)	-0.0008 (0.0013)	-0.0007 (0.0013)
INTERESTCOVERAGE	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
NETWORTHRATIO	-0.0017** (0.0007)	-0.0017** (0.0007)	-0.0017** (0.0007)	-0.0017** (0.0007)	-0.0017** (0.0007)	-0.0017** (0.0007)	-0.0017** (0.0007)	-0.0017** (0.0007)
CASHFLOWDEBT	0.0001 (0.0003)	0.0001 (0.0003)	0.0001 (0.0003)	0.0001 (0.0003)	0.0000 (0.0003)	0.0000 (0.0003)	0.0000 (0.0003)	0.0000 (0.0003)
INTANGIBILITY	0.0063*** (0.0018)	0.0063*** (0.0018)	0.0063*** (0.0018)	0.0062*** (0.0018)	0.0063*** (0.0019)	0.0062*** (0.0019)	0.0062*** (0.0018)	0.0063*** (0.0018)
TRADEDEBT	0.2202 (0.3531)	0.2197 (0.3527)	0.2169 (0.3519)	0.2177 (0.3518)	0.2249 (0.3521)	0.2248 (0.3526)	0.2269 (0.3509)	0.2218 (0.3528)
Locality-specific time varying economic conditions								
UNEMPLOYMENTRATE	0.1785 (0.1285)	0.1703 (0.1272)	0.2187 (0.1327)	0.1887 (0.1323)	0.1975 (0.1316)	0.1632 (0.1322)	0.1638 (0.1316)	0.1646 (0.1302)
Locality-specific time varying characteristics of credit market								
OPDIS	2.9671* (1.5480)	2.8021* (1.5032)	3.2819* (1.9177)	3.0423* (1.6132)	2.2052 (1.6687)	2.6388* (1.3554)	1.8901 (1.5421)	2.5571* (1.3510)
FUNDIS	0.1412 (0.4366)	0.1077 (0.3910)	0.1189 (0.4885)	-0.0608 (0.4027)	-0.0757 (0.7224)	-0.0209 (0.4850)	-0.2312 (0.7417)	0.0996 (0.4598)
HHI	-7.6539* (4.0644)	-7.8326** (3.1203)	0.0735 (6.6758)	-3.7333 (5.3799)	1.6701 (8.2564)	-8.5354*** (2.7850)	-5.4165 (7.9387)	-8.0934*** (2.7520)

FIN	0.0225 (0.0780)	0.0065 (0.0653)	0.0352 (0.1174)	-0.0413 (0.0631)	-0.0228 (0.0545)	-0.0298 (0.0364)	-0.0134 (0.0447)	0.0059 (0.0199)
FIN*FUNDIS	-0.0039 (0.0136)	-0.0002 (0.0125)	0.0123 (0.0234)	0.0155 (0.0139)	0.0082 (0.0111)	0.0032 (0.0066)	0.0050 (0.0087)	-0.0005 (0.0039)
FIN*HHI	0.0156 (0.1725)		-0.3730 (0.4150)		-0.1806 (0.1339)		-0.0584 (0.1231)	
FIN*OPDIS	-0.0070 (0.0108)		-0.0109 (0.0134)		0.0004 (0.0059)		0.0030 (0.0043)	
Number of Obs.	4829							
Prob > F	0.0007	0.0003	0.0002	0.0001	0.0000	0.0001	0.0000	0.0002
Adj R-squared	0.0344	0.0347	0.0347	0.0350	0.0348	0.0349	0.0345	0.0348
Root MSE	1.3027	1.3024	1.3025	1.3023	1.3024	1.3023	1.3026	1.3024

Note: Dependent variable: FINANCING MIX (i.e., ln((overdraft/(overdraft + trade credit))*100). Functional distance (FUNDIS) is measured by traveling time. Banks' financial condition (FIN) is measured by capitalization and core deposit ratio (as indicated in the second row), respectively. The weight used to construct the locality-specific financial condition of banks is indicated in the third row. Figures between brackets are robust standard errors clustered at locality level. * significance at 10%, ** significance at 5%, and *** significance at 1%. Constant, year and locality dummies are included in the estimation, but not reported for the sake of brevity. All variables are defined in Table 1.

