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CREDIT RATIONING BEHAVIOR OF AGRICULTURAL LENDERS: THE IRON LAW OF INTEREST RATE RESTRICTIONS

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CREDIT RATIONING BEHAVIOR OF AGRICULTURAL LENDERS: THE IRON LAW OF INTEREST RATE RESTRICTIONS

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Claudio Gonzalez-Vega*

When allocating credit among borrower classes, formal lenders behave in predictable ways. Transaction costs, risks of default, financial constraints, and policies influence lender behavior. They also have a significant impact on access to credit by different borrower types and on the composition of the lender's portfolio. This paper examines the impact of interest rate restrictions on rationing behavior, access to credit and portfolio concentration. Its main conclusion, the "iron law of interest rate restrictions," claims that constrained interest rates redistribute credit portfolios to larger, safer, and established borrowers over smaller, more innovative, riskier, newer clients. This concentrates loan portfolios in fewer hands. This also accentuates the unfavorable distributive consequences of differential access to credit.

During the past three decades, formal financial institutions (FFIs) in low income countries have channeled large amounts of credit to agriculture. At the same time, through legal and financial controls, governments have kept the rates of interest that FFIs can charge on loans at low levels. The rates charged on loans to agriculture and, in particular, those charged to small farmers have been particularly low. Recent financial reforms in some low income countries, while increasing most interest rates, have often not raised the preferential rates for agriculture. As a result, interest rate differentials between

* Among the many friends who have influenced my ideas on rural finance, I want to especially acknowledge Dale W Adams, Ronald I. McKinnon, Edward S. Shaw and Robert C. Vogel.

agriculture and non-agriculture have increased. These differentials have not reflected the costs and risks of FFIs' lending to different borrower classes. Rather, they have reflected the political intent to favor some groups at the expense of others.

Usually, FFIs consider the costs and risks associated with lending to different borrower classes. If forced to charge differential interest rates, they will adopt predictable rationing mechanisms that have a considerable impact on the final allocation of credit. Often the preferential rates have been mandated with the best of intentions. They may have been adopted to promote socially desirable activities or to benefit otherwise unattended marginal groups. Unfortunately, such policies have frequently resulted in consequences opposite to those desired. These interest rate policies have repressed savings mobilization and formal financial intermediation in general, thus causing lower rates of economic growth. By reducing the size of domestic formal financial markets, these policies have also increased the importance of foreign debt as a means of financing capital formation and, thus, increased the dependency of low income countries.

In the discussion that follows, I explore the determinants of the behavior of borrowers and lenders under interest rate restrictions. I examine the consequences of such controls on the final composition of loan portfolios, and argue that the behavior of borrowers and lenders leads to a redistribution of loan portfolios to a few large borrowers.

Impact of Interest Rate Ceilings

The traditional analysis of the impact of interest rate ceilings posits a market for credit, characterized by an aggregate demand for loans, inversely related to the loan rate of interest, and an aggregate supply of deposits, directly related to the deposit rate of interest. In this model, the imposition of a ceiling on the loan rate leads to a decline in the rate paid to depositors. As a result, less resources are mobilized and the total volume of lending declines. Further, at the ceiling loan rate there is an excess demand for credit and non-price rationing mechanisms are required to clear the market. The demands by all or some of the potential borrowers will be totally or partially frustrated.

It has been increasingly recognized that these rationing processes have an unfavorable impact on small farmers. This is due to the higher risks and costs associated with lending to small borrowers. The conventional analysis, however, does not explain how these rationing processes clear the market. In particular, although the conventional model shows that depositors are worse off as a consequence of the ceiling, it does not show if all borrowers, as a group, or if specific borrower classes are better off. Since it does not explain how the new, smaller amounts of credit are allocated among various borrower classes, it is not possible to determine if the reduction in the loan rate is less or more than compensated for by a decline in the size of the loans received. Thus, the conventional analysis sheds little

light on the impact of interest rate ceilings on the allocation of resources and on the distribution of income.

The imposition of a binding ceiling on interest rates has at least three aggregate and distributive effects on the portfolios of FFIs: First, a reduction in the size of the total portfolio of assets will occur. A drop in the rate paid on deposits reduces the ability of FFIs to attract savings. The reduction in the rate of profit caused by the ceiling also reduces the ability to attract equity capital. Second, since ceilings on the loan rates of interest reduce the relative profitability of lending, the proportion of the total asset portfolio of the FFIs devoted to loans will decline. Third, a change in the composition of the loan portfolio of the FFIs will take place. Loan rate ceilings alter the relative profitability of loans to different borrower classes. Depending on the rationing mechanisms adopted, the ceilings lead to changes in the relative shares of the loan portfolios going to different borrowers. These redistributions usually lead to greater portfolio concentration.

