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**CHEAP AGRICULTURAL CREDIT:
REDISTRIBUTION IN REVERSE**

By

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Claudio Gonzalez-Vega*

Limited access to institutional credit and portfolio concentration characterize rural financial markets in low income countries. This paper examines the powerful impact of differential access to credit on income distribution. Interest rate restrictions usually imply the transfer of a subsidy. This subsidy has a regressive direct impact on income distribution, since the transfer is related to the size of loan. The subsidy also has an indirect influence on distribution, through its impact on access to loans. Given the rationing behavior implicit in the "iron law of interest rate restrictions," access to credit is further restricted by the exclusion of certain borrowers. It is concluded that the imposition of interest rate ceilings accentuates portfolio concentration and causes income distribution to worsen.

Two of the main characteristics of rural financial markets in low income countries are limited access to institutional credit, and a high degree of concentration of the loan portfolios of the formal financial institutions (FFIs). That is, only a small proportion of the total number of rural producers receive loans from FFIs and, among those with access to institutional loans, a very small group captures a very large share of the total amount of credit disbursed. It has been estimated that, on the average, only about 15 percent of the farmers in Asia and in Latin America, and no more than five percent of the farmers in Africa have had access to institutional credit. In addition,

* 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.

usually less than 20 percent of the total number of borrowers of the FFIs have received 80 percent of the total amounts of agricultural credit disbursed. This means that three percent of the total number of agricultural producers in low income countries have been the beneficiaries of at least 80 percent of the credit disbursed by FFIs.

Limited access to institutional credit and a high concentration of the loan portfolios of FFIs characterize the evolution of institutional credit markets in low income countries. These problems are particularly acute in the case of rural financial markets, however. Since the majority of the population in low income countries lives and works in rural areas, the income distribution implications of these issues are particularly important.

Factors associated with the demand and the supply of credit explain limited access to credit and the high degree of concentration of loan portfolios. The low average returns and high risks associated with many agricultural activities induce a limited demand for agricultural credit. High transactions costs, for both borrowers and lenders, further reduce the size of these markets and restrict loan access for many rural producers.

The high degree of concentration in loan portfolios of FFIs is frequently explained by the underlying concentration of wealth and political power. If there are a few wealthy producers who own a significant share of the total assets of the community, it is not surprising that they also receive a significant portion of

the credit. There is increasing evidence, however, that the distribution by size of loans of the credit portfolios of the FFIs is more concentrated than the distribution of income, the distribution of the value of the agricultural product or the distribution of land. Credit concentration, therefore, requires an additional explanation.

While initial wealth is an important determinant of differential access to loans, in fragmented capital markets highly restricted access to credit explains a significant portion of the differential rates of growth of wealth through time. Policy makers concerned with income inequalities have emphasized redistribution of land as a solution to these concentration problems. Although access to credit is as crucial as access to land, in order to provide farmers with an adequate command over resources, financial reform has been much less popular. Actually, the financial policies of low income countries, particularly the imposition of interest rate ceilings, have accentuated this limited access to credit and have aggravated the problem of very unequal wealth distributions.

Through several types of controls most low income countries have kept nominal interest rates fixed during long periods. In real terms these rates have often been negative, erratic and unpredictable. In addition, preferential rates have been established to favor agriculture and other priority sectors. I will be arguing in this essay that these interest rate policies have significantly contributed to the concentration of the loan

portfolios of FFIs and have accentuated restrictions on access to institutional credit. The modification of these policies is a necessary, although not a sufficient condition, for greater equity in the rural areas of the low income countries.

Interest rates influence income distribution in several ways. As the relative price of the future in terms of the present, they influence savings and investment flows and, therefore, affect the intertemporal distribution of income between present and future generations. As the price of financial assets interest rates affect the composition of wealth portfolios and the distribution of income among asset holders. As a component of the costs of borrowing interest rates also affect the distribution of income between lenders and borrowers and between those with access and those without access to credit.

This paper focuses on the impact that the loan rates of interest charged by the FFIs have on the personal distribution of income; that is, on the distribution of income among borrower and non-borrower classes. For these purposes, rural producers may be classified into groups, according to their size (large-small), their wealth (rich-poor), the length of their banking relationship (new client-old client), or the uncertainty associated with their productive activities (safe-risky). Any of these classifications is relevant for the analysis as long as it represents a classification related to the credit rationing behavior of FFIs or as long as it is closely correlated to such classifications.

