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Two Decades of Subsidized Agricultural Credit in Brazil

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A number of developing countries have stressed credit policies to achieve agricultural goals. It is frequently difficult, however, to evaluate their effect because the amount of funds involved has been small or their impact has been masked by other development policies. The Brazilian case is revealing because huge amounts of credit have been channeled to agriculture, and credit policy stands out as a key component of agricultural policy during the 1960s and 1970s. Thus, the Brazilian experience provides insights into what countries might expect if and when they assign credit policies such an important role. Furthermore, commercial banks have been used almost exclusively to supply the credit rather than creating new specialized agricultural credit institutions. Thus, the Brazilian case provides some evidence into how an existing banking system can be used to service agricultural credit needs in a developing country. This paper analyzes Brazilian policy objectives and the impact of credit on agriculture over the 1960-1982 period.

Brazilian Agricultural and Credit Policies

Like many Latin American countries, Brazil has heavily regulated its financial markets in pursuit of development goals (Eckaus). It is unique, however, because of the energy and

initiative with which it has pursued conventional and innovative prescriptions in the financial sphere (Yusaf). Portfolio ceilings and quotas, discount mechanisms, and reserve requirements have been extensively employed to affect bank behavior in developing countries (Johnson). These methods plus interest rate controls and regulations on bank mergers and expansion have been used in Brazil. The usual indirect mechanisms of monetary control have also been used to influence the supply of credit.

Brazilian objectives for this intervention include modernization and increased efficiency in banking, enlarged financial services to less developed regions, and increased capital availability for particular economic sectors including agriculture. The strategy explicitly attempts to alter banking behavior through selective controls so resources flow to socially desired sectors and activities. The magnitude and comprehensiveness of the strategy suggests a "supply-leading" relationship between financial and economic development (Patrick).

The institutional credit system for agriculture consists largely of private and "official" banks (Meyer et al.). Official banks have various degrees of state and federal government ownership and capital and hold public sector deposits. The National Monetary Council and Central Bank Created in 1964 provided the federal government with an effective means to

control bank behavior. Furthermore, a large part of agricultural credit comes from funds administered by the Central Bank and/or the federal Bank of Brazil.

The stated objectives of agricultural credit were established in 1965 by the Agricultural Credit Law 4829: (a) finance a portion of operating costs of agricultural production and marketing, (b) stimulate capital formation, (c) accelerate the adoption of modern technology, and (d) strengthen the economic position of farmers, especially small and medium ones. An implicit but very important objective appears to have been the use of credit subsidies to compensate farmers for the price and exchange rate controls designed to stimulate industrialization and control inflation. Moreover, credit policies have been used to address short-term problems like high fertilizer prices and the 1975 coffee freeze. Combining credit controls with product pricing policies has resulted in a comprehensive system for influencing factor use and output in agriculture.

A vast number of rules, regulations, programs, and subprograms have been applied to agricultural credit. Each program has specific objectives, interest rates, and repayment schedules. However, three general features of agricultural credit policies need to be emphasized. First, nominal interest rates on agricultural loans have been controlled at rates lower than those permitted for other types of loans. During the last decades, these controls resulted in negative real rates of

interest (i.e., nominal interest rates lower than the rate of inflation). Second, incentives and controls have been used to induce banks to lend more of their own deposits and/or government funds to agriculture. Third, nominal interest rates for small loans (supposedly made to small farmers) have been set 1 or 2 percentage points below large loans.

Credit and Performance of the Agricultural Sector

The first major result of Brazilian credit policies has been a sharp expansion of formal credit supplies from 1960 through the end of the 1970s. Table 1 shows loans made each year and agricultural production for the 1960-82 period. Columns 1 and 2 list operating loans, usually with terms of less than a year, which represent more than half of the number and value of loans made in recent years. The remainder of the credit is split between marketing loans[1] with terms of a few months and investment loans payable over several years.[2] In this period, agricultural output approximately tripled . New loans made per year rose almost 14 times. The ratio of operating loans to agricultural output (column 6) rose from 0.06 in 1960 to 0.36 in 1982 while the ratio of total loans to output rose from 0.12 to 0.56. In 1975, the first ratio reached a peak of 0.37 and the second rose to 0.84 due, in part, to major funding for drought relief and coffee recuperation. These ratios are among the highest found in most other Latin American countries (Adams). In subsequent years, however, these ratios were substantially

Table 1. - Agricultural Credit and Output, Brazil, 1960-82.

