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COSTS OF AGRICULTURAL LENDING, INSTITUTIONAL
VIABILITY, AND LENDER BEHAVIOR
IN JAMAICA

DISSERTATION

Presented in Partial Fulfillment of the
Requirements for the Degree Doctor of Philosophy
in the Graduate School of The Ohio State University.

By

Ohene Owusu Nyanin, B.S. M.S.

* * * * *

The Ohio State University

1982

ABSTRACT

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By

Ohene Owusu Nyanin, Ph.D.

The Ohio State University, 1982

Professor Dale W Adams, Advisor

The main objectives of this study are to document lending costs of the Jamaica Development Bank's Self-Supporting Farmers' Development Program (SSFDP), to assess the financial viability of the program, and to investigate credit rationing behavior of the SSFDP in the face of interest rate controls in an inflationary environment.

The data used in this study were obtained from the SSFDP. I spent a total of nine months (July 1980-March 1981) inside the Jamaica Development Bank collecting data. The principal sources are audited and unaudited financial statements; monthly expenditure statements, including individual employee salary expense accounts; loan account files; and other records, documents and files of the bank.

A major part of the objectives were met by descriptive or tabular analysis. In addition, a cost function was

estimated using a Cobb-Douglas type regression model employing the ordinary least squares (OLS) estimation technique.

The results of the study showed the SSFDP experienced high lending costs that increased substantially from 1974 to 1980. The total cost of lending ranged from about 23 percent of loans outstanding to almost 49 percent for a period average of 26 to 35 percent.

The high cost of lending, coupled with administered low interest rates and high levels of inflation, have compromised the financial viability and growth potential of the SSFDP.

It was hypothesized that high costs of lending and interest rate ceilings, would force the SSFDP to alter the growth and composition of its portfolio so as to minimize its losses and contain the rate of increases of subsidies needed to function, or actually reduce them. The findings of this study show that this was not the case. It is concluded that either through choice or through political pressure from the government (and possibly the Inter-American Development Bank--the SSFDP's external source of funds) or some combination of all, there was not a concerted or consistent effort on the part of the SSFDP to ration credit by non-price means in an attempt to reduce the risks and costs in its portfolio.

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To my mother,
Madam Yaa Akyaa,
for her foresight, understanding, and love.

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The finishing of this dissertation is the completion of a ten year "journey" which began with my arrival in the U.S. in search of education. Many people have contributed to the relative ease of this journey by way of encouragement and support, making the road less bumpy than it otherwise would have been, and I am thankful to them all.

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graduate study; and to the Department of Agricultural Economics and Rural Sociology, for supplementing the Fellowship and later granting me a Research Associateship for the completion of my graduate studies.

I am also grateful to the Rural Development and Development Administration Office of the U.S. Agency for International Development, for funding the Rural Financial Markets Project under which I worked as a research associate.

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PREFACE

Many low income countries have formed rural development banks and related agricultural credit programs during the past three decades. These credit programs were expected to accelerate increases in agricultural output and incomes, reduce reliance on importation of food and improve welfare of rural dwellers by hastening development.

Many of these programs have followed a similar pattern. That is, sooner or later, they begin to face massive repayment problems, which coupled with high operating expenses make them flounder. Policymakers in these countries usually force these institutions to charge fixed and low interest rates on their loans, compromising the ability of the institutions to earn adequate revenues to cover their lending costs. The result has been that the initially large portfolios of these programs begin to decline or stagnate and the programs eventually implode. This usually leads to declines in the quantity and quality of the loan services of the credit institutions and thereby undermines their original objectives.

When this happens, scapegoats are usually sought to be blamed for the programs' demise; managers are either fired

or the programs themselves are transferred to other viable financial institutions. Yet another common practice is to legally dissolve the institution and initiate another one with a different name and/or staff.

The supervised agricultural credit program of this study--the Jamaica Development Bank's (JDB) Self-Supporting Farmers Development Program (SSFDP)--has followed a similar pattern. The parent institution, JDB, was dissolved in June of 1981 (after the data for this study was collected) by the government of Jamaica. Two new institutions were created in its place, a National Development Bank to cater to industry and tourism, and an Agricultural Credit Bank Ltd. (ACB Ltd.). The ACB Ltd. has taken over the assets of the SSFDP. It is expected that all agricultural credit programs in Jamaica will, in the future, be brought under the direction and control of the ACB Ltd. as a result of a policy to "rationalize" agricultural credit in the island.

It is pertinent, therefore, for the reader to keep in mind that, even though, the institution studied is referred to as the JDB's SSFDP (or SSFDP for short) it is now part of the ACB Ltd. For the ACB Ltd. to do a better job in achieving the objectives of this new rationalized agricultural credit delivery system, it must be cognizant of the importance of tight financial management and financial viability. This will require some degree of autonomy with which will come accountability on the part of the managers

of the program. Critical to this goal of viability is interest rate reforms. No matter how good or efficient a manager is, he cannot run a viable institution when his revenues are consistently less than his costs.

CHAPTER I
INTRODUCTION

Many low income countries (LICs) have rapidly expanded financial services in rural areas during the past three decades. This expansion in rural financial markets (RFMs) has been spurred through projects funded by the World Bank, regional development banks such as the Inter-American Development Bank (IDB), and the Agency for International Development (AID)[1].^{1/} These projects have included substantial increases in the number of institutions providing formal loans, as well as increases in amounts lent for agricultural credit [1,3].

Academics and policymakers have recently evaluated many of these projects and also assessed the performance of some rural financial markets. As part of this effort, researchers from The Ohio State University and the University of the West Indies - Mona, under the sponsorship of the Rural Development Office of the AID Mission in Jamaica, and of the Rural Development and Development Administration Office of the Development Support Bureau in

^{1/} Refers to citations in the Bibliography.

AID Washington, completed a report on the state of rural financial markets in Jamaica. This report, titled: "Rural Financial Markets in Jamaica: Analyses of Performance, Problems and Recommendations," reviewed the size, structure and recent performance of RFMs in Jamaica [31].

Two other studies were recently done on RFMs in Jamaica. The first, a field survey conducted during the last half of 1979 produced an interim report, titled: "Farm-Household Credit Behavior: A Case Study of the Jamaican Experience," which analyzed farm level credit, savings and rural off-farm employment [33]. A second study by Begashaw dealt with the farm level impact of the Self-Supporting Farmers' Development Program (SSFDP) [17]. The first study found that the SSFDP performed better than other public sector agricultural credit institutions and programs in Jamaica [31].

Following these studies, it was felt that additional work was needed on formal agricultural lending costs and the borrowing costs of farmers. While a considerable amount of information has been gathered by the previous studies, none directly addressed the important question of lending costs and the viability of financial institutions. Begashaw raised the question of lender viability and pointed out that only "research which quantifies the costs associated with financial and extension services" can definitely answer the lender viability question [17]. "The Farm-Household Credit

Behavior" study after presenting arguments for the need to study lender and borrower costs concluded that "in the end, both studies would add considerably to our knowledge of the nature and functioning of rural financial markets in Jamaica" [31].

The purpose of this research is to document lending costs using data from the Jamaica Development Bank's Self-Supporting Farmers Development Program and assess the financial viability of the program. An attempt will also be made to assess the role these costs play in the behavior of the bank, particularly in its credit rationing. Lending costs are those direct costs incurred by credit agencies in granting, monitoring and recovering loans. These may include costs involved in loan supervision or extension of technical information to farmers by the lending institution.

Objectives of the Study

The main objectives of the study are:

1. to identify and measure the main components of the costs of lending to farmers,
2. to evaluate the factors influencing these costs,
3. to assess the influence of the structure and level of lending costs on the financial viability of the credit agency,
4. to assess the adequacy of internal information flows for the effective control and management of

- lending costs,
5. to investigate the existence of credit rationing,
and
 6. to estimate a cost function for institutional
lending to agriculture.

Justification

The role of finance and financial deepening in economic growth and development is now well documented in the literature. The works of Shaw [93] and McKinnon [66] are but two of these, if the most famous. These studies were preceded by the works of Gurley and Shaw [36,37,38] and Patrick [72]. There is a growing consensus that financial deepening can accelerate the development process by promoting efficient resource allocation and in lessening income and wealth inequality.

This view is, in part, responsible for the preponderance of "supply leading" finance in LICs' agriculture. The "supply-leading" phenomenon has involved the "creation of financial institutions. . . and related financial services . . .," as pointed out by Patrick [72]. This is in an attempt to increase agricultural output and incomes, reduce reliance on importation of food and improve the welfare of rural dwellers by hastening rural development. Financial intermediation brings together these financial

institutions, the suppliers of their liabilities, and the demanders of their assets to form rural financial markets.

The participants in RFMs are constrained by the transaction and other costs they incur. There are costs to savers or the suppliers of funds, be it the opportunity cost of their funds or negative real interest rates. The financial institutions also incur costs. Some of these costs arise from its lending operations and others arise from the acquisition of funds for onlending to borrowers. The borrower on the other hand incurs both interest and non-interest costs.

Understanding the nature and magnitude of these costs is crucial because they influence both lender and borrower behavior which, in turn, affect the performance of RFMs. This performance includes access to credit by farmers and the concentration of loans.

Apart from influencing lender behavior, costs affect the viability of financial institutions and therefore make cost studies important. Viability is crucial if the institutions are to continue to be an impetus to development. The issue of the viability of these institutions becomes even more prominent given policies in LICs that underprice agricultural credit and force an inverted interest rate - lending cost structure on banks; i.e., forcing banks to charge lower rates to the high cost portion of their portfolio and higher rates on their low cost portion [30].

An important factor in the viability of the institutions in RFMs is financial innovation. Group lending, for example, has been suggested as a means of reducing both lender and borrower transaction costs [23,92]. Any attempt to reduce these costs of intermediation through financial innovations will require knowledge of the nature of these costs and the factors that affect them.

As important as costs are in understanding the nature and functioning of RFMs as argued above, very little is known about the real cost of providing institutional credit to farmers [99]. The benefits to be derived from such a study are both practical and academic. In particular, at least seven benefits might result:

(1) This study should provide information for judging and improving the cost-effectiveness of this supervised agricultural credit program (SSFDP) in Jamaica. This feature is particularly important since rates of interest have been kept low on agricultural loans by domestic policy-makers and foreign donor agencies.

(2) Since the SSFDP is a supervised credit program, the findings of this study will give a clearer understanding of the cost implications of technical assistance and supervision through supervised credit. This should assist policy-makers in clarifying the costs and benefits of these services and result in the design of better programs.

(3) By documenting the relative importance of the various costs, e.g., administrative cost vs. risk cost, the study will assist in directing the attention of decision makers to critical cost areas and furthermore provide some insight into the kinds of policies that might be appropriate for better cost management.

(4) The results of this study might also provide guidelines for the design of improved cost information systems for use by the management of agricultural credit institutions.

(5) Cost studies are useful if they provide managers data from which they can estimate the marginal cost (MC) of specific activities. MC information would enable the institution to operate more efficiently in making loans and providing other services.

(6) As part of the loan contract between the Government of Jamaica and the Inter-American Development Bank for the SSFDP, four socio-economic evaluations of the SSFDP have been done to date: in 1972, 1975, 1977 and 1980 [83,85,88, 91]. These are in addition to the Begashaw study mentioned above [17]. All these studies show a positive impact of the SSFDP on their farm clientele. But at what cost? This study will address this question and allow us to understand more completely the "costs and benefits" of the SSFDP.

(7) More generally, this study can serve as a basis for further studies of this aspect of rural financial markets in

countries other than Jamaica. It is also hoped that the findings of this study will increase understanding of this vital industry and stimulate further inquiry.

Organization of the Study

The discussion that follows is organized as follows: Chapter II presents an overview of the Jamaican economy and its formal rural financial institutions, highlighting the SSFDP. In Chapter III the theoretical underpinning of the costs of lending is explored and related empirical evidence that exists in the literature is reviewed. Chapter IV investigates the behavior of the financial intermediary in cost minimization and credit rationing. Chapter V discusses the data used in the analysis, describes the methodology used, and presents a definition of variables and statistical methods utilized. Chapters VI and VII present the results and analyses of the study while the final chapter presents the summary, conclusion, and policy implications.

CHAPTER II

THE JAMAICAN ECONOMY AND ITS RURAL FINANCIAL MARKET

In this chapter a brief overview of the Jamaican economy is presented. Next the formal rural financial institutions in the country will be described and the Jamaica Development Bank's Self-Supporting Farmers Development Programme is highlighted.

The Jamaican Economy: 1974-79

Economic Growth

Jamaica's economy declined steadily from 1974 to 1979. Real Gross Domestic Product (GDP) fell by 0.7 percent in 1974, the smallest decline within the period, declining to a rate of -8.3 percent by 1976 and -2.3 percent in 1979 (Table 1). The average annual decline for the period was 3 percent. This dismal performance is in contrast to the "respectable" growth of about 6 percent per year in real GDP during the late sixties and early seventies [34].

Economic decline occurred in all productive sectors of the economy except agriculture. The agricultural sector had an average growth rate of about 2 percent per year over the period. However, its growth rate has ranged from a low of

TABLE 1: Macroeconomic Indicators, Jamaica, 1974-79

Item	Year					
	1974	1975	1976	1977	1978	1979
Rate of Growth of GDP	-0.7	-2.6	-8.3	-1.9	-1.7	-2.3
Inflation Rate ^{a/}	20.6	15.7	8.1	14.1	49.4	19.8
Unemployment Rate ^{b/}	21.2	20.5	22.4	24.2	24.5	27.8

^{a/} December to December.

^{b/} Average of April and October figures.

Source: National Planning Agency, Jamaica, Economic and Social Survey
(Kingston, Jamaica, various years) [68].

about -6 percent in 1979 to a high of about 9 percent in 1978 (Table 2). Table 2 shows an increasing share of domestic agriculture and a declining share of export agriculture. The value of domestic agriculture rose from J\$70.2 million in 1974 to J\$81.6 million in 1979. In contrast, the value of export agriculture was lower in 1979 than it was in 1974: J\$31.7 million vs. J\$36.5 million. The value of livestock and hunting rose from a low of J\$37.2 million in 1974 to a high of J\$46.4 million in 1977. It declined, however, in the years 1978 and 1979 to J\$44.3 million and J\$43.8 million, respectively.

Employment

The decline in economic activity has exacerbated the unemployment situation in the economy. The April and October average rate of unemployment increased steadily from about 21 percent of the labor force in 1974 and 1975 to about 28 percent in 1979 (Table 1). The incidence of these high rates of unemployment is not symmetrical with respect to the various social groups within the economy. In October 1979 for example, the unemployment rate was about 44 percent for the female labor force while the male unemployment rate was about half of that. This asymmetry was true for April, 1979 and the October-April figures for the other years within the period [68(1979)].

TABLE 2: Gross Domestic Product (GDP) by Sector in Constant
(1974) Prices, Jamaica, 1974-79.^{a/}

Sectors, Item	Year (Million Jamaican Dollars)						
	1974	1975	1976	1977	1978	1979	
Agriculture and Fisheries	162.7	165.0	158.3	170.8	186.6	175.5	
Export Agriculture	36.5	32.4	35.9	29.5	33.4	31.7	
Domestic Agriculture	70.2	72.3	60.4	75.6	90.7	81.6	
Livestock and Hunting	37.2	41.2	42.8	46.4	44.3	43.8	
Other Agriculture ^{b/}	18.8	19.1	19.2	19.3	18.2	18.4	
Other Sectors	2,107.2	2,046.9	1,870.0	1,817.8	1,768.7	1,735.6	
Total GDP	2,269.9	2,211.9	2,028.3	1,988.6	1,955.3	1,911.1	
Rate of Growth of Agriculture in GDP	2.0	1.4	4.1	7.9	9.3	-5.9	

^{a/} See Appendix A for the Implicit GDP Deflator used in deflating the current values, and the U.S. exchange rate for J\$.

^{b/} Fishing, Forestry and Logging.

Source: Extracted (1) and calculated (2) from National Planning Agency, Jamaica, Economic and Social Survey (Kingston, Jamaica, various years). [63]

Price Level

The rate of inflation fluctuated substantially between 1974 and 1979. Measured by the December to December changes in the All Jamaica Consumer Index, inflation declined from about 21 percent in 1974 to about 16 percent in 1975 and then to 8 percent in 1976. In 1978 it shot up to almost 50 percent, and then dropped to about 20 percent in 1979 (Table 1). This price instability clearly adds to the risk and uncertainty of farming as well as financing.