Types of Rationing

Any loan has three aspects: its size, the interest rate charged, and the non-interest terms of the loan contract. For the reasons discussed below, given the risks, transaction costs, and information costs associated with lending to different borrower classes, most FFIs adjust these three aspects of a loan to a particular borrower in optimum manners. When the ceilings

on loan rates become binding lenders are forced to change the non-interest terms of the loan contract, or reduce loan size. The result is that borrowers receive a less attractive combination of these three aspects of their loans and the profits of the FFIs decline. The welfare of both rational borrowers and lenders could be improved by the elimination of the ceilings.

There are three ways to clear a credit market: through interest rates, through changes in the non-interest terms of the loan contract, and through changes in loan size. The first two are examples of rationing-through-price, in contrast to rationing-through-quantities. The non-interest terms of the loan contract may be considered as elements of the price vector of the loan, in addition to the interest rates. The third way to clear the market is through non-price rationing. In the event of non-price rationing, the potential borrower is willing to pay the full price, but the FFIs are not willing to grant him a loan of the size demanded. In this case, an unsatisfied excess demand for credit exists at the ruling interest rate. In practice, when ceilings on loan rates are imposed, rationing will occur through both changes in the non-interest terms of the loan contract and in loan size. Both types of rationing lead to a greater loan portfolio concentration.

Non-price Credit Rationing

Several models of lender behavior can be used to explain rationing decisions. Portfolio theory provides insights because

of uncertainty and risk, while the theory of the multiproduct firm is useful because transactions costs and product heterogeneity and differentiation are important. Also, it is possible to capture uncertainty and risk within the theory of the firm, by incorporating an ex ante premium for risk in the cost functions of the FFIs.

To demonstrate the existence of non-price rationing, it must be shown that an excess demand for credit persists at the rate charged. This requires a discussion both of supply and demand. That is, non-price rationing occurs when the lender is unwilling to grant the loan demanded by the borrower and offers a smaller amount. Jaffee set up a model of a lender who maximizes expected profits, taking into account possible borrower default. He then formulated the lender's expected income from each loan as an explicit function of the parameters of the borrower's demand function, the probability of default, and the rate of interest charged on the loan. Within this framework, the proof of the rationality of rationing amounted to showing that the lender can increase its expected profits by rationing some clients.

Jaffee also showed that credit rationing is not profitable for a lender acting as a discriminating monopolist, i.e., for a lender who maximizes his expected profits with respect to each borrower separately and is free to charge each borrower a different interest rate. Rationing is profitable only if there are restrictions on interest rate discrimination.

Keeton also showed that non-price rationing takes place if risk of default increases with the size of loan, or if there is a moral hazard problem. In some cases, FFIs may find it possible to specify all relevant characteristics of the investment project as part of the loan contract, and enforce such agreements by monitoring the borrower's behavior. If this cannot be done, FFIs will want to take into account the effect that the terms of the loan have on the borrower's project choice. A change in the interest rate affects project choice in the same way that a change in coverage influences the policyholder's level of care in avoiding accident. This moral hazard may perform essentially the same role as interest rate ceilings in inducing non-price credit rationing.

Moral hazard is only one example of a broader class of imperfections that prevail in credit markets. Another type of market imperfection arises when the outcome of the investment project depends both on some state of nature which is realized at a later date and on the amount of additional resources that the borrower is willing to contribute to the project, after that state is realized, but before the loan becomes due. Since the borrower receives only that part of the outcome which remains after repaying the loan, he will either contribute the same amount of new resources as if he received the entire outcome and repay the loan in full, or he will contribute no new resources and default. Since the borrower will choose the latter course whenever the amount left over after paying back the loan should

be less than the opportunity cost of the new resources, an increase in the interest rate will increase the likelihood of default.

According to Fried and Howitt credit rationing exists as part of an equilibrium risk-sharing arrangement between the FFIs and the borrowers. Borrowers and lenders can benefit not only from trading loan contracts now, but also from an understanding or implicit contract, concerning the amounts they will be willing to trade, and at what prices, under various conditions in the future. This is the old "customer relationship." By means of such arrangements, borrowers and FFIs can share the risks associated with an uncertain future. By dampening the movements in interest rates, these arrangements open up the possibility of non-price credit rationing.

Most of the imperfections and costs that explain nonprice credit rationing, even in the absence of interest rate restrictions, exist in the rural credit markets in low income countries. Uncertainty, default risks, transactions, information and collection costs are all particularly high in fragmented financial markets. Moral hazard and related problems are especially acute. In these markets, FFIs find many reasons to practice one or more forms of non-price credit rationing.

