Information Asymmetry: Private Knowledge Beats Collateral in Reducing the Information Wedge

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Abstract:

In this first ever study to examine the marginal importance of collateral level vis-à-vis reputation in reducing information asymmetry, we find using unique data for UK business credit, that pre-existing reputation is the single-most important determinant in inducing a bank to extend a loan. Moreover, a bank responds positively to higher levels of collateral and negatively to higher credit requests. Similar to Cole (1998), but controlling for collateral level, we find that it helps to have banked with the lender before. Non-trivial information search costs imply an important role for reputation in extending credits.

1 Introduction

We set out to look at the issue of information asymmetry from a fresh perspective. Typically the empirical and theoretical literature views *'reputation models'* (Diamond, 1989; Petersen and Rajan, 1995) and *'signalling models'* (Bester, 1985; Besanko and Thakor, 1987; Clemenz, 1993) as being mutually exclusive to one another. Early signalling models recognised the ability of collateral to plug any information gap between borrower and lender. On the other hand, the reputation models distinguish between the business-bank relationship that is built up over time (private reputation) and the creditworthiness of a firm that is conveyed to outsiders as the firm ages (public reputation).[1]

The literature does not provide a clear analysis of the marginal effects of reputation and collateral on a lender's decision to extend credit. The shortcoming of using an indicator variable for collateral in existing literature, is that nowhere in the financial literature do we have an analysis of the marginal effects of changes in the value of collateral on reducing the information wedge, *while simultaneously controlling for bank-borrower reputation*.

We set out to close this gap in an analysis of the marginal effect of collateral on the bank rejection decision, while controlling for bank-borrower reputation. Our sample comprises 5,968 credit decisions made for a set of non-listed, UK enterprise Start-ups. In focusing on UK small businesses to investigate information asymmetries, we follow in the wake of others who examine the supply-side of UK finance to unlisted firms by an agent such as a bank (Cressy and Toivanen, 2001) or factor (Wilson and Summers, 2002).

In our analysis of the marginal effects of these variables on the loan sanctioning decision, we find that reputation wins out over credit terms (collateral and credit amount) in shaping a bank's decision to grant a loan. This result suggests the following: insider information (private reputation) is a valuable resource where

[1] This information 'wedge' between a lender and borrower, describes the information bias between what a borrower, vis-à-vis her lender, knows about the viability of an application for credit and the creditworthiness of the borrower. See Cressy (2002) for a review of this literature on information asymmetries

verifiable outside information is scarce and a bank is significantly more likely to lend to applicants with a track record.

Despite reports and theories highlighting the highly competitive market for first time business loans, which would make first-time loans easier to procure, an applicant with a bank-borrower history is more likely to secure finance, even when collateral and loan amounts are controlled for.

Our paper is structured in the following way. We first give an outline of the theories of borrower reputation before providing an overview of analyses that have already been undertaken in this area. We next describe our econometric model before discussing our data, in the section that follows. We provide some summary descriptives before providing a section outlining the regression results. In a separate section we outline the marginal effects for these regressions. We conclude in a final section.

2 Theories and analyses of borrower reputation and the information gap

(i) Borrower assets / wealth / collateral perspective

Models of information asymmetry concentrate on collateral as a signalling, or alternatively as a risk reduction mechanism. Signalling involves collateral and one or two other loan instruments, most usually interest margins. Borrowers choose from a menu of paired options, higher risk borrowers signalling their risk status by opting for low collateral coupled with higher interest margins. Models that focus on the signalling function of collateral follow from the early contribution of Bester (1985) with modifications by Besanko and Thakor (1987) and more recently by Clemenz (1993). Signalling models have more recently been downplayed and there is a need for models that more readily explain why lenders act as they do.[2] Coco (2000) concludes that

[2] The motive for a lender to cover against credit exposure appears to be the dominant motive in the analysis by Manove et. al., (2001).

'The [empirical] evidence is incompatible with the use of collateral as a signal of projects' quality, while broadly consistent with explanations based on its incentive properties and asymmetric evaluation of projects'.[3]

Our own anecdotal experience from conversations with lenders who deal with unlisted, small firms, describe the 'menu approach' that underpins signalling models as lacking in realism.

Whatever the reason behind a lender's need to request collateral and the lack of realism of some models that describe the use of collateral, there is sufficient empirical evidence to indicate its importance in credit markets with asymmetric information. Black et al., (1996) in an aggregate analysis, focus on the knock-on effect of changes in the value of real estate on lending balances. Evans and Jovanovic (1989), in a demand-side model, look at the implications of an exogenous shock (individuals receiving an inheritance) on entry into self-employment. More recently, Cressy and Toivanen (2001) conclude that the lack of correlation between collateral and borrower type (an ex post risk measure), is consistent with a regime of *symmetric* information.