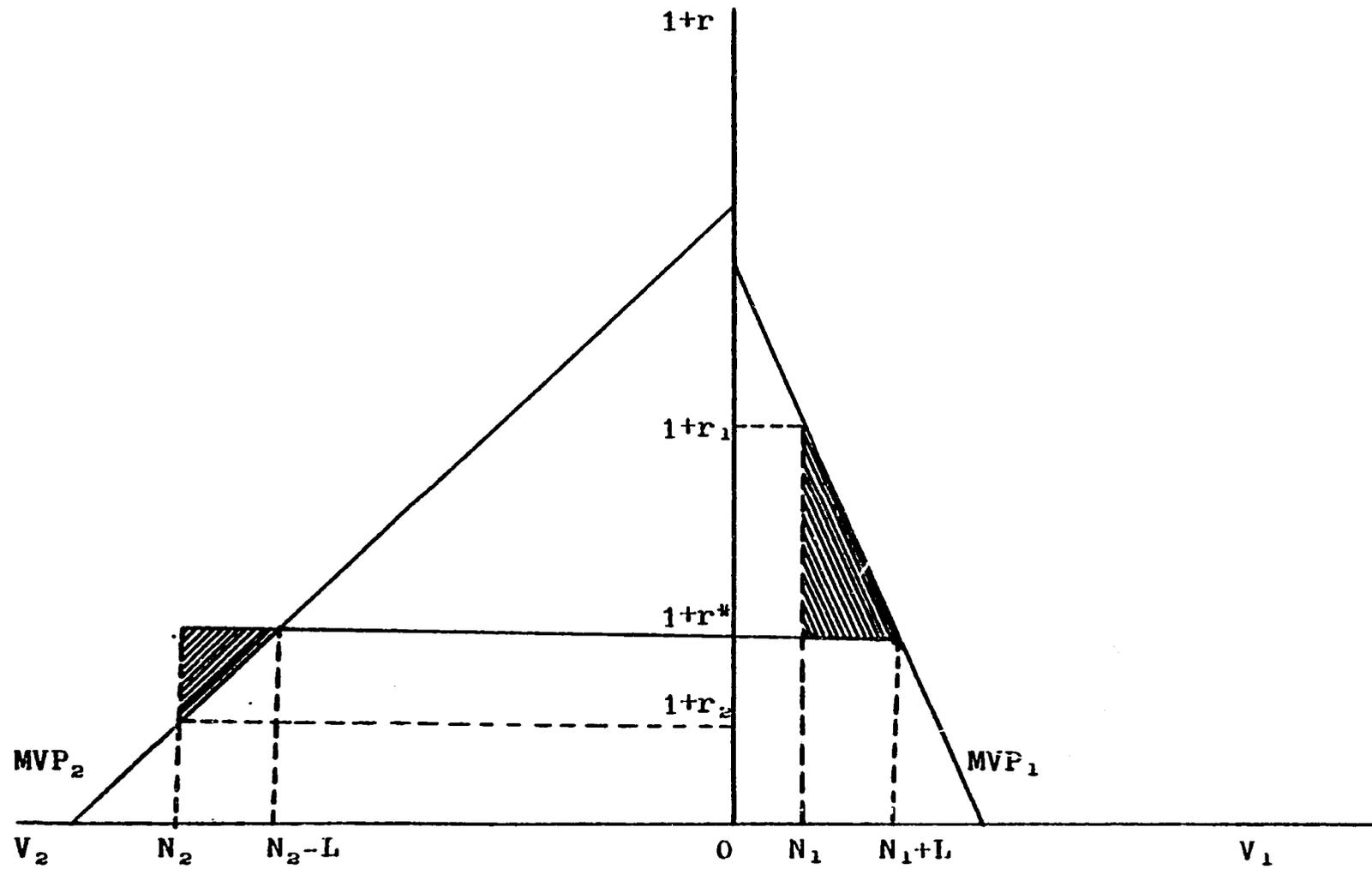
CREDIT AND INCOME

The income of any producer is determined by his productive opportunities and by his command over resources that allow him to take advantage of these opportunities. Command over the required inputs depends on the producer's own initial endowment, which is a result of his previous savings efforts, and on his access to resources external to his enterprise through credit.