Table 5.2: The characteristics of local banking market and the transmission of the financial condition of banks: 2008-2011

	1	2	3	4	5	6	7	8
	FIN=CAPITALIZATION				FIN=COREDEPOSIT			
	Equally-weighted	Equally-weighted	Branch-weighted	Branch-weighted	Equally-weighted	Equally-weighted	Branch-weighted	Branch-weighted
Firm-specific time varying characteristics								
LNASSETS	0.0659** (0.0261)	0.0660** (0.0261)	0.0657*** (0.0261)	0.0662** (0.0261)	0.0661** (0.0261)	0.0663** (0.0261)	0.0658** (0.0261)	0.0660** (0.0261)
TANGIBILITY	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0055*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)
INTERNALFINANCING	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)
INTERESTCOVERAGE	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)
NETWORTHRATIO	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)
CASHFLOWDEBT	-0.0026*** (0.0009)	-0.0026*** (0.0009)	-0.0026*** (0.0010)	-0.0026*** (0.0009)	-0.0026*** (0.0010)	-0.0026*** (0.0010)	-0.0026*** (0.0009)	-0.0026*** (0.0010)
INTANGIBILITY	0.0071*** (0.0015)	0.0071*** (0.0015)	0.0071*** (0.0015)	0.0071*** (0.0015)	0.0071*** (0.0015)	0.0071*** (0.0015)	0.0071*** (0.0015)	0.0071*** (0.0015)
TRADEDEBT	0.2463 (0.2901)	0.2443 (0.2905)	0.2478 (0.2903)	0.2434 (0.2904)	0.2437 (0.2898)	0.2402 (0.2897)	0.2431 (0.2902)	0.2404 (0.2902)
Locality-specific time varying economic conditions								
UNEMPLOYMENTRATE	-0.0076 (0.0633)	-0.0071 (0.0637)	-0.0382 (0.0688)	-0.0290 (0.0651)	-0.0269 (0.0676)	-0.0297 (0.0654)	-0.0372 (0.0650)	-0.0365 (0.0654)
Locality-specific time varying characteristics of credit market								
OPDIS	-0.9212 (0.7153)	-1.2323* (0.6337)	-0.8657 (0.5448)	-1.3182** (0.5383)	-0.3934 (0.7190)	-1.0241** (0.4957)	-0.3503 (0.6808)	-0.9067* (0.5053)
FUNDIS	-0.1536 (0.3485)	-0.4210 (0.3356)	0.1600 (0.3792)	-0.1892 (0.3603)	0.9807 (0.6428)	0.5669 (0.5651)	0.9106 (0.7884)	0.4915 (0.6547)
HHI	0.4089 (4.0645)	0.6096 (1.9173)	-3.5608 (3.1367)	0.4318 (1.9141)	-2.9950 (7.9050)	0.3407 (1.8924)	-2.0869 (7.9960)	0.9122 (2.0970)

FIN	0.3011 (0.2269)	0.1217** (0.0522)	0.4657 (0.3381)	0.3490** (0.1736)	0.1641** (0.0745)	0.1298*** (0.0460)	0.1777* (0.1013)	0.1382** (0.0683)
FIN*FUNDIS	-0.0606** (0.0304)	-0.0273** (0.0117)	-0.1534*** (0.0522)	-0.0800*** (0.0290)	-0.0324*** (0.0118)	-0.0236*** (0.0086)	-0.0356** (0.0163)	-0.0258** (0.0121)
FIN*HHI	0.0168 (0.5855)		0.8913 (0.6339)		0.0675 (0.1538)		0.0660 (0.1838)	
FIN*OPDIS	-0.0245 (0.0197)		-0.0439 (0.0295)		-0.0075 (0.0069)		-0.0091 (0.0077)	
Number of Obs.	4884							
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Adj R-squared	0.0623	0.0626	0.0631	0.0629	0.0628	0.0630	0.0625	0.0628
Root MSE	1.2270	1.2269	1.2265	1.2266	1.2267	1.2266	1.2269	1.2267

Note: Dependent variable: FINANCING MIX (i.e., ln((overdraft/(overdraft + trade credit))*100). Functional distance (FUNDIS) is measured by traveling time. Banks' financial condition (FIN) is measured by capitalization and core deposit ratio (as indicated in the second row), respectively. The weight used to construct the locality-specific financial condition of banks is indicated in the third row. Figures between brackets are robust standard errors clustered at locality level. * significance at 10%, ** significance at 5%, and *** significance at 1%. Constant, year and locality dummies are included in the estimation, but not reported for the sake of brevity. All variables are defined in Table 1.

Table 6: The heterogeneous transmission of the financial condition of banks for the period 2008-2011 (borrower heterogeneity)