Balance of Payments

Jamaica's current account balance was consistently in deficit for the period 1974-79. As can be seen in Table 3, the current balance fell from about minus J\$152 million in 1974 to about minus J\$257 million in the following two years. It improved to minus J\$31 million but deteriorated again to minus J\$60 million in 1978 and got even worse in 1979, when the deficit recorded was minus J\$107 million. The balance on services was largely responsible for these deficits. It deteriorated from about minus J\$86 million in 1974 to about minus J\$232 million in 1979. The balance on merchandise improved from about minus J\$107 million in 1974 to about J\$55.7 million in 1979. There was a considerable increase in the balance on transfer payments which moved from about J\$21 million to J\$69 million during the period.

TABLE 3: Balance of Payments in Jamaica: Current Account
Balance and Net Capital Movements, 1974-79

Year	(Million Jamaican Dollars)				
	Merchandise	Services	Transfer Payments	Current Account Balance	Net Capital Movements
1974	-106.9	- 79.5	21.3	-151.8	221.1
1975	-144.8	-136.0	23.8	-257.0	189.9
1976	-119.9	-175.5	36.2	-257.2	43.9
1977	85	-134.6	18.2	- 31.4	51.7
1978	47.1	-130.1	23.3	- 59.7	8.9
1979	55.7	-231.5	9.0	106.8	-30.4

Source: National Planning Agency, Economic and Social Survey (Kingston, Jamaica, various years). [68]

The consistent deficits in the current account balance have generally been covered by capital movements, but even that has deteriorated from a high of about J\$221 million in 1974 to a deficit of J\$30 million in 1979 (Table 3).

During this period, the foreign exchange reserve position was also unfavorable. It declined from about J\$130 million in 1974 to minus J\$394 million in 1979. The deficit between 1978 and 1979 was J\$128 million (Table 4).

In summary, the Jamaican economy has been beset with declining economic activity for the past six years. It has experienced severe unemployment and inflationary pressures, deteriorating balance of payments and acute depletion of foreign exchange reserves. The overall poor performance of the Jamaican economy is not all that unusual for a non-oil producing, open-economy LIC in the post-OPEC oil price hike world environment. It is the magnitude of the poor performance that makes Jamaica stand out. The average rates of economic growth for the non-oil producing LICs have been appreciably lower in the last six years than during the late 1960s and early 1970s. As a group, their growth of real GDP, after averaging 6 percent a year during the period 1967-72 and approaching 7 percent in 1973, has eased to around 5 percent since 1976. In 1979 it averaged 4.6 percent [51]. Still this growth performance stands out in sharp contrast to the uniformly negative record of Jamaica.

TABLE 4: Jamaica's Net Foreign Exchange Reserves,
1974-79 (\$ million)

Year	Net Foreign Exchange Reserves
1974	130.2
1975	56.6
1976	-181.4
1977	-195.3
1978	-265.8
1979	-393.9

Source: National Planning Agency, Jamaica, Economic and Social Survey (Kingston, Jamaica, 1975 and 1979).
[68]

Rural Financial Markets in Jamaica

In this section a brief description of the formal rural financial institutions in Jamaica is presented.^{1/} This is followed by a closer look at the institution to be studied, the Self-Supporting Farmers' Development Program (SSFDP).

Structure and Growth of Jamaica's RFMs

There are five principal formal sources of agricultural credit in Jamaica [31].^{2/} They are the Commercial Banks, the Jamaica Development Bank (JDB), the Self-Supporting Farmers' Development Program (SSFDP), the Agricultural Credit Board with the People's Cooperative Banks (PCBs), and the Crop Lien Program of the Ministry of Agriculture.

The Commercial Banks are the only private sector source of formal credit to agriculture. They are also the single largest source of credit and their loans are mostly short-term. They lend mainly to medium and large sized farmers. In recent years, however, the commercial banks have become involved in lending to large government agricultural cooperatives [31,32,34].

The remaining agricultural credit sources are public sector institutions or programs. The Agricultural Credit Board, the first of these public institutions was

^{1/} For further details see Graham and others [31]. Some of the material in this section is drawn from this report.

^{2/} The other minor sources of credit are: (1) The commodity boards serving key export crops, e.g., cocoa, coffee, sugar, etc., (2) Direct loans by the Ministry of Agriculture to farmers in its Land Lease Program.

established in 1960. It has two portfolios: one line of direct loans to large farmers, and the other line for small farmers through the People Cooperative Banks. The term structure of the ACB loans are largely short term [31,32,34]

The Crop Lien Program was the last of these public programs to be created in 1977. It is administered by the Ministry of Agriculture through their extension agents who work with the Peoples' Cooperative Banks. Crop Lien loans are mainly for small, domestic food producing farmers [31,32,34].

The Jamaica Development Bank

The Jamaica Development Bank started operations in 1969. It was an autonomous government sponsored institution and succeeded the Development Finance Corporation which was established in 1959. The principal role of the Bank was to foster economic development by assisting in the establishment and growth of productive enterprises. The JDB was designed to meet four main objectives; to fill various gaps in Jamaica's existing financial system by increasing the availability of medium and long term financing in certain sectors; to supplement scarce domestic funds with loans from overseas sources; to assist in the establishment and expansion of development enterprises by participating in share capital, granting loans to industry, tourism, and agriculture and other forms of financial assistance [54].

As of June 30, 1980, the JDB had a loan portfolio of just over J\$80.35 million with the largest portion, J\$38 million (47 percent) in industry. Agricultural loans comprised about J\$21 million or 26 percent of the total portfolio with tourism accounting for J\$15 million or 19 percent. The remaining 8 percent or J\$7 million were in Insurance Premiums and Guarantees. These are largely medium to long term loans to mainly medium to large farmers.

The Self Supporting Farmers' Development Program

The Self Supporting Farmers' Development Program (SSFDP) was established in 1969. Its aim is to provide a combination of short, medium and long term credit, as well as technical assistance to small farmers (mainly in the 5 to 25 acre category) to make them viable and improve their standard of living. The program also aims at increasing agricultural production to provide food for domestic needs and for the export market.

The Program is jointly sponsored by the Government of Jamaica (GOJ) and the Inter-American Development Bank (IDB). To date it has been the beneficiary of four separate loans. A breakdown of the sources for all four loans is presented in Table 5. In addition to these funds, the SSFDP also operates a "Recovery" Loan Program to finance three enterprises, namely: banana, sugar cane, and cocoa, for which loans are not normally available in the IDB loan

TABLE 5: Self-Supporting Farmers' Development
Program: Sources of Funds.

Contract No.	Contract Date	Million U.S. Dollars		
		IDB Loan	GOJ Loan	Total
269/SF-JA	Dec. 18, 1970	6.20	3.70	9.90
317/SF-JA	March 9, 1972	3.00	1.80	4.80
359/SF-JA	Sept. 1, 1973	7.90	7.85	15.75
516/SF-JA	Dec. 14, 1977	6.00	3.00	9.00

Source: Jamaica Development Bank, Self-Supporting Farmers' Development Program, "Socio-Economic Evaluation Report," September, 1980.

Program. The source of this "Recovery" loan fund is made up from the repayments made by the beneficiaries of the IDB/GOJ loans.

The SSFDP has experienced several administrative changes since it was established. From 1969 to 1972 it was coordinated by the Ministry of Rural Land Development, while the Agricultural Credit Board was responsible for loans to farmers. In 1972, the Ministry of Rural Land Development was abolished and the coordinating responsibility was transferred to the Ministry of Agriculture. In 1974, the JDB became the main administrator responsible for loan approvals, disbursements, and loan recoveries, while the Ministry of Agriculture provided extension services to the borrowers.^{3/} To promote an efficient operation of the program, the JDB took over the extension services and in May of 1975 became the sole administrator of the program.

With the JDB now in complete control of the program, it established 13 Area Offices, covering the entire island. These were grouped into six Regional areas and placed under the supervision of six Regional Project Officers (RPO), assisted by Assistant Project Officers (APO), Development Officers (DO), Area Recovery Officers (ARO), and secretarial staff. The APOs were given the responsibility of processing, assessing, and submitting loan applications for decision, while the DOs supervised farming operations and

^{3/} The JDB is paid a management fee of 1 percent of loan outstanding for its management function.

gave technical assistance to the farmers. The Recovery Officers have the responsibility of collecting outstanding loans. In 1976, the RPOs were given the authority to approve loans of up to J \$5,000, as a move towards decentralization.

In March 1979, the Bank abandoned the area boundaries classified as Land Authorities. Area boundaries were then made to equate with the 13 parish boundaries, under Parish Project Officers (PPOs). The field staff of the SSFDP consequently consisted of PPOs, Assistant Parish Project Officers, Parish Recovery Officers, DOs, and the secretarial staff.

The field staff are linked with the SSFDP Central Office in Kingston through the Agricultural Department headed by an Agricultural Officer who is assisted by Assistant Agricultural Officers. The remainder of the Central Office consists of a Technical Support Unit, an Internal Audit Department, a Legal Department, a Finance Department, an Economics and Statistics Department, and an Administrative Department. The overall activities of the SSFDP were directed by a coordinator who is an employee of the JDB.

The SSFDP continued to change administratively. The Central Office staff, which was housed a few blocks from the Jamaica Development Bank Building, moved into the JDB building in February 1980. As part of these changes, and

also as a part of an attempt to reorganize the overall structure of the JDB, the SSFDP came under the authority of the Vice President for Agriculture and SSFDP (of the JDB) effective January 1, 1980.

The SSFDP was fully integrated into the JDB in October 1980 as the "Small Farms Project" Department of the JDB.^{4/} Since then the Legal, Finance, Administrative, and Technical units report to the respective Vice Presidents in the JDB. The Internal Auditor reports directly to the President of JDB, while the Agricultural and Economics sections reported directly in the Small Farms Project Department.

Summary statistics about the SSFDP from 1974 to 1980 are given in Table 6. As can be seen in the Table, the Program increased its number of loans made per year from 219 in 1974, to 1,519 in 1977, with the 1980 figure dropping to 756. The value of these loans for these years was more than J\$1 million, about J\$7 million, and more than J\$5 million, respectively. Disbursements were about J\$458 thousand in 1974, peaked at close to J\$6 million in 1977 and dropped to less than J\$5 million in 1980. The SSFDPs overall loan outstanding to agriculture also increased from about J\$974 thousand in 1974 to more than J\$25 million in 1980.

The SSFDP has become one of the most important sources of agricultural credit in Jamaica. SSFDP loans constitute a major proportion of the total loans to agriculture in

^{4/} For the purposes of this study, I will still refer to the program as the SSFDP.

TABLE 6: Self-Supporting Farmers Development Program:
 Loan Approvals, Disbursement, and Loan
 Balance^{a/} at Year End, 1974-1979.
 (Thousand Jamaican Dollars)

Year	No. of Loans	Amount	Disbursements	Loan Balance
1974	219	1,046	458	9,739
1975	1,059	5,277	2,764	11,764
1976	1,213	6,649	4,538	15,782
1977	1,519	6,913	5,969	20,912
1978	753	3,777	5,547	24,939
1979	798	4,361	2,870*	24,437
1980	756	5,631	4,581	25,618

^{a/} Loan Portfolio

* Does not include disbursements on Recovery Loan.

Source: Unpublished data, Jamaica Development Bank,
 Self-Supporting Farmers' Development Program,
 Kingston, Jamaica.

Jamaica, and it represents one of the most rapidly growing agricultural programs in the island [31]. Since the SSFDP and the JDB commercial agricultural window are largely responsible for the increase in agricultural credit in Jamaica during the 1970's, the SSFDP represents a good choice for a study the lending costs of agricultural credit in Jamaica.

Consolidation of Public Sector Credit Programs

Various studies have called for reform of the public sector agricultural credit programs due to overall unsatisfactory performance [7,31,34]. Among the deficiencies identified by these studies are (a) "a plethora of credit institutions and schemes resulting in inefficiencies, duplication, waste of resources and confusion in the minds of farmers" [7]; (b) "organizational and administration problems associated with some credit agencies" [7]; (c) "lack of management and technical expertise in the administration of credit" [7]; (d) "limited access to formal credit by a majority of small farmers" [34]; (e) "weak loan monitoring and collection procedures leading to high delinquency and thereby affecting adversely the viability of the programs" [34]; (f) "interest rate restrictions and lack of any sustained effort to mobilize savings in the rural areas" [34].

The government, in response to this poor performance, sought to revamp the agricultural credit system in the island. This led to the strategy of "rationalizing" agricultural credit by consolidating existing programs. The JDB was originally suggested as the overseer of the "rationalized system but was found to be an unacceptable choice due to its negative image with the World Bank, IDB, and the Caribbean Development Bank.

In June 1981, the government dissolved the JDB and in its place created two new institutions; the National Development Bank to cater to industry and tourism and the Agricultural Credit Bank Ltd. (ACB Ltd.) The ACB Ltd. is the institution designated to carry out the rationalization of agricultural credit in Jamaica. It is to take over the SSFDP and upgrade the PCBs. It will be solely responsible for attracting international financing for agricultural development in the country. It is expected that all agricultural credit programs in the country will, in the future, be brought under the direction and control of the ACB Ltd.

CHAPTER III
COSTS OF LENDING TO FARMERS

In this chapter the theoretical underpinning of the costs of lending to agriculture will be explored. Related empirical evidence from the literature will also be reviewed.

Very little is reported in the literature about the real cost of providing institutional credit to farmers and especially to small farmers [99]. However, it is generally accepted that agricultural credit programs are costly to administer [27,63,98]. This is because of the uncertain nature of farming, because farmers usually require more attention due to their lack of experience in the use of bank services, because they often lack secure collateral, and because they are widely dispersed. Agricultural lending costs are also high because of the lack of management and technical expertise, in the administration of credit, of some of the financial institutions operating in the formal credit market [27].

The financial cost of agricultural credit consists of direct and indirect costs or private and social costs.^{1/}

^{1/} Gonzalez-Vega defines financial costs to mean interest payment of loanable funds [26]. Reghavan also used financial costs to represent the cost of funds [77]. For the purposes of this study, financial costs is defined as stated above.

Direct costs can be defined as those reflected in the income statement (income and expenditure account) of the lender without subsidies. Indirect costs are those incurred by society. This includes the government costs and externalities in activities directly associated with credit operations [15,99]. But as Benston [15] explains, there are relatively few externalities in the production of financial services, which leaves the indirect or social costs to basically those incurred by government and its agencies.

The cost of lending has traditionally [20] been defined to include three main components: the cost of loanable funds, the costs of administration of the loans, and the losses due to default (risk cost). These, in addition to taxes, constitute the direct costs of lending. The erosion of the purchasing power of the loan portfolio, by inflation, could be considered a further category of direct cost [99]. This, however, will not be the case where the lender can charge variable rates. That is, where the loan rate is indexed to inflation or the lender can charge a premium for expected inflation. The three main components of the cost of lending are examined in detail below.

Cost of Funds

In most low income countries, a large part of the funds for agricultural credit institutions are provided by governments, a central bank or a refinancing agency. These funds

are often made available to the government by external sources. These sources include foreign governments, multi-lateral development agencies, particularly the World Bank, and regional development banks such as the Inter-American Development Bank and the African Development Bank [21,63,99]. These external funds may carry concessionary prices. Most funds made available to the ultimate lender are priced at rates below those that would have to be paid to mobilize deposits from the public [99].

The economic cost of loanable funds consists not only of the interest payments on deposits and on borrowings, but also of some "administrative" costs associated with the acquisition and management of the funds [26].^{2/} These may include labor and non-labor costs incurred in negotiating loans and servicing loanable funds and contracts.

There is yet another component of the cost of funds associated with foreign loanable funds. These funds are usually denominated in foreign currency. A devaluation of the domestic currency or a revaluation of the foreign currency will change the domestic currency value of these liabilities. Local governments sometimes assume these foreign exchange risks. Sometimes, however, external donors stipulate that the sub-borrowers bear the foreign exchange costs associated with their loans [22]. To the extent that

^{2/} The interest payments may also include service charges and commitment fees.

these costs are borne by the local government or the sub-borrowers, it does not constitute a cost to the lending agency. However, it is also not uncommon for the credit institution to be saddled with these costs. If and when this occurs, it should be correctly accounted for as a component of the cost of loanable funds. Raghavan has suggested several broad guidelines for allocating foreign exchange risk [77]. My intention here is not to indulge in the debate about who should bear the foreign exchange risk but rather to point out that, to the extent that a lending institution bears part or all of this kind of cost, it should be treated as a cost in calculating the economic costs of loanable funds.

The World Bank in its Agricultural Credit Sector Policy paper of 1975 suggested, as appropriate, the use of the opportunity cost of using funds for agricultural credit, rather than for some alternative program, as the cost of funds [98]. The statement noted that estimates of opportunity cost of capital in low income countries in the literature are "seldom less than 8 percent in real terms, approximately the level required to mobilize savings effectively."