In fragmented capital markets, potentially productive opportunities are poorly correlated with command over resources. Given the heterogeneity of farmers, varied investment opportunities arise from the unique individual circumstances of each producer. Given investment indivisibilities and low levels of income, past savings are frequently insufficient to take advantage of such opportunities. Therefore, many producers with attractive investment options do not possess enough resources to take advantage of these opportunities. Fragmentation implies, in turn, that other producers with abundant resources are forced to invest them in low return activities, sometimes even at negative real rates of return. In this environment access to credit is a crucial precondition for many producers to take advantage of new investment opportunities.

When producers lack access to credit markets they are forced to self-financing. This, in turn, leads to a wide dispersion in rates of return and to gross social inefficiencies. Such a situation is represented in Figure 1 for a two-producer case. In this Figure, positive amounts of variable inputs (V_1 and V_2) are

FIGURE 1



measured in both directions from the origin. The productive opportunity of each producer is represented by the corresponding curve of the marginal value of the product of the variable inputs employed (MVP_1 and MVP_2). Diminishing marginal returns are assumed throughout.

Given their initial endowments of variable inputs (N_1 and N_2), the gross income of each producer is represented by the area under the curve. Income differences are explained in terms of the different productive opportunities and of the different initial endowments ($N_2 > N_1$).^{1/} The superiority of the larger producer is assumed to be relatively greater in terms of initial endowments, than in terms of productive opportunities. Thus, under conditions of self-financing, the marginal rate of return of the large producer will be lower than the marginal rate of return of the smaller producer (that is, in equilibrium, $r_2 < r_1$). This is a situation frequently encountered in rural areas in low income countries.

Given these differences in marginal rates of return the two producers can increase their incomes through a direct loan, of size L , from the large producer to the small one, at the rate of interest r^* . After repaying the principal plus the interest on the loan $(1 + r^*) L$, the small producer has increased his income by the equivalent of the shaded area in the right-hand quadrant

^{1/} For example, for the same given amount of variable inputs, the marginal rate of returns (i.e. different productive opportunities) for the larger producer (shown on the left hand side of the figure) is higher than that for the smaller producer ($r_2 > r_1$).

of Figure 1. At the same time, the large producer obtains an increase in his income, over that previously earned from his own productive activity, equivalent to the shaded area in the left-hand quadrant of Figure 1.

While the incomes of both producers increase, as a result of a better allocation of resources, the income of the small producer increases more, if the marginal returns to the variable inputs employed by this producer decline more rapidly than the marginal returns to the variable inputs used by the large producer. The assumption that diminishing marginal returns are more pronounced for small than for large producers is a reasonable one, in view of the smaller stock of fixed inputs and possibly less favorable access to technologies of the former. If this is the case credit not only improves the allocation of resources, but it also improves income distribution. That is, the net gain of the small producer will be larger than the net gain of the large one, as represented by the shaded areas in Figure 1.

In summary, income differences among producers are due to differences in productive opportunities and to differences in initial endowments. Access to credit for the acquisition of variable inputs reduces differences that are due to diverse initial endowments. Access to credit for investment in physical or human capital, in turn, may also tend to eliminate income differences due to differences in productive opportunities. In this static context, therefore, access to credit is crucial for the generation of higher incomes.

CREDIT AND GROWTH

In a dynamic context access to credit increases the rate of growth through time of the producer's initial endowment (his wealth). In any given time period, the producer's net income is given by:

$$(1) \quad Y = a (N + L) - i L$$

where:

a: average rate of return of the variable inputs employed,

N: producer's initial endowment (wealth),

L: size of the loan received,

i: rate of interest paid on the loan.

Under the assumption that all of his net income is added each period to the producer's wealth, the rate of growth through time of his initial endowment is given by:

$$(2) \quad g = \frac{Y}{N} = \frac{a (N + L) - iL}{N} = a + R (a - i)$$

where $R = \frac{L}{N}$ is the leverage ratio.