	1	2	3	4	5	6	7	8
	FIN=CAPITALIZATION		FIN=COREDEPOSIT		FIN=CAPITALIZATION		FIN=COREDEPOSIT	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Firm-specific time varying characteristics								
LOW	-0.0971	0.0577	0.3842	0.2053	0.1778	0.0814	-0.2404	-0.2993
	(0.1692)	(0.1765)	(0.2646)	(0.3395)	(0.1517)	(0.1716)	(0.4077)	(0.4077)
LNASSETS	0.0615**	0.0622**	0.0621**	0.0615**	0.0878***	0.0858***	0.0874***	0.0869***
	(0.0258)	(0.0254)	(0.0258)	(0.0256)	(0.0311)	(0.0319)	(0.0312)	(0.0315)
TANGIBILITY	0.0049***	0.0048***	0.0049***	0.0049***	0.0055***	0.0056***	0.0056***	0.0056***
	(0.0015)	(0.0015)	(0.0016)	(0.0015)	(0.0014)	(0.0014)	(0.0014)	(0.0014)
INTERNALFINANCING	0.0014**	0.0014**	0.0014**	0.0014**	0.0013**	0.0013**	0.0014**	0.0014**
	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)
INTERESTCOVERAGE	0.0000**	0.0000**	0.0000**	0.0000**	0.0000**	0.0000**	0.0000**	0.0000**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
NETWORTHRATIO	-0.0011	-0.0011	-0.0011	-0.0011	-0.0011	-0.0012	-0.0011	-0.0011
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
CASHFLOWDEBT	-0.0025***	-0.0025***	-0.0025***	-0.0025***	-0.0026***	-0.0026***	-0.0026***	-0.0026***
	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0010)	(0.0009)
INTANGIBILITY	0.0065***	0.0065***	0.0066***	0.0066***	0.0071***	0.0071***	0.0072***	0.0072***
	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0015)	(0.0015)	(0.0015)	(0.0015)
TRADEDEBT	0.2019	0.1991	0.2045	0.2017	0.2273	0.2337	0.2378	0.2395
	(0.2868)	(0.2860)	(0.2849)	(0.2860)	(0.2902)	(0.2901)	(0.2895)	(0.2896)
Locality-specific time varying economic conditions								
UNEMPLOYMENTRATE	-0.0069	-0.0273	-0.0305	-0.0365	-0.0115	-0.0278	-0.0304	-0.0370
	(0.0636)	(0.0653)	(0.0655)	(0.0657)	(0.0641)	(0.0654)	(0.0649)	(0.0650)
Locality-specific time varying characteristics of credit market								
OPDIS	-1.2033*	-1.3277**	-1.0036**	-0.8718*	-1.2089*	-1.2517**	-1.0159**	-0.9002*
	(0.6345)	(0.5308)	(0.4923)	(0.5060)	(0.6357)	(0.5291)	(0.4996)	(0.5104)
FUNDIS	-0.4206	-0.1924	0.5241	0.4514	-0.4121	-0.2014	0.5451	0.4569
	(0.3368)	(0.3604)	(0.5738)	(0.6640)	(0.3303)	(0.3584)	(0.5750)	(0.6729)

HHI	0.6072 (1.9257)	0.3720 (1.9201)	0.2854 (1.9054)	0.8714 (2.1257)	0.5934 (1.8666)	0.4020 (1.9046)	0.3289 (1.8810)	0.9280 (2.0507)
FIN	0.1220** (0.0525)	0.3513** (0.1747)	0.1276*** (0.0471)	0.1348* (0.0694)	0.1295** (0.0514)	0.3381** (0.1713)	0.1284** (0.0467)	0.1358* (0.0693)
FIN*FUNDIS								
FIN*FUNDIS*HIGH	-0.0279** (0.0114)	-0.0770*** (0.0299)	-0.0222** (0.0090)	-0.0246* (0.0126)	-0.0247** (0.0121)	-0.0742** (0.0289)	-0.0238*** (0.0084)	-0.0260** (0.0121)
FIN*FUNDIS*LOW	-0.0273** (0.0124)	-0.0836*** (0.0291)	-0.0241*** (0.0086)	-0.0258** (0.0121)	-0.0327*** (0.0114)	-0.0812*** (0.0289)	-0.0231** (0.0090)	-0.0249* (0.0128)
Number of Obs.	4884							
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Adj R-squared	0.0629	0.0634	0.0641	0.0634	0.0636	0.0631	0.0630	0.0629
Root MSE	1.2266	1.2263	1.2259	1.2263	1.2262	1.2265	1.2266	1.2266
t-test on equality high and low likelihood financial stress (p-value)	0.9040	0.3750	0.0900*	0.4300	0.0490**	0.3420	0.6710	0.5720

Note: Dependent variable: FINANCINGMIX (i.e., ln((overdraft/(overdraft + trade credit))*100). Functional distance (FUNDIS) is measured by traveling time. Banks' financial condition (FIN) is measured by capitalization and core deposit ratio (as indicated in the second row), respectively. The weight used to construct the locality-specific financial condition of banks is indicated in the third row. LOW (HIGH) is a dummy variable indicating lower (higher) likelihood of financial stress. LOW and HIGH are defined on the basis of Altman's (1968) z-score in Column (1)-(4) while they are defined on the basis of natural logarithm of total assets in column (5)-(8). LOW=1 if the firm has a z-score (LNASSET) which is higher than the sample median in 2007, zero otherwise. HIGH=1 if the firm has a z-score (LNASSET) which is lower than the sample median in 2007, zero otherwise. Figures between brackets are robust standard errors clustered at locality level. * significance at 10%, ** significance at 5%, and *** significance at 1%. Constant, year and locality dummies are included in the estimation, but not reported for the sake of brevity. All other variables are defined in Table 1.