A Model of Lender Behavior

A simple model of non-price credit rationing is used here to illustrate the impact of interest rate ceilings on access to

credit by different borrower classes and on portfolio concentration. I assume that the lender is a profit maximizing firm (this assumption is further justified below) and that the lender's only source of revenue is the interest payments on loans. There are three components of its lending costs: the opportunity cost of the funds, the costs of administration of the loans, and the losses due to default.

The opportunity cost of the funds is exogenously given to the lender, independently of loan size, and is identical for all borrower classes. The costs of administration, in turn, include the handling costs of the loan and the risk-reducing costs of the loan. Handling costs are incurred in recording and disbursing the loan, and in receiving payments. These costs tend to be independent of the size and degree of riskiness of the loan. Thus, average handling costs, decline with loan size.

Risk-reducing costs are directed at lowering the probability of default in the loan portfolio. These costs are not independent of loan size or of the expected losses due to default. If more resources are spent in loan evaluation and supervision, the lender can reduce losses. The lender cannot, however, completely eliminate uncertainty about repayment. Therefore, it must always include, among its *ex ante* costs, a premium for risk.

Ex ante, FFIs do not know if a particular borrower will repay a loan. Instead, they must estimate the probable losses due to default. This probability of default, and the corresponding premium for risk, depend on the borrower's ability

to repay. This is a function of the outcome of the productive activity financed with the loan, the value of the additional collateral offered, and the borrower's willingness to repay.

In order to determine the probable losses due to default, FFIs usually distinguish among several borrower classes and estimate that a certain proportion of the borrowers in a given class will default. In addition, FFIs estimate the expected losses related to this default. It is in the interest of FFIs to distinguish among as many borrower classes as possible. However, this requires information that is costly to acquire and process. Due to these costs, FFIs set up a small number of borrower classes and estimate cost functions, including an ex ante premium for risk, for each class. Because of the nature of their productive activities and of the collateral offered, loans to borrowers in certain classes are riskier than loans to other borrowers. Therefore, while FFIs will charge the same premium for risk, for a loan of a given size within a given borrower class, they will want to charge a different premium to borrowers in different classes.

While additional information reduces the required premium for risk, it also increases administration costs. In order to estimate their cost functions, FFIs must determine the optimum (least cost) combination of information costs and the residual risk accepted. The sum of the premium for risk and the risk-reducing administration costs will be minimized when the marginal

cost of additional information is equated to the marginal return of using additional information to reduce default losses.

Interest rate restrictions and other financial regulations usually tend to restrict the use of information by FFIs. If FFIs operate with narrow margins, the evaluation of mortgageable property may be the only risk-reducing activity they can afford. As a result, the allocation of loans will be strongly influenced by the type of security offered. Under these conditions small farmers with few assets to offer will be penalized.

The costs and returns to the use of information in borrower selection are a function of the degree of homogeneity among borrowers. Homogeneity makes it possible to have few borrower classes. Given the heterogeneity found among small farmers in low income countries, however, FFIs ought to establish a relatively large number of classes. But, interest rate ceilings restrict the number of borrower classes that FFIs can serve. As a result of these ceilings, many small producers and new potential borrowers are thrown into the class of non-borrowers because FFIs cannot afford the information costs involved in classifying them in one of the established classes. Since the premium for risk for this residual class of potential borrowers is too high, compared to the interest rate ceilings, these producers are excluded from the portfolios of the FFIs.

For a given borrower class, the premium for risk increases with loan size, as long as the project financed is of a fixed

size; the project financed, even of variable size, shows diminishing marginal returns; the variance of marginal returns increases with loan size; or the value of the collateral offered does not increase as rapidly as loan size. Given diminishing marginal returns to the use of information, this implies that the (optimal) sum of risk-reducing costs and premium for risk increases with loan size. As a result, the marginal costs of lending are an increasing function of loan size.

As mentioned earlier, loan contracts have many dimensions. Thus, loans are viewed as non-homogeneous products by lenders. In particular, loans to different classes of borrowers are treated as different products if the lender distinguishes among them and estimates different cost functions for each borrower class. It is appropriate, therefore, to employ the theory of the multiproduct firm to examine lender behavior.

Profit-Maximizing Rationing

With respect to a given borrower class, the lender's costs, as a function of loan size, have been defined as:

(1) $$C = dL + H + xL$$

where: C: total cost of the loan,

d: constant average opportunity cost of the funds,

L: size of the loan,

H: fixed handling costs of the loan, and

x: optimum sum of average risk-reducing costs and the premium for risk.

In turn, the lender's profit function can be defined as:

(2) $$\pi = \sum^{n} R_i - \sum^{n} C_i$$

where: $R_i = r_i L_i$

π : the lender's total profits,

R_i : revenues from a loan to the i-th borrower (or class),

r_i : the interest rate charged to the i-th borrower (or class),

L_i : the size of the loan granted to the i-th borrower (or class), and

C_i : the total cost of the loan granted to the i-th borrower (or class).