Year	Loans Made During Year[a]				Gross Domestic Product (GDP) from Agriculture in 1975 Cruzeiros[de]	Ratio of Operating Loans Made to Agricultural GDP	Ratio of Total Agricultural Loans to Agricultural GDP
	Operating Loans[b]		Total Agricultural Loans				
	Number[c]	Value in 1975 Cruzeiros[d]	Number[c]	Value in 1975 Cruzeiros[d]			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1960	112	3,180	231	6,176	49,957	0.06	0.12
1961	184	3,280	285	6,157	50,755	0.06	0.12
1962	337	4,910	441	8,382	57,883	0.08	0.14
1963	416	4,410	549	7,267	49,131	0.09	0.15
1964	527	6,560	771	9,864	54,365	0.12	0.18
1965	509	5,730	666	8,483	57,366	0.10	0.15
1966	529	6,700	856	11,539	50,126	0.13	0.23
1967	633	9,040	1,029	14,095	53,194	0.17	0.26
1968	733	11,470	1,500	21,019	53,341	0.22	0.39
1969	675	9,624	1,145	20,713	56,866	0.17	0.36
1970	649	10,992	1,191	24,648	53,752	0.20	0.46
1971	686	12,394	1,253	28,481	61,009	0.20	0.47
1972	687	14,705	1,266	35,321	67,702	0.22	0.52
1973	771	21,288	1,400	49,852	87,699	0.24	0.56
1974	789	27,757	1,450	61,648	100,914	0.28	0.61
1975	1,076	39,446	1,856	89,997	107,349	0.37	0.84
1976	1,059	38,886	1,832	92,143	140,252	0.27	0.66
1977	1,011	38,901	1,722	82,266	172,536	0.23	0.48
1978	1,104	45,698	1,896	83,659	167,859	0.27	0.50
1979	1,375	52,433	2,373	104,248	183,203	0.28	0.57
1980	1,876	56,406	2,766	99,686	191,333	0.29	0.52
1981	1,944	50,705	2,613	86,458	172,386	0.29	0.50
1982	1,826	53,857	2,604	83,725	150,484	0.36	0.56

[a] Source: Various Central Bank and Bank of Brazil reports (Brazil, Banco Central). Figures represent number and value of new loans made.

[b] From 1960 to 1968, the estimates for operating loans are based on loans made by the Bank of Brazil, which was responsible for the majority of agricultural credit lent during the period.

[c] Thousands of loans.

[d] 1 million cruzeiros. Values adjusted by the index "2" of Conjuntura Economica (Brazil, Fundacao Getulio Vargas).

[e] Source: Brazil, Fundacao Getulio Vargas.

less. The droughts of 1981 and 1982 reduced the value of agricultural output so the ratios appeared more favorable than they would have been if output would have followed its upward trend.

Piza compared the indebtedness of agriculture relative to other sectors. He found the credit output ratio for agriculture grew much faster in recent years. Although Brazil's general economic development strategy is oriented towards accelerating development through financial means, the agricultural sector has been especially favored with subsidized credit.

No comprehensive study exists on agricultural capital formation. Schuh cited data suggesting the structure of farm capital shifted away from real estate between 1940 and 1965, wile the share in equipment rose. The 1970 census shows that land and buildings represented 68% of total capital assets, 18% in productive and work animals, 9% in permanent crops, and 5% in farm machinery and vehicles (Brazil, Fúndaçao Instituto Brasileiro de Geograpfia e Estatística). In the 1980 census, these proportions were 74% for land and buildings, 12% for animals, 9.6% for permanent crops and 4.4% for machinery and vehicles. Thus, contrary to earlier evidence, the value of land and buildings still commands a large and growing share of farm capital because of increases in farming area and land prices. Some of the rapid increases in credit may have been capitalized in land prices.