Table 7: Credit constraints and local banking market for the period 2008-2011 controlling for the proportion of seniors in population

	1	2	3	4
	FIN=CAPITALIZATION		FIN=COREDEPOSIT	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Firm-specific time varying characteristics				
LNASSETS	0.0653** (0.0261)	0.0652** (0.0261)	0.0653** (0.0261)	0.0652** (0.0261)
TANGIBILITY	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)
INTERNALFINANCING	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)
INTERESTCOVERAGE	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)
NETWORTHRATIO	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)
CASHFLOWDEBT	-0.0026*** (0.0009)	-0.0026*** (0.0009)	-0.0026*** (0.0009)	-0.0026*** (0.0009)
INTANGIBILITY	0.0072*** (0.0015)	0.0072*** (0.0015)	0.0072*** (0.0015)	0.0072*** (0.0015)
TRADEDEBT	0.2388 (0.2911)	0.2398 (0.2909)	0.2386 (0.2904)	0.2400 (0.2908)
Locality-specific time varying economic conditions				
UNEMPLOYMENTRATE	0.0441 (0.0700)	0.0261 (0.0710)	0.0441 (0.0700)	0.0379 (0.0708)
Locality-specific time varying characteristics of credit market				
OPDIS	-1.0221 (0.7273)	-0.7672 (0.6305)	-0.8438 (0.6434)	-0.8139 (0.6375)
FUNDIS	-0.7646*** (0.2697)	-0.8335*** (0.2679)	-0.8000*** (0.2674)	-0.7812*** (0.2785)
HHI	0.8249 (1.8988)	1.0251 (1.8553)	0.8621 (1.8499)	0.8231 (2.0311)
SENIOR POPULATION	0.1156 (0.0734)	0.1109 (0.0745)	0.1177 (0.0731)	0.1097 (0.0767)
FIN	0.0210 (0.0432)	-0.0622 (0.0767)	0.0080 (0.0126)	-0.0017 (0.0204)
Number of Obs.	4884			
Prob > F	0.0000	0.0000	0.0000	0.0000
Adj R-squared	0.0625	0.0625	0.0625	0.0625
Root MSE	1.2269	1.2269	1.2269	1.2269

Note: Dependent variable: FINANCING MIX (i.e., ln((overdraft/(overdraft + trade credit))*100). Functional distance (FUNDIS) is measured by the traveling time. Banks' financial condition (FIN) is measured by capitalization and core deposit ratio (as indicated in the first row), respectively. The weight used to construct the locality-specific financial condition of banks is indicated in the third row. Figures between brackets are robust standard errors clustered at locality level. * significance at 10%, ** significance at 5%, and *** significance at 1%. Constant, year and locality dummies are included in the estimation, but not reported for the sake of brevity. All variables are defined in Table 1.

Table 8: The characteristics of local banking market and the transmission of the financial condition of banks for the period 2008-2011 with controlling for the proportion of seniors in population

	1	2	3	4	5	6	7	8
	FIN=CAPITALIZATION				FIN=COREDEPOSIT			
	Equally-weighted	Equally-weighted	Branch-weighted	Branch-weighted	Equally-weighted	Equally-weighted	Branch-weighted	Branch-weighted
Firm-specific time varying characteristics								
LNASSETS	0.0654** (0.0261)	0.0654** (0.0261)	0.0656** (0.0260)	0.0656** (0.0260)	0.0659** (0.0261)	0.0658** (0.0260)	0.0655** (0.0260)	0.0655** (0.0260)
TANGIBILITY	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)	0.0056*** (0.0014)
INTERNALFINANCING	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)	0.0014** (0.0006)
INTERESTCOVERAGE	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)
NETWORTHRATIO	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)	-0.0011 (0.0010)
CASHFLOWDEBT	-0.0026*** (0.0009)	-0.0026*** (0.0009)	-0.0026*** (0.0010)	-0.0026*** (0.0010)	-0.0026*** (0.0010)	-0.0026*** (0.0010)	-0.0026*** (0.0010)	-0.0026*** (0.0010)
INTANGIBILITY	0.0072*** (0.0015)	0.0072*** (0.0015)	0.0072*** (0.0015)	0.0072*** (0.0015)	0.0071*** (0.0015)	0.0071*** (0.0015)	0.0072*** (0.0015)	0.0072*** (0.0015)
TRADEDEBT	0.2367 (0.2912)	0.2371 (0.2913)	0.2368 (0.2910)	0.2366 (0.2910)	0.2340 (0.2902)	0.2338 (0.2901)	0.2377 (0.2909)	0.2364 (0.2906)
Locality-specific time varying economic conditions								
UNEMPLOYMENTRATE	0.0426 (0.0691)	0.0420 (0.0695)	0.0158 (0.0713)	0.0166 (0.0707)	0.0117 (0.0708)	0.0122 (0.0705)	-0.0100 (0.0702)	-0.0026 (0.0712)
Locality-specific time varying characteristics of credit market								
OPDIS	-1.6876** (0.6588)	-1.6776** (0.6553)	-1.6370*** (0.5713)	-1.6303*** (0.5744)	-1.1932** (0.5972)	-1.1956** (0.5942)	-1.0341* (0.5939)	-1.0211* (0.5815)
FUNDIS	-0.3750 (0.3580)	-0.3233 (0.3586)	-0.0829 (0.3840)	-0.0947 (0.3888)	0.6488 (0.6514)	0.6238 (0.6097)	0.6861 (0.6786)	0.4325 (0.6469)
HHI	1.0543 (1.8589)	1.1429 (1.9014)	0.9227 (1.8870)	0.9003 (1.8734)	0.7645 (1.8390)	0.7504 (1.8253)	1.5312 (2.0827)	1.3491 (2.0816)

