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RESEARCH NOTES ON AGRICULTURAL CAPITAL FORMATION AND TECHNOLOGICAL CHANGE

The Ohio State University and
ESALQ/University of São Paulo

No. 5
Subject: Credit-Brazil

Researchers: Dale Adams & Josephy Tommy
Date: April 30, 1971
Location: Columbus, Ohio

Tentative title of study, "Capital Formation on Small-to-medium Sized Farms in Southern Brazil, 1965 to 1969."

Tentative completion date: October, 1971.

> These notes report on preliminary findings of a continuing research project. The data and conclusions are tentative and formal reference to them should be cleared with the authors.

I - Objectives

The main objective of this study is to document the capital formation which has occurred on a sample of small-to-medium sized farms in Southern Brazil during 1965 to 1969. The specific objectives are: (1) to measure and describe the capital base of these farms in 1965 and 1969, and (2) to assess the importance of institutional credit (banks) and informal loans (dealers and private individuals) in the growth of this capital base. (3) An attempt will also be made to identify additional factors which have been related to changes in capital base and structure as well as credit use. Some information on changes in credit use are reported in this Note.

II - Area Description

This study is based on 330 detailed farm interviews done in 1965-66 and later repeated in 1969-1970. These interviews were part of a larger

capital formation study which included 954 farm interviews in 1965-1966 and 1,571 interviews in 1969-1970. The 330 farms are located in four Brazilian municipios of the Southern States of Santa Catarina (Concordia and Timbo) and Rio Grande do Sul (Lageado and Carazinho). As can be noted in Table 1, almost three-quarters of the farms selected for this study were 10 to 30 hectares in size, and all were smaller than 50 hectares.

Table 1: Distribution of 330 sample farms by size and municipio, Southern Brazil*

Size in Hectares**	Municipio				Total	
	Lageado	Carazinho	Concordia	Timbo	No.	%
5.0 - 9.9	18	--	5	8	31	9
10.0 - 14.9	23	--	26	22	71	22
15.0 - 19.9	14	--	21	30	65	20
20.0 - 29.9	22	2	34	42	100	30
30.0 - 49.9	10	7	26	20	63	19
TOTALS	87	9	112	122	330	100

* By size of farm in 1965.
** 2.47 acres.

SOURCE: 1965/66 farm interviews.

The municipio of Lageado is located in the east central part of the State of Rio Grande do Sul where the topography is very mountainous and farms are generally small. Agriculture is based mainly on a mixture of crop and livestock enterprises and many farms are subsistence oriented. Carazinho is near the center of the state where the topography is rolling. First settled in large cattle ranches, the area has recently switched to intensive crop production, and farms are now medium to large in size.

Concordia is located in the middle of the state of Santa Catarina in an area of steep hills and valleys. Farms are small to medium in size

and corn and hogs are important products. Timbo is located in the coastal mountain range of the state and farms are generally small. Production patterns are represented by mixed enterprises with some emphasis on dairy and rice.

III - Agricultural Policy Background

For the past 6 to 8 years the agricultural sector in Southern Brazil has been among the most dynamic in the world. The opening up of new land is a partial explanation, but increasingly new technology and more intensive use of land is causing change. Major adjustments in agricultural policy since the early 1960's have played an important part in this. As can be noted in Table 2, the real value of agricultural credit available in Brazil more-or-less doubled from 1965 to 1968. Most of this credit has carried negative real rates of interest, that is nominal rates of interest which are lower than the rate of inflation.

Table 2: Loans by Brazilian Banks to Agriculture, 1965 and 1968, Total and for Selected States (Year-end Balances)

	1965	1968*	Ratio 1968 ÷ 1965
	(1.000 New Cruzeiros)		
Brazil Total	1,667.738	3,211.352	1.93
Rio Grande do Sul	193.974	512.124	2.64
Santa Catarina	26.000	53.265	2.05
Sao Paulo	444.669	863.925	1.94

* Expressed in 1965 Cruzeiros using unpublished Index of prices-paid-by-farmers-for-purchased-inputs-in-São Paulo, Instituto do Economia Secretaria da Agricultura, São Paulo.

SOURCE: Instituto Brazileiro De Estatistica, Anuario Estatistico Do Brazil, 1966 and 1969, various pages.

Partly as a result of the credit expansion, fertilizer use in Brazil also increased from 237 thousand metric tons of NPK equivalents in 1962

to 630 thousand metric tons in 1969. Fertilizer use in Rio Grande do Sul and Santa Catarina increased at an even faster pace jumping from 34 thousand tons to 151 thousand tons during the same period. This along with favorable product and input price adjustments and substantial mechanization resulted in major shifts in land use and an increase in output of some agricultural commodities. Wheat production in the southern part of Brazil, for example, quadrupled from 400 thousand metric tons in 1962/63 to 1,600 thousand metric tons in 1970/71. A similar increase in soybean production has also occurred.

While agricultural growth has come with a rush in Southern Brazil, the income distribution impact of these changes is not entirely clear. The following data on changes in credit use partially indicate the extent to which small-to-medium sized farms have participated in this growth.

