ASYMMETRIC INFORMATION AND CREDIT RATIONING: ANOTHER VIEW OF INDUSTRIAL BANK LENDING AND BRITAIN'S ECONOMIC PROBLEM.

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I. Introduction

British clearing banks have often been attacked over their provision of industrial finance. Lever and Edwards (1980) and Edwards and Carrington (1979) are among the more recent critics; in their view the failings of the banks in this area are a major cause of Britain's relative economic decline. They emphasize the distortion of the credit system towards easy credit for consumption (especially housing) and away from productive investment. They argue that 'excessively cautious' lending policies on the part of the banks are to blame, rather than any lack of industrial projects which are viable by international standards. They describe industrial finance in the UK as 'short term, dear, unreasonably restricted in amounts, carrying legal risks, and subject to excessive security requirements', in comparison with that provided in countries such as West Germany and Japan.

In this paper we focus mainly on one fundamental aspect of these wide-ranging criticisms, namely credit-rationing. Thus, amongst other things, lenders are held to be supplying fewer funds than are demanded by borrowers at going interest rates.[1] We also consider briefly the issue of strict collateral conditions ('excessive security requirements'). We do not dispute that shortcomings in financial provision, if proved, could have serious implications for overall economic performance, though we do not address the question of the relative importance of financial factors amongst all the other determinants of performance. Nor do we dispute, in general the Lever and Edwards depiction of international differences in banking practice. However we take issue with them over the origin and significance of these differences and the consequential policy implications.

In Lever and Edwards' account the alleged shortcomings of the banks are behavioural, stemming from old-fashioned or unduly conservative banking conventions. Thus credit-rationing, strict collateral requirements and so on appear as either wholly irrational or indicative of 'undue' risk aversion on the banks' part. This is both explicitly stated and implicit in their policy implications which, where they relate to the banks, simply call for a change in banking policy as something "concrete and copyable which the more successful countries are doing, which we can adopt".

Our argument is that the behaviour described could more plausibly be explained as a rational, risk-neutral response to problems of asymmetric information in the loan market, of the kind economists have been examining over the past decade in insurance and credit markets where clients have different risk characteristics, known to the individual clients but not to the insurance companies or lending institutions (Rothschild and Stiglitz, 1976; Jaffee and Russell, 1976; Stiglitz and Weiss, 1981). We build in particular on Jaffee and Russell (hereafter J-R) who show that rationing (in the sense previously defined) is a feature of competitive equilibrium in credit markets lending to personal borrowers. In section II we extend this result to an oligopolistic market where borrowers are firms investing funds in industrial projects, rather than consumers anticipating future consumption: i.e. to conditions more nearly descriptive of UK industrial credit markets.

Section III considers the collateral and gearing issues.

Section IV goes on to show that the international differences in banking practice between Britain, West Germany and Japan correspond to informationally significant differences in the relationship between debtors

and creditors. Specifically, we argue that the German banks close involvement in corporate management and the activities of financial institutions within the Japanese corporate groups may attenuate or remove informational asymmetries over a wide area.

Section V discusses the measures that would be needed to modify UK bank lending to industry under the 'rational rationing' interpretation. Contrary to Lever and Edwards, these are not feasible short-run options, but would involve medium and long-term structural changes in the institutional fabric. Moreover, there could be potentially undesirable side-effects, and the overall effect on welfare is uncertain. However it is also suggested that the internal capital markets within multidivisional, M-form firms may be seen as an alternative institutional solution to the information problem, and evidence is presented showing their more extensive development in the UK than in Germany and Japan. If this is correct, the underlying presumption of Lever and Edward's arguments - industrial capital shortage due to banking failures - comes into question, and the need for corrective measures becomes uncertain.

Our principal conclusions are summarised in section VI.

II The optimality of credit rationing

J-R consider a two-period Fisherian consumption model where first-period consumption is augmented by borrowing to be repaid out of second-period income. This modifies readily to our case, in which borrowers are profit-maximising firms investing in fixed capital in period one and earning a return Y_2 in period two.