(ii) *Multi-period models of borrower reputation*

The Boot and Thakor (1994) and Diamond (1989) models predict that interest margins in the second period (after some repayment behaviour has been observed) are higher than interest margins in the first period i.e. that interest margins *fall* as bank-borrower reputation lengthens.

Boot and Thakor describe a repeated credit market game where all banks initially charge high interest rates to first-time borrowers. Once the lender has survived the first lending period, the lender is in a position to relax the interest margin and charge a margin that is commensurate with the now reduced risk status of the borrower. Collateral requirements are also relaxed. The Diamond model, like the B-T model, predicts lower interest margins for borrowers in subsequent lending periods. Diamond assumes a multi-period framework where it pays a borrower to develop a reputation once she has survived the first period with higher borrowing margins.

[3] P.191, Coco (2000)

Other models consider either directly or indirectly the role of reputation in attenuating borrower risk, with implications for the interest margin (Greenbaum et al., 1989; Sharpe, 1990). Sharpe predicts that interest margins *rise* with the duration of the business bank relationship because a borrower becomes informationally captured and cannot exit the borrowing relationship. Similarly, Greenbaum et al. predict a positive relationship between relationship and interest margin. Unlike Sharpe, they attribute this phenomenon to the presence of exit costs, which a borrower incurs when changing bank.

3 Influence of Reputation and Collateral in the Empirical Literature

This section describes the main variables shown in the empirical literature to affect the decision to grant a loan to a first-period borrower. We concentrate specifically on reputation and collateral, which represent the joint objectives of this study. However, we include other control variables, hypothesised and shown to affect lending terms. We include a summary of all variables used and their conjectured signs in **Table 1**.

[**Table 1 here**]

Role of collateral

Cressy and Toivanen (2001) document the role of collateral in credits to unlisted firms, Avery et al. (1998) to a sample of listed and unlisted firms, while Berger and Udell (1995) focus on collateral in the context of commitment loans only (overdrafts). A common denominator in these studies is the use of a collateral indicator variable, denoting whether collateral is used or not. No continuous variable is used. Therefore, these studies do not set out to describe the marginal effects of the *amount* of collateral on an endogenous loan contract variable (amount, availability of credit, interest margin).

Cressy and Toivanen find a trade-off between the collateral dummy and interest margin using standard regression and 2SLS. This relationship is significant. However, they do not report loan size as a function of collateral and thus report no

result for collateral in the loan size estimations. Berger and Udell similarly report a trade-off between collateral and margins for the commitment loans in their sample.[4] However, this coefficient is positive for commitment loans secured on the riskiest type of assets i.e. inventories. Finally, Avery et al. find that the smallest firms (in terms of sales and employee numbers) and youngest firms in their data, and hence the riskiest, display the highest probabilities of collateral usage.

We hypothesise on the basis of the evidence from the studies above using collateral indicator variables, that *increasing the level* of collateral for a given amount of borrowing, increases a borrower's chances of raising bank finance.[5]

In so doing we assume that the *level of collateral* influences the response variable in a similar way to an indicator variable describing the *binary yes/no* decision to demand collateral. We hypothesise the relationship between the amount of finance requested and the rejection decision to be positive, on the basis that a cautious bank will seek to limit its exposure to a small business borrower.

Role of Reputation

We now turn to analyses estimating the impact of business-bank relationships in the literature. Berger and Udell (1995), Cole (1998) and Harhoff and Körting (1998) model this variable as exogenous to some component of the credit contract (interest margins, rejection probability or collateral). While Berger and Udell and Harhoff and Körting estimate interest margins (commitment loans only) as endogenous to relationship, Cole estimates the decision to extend credit as endogenous to business-bank relationship.

The Berger-Udell analysis reports a positive coefficient on the relationship variable and Cole reports that first-time applicants exhibit higher rejection probabilities than applicants in subsequent periods. However, the coefficient for overall relationship

[4] While Cressy and Toivanen (2001) found that collateral is independent of risk type, Berger and Udell (1995) found that riskier entrepreneurs are more likely to be asked to provide collateral. However, Cressy and Toivanen have criticised the latter study on the basis that the risk measure (gearing) used was inappropriate and not a valid ex post measure of risk.

[5] This hypothesis is predicated on our ability to control for the risk type of a small business application for finance, given that all applicants in our sample are denoted as being 'high risk' by the bank.

length is insignificant. Similarly, Harhoff and Körting find that the coefficient on the relationship duration variable is insignificant. These two results imply that a presence of a track-record, however minor, is what matters.

Consistent with the evidence from Harhoff and Körting (1998) and Cole (1998) that relationship *duration* is insignificant but merely the existence of *any* track-record is important, we expect that a pre-existing borrowing reputation raises the business owner's chances of raising bank finance. It follows that we expect a positive sign on our track-record indicator variable.