The cost of funds will vary, depending upon the country and the sources of funds. One study found that the average nominal cost of funds was about 5 percent of loan values for a group of agricultural banks [63]. Gonzalez-Vega found the

cost of funds in the rural banking system in the Phillipines to have ranged between 1.5 and 3.2 percent between 1964 and 1971 [26]. A World Bank study estimated the cost of funds in the Indian three-tier cooperative banking system to be 11 percent of loans outstanding [99]. Ahmed [5], found this component of cost to be 3 percent in the Sudan while Pokharel assumed it to be 2 percent in a group lending project in Nepal [74].

Cost of Loan Administration

Administrative costs arise from evaluating loan applications, monitoring loan performance of borrowers, collecting loans and managing delinquencies. These costs include wages and salaries, occupancy expenses, costs of materials and other miscellaneous expenses. The administrative cost of agricultural credit institutions tend to be higher than those of other types of lending institutions [27,63,98]. Credit distribution is more costly in rural areas than in urban areas because borrowers in rural areas are widely dispersed [98].

It is difficult to compare administrative costs because there is little comparability in what credit institutions do and what they report as administrative costs [63]. Some credit institutions provide only credit, while others provide ancillary services and technical assistance in addition to loans. The size and duration of loans also have an

effect on administrative costs [98]. The World Bank found the median administrative cost for a group of institutions to be around 5 percent of the total loan portfolio. The same study estimated the administrative cost of an efficient institution making medium and long term loans to large farmers to be about 3 percent. For an institution providing short and long term credit to small farmers the estimate was between 7 percent and 10 percent of the total portfolio [98].

The estimated administrative cost of the Indian three-tier cooperative credit system was about 6 percent of loans outstanding [99]. Ahmed [5] found the cost of loan administration in the headquarters of the Agricultural Bank of Sudan to have ranged between 2 percent and 8 percent and at one branch office to be between 2 percent and 23 percent from 1965 to 1977. For the rural banking system in the Phillipines, the average administrative costs of operation declined steadily from 7 percent in 1960 to 5.2 percent in 1973 [26]. In a different study, Saito and Villanueva [79] found the administrative costs of lending to small-scale farmers in the Phillipines to be between 3 and 4 percent.

Risk Cost

In many cases, a considerable percentage of loans made by agricultural credit institutions to farmers are not repaid on time or are never repaid [63]. Various reasons

have been given as to why these credit programs have and are experiencing serious arrears problems.^{3/} Whatever these reasons are, delinquencies and defaults entail a cost to the financial institution. These are risk costs. They are costs because default risks concern the probability of losses of interest and principal owing to borrowers' failure to meet their contractual obligations to a bank and of nonrecoverable costs that the bank must incur when attempting to enforce contractual compliance.

The World Bank study of the Indian cooperative credit system [99] estimated the risk cost to be 1.5 percent of loans outstanding. The study enumerated the main elements in the cost of risk as follows:

- a) The time of management and staff, and their associated overhead, devoted to collection efforts beyond the normal process of accounting, billing and routine reminders, including the administration of penal interest charges and the cost of legal action to enforce recoveries after default.
- b) The cost of erosion of confidence and goodwill on all sides that results from such conditions.
- c) The cost of maintaining bad debt reserves in excess of legal requirements.
- d) A loss of access to funds in some cases where these would be available if delinquencies and defaults were better controlled.

^{3/} See, for example, Boekya-Dankwa [19] and Von Pischke [97]

- e) The cost of postponing income because of delinquencies, and eventually the cost of writing off bad debts. The former might be lost earnings from additional investment, while the latter is erosion of the assets of the institution.

Ahmed's Sudanese study [5] found the risk cost to have ranged from 9 percent to 22 percent. The Nepalese study [69] using default rates as a proxy for risk cost found this component of cost to be 2.7 percent in one branch of the Small Farmer Development Program (SSFDP) and 31.0 percent in another.

There is often a trade-off between administrative costs and loan arrears [58,98]. Quality of service, more careful scrutiny of applicants, supervision and pursuit of delinquents can lower the delinquency and default rates but also increase administrative costs. The cost of loan administration is the main component of lending costs over which management can exercise some control. Sound and efficient management can reduce these costs to some extent. Bhatt also argues that innovations in rural financial markets can reduce lending transaction costs, a major portion of which is administrative cost [18].

Total, Average and Marginal Costs

The foregoing discussion has identified three main components of costs, i.e., cost of funds, administrative costs,

and risk cost. These costs constitute the total cost (TC) function for a lender, which can be expressed as:

$$TC = F + K + R \quad (3.1)$$

where,

TC = total cost

F = cost of funds

K = Administrative cost

R = Risk cost

In this section I will postulate a relationship between this cost function and the size of loan granted. To facilitate this, the administrative cost (K) will be divided into two parts: handling cost (H) and risk reducing costs (D). Putting these in (3.1) gives:

$$TC = F + H + D + R \quad (3.2)$$

The lender's cost of funds (F) is fixed and does not vary with loan size. The two parts of the administrative cost behave differently. The handling costs (H) are generally fixed and independent of loan size. The risk-reducing costs (D) on the other hand are not fixed. They may vary positively with size of loan. The bank will normally put in more effort and resources in gathering information about, and monitoring, a large loan than it will a small loan. This is because if the borrower defaults, the default is greater for the larger loan. For this same reason, the default costs vary positively with size of loans.

The average cost function (costs per unit) can be represented as:

$$AC = f + h + d + r \quad (3.3)$$

From the above discussion, this function consists of Average Fixed Costs (AFC) which comprises $f + h$, and Average Variable Costs (AVC) comprising $d + r$. These and the marginal cost curves are depicted in Figure 1.

AFC takes on the characteristics of a hyperbola. This is because the fixed costs are spread over a larger number of units as loan size is increased, and therefore AFC declines monotonically. AVC and AC first decline and then increase as loan size is increased. The corresponding MC curve increases as the size of loan increases. MC is equal to f when the size of the loan is equal to zero. The foregoing discussion will not change if the number of loans (not the size of loans) was used as the unit of output.

These costs and their relationships to output will serve as the backdrop of the theory of the behavior of the lender (the bank) which is explored in the next chapter.

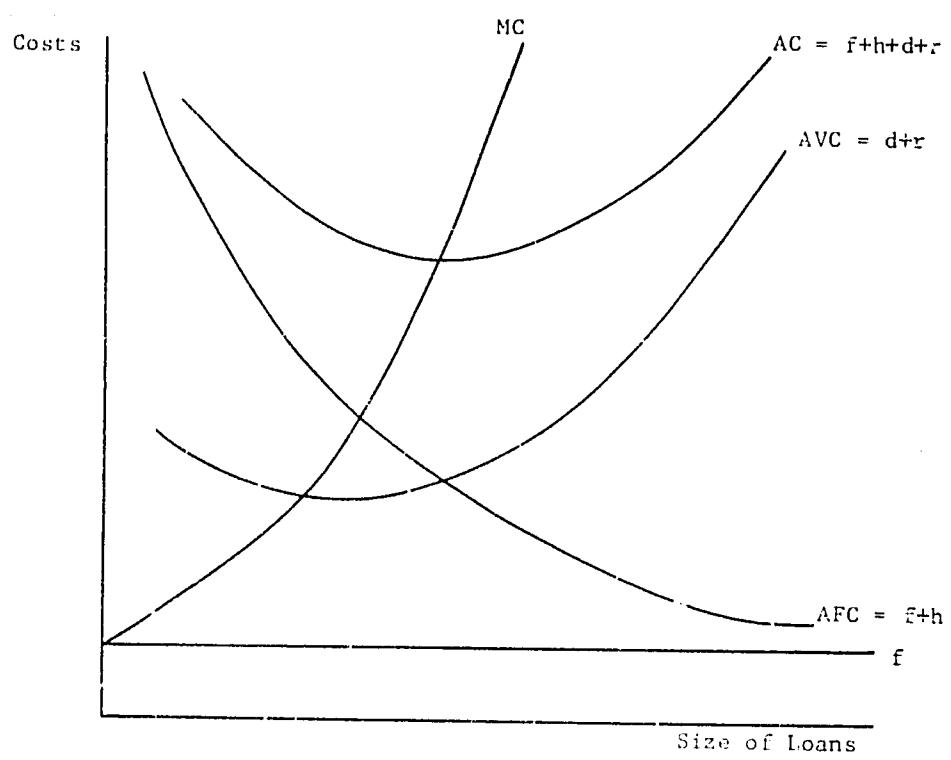


Figure 1. Average and Marginal Lending Cost Curves

CHAPTER IV
LENDER BEHAVIOR

In this chapter the behavior of financial intermediaries is investigated. The costs of lending, developed in the previous chapter, will serve as a backdrop for the following discussion. This chapter deals with two main issues, namely, cost minimization and credit rationing. The discussion is based on the premise that managers of rural financial institutions are rational and that they attempt to optimize some utility function which includes financial viability. Financial viability requires that revenues cover costs and that the real value of the loan portfolio is sustained or expanded over time.

Cost Minimizing Behavior

Two different approaches have been employed in the literature to model financial intermediaries. The Markowitz-Tobin [65,95] portfolio theory has been adopted by some writers as their analytical framework. The portfolio theory approach assumes that the lender's utility function is quadratic in expected return and risk and that his behavior can be explained by the expected return-risk (E-V)

trade-off. A portfolio is efficient if it is impossible to increase its expected rate of return without raising its risk (variance) since the lender is usually assumed to exhibit risk aversion.

The expected return of a portfolio $E(P)$ and the variance of the portfolio $V(P)$ can be defined as:

$$E(P) = \sum_{i=1}^N u_i x_i \quad (4.1)$$

$$V(P) = \sum_{i=1}^N \sum_{j=1}^N \sigma_{ij} x_i x_j \quad (4.2)$$

where,

u_i = return on the i^{th} asset in the portfolio

x_i = percentage of the portfolio in the i^{th} asset

σ_{ij} = the covariance between the returns of assets i and j , and $\sigma_{ii} = \sigma_i^2$ represents the variance in the return of asset i .

N = number of assets in the portfolio

The utility function for a profit-maximizing, risk-averse lender is given by

$$U = f [E(P), V(P)] = \sum_{i=1}^N u_i x_i - \rho \sum_{i=1}^N \sum_{j=1}^N \sigma_{ij} x_i x_j \quad (4.3)$$

where ρ = degree of risk aversion of the lender,

$$\frac{\delta U}{\delta E(P)} > 0, \quad \frac{\delta U}{\delta E(V)} < 0 \quad (4.4)$$

The general portfolio problem of the lender is to

$$\begin{aligned} \text{Maximize} \quad & U = \sum_{i=1}^N u_i x_i - \rho \sum_{i=1}^N \sum_{j=1}^N \sigma_{ij} x_i x_j \\ \text{subject to} \quad & \sum_{i=1}^N x_i \leq 1 \\ & x_i \geq 0 \quad i = 1, \dots, N \end{aligned} \quad (4.5)$$

Given values for the u_i 's and σ_{ij} 's, an optimal selection portfolio will be determined as a function of ρ . This maximization for the risk-averse lender will normally imply the selection of a diversified portfolio.

Diagrammatically, the (E-V) framework can be represented by Figure 2. The efficiency frontier consists of efficient asset portfolios. I_1 to I_3 are iso-utility curves. Each iso-utility curve represents different combinations of E and V that will give the lender the equal utility. I_1 represents a higher level of utility than I_2 and I_3 . The optimal portfolio is at point P, where the iso-utility curve I_2 is tangent to the efficiency frontier.

Prominent among the portfolio theory approach are the works of Hart and Jaffee [44], Hyman [50], Kane and Malkiel [55], Parkin [71], and Pyle [76]. Robison and Barry [78] have also applied portfolio theory to rural banks.

The main advantage of this approach is its explicit treatment of risk and uncertainty, an important feature in any firm's behavior. However, portfolio theory has drawbacks. Most importantly, it does not deal with the production and cost constraints of intermediary operations. The role these constraints play in determining equilibrium output and its quality is thus ignored. The portfolio theory approach also assumes perfect competition in the asset and liability markets of financial intermediaries, an

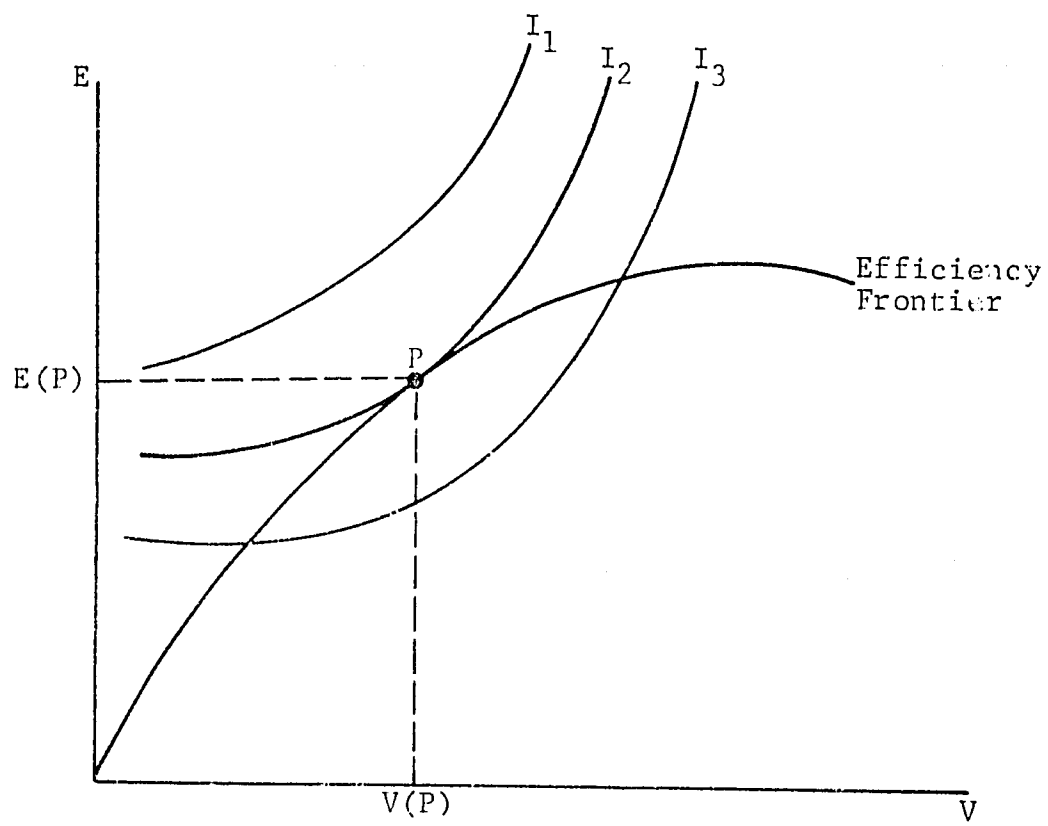


Figure 2. The Optimal E-V Strategy

assumption which has been criticized by Klein [59,60], among others.

Other authors have used the neo-classical theory of the firm in attempts to improve upon the deficiencies in the portfolio theoretic models of financial firm behavior. Bell and Murphy [11], Kareken [56], Klein [60], Pesek [73], Shull [94], Towey [96], and Gonzalez-Vega [27,28,29] are examples of this approach. The theory of the firm approach appropriately consider production and costs in describing the operations of profit-maximizing financial firms in an imperfectly competitive market. However, they mostly disregard risk and uncertainty. But as Baltensperger [10] has pointed out, "There are important links between a bank's operating expenses and its financial risk characteristics so that these two aspects should not be looked at separately, but in conjunction." Sealey [81] does that by developing a model of intermediary behavior that integrates risk considerations with market conditions and cost considerations.

The theory of the firm deals with costs and production. The firm-theoretic models have encountered obstacles in applying this theory to intermediary behavior due to inconsistencies in, and a debate about, what constitutes a bank's output. At the heart of this debate is whether deposits in financial institutions should be considered as inputs in "producing" loans or as output in themselves. Benston [15] in his 1972 encyclopedic study, enunciates three, somewhat

interrelated reasons for these differences. "One is basic to the nature of the industry: financial institutions produce services rather than readily identifiable physical products, and it is not clear how one might measure the output of services. A further complication of this problem (not limited to cost studies of financial institutions) is how to define output for a multi-product (or service) firm. A second reason is the different purposes for which the studies were undertaken and the way in which cost is related to the multiple services produced. Thirdly, the availability of data has forced some researchers to use a pragmatic definition of output."

Benston [13,14] and Bell and Murphy [11] defined output in terms of what banks or savings and loan associations do that cause them to incur costs. Even though the basic services provided are in the form of funds, a majority of their operations deal with handling documents and dealing with people. The dollar amount written on the document affects the cost of handling and the customers in a way, but the operating costs are related primarily to the number of documents handled and customers served rather than the dollars deposited or loaned. These researchers, therefore, measure output in terms of the number of deposits and the number of loans produced [15]. Greenbaum [35] and Powers, on the other hand, considered deposits as inputs in the production

process and not as output. The former used average yield as a measure of output while the latter used operating income.