If the lender is a perfectly discriminating monopolist, it will charge different interest rates, for a loan of the same size, to borrowers of different classes, as well as different interest rates, for loans of different sizes, within a given borrower class. In this case, the first order conditions for profit maximization are:

(3) $$\frac{\partial \pi}{\partial L_i} = \frac{\partial R_i}{\partial L_i} - \frac{\partial C_i}{\partial L_i} = 0.$$

That is, profit maximization requires that the marginal revenue and the marginal cost of the loan be equated, for the size of loan granted to each particular borrower. In these circumstances, the rates of interest charged to different borrowers will differ, reflecting both the different elasticities of the demand for credit from different borrowers and the different marginal costs of lending to them. Obviously, non-price

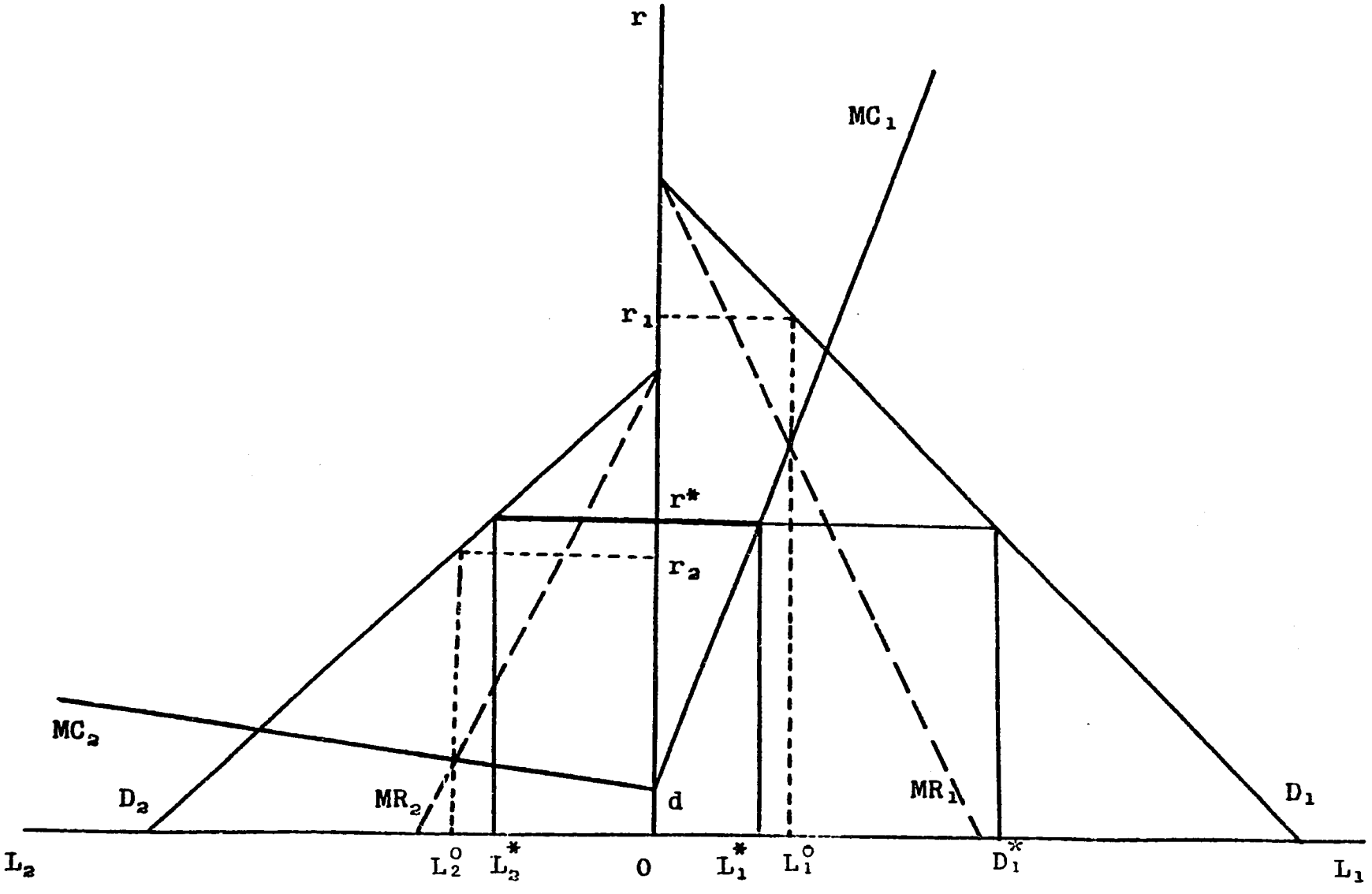
rationing will not occur in this case. This situation is represented, for a two-borrower case in Figure 1.