Credit policies have encouraged the adoption of both biological and mechanical technology. Programs have been introduced to finance so-called "modern inputs" including improved seeds, fertilizer, lime, agricultural chemicals, and livestock rations. Nominal interest rates for these programs varied from 0 to 7% much of the time. Likewise, purchasers of domestically manufactured machinery have benefited from five-year loans with nominal interest rates ranging up to 15%, occasionally with a two-year initial grace period. Chemical fertilizer use rose from 380,000 metric tons in 1966 to a peak of 4.2 million tons in 1980, then fell to 2.7 million in 1982. Allegedly, the quantity of fertilizer supposedly financed in some regions has exceeded the amount actually sold. Domestic tractor production per year grew from 6,300 units in 1967 to over 70,000 in 1976 and then declined to 37,610 units in 1982[3] (Brazil, Instituto de Economia Agrícola).

For the 1970 census, farmers reported investing Cr$ 4.4 billion (in cruzeiros) in on-farm investments. Of this total, Cr$2.2 billion was spent for machinery, livestock, and permanent crops, all of which were eligible for credit. The Central Bank reported Cr$2.5 billion in new institutional loans for agricultural investments that year (Brazil, Banco Central). In the 1980 census, aggregate on-farm investments amounted to Cr$ 579.1 billion (25.2 billion in cruzeiros of 1970), of which Cr $359.7 billion (15.6 billion in cruzeiros of 1970) were eligible

for institutional loans. However, Central Bank statistics indicate only 7.0 billion (in cruzeiros of 1970) as the total value of new investment loans contracted by farmers in 1980, suggesting that the farmers self-financed a considerable amount of on-farm investment.

Over 50% of the investment loans were reported for machinery purchase, and almost two-thirds of these loans were made in the states of Rio Grande do Sul, Parana, and Sao Paulo, which accounted for over 70% of the tractors reported on farms in 1970 and 1980. It is quite likely, then, that credit for investment has been highly correlated with new machinery purchases and on-farm investments.[4] This conclusion is consistent with the tractor demand models estimated by Sanders for 1950-71, and by Barros for 1960-76. The variable for real value of tractor financing overshadowed the variable measuring tractor price relative to agricultural wage rates in both studies.

Distribution of Farms and Credit

Table 2 shows the size distribution of farms as reported in the 1970 and 1980 censuses.[5] The total number of farms increased from 3.3 million in 1960 to 4.9 million in 1970, and to 5.2 million in 1970, and to 5.2 million in 1980. The total farm area increased from about 250 million hectares in 1960 to almost 295 million in 1970 to 365 million in 1980. From 1960 to 1970, over a million new farms were added to the less than 10 hectares group, while the 1980 census reports an increase of only 78.4

Table 2 - Size Distribution of Farms[a], Brazil, 1970 and 1980.

Farm Size Strata (Ha.)	1970 Census				1980 Census			
	Farms		Percent of Area[b]	Percent of Product	Farms		Percent of Area[b]	Percent of Product
	Number	Percent			Number	Percent		
Less than 10	2,519,630	51.1	3.1	17.8	2,598,019	50.4	2.5	13.0
10 to less than 100	1,934,392	39.3	20.4	40.0	2,016,774	39.1	17.7	37.7
100 to less than 1,000	414,746	8.4	37.0	29.3	488,521	9.5	34.8	33.2
1,000 to less than 10,000	35,425	0.7	27.2	10.7	45,496	0.9	28.7	13.9
10,000 +	1,449	<0.1	12.3	1.9	2,345	<0.1	16.5	2.1
No Farm Size Reported	18,377	0.4	-	0.3	8,696	0.2	-	0.1
Total	4,924,019	99.9	100.0	100.0	5,159,851	100.0	100.2	100.0

SOURCE: Fundaçao Instituto Brasileiro de Geografia e Estatistica (Agricultural Census, 1970 and 1980).

[a] In the Brazilian census, farms are defined as "establishments". A farm is a unit with one or more adjacent parcels under a single administration. Two nonadjacent parcels are treated as separate farms, even if they are under a single administration. Likewise parcels are treated separately even though owned by the same person if they are rented or sharecropped to two different persons with separate administration.

[b] An unknown bias exists in these data due to the farms not reporting size.

thousand farms in this group. During the 1960-1980 period the average size of the less than 10 hectares group increased from almost 4 to 3.5 hectares.

The inverse relationship between farm size and value of production noted in several countries was found in Brazil in 1970 and 1980. In the latter period, the first two size strata represented 89% of the farms with only 20% of the area, but 51% of the production. Units of 10,000 or more hectares represented less than 0.1% of the farms, 16% of the area, but only 2% of the production.