SENIOR POPULATION	0.2062* (0.1137)	0.1654* (0.0860)	0.1484 (0.1138)	0.1602** (0.0830)	0.1269 (0.1376)	0.1374* (0.0762)	0.0243 (0.1278)	0.1042 (0.0762)
FIN	0.1981** (0.0766)	0.1767*** (0.0660)	0.4304** (0.2039)	0.4381** (0.1950)	0.1419*** (0.0503)	0.1420*** (0.0503)	0.1407** (0.0683)	0.1377** (0.0682)
FIN*FUNDIS	-0.0304@ (0.0192)	-0.0381** (0.0154)	-0.1016** (0.0406)	-0.0976*** (0.0345)	-0.0259** (0.0109)	-0.0253*** (0.0093)	-0.0309** (0.0136)	-0.0252** (0.0120)
FIN*SENIOR POPULATION	-0.0035 (0.0059)		0.0014 (0.0085)		0.0002 (0.0018)		0.0016 (0.0020)	
Number of Obs.	4884							
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Adj R-squared	0.0627	0.0629	0.0630	0.0632	0.0630	0.0631	0.0627	0.0628
Root MSE	1.2268	1.2267	1.2266	1.2264	1.2266	1.2265	1.2268	1.2267

Note: Dependent variable: FINANCING MIX (i.e., ln((overdraft/(overdraft + trade credit))*100). Functional distance (FUNDIS) is measured by traveling time. Banks' financial condition (FIN) is measured by capitalization and core deposit ratio (as indicated in the second row), respectively. The weight used to construct the locality-specific financial condition of banks is indicated in the third row. Figures between brackets are robust standard errors clustered at locality level. * significance at 10%, ** significance at 5%, and *** significance at 1%. Constant, year and locality dummies are included in the estimation, but not reported for the sake of brevity. @: p-value is 0.116. All variables are defined in Table 1.

Table 9: The heterogeneous transmission of the financial condition of banks for the period 2008-2011 controlling for the proportion of seniors in population (borrower heterogeneity)

	1	2	3	4	5	6	7	8
	FIN=CAPITALIZATION		FIN=COREDEPOSIT		FIN=CAPITALIZATION		FIN=COREDEPOSIT	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Firm-specific time varying characteristics								
LOW	-0.0990	0.0542	0.3809	0.2082	0.1702	0.0826	-0.2281	-0.2885
	(0.1682)	(0.1766)	(0.2645)	(0.3387)	(0.1539)	(0.1716)	(0.4084)	(0.4101)
LNASSETS	0.0610**	0.0617**	0.0617**	0.0611**	0.0871***	0.0851***	0.0867***	0.0863***
	(0.0258)	(0.0254)	(0.0257)	(0.0256)	(0.0311)	(0.0319)	(0.0312)	(0.0315)
TANGIBILITY	0.0049***	0.0049***	0.0049***	0.0050***	0.0056***	0.0056***	0.0056***	0.0056***
	(0.0015)	(0.0015)	(0.0016)	(0.0015)	(0.0014)	(0.0014)	(0.0014)	(0.0014)
INTERNALFINANCING	0.0014**	0.0014**	0.0014**	0.0014**	0.0013**	0.0013**	0.0014**	0.0014**
	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)
INTERESTCOVERAGE	0.0000**	0.0000**	0.0000**	0.0000**	0.0000**	0.0000**	0.0000**	0.0000**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
NETWORTHRATIO	-0.0011	-0.0011	-0.0011	-0.0011	-0.0011	-0.0011	-0.0011	-0.0011
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
CASHFLOWDEBT	-0.0025***	-0.0025***	-0.0025***	-0.0025***	-0.0026***	-0.0026***	-0.0026***	-0.0026***
	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0010)	(0.0009)
INTANGIBILITY	0.0066***	0.0065***	0.0067***	0.0066***	0.0072***	0.0072***	0.0072***	0.0072***
	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0015)	(0.0015)	(0.0015)	(0.0015)
TRADEDEBT	0.1960	0.1934	0.1990	0.1984	0.2211	0.2270	0.2316	0.2357
	(0.2875)	(0.2866)	(0.2853)	(0.2865)	(0.2909)	(0.2907)	(0.2899)	(0.2901)
Locality-specific time varying economic conditions								
UNEMPLOYMENTRATE	0.0409	0.0166	0.0095	-0.0037	0.0341	0.0177	0.0108	-0.0046
	(0.0694)	(0.0707)	(0.0706)	(0.0713)	(0.0703)	(0.0708)	(0.0706)	(0.0710)
Locality-specific time varying characteristics of credit market								
OPDIS	-1.6376**	-1.6276***	-1.1673**	-0.9829*	-1.6215**	-1.5629***	-1.1835*	-1.0093*
	(0.6591)	(0.5693)	(0.5890)	(0.5793)	(0.6609)	(0.5689)	(0.6040)	(0.5899)