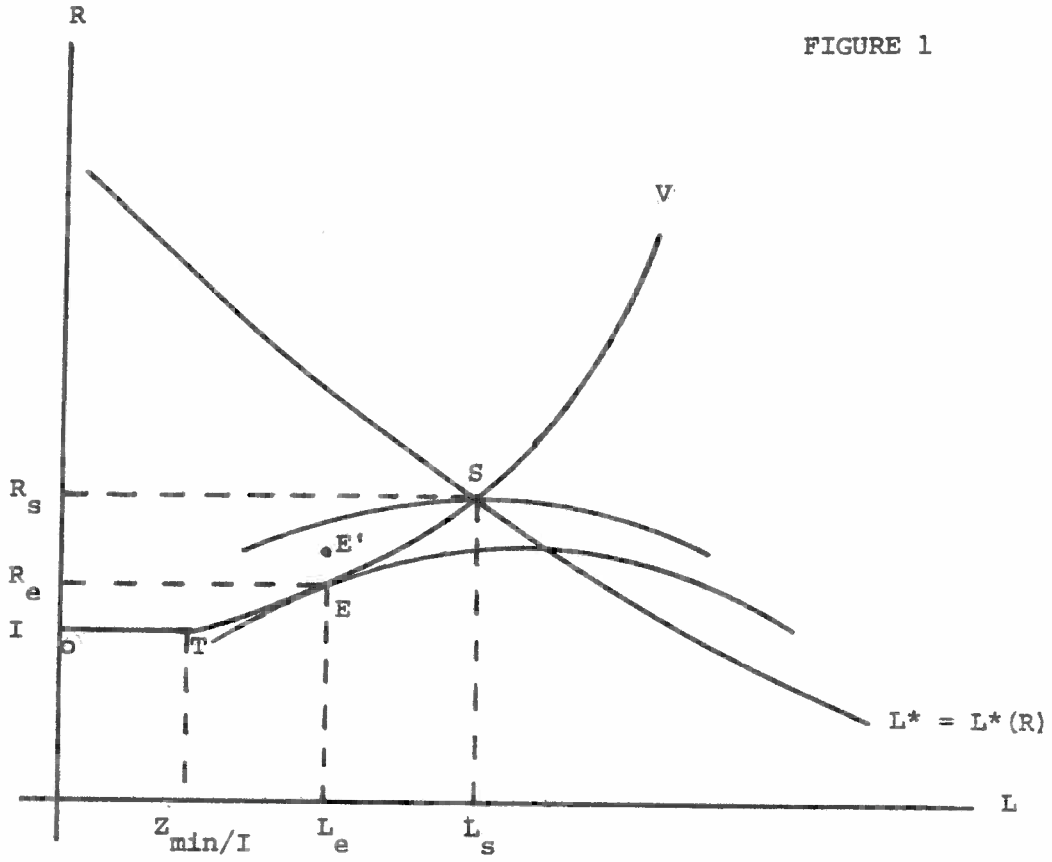
In the consumption model J-R derive the demand for loans: $L^* = L^*(R)$,[2] , where L is loan size and $R = (1+r)$. If the maximised utility function is quasi-concave, the demand curve is the locus of the peaks of indifference curves in L,R space which increase monotonically up to the demand curve and fall thereafter (figure 1). In the industrial credit model, the firm's iso-profit curves will have similar properties provided that projects of various size are feasible and production is subject to first increasing and then decreasing returns.[3] Hence the firm's unconstrained demand curve for loans $L^* = L^*[R]$ is again the locus of their maxima.

We can reasonably assume that the conditions governing the supply of credit apply in the same way to industrial as to consumer credit markets. Thus we retain J-R's assumptions that lenders are risk-neutral and maximise expected profit, borrowing in a perfect capital market at rate $I = (1+i)$, with no other costs and subject to constant returns. Expected profit is contract revenue (LR) times the liklihood of repayment $(\lambda[LR])$ minus opportunity cost (LI):

$$E(\Pi) = LR\lambda[LR] - LI.$$

Under competition $E(\Pi) = 0$ and so the competitive supply function is

FIGURE 1



written

$$R\lambda[LR] = I.$$

The repayment probability function $\lambda[LR]$ takes account of defaults. J-R consider two ways in which default behaviour can occur. In the first case there are honest and dishonest borrowers (who cannot be distinguished ex ante by lenders) and first and second period incomes Y_1, Y_2 are certain. Honest borrowers always repay L^*R, but dishonest borrowers choose between

$$C_2 = Y_2 - L^*R$$

and $$C_2 = Y_2 - Z$$

according to $Z \gtrless L^*R$, where Z is some default penalty. If Z is the same for all borrowers, dishonest borrowers all default over loan sizes greater than L, in figure 2. However, if Z is allowed to vary continuously across borrowers above some level Z_{min} at which no defaults occur, the distribution of Z will determine a no-default function $\lambda[LR]$ as in figure 3. The properties of the no-default function,

$$\lambda[LR] = 1 \quad \text{for} \quad LR \leqslant Z_{min},$$

and more especially

$$\lambda'[LR] < 0 \quad \text{for} \quad LR > Z_{min},$$

are the critical input in the J-R model, and crucial to the existence of an equilibrium with rationing.

