

A Theory of Discouraged Borrowers

Y. Kon
D.J. Storey

ABSTRACT. This paper examines the implications for the SME financing market of Application costs that vary between firms, and of imperfect screening of applicants by Banks. Under these conditions 'Discouraged Borrowers' can exist. These are good borrowers who do not apply for a bank loan because they feel they will be rejected. The paper shows that, under a range of assumptions, the scale of discouragement in an economy depends upon the screening error of the banks, the scale of Application costs and the extent to which the bank interest rate differs from that charged by the moneylender. Discouragement is shown to be at a maximum where there is some, but not perfect, information.

1. Introduction

The central issue addressed in the literature on financing SMEs is that of credit rationing stemming from asymmetric information (Stiglitz and Weiss, 1981; De Meza and Webb, 1987). These papers argue that, in equilibrium, markets are imperfect since credit is allocated by rationing, rather than by price. The difference between the two papers is that, whereas Stiglitz and Weiss' assumptions lead to credit rationing, those of De Meza and Webb lead to over-supply. The theoretical issues addressed in these papers underpin a huge raft of empirical papers on credit rationing in many countries, of which those by Berger and

Udel (1992) and by Petersen and Rajan (1994) are examples.

Stiglitz and Weiss discuss adverse selection and incentive (moral hazard) effects and say "Both effects derive directly from the residual imperfect information which is present in loan markets *after banks have evaluated loan applications*" (our emphasis)

The current paper has a different theoretical focus. It examines the implications for the SME financing market of Application costs that vary between firms and of imperfect screening of applicants by Banks. Application costs can be considered as financial, in-kind, or psychic. We show that positive Application costs mean that a good borrower may not apply for a loan to a bank, because they feel they will be rejected. This is defined as a Discouraged Borrower. Such borrowers are ignored in the Stiglitz-Weiss model since they do not make applications to the bank.

Until very recently, this topic generated little interest amongst scholars but is now recognized as important in the financing of small businesses in developed and less developed economies. For example, Raturi and Swamy (1999) quantify its significance in Zimbabwe,¹ whilst Levenson and Willard (2000) examine it for the USA. Importantly, in the current context, the latter paper finds more than twice as many small firms are "discouraged" as are rejected for loans from financial institutions in the United States, implying that "discouragement" is more important than credit restrictions of the Stiglitz-Weiss form.

This paper provides a theoretical base for "discouragement", using an institutional framework that is, in principle, applicable to a developed or a less developed economy, although generally we predict discouragement to be higher in less developed countries. A standard static adverse selection

Final version accepted on 1 November 2001

Y. Kon
Faculty of Management and Economics
Aomori Public College
Aomori 030-0196
Japan
E-mail: KON@bb.nebuta.ac.jp

D.J. Storey
University of Warwick
Warwick Business School
Centre for Small and Medium Sized Enterprises
Coventry CV4 7AL, UK
E-mail: smeds@wbs.warwick.ac.uk



Small Business Economics 21: 37–49, 2003.
© 2003 Kluwer Academic Publishers. Printed in the Netherlands.

model of credit markets is extended to incorporate two elements; Application costs for borrowers and imperfect screening by banks. We formulate the application behaviour of firms and the loan granting decision by banks in a pooling equilibrium where both discouragement and rejection of loan applications appear. We examine conditions under which discouraged borrowers exist, and consider the impact of policies which governments might implement to minimize discouragement. We begin with a discussion of the key assumptions that underlie the analysis in the remainder of the paper.²

2. A model of imperfect screening under asymmetric information

Assume there are two types of firms; Good (G) and Bad (B), and each firm requires one unit of funding for his/her investment. The number of firms of each type is exogenously given as, N_G and N_B respectively. We now introduce the following ten assumptions, a number of which are subsequently relaxed.

- [A.1 *Information asymmetry*]: Firms know for certain whether their investment will be a success, whereas the bank does not. This assumption is later modified.
- [A.2 *Homogeneous G and B*]: Good firms and Bad firms are homogeneous in each type. This assumption is relaxed later.
- [A.3 *Return of G firms*]: The return from investment for G firms is certain, X_G , and it is always profitable for the bank to lend to such firms.
- [A.4 *Return of B firms*]: The return to the bank from investment in B firms is risky. The return on the B firm is X_B if the business survives and zero if it fails. The probability of a B firm being successful is p_B . The expected value of loans to B firms by the bank is assumed to be negative.

The uncertain return explains the demand for loans by Bad firms.³ In the absence of collateral, Bad firms will choose to borrow on the grounds that if their project is successful they will benefit, but if not, they will incur no loss.

G_A and B_A denote the number of good and bad applicants for a bank loan respectively. This is endogenous because we assume if firms require

external funding they can either borrow from a bank or from an alternative source, which we call the Money Lender.⁴ The choice by the business to approach the bank or the Money Lender depends on Application costs,⁵ screening error, and interest rates. We assume,

- [A.5 *Application cost*]: The Application cost of G and B firms for a bank loan is a fixed amount K . This assumption is later relaxed. However, The Money Lender's application costs are always zero.

Application costs for a bank loan can be considered to cover financial, in-kind and psychic costs. Financial costs include the costs of paying others to provide information required by the bank. In-kind costs cover the applicants time in completing forms, traveling to, and meeting with, the bank. Finally psychic costs will include the discomfort which many entrepreneurs experience in passing on information about themselves and their enterprise to a third party.

- [A.6 *Screening*]: All Firms are subject to screening when they apply for a bank loan, whereas all applicants to the Money Lender are successful.

All applicants announce themselves as G firms to the bank. However, the Bank cannot perfectly distinguish B from G , but is able to distinguish imperfectly by using the observable characteristics of the applicant, such as age and education of owner, age of firms, and the purpose for which funding is required, etc. So, we assume,

- [A.7 *The Bank is only able to screen imperfectly*]: The bank screening process assumes the following, and this information is known to all firms;
 - b_G : The probability that an application by G firm is perceived by the bank as B
 - g_B : The probability that an application by B firm is perceived by the bank as G

If the bank can perfectly identify G firms from the total applicant pool, then $b_G = g_B = 0$. We assume all banks are homogeneous,

- [A.8 *Homogeneous Banks*]: All banks use the same screening procedure and have the same error ratios.