Surprisingly, almost 80% of the Brazilian farms reported no credit from any formal or informal source in the 1980 census. Even allowing for possible data limitations, credit use was much less widespread than anticipated. About one-third of the farms in the upper three size strata reported receiving loans. Only 4% of the farms in the smallest strata reported loans. Thus, a significant number of farms in the country were still untouched by formal credit programs in 1980. As shown in Table 3, during the 1970s farms in the upper three size strata were benefited by these programs, while farms in the smallest strata were worsened in relative terms.

Table 3 also reports the distribution of total volume of credit. Government entities provided 87% of the Cr$ 347 billion in credit reported in 1980. The two smallest farm size strata received far less credit than their share of farm numbers, while

Table 3 - Value and Distribution of Credit Received by Farm Size, Brazil, 1970 and 1980.

	Sources of Credit (1970)			Sources of Credit (1980)		
	All Sources	Government Entities	Other Sources[a]	All Sources	Government Entities	Other Sources[a]
Total Value:						
Value in cruzeiros of 1980[b]	95,182,934	75,121,831	20,061,103	347,031,189	301,506,878	45,524,310
Percent	100.0	78.9	21.1	100.0	87.1	12.9
			%			
Size Strata (Ha.):						
Less than 10	5.5	4.2	10.4	4.9	4.5	7.4
10 to less than 100	33.1	33.4	31.7	31.7	31.7	31.8
100 to less than 1,000	41.8	44.2	32.6	42.0	43.3	34.0
1,000 to less than 10,000	15.6	15.2	17.1	18.1	17.6	19.9
10,000 +	4.0	2.9	7.7	3.3	2.8	7.0
No farm size reported	0.1	0.1	0.4	0.0	0.0	<0.1
Total	100.1	100.0	99.9	100.0	100.1	100.1

[a] The 1970 Census reports the volume of credit from individuals and private entities, while the 1980 Census reports separately the volume of credit from cooperatives and combines credit from other sources.

[b] 1 thousand cruzerios (real value adjusted by the IGP Index from Fundaçao Getúlio Vargas).

SOURCE: Fundaçao Instituto Brasileiro de Geografia e Estatistica (Agricultural Census, 1970 and 1980).

the three larger groups received far more. Considering farm area, however, the first three strata received more credit than their land share. Considering value of production, the two smallest strata received less credit than warranted by their production, while the 100 to 1,000 hectare group appeared to be especially favored with credit from government entities. Thus, according to the 1970 and 1980 census, Brazilian policy makers had not succeeded in increasing the share of agricultural credit lent to small farmers.

An analysis of the regional distribution of credit showed that approximately 75% went to the most commercialized agricultural regions. Farmers in the state of Sao Paulo alone produced 20% of the 1970 agricultural output and received one-fourth of total credit. Estimates of that state's credit to output ratio were even higher than for the rest of the nation. Contrary to the national trends, results from farm surveys suggested that this state was increasing the share of credit going to small farmers. In 1980 this picture changed somewhat so that farmers in Sao Paulo produced 19% of the Brazilian farm production and received 21% of total credit. The credit share in the states of Parana and Rio Grande do Sul was essentially unchanged while it increased in the states of Goias and Mato Grosso where the cultivated area was expanding rapidly.

Agricultural credit policy changed substantially after 1980 (Araujo, 1983a). External and internal debt problems, inflation

rates ranging from 120 to 150% per year, and the high social cost and economic distortions prevailing in the financial markets induced policy makers to implement a set of restrictive economic measures in 1981 and in 1983 that affected the entire agricultural sector. The real value of total farm credit declined 20% from 1979 to 1982, as a consequence of reduction both in the supply of and in the demand for credit.

The supply of agricultural loan funds was affected by the volume and composition of bank financial assets. During much of this period commercial banks were obligated to lend to farmers approximately 25% of their demand deposits. At the beginning of the 1980's, the effects of growing inflation rates and the indexation of some financial assets led to a radical change in the composition of bank assets. This can be seen in the rapid decline of the share of the demand deposits in the composition of total financial assets: 46% in 1970 vs. 28% in 1980 (Oliveira).