FIGURE 2

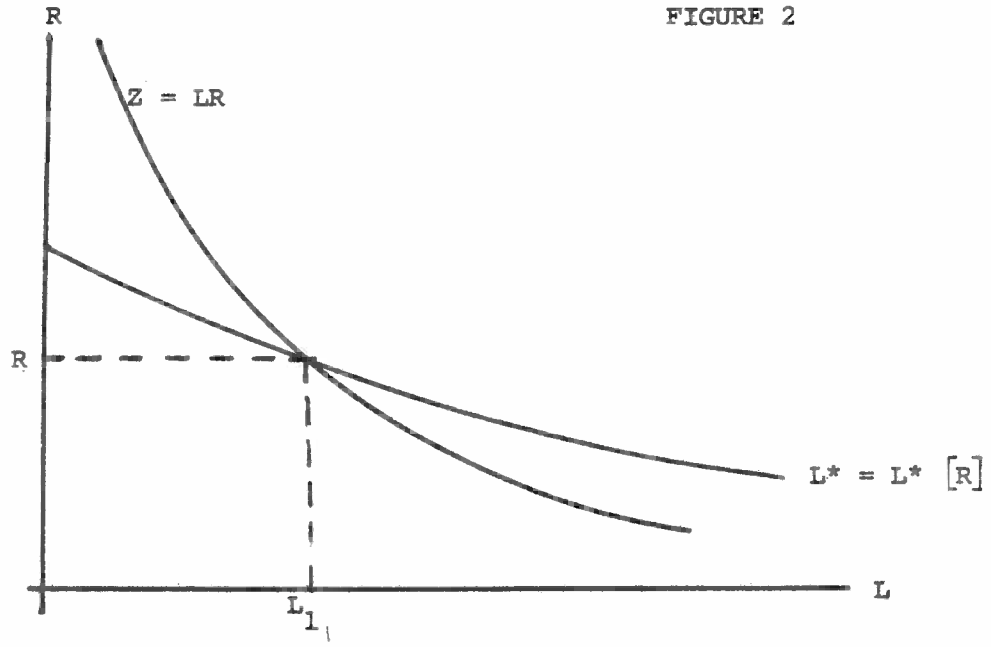
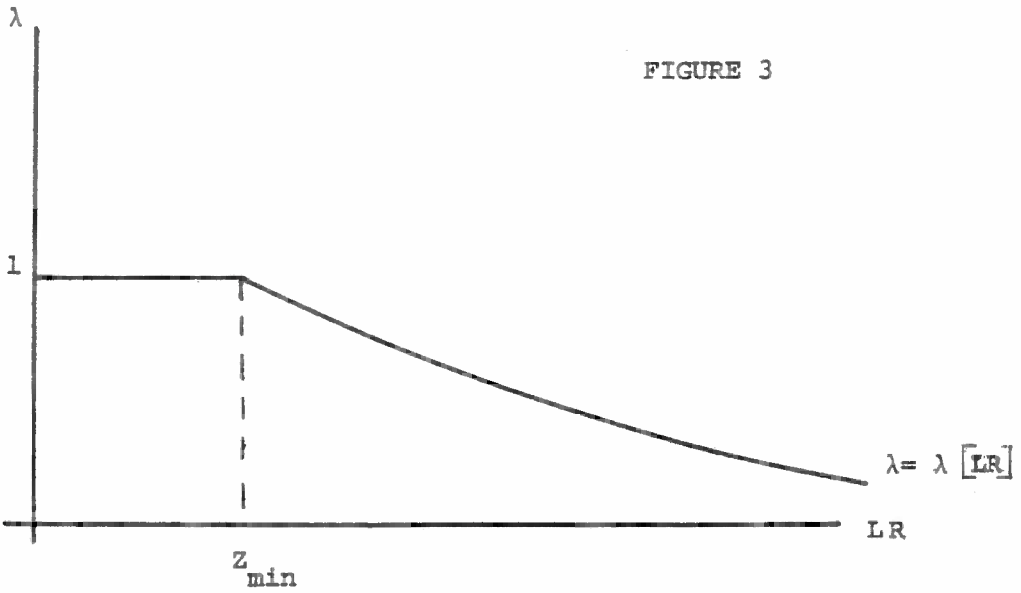


FIGURE 3



In J-R's second case buyers are identical ex ante, but become either 'lucky' or 'unlucky' ex post according to the size of a stochastic element Z in second-period income. Default now occurs if $Z < LR - Y_2$. Again, a continuous distribution of Z across borrowers above some Z_{min} will, in conjunction with the loan demand function $L^*(R)$, define a $\lambda[LR]$ function such that default increases with loan size.

We assume that default can occur in industrial credit markets for either of J-R's reasons; no doubt there are 'dishonest' firms as well as 'dishonest' consumers and it may be that the returns on some industrial investment projects are most nearly stochastic. However it could be argued that in the more general case investment returns are determined by the borrowing firms' choices and actions and hence depend ultimately on their skills and attitudes towards risk . This case also handles neatly in the J-R framework.

Thus assume that firms determine loan size in period one by maximising expected profit, taking the uncertainty of investment returns into account in some way. (For example, if the mean second period income $\bar{Y}_2$ is taken as the certainty equivalent, L^* is determined as in the basic J-R model). Actual (second period) returns depend on individual investment strategies, and in this sense $Z = \bar{Y}_2 - Y_2$ is no longer stochastic. However we can assume a distribution of Z across firms according to certain salient, risk-related characteristics. These include the firms' skill in finding investment opportunities and in judging the probabilities of different payoffs, plus their attitudes towards risk i.e. their relative risk-aversion or risk-preference. Even if there are no dishonest borrowers default must occur if $Z = Y_2 < LR$. Again the distribution of Z (ultimately of the firms' characteristics) generates a no-default function $\lambda[LR]$ with properties as before.

Thus for one reason or another the loan-demand, default and credit-supply functions and their properties all carry over from the consumer market case considered by J-R to an industrial credit-market setting. J-R's principal results, that rationing will occur under competition but not under monopoly, also therefore go through and can be briefly stated.

In L,R space the competitive supply function is the locus $\overline{OTSV}$ (figure 1). For $L \leq \bar{z}_{\min/I}\ \lambda = 1$ and therefore $R = I$. Beyond T, as J-R show, the supply function may be positively sloped or backward bending, according to whether λ is generated from a Pareto or an exponential distribution. Whereas the single contract, no-rationing equilibrium is at S, the rationing equilibrium E will prevail. Borrowers who would not default at S prefer E, which is on a higher indifference curve. If E is offered, S is driven out, and competition will eliminate contracts such as E' with higher interest rates than E and hence $E(\Pi) > 0$.

The advantage of rationing under competition, as J-R point out, is that it leads to fewer defaults and hence $R_e < R_s$. However, rationing is never profitable under monopoly; the monopolist's best strategy to decrease defaults is by limiting contract size through higher interest rates. Thus monopoly equilibrium will occur at a point on the demand curve to the left of S in figure 1, vertically above the intersection of the monopolists' marginal cost and expected marginal revenue curves.

We now consider oligopolistic lending and show that, assuming symmetric duopoly for simplicity, the non-collusive Nash equilibrium is the same as the competitive equilibrium and will entail rationing. This is intuitively plausible since by very slight variations in the contract a bank can effectively obtain the whole of the market for itself.

There are three steps in the argument. Thus we show that:

(i) any rationing contract, for which there exists a corresponding non-rationing contract with the same default rate which makes positive profits, can be beaten out of the market;

(ii) any non-rationing contract with positive profit will be beaten out of the market; and

(iii) there exists a zero-profit rationing contract which dominates the non-rationing contract.