Hence we assume there is no value to the firm in making repeated applications with the same proposal to another bank because they assume the outcome will always be the same.⁶

- [A.9 *The interest rates*]: *The interest rate for a bank loan is D , and D^* for a Money Lender, where $X_B > X_G > D^* > D > p_B X_B$ in equilibrium.*
- [A.10 *Collateral*]: *The use of collateral as a term of the loan contract for the Bank or the Money Lender is not considered. This assumption is later relaxed.*

3. Loan applications and discouragement: Modeling the banks' decision

3.1. Applications by Good firms

When G firms apply to the bank for a loan, the outcome is uncertain, since their application may either succeed or fail. If successful, the firm undertakes a project from which it obtains a gross return X_G . If the application is rejected by the bank the firm considers funding from a Money Lender who charges an interest rate D^* .

Financing the project through the Money Lender yields a return of w . This is defined as the value of the net return after interest payment D^* to the Money Lender and can be considered as the opportunity cost for the bank loan application. Since D^* is assumed to be much higher than D , w is low compared with $X_G - D$.

Given the above notation the returns to the G firm after interest payments are;

$$\begin{aligned} \text{net return if successful: } & X_G - D - K \\ & \text{(with probability } 1 - b_G), \\ \text{net return if rejected: } & w - K \\ & \text{(with probability } b_G). \end{aligned}$$

Application costs K are paid irrespective of the screening result. The success probability $1 - b_G$ corresponds to whether the bank correctly screens the G firm.

Hence the net expected return of a bank application for a G firm, Ey_G , is,

$$Ey_G = (1 - b_G) (X_G - D - K) + b_G (w - K).$$

The expected return of non-application is simply w .

Hence the application condition for G firms is the following inequality,

$$(1 - b_G) (X_G - D - K) + b_G (w - K) > w,$$

Rearranging this yields

$$(1 - b_G) (X_G - D - w) > K$$

and,

$$X_G > D + w + K/(1 - b_G) \quad (1)$$

The LHS of (1) shows the good firm's return, and the RHS is "the effective borrowing cost", defined as the sum of the interest payments, the opportunity cost, and the effective application cost. Since applicants expect the possibility of erroneous rejection, their effective application cost per loan, $K/(1 - b_G)$ is higher than K .

The good firm, which satisfies this condition, applies for the bank loan and constitutes the applicant group G_A . Interpreting this inequality we further infer:

- First, since X_G and D are common to all applicants, the application decision of each firm depends on the opportunity cost and effective application cost of each firm. Bank application rates will be high when the costs of other sources of finance are high – most notably when D^* is high relative to D . Bank application rates are also high when Application costs K are low, and when b_G (the error ratio) is low.
- Second, bank application rates are higher when the interest rate D is low, or the return X_G is high.
- Third, if the application cost K is equal to zero for all firms, this condition reduces to $X_G > D + w$. This implies that if application costs are zero the bank's erroneous screening due to the lack of information does not discourage application. All G firms will apply irrespective of high mis-screening probability when D and w are low. Here the firm can apply for a loan repeatedly without cost, and so is not influenced by the probability of rejection.

3.2. Relaxing the Assumption that G firms are homogeneous

If G firms are homogeneous [Assumption 2] in the sense that the parameters (X_G , b_G , K , w) are the

same, then each G firm would behave in the same way, that is, all would apply for bank funding, or all would not. However, the introduction of heterogeneity amongst G firms shows this is associated with discouragement.

Heterogeneity could be characteristic of all four parameters above, but we will assume, initially, that it is in K only. Two examples of sources of variation in K among small firms are now provided. The first could be their ability to prepare a loan application. For example, mature firms are more likely to have experience in seeking bank loans and may have well established relationships with banks, whereas start-up firms need to commit substantially greater efforts to accessing finance. The second could be different attitudes towards banks. Some G firms are less prepared than others to incur the psychological costs of application – such as filling in forms, or providing private information to an external institution.

Information on each firm's application cost K is assumed to be private to the bank. To simplify the discussion, we assume X_G , b_G , and w are the same for all firms in G .

Each firm i in G is characterized by (X_G, b_G, w, K_i) . The application condition (1) becomes the following inequality,

$$X_G > D + w + K_i/(1 - b_G) \quad (1')$$

We now define $\gamma_i = D + w + K_i/(1 - b_G)$. This may be considered as “the effective Borrowing Cost” for the i th firm in G , and in Figure 1 is denoted as AC_G .

Using this notation we can identify, in Figure 1, the condition under which Discouraged Borrowers exist. G firms are arranged in ascending order of γ_i along the horizontal axis. The AC_G^P line shows the level of γ_i for each firm under perfect information – defined as $b_G = 0$. Here it can be seen that all G firms apply and are successful, because the gross return X_G is greater than the effective borrowing cost.

But under imperfect information, applicants are screened with error, and incur application costs [$K > 0$; $b_G > 0$]. AC_G^P then shifts up to AC_G' , with the number of applicants falling from N_G to G_A .