IV - Changes in Credit Use

In 1965 only 47 percent (157) of the 330 farmers held institutional loans. This increased to 55 percent (182) by 1969. The large increase in overall agricultural credit did, therefore, reach a somewhat broader audience. As can be seen in Table 3, however, the total number of institutional loans decreased from 1965 to 1969. A number of the borrowers were able to get much larger loans in 1969 and therefore did not need to resort to the two or more loans which they had previously held in 1965.

It can also be noted in Table 3 that the total value of institutional credit held by these farmers in 1969 had more than doubled in real terms over 1965.

Table 3: Total Value of Institutional Loans and Time Purchases in 1965 and 1969 for Four Municipios - 330 Farms, Southern Brazil

	1965		1969		Credit in 1969 as Percent of 1965	
	No. of* Loans	Amounts N. Cruzeiros	No. of* Loans	Amounts N. Cruzeiros**	No. of* Loans	Amounts N. Cruz.
TOTALS for all 4 Municipios						
Institutional Loans	284	72,059	279	167,847	98%	231%
Time Purchases***	170	70,544	121	53,582	71%	76%
Total	454	142,603	400	221,429	88%	155%

* Some individuals held up to 8 loans.
** Deflated to 1965 new cruzeiro equivalents using same Index as cited in Table II: base period 1948-52, with 1965 = 7,513 and 1969 = 17,590, (a factor of .427).
*** Generally financed outside the institutional credit market.

SOURCE: 1965/66 and 1969/70 farm interviews.

An analysis (not shown in Table 3) of the farms with more than 5,000 new cruzeiros in institutional loans in 1969, however, indicates a good deal of loan value concentration. Only 13 of the 330 farms had a loan portfolio of this size and each farm was somewhat unique in its characteristics. For example, several were intensive, large scale poultry producers. These 13 farms held about 20 percent of the total value of institutional loans shown for 1965 in Table 3, but their proportion had jumped to 34 percent by 1969. The increase in loans to these 13 individuals accounted for 60 percent of the total increase in value of institutional loans from 1965 to 1969 shown in Table 3.

Another interesting point in Table 3 is the rather dramatic decrease in number, as well as value, of time purchases (credit from dealers and individuals) from 1965 to 1969. The large increase in availity of inexpensive institutional credit for some farmers has substituted for some of the informal credit previously used.

V - Conclusions and Issues for Further Research

There is little doubt that agricultural credit policy during the late 1960's had a major impact on agricultural production in Southern Brazil. It is also clear, nevertheless, that only a trickle of the heavily subsidized credit has filtered down to the smaller operators. Credit policy has had little impact on improving income distribution.

Earlier research by B. P. Rao suggests that many of the small farm operators in Southern Brazil could realize high marginal returns from inputs which could be purchased with additional credit.[1/] Small farmers' marginal returns were much higher, in fact, than those of larger farmers already heavily involved in institutional credit. If these results generally hold, it strongly suggests that, from a social viewpoint, small-to-medium sized farmers have an economically justified demand for institutional credit.

The problems of getting credit to small-to-medium sized farms in Brazil may lie mainly on the supply side. With the recent large increase in institutional agricultural credit, the main problem now appears to be with socially efficient distribution and not with total supply of credit in the system. This problem may be closely related to interest rates. That is, with credit negatively priced there is no effective price mechanism for rationing funds. Credit institutions, therefore, are forced to ration their credit on the basis of internal criteria: who has the most collateral, where are default risks lowest, how can loans be made so that administrative costs are kept low? Imposing different

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1/ B. P. Rao, "The Economics of Agricultural Credit Use In Southern Brazil," unpublished Ph.D. Dissertation, Department of Agricultural Economics and Rural Sociology, The Ohio State University, 1970.

rationing criteria upon the banking system, or substantially raising the real rates of interest paid by farmers may result, surprisingly, in more credit going to a larger number of small-to-medium sized operators.

Additional research issues which will be explored in this study are:

1. What have been the changes in total capital base of various economic sub-groups of these 330 farms?
2. What role has institutional and non-institutional credit played in these changes?
3. What farm characteristics have been associated with changes in farm capital as well as credit?

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Tentative Completion Date: October, 1971

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I - Objectives -

The main objective of this study is to document the capital formation which has occurred on a sample of farms in Southern Brazil from 1965 to 1969. (Additional details on the objectives are included in Research Note Number 5, April 30, 1971).

II - Area and Sample Description -

The study is based on 330 medium-to-small (10-50 ha.) farm interviews and 62 large (50 ha. +) farm interviews done in 1965-66 and later repeated in 1969-70. All of the farms are located in the four Brazilian municipios of the Southern States of Santa Catarina (Concordia and Timbo) and Rio Grande do Sul (Lageado and Carazinho). (Additional information on the areas studied can be found in Research Note Number 5).

III - Agricultural Policy Background -

During the period 1965 through 1970 the real value of institutional agricultural credit available in Brazil more than doubled. Most of this credit carried nominal rates of interest which were lower than the rate of inflation and thus resulted in negative real rates of interest. The following data on changes in credit use among the 392 farms studied indicate that only a small portion of these farms apparently utilized a major portion of the credit portfolio increase.