In Figure 1, positive loan amounts (L_1 and L_2) are measured in both directions from the origen. The demand functions for each borrower (D_1 and D_2) are inversely related to the real rate of interest charged. Marginal revenue functions (MR_1 and MR_2) are associated with the demand functions. The lender's marginal cost functions (MC_1 and MC_2) increase with the size of loan. Profit maximization requires that marginal revenue be equated to marginal cost for each borrower. Thus, the lender must grant loans of size L_1^o and L_2^o and charge different interest rates, r_1 and r_2, to the two borrowers.

The simplest restriction that can be imposed on the rates of interest charged by FFIs is the requirement that they charge a uniform interest rate to all borrowers. It is assumed that FFIs are to be free to set this uniform rate at their most profitable level. The model can be used to show that in this case profit maximization may require non-price credit rationing.

Given the possibility of rationing, that is, of the existence of individual excess demands for credit at the uniform interest rate charged by the lender, the profit maximizing loan sizes for different borrowers can be obtained. This can be done, following Eckaus, through the solution of a programming problem in which the demand functions are introduced as inequality constraints. If there is no rationing, loan size will equal the

FIGURE 1



amount of credit demanded at the uniform rate charged. If there is rationing, the inequality constraint will be binding, and an excess demand for credit will exist. The programming problem consists of in maximization of the lender's profits, with respect to the uniform rate charged and the size of the loans granted to different borrowers, subject to
the constraints that the rate charged be the same for all borrowers and that the size of each loan be equal or less than the amount demanded at the profit maximizing rate.

The lender's total profits can be defined as:

$$(4) \qquad \pi = r \sum^{n} L_i - \sum^{n} C_i$$

Total profits must be maximized, subject to:

$$(5) \qquad L_i - D_i \leq 0$$

$$0 \leq r$$

$$0 \leq L_i$$

The corresponding Lagrangean function is:

$$(6) \qquad K = r \sum^{n} L_i - \sum^{n} C_i - \sum^{n} \lambda_i \, (L_i - D_i)$$

The Kuhn-Tucker conditions for maximum profits are:

$$(7) \qquad \frac{\partial K}{\partial r} = \sum^{n} L_i + \sum^{n} \lambda_i \frac{\partial D_i}{\partial r} \leq 0$$

$$\frac{\partial K}{\partial L_i} = r - \frac{\partial C_i}{\partial L_i} - \lambda_i \leq 0$$

$$r \left[L_i + \lambda_i \frac{\partial D_i}{\partial r}\right] + \sum^{n} L_i \left[r - \frac{\partial C_i}{\partial L_i} - \lambda_i\right] = 0$$

$$0 \leq L_i$$

$$0 \leq r$$

$$L_i - D_i \leq 0$$

$$\lambda_i \ (L_i - D_i) \leq 0$$

$$0 \leq \lambda_i$$

These conditions imply that when credit rationing does not take place, the Lagrangean multiplier must be strictly positive. That is, if a borrower receives the size of the loan demanded, $L_i = D_i$, and $\lambda_i > 0$. On the other hand, credit rationing occurs when $L_i - D_i < 0$. In this case, the Lagrangean multiplier must be equal to zero; i.e., $\lambda_i = 0$. Therefore, when in the programming exercise one of the Langrangean multipliers becomes equal to zero, the corresponding borrower (or class) is rationed.

The Kuhn-Tucker conditions imply that, for the Langrangean multipliers to become equal to zero and for rationing to occur, the rate of interest charged has to become equal to the marginal cost of granting the loan. If there is no rationing, the rate of interest charged has to be higher than the corresponding marginal cost.

Therefore, when a uniform interest rate is enforced, if it is less than the marginal cost of lending to a particular borrower, the lender will limit the size of the loan granted and an excess demand for credit will prevail at the rate charged. If, in these circumstances, the lender granted a larger loan, as demanded, the addition to its costs would be higher than the addition to its revenues, and its expected profits would decline. The optimum uniform rate must be bounded by the rates that a discriminating monopolist would charge to the various borrowers, so that at least one class of borrowers will not be rationed.

As indicated earlier, Figure 1 shows a two-borrower situation where L_1^o and L_2^o are the profit maximizing size of loans granted by an unconstrained discriminating monopolist, while r_1 and r_2 are the interest rates charged. The profit maximizing interest rate set by a lender forced to charge a uniform rate to all borrowers is r^*, while L_1^* and L_2^* are the size of loans granted in this case. Given the levels of the marginal cost curves and of the uniform interest rate, one borrower is not rationed while the other one is $(L_1 < D_1)$.