In this case G_A represents the “marginal firm” whose γ_i is just equal to X_G . To the left of G_A , AC_G' is lower than the return, so these firms apply for a loan. However, firms to the right of G_A do not

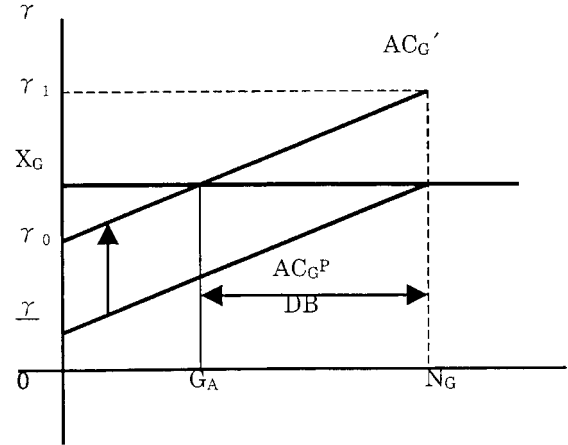


Figure 1. Discouraged borrowers and good applicants.

apply, even though they are G firms. For this reason they are defined as “discouraged”, defined as firms “which would have chosen to receive a loan from the bank, and which the bank would have lent to, but where the business did not apply for a loan”.

Some comments on this notion of Discouragement are in order. First, we considered imperfect information as the source of discouragement. Thus we defined Discouraged Borrowers as non-applicants caused by the bank's screening error under positive heterogeneous application costs. Non-application solely caused by the high interest rates charged by bank and/or by relatively modest interest rates charged by the Money Lender are not considered as Discouragement because these types of non-applications are not necessarily particular to imperfect information. We assume they are equal to zero.

Second, we have focused our attention on the heterogeneity of application costs K among G firms. However, this framework could be extended to incorporate the heterogeneity of other parameters of G firms, such as screening error. These would also show increasing effective borrowing costs determining the scale of Discouraged Borrowers.

4. Equilibrium of the bank credit market and Money Lender market

The application decision of firms is influenced by the gap between D and D^* , since the presence of

the Money Lender means firms have an alternative to borrowing from the bank. In practice, for small firms, family and relatives can be an important source of finance but, to avoid this complexity, we assume the only alternative is the Money Lender. In this section we discuss the determination of the interest rates in the pooling equilibrium of the market for bank loans and the Money Lender.

4.1. Bank loan market

The interest rate D is determined in a pooling equilibrium where G and B applicants constitute the demand side of the credit market. The application decision of B firms is the same as that for G firms, and is discussed in Appendix 2.

We assume a competitive credit market where banks' expected profit is equal to zero. The gross expected interest revenue of the bank includes the certain repayment from G firms, $D(1 - b_G)G_A$ and the uncertain repayment from B firms $Dp_Bg_BB_A$, where G_A and B_A represent the number of G and B applicants respectively. That is

$$G_A \equiv \int_0^{K_G^*} f(K) dK, \quad X_G = D + w + \frac{K_G^*}{1 - b_G}$$

$$B_A \equiv \int_0^{K_B^*} h(K) dK, \quad p_B(X_B - D) = w + \frac{K_B^*}{g_B}$$

where f and h shows the distribution function of the number of firms corresponding to the application cost K among G and B respectively, and K_G^* , K_B^* shows the application cost of the marginal applicants in G and B respectively.

The bank is assumed to finance its required funds at the interest rate $1 + r$ in a deposit market. The total fund required is equal to the total credit supply $(1 - b_G)G_A + g_BB_A$. Here, to simplify the argument, we ignore bank operating cost so the bank's expected profit is

$$EP = \{(1 - b_G)G_A + p_Bg_BB_A\}D - (1 + r) \{(1 - b_G)G_A + g_BB_A\}.$$

In the competitive credit market the equilibrium loan interest rate D is determined by setting $EP = 0$, then

$$D = \frac{(1 + r)\{(1 - b_G)G_A + g_BB_A\}}{(1 - b_G)G_A + p_Bg_BB_A}.$$

4.2. Equilibrium of Money Lenders market

Applications to the Money Lender are of four types: (1) G firms that apply for a bank loan but are erroneously judged as B and rejected, b_GG_A , (2) G firms that don't apply for bank loan because of its high application cost, $N_G - G_A$, (3) B firms that apply for bank loans and correctly identified as B and so rejected, $(1 - g_B)B_A$, and (4) B firms that don't apply to banks because of the high application cost, $N_B - B_A$. The interest rate charged by the Money Lender must not be so high that the borrowers' business is unable to survive after the interest payments are made. This condition requires that $X_G > D^*$ for G firms, and $p_B(X_B - D^*) > 0$ for B firms.

Although the Money Lenders collect the interest from G firms with certainty, they can collect the interest from B firms only when their business is successful. The financing cost for Money Lender is assumed to be $1 + r + c$, which is higher than that for banks reflecting the low credit reputation in the market where c is the credit risk premium ($c > 0$). Thus, the expected profit of the Money Lender is

$$EP_{ML} = D^*\{N_G - (1 - b_G)G_A\} + p_BD^*\{N_B - g_BB_A\} - (1 + r + c)\{N_G - (1 - b_G)G_A + N_B - g_BB_A\}.$$

Assuming competition in the ML market,⁷ it holds that $EP_{ML} = 0$ and then D^* is determined as,

$$D^* = \frac{(1 + r + c)\{N_G - (1 - b_G)G_A + N_B - g_BB_A\}}{N_G - (1 - b_G)G_A + p_B(N_B - g_BB_A)}.$$

Thus the gap between D^* and D becomes larger when the Money Lender's credit risk premium becomes larger, when G applicants for bank loans increase, and when B applicants for bank loans decrease. In the latter two cases the bank's expected profit increases and Money Lender's expected profit falls.

Here it must be noted that G_A and B_A are dependent on D and D^* , so the gap between D and D^* depends not only on the parameters in the above equations but also on the distribution functions f and h . To confine our attention to the case where

both the bank loan market and *ML* market are viable, we introduce Assumption 9 in equilibrium,

$$p_B X_B < D < D^* < X_G < X_B.$$

This ensures that both *G* and *B* types of firms are applying for bank loans and some of them also try to get funding from the Money Lenders.

5. Characteristics of Discouraged Borrowers

This section examines the impact of changes in two key influences upon the presence and extent of Discouraged Borrowers: Screening Error and Positive Application costs.