Most of the studies cited have dealt with U.S. financial intermediaries, mainly commercial banks or depository financial institutions. The structure of rural financial markets in low income countries is somewhat different from that in which these commercial banks operate. Rural financial institutions, which are the focus of the present study, are also different from U.S. commercial banks in some ways. Nonetheless, they are all financial institutions and, therefore, a lot can be extracted from this literature in an attempt to model the behavior of rural financial institutions.

Rural Financial Institutions

A rural financial institution is usually established by the government with the help and funding of some international financial institution or agency. It may be called a bank, a cooperative or a supervised credit program. For purposes of brevity, however, let us call these institutions banks. The bank typically does not accept deposits, relying mainly on funds from foreign sources and budgetary appropriations from the government.

These sources of funds wield a considerable amount of influence in the operations of the bank. The government

usually regulates the institutions heavily, with the most pervasive form of this regulation being interest rate ceilings. The rates that the banks are allowed to charge are frequently fixed at low levels, and, given levels of inflation, are often negative in real terms. Interest rate regulations reduce the control that the bank has on its revenues since bank revenues result mostly from interest income. At the same time, the bank operates in a competitive input (mainly labor) market. The prices it pays for its factors of production (labor capital and materials) are therefore exogenous.^{1/}

The bank is often mandated to lend to a particular target group, be it agriculture, small farmers or producers of a specific good. The demand for the banks product--loans--is largely dictated by this regulation and how broadly the target group is defined. Hence, differences in the level of output, *ceteris paribus*, are primarily due to local demand conditions which are exogenous to the bank.

The above characteristics--interest rate regulation, exogenous output and exogenous output and input prices--make cost minimization the most plausible model of behavior for the bank. That is, the objective of the bank would be one of minimizing the total cost of the i^{th} product, subject to

^{1/} The banks production function is assumed to include the possibility of factor substitution.

the production function and the prices it must pay for factors of production. It might be prudent, therefore, to look at the production function before considering cost minimization.

The Production Function

The Constant Elasticity of Substitution (CES) production function, first developed by Arrow, Chenery, Minhas, and Sollow [6], may be used to approximate the production process of the banking industry since it permits factor substitution. The mathematical form of the CES may be given by:

$$N = A [\alpha K^{-\rho} + (1 - \alpha)L^{-\rho}]^{1/\rho} \quad (4.6)$$

where:

A = constant (efficiency parameter)

N = output (number of loans)

K = capital input

L = labor input

α = distribution parameter

ρ = elasticity of technical substitution.

The elasticity of substitution (σ) between the factors of production is

$$\sigma = \frac{1}{1 - \rho} \quad (4.7)$$

It has been shown elsewhere [69] that when $\sigma = 1$, the CES

2/ Assuming only two factors of production for simplicity.

production function reduces to the Cobb-Douglas production function. Equation (4.6), under this assumption becomes:

$$N = AK^\alpha L^\beta \quad (4.8)$$

which is the two-factor Cobb-Douglas production function.

A cost identity may be established:

$$C = wL + rK \quad (4.9)$$

where,

C = total direct costs

w = wage rate

r = rental rate on capital

K, L = same as described for (4.5).

Cost Minimization

The bank may minimize cost (4.9) subject to the production function (4.8) for a prescribed level of output (N^0).

Setting up the Lagrangian expression,

$$Z = wL + rK + \lambda [N^0 - AK^\alpha L^\beta] \quad (4.10)$$

the first order conditions for a constrained minimum

(setting the partial derivative of Z with respect to K, L

and λ to zero) are

$$\frac{\partial Z}{\partial K} = r - \lambda \frac{\partial N}{\partial K} = 0 \quad (4.11)$$

$$\frac{\partial Z}{\partial L} = w - \lambda \frac{\partial N}{\partial L} = 0 \quad (4.12)$$

$$\frac{\partial Z}{\partial \lambda} = N^0 - AK^\alpha L^\beta = 0 \quad (4.13)$$

where $\frac{\partial N}{\partial K} = MP_K$ and $\frac{\partial N}{\partial L} = MP_L$. (MP is marginal product.) Inserting these into (4.11) and (4.12) and moving

the price terms to the right and dividing (4.11) by (4.12):

$$\frac{M P_K}{M P_L} = \frac{r}{w} \quad (4.14)$$

Equation (4.14) is the familiar marginal productivity conditions for cost minimization. That is, the cost minimizing bank will equate the rate of the MPs of the factors of production (the rate of technical substitution--RTS--between the factors)^{3/} to the ratio of their prices.

A cost function can be established for the bank. Differentiating the production function with respect to the factor inputs yields,

$$M P_K = A \alpha K^{\alpha-1} L^\beta \quad (4.15)$$

$$M P_L = A \beta K^\alpha L^{\beta-1} \quad (4.16)$$

Inserting (4.15) and (4.16) into (4.14) yields

$$\frac{r}{w} = -\frac{\alpha L}{\beta K} \quad (4.17)$$

Rearranging (4.17) produces $r\beta K = w\alpha L$. Dividing both sides by $\alpha\beta$ yields the marginal productivity condition or

$$\frac{rK}{\alpha} = \frac{wL}{\beta} \quad (4.18)$$

Equation (4.9) --the cost identity--and (4.17) may be combined to solve for the factor inputs in terms of cost.

$$K = \frac{\alpha C}{r(\alpha + \beta)} \quad (4.19)$$

$$L = \frac{\beta C}{(\alpha + \beta)r} \quad (4.20)$$

Substituting (4.19) and (4.20) into the production function

$$\underline{3/} \quad RTS_{LK} = \frac{\partial N_f / \partial L}{\partial N_f / \partial K}$$

(4.18) yields a Cobb-Douglas cost function or reduced form equation,

$$C = \left[\frac{j}{A^{1/j} \alpha^{\alpha/j} \beta^{\beta/j}} \right] N^{1/j} r^{\alpha/j} w^{\beta/j} \quad (4.21)$$

where $j = \alpha + \beta$ (4.22)

This is the cost function of the bank. The next section will look into the behavior of the bank as it relates to credit rationing.

Credit Rationing

There have been extensive discussions of credit rationing during the past three decades. This issue was first raised as part of the "availability doctrine" during the early fifties [9,52]. Since then the discussion of rationing has focused on two issues: the existence and empirical verification of credit rationing and the rationality of rationing credit by non-price means. Much of this debate emanated from the assumptions the different writers employed in modeling U.S. commercial banks. My intention here is not to join this debate but to glean out the results of some of these studies and adapt them to the structure and institutional basis of rural financial intermediaries in LICs. My objective is to show why rational rural financial institutions will ration credit and attempt, later on, to test for the existence of such rationing in Jamaica.

Credit rationing occurs if the demand for loans exceeds the supply at the ruling loan rate, i.e., the existence of

excess demand for credit as shown in Figure 3. Given the supply (S) and demand (D) for loans there exist an excess demand ($D_1 - L_1$) at the rate r_1 . There are several forms of credit rationing. Disequilibrium or dynamic rationing refers to temporary or transient rationing. Equilibrium rationing, refers to permanent rationing. Much of the literature on rationing deals with the latter, and this is the form of rationing that the present study is also concerned with.

One can also distinguish non-interest rationing from non-price rationing. A loan contract has three attributes, the explicit interest charged, the non-interest charges, and the non-price terms of the contract like the size of the loan or the term-structure of the loan. The first two attributes constitute the price vector of the loan while the last represents the non-price vector. Non-interest rationing deals with the use of the non-interest elements of the loan price vector to ration borrowers. That is, even though the contractual loan rate might not change, the lender can impose certain costs on the borrower which in effect increases the borrower's transaction costs and thereby increase his borrowing cost.^{4/} The literature that has discussed this type of rationing suggests that this usually results in prospective borrowers being crowded out or rationed out of the market [39,41,43,64,70]. Non-price

^{4/} For a discussion of borrower costs, see Adams and Nehman [2].

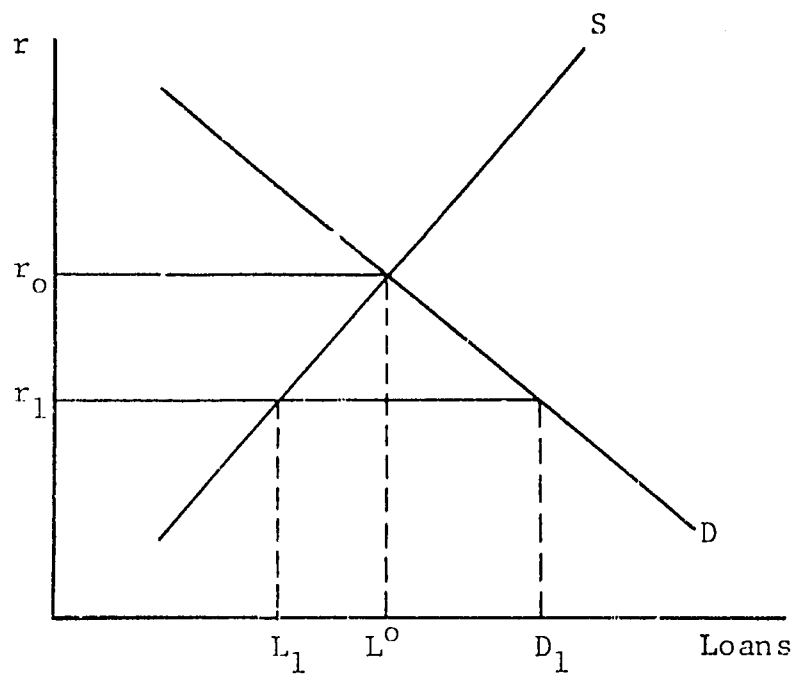


Figure 3. Supply and Demand for Loans

rationing, which is the main focus of this study, refers to the use of other attributes of the loan other than price to ration. From here on, unless specified, credit rationing refers to non-price rationing.

Jaffee [52] credits the first important advance in the theory of credit rationing to Hodgman's [46] comment on a paper by Kareken [56] and Kareken's [57] subsequent reply. Baltensperger [9] also attributes the initiation of the "modern" credit rationing discussion to Hodgman [47]. Other contributors to the development of the theory have been Miller [67], Friemer and Gordon [25] and most recently Jaffee and Modigliani [53]. They show convincingly that rational profit-maximizing banks may use some aspect of the loan or the loan customer other than the price of the loan to ration credit. These non-price characteristics of the loan and the loan customer may include (1) size of the loan, (2) maturity of the loan, (3) collateral required, (4) length and value of the "customer relationship," (5) amount of compensating balance and (6) the risk of partial or complete default on the loan [52].

Jaffee [52], emphasizing the risk characteristics of the customer as the rationing criterion, concluded that "because of usury laws and other social pressures against high interest rates, substantial rationing of high-risk firms is anticipated." Friemer and Gordon [25] also stressed the riskiness of customer loans as the credit

rationing criterion. But unlike Jaffee, they did not consider loan demand in their models. Jaffee and Modigliani [53] also emphasized the rate constraints on the difference between the interest rates that a bank can charge to different customers as justification for credit rationing.

Hodgman [48,49], Kane and Malkiel [55], and Koskela [61, Chapter 6] have stressed the importance of the "customer relationship" in determining who is rationed in periods of tight money. These studies give different, but somewhat related, reasons for this behavior. The customer relationship argument can be justified, however, if one considers the cost of information, or screening costs. The bank might find it costly to distinguish sufficiently between the risk characteristics of new borrowers. On the other hand, the bank already has information on its "old" customers and might not have to spend as much screening them. The rationality of a profit maximizing or cost-minimizing bank in preferring "old" borrowers over "new" borrowers can certainly be justified under these conditions. All these studies point to one general conclusion; that is, credit rationing tends to result in the reduction of loans to small, risky borrowers rather than large less risky borrowers, and to new as opposed old borrowers.

The Jaffee and Modigliana study [53] is of utmost interest to the present study because of its emphasis on constraints on price setting. They point out that different

borrowers may differ with respect to their risk characteristics and their demand functions. In this case, if the bank were free to set its own price, it would charge different rates to these two borrowers. If, however, the bank (for whatever reason) charges identical rates to these unidentical borrowers, the identical rate for the two groups will be such that some customers' demands at that rate will exceed the lender's optimal supply to them, so that they will be rationed. This can be extended to show that given the structure and the institutional or policy framework under which rural financial intermediaries operate they will indulge in credit rationing to optimize their objectives.

The Model of Interest Rate Restrictions
and Credit Rationing in RFMs

The model first assumes that the bank faces two borrowers--large and small, and that they each have a separate and identifiable demand for loans.^{5/} This assumption implies two separate markets for the bank. The tenability of market separation is well documented in the RFM literature. Small farmers usually lack information about alternative sources of formal credit. Lenders also usually prefer not to lend to small farmers because of repayment risks and the lack of adequate collateral. The small farmer usually lacks the social and political clout that are

^{5/} This dichotomy could be between enterprises (livestock vs. crops) between regions, or between "new" and "old" borrowers.

sometimes important in determining who has access to inexpensive credit.

The lender may also prefer to lend more to old and established borrowers (as against new borrowers) because of the high cost of information (screening cost) mentioned above. In such a situation when a borrower establishes himself with a lender he might not want to leave for another lender. The above suggests that the small and new borrowers have relatively inelastic demand for credit. Large borrowers, on the other hand, usually have relatively more information about alternative sources of credit, are less risky, possess more collateral and have more social and political clout. The bank does not have to spend much to screen "old" or established borrowers and, therefore, favors them over new borrowers. These usually give the large and "old" borrowers a more elastic demand curve.

A second assumption in the model relates to the total cost of lending to the two borrowers. Given the risk characteristics mentioned above, it might cost the bank more to lend to the small and risky, or new borrower, than to the large and less risky, or old borrower. Small farmers usually require more attention and help in filling out application forms than large farmers. This means higher costs to the lender. The information costs, mentioned above, are usually very high and sometimes prohibitive for

lending to new borrowers. The foregoing suggest identifiably different costs of lending to small and new borrowers on one hand, and to large and old borrowers on the other hand. It also implies that the average cost of lending may be higher for the small and new borrower while the marginal cost of lending to them may be higher and rises more rapidly. The opposite holds for the large and old borrower.

A third assumption relates to the structure of the market. It will be assumed that the bank has some monopoly power. This assumption is also plausible because there are usually few banks that lend to agriculture in LICs due to the perceived risks and costs of lending to this industry. This reluctance to lend to agriculture has, in part, been responsible for the recent establishment of agricultural banks in most LICs and the frequent mandating of existing commercial banks to lend to agriculture.

A fourth assumption is that the bank attempts to maximize expected profits. Profit maximization is consistent with the optimization of a utility function that is convex in "viability" because, as defined above, viability requires not only that the bank covers costs but also to maintain the real value of its portfolio over time. Profit maximization is also not inconsistent with the earlier assumed behavior of cost minimization, since cost minimization is the "dual" of profit maximization, i.e., for the bank to maximize

expected profits to safeguard viability, it must produce each output at minimum cost.

A fifth and final assumption, which has already been stated, is that price rigidities or administered prices prevail in the market for agricultural loans. Lenders are usually forced to charge a uniform rate on all agricultural loans. Another restriction which is often imposed on the bank is a ceiling on this uniform interest rate.

The underlying assumptions are represented in Figure 4.3 and Figure 4.4, where MC_1 and D_1 are the marginal cost and demand curves for the small or new borrower; MC_2 and D_2 are those for the large or "old" borrower. Size of loan granted to the borrowers are on the horizontal axis and interest rate is measured on the vertical axis.

Given the two separate markets with separate demands and costs, the banks' profits will be the difference between total revenues and total costs in each market, i.e.,

$$\pi = r_1 L_1 + r_2 L_2 - C_1(L_1) - C_2(L_2) \quad (4.23)$$

where π is total profit, r is the interest rate charged in the respective market, L is the size of loan and C cost in the respective market. The first order conditions for profit maximization are:

$$\frac{\partial \pi}{\partial L_1} = r_1 - \frac{\partial C_1}{\partial L_1} = 0 \quad (4.24)$$

$$\frac{\partial \pi}{\partial L_2} = r_2 - \frac{\partial C_2}{\partial L_2} = 0 \quad (4.25)$$

That is, the profit maximizing bank will equate marginal revenue and marginal cost in each market, which will result in two different rates being charged each borrower.

Rationing

Given a uniform interest rate ceiling \bar{r} , \bar{r} becomes the (horizontal) marginal and average revenue curve for the bank. The possibility of rationing will depend on three factors: the level of the ceiling, the marginal costs of lending (which determines the supply curve), and the demand.^{6/} As shown in Figure 4,^{7/} at a ceiling of \bar{r}_1 no one is rationed because the marginal revenue, \bar{r}_1 , is above marginal cost in both markets. At a ceiling of \bar{r}_2 , however, the small borrower is rationed because, at that rate, there exist excess demand ($D_1 - L_1'$) in market 1 and the bank grants him a loan of size L_1' which is less than he is demanding (D_1).