That is, the rate of growth of the producer's wealth is directly associated with the average rate of return on the variable inputs used by the producer and with the leverage ratio, while it is inversely related to the rate of interest paid on the loan. These three variables, however, are not independent. Even if the rate of interest paid is given, the average rate of return will be inversely related to the leverage ratio, if decreasing marginal returns are present. Taking the total differential of

(2), the impact on the growth rate of wealth of a larger loan is given by:

$$(3) \quad \frac{dg}{dL} = \frac{\partial a}{\partial L} + R \frac{\partial a}{\partial L} + \frac{R}{N} (a - i) = \frac{N + L}{N} \frac{\partial a}{\partial L} + \frac{a - i}{N}$$

However, the marginal rate of return, r , is equal to:

$$(4) \quad r = (N + L) \frac{\partial a}{\partial L} + a$$

Therefore:

$$(5) \quad \frac{dg}{dL} = \frac{r-i}{N}$$

That is, the rate of growth of the producer's wealth will increase as his access to credit increases (the size of loan L increases), as long as the marginal rate of return on the variable inputs employed is higher than the rate of interest paid.

The impact of differential access to credit on the rates of growth of wealth can lead to dramatic differences in future endowments and, therefore, in the level of incomes through time of different producers. Assume that, initially, two producers X and Z possess identical productive opportunities and identical initial endowments. That is:

$$(7) \quad a_x = a_z = a(V), \text{ for any given level of variable inputs used, and}$$

$$N_x = N_z = N_0, \text{ in the initial period } 0.$$

Assume that each of these producers adds to his initial endowment each period all of his net income. Assume that, while

producer Z has access to credit, producer X does not. The rates of growth of their initial endowments will be:

$$(8) \quad g_x = a_x$$

$$g_z = a_z + R (a_z - i)$$

After n periods of time, the wealth of these producers will be:

$$(9) \quad N_n^x = (R + g_x)^n N_0 = (R + a_x)^n N_0$$

$$N_n^z = (R + g_z)^n N_0 = [R + a_z + R (a_z - i)]^n N_0$$

After n periods of time, therefore, the relative size of their endowments will be:

$$(13) \quad W = \frac{[R + a_z + R (a_z - i)]^n}{(R + a_x)^n}$$

That is, W indicates how many times the wealth of the producer with access to credit is larger than the wealth of the producer without access to credit. Assume that the initial period $W = 1$. The differences that will exist after some time are directly related to the number of periods that have passed (n), the difference between the average rates of return, a_x and a_z , the leverage ratio (R), and the rate of interest paid (i). Table 1 illustrates the impact of these variables of W under the assumption that the average rate of return is constant.

For example, given a constant real average rate of return (a) of 25 percent, if each year one of these two producers receives a loan equal to three times his initial endowment, at a real rate of interest of minus ten percent (r), and the other producer does not receive any loans, after five years (N=5) the wealth of the former will be more than 21 times larger than

Table 1: Hypothetical Increases Through Time of a Firm's Wealth Under Various Assumptions of the Real Rate of Return, Interest Rates and Leverage Ratios.

a	r	R	W		
			n=5	n=10	n=20
.25	.20	1	1.2	1.5	2.2
25	.05	1	2.1	4.4	19.5
.25	.05	3	7.1	50.4	2,542.3
25	-.10	3	21.1	444.8	197,859.3
10	-.30	4	89.1	7,938.0	63,011,755.0

the wealth of the latter. After 20 years, the wealth of the borrower will be almost 200,000 times larger than the wealth of the non-borrower!

The previous simulation illustrates the magnitude of the impact of differential access to credit on rates of growth of wealth and on income distribution. Differences in wealth between producers increase as the difference between the average rates of return earned and the rate of interest paid increases. The most dramatic differences, however, are directly related to the leverage ratio (R), $\frac{L}{N}$. That is, access to credit, in comparison to the producer's initial endowment, is the most important determinant of his relative level of wealth and income in the future. Therefore, a key mechanism for influencing the distribution of wealth through time is access to credit.

NATURE OF INTEREST RATE POLICIES

The interest rates charged by FFIs have been administratively set, or constrained by usury ceilings in most low income

countries. Even in the presence of high rates of inflation, these interest rates have been kept at low nominal levels. As a result, in real terms many of these rates have been negative. Also, they have not reflected the opportunity costs of the claims on resources transferred by FFIs to their borrowers; they have not equated the supply and demand for institutional loans; and they have not covered the costs and risks associated with lending to some borrower classes. Most importantly, these low interest rates have implied the transfer of a substantial subsidy to the relatively few, not so poor, beneficiaries of the loans.