5.1. Screening error

When banks have accurate information on firms then screening error will be low. Given our earlier Assumption [A.7] that firms know whether the bank makes good decisions, more *G* firms will then apply with the expectation of correct screening.

Figure 2 shows the effect of an improvement in screening by banks. It is shown as a downward shift in the AC_G curve. When banks have no information b_G is at a maximum and the effective borrowing cost is AC_G^M . Increases in information shift the curve down to AC_G' , and under perfect information to AC_G^P . This increases the number of applications from G_A^M to G_A' , and to N_G . It also decreases the number of Discouraged Borrowers from DB^M to DB' , and to zero. This monotonic relationship between the degree of information and

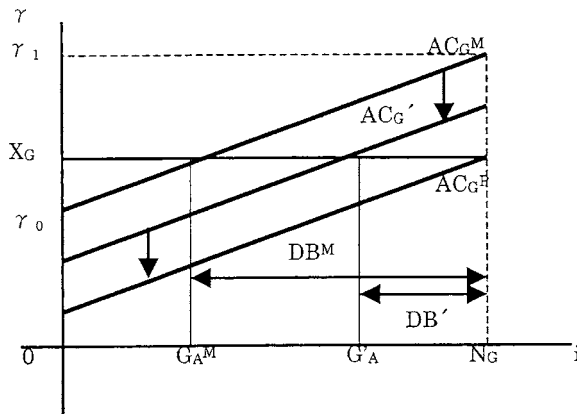


Figure 2. Decrease of screening error and Discouraged Borrowers.

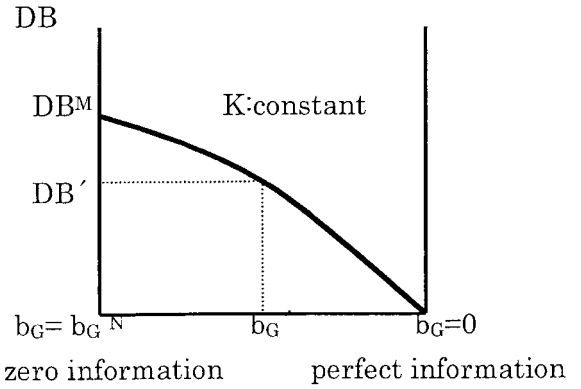


Figure 3. Change in screening error and Discouraged Borrowers.

the extent of Discouraged Borrowers is shown in Figure 3.

5.2. Application costs

So far we have assumed Application costs K are heterogeneous and fixed. However Application costs may change for a number of reasons. Improvements in firms' ability to prepare applications for funding, for example by using outside professionals or receiving advice from public agencies, will decrease application costs. Strategic changes in banks' lending policy towards small businesses may simplify the application procedure, which will lower the application costs incurred by firms. When application costs for all firms rise uniformly, with constant screening errors, the effective borrowing curve AC_G shifts upwards, which causes an increase in the number of Discouraged Borrowers. This monotonic relationship between application costs K of all *G* firms and the extent of DB is shown in Figure 4. When

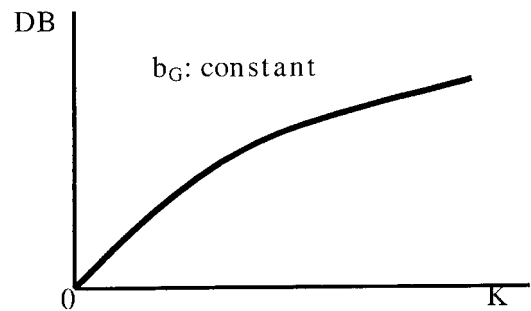


Figure 4. Changes in application costs and Discouraged Borrowers.

application costs are zero for all G firms, all G firms apply, hence $DB = 0$ as discussed in (c) of Section 3.1.

5.3. Increased information

This section examines the role of increased information upon application costs. It supplements the earlier discussion in Section 5.1 concerned with the impact of increased information on bank screening errors.

Suppose initially that banks have zero information about firms. Under Assumption A.7, firms also know banks have no information about them and that banks' screening is, in effect, close to a random selection. Hence they need not prepare applications assiduously, and so application costs are low. But, as banks become better informed and so increase their screening skills, firms have to supply better data in order to obtain the loan, so increasing application costs.

However, to examine the overall impact on discouraged borrowers we have to combine the impact of increased information on both application costs and improved screening. Hence, when bank information increases, the reduced error, b_G , shifts the AC_G curve downwards. An increase in K , however, has the opposite effect.

Increased information influences AC_G only through changes in effective application costs, $K/(1 - b_G)$. *A priori* we cannot specify the magnitude of this impact, but one plausible case is as follows.

We suggest bank screening is likely to improve significantly with increased information, but only after the bank has accumulated sufficient information to enable it to compare new applicants with existing customers. This relationship is shown as a screening error function of the banks' information, I , in Figure 5. When banks have no information, screening error is at a maximum b_G^N . Screening error then falls, at an accelerating rate, to zero under perfect information.

In contrast, once firms know the bank has even modest assessment skills, it has to incur costs in preparing applications for funding. Once that expertise is in place, however, we assume the firm at decreasing, but positive, marginal costs can meet the banks' requirements for any additional information. This relationship is shown as an

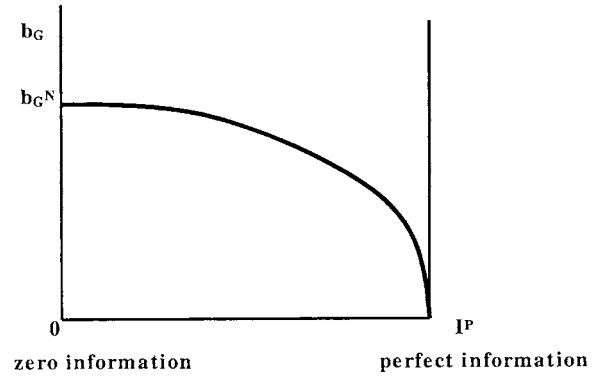


Figure 5. Screening error function.