The large borrower, on the other hand is not rationed because his demand is satisfied with a loan of L_2' . At yet a lower rate, \bar{r}_3 , both borrowers are rationed because there is excess demand in both markets at that rate. In the first instance, (\bar{r}_1) the ceiling is not effective with respect to either borrowers, i.e., it is above the rate that the bank will normally charge if it were

^{6/} Rationing here refers to the granting of a loan smaller than the size of loan demanded at the requisite interest rate.

^{7/} This discussion draws heavily from Gonzalez-Vega [27,29].

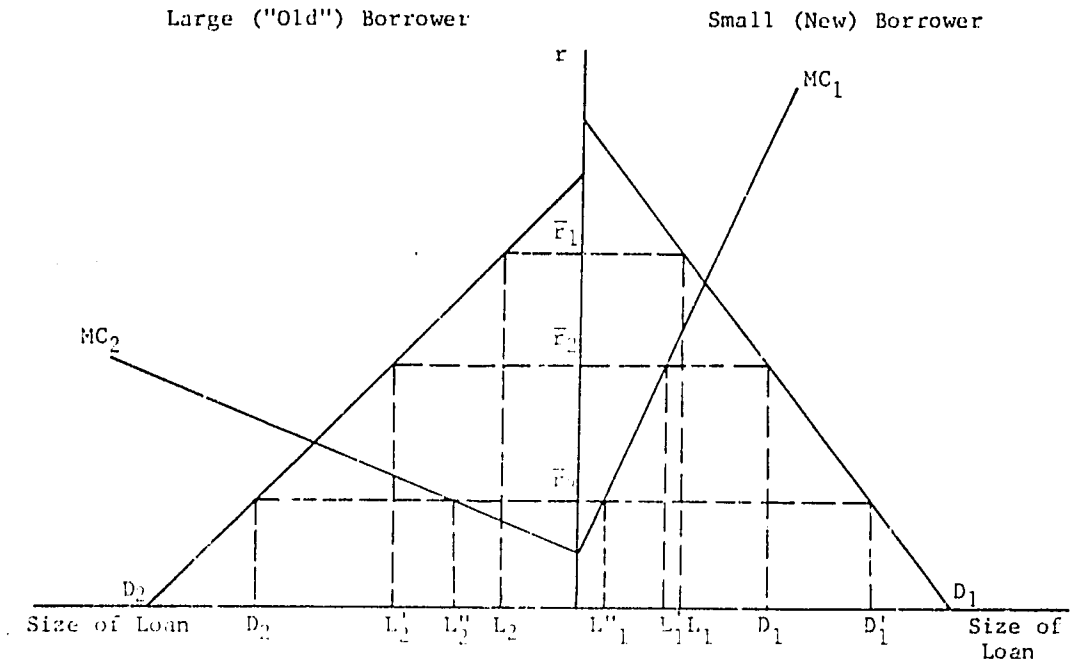


Figure 4. Interest Rate Restrictions and Credit Rationing

free to do so. In the second instance (\bar{r}_2), the ceiling is effective only with respect to the small borrowers; and in the third (\bar{r}_3), it is effective in both markets.

The scenario that is more representative of RFMs is presented in Figure 5. This is the situation where the ceiling is such that some borrowers (small and new) are rationed while others (large and "old") are not. At the ceiling, \bar{r}_1 , the small borrower is rationed ($D_1 - L_1$) but the large borrower is not. It can also be seen that as the ceiling is lowered to \bar{r}_2 (becoming more restrictive), the size of the loan to the small (rationed) borrower becomes even smaller ($L_1' < L_1$) while the size of the loan to the large borrower gets larger ($L_2' > L_2$). The small borrower's loan size gets smaller because his excess demand widens. The widening of this excess demand is due to the basic laws of supply and demand, i.e., at a lower rate the borrower demands more but the lender is willing to supply less. The above is what Gonzalez-Vega [27, p. 397] calls the "iron law of interest rate restrictions," i.e.,

"As a ceiling imposed on loan rates becomes more restrictive, the size of the loan granted to borrowers who are rationed declines and the size of the loans granted to borrowers who are not rationed increases."

It is also conceivable that when this ceiling rate falls below the average cost of lending to a borrower at all output levels (loan sizes), the bank will drop (ration out) the particular borrower from his clientele. This implies

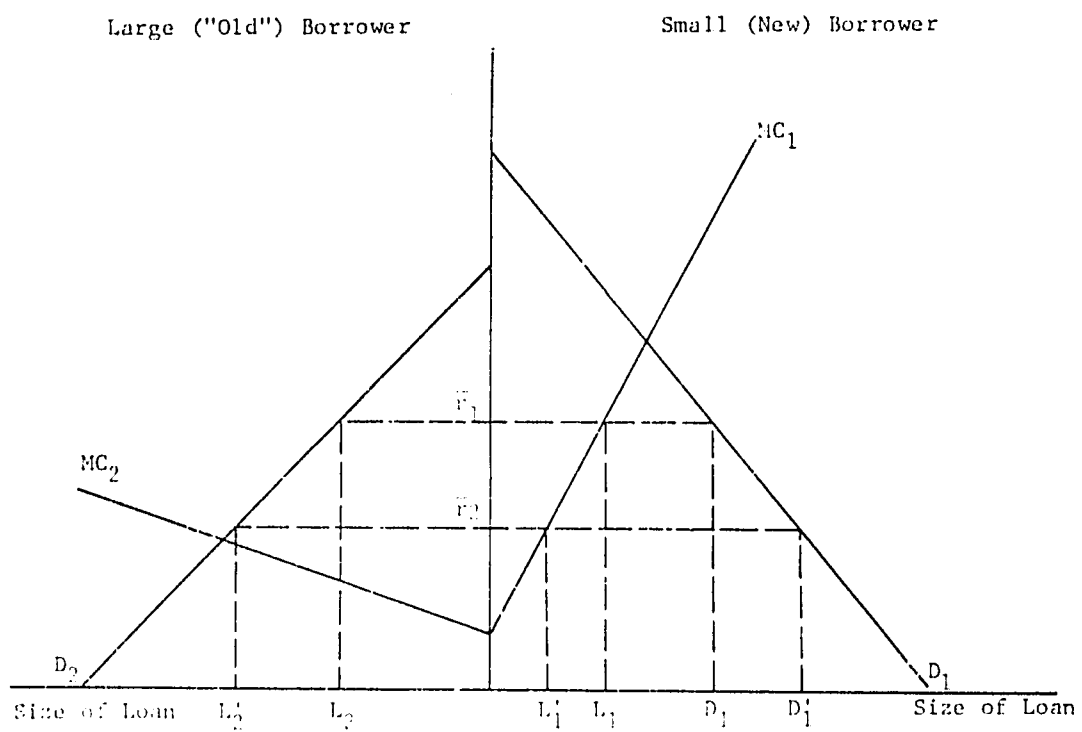


Figure 5. Credit Rationing in MM's

that the smaller borrower is more likely to be rationed out first since the marginal and average costs of lending to him are higher than is true for the large borrower.

The reviewed literature on non-price rationing, and the above model, suggests that it is rational for rural financial institutions to ration credit to remain viable institutions, given interest rate ceilings. The characteristics of the loan or the loan customer that might be used as the rationing device may include size of the loan, maturity of the loan, collateral required, whether a borrower is a new or old customer, and risk of partial or complete default on the loan.

A Hypothesis

The foregoing discussion logically leads to the hypothesis that with rising inflation (and therefore rising costs of loan administration and negative real rates of interest) and interest rate ceilings (restricting the capacity to meet those rising costs), lenders will alter the growth and composition of their portfolio so as to maximize their objective function (i.e., profits) or minimize their losses (i.e., contain the rate of increases of subsidies needed to function or actually reduce them).

Even if the lender is a public entity expected to service some broader social goals, one can reasonably assume that, in time, whatever source is granting the subsidies to

this lender (e.g., "foreign source or a government" budgetary fiscal transfers) would expect to see and demand some reasonably efficient management of these subsidies so as to contain their growth and drain on the public purse. This implies that the lender will be driven, sooner or later, into reducing the risks and the costs in his portfolio so as to limit the growth of subsidies.

This suggests that lenders over time would want to engage in the following behavior.

1. Reduce the growth in the number of loans made.
2. Increase the number and amount of multiple loans to established clients.
3. Reduce the rate of growth of loans to new clients.
4. Concentrate the loan portfolio into larger sized loans (where administrative costs are less per unit of money lent).
5. Concentrate the loan portfolio into larger sized farms (where presumably risks are less and returns more certain).
6. Shorten the term structure of loans (to reduce losses associated with inflation).
7. Increase the collateral demanded (to reduce risk).
8. Allocate loans on a regional or branch basis where risk and costs are less.
9. Shift the new loans into enterprise types that reduce risk or lower costs.

This behavior could be expected to reduce the delinquency or arrears rate; increase the rate of loan recoveries (as a percent of operating expenses); and contain the rise in operating expenses and the growth of required subsidies (or in unusual cases perhaps lower them).

If for some reason, the change in the portfolio composition does not reflect the changes suggested above in (1) through (9), then one would expect to see a rise in costs and subsidies, an erosion in the real value of the total portfolio, a rise in arrears and a decline in loan recoveries. This would in time create tensions between the lender and the subsidizer and, very likely, a deterioration in staff morale and individual or group initiative or efficiency within the lending agency.

This scenario also suggests that some kind of political pressure would have been brought to bear on the lender to force him to behave in a cost increasing fashion contrary to its normally expected behavior to maintain viability or survival in a highly inflationary setting with interest rate controls.

CHAPTER V
DATA AND METHODOLOGY

This chapter presents the sources of the data, and the methodology used to meet the objectives of the study.

Source of Data

The data used in this study were obtained from the SSFDP. I spent a total of nine months (July 1980 - March 1981) in the Jamaica Development Bank in Jamaica collecting the data. The principal sources are audited and unaudited financial statements, monthly expenditure statements, including individual employee salary expense accounts, loan account files, and other files in the bank.

Extensive interviews with bank officials and staff were conducted in the central office in Kingston and some of the parish (branch) offices. These interviews, a survey of the bank's borrowers in St. Catherine, and informal discussions with bank staff and borrowers were helpful in gaining an appreciation of the operations of the institution.

All monetary units are in Jamaican dollars. Exchange rates for the various years are presented in Appendix A.

Methodology

This section outlines the procedures used to achieve the objectives of the study. By its nature and scope, a major part of the study's objectives is met by the use of descriptive or tabular analysis.

The first objective of identifying and measuring the main components of lending costs is met by breaking the total cost of lending into cost of funds, cost of loan administration and risk cost. Each component is measured as a percentage of loans outstanding for the years 1974 to 1980.

The cost of funds is further broken down into direct and indirect costs. The direct cost of funds is a weighted average of interest charges. Loan programs 269 and 317 carry an explicit interest charge of 2.25 percent and a service charge of .75 percent for a total of 3 percent. Loan programs 359 and 516 both carry an interest charge of 2 percent. Each of these four loan tranches carry an additional .5 percent commitment fee for the portion of the committed loan not drawn down by the SSFDP. The commitment fee is omitted from the interest charge calculations due to lack of knowledge of how much of a loan program is drawn down at any point in time. For a particular year, the percentage of each loan program's fund in the portfolio is used as a weight and multiplied by the interest charge. The resultant costs are summed for all the different loan

programs to get the weighted average cost of funds, F_1 , for the i th year.^{1/} Mathematically this is:

$$F_1^i = \sum_{j=1}^5 P_j I_j \quad (5.1)$$

where,

P_j = percent of the j th loan program's funds in the portfolio

I_j = interest charge of the j th loan program.

The indirect cost of funds is mainly personnel time expended in servicing the IDB loan contracts. The economics department of the bank is in charge of collecting information and writing reports to the IDB. The time of the economist and his staff expended in this function are multiplied by their respective annual salaries and summed. The sum is divided by the value of loans outstanding to come up with the indirect cost of funds, F_2^i , for the i th year, i.e.,

$$F_2^i = \frac{\sum_{j=1}^n T_{ej} S_{ej}}{\text{Value of Loans Outstanding in the } i\text{th year}} \quad (5.2)$$

where,

T_{ej} = percent of economics and statistics department employee time spent on servicing IDB loan funds, and

S_{ej} = wages and salaries of the economics and statistics department employees, including the travel and subsistence expenses of the economist.

The non-labor costs incurred by the bank in servicing the loans and the labor and non-labor costs incurred in

^{1/} A charge of 3 percent is assigned to the Recovery loan funds.

negotiating the loans could be included in F_2 but are not due to inadequate information.

The administrative costs are comprised of salaries and wages, travel and subsistence expenses, supplies and materials, rental of property (occupancy expense), utilities, furniture and equipment, management fees to JDB, and other operating and maintenance expenses, which include audit fees, stamp duty and registration, staff training, insurance, and advertising. The salaries and wages and travel and subsistence expenses (and therefore administrative costs) do not include the portions of the operating expenses charged to the cost of funds (F_2) and those charged to risk cost (R_2) explained below. The administrative costs (K_1), so adjusted, are divided by the value loans outstanding in the respective years, i.e.,

$$K_i = \frac{\sum_{j=1}^n E_j}{\text{Value of Loans Outstanding in the } i\text{th year}} \quad (5.3)$$

where,

E_j = the j th operating expense adjusted to exclude F_2 and R_2 .

C. Risk cost is broken down into two parts. Default cost (R_1) which is an estimate of the probabilistically endangered part of the portfolio and an administrative portion (R_2), comprising the allocated personnel salaries and wages and travel and subsistence expenses expended in trying to collect delinquent loans. This is 100 percent of

the above expenses attributable to the loan recovery officers. Computationally R_2 is:

$$R_2^i = \frac{\sum_{j=1}^n S_{rj}}{\text{Value of Loans Outstanding in the } i\text{th year}} \quad (5.4)$$

where,

S_{rj} = salaries of the loan recovery officers.

R_1 is further broken into upper and lower limits reflecting the highest and lowest estimates of the probability of defaults used. The upper limit is derived from the probability that all loans in arrears more than 180 days will never be recovered; and the lower limit from the probability that 50 percent of the arrears greater than 180 days, and 50 percent of the 91 to 180 days arrears will not be recovered, i.e.,

$$R_1^{\text{upper}} = \frac{\text{Arr.} > 180}{\text{Loans Outstanding}} \quad (5.5.1)$$

where,

Arr. > 180 = Value of loans in arrears for more than 180 days,

$$R_1^{\text{lower}} = \frac{[.5 (\text{Arr.} > 180)] + [.5 (91 < \text{Arr.} < 180)]}{\text{Loans Outstanding}} \quad (5.5.2)$$

where,

91 < Arr. < 180 = Value of loans in arrears between 91 and 180 days.

Due to this dichotomy, the total cost of lending is presented as a range of upper and lower limits.

Two alternative measures of average cost are computed. The first is cost per dollar lent and the second, cost per loan. This is achieved by dividing the administrative costs (operating expenses) by the amount (value) of loans and the number of loans respectively for each year. Computationally,

$$AC_{1i} = \frac{K_i}{L_i} \quad (5.6)$$

where,

AC_{1i} = Average (administrative) cost per dollar lent in the i th year,

K_i = Operating expenses for the i th year, and

L_i = The value of loans made in the i th year;

$$AC_{2i} = \frac{K_i}{N_i} \quad (5.7)$$

where,

AC = Average (administrative) cost per loan in the i th year, and

N_i = Number of loans made in the i th year.

The above approach implicitly assumes that administrative costs incurred in a particular year accrue as a result of only the loans made in that year; thereby disregarding the influence on cost of previous years loans still in the portfolio. A corollary to this assumption is that the costs of a loan should be charged to the period during which the loan was made. The assumption obviously introduces a bias in these estimates of average cost. This bias is larger the faster the loan portfolio is growing and the longer the

share of medium and long term loans in the portfolio. The average cost estimates are, however, important because they give one an idea about relative efficiency, and the above mentioned bias may not be that great since administrative costs tend to be high at the time the loan is made.

Part of the evaluation of the factors influencing costs (objective two) is achieved by objective one. By breaking the cost of lending into the three components for the period 1974 through 1980, the contributions, to total costs, of cost of funds, administrative costs and risk cost over time can be verified. Of prime importance here are the administrative and risk costs. The salaries and wages, and the other operating expenses are perused to ascertain how their level and percentage contribution to administrative costs have changed from 1974 to 1980.