(i) Consider the rationing contract P in figure 4 on the rectangular hyperbola $LR = k$, which is the locus of all L,R combinations at which the default rate is the same, since loan size is constant. If both banks initially offer P then one can obtain the whole of the market for itself by offering a marginally less restrictive contract on the $LR = k$ locus without changing the size of the loan repayment.

If the bank initially had n_1 borrowers and gains n_2 through offering the less restrictive contract then the change in profit is

$$n_1 + n_2\left[LR\lambda(LR) - L_2I\right] - n_1\left[LR\lambda(LR) - L_1I\right] , \qquad (1)$$

where L_1 and L_2 are the initial and the new loan sizes (1) can alternatively be written

$$n_2\left[LR\lambda(LR)\right] - n_1(L_2 - L_1)I - n_2L_2I \quad . \qquad (2)$$

FIGURE 4

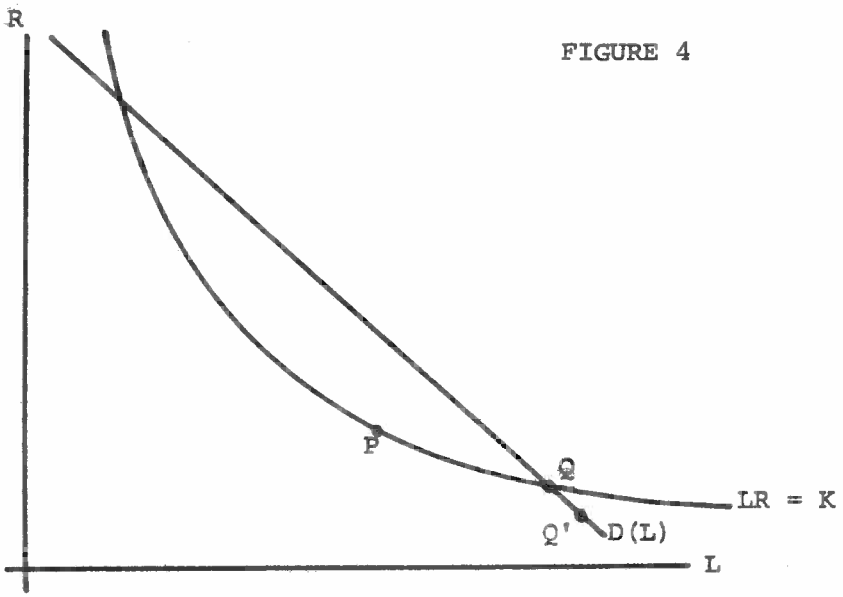


FIGURE 5

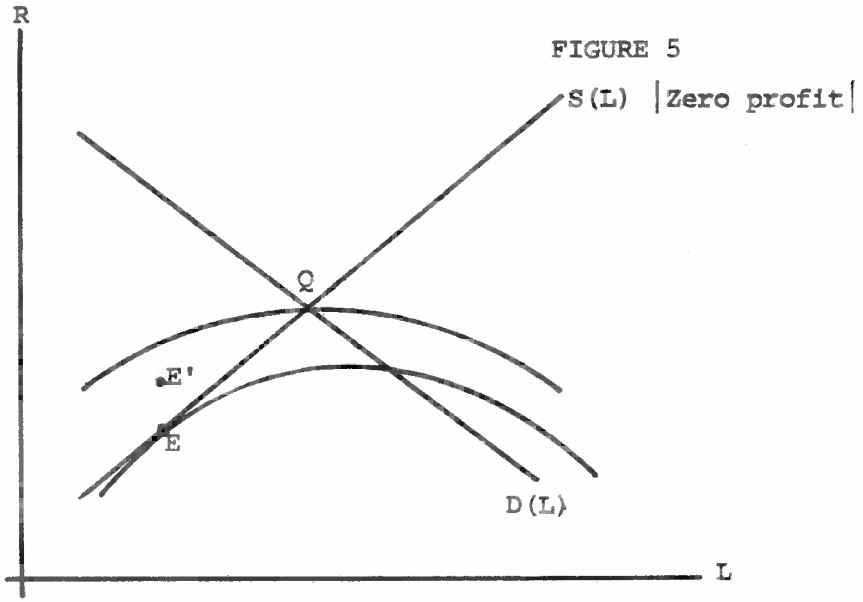
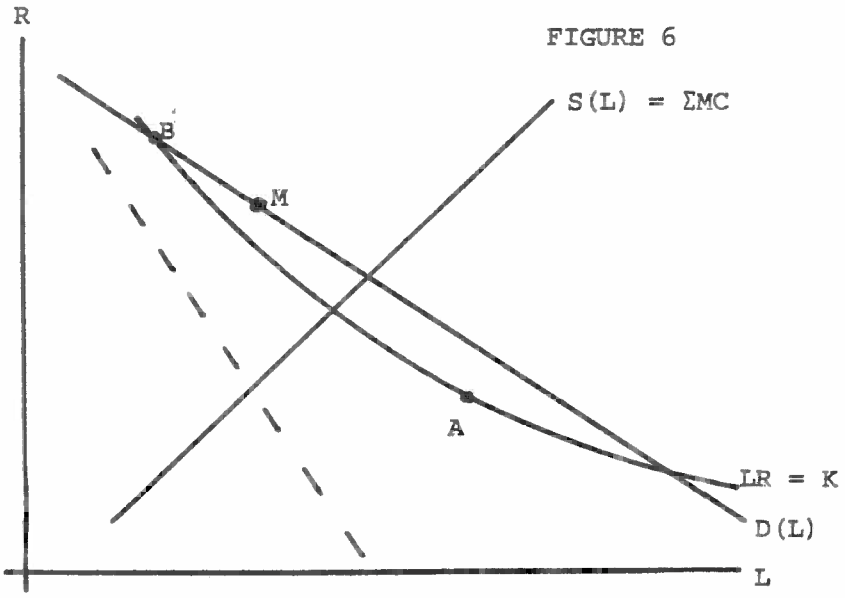