Non-price credit rationing will be practiced, a fortiori, when a binding ceiling on interest rates is enforced. Assume that a ceiling r^* is imposed on the rates of interest charged on all kinds of loans. In this case, the lender's profit function will be:

$$(8) \qquad \pi = r^* \sum^n L_i - \sum^n C_i$$

This function has to be maximized subject to:

$$(9) \qquad L_i - D_i \leq 0$$

$$0 \leq L_i$$

$0 \leq r^* < r_i$; that is, the ceiling is binding for all borrowers.

The corresponding Lagrangean function is:

$$(10) \qquad K = r^* \sum^n L_i - \sum^n C_i - \sum^n \lambda_i (L_i - D_i)$$

The Kuhn-Tucker conditions for maximum profits are:

$$(11) \quad \frac{\partial K}{\partial L_i} = r^* - \frac{\partial C_i}{\partial L_i} - \lambda_i \leq 0$$

$$\sum^{n} (r^* - \frac{\partial C_i}{\partial L_i} - \lambda_i) L_i = 0$$

$$\lambda_i (L_i - D_i) \leq 0$$

$$L_i - D_i \leq 0$$

$$0 \leq L_i$$

$$0 \leq \lambda_i$$

Again, these conditions imply that, in the absence of rationing, the Lagrangean multipliers will be strictly positive. This implies that marginal cost is lower than the given interest rate ceiling. On the other hand, rationing implies that $\lambda_i = 0$. Thus, when rationing is taking place, the marginal cost of the loan is being equated to the ceiling interest rate. Depending on the relative level of the ceiling, with respect to the marginal cost curves of lending, some or all of the borrowers may be subjected to non-price credit rationing.

The Iron Law of Interest Rate Restrictions

Non-price credit rationing is widely practiced by FFIs in low income countries. Many devices are employed by lenders to restrict the size of the loans granted to certain borrower classes. One of the most popular mechanisms for rationing credit is to specify the mzximum amount that can be granted per unit of land cultivated. The setting of these limits of credit per unit of land has also been vulnerable to pressures from growers associations, particularly in the case of public FFIs. Frequently,

the proportion of total costs represented by these limits varies significantly from crop to crop. These differences tend to reflect the perceptions of FFIs about the risks and costs associated with loans for the production of different crops. Rationed borrowers are forced to complement the loans received from the FFIs with loans obtained in informal credit markets, at higher interest rates. The extent of this additional financing reflects the extent of excess demand for credit from the FFIs.

The loan portfolios of FFIs in low income countries usually include both rationed and non-rationed classes of borrowers. When interest rate ceilings become more restrictive, the size of the loans granted to the non-rationed borrower classes increases, while the size of the loans granted to the rationed borrower classes diminishes. This is the "iron law of interest rate restrictions."

A two borrower case is shown in Figure 2. At a given interest rate ceiling, r^*, the rationed borrower, represented in the right-hand quadrant, receives a loan of size L_1^*, which equates the interest rate charged with the marginal cost of lending, and leaves the borrower with an unsatisfied demand for credit. The non-rationed borrower, represented in the left hand quadrant, receives the size of loan that he demands, L_2^*. As the interest rate ceiling is lowered from r^* to r^{**}, the size of the loan granted to the non-rationed borrower increases, from L_2^* to M_2 as he demands a larger loan. At the same time, the size of