Other Control Variables

We first turn to the potential influence of variables measuring the quality of an entrepreneur and/ or an enterprise, on a loan officer's decision to grant a loan.

Cressy (1996) and Avery et al. (1998) both use indicator variables to denote business ownership structure dispersion. Cressy finds a higher correlation with business survival and Avery et al. document a higher incidence of collateral use for businesses with more fragmented ownership. Accordingly, the ownership dispersion proxy variable *'partner'* is included, indicating that an entrepreneur has at least one business partner. We also include a business continuity proxy *'busoper',* on the basis that businesses where the ownership succession is assured, are favoured by a lender over a business where business continuity is a problem (Bopaiah, 1997; Cressy, 1996; Harhoff et al., 1998).[6] A business that is able to continue its day to day operations even when the main principal is absent through illness or death is denoted by *'busoper=1'* (See **Table 1**). Entrepreneur's age is also used as a control in several studies (Cressy, 1996; Avery et al., 1998), and it is therefore included.

Consistent with Cressy's argument that an entrepreneur's age and the survival of her business are positively related, we include the variable *'age'* and a squared term to capture potential non-linear effects. The duration of a borrower's work experience is

[6] Anecdotal evidence from conversations with German bankers denoted business continuity/ succession issues as a major concern jeopardizing a long term lending relationship

conveyed by the variable *'exp'*, with the squared term included as a control for diminishing returns to experience. We hypothesise that business cash flow, captured in our variable *'liq1'*, also informs the bank's decision on the basis of its high correlation with business survival (Schellenger and Cross, 1994; Taffler, 1999). We expect that the sign of the coefficient of our growth proxy *'growth1'* shows that higher growth is associated with a higher rejection likelihood because excessive early growth drains the enterprise of cash flow, thereby increasing the likelihood that the entrepreneur will default on her repayments. Our final business attribute variable *'norisk'* denoting borrower confidence, has not been used in any study to date. A value of 1 for this dummy, indicates that the borrower has stated on her application form for finance that, in her opinion, the business will not encounter any risks in the year ahead. If a loan officer believes her business forecast, then this variable should be negatively related to the likelihood of rejection.[7]

Finally, interest margins were not included as loan contract variables because they are set after a loan officer has reached its decision to lend to small firm or otherwise i.e. they arise ex post.

4 Model specifications and methodology

The fundamental question that our analysis aims to answer is; which variables are the most significant in predicting whether a loan was turned down or not? Secondly, what is the marginal contribution of collateral vis-à-vis reputation in reducing the rejection probability?

We use a logistic regression specification to model the relationship between the ex post likelihood that the bank rejects a first-period business loan.[8] The model for bank rejection, *'con'* is $Con_i=1$ for a rejected borrower (has had application rejected) and $Con_i=0$ otherwise. For the logistic regression let

$Pr\ (Con_i=1) = G(Z_i), \quad \forall i = \{1,2\},$

[7] An alternative outcome is also possible. If a sanctioner believes that more confident entrepreneurs are higher risk, as de Meza and Southey (1996) have suggested, the sanctioner may penalize applicants who state that their business is low risk on the basis that an entrepreneur misrepresents the extent of commercial risk

Where $PR\ (Y_i=1)$ denotes the probability of $Y_i = 1$,

and $G(Z_i)$ is the corresponding cumulative logistic function defined as

$G(Z_i) = 1/(1+e^{-Zi})'\ \forall_i = -\infty < Z_i < \infty$

and

$$Z_i = \alpha + \beta_{j=1}x_{j=1} + \sum_{j=2}^{6}\beta_j x_j + \beta_{j=7}x_{j=7} + \sum_{j=8}^{15}\beta_j x_j + \sum_{j=16}^{18}\beta_j x_j$$

Where

$j = 1$ is our relationship proxy

$j = 2\text{-}6$ are our loan contract variables (including collateral)

$j = 7$ is our size proxy

$j = 8\text{-}15$ are entrepreneur/business variables

$j = 16\text{-}18$ are credit history variables

as set out in **Table 1** and discussed above.

5 Discussion of the data

Our data comprises 5,968 first-period business credit applications to a major UK retail bank for the period January 1998 until December 1999.[9] Of the 5,968 observations, approximately 28 percent (1,695 applicants) had their applications for finance turned down. Applicants are individuals applying for credit on behalf of their business. Although all businesses are business start-ups, and hence we are dealing with first-period business credit applications, this does not preclude applicants from having established a previous credit history with the bank.

All businesses are either Sole Proprietorships or Partnerships. Previous reputation is non-commercial only e.g. a loan applicant setting up a Sole Proprietorship has borrowed from the bank before in a personal capacity. Information on corporate governance can only be gauged by looking at details such as guarantee provision (a

[8] Cole (1998) also uses a logistic regression with a more limited set of explanatory variables

[9] Credit applications took the form of loans or overdrafts

hallmark of companies with Limited status) and ownership dispersion.[10] However, we estimate that 2 percent of the sample are Limited Companies, 37 percent are Sole Proprietorships and the remaining 61 percent are partnerships.