The last and most important feature in evaluating the factors behind administrative costs lies in disaggregating these costs into the functional categories of loan processing, disbursement, monitoring/collection and supervision/technical assistance. This is achieved by estimating the percentage contribution of the functions to administrative costs (K). Ideally, this should involve the allocation of all the elements of operating expenses to these functions. This is not possible, therefore, only the salaries and wages and travel and subsistence expenses are allocated to the functions. This should not unduly affect the results since

these two elements of operating expenses constitute the major part of total administrative costs (i.e., they averaged 70 percent of operating expenses from 1974 to 1980).

Procedurally, a work sheet was used to develop a representation of the annual activity of management to supplement the official job descriptions of the bank's officers. Another work sheet was used to develop a representation of the annual activity of the staff.^{2/} The management time allocation developed and the staff time allocation were subsequently used as the basis for allocating personnel, salaries and wages, and travel and subsistence expenses to the different functions of loan processing, disbursement, monitoring and collection, and supervision and technical assistance. The procedure used to compile data for the two work sheets was identical except that staff time distribution was made by first level supervisors and the staff members themselves.^{3/} The dollar total for each function is divided by the total allocated salaries and wages, and travel and subsistence expenses to come up with their representative percentage contribution to administrative costs, for the 1975/76 and 1979/80 fiscal years. The arrears situation

^{2/} This procedure is similar to the techniques employed in the formation of the Functional Cost Analysis [24] of the Federal Reserve System. These entailed extensive interviews with management, staff and selected parish offices.

^{3/} Management here refers to all officers, and staff refers to other employees.

of the SSFDP is critically reviewed to ascertain its impact on risk costs.

To assess the influence of the structure and level of lending costs on the financial viability of the credit agency (Objective Three) requires knowledge of the income side of the income statement. This will be checked to see if the institution generated enough income to cover costs. If not, what are the subsidies that keep the institution "afloat"? Administrative and risk (default) costs reign very high in this area because they are the main components of costs over which management have some control.

My overall experience in the collection of the data is drawn upon to make a judgement about the adequacy of internal information flows for the effective control and management of lending costs (Objective four).

A basic cost function will be estimated to meet Objective six.

Form of the Cost Function

The general cost function for which output and other variables must be specified is:

$$C = f(Y, O, P, G) \quad (5.8)$$

where,

C = administrative cost per period (year)

Y = rate of output per period

O = output homogeneity variables that account for the fact that Y is not a homogeneous measure

P = factor prices

U = other unspecified factors

Output

Following Benston [13,14] and Bell and Murphy [11], output is defined as what the SSFDF does that causes it to incur costs, namely, making loans. The number of loans, therefore, is used as the measure of output.

Output Homogeneity (C)

Bell and Murphy in yet another study [12] argue that for many bank functions, the "account" is not a homogeneous unit of output; accounts differ in size, activity and composition. For example, large accounts are usually afforded more services and hence, are more costly to handle. Similarly, accounts that are more active require greater resources to process and, thus, incur higher costs. This might be true in commercial banking, but in the RFM literature the argument is that costs decrease as the size of loan increases. This is basically because small loans are usually granted to small and inexperienced farmers while large loans are usually associated with large and experienced farmers. Gonzalez-Vega [27] argues that administrative costs are higher for smaller farmers because they usually need a lot of assistance in preparing an investment

plan and in completing loan applications. He also contends that costs of collecting from small farmers tend to be higher partly because small farmers usually lack collateral and own resources of lower quality. To test this proposition, the average-size-of-loans per period is added as an output homogeneity variable.

Factor Prices (P)

Banks use both labor and non-labor resources in producing loans and other services. Two variables are used to account for this, namely a wages index and materials price index per period. For the wages index, the average wages and salaries per period (year) is used. The implicit GDP deflator is used as the materials price index.

Other Factors (U)

It seems advisable to consider various conditions under which cost might be higher or lower after adjustment for all the variables discussed above. Given the nature of lending to agriculture, one such category should be increased cost due to loan risks. The main component of risk in lending to agriculture is default. Therefore, the riskiness variable should be constructed with some measure of default or delinquency. One such measure is the arrears rate. Another measure could be the allowance for bad debt. If one assumes that the figure set aside by the bank truly reflects the riskiness of the loan portfolio, then this becomes a good

indicator of risk. In reality, however, banks, for obvious reasons, tend to underestimate this. Consequently the use of this measure might underestimate risk. This and the ease of the measurement of arrears rates make the use of arrears rates a better choice as the riskiness variable.^{4/}

Based on the theoretical model presented in Chapter IV and the studies cited above, [11, 12, 13, 14, 15, 16] it will be assumed that the endogenous variables have a multiplicative relationship. A Cobb-Douglas type function is, therefore, used as the functional relationship (form) of the model.

The Model

Based on the foregoing the cost function to be estimated for the institution is:

$$C = AN^{\alpha_1} S^{\alpha_2} W^{\alpha_3} M^{\alpha_4} R^{\alpha_5} e^U \quad (5.9)$$

where,

C = administrative cost of lending to agriculture

N = number of loans

S = average size of loans

W = wage index

M = materials price index

R = arrears rate

A, α_i = parameters

U = error term.

^{4/} Arrears as a percentage of loans outstanding.

This cost function can be transformed into a linear model by taking logarithms. The result is:

$$\text{Log } C = \log A + \alpha_1 \log N + \alpha_2 \log S + \alpha_3 \log W + \alpha_4 \log M + \alpha_5 \log R + U \quad (5.10)$$

Using Equation (5.9) the expected signs are:

- 1) $\frac{\partial C}{\partial N} > 0$
- 2) $\frac{\partial C}{\partial S} < 0$
- 3) $\frac{\partial C}{\partial W} > 0$
- 4) $\frac{\partial C}{\partial M} > 0$
- 5) $\frac{\partial C}{\partial R} > 0$

The hypotheses to be tested, therefore, will be:

$$H_0: \alpha_i \leq 0, \quad i = 1, 3, 4, 5,$$

$$H_a: \alpha_i > 0, \quad i = 1, 3, 4, 5,$$

$$H_0: \alpha_2 \geq 0$$

$$H_a: \alpha_2 < 0$$

One-tailed t-tests are used to test these hypotheses.

Marginal cost, $\frac{\partial TC}{\partial N}$, can be calculated as follows:

Using Equation (5.9):

$$\begin{aligned} \frac{\partial TC}{\partial N} &= \alpha_1 AN^{\alpha_1-1} S^{\alpha_2} W^{\alpha_3} M^{\alpha_4} R^{\alpha_5} \\ &= \alpha_1^* \frac{TC}{N} \end{aligned} \quad (5.11)$$

where α_1^* is the estimated value of α_1 and TC and N are the mean values of the respective variables.

Time series data for 1974-80 are used in the regressions.

Objective five, investigating the existence of credit rationing, is met by looking at changes in the loan portfolio characteristics whose changing growth and distribution is hypothesized to reflect lender behavior to reduce risks or lower costs.

Stock vs. Flow

In measuring the changing loan portfolio characteristics over time one can use stock or flow measures. Stock measures refer to the total accumulated percentage distribution in some end of year balance sheet. This includes not only the accumulation of that year's allocation of loans (by loan size or enterprise type or farm size, etc...) but all the previous years as well. Flow measures reveal only that allocation associated with the year (or quarter) in question. The latter measure captures the changing portfolio (and lender behavior) mix more sharply and more quickly than the former. One's choice of using one or the other may depend on data availability but, in general, the flow data are preferable since they show more visibly, the changing lender behavior (i.e., the changing portfolio mix) year by year, free from the influence of previous years' allocations. For these reasons, flow measures are used in

this study. The selected periods of time will be 1975 vs. 1980.

Specifically, I look at changes in:

1. number of loans,
2. number of farmers serviced,
3. multiple loans to old farmers vs. new loans to new farmers,
4. loan size distribution,
5. enterprise type distribution,
6. number of amount of total loan portfolio by farm size categories,
7. length of term structure of loan portfolio,
8. regional (or branch) distribution of number and amount of total loan portfolio, and
9. collateral required.

Loan Size Distribution

When measuring changing loan size distributions in an inflationary setting, one has to be careful in using the nominal loan size distributions by loan size categories over two points in time. Two methods exist to deal with this: (1) deflate the total portfolio in the latter year, loan by loan, and then allocate within the previously established loan size categories; (2) use the percent of loans accounting for percent of loan value method. The former is a cumbersome and difficult procedure. The latter is more

simple and feasible. By the latter method one first makes sure one has a sufficient number of disaggregated loan size categories so that one does not have too large a percent in any one class. Also, one has to be sure one has a sufficient number of larger size categories to capture the possible shift into these categories in the latter years. Then one can point out, for example, how the lowest three, four or five percent of the number of loans in the earlier years account for a given percent of the total amount (\$) of loans (say, four percent); then one can compare this with the latter year to see if the percentage of number of loans is associated with a greater or lesser percent of the amount of loans. This latter method is what is employed in this study.

Finally, it needs to be pointed out that the approach taken in measuring credit rationing (survey technique) is a second best approach. One needs information on loan supply and demand in order to establish directly the existence of credit rationing. However, as Sealey [81] has pointed out, "even though such data are obtainable in principle, no such data are currently available nor are likely to be in the foreseeable future." To circumvent this problem various indirect approaches have been adopted in the literature to test for credit rationing. Sealey points out again that survey techniques or proxy measures are among the most successful approaches used to date. Harris [40,42,43], for

example, employs survey techniques and the Federal Reserve's "Quarterly Survey of Changes in Bank Lending Practices" in establishing the existence of credit rationing. Given data constraints and the success with which others have established the existence of credit rationing with survey techniques, it is an appropriate methodology in meeting Objective five.

CHAPTER VI
RESULTS OF COSTS OF LENDING ANALYSIS

This chapter presents the results and analysis of the costs of lending of the SSFDP. It is divided into two main parts. The first part presents the levels and structure of lending costs. The next section presents analyses of the factors affecting these costs, notably administrative and risk costs.

Costs of Lending

Cost of Funds

The estimated cost of funds for the SSFDP from 1974 to 1980 are presented in Table 7. The direct cost of funds decreased continuously from 3 percent in 1974 to about 2.4 percent in 1980, for a period average of about 2.8 percent. The indirect cost of funds also declined from .15 percent in 1974 to .11 percent in 1980, averaging .12 percent. These add to a total cost of funds which declined from about 3.2 percent in 1974 to about 2.5 percent in 1980, for an average of 2.9 percent.^{1/}

^{1/} The cost of funds estimates do not include commitment fees, the non-labor costs incurred in servicing the loan funds and the labor and non-labor costs incurred in negotiating the loans. The labor and non-labor costs are, however included in the Administrative costs.

Table 7. Self-Supporting Farmers Development Program:
Costs of Funds as Percentages of Loans
Outstanding, 1974-1980.

Year	Costs of Funds		Total (C=A+B)
	Direct (A)	Indirect (B)	
1974 ^{a/}	3.00	.15	3.15
1975	2.99	.14	3.13
1976	2.93	.14	3.07
1977	2.83	.11	2.94
1978	2.67	.10	2.77
1979	2.48	.11	2.59
1980	2.35	.11	2.46
Average	2.75	.12	2.87

a/ April to December (9 months)

Source: Computed with unpublished data from the Jamaica Development Bank's Self-Supporting Farmers Development Program, Kingston, Jamaica.

The main reason for this decline is the fact that the last two loan contracts of the SSFDP with IDB (359 and 516) were negotiated at a lower interest charge than the previous two loans (269 and 317). Loans 269 and 317 carried an interest charge of 3 percent while 359 and 516 were negotiated at a 2 percent rate of interest. The direct cost (interest charge) estimates are weighted averages, and as the percentage of the higher cost 269/317 loans decline in the portfolio with time, the direct cost of funds is bound to decline to reflect the percentage increase in the lower cost 359/516 loans. These costs of funds are highly subsidized, obviously, since they do not reflect the opportunity cost of the funds. It should also be noted that the cost of funds to the SSFDP were cheaper than if the funds were to have been mobilized from the public. The rates the commercial banks paid on saving deposits in Jamaica, for example, rose from 7 percent in 1979 to 9 percent in February 1980, while the Bank of Jamaica Rediscount Rate increased from 9 percent in 1979 to 11 percent in January 1980.

Costs of Loan Administration

The adjusted administrative costs of the SSFDP ranged from about 8 percent of loans outstanding in 1974 to 14 percent in 1980, for a period average of a little more than

Table 8. Self-Supporting Farmers Development Program:
Administrative Costs as Percentages of Loans
Outstanding,^{a/} 1974-1980.

Year	Administrative Costs
1974 ^{b/}	7.96
1975	12.32
1976	11.16
1977	12.24
1978	10.68
1979	11.67
1980	14.27
Average	11.47

^{a/} Adjusted for administrative costs charged to cost of funds (Table 2) and risk costs (Table 4).

^{b/} April to Decemer (9 months)

Source: Computed with unpublished data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program. Kingston, Jamaica.

11 percent (Table 8).^{2/} Data in Table 8 shows fluctuations in administrative costs but the trend was clearly upward. It is difficult to compare administrative costs between institutions or programs for lack of comparability in what the institutions do and report as administrative costs. Nevertheless, the level of administrative costs of the SSFDP appear to be relatively high. As pointed out in Chapter III, the World Bank 1975 Agricultural Sector Policy paper estimated the administrative cost of an efficient institution making medium and long term loans to large farmers to be about 3 percent. It placed the estimate at between 7 percent and 10 percent for an institution providing short and long term credit to small farmers [98].

Risk Costs

The risk costs are the most difficult to estimate since the default cost entailed a judgement about the probabilistically endangered part of the portfolio. Table 9 presents the risk costs. The lower limit default cost ranged from a little more than 7 percent of loans outstanding in 1976 to 18 percent in 1980 with the upper limit ranging from 13 percent to 31 percent for the same period. The average lower and upper limit default costs for the period 1974 to 1980 were 11 and 19 percent of loans outstanding, respectively. The risk administrative cost increased from about .5 percent

^{2/} Adjusted to exclude administrative costs charged to cost of funds and risk costs.

Table 9. Self-Supporting Farmers Development Program:
Risk Costs as Percentages of Loans
Outstanding, 1974-1980.

Year	RISK COSTS				
	DEFAULT (A)		ADMIN. (B)	TOTAL (C=A+B)	
	Lower Limit (1)	Upper Limit (2)		Lower Limit (A1+B)	Upper Limit (A2+B)
1974 ^{a/}	11.70	14.03	.45	12.15	14.48
1975	9.05	17.60	.79	9.84	18.39
1976	7.54	13.18	.79	8.33	13.97
1977	8.12	14.00	.70	8.82	14.70
1978	10.68	13.20	.66	11.34	18.86
1979	14.11	28.03	.92	15.03	28.95
1980	18.02	31.29	.88	18.90	32.17
Average	11.32	19.48	.74	12.06	20.22

^{a/} April to December (9 months)

Source: Computed with published and unpublished data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Kingston, Jamaica.

in 1974 to .9 percent in 1980, for an average of .7 percent. The total risk costs declined from 12 percent (lower limit) and 14 percent (upper limit) in 1974 to 8 percent and 13 percent in 1976 only to increase continuously to 19 percent and 32 percent in 1980. The average lower and upper total risk costs were 12 percent and 20 percent, respectively.

The risk costs are high and, therefore, the probabilities of default used in generating them may seem unreasonable. They may not be unreasonable, however, if one compares them with the estimated uncollectable loans by the external auditors of the SSFDP. As part of the IDB loan agreement, the Government of Jamaica is required to reimburse the SSFDP for any uncollectable loans. Estimates of these uncollectables are made by the external auditors and are included in the audited financial statements of the program. For fiscal years 1974, 1975 and 1976, when these estimates were explicitly separated from the "loans receivable account," it increased from \$5.6 million in 1974 to \$6.4 million in 1975 and \$6.2 million in 1976.^{3/} From fiscal year 1977 the accounts only reflected the actual payments received from the government with respect to the estimated uncollectables. This payment was about \$630 thousand in 1977, increasing to a total of 2.4 million in 1978 and 4.7 million in 1979. The arrears situation of the SSFDP, discussed later in this chapter, will shed more light

^{3/} Fiscal years end on March 31st.

on the risk exposure of the program and show that the estimates of risk cost presented above may not be unreasonable.

Total Cost of Lending

From the foregoing, the total cost of lending of the SSFDP ranged from about 23 percent of loans outstanding to almost 49 percent from 1974 to 1980. The average total cost of lending for the period is in the range of 26 percent and 35 percent, as shown in Table 10.^{4/} Information in Table 10 shows that risk costs were the major contributor to this high cost of lending, followed by administrative costs and the cost of funds for the entire period studied. It is also evident from this table that, with the exception of the cost of funds, total costs and its components all increased from 1974 to 1980.