FUNDIS	-0.3249 (0.3594)	-0.1014 (0.3881)	0.5787 (0.6167)	0.3941 (0.6564)	-0.3220 (0.3528)	-0.1071 (0.3868)	0.6014 (0.6209)	0.4017 (0.6642)
HHI	1.1294 (1.9110)	0.8248 (1.8796)	0.6765 (1.8400)	1.2952 (2.1090)	1.0862 (1.8582)	0.8696 (1.8652)	0.7277 (1.8180)	1.3416 (2.0443)
SENIOR POPULATION	0.1614* (0.0858)	0.1542* (0.0821)	0.1309* (0.0757)	0.1010 (0.0755)	0.1530* (0.0863)	0.1598* (0.0827)	0.1343* (0.0775)	0.0995 (0.0774)
FIN	0.1758*** (0.0659)	0.4371** (0.1955)	0.1393*** (0.0513)	0.1344* (0.0692)	0.1801*** (0.0653)	0.4270** (0.1929)	0.1404*** (0.0514)	0.1354* (0.0691)
FIN*FUNDIS								
FIN*FUNDIS*HIGH	-0.0384** (0.0151)	-0.0940*** (0.0349)	-0.0238** (0.0097)	-0.0240* (0.0125)	-0.0347** (0.0162)	-0.0917*** (0.0345)	-0.0254*** (0.0091)	-0.0254** (0.0119)
FIN*FUNDIS*LOW	-0.0377** (0.0159)	-0.1003*** (0.0346)	-0.0258*** (0.0093)	-0.0253** (0.0120)	-0.0424*** (0.0148)	-0.0987*** (0.0342)	-0.0248** (0.0098)	-0.0244* (0.0126)
Number of Obs.	4884							
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Adj R-squared	0.0632	0.0637	0.0642	0.0634	0.0639	0.0634	0.0632	0.0629
Root MSE	1.2265	1.2261	1.2258	1.2263	1.2260	1.2263	1.2264	1.2266
t-test on equality HIGH and LOW likelihood financial stress (p-value)	0.8860	0.3930	0.0930*	0.4260	0.0640*	0.3380	0.6930	0.5910

Note: Dependent variable: FINANCNG MIX (i.e., ln((overdraft/(overdraft + trade credit))*100). Functional distance (FUNDIS) is measured by traveling time. Banks' financial condition (FIN) is measured by capitalization and core deposit ratio (as indicated in the second row), respectively. The weight used to construct the locality-specific financial condition of banks is indicated in the third row. LOW (HIGH) is a dummy variable indicating lower (higher) likelihood of financial stress. LOW and HIGH are defined on the basis of the Altman's (1968) z-score in Column (1)-(4) while they are defined on the basis of natural logarithm of total assets in column (5)-(8). LOW=1 if the firm has a z-score (LNASSET) which is higher than the sample median in 2007, zero otherwise. HIGH=1 if the firm has a z-score (LNASSET) which is lower than the sample median in 2007, zero otherwise. Figures between brackets are robust standard errors clustered at locality level. * significance at 10%, ** significance at 5%, and *** significance at 1%. Constant, year dummy and locality dummy are included in the estimation, but not reported for the sake of brevity. All variables are defined in Table 1.

Table 10: The characteristics of local banking market and the transmission of the financial condition of banks