FIGURE 6



Since an arbitrarily small reduction in the restrictiveness of the loan will secure the whole market we can neglect the second term since $[L_2 \hat{=} L_1]$ and (2) reduces to

$$n_2[LR\lambda(LR) - L_2I]. \tag{3}$$

The new contract will make more profit than the old contract if (3) is positive. This will always be satisfied so long as the new contract makes positive profits. Therefore under the Nash assumption a contract such as P will always be beaten out of the market.

(ii) Likewise a non-rationing solution with positive profits must always be beaten out of the market under the Nash assumption. Suppose that instead of Q one bank offers contract Q' which will be preferred by all Borrowers. The change in the bank's profit is

$$n_1 + n_2[LR\lambda(LR)' - L_2I] - n_1[LR\lambda(LR) - L_1I] \tag{4}$$

$$= n_2[LR\lambda(LR)' - L_2I] + n_1[LR\lambda(LR)' - LR\lambda(LR)] + n_1[L_1I - L_2I]$$

where $LR\lambda(LR)'$ is the revenue obtained from the new contract Q' . Since Q' can be arbitrarily close to Q, the second two terms can be made negligibly small reducing (4) to:

$$n_2[LR\lambda(LR)' - L_2I] \tag{5}$$

The condition for the new contract to make more profit than the old is again simply that the new contract must itself make positive profit.

(iii) It remains to show that there exists a zero profit rationing solution which dominates the zero profit non-rationing solution. This is analogous to the J-R analysis of the competitive case.

Consider figure 5. Q is the zero-profit, non-rationing solution. However there exists a zero-profit rationing solution E which puts borrowers on a superior iso-profit curve. E will dominate Q since if the equilibrium was initially at Q either bank could offer E' which makes positive profit and is preferred by all borrowers. But non-collusive Nash behaviour will drive profits to zero and the oligopoly solution will converge onto the competitive equilibrium.

The unusual equivalence of the Nash and competitive outcomes merits further comment. In the standard oligopoly problem Nash or Cournot solutions permit positive profits for industries with homogeneous products. The reason for this must be that it does not pay an individual firm to allow his price to undercut that of his competitors since, even though he gains the whole of the market, his profit falls because marginal costs of production rise sharply in the short-run at least. In our case the marginal cost of a loan simply means the opportunity cost as represented by the bond rate, for example. Since this remains constant however many loans the bank makes it is always profitable for the bank to try to undercut its competitors by varying either loan size or repayment rate in order to capture the whole of the market. Therefore our result is simply due to the rather peculiar 'technology' of the finance industry which permits large increases in the 'production' of loans at constant marginal cost even in the very short-run.

At the polar extreme from Nash behaviour, however, full collusion to maximise joint profits leads to the monopoly, no-rationing equilibrium. In figure 6 the demand curve D(L) and iso-default locus LR = k are as before. S(L) is the two-plant monopoly supply curve, i.e. the sum of the duopolists' marginal cost curves defined by the first derivatives of their respective profit functions with respect to L. For any rationing solution such as A there must exist a more profitable, non-rationing solution B, since revenue (LRλ[LR]) is unchanged but loan size is lower therefore the opportunity cost of lending (LI) is lower. The joint-profit maximising solution therefore lies on the demand curve (at M in figure 4 above the intersection of the marginal cost and expected marginal revenue curves) and hence does not entail rationing. As in the J-R model, there is no necessary relation between the collusive loan size M in figure 6 and the Nash, rationing contract E in figure 5, and the colluding firms may offer a larger loan though they will of course charge a higher price.

Taking our two oligopoly results together (and recognising their generalisation to more than two firms is straightforward) we can see that under the Nash assumption the degree of monopoly in an oligopolistic credit market depends only on the degree of collusion. For any number of firms not less than two we get the competitive outcome, so that the number of firms is irrelevant, except to the extent that it might influence the probability of collusion.

III Collateral Requirements as a Screening Mechanism.

The use of collateral as a screening device to counteract adverse selection has been analysed thoroughly by Stiglitz and Weiss (1981). In this section we provide a simple illustrative example to demonstrate that the banks' demands for collateral can be a rational response to the existence of asymmetric information.

Consider a market consisting of two types of borrower with the same mean return on projects but different variances. This is illustrated in figure 7.