We cannot, for reasons of confidentiality, disclose the name of the bank that donated the data used in our analysis. However, we can perform a check as to whether our data from this bank is representative of UK loans in general for this period. We examine data from the same period (1998) from the *Forum of Private Business Survey* (**Figure 1**). Applicants cited *'Other Banks'*, as the banking category most likely to damage their business through rationing. The *'Bank of Scotland'* is listed as the bank least likely to do so. The $\chi 2$ statistic for the inter-bank differential in perceptions is significant.

Comparisons with other banks from the UK Banks FPB Survey for 1998 show that the bank that permitted us to use its data, does not adopt an extreme rejection policy.

However, the sample bank does operate a high rejection rate compared to the 15.5 percent rejection rate of firms in Cole's US National Survey of Small Business Finances (NSSBF) data. The reasons for this are as follows. Firstly, the UK businesses in our data are on average smaller than firms in the US data and may therefore be higher risk. Their average sales amount to £281,267 (standard deviation of £1,656,031) compared to a sales turnover of approximately £4,485,507 ($6,190,000) for US firms.

Secondly, all businesses in our data are new commercial borrowers and designated as *'high risk'* by the bank, whereas this constraint did not apply in the US data. Since a bank is likely to be more cautious about granting loans to new commercial borrowers, it follows that the higher rejection rate in our data is likely to be a consequence of the relatively higher risk of lending to applicants in our data.

[10] This data was originally used to construct a proprietary scorecard. Corporate Governance details were not included.

Finally, there is the possibility that businesses in our sample applied for credit with more than one bank and hence the overall rejection rate in the population of applicants for credit is likely to be lower.[11]

6 Descriptive statistics

Table 2 outlines the univariate statistics for the relationship, loan contract, size, firm/entrepreneur specific and credit history variables used in our analysis.

[**Table 2 here**]

Column 2 describes the mean value for the group that was denied credit by the bank in each case. Alternatively, in the case of indicator variables, **Column 2** indicates the proportion of firms within the category of the variable that was denied credit. These individual proportions for separate indicator variables can then be compared to the overall rejection rate of 28.4 percent. **Column 3** likewise describes the mean amounts or proportions for each of the separate explanatory variables that will later be used in our estimations. In this instance, the proportions are compared to the overall acceptance rate of 71.6 percent. **Column 4** contains the significance levels and test statistics for each of the variables in the table.

We can see from **Table 2** that the most significant variables are the relationship and the loan contract variables. However, some of the firm/entrepreneur characteristics are also significantly associated with the sanctioning of finance.

Of the significant variables, if a borrower has borrowed finance previously from the bank for her own personal use ('*prevbor*'=1), it raises the probability that she will receive funding for her business. The proportion of accepted applicants within the category of borrowers with existing borrowings is 81 percent, compared with an overall acceptance rate of 71.6 percent.

[11] See Storey (1999) for an excellent analysis of this phenomenon

Firms that are extended credit are more likely to request smaller amounts. The difference in the means of £9,682 is significant at the 0.01 level. Firms who are successful with their loan applications are also more likely to provide higher collateral. The difference of £6,293 in the value of collateral is also significant at the 0.01 level. We can conclude therefore that a sanctioner is more likely to accept credit applicants where the bank's exposure to the possibility of default is minimised i.e. the credit amount is comparatively low and the collateral level is comparatively high.

Consistent with the cautious approach employed by the bank that we have seen in its preference for low risk loans, is the slight but significant preference for non-working capital loans, which is significant at the 0.10 level.

Turning to the firm/entrepreneur characteristics that significantly affect the decision to deny credit; the self-assessment by the entrepreneur of her own risk is highly significant. More sanguine entrepreneurs who see no risks that would jeopardise their business projects, are more likely to receive credit than entrepreneurs who cite business risk as a potential problem are. Finally, the bank shows a marked preference for businesses who can operate in the absence of the principal owner, as evidenced by the higher proportion (73 percent) of applicants in this group who receive finance.

There is only one variable, namely credit history, in the last group and this is significantly related to the credit granting decision. Firms whose applicants for finance have demonstrated financial difficulty in the past, '*fin_dif*'=1, are significantly less likely to receive credit than firms who have an unsullied credit history.

Overall, the univariate statistics point to the fact that the bank is cautious about the extent of its exposure to the risk of the business. However, it responds positively to a business who is in a position to finance a portion of the project, who is confident of the outcome of her project and who can assure the bank that the business can continue to manage its daily operations in the owner's absence.