	1	2	3	4	5	6	7	8
	2004-2007				2008-2011			
	FIN=CAPITALIZATION		FIN=COREDEPOSIT		FIN=CAPITALIZATION		FIN=COREDEPOSIT	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Firm-specific time varying characteristics								
LNASSETS	-0.013 (0.026)	-0.013 (0.026)	-0.014 (0.026)	-0.013 (0.026)	0.073 (0.026)***	0.073*** (0.026)	0.073*** (0.026)	0.073*** (0.026)
TANGIBILITY	0.005*** (0.002)	0.005*** (0.002)	0.005*** (0.002)	0.005*** (0.002)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)
INTERNALFINANCING	-0.003 (0.003)	-0.003 (0.003)	-0.003 (0.003)	-0.003 (0.003)	0.001** (0.001)	0.001** (0.001)	0.001** (0.001)	0.001** (0.001)
INTERESTCOVERAGE	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000*** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)
NETWORTHRATIO	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
CASHFLOWDEBT	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.003*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
INTANGIBILITY	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.007*** (0.002)
TRADEDEBT	0.201 (0.424)	0.206 (0.424)	0.207 (0.425)	0.206 (0.425)	0.301 (0.309)	0.297 (0.309)	0.294 (0.308)	0.296 (0.308)
Locality-specific time varying economic conditions								
UNEMPLOYMENTRATE	0.092 (0.132)	0.129 (0.136)	0.068 (0.131)	0.070 (0.129)	-0.038 (0.062)	-0.049 (0.061)	-0.056 (0.061)	-0.066 (0.066)
Locality-specific time varying characteristics of credit market								
FIN	0.044	-0.017	0.012	0.021	0.266**	0.497**	0.150***	0.137*

	(0.067)	(0.057)	(0.041)	(0.023)	(0.112)	(0.220)	(0.055)	(0.072)
FIN*FUNDIS	-0.007 (0.013)	0.012 (0.013)	-0.004 (0.007)	-0.004 (0.004)	-0.060** (0.026)	-0.104** (0.041)	-0.028*** (0.011)	-0.027** (0.013)
Number of Obs.	4478				4698			
Prob > F	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000
R-squared	0.068	0.069	0.068	0.068	0.094	0.094	0.094	0.094
Adj R-squared	0.039	0.039	0.039	0.039	0.067	0.067	0.067	0.067
Root MSE	1.300	1.299	1.300	1.300	1.230	1.230	1.230	1.230

Note: the above table reports the results from the regression: $\ln Y_{irt} = \alpha + \alpha_1 X_{irt-1} + \alpha_2 ECN_{rt-1} + \beta_1 LOCALBANK_r + \beta_4 FIN_{rt-1} + \beta_5 FIN_{rt-1} * FUNDIS_r + \lambda_r + \upsilon_t + \varepsilon_{irt}$

Where the characteristics of local banking market are fixed as their value at year 2003 and 2007 for the period 2004-2007 and 2008-2011, respectively. Dependent variable: FINANCING MIX (i.e., ln((overdraft/(overdraft + trade credit))*100). Functional distance (FUNDIS) is measured by traveling time. Banks' financial condition (FIN) is measured by capitalization and core deposit ratio (as indicated in the third row), respectively. The weight used to construct the locality-specific financial condition of banks is indicated in the fourth row. Figures between brackets are robust standard errors clustered at locality level. * significance at 10%, ** significance at 5%, and *** significance at 1%. Constant, year and locality dummies are included in the estimation, but not reported for the sake of brevity. The first-order impact of characteristics of local banking market is absorbed by the locality dummies, and cannot be estimated. All variables are defined in Table 1.

Table 11: The heterogeneous transmission of the financial condition of banks for the period 2008-2011 (borrower heterogeneity)