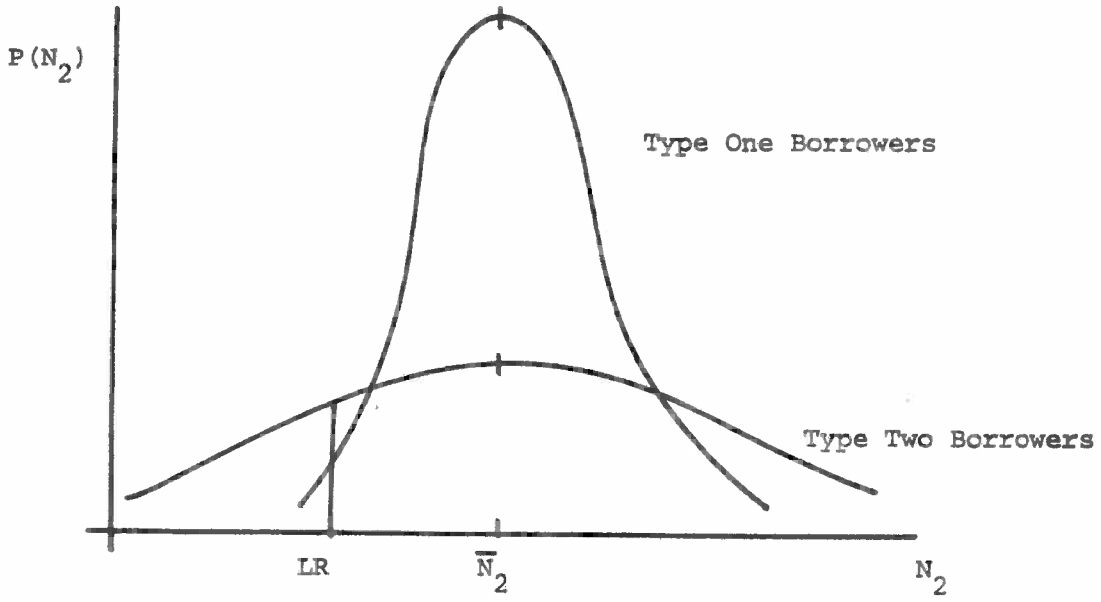


FIGURE 7

Obviously the default profitability i.e. $P(N_2 < LR)$ is greater for the type two firms. For simplicity assume that the P.d.f. for the good risk firms is degenerate i.e. its variance is zero. By making a slight reduction in the interest rate and asking for collateral the bank can offer a contract which will be preferred by the good risk firms but rejected by the bad risks. For this to be profitable for the banks the increase in revenue obtained from obtaining more good risks must offset the loss of revenue due to bad risk firms rejecting the contract.

If there are n_b banks who initially divide the market evenly then the collateral contract will be profitable if

$$n_1 LR > \frac{n_1}{n_b} LR + \frac{n_2}{n_b} LR\lambda_2 \qquad (6)$$

The assumption that the good risk firms have zero variance of returns enables us to make two simplifications. Firstly the default rate on such firms can be set to zero. Secondly we can assume that the interest rate discount offered to good risk firms is sufficiently small to neglect when considering bank profitability. Thus (6) can be rewritten:

$$n_1 (n_b - 1) LR > n_2 LR\lambda_2 \qquad (7)$$

Banks are therefore more likely to find it profitable to use the collateral contract:

(i) the greater the ratio of good to bad risks;

(ii) the larger the number of banks;

(iii) the greater is the variance of the return for the bad risks [and therefore the greater the default rate].

Given Nash behaviour all banks will eventually offer the same collateral contract and again divide the market evenly between them.

If all firms can meet the collateral requirement and there exists some degree of monopoly profit then there is no net welfare effect of the new contract. This is because the collateral requirement merely transfers some of the risk which had been borne by the banks to the bad risk firms. The collateral requirement acts in a similar way to a lump-sum tax. In the case where firms operate in a cooperative environment, however, the bad risk

firms will be driven out of the market and there will be a net welfare loss to the community [and a loss of profitability to the banks].

Another important consideration is that ability to meet collateral requirements may not be distributed evenly across firms. Thus as the collateral required increases some firms [both good and bad risks] are forced to drop out of the market. This leads to a net welfare loss. The problem is likely to be particularly severe for new firms.

IV International Differences

The foregoing theoretical arguments suggest that we should expect credit rationing and strong collateral requirements in loan markets if lending behaviour approximates competition or non-collusive oligopoly, and if borrowers may be 'honest' or 'dishonest', adopt good- or bad-risk strategies, or face stochastic returns on their investment. These circumstances seem quite general. It should be noted that the cause is not simply old fashioned banking conventions and unduly conservative attitudes; the lending behaviour in our models is a rational, risk-neutral response to the circumstances faced.

The root of the problem lies in an asymmetry of information (essentially, information on the probability of default) as between debtor and creditor.[4] Thus the individual risk characteristics of the borrowers are known to themselves, but cannot be determined ex ante by lenders. The application of conventional risk screens (e.g. in our case firm size, industrial classification, type of investment, as well as collateral), as J-R point out, can identify a risk category for a particular borrower, but credit rationing is then used to deal with the problem of individual variation within the relevant groups.

One implication of this explanation of credit rationing is that it is new firms which will be the most heavily rationed. Our models consider only single contracts, with no opportunity for borrowers' risk characteristics to be revealed in past behaviour. In practice we can imagine a series of loan contracts between individual firms and banks, through which the firm's risk characteristics would over time be revealed to the bank (though with

always some remaining uncertainty as policies and environmental circumstances changed) and the initial asymmetry is therefore reduced. Thus we may expect to observe market segmentation according to risk categories, and rationing or no-rationing according to the degree of asymmetry.

Recognition of asymmetric information as the root of the problem may be the key to understanding the international differences in lending behaviour to which Lever and Edwards give much weight in their arguments. In both Germany and Japan the banks are much more closely involved in the activities of non-banking corporations than in Britain. Inspection of the roles they play suggests that these may be expected greatly to attenuate the information-asymmetry, in comparison with the traditional arms-length creditor-debtor relationship in the UK, or even remove it entirely.