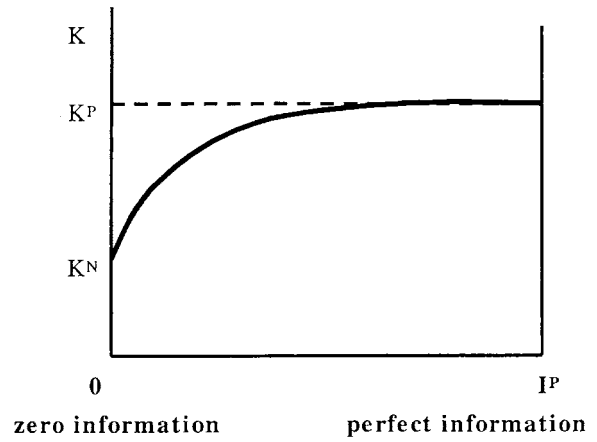


Figure 6. Application cost function.

application cost function in Figure 6. When banks have no information, application costs are zero. However, once banks have some information the firms have minimum costs, K^N . Costs then rise at a diminishing rate up to K^P under perfect information.

Under these conditions effective application costs initially rise and then fall. They rise from $K^N/(1 - b_G^N)$ at zero information; in the early stages this reflects the sharp rise of K . It then reaches the maximum point where the two contrasting effects are balanced. Finally it falls to K^P under perfect information because the effects of the improved screening error become dominant.

Since effective application costs are a surrogate for the number of Discouraged Borrowers the latter increase when banks are poorly informed. They reach a maximum level at an intermediate

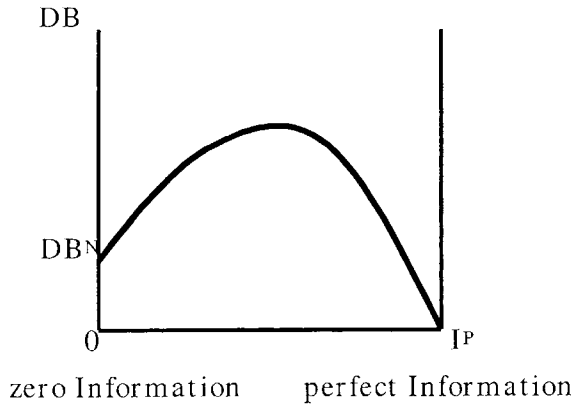


Figure 7. Increased information and Discouraged Borrowers.

level of information, but fall to zero under perfect information. This pattern of change is shown in Figure 7.^{8,9}

6. Imperfectly informed firms

Assumption A.1 at the start of the paper was that firms are perfectly informed about their own business prospects. Where the bank was also perfectly informed, Discouraged Borrowers did not exist.

This section relaxes Assumption A.1. We now assume information imperfections, not only amongst banks, but also amongst businesses. We begin by assuming, very unconventionally, that banks are perfectly informed but businesses are imperfectly informed. This is particularly likely to characterize start-up firms. Here banks are likely to have good information because of many years of codified experience in lending to other similar firms. In contrast, the individual starting a business may have no prior business experience.

Later in the section we will assume information imperfections amongst both firms and banks, but without assuming which is the better informed.

Firms are assumed to know their judgment is imperfect but to assess their business prospect before applying to the bank. Every G (B) firm thinks that she/he might be a B (G) firm with some probability. When firms are well informed the error ratio is low. The error ratio for G firms is expressed as;

fb_G : the error ratio G firms self perceive as B
 $1 - fb_G$: the ratio G firms perceive correctly.

Likewise we can define the error ratio for B firms;

fb_B : the error ratio B firms self perceive as G
 $1 - fb_B$: the ratio B firms perceive themselves correctly.

Whether or not the firm applies to the bank depends on their assessment of the bank's decision on the application and its own expected return if the application is successful. Hence Application rates depend partly on the firms perception of the bank's screening accuracy.

6.1. Case 1: The bank can correctly identify the G firm but the firm cannot correctly assesses itself

Where firms know the bank has considerable expertise in assessing proposals it might be thought that every G firm would apply. But, if firms have imperfect knowledge about themselves, they may be reluctant to apply to the bank where application costs are positive. However, some B firms may erroneously self-assess themselves as G , and apply, only to find themselves rejected ex post (De Meza and Southey, 1996).

When they apply to the bank G firms, of course, announce themselves as good firms. However, from their own self-assessing, they may suspect they are a G firm only with probability $1 - fb_G$. Since this is the best information available to the firm ex-ante, it assumes the bank will also reach a similar conclusion. That is, if G firms consider themselves as G with probability $1 - fb_G$, the bank would judge them as G with the same probability. Of course this estimate might be false ex post, but firms have only this information on which to decide.

When firms apply and succeed in getting a loan, the return is $X_G - D - K$, and when rejected its return is $w - K$. Then the expected return from applying is,

$$(1 - fb_G)(X_G - D - K) + fb_G(w - K).$$

The expected return for non-application is w as before, so the application condition becomes

$$(1 - fb_G)(X_G - D - K) + fb_G(w - K) > w \quad (2)$$

Rearranging this yields

$$X_G > D + w + K/(1 - fb_G) \quad (2')$$

The above inequality is almost identical to that derived by assuming erroneous bank screening, but a perfectly informed firm. The difference is that the single variable fb_G on the RHS is replaced by b_G in that model. This is because the difference emerges only because firms self-screen rather than the bank.

The previous analysis of Discouragement is unaltered, except for the effects of the change of information. Thus, DB would fall as w falls, as application costs K fall, and as the information available to the firm improves. The latter is reflected in a fall in fb_G .

Hence, if G firms become more confident of their business by gathering more information, they then become more likely to apply for a loan. Conversely, applications from B firms decrease as they become better informed, because they correctly become aware of their poor prospects.