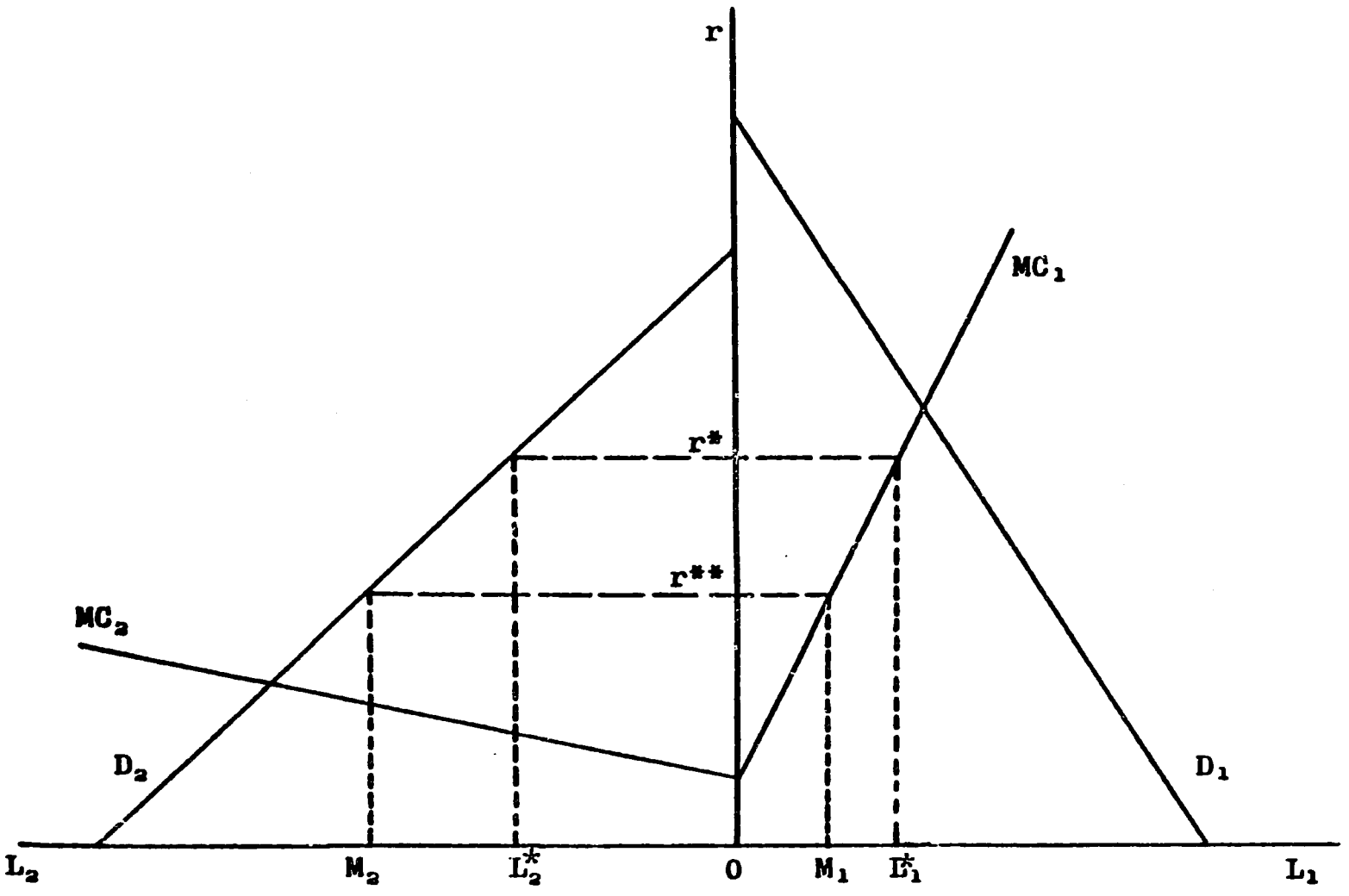
the loan granted to the rationed borrower declines, from L_1^* to M_1.

The changes in loan size implied by the "iron law of interest rate restrictions" cause a redistribution of the loan portfolios of the FFIs, as the non-rationed borrowers get larger shares of these portfolios, while the rationed borrowers get smaller shares. Finally, when the interest rate ceiling becomes very low, some borrower classes are excluded altogether from formal loans. A large proportion of the rural producers in low income countries are in these excluded groups.

Since the non-rationed borrowers tend to be the large, wealthy, and influential producers, who are already receiving the largest loans, the behavior of the FFIs implied by the "iron law of interest rate restrictions" leads to a further concentration of the size distribution of their loans. This process of increasing concentration is accelerated by the exclusion of potential borrower classes from the credit portfolios, as the FFIs are precluded from covering their average variable costs of lending in these cases. This progressive concentration of loan portfolios and the exclusion of marginal producers from access to institutional credit significantly worsens the distribution of wealth.

High transaction costs for both lenders and borrowers limit the size of rural financial markets in low income countries.

FIGURE 2



When ceilings are imposed on interest rates, FFIs may be unable to cover these costs. Because of this, they will both practice non-price credit rationing and restrict the non-interest terms of the loan contracts. The more strict terms of the contract shift some transaction costs from the FFIs to the borrowers. This shift does not affect all classes of borrowers uniformly. Rather, it tends to restrict the access of marginal borrowers to institutional credit more than proportionately, in the fashion of the "iron law of interest rate restrictions," and further contributes to a higher concentration of loan portfolios.

Rationing and the Lender's Objective Function

The models of lender behavior presented in this paper are based on the assumption of profit maximization as the lender's objective. This assumption, however, is not necessary, and the results obtained are not dependent on it. The composition of the credit portfolios of FFIs is not a random or unconscious result; it is the consequence of lenders attempts to optimize a given objective function, within the constraints they face. That is, FFIs can be treated as rational optimizers that behave as if they possessed an explicitly or implicitly defined objective function and that attempt to get the optimum result from their operations.