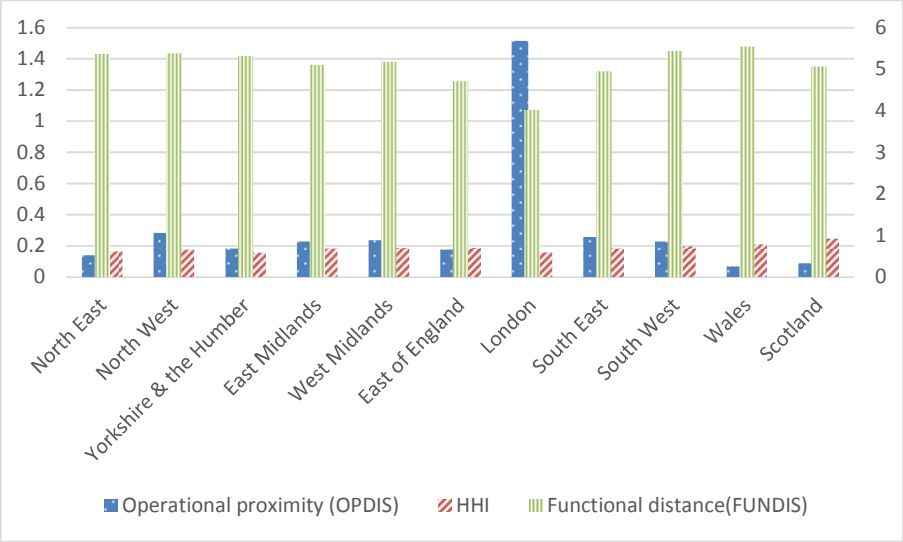
	LOW and HIGH are defined on the basis of natural logarithm of total assets				LOW and HIGH are defined on the basis of the basis of Altman's (1968) z-score			
	FIN=CAPITALIZATION		FIN=COREDEPOSIT		FIN=CAPITALIZATION		FIN=COREDEPOSIT	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Firm-specific time varying characteristics								
LOW	0.164	0.080	-0.264	-0.301	-0.114	0.051	0.405	0.253
	(0.150)	(0.176)	(0.413)	(0.425)	(0.172)	(0.186)	(0.294)	(0.370)
LNASSETS	0.104***	0.101***	0.103***	0.102***	0.069***	0.070***	0.070***	0.069***
	(0.032)	(0.033)	(0.032)	(0.032)	(0.026)	(0.025)	(0.025)	(0.025)
TANGIBILITY	0.005***	0.005***	0.006***	0.006***	0.005***	0.005***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)
INTERNALFINANCING	0.001**	0.001**	0.001**	0.001**	0.001**	0.001**	0.001**	0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
INTERESTCOVERAGE	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NETWORTHRATIO	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
CASHFLOWDEBT	-0.004***	-0.004***	-0.004***	-0.004***	-0.003***	-0.003***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
INTANGIBILITY	0.007***	0.007***	0.007***	0.007***	0.006***	0.006***	0.006***	0.006***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
TRADEDEBT	0.271	0.280	0.285	0.288	0.270	0.258	0.269	0.268
	(0.309)	(0.307)	(0.308)	(0.307)	(0.304)	(0.304)	(0.302)	(0.304)
Locality-specific time varying economic conditions								
UNEMPLOYMENTRATE	-0.043	-0.050	-0.058	-0.068	-0.038	-0.048	-0.058	-0.067
	(0.063)	(0.062)	(0.061)	(0.066)	(0.062)	(0.062)	(0.062)	(0.066)
Locality-specific time varying characteristics of credit market								
FIN	0.275**	0.489**	0.149***	0.137*	0.267**	0.496**	0.147***	0.133***
	(0.108)	(0.215)	(0.055)	(0.073)	(0.110)	(0.221)	(0.055)	(0.073)
FIN*FUNDIS*HIGH	-0.058**	-0.099**	-0.028***	-0.027**	-0.061**	-0.101**	-0.026**	-0.025*
	(0.026)	(0.041)	(0.010)	(0.013)	(0.024)	(0.042)	(0.011)	(0.013)

FIN*FUNDIS*LOW	-0.066*** (0.025)	-0.107*** (0.041)	-0.027** (0.011)	-0.026* (0.014)	-0.060** (0.027)	-0.106*** (0.041)	-0.028*** (0.010)	-0.027** (0.013)
Number of Obs.	4698							
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.096	0.095	0.095	0.094	0.094	0.095	0.095	0.094
Adj R-squared	0.068	0.068	0.068	0.067	0.067	0.067	0.068	0.067
Root MSE	1.229	1.230	1.230	1.230	1.230	1.230	1.229	1.230
t-test on equality high and low likelihood financial stress (p-value)	0.034**	0.297	0.672	0.621	0.727	0.488	0.129	0.425

Note: The above table reports the estimated results of the regression: $\ln Y_{irt} = \alpha + \alpha_0 Z_{ir} + \alpha_1 X_{irt-1} + \alpha_2 ECN_{rt-1} + \beta_1 LOCALBANK_r + \beta_4 FIN_{rt-1} + \beta_6 FIN_{rt-1} * FUNDIS_r * Z_{ir} + \beta_7 FIN_{rt-1} * FUNDIS_r * (1 - Z_{ir}) + \lambda_r + \upsilon_t + \varepsilon_{irt}$

where the characteristics of local banking market are fixed as their value at year 2003 and 2007 for the period 2004-2007 and 2008-2011, respectively. Dependent variable: FINANCING MIX (i.e., ln((overdraft/(overdraft + trade credit))*100). Functional distance (FUNDIS) is measured by traveling time. Banks' financial condition (FIN) is measured by capitalization and core deposit ratio (as indicated in the second row), respectively. The weight used to construct the locality-specific financial condition of banks is indicated in the third row. LOW (HIGH) is a dummy variable indicating lower (higher) likelihood of financial stress and is defined on the basis of the basis of Altman's (1968) z-score and the natural logarithm of total assets (as indicated in the top row), respectively. LOW=1 if the firm has a z-score (LNASSET) which is higher than the sample median in 2007, zero otherwise. HIGH=1 if the firm has a z-score (LNASSET) which is lower than the sample median in 2007, zero otherwise. Figures between brackets are robust standard errors clustered at locality level. * significance at 10%, ** significance at 5%, and *** significance at 1%. Constant, year and locality dummies are included in the estimation, but not reported for the sake of brevity. The first-order impact of characteristics of local banking market is absorbed by the locality dummies, and cannot be estimated. All variables are defined in Table 1.

Chart 1: Average main variables of interest by NUTS1



Average value of each indicator 2004-2011. The y-axis for operational proximity (OPDIS) and HHI index is on the left-hand side and for functional distance (FUNDIS) is on the right-hand side. Definitions of variables are in Table 1.