7 Regression results

We now move on to the first regression that estimates the relationship between the four main categories of explanatory variables and the probability that an entrepreneur has her credit application turned down. In other words, we model the likelihood that *'con=1'*. The results are shown in **Table 3**.

[**Table 3 here**]

Column 1 describes the model when we include the business-bank relationship variable, *'prevbor',* on its own. Consistent with what we have already seen in the univariate statistics, '*prevbor*' is highly statistically significant and has a negative sign. This indicates that the bank is significantly less likely to reject application from entrepreneurs who have borrowed from the bank on a previous occasion. This result underpins the importance of insider information in attenuating credit risk. It also corroborates Cole's (1998) findings regarding the importance of insider information.

The *pseudo r*-squared value of 0.009 is low. Nevertheless, as the χ^2 statistic indicates, the overall model is statistically significant.

Column 2 indicates the regression model of the accept/reject decision after the loan contract variables are added. Once again, consistent with what we have already seen in the univariate statistics, the higher the value of collateral provided, the lower the probability that an applicant will have her application for finance rejected, as indicated by a negatively signed coefficient. This confirms evidence from Basu and Parker (2001) that entrepreneurs attribute the lack of sufficient security as the main reason for having an application for finance rejected. However, there appear to be diminishing returns to collateral provision, as suggested by the positive sign on the coefficient of the variable *'coll2'*.

The larger the amount requested by the borrower, the higher the probability that a borrower's application will be declined by the bank, as evidenced in the positive sign

and high significance of the coefficient of the variable *'borr'*. Corroborating what we have seen earlier in the univariate statistics, loans for working capital purposes are more likely to be turned down.

In **Column 3**, we include the size control variable '*projsal'* but this is neither significant nor does it affect the model fit. The results in **Column 4** describe the effect on the regression outcome when the entrepreneur/firm specific variables are added to the model. The pseudo r^2 increases to 0.024.

Consistent with our conjecture as to the effect of assured business succession on the sanctioning decision, the negative coefficient of the variable *'busoper'* indicates that businesses with no succession issues, are less likely to have their loans turned down. Business borrowers who have reinvested capital in their business or who have partially financed their projects using their own funds, are also less likely to have their loan requests turned down. Also entrepreneurs who are confident that their businesses face no risks, are more likely to be successful.

Finally in **Column 5** we include the credit history variable *'fin_dif'* indicating whether the business owner exhibited insolvency in the past or had her borrowings rescheduled. The pseudo r^2 increases to 0.026. As we would expect, applicants who have experienced financial difficulty in the past are significantly less likely to be granted a loan.

8 Individual variables explaining the bank accept/reject decision

When interpreting the value of the coefficients in a logistic regression, we refer to the odds ratios because these reflect the most accurate measure of the individual contribution of the variables although the standardised coefficients can be used for ranking the variables in order of their relative importance (Allison, 1999). **Table 4** describes the marginal effects of the individual explanatory variables on the sanctioner's decision.

[**Table 4 here**]

Column 1 in **Table 4** recalls the beta values for the full regression model described in the previous table. In **Column 2**, the odds ratio for each of the explanatory variables is calculated. The odds ratio i.e. the probability of being rejected divided by the probability of being accepted, $(P_{REJECT} / (1 - P_{REJECT}))$, is calculated by obtaining the exponent of the beta values. In order to derive the values in **Column 3**, we first of all calculate the base odds ratio from the regression coefficients in order to provide a baseline against which we can measure any marginal effects. This baseline value (base odds ratio) is calculated by substituting back the averages of the continuous variables and setting the dummy variables equal to zero. The exponential of the resulting value is the base odds ratio, which is found to be equal to 0.4877. This in turn is multiplied by the odds ratio for each variable in turn to obtain the change in the probability of being turned down when the dummy variables are equal to 1 or when the continuous variables increase/decrease by £100,000.

In **Column 4** we convert the modified base odds ratio, where the marginal effect is included, to a rejection probability, P_{REJECT}, for that variable. Finally, in **Column 5**, the change in rejection probabilities from the baseline probability of approximately 33 percent, is calculated as $P_{REJECT} - P_{BASE}$, in order to demonstrate how entrepreneurs possessing this attribute exhibit rejection probabilities that differ from the baseline rejection probability.

We see in **Table 4** that the relationship dummy, *'prevbor'*, is the single most important variable in the regression, where new applicants for corporate finance are 12 percent less likely to have their applications turned down if they have banked with the lender before in a non-commercial capacity. In comparison, the probability of being turned down if collateral increases by £100,000 decreases by 3.98%. Put another way, having previously borrowed has the same effect on the chance of being turned down as having an additional £32,096 of collateral. This result confirms the importance of previous borrowing relationships testified by Cole (1998).[12] It also

[12] However, Cole (1998) did not include a marginal analysis of the effect of pre-existing borrowing relationships on the sanctioning decision and hence he did not quantify the impact of pre-existing relationships on the sanctioning process in terms of the percentage change in the rejection likelihood.

confirms our view that with asymmetric information, private knowledge is highly effective compared with collateral in attenuating risk by a lender.