IV - Changes in Credit Use Among 392 Farmers -

The data in Table I shows the changes in credit use from 1965 to 1969 among the small and large sized farms. Several points in this Table are of particular interest. First, the number as well as total value of time purchases decreased among both small and large farmers. A sharper drop, however, in the figures for the large farms was noted. Second, there was a substantial increase in the amount of institutional credit borrowed among the small farmers (131 percent) and also among the larger operators (57 percent) over the five year period studied. It can also be noted that increases in institutional credit use were not positively related to size of land holdings; small farmers as a group expanded institutional credit use percentage-wise faster than did large farmers.

In Table II, however, it can be noted that the increase in institutional agricultural credit was highly concentrated among relatively few farms in the sample. Many of these units were in the middle-size farm range. Tabulating those farms which had total institutional loans of more than five thousand cruzeiros in 1969 showed only 23 farms with

Table I: Total Value of Institutional Loans and Time Purchases in 1965 and 1969 for 392 Farms in Four Southern Brazilian Municipios

Size of Farms Types of Loans	1965 No. of Loans*	1965 Value	1969 No. of Loans*	1969 Value**	1965/1969 No.	1965/1969 Value
Farms - 10 to 50 ha.						
Institutional Loans	284	72,059	279	167,847	.98	2.31
Time Purchases***	170	70,544	121	53,582	.71	.76
Subtotal	454	142,603	400	221,429	.88	1.55
Farms - 50 ha. +						
Institutional Loans	88	261,365	97	409,268	1.10	1.57
Time Purchases***	46	110,305	25	64,647	.54	.59
Subtotal	134	371,670	122	473,915	.92	1.28
Totals						
Institutional Loans	372	333,424	376	577,115	1.01	1.73
Time Purchases***	216	180,849	146	118,229	.68	.65
TOTALS	588	514,273	522	695,344	.89	1.35

* Some individuals held up to eight loans.

** Deflated to 1965 new cruzeiro equivalents using unpublished Index of prices-paid-by-farmers-for-purchased-inputs-in-São Paulo, Instituto do Economia, Secretaria da Agricultura São Paulo. Base period 1948-52, with 1965 = 7,513 and 1969 = 17,590 (a factor of .427).

*** Generally financed outside the banking system.

Source: 1965/66 and 1969/70 farm interviews.

Table II: Farms with Institutional Loans of Five Thousand Cruzeiros or more in 1969*

Size of Farm (hectares)	Number of Farms**	Value of Loans 1965	Value of Loans 1969**
10 to 50	13	14,285	57,615
50+	10	206,259	338,567
TOTAL	23	220,544	396,182

* 5.000 Cruzeiros in undeflated 1969 value.

** Some individuals held up to eight loans.

*** Deflated to 1965 new cruzeiro equivalents using unpublished Index of prices-paid-by-farmers-for-purchased-inputs-in-São Paulo, Instituto do Economia, Secretaria da Agricultura São Paulo. Base period 1948-52, with 1965 = 7,513 and 1969 = 17,590 (a factor of .427).

Source: 1965/66 and 1969/70 farm interviews.

loan portfolios of this size.[1/] These 23 farms, however, absorbed almost three-quarters (72%) of the total increase in institutional credit which went to the 392 farmers from 1965 to 1969.[2/] Many of these 23 farms were speciality units: poultry operations, irrigated rice, intensive dairies, etc. A number of the operators had substantial off-farm sources of income as well as non-farm assets.

V - Policy Implications -

It is not entirely clear why the massive agricultural credit buildup in Brazil has not spread to a broader audience. With overall credit-to-value-of-output ratios in Southern Brazil approaching similar ratios in the United States, it is disturbing to find such a narrow range of farmers receiving most of the heavily subsidized credit. A number of explanations are possible, but one factor appears to be of prime importance. That is, with current lending policies, banks in Brazil have no financial incentives to spread their loans. In fact there are substantial disincentives in the current interest rate policies. For example, banks can only charge interest of 13 percent on small rural loans, but can charge 17 percent on large agricultural loans. Partially as a result of this policy some banks have recently sharply reduced the number of small agricultural loans which they grant.

Interest rates on agricultural credit should be raised so that market forces have more affect on allocating credit in Brazil. Without this change, some alternative means of rationing agricultural credit

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1/ Average exchange rate of Cruzeiros for dollars in 1969 was 4.35.

2/ That is, 396.182 Cr. minus 220.544 Cr. divided by 577.115 Cr. minus 333.424 Cr.

must be devised. Much more attention must be directed to providing incentives for the banking systems to grant loans to medium and small sized farmers who, according to recent research, are credit starved.[3/] Equalizing the interest rates which can be charged for all sizes of agricultural loans would certainly be helpful. Default insurance programs to back small loans, a larger interest rate spread on small loans discounted with the Central Bank, and lower handling costs on small loans would all help move credit to a broader audience.

3/ B. P. Rao, "The Economics of Agricultural Credit Use in Southern Brazil", Unpublished Ph.D. Dissertation, Dept. of Agricultural Economics and Rural Sociology, The Ohio State University, 1970.