The implicit subsidy in interest rates increased geometrically from 1974 to 1979 due to a steady rise in the rate of inflation, and to the rigidity of nominal interest rates (Araujo, 1983b). This subsidy is an indicator of the social cost associated with the credit policy. The Brazilian case is revealing because the rising social costs of providing cheap and abundant credit to agriculture eventually had to be adjusted to the objectives and needs of a more realistic and moderate monetary policy. This implicit subsidy was equivalent to Cr$

0.07 per unit of farm output in 1974, and climbed to Cr$ 0.15 in 1979. In 1982, this subsidy was estimated in Cr$ 0.08 per unit of output.[6]

Conclusions and Implications

Brazilian policy makers have established a complex set of controls and incentives to increase the quantity and lower the cost of agricultural loans. The volume of formal credit lent to farmers sharply increased during the 1960's and early 1970's. But most farmers still do not receive this credit, and the amount going to small farmers is especially low. Agricultural output and the use of some modern inputs have expanded. However, since value of production is a criterion for lending, it is difficult to establish a clear line of causality between credit and agricultural performance. The expansion in use of modern inputs is associated with the increase in formal credit, but there also has likely been some substitution of external for internal funds.

The banks' response to the distortions introduced in the financial market is understandable. Compensating balances and noninterest costs and fees are widely used to increase returns from agricultural loans. Banks with a clear profit orientation have been especially reluctant to increase long-term agricultural lending. Loan procedures are cumbersome and increase borrowing costs. As demand deposits fell as a share of the total bank financial assets, so did the supply of agricultural loan funds.

Two important unanswered questions exist regarding the Brazilian experience. First, what would have been the demand for credit if agriculture would have been less discriminated against through price controls, overvalued exchange rates, and export controls? Second, would bank performance have been better, especially on equity grounds, if there would have been more incentives for agricultural lending? The two questions appear to be related. A justification for subsidized interest rates is to offset the discrimination of other policies. But interest rate controls reduce bank profitability. Thus, a logical tendency by banks is to reduce costs by lending to large farmers and to use nonprice methods to allocate credit.

Commercial banks can play an important role in financing agriculture in developing countries. The Brazilian experience suggests that establishing an appropriate set of incentives is crucial in affecting back behavior. Flexible interest rates and simplified lending procedures are essential. General lines of credit should be created to meet agricultural development objectives. A special line of credit, including loans for land purchase, is probably required if the economic position of small farmers is to be improved. However, the proliferation of specific credit programs to resolve specific short-term agricultural problems must be avoided.

The Brazilian case also demonstrates the dilemma that can emerge between agricultural credit policies and macroeconomic

policies, especially monetary policies. Significant changes were made in agricultural credit policy in the early 1980s because of needed adjustments in macroeconomic policies. The inflationary effects of large amounts of agricultural credit were no longer supportable. Also beginning in the 1980's, policy makers began to look towards other policy instruments to stimulate the agricultural sector. Minimum price programs, investments in human capital, trade and commercial programs, and agrarian reform will likely play increasingly significant roles compared to credit policy in the coming years. It is relevant to note, however, that there still remains a crucial issue for the Brazilian policymakers, namely to define and establish a stable and long-term strategy to accelerate agricultural development. In this new framework, credit policy could be gradually adjusted to become primarily an instrument to increase farmers' liquidity rather than being used as a short-run or even an emergency policy instrument.

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FOOTNOTES

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1. Substantial amounts of marketing loans go to individuals other than farmers. Thus, column 2 underestimates the total short-term credit obtained by farmers, while column 4 overestimates total credit.

2. Little institutional credit is available for farm real estate mortgages, so investment loans are lent largely to finance machinery, livestock, and perennial crops.

3. From 1980 to 1983 a contraction was observed in the demand for both fertilizers and tractors.

4. In 1980 the supply of institutional credit for investments exhibited a substantial decline.

5. See footnote b, table 2, regarding the definition of a farm used in the census.

6. The rates of subsidy for each line of credit implicit in interest rates were estimated using the following formula:

$$\frac{(r-i)}{(1+i)} . t,$$

where:

r = nominal interest rate (annual basis)
i = annual rate of inflation
t= weight coefficients for the duration of different credit lines.

The coefficients used were 0.75 for operating loans, 1.0 for investment loans, and 0.25 for marketing loans.