Different types of FFIs, of course, have different objective functions. Some of them are small private banks maximizing profits, while others are large banks attempting to maximize market shares; some of them are public development banks attempting to

maximize their political influence, while others are public or private institutions maximizing staff expenditures, managerial emoluments, or discretionary profits under different sets of constraints. Given these constraints, all of them are attempting to maximize some utility function, in terms of their managers' set of preferences, through the pursuit of either profit maximizing or non-profit maximizing strategies or of some combination of both. While the actual impact of interest rate restrictions on their behavior depends on the nature of their particular objective functions, some general considerations can be made.

For our purposes, FFIs can be grouped into two classes: those whose objective function includes financial viability and institutional survival among the goals pursued, and those whose objective function does not include financial viability. This second group of lenders includes pilot projects not interested in a permanent presence as a lender in the rural areas. It also includes agencies set up to temporarily disburse relief loans. The first group includes all FFIs that, independently of the kinds of goals that they are attempting to achieve, do it under the constraint that they must remain financially viable.

For FFIs to remain financially viable they must be able to preserve, and possibly increase, their loan portfolio in real terms. That is, they must maintain the purchasing power of their assets. To do this, their revenues must cover a significant portion, if not all, of their lending costs. To remain financially

viable, therefore, FFIs must take into account revenues and costs; that is, they must have a profits strategy. If they do not, they will not survive.

In order to survive and maintain their relative importance within the financial sector, FFIs must preserve the purchasing power of the resources they mobilize. Otherwise, they will be increasingly less able to serve their clients, their market shares will decline, and the political support that they need for their survival will diminish. FFIs are able to preserve the real size of their portfolios to the extent that they protect them from the eroding impact of inflation, to the extent that they collect the loans granted, and to the extent that they are able to generate sufficiently high profits.

Consider, for example, two identical FFIs, each one supplying 50 percent of the local credit market. One of them generates profits of two percent per year, while the other generates annual profits of twelve percent. After ten years, ceteris paribus, the most profitable institution will be serving 72 percent of this credit market, while the less profitable one will be serving only 28 percent.

Some FFIs may have continued access to the government budget, Central Bank rediscounting, or cheap credit from international institutions, that allows them to remain temporarily viable, despite their losses. However, some measure of profitability is always included in evaluations of the performance of

FFIs. International agencies and fiscal sources are usually only willing to continue with their support as long as the FFI's losses are modest and temporary. International agencies are also judged by the success and financial strength of the FFIs they support. If FFI losses are high, international agencies will demand a management change or will request institutional reforms and program reorientations before they continue with their support. When the losses of FFIs are large, fiscal sources may not possess sufficient resources to continually provide the transfers needed. This is especially true of governments in low income countries that are facing severe budgetary problems. While inflationary financing from the Central Bank could make transfers in nominal terms possible, the ensuing inflation may erode the real value of the portfolio of the FFIs even faster.

Further, FFIs will be able to receive large fiscal transfers only to the extent that they accept political guidance in credit allocation. In this way FFIs lose their independence and become cashiers for other government agencies. When banking and economic criteria are replaced by administrative and political criteria for credit allocation, the rationing processes become more vulnerable to the demands of pressure groups and loan portfolios become even more concentrated. Reluctance to take into account creditworthiness, and to enforce vigorous collection policies, leads to high rates of default. The FFIs then become costly and arbitrary mechanisms for income transfers to a few priviledged borrowers.

Conclusions

In most low income countries, the interest rates charged by the FFIs on agricultural loans have been administratively set or constrained by regulations. As a result, these rates have been too rigid in nominal terms, and too erratic and unpredictable in real terms; too low, from several perspectives; and too differentiated, in an inverted fashion. That is, the FFIs have been forced to charge the lowest rates where they would have liked to charge the highest rates. This inverted structure of interest rates has accentuated the differential impact of the costs of lending on the relative profitability of loans to different borrower classes and distorted the distribution of the loan portfolios of the FFIs among borrower classes.

The conventional model, on the basis of an aggregate demand and supply of credit, cannot explain the distributive consequences of interest rate restrictions. This paper has explored models of non-price credit rationing and of rationing through the non-interest terms of the loan contracts. It has shown how interest rate ceilings restrict the access of small farmers to institutional credit, and how this results in a high degree of concentration of the loan portfolios of the FFIs.

In particular, the paper has shown that, according to the "iron law of interest rate restrictions," as interest rate ceilings become more restrictive, the size of the loans granted to non-rationed large producers increases, while the size of loans granted to rationed small producers decreases. This

behavior of loan sizes leads towards a redistribution of loan portfolios in favor of the larger borrowers. Through these mechanisms, therefore, the interest rate ceilings enforced in most of the low income countries have been an important determinant of the limited access to institutional credit and the high degree of concentration of loan portfolios that characterize rural financial markets.

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