Applicants retaining a profit or ploughing their own equity into a business project ('*liq1*'=1), are almost 8 percent less likely to be rejected compared with the baseline probability level. Hence the bank values the self-financing capability of new commercial borrowers.

Commercial borrowers who have had previous borrowings rescheduled due to an inability to meet repayments or who have been insolvent in the past, ('*fin_dif*'=1), are 5.8 percent less likely to have their applications accepted.

The role of entrepreneurial self-confidence is evident in the fact that applicants who state on their application forms that they do not foresee any risks lie ahead that would threaten their project ('*norisk*'=1), are 4.3 percent more likely to obtain finance. De Meza and Southey (1996) have documented some of the theoretical considerations relating to entrepreneurial self-confidence and have concluded that the most risky entrepreneurs are likely to be more confident. We cannot infer from our result whether these entrepreneurs are higher risk but we can conclude that more confident entrepreneurs are more likely to have their applications accepted.

A slightly worrying outcome is that applicants applying for working capital finance, *'working'*, are 3.6 percent more likely to be rejected than applicants whose borrowing purpose is for asset backed finance, even when collateral has been controlled for. The problem with this outcome is that liquidity constrained borrowers with good growth prospects, may find that this constraint bites.[13] However, one could argue that this marginal effect is small enough to be negligible and what really matters is relationship, clean track record and an ability to be self-financing.

It is evident that a bank is cognisant of business continuity issues when sanctioning a loan to a new commercial borrower. Business owners who indicate that their business

[13] Actual growth has virtually no effect on the rejection probability

can continue to operate in their absence, *'busoper'*=1, are associated with lower rejection probabilities.[14]

The loan contract variables *'coll'* and *'borr'* do not individually lead to a dramatic change in the likelihood that a loan is accepted/rejected. As mentioned, borrowers providing £100,000 additional collateral, are approximately 4 percent less likely to be rejected compared with the baseline acceptance probability. Applicants who request £100,000 more in bank funding are associated with a relatively higher rejection probability i.e. a 2.9 percent differential.

9 Conclusions

It is evident from our estimations that relationship, loan contract and some entrepreneur/firm variables are important inputs in the sanctioner's decision to reject a loan to a new commercial borrower. Increasing the amount of collateral provided and reducing the amount of finance requested, increases the likelihood that a loan is granted. This indicates that the bank prefers lower risk exposures to higher risk exposure, all things equal. This outcome is consistent with our expectation that a bank is a rational, risk adverse agent.

We conclude that a bank emphasises the value of pre-existing relationships, borrower credit history and the ability of a borrower to be self-financing when granting a loan. However, the fact that a borrower has banked with the lender before, is by far the most important factor enabling a business to elicit a positive lending decision.

In our analysis of the marginal effects of these variables on the loan sanctioning decision, we find that reputation wins out over credit terms (collateral and credit amount) in shaping a bank's decision to grant a loan. This result suggests the following: insider information (private reputation) is a valuable resource where

[14] It appears contradictory that the variable *'partner'*, indicating that the business ownership comprises at least one owner, is associated with a higher rejection likelihood. The business continuity variable *'busoper'* has the expected negative sign and *'partner'* was similarly expected to reduce the rejection probability. Our explanation for this anomaly is that a sanctioner may be marginally inclined to favour loans over which it has greater control and increasing the number of partners may decrease the strength of the relationship between the applicant and his contact at the bank.

verifiable outside information is scarce, and a bank is significantly more likely to lend to applicants with a track record.