German banks play a triple role. First, they are the largest source of external finance, providing 20 per cent of total funds in the period 1964-78, of which two-thirds were long-term loans (Samuels and McMahon, 1978). Secondly, the banks control substantial shareholders voting rights, partly through their own, small holdings, but mainly via their control of proxy voting rights exercised on behalf of shareholders who have deposited their shares with them. According to the second report of the German Monopolies Commission, the banks controlled 36 per cent of voting rights in the top 100 companies, with majority control, on average, in the ten largest companies and over 20 per cent of the votes elsewhere (Monopolkommission, 1978). Thirdly, and most important for the way information is distributed and held by the relevant agents, the banks are extensively represented on the supervisory boards of German companies. Latest statistics show that the banks hold 145 or 9.8 per cent of the total 1480 seats in the largest 100 companies (Monopolkommission, 1980). This is in fact less than the 179 seats held only three years earlier (Monopolkommission, 1978), the

decline being mainly due to the extension of co-determination laws requiring increased trade union representation. Nevertheless the banks remain represented on 61 of the top 100 companies. The three major industrial banks - the Deutsche-, Dresdener- and Commerz-banks - account for two-thirds of all bank representatives, holding seats on 38, 23 and 14 companies respectively.

It is sometimes said that external company board members in Britain occupy peripheral and relatively weak positions, hampered in policy discussions by their lack of inside knowledge of the company's activities and often not receiving the information they ask for. It is hard to judge the accuracy of this for the UK in general, but safe to conclude that it does not describe the Germany situation. Under the dual board system there the supervisory board is the ultimate authority. It consists entirely of outsiders and has power of appointment, dismissal and terms of contract over the wholly internal, executive board of management. It holds regular meetings to monitor and approve corporate strategy, and has legally backed rights to internal information that are specified in detail in Germay Company law. Bank representatives may be expected to occupy above averagely influential positions, in view of the degree of reliance on bank finance and of bank voting power, and this is reflected in the fact that they supply no less than 20 supervisory board chairmen and six deputy chairmen of the top one hundred companies (Monopolkommission, 1980).

Thus there is little doubt that it is widespread for German banks to be sufficiently informed and able to influence corporate policy, and empirical evidence contains that bank participation affects performance (Cable 1982).[5] In companies where this is so we can assume there is no significant asymmetry of information about the liklihood of default as between lender and borrower in the provision of industrial loans.

We reach a similar conclusion for Japan, in the case of companies covered by the major corporate groups in the primary part of the industrial sector, such as Mitsui, Mitsubushi, Sumitomo, Fuji, Sanwa and Daiichi Kanjin. Each group contains a number of financial institutions, typically including a commercial bank, a trust bank and an insurance company, enabling the different financial needs of the group to be met (Elston, 1981).

It is the informational aspect of the groups which is important in the present context. Central to this are the weekly meetings of the president-directors of group companies to formulate group policy and take decisions together with the meetings that also take place at lower levels in the managerial hierarchy. The meetings involve, and indeed often take place under the auspices of the banks, who act as group co-ordinators as well as lenders and financial advisors. The exchange of information within the groups is so central to their existence and operation that a Japanese observer has described them as 'information clubs', and proposed that the theory of clubs be used to analyze their behaviour (Imai, 1975). In any event there can be little doubt that the banks gain detailed knowledge of the characteristics and policies of individual companies, and this would include their risk characteristics. Also significant for our analysis is the trading company which typically exists in the group. Financed to a large extent by the group bank this typically provides trade finance to smaller firms in the group "with which it is in more knowledgeable contact and thus provides a buffer to the bank against the riskier end of the lending spectrum" (Elston, 1981, emphasis added).

Corporate groups control a significant share of Japanese industrial activity. The six listed earlier contain 55 out of 80 companies listed among the top 100 in 1977, and a total of 178 companies, accounting for over 16 per cent of the assets of all limited companies.

Thus in both West Germany and Japan there is a widespread absence of the informational asymmetry which we have seen can cause credit rationing and strong loan-collateral requirements. it is interesting to note that in both countries the system of industrial banking which now exists, and which Lever and Edwards admire, developed as a second best option in the absence of established capital markets like those of Britain and America. In Japan this occurred during the post-war recovery when the government decided that, in the absence of an adequate capital market, the necessary funds should come from banks (Elston, 1981; Brown, 1980). The tradition of industrial banking in Germany dates from the first phase of industrialisation following the political unification of the country in 1870 (Thanheiser, 1976; Kocka, 1980). Despite (the banks') share-flotation activities, the limitations of the infant capital market forced a strategy of risky borrowing and lending policies (by contemporary British and American standards) with 'unsoundly' high gearing, and direct bank participation in Corporate policy was seen as a way of reducing risk (Samuels and McMahon 1978).

V. Implications for UK Policy

The thrust of the foregoing arguments is that the lower levels and more onerous terms of industrial bank-lending in the UK, compared with Germany and Japan, are due not simply to the attitudes of bankers, but to a relatively greater asymmetry of information between lending banks and borrowing firms. The relative remoteness of British banks from corporate policy and decision-making, it appears, represents an institutional failure in the face of which credit-rationing and strict collateral terms are used to minimize default and screen out bad risks. There is no reason to suppose the outcome is other than privately optimal for the banks, and there is a social gain in that total default is reduced, via both an 'adverse selection' and an 'incentive' effect, so that loan terms in general need carry a smaller provison for bad debts. Thus the outcome may also be socially optimal in a second-best sense i.e. given the informational asymmetry as a constraint. The policy issue is therefore to determine whether a move to a first-best position is feasible, by removing or circumventing the information problem.

As the problem is structural there are no easy short-run options. Contrary to Lever and Edwards, it is no more malleable in the short run than are other proferred explanations of Britain's relative industrial decline, such as inefficient management and obstructive trade unions.

Even in the long term, full-blown adoption of either the Japanese or the German system can scarcely be regarded as feasible. In the case of Japan the essential feature is the corporate group structure, with mutually interlocking shareholdings and a characteristic mode of operation (embedded to an undetermined extent in Japan's consensus-approach and general culture.)