6.2. Case 2: The Bank has imperfect knowledge and firms lack confidence in their self assessment

So far we have assumed either the bank or the firm (applicant) has imperfect information. This section instead assumes the imperfections could be with both parties. It formulates a “two-sided screening error model” – combining the previous two models.

We assume the bank imperfectly screens the G firms from the pool of applicants and also that firms lack confidence in their self assessment. If firms are aware of the banks imperfect knowledge then they will not expect their self assessment to correspond with the banks judgment. G firms self-assess as G with probability $1 - fb_G$, but banks perceive G firms as G only with probability $1 - b_G$. So G firms estimate their application will be successful with probability $(1 - fb_G)(1 - b_G)$.

There will also be G firms which self-assess as B , but which the bank mis-screen as G . The probability of both these events occurring is $fb_G g_B$. This classification is summarized in Table I.

By using this classification, we can show that the expected return from an application is

$$\{(1 - fb_G)(1 - b_G) + fb_G g_B\} (X_G - D - K) + \{(1 - fb_G)b_G + fb_G(1 - g_B)\}(w - K).$$

TABLE I
Probability of application outcomes

		BANK SCREENING	
		Good	Bad
SELF ASSESSING	Good	$(1 - fb_G)(1 - b_G)$	$(1 - fb_G)b_G$
	Bad	$fb_G g_B$	$fb_G(1 - g_B)$
Return for firm		$X_G - D - K$	$w - K$

Since the return for non-application is w , the application condition is

$$\{(1 - fb_G)(1 - b_G) + fb_G g_B\} (X_G - D - K) + \{(1 - fb_G)b_G + fb_G(1 - g_B)\} (w - K) > w.$$

If the bank has perfect information, then $b_G = g_B = 0$, and this reduces to (2), and if the firm has perfect information, then $fb_G = 0$, this reduces to Condition (1) in Section 3. Rearranging the above inequality yields

$$X_G > D + w + K/\{(1 - fb_G)(1 - b_G) + fb_G g_B\} \quad (3)$$

We define the RHS as $\gamma_f = D + w + K/\{(1 - fb_G)(1 - b_G) + fb_G g_B\}$. As before this γ_f is “the effective borrowing cost curve” AC_G , and firms with higher AC_G would be discouraged from applying.

The effect of changes in information for both firms and banks can be seen as follows. If firms’ self screening skills rise, then fb_G will fall. This increases the denominator of the effective application cost when $g_B < 1 - b_G$. Thus AC_G shifts down, G_A increases and DB decreases. As before, reductions in K and w decrease DB .

7. Collateral

In practice lending to small enterprises by banks frequently is collateral-based. By this we mean that, in the event of the firm defaulting on the loan, the bank is able to secure ownership of some of the firms (or the entrepreneur’s) property and sell this to cover the outstanding balance on the loan. We assume firms (or entrepreneurs) prefer not to sell their collateralizable property, such as residential buildings, to finance their project since the subjective value exceeds the market value.

This section examines the impact of collateral upon discouragement. Since the prime role of collateral is to compensate for the information

imperfections of the bank, we shall only consider it in our standard model – where (only) the bank has imperfect information.

Figure 8 shows the introduction of collateral does not alter the key results from the earlier sections. It shows the classification of G firms characterized by their effective borrowing costs γ and collateralizable assets C . Those to the left of X_G are, in principle, those who would apply since their effective borrowing costs γ are below the expected project return. Those to the right of X_G are those discouraged, even in the absence of collateral requirements.

The introduction of collateral, however, means that an additional group of good firms are now discouraged. This is the group which, whilst they know they are good, also know the bank requires collateral from them as a guarantee of their quality. They also know they do not have the minimum level of collateral CB required by the bank, and so are discouraged from applying. This group is in the South West quadrant of the Figure, below the CB line.

In summary therefore, whilst the introduction of collateral requirements by banks does increase the number of discouraged borrowers, our previous conclusion about the relationships of (K, b_G, w) and DB still hold. Thus the number of Discouraged Borrowers falls with increasing information, with lower application costs, and with increasing alternative sources of funding.

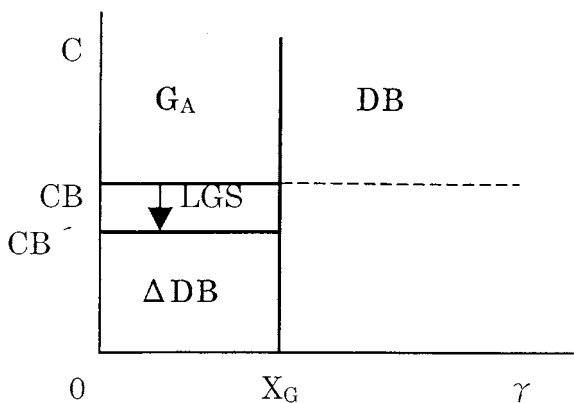


Figure 8. Collateral requirements and increases in discouragement.

8. Policy implications: Decreasing the burden of borrowers

Information imperfections on the part of firms and banks, together with positive application costs, are necessary conditions for discouraged borrowers to exist. This section examines the potential impact of three public policy responses that seek to overcome these imperfections.

8.1. Public Policies to decrease the impact of asymmetric information

Public policy can have two functions. First it can seek to equalize the information available to both parties – that is to eliminate the asymmetry. Second, if it is not able to achieve this, policy may seek to restrain the information superior side from exploiting its advantageous position.

When banks have less than perfect information, if they can improve their screening technique, this will increase the expected acceptance ratio of G firms and the rejection ratio of B firms. Public policies can help in this respect. For example, governments may give certificates to small enterprises which have achieved targets in technological sophistication or where the business owners have passed examinations, or won competitions. This certification means banks may view such enterprises as less likely to default on loans. It also provides the business owner with a greater expectation of success in making an application to the bank. Hence applications by G firms will rise, leading to decreased discouragement, resulting in a more socially efficient allocation of funds.