Average Costs of Lending

Two measures of average costs are presented in Table 11. The first measure, cost per loan, increased steadily from close to \$1,500 in 1975 to more than \$5,000 in 1980. The second measure, cost per dollar lent also rose from \$.30 in 1975 to \$.69 in 1980. It was actually \$.76 in 1978. The 1974 figures for the average cost measures are abnormally high as should be expected. They represent the first 9 months of the administration of the SSFDP by the JDB, when only 219 loans were made with substantial overhead costs.

^{4/} These do not include the cost of inflation in reducing the purchasing power of the loan portfolio.

Table 10. Self-Supporting Farmers Development Program:
Total Lending Costs as Percentages of Loans
Outstanding, 1974-1980.

Year	COST ITEMS					
	Funds (A)	Admini- strative (B)	Risks (C)		Total (D=A+B+C)	
			Lower Limit (C1)	Upper Limit (C2)	Lower Limit (A+B+C1)	Upper Limit (A+B+C2)
1974 ^{a/}	3.15	7.96	12.15	14.48	23.26	25.59
1975	3.13	22.32	9.84	18.39	25.29	33.84
1976	3.07	11.16	8.33	13.97	22.56	28.20
1977	2.94	22.24	8.82	14.70	24.00	29.88
1978	2.77	10.68	11.34	18.86	24.79	32.31
1979	2.59	11.67	15.03	28.95	29.29	43.21
1980	2.46	14.27	18.90	32.17	35.63	48.90
Average	2.87	11.47	12.06	20.22	26.40	34.56

^{a/} April to December (9 months)

Source: Tables 3 and 4.

Table 11. Self-Supporting Farmers Development Program:
Average Costs of Lending, 1974-1980.

Year	AVERAGE COSTS	
	Cost Per Loan	Cost Per Dollar Lent
1974 ^{a/}	3,807	.80
1975	1,472	.30
1976	1,573	.29
1977	1,797	.39
1978	3,789	.76
1979	3,889	.71
1980	5,171	.69

^{a/} April to December (9 months)

Source: Computed with unpublished data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Kingston, Jamaica.

From 1975 onwards, however, one would expect a decline in the average cost measures as the number and value of loans increase.

The number and value of loans did increase from 1975 to 1977, but so did cost per loan and cost per dollar lent. This is an indication of the percentage increase in cost for this period exceeding the percentage increase in the number and value of loans. The increases in the average cost figures from 1977 to 1980 are sharper, reflecting not only the increase in cost but also a sharp decline in the number and value of loans. This implies the existence of excess capacity. These results point clearly to a high degree of relative inefficiency in the operation of the SSFDP.

It has already been ascertained that risk costs and administrative costs were the two major components of the cost of lending from 1974 to 1980. The next section probes the factors that influenced these two cost items.

Factors Affecting Costs of Lending

Factors Influencing Administrative Costs

Total operating expenses (administrative costs) increased steadily from \$834 thousand in 1974 to about \$4 million in 1980 (Table 12). The most important component of administrative cost was salaries and wages. Not only did salaries and wages grow in absolute terms, slightly more than \$350 thousand in 1974 to almost \$2 million in 1980, but

Table 12. Self-Supporting Farmers' Development Program:
Total Operating Expenses, 1974-1980 (\$Thousand)

<u>YEAR</u>	<u>EXPENSES</u>
1974 ^{a/}	834
1975	1,559
1976	1,908
1977	2,729
1978	2,853
1979	3,104
1980	3,909

^{a/} April to December

Source: Same as Table 8

their relative importance also rose from 42 percent of total administrative costs in 1974 to about 50 percent in 1980. It was as high as 59 percent in 1976 as shown in Table 13. The next important component of administrative costs was travel and subsistence expenses. It also increased from about 14 percent of operating expenses in 1974 to about 20 percent in 1980 with its highest proportion being 24 percent in 1979. The next expense items following in order of importance are the management fees paid to the JDB, occupancy expenses (rental of property), furniture and equipment, and supply and material expenses. Other operating expenses fell from about 15 percent of total administrative costs in 1974 to less than 4 percent in 1976 and rose to about 16 percent in 1980.

The breakdown of administrative costs by the functions of loan processing, disbursement, monitoring and collection, and supervision and technical assistance is presented in Table 14. Supervision and technical assistance accounted for the largest share of administrative costs, 34 percent in 1975/76 and 33 percent in 1979/80. It is followed by monitoring and collection which was responsible for about 27 percent and slightly more than 28 percent in 1975/76 and 1979/80, respectively. Loan processing is next in importance accounting for some 26 percent in both periods. Loan disbursement accounted for the remaining 13 percent in 1975/76 and 1979/80. For all practical purposes, this shows

Table 13. Self-Supporting Farmers Development Program:
Percentage Distribution of Operating Expenses,
1974-1980^{b/}.

Item/Year	1974 ^{a/}	1975	1976	1977	1978	1979	1980
Salaries & Wages	42.0	55.3	58.8	56.9	52.7	54.6	49.5
Travel Expen. & Subsistence	14.4	15.3	15.5	14.5	20.2	23.6	19.5
Supplies & Materials	4.7	1.7	1.5	1.9	2.4	3.4	3.6
Rental of Property	6.3	6.7	8.3	4.0	3.8	3.9	2.5
Public Utility Services	0.8	1.4	2.8	1.7	2.2	2.6	2.3
Furniture & Equipment	5.7	2.8	1.2	0.8	1.3	0.7	0.4
Management Fees	11.7	7.6	8.3	7.7	8.7	7.9	6.6
Other Oper. & Maint. Expenses	14.5	9.9	3.7	12.5	8.8	3.3	15.8
Total Operating Expenses	100.0	100.0	100.0	100.0	100.0	100.0	100.0

a/ April to December (9 months)

b/ Columns may not sum up to 100 due to rounding.

Source: Computed with unpublished data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Kingston, Jamaica.

Table 14. Self-Supporting Farmers Development Program:
Functional Distribution of Administrative Costs,
1975/76^{a/} and 1979/80^{a/} (Percent of Total)

Function	1975/76	1979/80	Average
Loan Processing	26.0	25.6	25.8
Loan Disbursement	12.9	12.7	12.8
Monitoring/Collection	26.8	28.4	27.6
Supervision/Technical Asst.	34.3	33.3	33.8
SUM	100.0	100.0	100.0

^{a/} April to March

Source: Computed with unpublished data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Kingston, Jamaica.

no change in the distribution of the resources available to the SSFDP to the different functions; in the face of mounting delinquency and default problems discussed in the next section.

Factors Influencing Risk Costs: A Digression on Delinquencies and Defaults

The main component of the risk cost, default cost, is derived from the probabilistically uncollectable delinquent loans or loans in arrears. The arrears situation of the SSFDP from 1974 to 1980 is presented in Tables 15 and 16. Two measures of arrears are presented. In panel A is presented arrears rate I, which shows arrears as a percent of loans outstanding at the end of the year. Panel B presents arrears rate II or arrears as a percent of the payments due during the year. The latter measure, arrears rate II, not only shows more sharply the severity of the arrears problem, but it also shows how misleading arrears rate I (i.e., arrears as a percentage of loans outstanding) can be for early detection of the problem.

Table 15 shows the arrears problem of the SSFDP to be very severe with 75 percent of the loans due in 1975 in arrears. This arrears rate rises continuously to 83 percent in 1978, declining slightly to 74 percent in 1980. The deterioration in the arrears situation is also evident from Panel A, where arrears are about 16 percent of loans outstanding in 1974 but increases to about 42 percent in

Table 15. Self-Supporting Farmers Development Program:
Arrears Rates of All Overdue Loans as Percentages
of Loans Outstanding (I-Panel A) and of Amounts
Due (II-Panel B), 1974-1980.

Loan Program	1974 ^{a/}	1975 ^{a/}	1976 ^{a/}	1977 ^{a/}	1978 ^{a/}	1979 ^{b/}	1980 ^{b/}
<u>Panel A - Rate I</u>							
269/317	16.2	21.3	28.5	38.7	47.9	54.6	59.2
359	.4	.5	2.4	5.9	16.3	32.1	42.1
516							31.2
Recovery			6.1	6.2	18.3	44.5	49.7
Portfolio	15.6	16.8	16.6	18.9	24.4	39.3	41.9
<u>Panel B - Rate II</u>							
269/317		75.6	79.0	84.9	87.0		
359		39.8	52.8	70.5	79.9		
516							
Recovery			78.1	83.1	91.7		
Portfolio		75.4	77.0	82.4	83.7	57.5*	73.5

^{a/} Extrapolated linearly from fiscal year rates.

^{b/} December 31

Source: Computed with data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Audited Financial Statement and Supplementary Information, various years; and other unpublished data from same, Kingston, Jamaica.

1980. A perusal of Table 15 shows that the arrears problem affected all four IDB loan programs and the recovery loan program as well. The arrears rate for loan programs 269/317 rose from 16 percent of loans outstanding in 1974 to more than 59 percent in 1980. The rate for loan program 359 rose from .4 percent to 42 percent for the same period. The recovery loan program's arrears rate, increased from 6 percent in 1976 to almost 50 percent in 1980. An interesting finding is that since the inception of loan 359, each succeeding loan program's arrears rate begins at a higher level, then deteriorates more quickly. Loan program 359 began with an arrears rate of .4 percent of loans outstanding in 1974 while the recovery loan program's rate began at 6 percent in 1976. The last loan program of the SSFDP (i.e., 516) began with a 31 percent arrears rate in 1980.

It is usually accepted that arrears on loans less than 90 days overdue may not pose any serious threat to a loan portfolio. It is those loans more than 90 days overdue that should be alarming. Table 16 presents the same information presented in Table 15 using only the loans that are more than 90 days in arrears. It is evident from this table that the severity of the SSFDP arrears problem is no less if one only looks at loans more than 90 days overdue. In fact, this measure generates results similar to the earlier measure (i.e., all arrears regardless of time overdue). For

Table 16. Self-Supporting Farmer's Development Program:
Arrears Rates of Loans Over 90 Days Overdue as
Percentages of Loans Outstanding (I-Panel A)
and of Amounts Due (II-Panel B), 1975-1980.

Loan Program	1974 ^{b/}	1975 ^{a/}	1976 ^{a/}	1977 ^{a/}	1978 ^{a/}	1979 ^{b/}	1980 ^{b/}
<u>Panel A - Rate I</u>							
269/317		21.0	25.4	35.2	44.6	54.5	55.9
359		.4	1.0	3.3	11.9	31.9	37.1
516							23.1
Recovery			1.7	3.4	13.6	44.5	43.9
Portfolio		16.2	14.3	15.9	20.6	39.1	36.0
<u>Panel B - Rate II</u>							
269/317		74.6	70.8	76.8	81.0		
359		24.0	22.3	38.2	56.5		
516							
Recovery			25.0	42.8	65.7		
Portfolio		73.0	66.1	68.9	70.7	57.3*	63.2

^{a/} Extrapolated linearly from fiscal year rates.

^{b/} December 31

Source: Same as Table 9.

example, the arrears rate was about 58 percent for all loans overdue and 57 percent for 90 days overdue in 1979. This shows that, not only were these rates high and deteriorating but also, a high percentage of them were probabilistically endangered. The probability of default increases the longer a loan remains in arrears.

Table 17, using fiscal year figures, sheds more light on the aging of the SSFDP arrears. It shows that 95 percent of all the loans in arrears in fiscal year 1975 were more than 180 days overdue. The 180 days or more overdue loans were 94 percent of total arrears in 1976, 69 percent in 1977, 73 percent in 1978 and 72 percent in fiscal year 1979.

The arrears problem of the SSFDP was not restricted to only a few branches but rather permeated the entire program. It can be seen from Table 18 that all the branches or land authorities experienced high arrears rates. Claremont which had a relatively better arrears picture saw its arrears as percentages of loans outstanding drop from 8 percent in fiscal 1975 to 7 percent in 1976 and 6 percent in 1977 only to rise again to 9 percent and 20 percent in fiscal 1978 and 1979, respectively. Port Antonio, with the worst arrears situation during this period, had rates ranging between 20 percent and 42 percent of loans outstanding in 1977 and 1979, respectively.

It was these pervasive and high levels of arrears rates with the major part of them probabilistically uncollectable

Table 17. Self-Supporting Farmers' Development Program:
Aging of Arrears as Percentages of All Overdue
Loans, Fiscal Years, 1975-1979.^{a/}

Days in Arrears	PERCENT				
	1975	1976	1977	1978	1979
1 - 90	1.9	3.7	17.7	16.0	15.5
90 - 180	3.1	2.5	12.9	11.2	12.8
Greater than 180	95.0	93.7	69.4	72.8	71.7
All Over Due	100	100	100	100	100

^{a/} Years ending March 31.

Source: Computed with data from the Jamaica Development Bank's Self-Supporting Farmer's Development Program, Audited Financial Statement and Supplementary Information, various years, Kingston, Jamaica.

Table 18. Self-Supporting Farmers' Development Program:
Arrears Rates as Percentages of Loan Outstanding
Within and By Land Authority (Branch), Fiscal
Years, 1975-1979.^{a/}

Land Authority (Branch)	ARREARS RATES				
	1975	1976	1977	1978	1979
Cambridge	8.7	12.6	13.4	16.5	31.8
Christina	14.1	14.2	9.1	18.3	18.4
Claremont	7.9	6.8	6.2	8.8	20.3
Falmouth	12.2	12.4	11.7	14.9	19.3
Grange Hill	19.7	21.7	16.0	16.3	22.1
Linstead	24.0	26.0	24.5	23.7	28.7
Mandeville	3.5	5.2	6.2	18.1	24.7
May Pen	20.9	21.4	18.9	23.2	25.0
Morant Bay	19.4	24.8	26.3	16.4	29.3
Port Antonio	26.7	33.6	20.3	31.5	41.5
Port Maria	12.7	16.7	15.7	19.9	27.1
Santa Cruz	12.6	13.0	25.6	15.8	23.3
Yallah Valley	19.6	21.7	23.7	31.8	32.1

^{a/} Years ending March 31.

Source: Computed with data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Audited Financial Statement and Supplementary Information, various years, Kingston, Jamaica.

that led to the high risk costs and thereby high lending costs estimated in this study. The effects of bad debt or loan losses due to default can be devastating through its influence on the total cost of lending.

Lee and Baker used a simple, but effective, formula to accentuate the debilitating effects of defaults on a loan portfolio [62]. They consider lending costs to be given by:

$$lc = f + k + r \quad (5.1)$$

where f , k , and r represent cost of funds, administrative costs and risk premium respectively. The risk premium is an ex ante risk cost or the premium required to induce the lender to lend in the face of risk. They point out that the occurrence of a default causes the lender to lose, not only the uncollected principal and interest but also, the associated cost of funds, f , and administrative costs, k incurred in having serviced those loans that were never recovered. Expressing the cost figures as percentages of the principal loaned, they present the risk premium as:

$$r = \frac{d}{1-d} (1 + f + k) \quad (6.2)$$

where d , the default rate, is also expressed in terms of the principal loaned. Using a hypothetical f and k of 7 percent and 2 percent respectively, with a default rate of .5 percent, they show lending costs to be:

$$lc = .07 + .02 + \frac{.005}{1-.005} (1 + .07 + .02) = 0.0955$$

This result shows that in addition to itself, the default rate added .05 percent of principal loaned to lending costs, i.e., the risk premium is greater than the default rate that generated it. Increasing the default rate in the above example from .5 percent to 5 percent, for example, will add 5.74 percent to lending costs. This is .74 percent of principal loaned in addition to the 5 percent itself. Finally, they point out that with f and k at 7 percent and 2 percent respectively, lc becomes 100 percent of the principal loaned when d reaches 45.5 percent. This threshold value of d would have been less if f and k were higher than 7 percent and 2 percent.

In the case of the SSFDP the average cost of funds and administrative costs were found to be 2.87 percent and 11.47 percent of loans outstanding respectively, (Table 10) if we use these f and k values and employ the Lee-Baker formula, the threshold or "break even" value for the SSFDP would be 42.8 percent. That is, at a cost of funds of 2.87 percent and administrative costs of 11.47 percent, total lending costs will be 100 percent of loans outstanding when the default rate reaches 42.8 percent of loans outstanding. Another way of interpreting this is that at a 42.8 percent rate of default, the risk premium will be 85.7 percent of loans outstanding, i.e., the institution would have to charge a risk premium of 85.7 (double the default rate) to break even.

In their conclusion, Lee and Baker point out that, "(t)his relationship makes default a destructive factor for the lender if it reaches any appreciable level" [62]. The structure and level of arrears experienced by the SSFDP is clearly one that would endanger any loan portfolio and result in the high levels of risk cost presented above.

Considering the destructive effects of the high arrears and default rates on the SSFDP portfolio, it is pertinent to investigate the probable causes of the delinquencies and related defaults the program has experienced.