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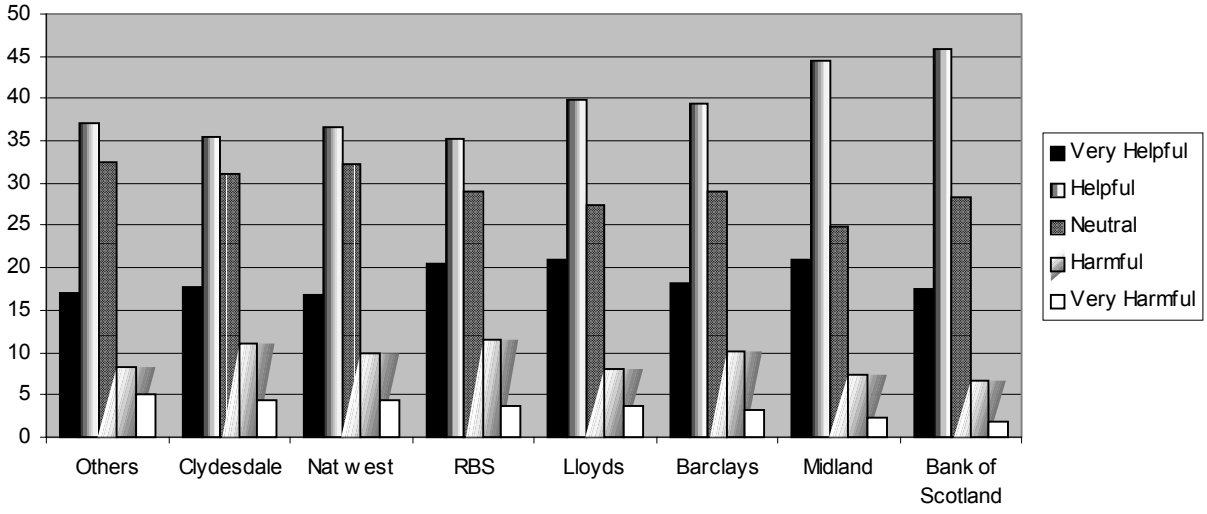
Figure 1
UK Banks FPB Survey (1998): Evaluations' of Credit Availability



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Chi-Square Tests for Credit Availability Evaluations by Bank			
	Value	df	Asymp. Sig. (2-sided)
Pearson χ^2	46.46	28	0.02
Number of Valid Cases	4556		

Table 1 List of variables

Response variable	**Description**	**Predicted sign**
con=1	The loan is rejected by the bank	.
Relationship		
prevbor	*prevbor* =1 if applicant has previously borrowed from the bank	(-)
Loan contract		
coll	Sum of owner's equity injected into the project in addition to the 'carcass' or liquidation value of land, buildings and life policies offered as collateral	(-)
coll2	Collateral squared	
borr	Amount of new borrowing requested. Sum of loan, overdraft and any other amounts requested	(+)
borr2	Borrowing squared	
working	Borrowing used to finance working capital. Most risky type of borrowing as no purchased asset to submit as collateral against borrowed amount	(+)
Size variable		
projsal	Projected sales for the current year (size proxy)	
Entrepreneur/business		
partner	The business owner has at least one business partner i.e. the ownership structure is dispersed	(-)
busoper	The business can continue to exist without the founder. Measure of dispersion of ownership (busoper=1 if 'Yes')	(-) as for *'partner'*
liq1	Proxy for the ability of the entrepreneur to be self-financing. Liq1=1 if the business has reinvested profit in business or injected its own cash into the business project	(-)
growth1	Sales growth. Percentage change in sales from last year's sales	(+) See liq1
age	Borrower's age	(+)
age2	Borrower's age squared	
exp	Experience of borrower in current industrial sector	
exp2	Experience of borrower in current industrial sector squared	
norisk	Borrower believes that he will have no business or financial risks in the year ahead. Denotes borrower confidence (norisk=1 if 'Yes')	(-)
Credit history		
fin_dif	Borrower has had to have her loan rescheduled due to difficulties meeting repayments or has previously been declared insolvent. Denotes financial distress if debtres=1.	(+)

Table 2 Univariate Statistics			
(1) Variable	(2) Firms denied credit	(3) Firms extended credit	(4) t-statistic/ χ^2 statistic
Number of firms	1,695	4,273	
Proportion of firms	**28.4%**	**71.6%**	
Business-bank relationship			
Entrepreneur has previous borrowings (*prevbor*=1)	19%	81%	65.394[a]***
Loan contract terms			
Amount borrowed	76,679	66,997	-3.166[b]***
Amount of collateral	52,549	58,842	1.744[b]***
Loan purpose is working capital (*working*=1)	29.4%	70.6%	3.192[a]*
Size			
Sales	265,250	309,506	0.296[b]
Firm/entrepreneur characteristics			
Entrepreneur's age	43.3	43.5	0.582[b]
Number of yrs. work experience	12.7	12.5	-0.821[b]
Business owner has business partner	29%	71%	1.055[a]
Business sees no risks ahead (*norisk*=1)	26%	74%	19.058[a]***
Firm growth (projected sales/present sales)	5.31	5.85	0.251[b]
Ability to self-finance (has retained a profit or invested own capital) (*liq1*=1)	26%	74%	40.809[a]***
Continuity of business is assured (*busoper*=1)	27%	73%	9.241[a]***
Credit history			
Financial difficulty (*fin_dif*=1)	33%	67%	15.572[a]***

[a] denotes χ^2 statistic (difference in proportions)
[b] denotes t-test (difference in means)
*** difference in means of groups or proportions significant at the 0.01 level
** difference in means of groups or proportions significant at the 0.05 level
* difference in means of groups or proportions significant at the 0.10 level