Conversely, when firms are poorly informed, compared with the bank, the government may provide them with advice and information. Examples of this are the often free or heavily subsidized services provided either by public servants or consultants which help small firms produce business plans which can be the basis for an application for bank funding. This service enables firms to assess themselves more accurately as to whether or not they are a G firm. Of course the certificates issued by governments, noted above, also enhance the confidence of firms' self-assessments. Ceteris paribus these lead to an increase in G applicants and a decrease in B applicants.

When banks are better informed than firms, the

former may exploit this asymmetry. Take the case of small firms in the countryside. Here there may be local banks that have good information about local firms, information that is not available to City banks. The countryside bank may be able to exploit that information advantage in two ways. First it will be more profitable if it is able, more accurately than the City bank, to distinguish between good and bad firms, by avoiding loss making lending to bad firms with the same interest rates as the City banks. Secondly, the good firm, expecting more accurate screening from countryside banks, has a lower effective application cost than with applications to City banks. So the City banks would have to reduce their interest rates to compete with the countryside banks. Thus the country bank will be able to charge a higher interest rate than its less well informed city bank competitor.

8.2. *The impact of a Loan Guarantee Scheme*

Many countries overcome the problem of limited access to collateral by G firms by having a Loan Guarantee Scheme (LGS). The Schemes are broadly similar and relate to (good) applications for funding from firms being deemed risky by banks because of limited collateral. Here the state agrees to provide the collateral to the bank in the event of a loan default, with an interest premium being charged to firm.

The impact of an LGS is best shown with reference to Figure 8. The LGS lowers CB to CB' , but leaves the vertical line X_G unchanged. The effect is to increase the number of G applicants, so reducing the number of discouraged borrowers.

8.3. *Policies to decrease application costs*

Section 8.1 above examined the impact of, for example, providing to the firm advice and/or training in writing a business plan prior to an application for bank funding. In this case we argued this benefited the bank since the good project was highlighted.

However such policies also benefit the firm through lower application costs. This happens by a lowering of the effective borrowing costs AC_G , so increasing applications from G firms and lowering Discouragement.

The overall impact of public subsidies seeking to lower application costs is, however, complex. Assuming the subsidy is available to both G and B firms, this will encourage applications from both groups. More applications from B firms, given unchanged screening error, leads to additional default costs incurred by the bank. In a competitive market this would lead to a higher equilibrium interest rate D , being charged to all borrowers including G firms. If, however, the policy leads to lower screening errors, then Discouragement will fall. The net impact therefore remains an empirical question.

9. **Conclusions and implications**

This paper has examined the concept of the "Discouraged Borrower", defined as a good firm, requiring finance, that chooses not to apply to the bank because it feels its application will be rejected.

The paper shows that, under a range of assumptions, the scale of Discouragement in an economy depends upon the screening error of the banks, the scale of Application costs and the extent to which the bank interest rate differs from that charged by the Money Lender. It shows that Discouragement does not exist where banks and firms are perfectly informed, and is minimal where banks have zero information and allocate funds by lottery. Discouragement is therefore at a maximum where there is some, but not perfect, information.

It is therefore appropriate to conclude by speculating about whether Discouragement is likely to be more widespread in a developed or a less developed economy. Our judgement is that developed economies are likely to have better informed banks, so that screening errors will be lower, Bank Applications higher and Discouragement lower.

On the other hand developed economies may be more characterized by competition in the formal financial markets, so that the gap between the interest rate of the bank and that of the Money Lender will be smaller. The price advantage of the banks is therefore likely to be smaller, so Bank Applications will be smaller and Discouragement larger.

Finally the impact of Application Costs is difficult to determine, a priori. In less developed

economies good firms may have higher psychic Application costs – cultural reluctance to provide outsiders with information, lack of literacy skills to complete application forms, intimidation of entering the “marble halls” of the bank. Yet banks in developed economies, with good screening techniques, may impose heavy costs upon applicants in terms of information requirements. It is not immediately apparent where Application Costs are higher.

It therefore remains an empirical question, of considerable importance if the findings of Levenson and Willard are valid, as to the scale of Discouragement in the market for small firm financing both in developed and less developed countries. This paper has sought to provide the theoretical framework for such an analysis.

Acknowledgements

This paper was written whilst Yoshinori Kon was a visitor to the SME Centre at Warwick University. David Storey’s interest stems from work he undertook looking at financing micro enterprises in Trinidad and Tobago. In developing the concept the contributions of Robert Cressy, Koos van Elk, Mike McLeod and Colin Barnes are appreciated. Finally we are grateful for the insights provided by the two referees.

Appendix 1: Justifying the key variables

a. Application costs

To get a loan, clients have to complete a fairly rigorous application procedure.

Initially the process is likely to begin with a *baraza* (public meeting) after which prospective clients are asked to complete a ‘sales and materials form’ (which has to be bought for a nominal fee). From this point onwards the applicants go through a process of close monitoring. This form is assessed by the field officer during a visit to the entrepreneur’s business place. If successful, the prospective borrower will then have to attend a Client-Orientation Programme (COP). This is a gathering of between 10 and 15 potential clients who come together to receive an introduction to the ISP, to learn how to make a business plan and to correctly estimate the size of the loan for which they wish to apply. The COP is conducted by the field officers usually for a total of about 10 days spread over four or five weeks. After the COP, the field officer completes approval forms for successful participants which are passed to an approvals committee. . . . Successful completion of the COP paves the way for the loan (Buckley, 1996).