Interest rates not only have been kept low, but inverted and differentiated rate structures often have been enforced. That is, interest rate differentials have not reflected the costs and risks associated with lending to different borrower classes. Rather, they have resulted from policy makers trying to favor some sectors and activities at the expense of others. Typically, the borrower classes favored with preferential rates, like small farmers, are associated with the highest costs and risks for the FFIs. Thus, FFIs have been forced to charge the lowest rates precisely to those borrower classes to which they would want to charge the highest interest rates.

As a result of these discrepancies, the borrower classes that the authorities intended to favor have been harmed. Recent interest rate reforms, that in some countries increased all but the preferential rates, have significantly widened the differentials within the inverted interest rate structure and have thus

accentuated credit rationing and the concentration of the loan portfolios. For example, in the mid-1970's, while the commercial interest rates and Government bond rates reached 50 percent per annum and more in Brazil, the interest rates charged on agricultural loans were kept at 15 and 17 percent per annum. Substantial inefficiencies in credit allocation and inequities in income distribution resulted from this policy.

NATURE OF THE INTEREST RATE SUBSIDY

When the interest rates charged on loans do not reflect the social opportunity cost of the resources disbursed, plus the social cost of transferring them, a subsidy is implicit in the credit transactions. This subsidy can have a significant impact on income distribution.

Restrictions on the rates of interest charged on loans impact income distribution in two ways: directly, due to the implicit subsidy, and indirectly, due to the differential influence of the restrictions on access to credit.

Suppose, very conservatively, that the social costs of the loan are, in real terms, ten percent per annum. If the nominal rate of interest charged is 15 percent per annum, but the rate of inflation is 55 percent per annum, then the real rate of interest charged is minus 23 percent per annum.^{2/} If a positive rate of 10 percent should have been charged, while a negative rate of 23

^{2/} $r = \frac{1+i}{1+p} - 1$, where r: real rate of interest;
i: nominal rate of interest; and
p: rate of inflation.

percent was actually charged, there is a rate of subsidy of 33 percent implicit in this credit transaction. That is, 33 cents out of every dollar lent represent an outright, free transfer of resources, a gift.

The magnitude of this subsidy can be substantial. Suppose that the total volume of agricultural credit disbursed by the FFIs represents 60 percent of the gross value of the domestic agricultural output. In this case, the total amount of the subsidy, the grant transferred, will be equivalent to 20 percent of the value of this output. This is a very sizable transfer of resources and its impact on income distribution is very significant. Because the subsidy implicit in underpriced credit can be so substantial, it is not surprising that policy makers value it as a powerful instrument for income redistribution. Unfortunately, the subsidy seldom reaches the poor. The vested interests of the groups that eventually capture the subsidy create serious obstacles for interest rate reform in agricultural credit programs.

The main claim of this essay is that credit, in general, and interest rate subsidies, in particular, are a very poor tool for income redistribution. The mechanism is inefficient, because the same redistributive objectives could be achieved at much lower social costs by other means. Even as a second best solution, the subsidy is not justified, because it is ineffective; that is, it is intrinsically incapable of achieving the desired redistributive goals, and because, for most empirically relevant

circumstances, it is perverse. It leads to a redistribution "in reverse," actually accentuating the concentration of wealth, instead of alleviating it. This is the case because, while the direct impact of the subsidy is regressive, its indirect impact further restricts access to institutional credit, and further concentrates the loan portfolios of FFIs in the hands of a few large borrowers.

DIRECT IMPACT OF THE SUBSIDY

To become a beneficiary of the interest rate subsidy, a producer must first become a borrower. Access to cheap credit, however, is very restricted. As a consequence, a large proportion of the total number of producers are excluded, ad portas, from this subsidy. Moreover, the amount of the free grant is directly proportional to the size of the loan received. That is:

$$(10) G = [r^* - r] L(W)$$

where G: the amount of the grant,

L: size of the loan,

W: the borrower's wealth,

r*: the social opportunity cost of the claims on resources lent, and

r: the rate of interest charged on the loan.

That is, the larger the loan, the larger the grant. In addition, since there is a high correlation between previous wealth and the size of the loan received, the wealthier the borrower, the larger the grant. As a result, large producers

have access to large loans and to the accompanying large grants. Medium-size producers have access to small loans and to the associated small grants. Small producers have had few or no loans and thus few or no grants.