In Germany the essential features are the dual board system of company control, together with bank control of the stockbroking business and of shareholders' proxies and bank representation on supervisory boards. In both countries the present situation is the product of a long-term historical development and it is hard to identify a politically feasible transition path from the current UK position to either of the others. A large scale realignment of existing property rights and/or a major revision of company law would be involved. Even then new patterns of behaviour and new policy conventions would take time to evolve, with no guarantee of the desired end-results on industrial lending.

There could in any case be unwelcome side effects, in particular concerning antitrust. Japanese corporate groups involve substantial concentrations of economic power at aggregate and market level, and post-war Japanese industrial development, in which the corporate groups have played an important part, has involved subordinating antitrust issues and the Free Trade Commission to other policy ends and to the powerful MITI (Brown, 1980). IN Germany, on the other hand, there has recently been much concern over the possible anti-competitive effects of bank involvement in industry. In its third general report the Monopolkommission focused in particular on the potential for effecting cartel-like behaviour via personal inter-company links including those based on bank representation (Monopolkommission, 1980) while the general concern had earlier led to the setting up of a special enquiry (Studienkommission, 1979). This and a variety of suggested reforms, ranging from greater information disclosure to nationalisation of the banks, are reviewed elsewhere (Eckstein, 1980).

It would, of course, be possible to move somewhat towards the German system merely by increasing bank representation on existing UK company boards (assuming that the technical problem that directors are

elected at shareholders' meetings could be satisfactorily solved). There is, however, a question as to the effectiveness of external board membership of UK company boards, which has already been raised. Moreover, to the extent that the German case remains a relevant guide, it would be necessary for the banks to support their representatives from specialist departments set up to monitor, analyse and advise on corporate matters, and this would impose additional pecuniary costs on the system. Potential anticompetitive effects could also result in additional social costs and would be a matter of some concern. However the main difficulty with this proposal is that, since it is so simple and if it has tangible benefits for banks and companies in the provision of industrial credit, why has it not already happened?

The answer could be that there is an alternative, preferred solution, namely the internal capital market which Williamson (1970,1975) has emphasized as the hallmark of the multidivisional (M-form) firm. Internalisation may be seen as a general solution to problems of asymmetric information in various contexts. The German and especially the Japanese systems may themselves be regarded as leading to 'quasi-internal' capital markets, insofar as banks are interlocked with particular companies. The large, divisionalised M-form firm is another example. It goes beyond the holding company in that net revenues are pooled and redistributed, according to expected future yield rather than past performance. This process of capital transfer takes place under the direction of a head office which proxies the role of shareholders in the external market, but with operational advantages that Williamson stresses include access to internal information. Head office is also the interface between the external and internal markets, less likely to encounter problems of credit rationing, whether from banks or the stock market since, as a large, established corporation its risk profile has been revealed in many previous contracts.

Thus the M-form firm is, in some ways like the Japanese trading company, a risk-buffer between financial markets and institutions and the riskier end of industrial investment with which it is in direct contact. Moreover, it offers a potential solution to the problem of financing new firms and technologies, in the shape of acquisition or conglomerate merger.

The penetration of M-form firms in the UK, Germany and Japan and their relative financial performance are the subject of continuing research. The differences so far revealed are somewhat supportive of our arguments. Thus whereas nearly 70 per cent of the leading UK firms had adopted M-form by the early 1970s (Steer and Cable, 1978) only 50 per cent had done so in Germany (Thanheiser, 1976) and only 43 per cent in Japan (Cable and Yasuki, 1983). Moreover, the adoption of M-form seems to have raised profitability significantly in the UK (Steer and Cable, 1978; Thompson, 1981) but not in Germany (Cable and Dirrheimer, 1983) and this seems likely to be at least partly due to the non-availability of M-form gains from improved capital transfer in Germany on account of the pre-existing activities of the banks. Comparable empirical results for Japan are awaited.

VI Conclusions

Credit rationing and collateral requirements can be rational, risk-neutral strategies for lenders in loan markets bearing similarity to the UK industrial credit market, if there is an asymmetry in the way information is distributed between borrowers and lenders. Differences between UK banking practices and those of other countries seem to correspond to institutional differences affecting the way information is held. Internal capital markets within multidivisional firms may reduce the significance of the alleged shortcomings of British banks in providing industrial debt capital.

Footnotes

(1) We adopt Jaffee and Russell's (1976) definition. Stiglitz and Weiss (1981) consider a different type of rationing, where some borrowers are unable to obtain loans while others are.

(2) Suppressing fixed values of Y_1 and Y_2.

(3) Firms maximise $\Pi = N_2 - LR$ where LR is the loan repayment, N_2 is (second-period) revenue net of all other costs and $N_2 = N_2(L)$. The iso-profit curves are defined by

$$N_2(L) - LR = \bar{K}$$

where $\bar{K}$ is a constant. Since $\partial\Pi/\partial L = R$, a constant, their increasing/decreasing shape clearly requires $\partial N_2/\partial L \gtrless 0$ according to $L \lessgtr L^*$.

(4) While this is clearly for the honest/dishonest and good/bad risk cases, it is less obviously so in the case of stochastic returns; here neither borrowing firms nor lending bank can be better informed about expected returns. In practical terms, however, we regard this as likely to be less common and therefore less important than the other two cases.

(5) The fact that banks can participate in policy in Germany (and also Japan) could well explain their willingness to value the company as a going concern rather than take its carcass value, which Lever and Edwards describe as typical UK behaviour.

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