This procedure describes the process of obtaining a loan as a small scale entrepreneur in Kenya. The organisation described is the Kenya Industrial Estates (KIE) Informal Sector Programme (ISP). The ISP is a nation-wide programme seeking to provide loans to informal sector businesses that are able to demonstrate growth potential. It seeks to overcome problems over access to finance at ‘affordable’ interest rates from the two main sources the Commercial Banking Sector and the Moneylenders.

b. Travelling time

Hume and Mosley (1996) in their review of micro finance provision in countries as diverse as Bolivia and Kenya say “for women borrowers, often precluded by family responsibilities and sometimes by social custom from making long trips to cities to conclude a loan agreement, the difference in travelling time in favour of the non-traditional lending institution may be particularly important”.

c. Money lenders

“Money lenders supply services desired by their clients without the costly apparatus of buildings, papers and staff, and they do this at low cost to borrowers because of proximity, their quick response to requests and the flexibility they permit in repayment. There is no doubt about the broad access of low income rural people to such credit, nor do cultural gaps separate lenders from clients. Informal lenders are often better judges of creditworthiness among their neighbours”. Hume and Mosley (1996).

d. Collateral

There is some debate in the literature as to whether money lenders seek collateral. Bottomley in von Pischke et al. (1983) says “in general the provision of security will not be an important feature of lending in the informal money market.” However Hume and Mosley report that the money lenders in Bolivia, Kenya and Malawi habitually took collateral, often like a pawnbroker in the form of a mortgage on jewellery or other loose assets.

Appendix 2: Applications by bad firms

To complete the credit market model, we show the application decision of *B* firms in a similar manner to that of *G* firms. Their return from business is assumed to be uncertain as follows;

Returns if business successful: X_B (with probability p_B)
Returns if business failed: 0 (with probability $1 - p_B$).

If a *B* firm’s application for a bank loan is successful, its expected return is $p_B(X_B - D - K) + (1 - p_B)(-K)$, where the second term reflects that the failed firm need not pay interest rate D but must pay application cost K . We assume that $D > p_B X_B$ in equilibrium, which shows that lending to a *B* firm is

unprofitable for a bank. The expected return for an application by a B firm is,

$$E y_B = g_B(p_B(X_B - D - K) + (1 - p_B)(-K)) + (1 - g_B)(w - K).$$

Since the net return is w when firms do not apply for the bank loan, B firms will apply if the following inequality holds,

$$g_B(p_B(X_B - D - K) + (1 - p_B)(-K)) + (1 - g_B)(w - K) > w.$$

Rearranging this yields,

$$p_B(X_B - D) > w + K/g_B.$$

As with the case for G firms, the values of some parameters are different among B firms. Here we assume that K is heterogeneous, but that all others are homogeneous following the case for G firms. Each j firm in B is characterized by (X_B, p_B, g_B, w, K_j) . The application condition for B firm is, then,

$$p_B(X_B - D) > w + K_j/g_B.$$

Denote the opportunity cost plus effective application cost for B firms as $\beta_j = w + K_j/g_B$. The application decision can be explained in a similar manner to that of G firms. The marginal firm's application cost is just equal to $p_B(X_B - D)$. The firms with lower β_j than $p_B(X_B - D)$ apply for a bank loan and constitute B_A .

Notes

¹ Their definition of "discouragement" is slightly different from ours. It includes all borrowers, whereas ours only includes good borrowers.

² Levenson and Willard (2000) construct a search model to analyse discouraged borrowers and credit rationing, where firm's application costs and noisy screening by banks are underlying factors. Although these are common ingredients to the present model, Levenson and Willard focus on dynamic aspects of the loan granting procedure, such as the duration of credit rationing and its negative effects on the application decision. They therefore differ significantly from our static model of the pooling equilibrium.

³ Alternatively moral hazard or the utility of the owner of B firms may explain why such firms wish to borrow.

⁴ See Appendix 1.

⁵ See Appendix 1.

⁶ Rejection of this assumption would imply the need for a dynamic iterative model, which could be the subject of future work.

⁷ When the Money Lender market is characterized by monopolistic factors, ML can obtain excess profit from their lending and the interest rate D^* would be higher than the present case, which would widen the gap between D^* and D .

⁸ We assume in Figure 7 that $K^N/(1 - b_G^N)$ is greater than K^P because of large screening errors b_G^N at zero information. Thus DB^N at zero information is positive.

⁹ The assumption that both the application cost function and the screening error function are diminishing is not sufficient for the DB to have inverse U shaped function of degree of information. However the assumption ensures that the maximum level of DB s appears between zero information and perfect information.

References

- Berger, A. N. and G. F. Udell, 1992, 'Some Evidence on the Empirical Significance of Credit Rationing', *Journal of Political Economy* **100**(5), 1047–1077.
- Buckley, G., 1996, 'Financing the Jua Kali Sector in Kenya, The KREP Juhudi Scheme and Kenya Industrial Estates Informal Sector Programme', in David Hume and Paul Mosley (eds.), *Finance Against Poverty*, Vol. 2, Routledge, London, pp. 271–332.
- de Meza, D. and D. C. Webb, 1987, 'Too Much Investment: A Problem of Asymmetric Information', *Quarterly Journal of Economics* **102**, 281–292.
- de Meza and C. Southey, 1996, 'The Borrowers Curse: Optimism, Finance and Entrepreneurship', *Economic Journal* **106**(435), 375–386.
- Hume, D. and P. Mosley, 1996, *Finance against Poverty*, Routledge, London.
- Levenson, A. R. and K. L. Willard, 2000, 'Do Firms Get the Financing They Want? Measuring Credit Rationing Experienced by Small Businesses in the US', *Small Business Economics* **14**(2), 83–94.
- Petersen, M. A. and R. G. Rajan, 1994, 'The Benefits of Lending Relationships: Evidence from Small Business Data', *Journal of Finance* **49**(1), 3–37.
- Raturi, M. and A. V. Swamy, 1999, 'Explaining Ethnic Differentials in Credit Market Outcomes in Zimbabwe', *Economic Development and Cultural Change*, 585–604.
- Stiglitz, J. and A. Weiss, 1981, 'Credit Rationing in Markets with Imperfect Information', *American Economic Review* **71**(3), 393–410.
- von Pischke, J. D., Adams Dale and Donald Gordon, 1983, *Rural Financial Institutions in Developing Countries*, Washington, D.C.: Economic Development Institute of the World Bank.

Copyright of Small Business Economics is the property of Springer Science & Business Media B.V. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.