Table 3 Logit to determine relative importance of variable groups in accept/reject decision					
Response variable: *P(con)=1*: applic. Rejected (Prob. > χ2)					
	(1)	(2)	(3)	(4)	(5)
Intercept	-.8137***	-.9064***	-.9064***	-1.0098**	-.9444***
	(.0000)	*(.0000)*	*(.0000)*	*(.0261)*	*(.0378)*
Business-bank relationship					
prevbor	-.6526***	-.6214***	-.6214***	-.6665***	-.6430***
	(.0000)	*(.0000)*	*(.0000)*	*(.0000)*	*(.0000)*
Loan contract terms					
coll		-1.8E-06***	-1.8E-06***	-1.7E-06***	-1.9E-06***
		(.0001)	*(.0001)*	*(.0003)*	*(.0001)*
coll2		9.48E-13**	9.48E-13**	8.83E-13*	9.87E-13**
		(0.0412)	*(.0413)*	*(.0581)*	*(.0344)*
borr		1.28E-06**	1.28E-06**	1.48E-06**	1.30E-06**
		(.0321)	*(.0321)*	*(.0129)*	*(.0307)*
borr2		4.58E-13	4.58E-13	1.05E-13	3.14E-13
		(.6075)	*(.6076)*	*(.9042)*	*(.7202)*
working		.1359**	.1359**	.1672***	.1594***
		(.0239)	*(.0239)*	*(.0062)*	*(.0092)*
Size					
projsal			-1.2E-10	3.06E-10	2.47E-10
			(.9866)	*(.9645)*	*(.9718)*
Firm/entrepreneur characteristics					
partner				.0901	.0818
				(.1296)	*(.1699)*
age				.0281	.0254
				(.1783)	*(.2251)*
age2				-.0003	-.0003
				(.1322)	*(.1505)*
exp				-.0016	-.0019
				(.8424)	*(.8142)*
exp2				.0001	.0001
				(.5819)	*(.5282)*
busoper				-.1428**	-.1577**
				(.0466)	*(.0282)*
norisk				-.1964***	-.2019***
				(.0011)	*(.0008)*
liq1				-.3892***	-.3845***
				(.0000)	*(.0000)*
growth1				5.05E-05	6.91E-05
				(.8992)	*(.8622)*
Credit history					
fin_dif					.2523***
					(.0006)
-2 log likelihood					
Intercept	7052.50	7021.63	7021.63	6953.49	6941.81
χ2 for covariates	69.766	100.64	100.642	168.776	180.464
DF χ2 for covariates	1	6	7	16	17
Sig. for covariates	.0000	.0000	.0000	.0000	.0000
Pseudo-r^2	0.00989	0.0143	0.0143	0.024	0.026
Number of observations	5,968	5,968	5,968	5,968	5,968
***sig. at 0.01 level		** sig at 0.05 level		*sig. at 0.10 level	

Table 4 Marginal analysis; effect of individual variables on the bank rejection rate

	B	Odds ratio *(exp(β_i))*	Odds ratio * base odds ratio[1]	P_{REJECT}[2]	Difference in rej. rates[3]
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Intercept	-0.9444				
prevbor	-0.6430	0.5257	0.2564	0.2041	-12.4%
coll *(00,000)*	-0.1900	0.8270	0.4033	0.2874	-3.98%
borr *(00,000)*	0.1300	1.1388	0.5553	0.3571	+2.9%
working	0.1594	1.1728	0.5719	0.3638	+3.6%
projsal *(00,000)*	2.47E-5	1.0000	0.4877	0.3278	0.0%
partner	0.0818	1.0852	0.5292	0.3461	+1.8%
age	0.0254	1.0257	0.5002	0.3334	+0.6%
age2	-0.0003	0.9997	0.4875	0.3277	0.0%
exp	-0.0019	0.9981	0.4867	0.3274	0.0%
exp2	0.0001	1.0001	0.4877	0.3278	0.0%
busoper	-0.1577	0.8541	0.4165	0.2940	-3.4%
norisk	-0.2019	0.8172	0.3985	0.2849	-4.3%
liq1	-0.3845	0.6808	0.3320	0.2492	-7.9%
growth1	0.0001	1.0001	0.4877	0.3278	0.0%
fin_dif	0.2523	1.2870	0.6276	0.3856	+5.8%

[1] The base odds ratio = $exp(\beta'_i \mu_i)$ = 0.4877 where is the column vector of the mean values of the continuous variables and of dummy variables ascribed the value of zero

[2] P_{REJECT} = base odds ratio * odds ratio$_i$ / [1 + (base odds ratio * odds ratio$_i$)] where *i* = variable *i*

[3] P_{BASE} = *base odds ratio/ (1 + base odds ratio)* = 0.3272 or 32.7%
Difference in reject rates = $P_{REJECT} - P_{BASE}$