Moreover, as indicated elsewhere in this volume, when the rate of subsidy ($r^* - r$) increases, large non-rationed borrowers have access to loans larger than before and the magnitude of their grants increases more than proportionately. The size of the loans granted to rationed borrowers, on the other hand, declines, and the magnitude of their grants could increase or decline, depending on the relative position of the intermediaries marginal cost curve of lending to them.

There is one more way in which cheap credit has a direct unfavorable impact on income distribution. The resources freely transferred to the privileged borrowers are collected by the FFIs through the exploitation of savers and of holders of financial assets, through the inflation tax, which reduces the purchasing power of their assets. In most low income countries, the size distribution of the borrowers of FFIs is much more concentrated than the distribution of holders of claims on the financial system. As a consequence, the majority of the population in low income countries has been paying a substantial tax, used to finance a subsidy enjoyed by a few privileged borrowers.

INDIRECT IMPACT OF THE SUBSIDY

Interest rate restrictions also influence income distribution through their differential impact on access to credit. The nature of this impact depends on the rationing behavior adopted by FFIs when the ceilings are imposed. Most of the likely mechanisms for rationing adopted by the FFIs tend to redistribute loan portfolios in favor of some borrower classes (e.g. large, safe, and well known borrowers).

For these purposes, producers can be classified into three groups, according to the nature of their access to institutional credit: non-rationed borrowers, that is, producers that receive all the credit that they demand at the rate of interest charged by FFIs; rationed borrowers, that is, producers who are granted FFIs loans smaller than the size they demand at the going rate of interest, so that they are left with an unsatisfied excess demand for institutional credit; and excluded borrowers, that is, potential or previous borrowers, that FFIs are not willing to serve at the constrained interest rates.

In general, in the case of FFIs with a profits strategy, if the maximum rate of interest that can be charged covers the marginal costs of lending to a particular borrower, his demand will be satisfied. If, on the other hand, this maximum rate of interest does not cover the marginal costs of lending, the FFIs will reduce the size of the loan granted, below the size of the loan demanded, until the rate of interest and marginal costs are equated. Finally, when the maximum rate of interest does not

cover the average variable costs of granting the loan, FFIs will exclude the borrower from their portfolios.

Lending costs tend to be particularly high in rural financial markets. There is a great diversity among rural producers and the information required for borrower selection, concerning entrepreneurial ability, productive opportunities, and access to resources, is expensive to collect. Risks are also particularly high, due to the importance of exogenous factors in determining the outcome of investment efforts, and creditworthiness is difficult to ascertain. Even if, ex post, small producers tend to be less delinquent than some of the larger producers, it is difficult for lenders to choose from the heterogeneous mass of farmers.

One of the consequences of these high costs and risks of lending is that rural producers, in general, and small farmers, in particular, are among the rationed classes of borrowers. When ceilings on interest rates are imposed or lowered, the amounts of credit demanded by all classes of borrowers increase. However, according to the "iron law of interest rate restrictions," only the size of the loans granted to non-rationed borrowers increases. In the case of the rationed borrowers, the size of loan granted declines, while in certain circumstances these borrowers are excluded from the loan portfolios altogether.

Conclusions

The most important conclusion of this paper is that interest

rate ceilings redistribute the loan portfolios of FFIs in favor of non-rationed borrowers, and modify the access to credit by different producer classes. Since access to credit is a crucial determinant of differences in the growth of wealth through time, these changes in loan size significantly influence income distribution. Non-rationed borrowers tend to be the largest and most influential producers, and interest rate restrictions lead to the concentration of credit portfolios in their favor.

For a rural producer, an important aspect of financial markets is his degree of access to credit. Ironically, the policies that have attempted to keep the price of credit artificially low have, at the same time, modified access in unwanted ways: these policies have improved the access of the large and influential producers, while at the same time they have limited, or completely eliminated, the access of the small producers to the loan portfolios of the FFIs. These policies have not only reduced efficiency in the allocation of the economy's resources, but they have also reduced the financial viability of the FFIs and have contributed to more concentrated distributions of wealth and of income in the rural areas of the low income countries--the reverse of what most policy makers say they want to do.

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