Several reasons have been given for the non-repayment of loans by farmers. These reasons can be summarized into three main causes, namely:

- 1) Factors associated with the farmers ability to pay;
- 2) Factors associated with the farmers willingness to pay, and
- 3) Factors associated with the ability and effectiveness of the lending institution to collect due debts.

The first category, ability to pay, deals mainly with the levels and variability in incomes that may result in inadequate incomes to render the borrower unable to meet his contractual loan obligations to the institution. Two key variables affecting the farmer's income are his output and the price he receives.^{5/} The output is affected by the

^{5/} Other factors that may affect a farmer's income, and thereby his ability to pay, are land tenure systems and productivity. Praedial larceny (stealing of farm produce), if unchecked, may be another problem negatively affecting incomes in some countries.

vagaries of weather, diseases, and the availability of appropriate technology. Lack of appropriate and profitable technology, for instance, can result in a lower rate of return in agriculture, from which farmers can repay their loans. Natural disasters and diseases can wipe out an entire crop or major parts of it and impair the farmers' ability to repay loans. The output has to be turned into income in the market place. Inadequate marketing facilities can impede the income generation process, but most importantly, lower prices, either as a result of government cheap food policies, exchange rate overvaluations, inappropriate marketing board price setting policies or inadequate marketing channels, leave farmers low incomes from which they can repay their loans. Changing relative prices can also have an effect on farm incomes. If due to inflation, changes in the prices farmers pay for inputs exceed changes in what they receive for their produce over time, the terms of trade will turn against farmers and a cost squeeze will result in farmer incomes declining, impairing the farmers' ability to repay loans.

The willingness to pay is concerned with farmers attitudes toward repayment. Some farmers may have the ability to pay and yet not repay loans. The farmers that fall into this category may regard government funds as grants and not loans that should be repaid. This attitude is usually

prevalent when you have political interference in the administration of credit programs. It is not uncommon for a borrower to consider loans from a public sector credit program as his payment for supporting a particular political party. Lack of effective sanctions on non-repayment may reinforce arrears behavior. When other borrowers see defaulting borrowers escape penalties or sanctions, they may be tempted to follow suit.

Another factor in a farmer's willingness to pay may deal with the quality of the service he gets from the institution. Disbursement lags and other rationing techniques that increase the farmer's borrowing transaction costs (beyond the interest rate) may result in a negative attitude towards repayment. Furthermore, if repayment is not associated with a strong likelihood of receiving more loans in the future (or lack of repayment doesn't compromise one's chances of getting additional loans), then there is no incentive to repay.

The last cause of non-repayment, the ability and effectiveness of the lending institution to collect, deals with the institution's capacity and determination to collect due loans. A key factor in the capacity to collect loans is adequate staffing and supporting materials and services. An institution may have the staff and materials and yet not be able to use these resources effectively to contain arrears and collect overdue loans.

The severe and pervasive arrears that the SSFDP has faced cannot be explained by the farmers' ability to pay. Marketing problems and an occasional flood, drought or hurricane notwithstanding, available evidence suggest that there were increases in the SSFDP farmers incomes, which enhances their ability to pay. The SSFDP's own Socio-Economic Evaluations attest to this fact [83, 85, 88, 91]. The 1977 evaluation, for example, concluded that (t)he major findings of the socio-economic evaluation exercise of 1977 serves to reiterate those of its earlier counterparts executed in the years 1972 an 1975; in that with few exceptions, beneficiaries had in fact considerably increased over all levels of productuction in terms of volume and value since getting the loan" [88]. This apparently led to "increascs in net income and in overall wealth" [88]. The 1980 evaluation also found "a positive impact (of the SSFDP) on its beneficiaries" [91]. In its conclusion, it stated that "marked improvement (was) recorded in terms of production and income over the period reported on." Lastly, the Begashaw study concluded that "(a) substantial increase in farm level resource use, farm production, farm income and net worth were observed on borrowers' farms" and that "the SSFDP's contribution towards these increases was found to be through its loan activities" [17].

In summary, the search for the causes for the poor collection performance of the SSFDP should focus on the last two categories, i.e., the farmers' willingness to pay on the one hand, and the institution's ability and effectiveness to collect overdue loans on the other. In reference to the latter category, the SSFDP had the capacity to maintain a decent arrears picture and collect overdue loans. It has had adequate staffing and is, operationally, decentralized with good communications between the thirteen parish offices and the central office in Kingston. The PPOs (branch managers) and their staff would appear to have good rapport with the farmers. Furthermore, this field staff includes, for each branch, a full-time loan recovery officer, whose sole job is to collect overdue loans to prevent serious delinquencies. It is this function that generated the administrative cost portion of risk costs in Table 9. It was shown earlier that this cost item increased from about .5 percent of loans outstanding in 1974 to almost 1 percent in 1980. Despite this increase which, in theory, should dampen the arrears situation, just the opposite occurred, i.e., arrears were increasing continuously over the period.

The SSFDP is a supervised credit program. The functional cost analysis presented in Table 14 showed that a third of the resources available to the institution in fiscal 1976 and 1980 were devoted to supervision and technical assistance. A little more than one quarter of the

resources were used in the monitoring and collection of loans. These two functions accounted for almost two-thirds of the operating expenses of the program. The large infusion of resources into these two functions should not only increase the SSFDP's capacity to contain delinquencies and defaults but also increase the farmers' ability to repay through technical assistance.

The foregoing suggests that the causes of the delinquency and default problems of the SSFDP may be due to the lack of effectiveness or efficiency, on its part, in using scarce resources to contain the problem, and/or the farmers' sheer unwillingness to repay. Both of these factors may, in turn, stem from the initial design and implementation of the program, and possible political interference in the administration of the program. By design, the administrative and risk costs of the program are borne by the government out of budgetary allocations. As part of the agreement between the Government of Jamaica and the IDB, the government is expected to reimburse the SSFDP for any loans deemed uncollectable, as mentioned earlier. This escape valve may weaken the resolve and accountability of managers of the program. They may not have been effective in containing arrears and defaults because, in the end, the government covers all operating expenses and uncollectable loans, and repays the IDB through other funds. In this setting, political interference may manifest itself in the selection of

borrowers. Borrowers receiving loans because of party affiliation, personal connections, etc., may feel less obligated to repay, and a change in government may even harden that attitude.

Lack of stringent penalties and sanctions against delinquent and defaulting farmers by the SSFDP may also explain this unwillingness to repay. This point bears further elaboration. From its inception to the present the major objective of the program has been to introduce modern production methods to small to medium sized farmers through long term loans. This emphasis has always been on "targeting" the loans to designated enterprise type and farm size clients with a specified level of net worth. Evaluation of the alleged impact of the loans on farm output and income is almost the sole criterion used by the IDB to judge the program's success. Rarely, if ever, has prompt and effective loan recovery been highlighted as an important indicator of program success. Thus, one would expect less attention and concern about rising delinquency and default among those responsible for the program. We must recognize the obvious trade-off that exists between a viability goal that emphasizes tight financial management with low arrears and a basic needs goal that emphasizes increased income for a targeted group of farmers. One cannot emphasize one except, to some greater or lesser extent, at the expense of

the other. In the case of the SSFDP it is clear they emphasized the latter at the expense of the former.

A further indication of the low ranking given to loan recovery and low arrears is the lack of any sanctions, penalties or disciplinary actions exercised on the SSFDP itself either by the government or by the foreign donor agency, the IDB. Despite the evidence of rising delinquency and default, the IDB and the government have continued to grant new loan tranches and overhead subsidies through the years with a minimum of hassle. In brief, given the low priority of loan recovery in the determination of program success, and the fact that high arrears do not jeopardize continued loans and subsidies from the IDB and the government, it is not surprising to note the lack of any concerted effort to control growing delinquency and the high cost of lending. An ostensible credit program becomes, in time, a hidden expensive income transfer program derived from a grants mentality operating both within the donor agency and the SSFDP itself.

Summary

In summary, the SSFDP experienced high levels of lending costs which also increased substantially from 1974 to 1980. Risk or default costs constituted the major cost item with administrative costs being second throughout the period. Salaries and wages constituted the main operating expense. The high administrative costs were, in part, a

result of relative inefficiency in the operation of the program and, most importantly, because of the nature of the program, i.e., a supervised credit program. Supervision and technical assistance to its farmer clientele accounted for a third of operating expenses.

The high risk costs were as a result of farmers' unwillingness to honor their contractual obligations and/or the ineffectiveness of the SSFDP to collect delinquent loans. Both of these point to flaws in the initial design and implementation of the program, and possible political interference in the administration of the program.

CHAPTER VII

RESULTS ON INSTITUTIONAL VIABILITY, CREDIT RATIONING, AND THE COST FUNCTION

This chapter presents the results and analyses of the financial viability of the SSFDP and its credit rationing behavior. The last section presents the estimated cost function of the SSFDP.

Institutional Viability

Given the magnitude of the lending costs of the SSFDP, an obvious and pertinent question is whether or not the institution is viable; does the SSFDP generate enough income to cover its costs and maintain the real value of its portfolio? The answer is no. Until 1977 the SSFDP charged an interest of 4 percent on loans. Thereafter, it was authorized by the government to charge 7 percent. Even this higher 7 percent rate was below the administrative costs, that averaged more than 11 percent from 1974 to 1980 (Table 10), and far below the overall lending cost which averaged between 26 percent and 35 percent for the same period.

Table 19, using fiscal year figures, highlights the above point. Column 4 presents the total interest income of the SSFDP, with operating expenses presented in column 6.

Table 19. Self-Supporting Farmers' Development Program:
Receipts and Expenditure, 1975-1979
(\$ Thousand)

Year ^{a/}	RECEIPTS ^{b/}				Total (5=4+1)	EXPENDITURE ^{c/} (6)
	Principal (1)	Interest Income		Total (4=2+3)		
		On Loans (2)	Deposits (3)			
1975	639	359	53	412	1,051	984
1976	732	399	97	496	1,228	1,490
1977	866	484	205	689	1,555	2,108
1978	835	545	172	717	1,552	2,332
1979	1,364	675	366	1,041	2,405	2,783

^{a/} Fiscal Year ending March 31

^{b/} Does not include amounts received from the government

^{c/} Does not include interest expense

Source: Jamaica Development Bank, Self Supporting Farmers Development Program, Financial Statement and Supplementary Information, various years, Kingston, Jamaica.

Comparing columns 4 and 6 reveals that income to the SSFDP was below operating expenses for all 5 years, 1975-79. In all the years, expenses were more than two times the income, and in three of the years (1976, 1977 and 1978) they were at least 3 times income.

It is interesting to note the prominence of income from deposits (Column 3) in the interest income figures. It accounted for 27 percent of all interest income from 1975 to 1979, and in 1979 it was more than half of the income from loans. Given the low rates that the SSFDP was allowed to charge on its loans, and a major part of these loans not being repaid, this might have been a deliberate move by the managers of the program to enhance SSFDP revenues. Such behavior, however, defeats the main purpose of the program which is, making developmental loans to farmers.

Column 5 of Table 19 presents total receipts of the SSFDP, which is the total interest income (column 4) and the principal repayments from farmers.^{1/} Comparing columns 5 and 6 brings to light the fact that even total receipts fell below operating expenses for all the years, with the exception of 1975. This suggests that without subsidies, the program was not only not generating enough income to cover costs but also a massive erosion of its capital base was taking place. Capital erosion and the debilitating effects

^{1/} These do not include receipts from the government.

of inflation adversely affected the capacity of the SSFDP to sustain the purchasing power of its portfolio.

Government subsidies to the SSFDP to cover operating expenses (recurrent expenditure) rose from \$760 thousand in 1974 to \$2.7 million in 1978. It dropped slightly to about \$2 million in 1980, as shown in Table 20. As high as these subsidies were, they were not enough to cover all the operating expenses in the various years as they were expected to do. Comparing the subsidies in Table 20 with the calendar year operating expenses presented earlier in Table 11 attests to this fact. In fact, in contravention of the original design of the program, the government often authorized the administrators of the SSFDP to meet the difference between the operating expenses and the voted subsidies by dipping into the accumulated funds of the program. This and frequent battles between the government and the administrators of the SSFDP, with respect to adequate funding for the operation of the program, in part, reflect the government's later dissatisfaction with the high lending costs of the SSFDP and the government's own inability to support the high costs due to budgetary constraints. For example, the SSFDP's revised estimated budget for the 1979/80 fiscal year was \$3.219 million. The government allocation was \$2.442 million and even this was trimmed to \$2.188 million by Parliament due to "resource constraints."

Table 20. Self-Supporting Farmers' Development Program: Subsidies for Operating Expenses (Recurrent Expenditure) from the Government of Jamaica, 1974-1980 (\$ Thousand)

YEAR	SUBSIDY
1974	760
1975	1,507
1976	1,482
1977	2,078
1978	2,693
1979	1,373
1980	1,959

Source: Unpublished data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Kingston, Jamaica.

The foregoing leads to the conclusion that the SSFDP is not a viable entity given the high levels of lending cost, fixed and low interest rates, and the apparent reluctance of the government to continue subsidizing the high costs of the program. Given this situation, one would expect the managers of the program to ration credit by non-price means in attempt to stem the rising costs, especially the risk or default costs. This is the topic of the next section.

Credit Rationing

It was postulated in chapter four that a public sector lender, in attempting to reduce the risks and costs in his portfolio so as to limit the growth of subsidies will engage in the following behavior:

- 1) Reduce the growth in the number of loans made,
- 2) increase the number and amount of multiple loans to established clients,
- 3) concentrate the loan portfolio into larger sized loans (where administrative costs are less per unit of money lent),
- 4) shift the new loans into enterprise types that reduce risk or lower costs,
- 5) concentrate the loan portfolio into larger sized farms (where, it is assumed, risks are less and returns more certain).

- 6) shorten the term structure of loans (to reduce losses associated with inflation),
- 7) allocate loans on a regional or branch basis where risks and costs are less, and
- 8) increase the collateral demanded (to reduce risk).

The behavior of the SSFDP with respect to the above, for 1975 and 1980 is discussed in this section.

As shown in Table 21, the number of new loans granted by the SSFDP and the number of beneficiaries did, in fact, decrease from 1975 to 1980. The number of loans granted declined from over 1,000 to less than 800, while the number of beneficiaries dropped from 860 to 755. This was expected. The number of multiple loans also declined from 24 percent of loans made in 1975 to a mere 4 percent in 1980, contrary to what was postulated.

Table 22 presents the loan size distribution. The smallest 5 percent of the number of loans accounted for 1 percent of the value of loans in 1975 and .4 percent in 1980, a decline. The next 20 percent of the number of loans' value also declined from 8 percent in 1975 to 5 percent in 1980. So did the next 50 percent of the number of loans (41 percent of the value of loans in 1975 to 36 percent in 1980). The largest 5 percent, however, increased its share of the value of loans from 13 percent to 20 percent. The next 20 percent (from the top) also increased its value from 32 percent in 1975 to 39 percent in 1980. Thus,

Table 21. Self-Supporting Farmers' Development Program:
Loan Commitments and Number of Beneficiaries,
1975 and 1980

Item	Year	
	1975	1980
No of Loans (1)	1,070	787
No of Beneficiaries (2)	860	755
Multiple Loans (3=1-2)	210	32
Multiple Loans As Percent of No of Loans (4=3/1)	24.4%	4.2%

Source: Unpublished data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Kingston, Jamaica.

Table 22 Self-Supporting Farmers' Development Program:
 Loan-Size Distribution; Percentage Distribution
 of Number of Loans by Value of Loans,
 1975 and 1980

No of Loans	Percent of Total Value		
	1975	1980	CHANGE
Smallest 5%	1.0	.4	-.6
Next 20%	8.2	5.0	-3.2
Next 50%	41.0	35.8	-5.2
Next 20%	31.8	38.8	7.0
Largest 5%	18.0	19.8	1.8
All Loans ^{a/}	100.0	100.0	---

^{a/} May not add up to 100% due to roundings.

Source: Computed with unpublished data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Kingston, Jamaica.

while the smallest 75 percent of the number of loans declined in loan value from 50 percent of total in 1975 to 41 percent in 1980, the largest 25 percent (of number of loans) increased its loan value from 50 percent to about 59 percent, indicating a concentration of the loan portfolio into larger sized loans.

Table 23 presents the changes in the percentage distribution of the number and value of loans by enterprise. The picture that emerges out of this table is a mixed one. Since crops are usually more risky enterprises compared to livestock, one would expect a shift towards livestock in the portfolio from 1975 to 1980. Livestock loans, however, declined in terms of share of both number and value of loans - minus 3 percent and minus 4 percent respectively. Two enterprises that were associated with minimal risk of default were poultry and tobacco. The reason being that the farmers' installment payments are usually deducted from a marketing source. When these farmers sell their produce, the companies that they are contracted to deduct from the farmers' proceeds and pay the SSFDP the amounts due the program. The Jamaica Broiler Company, for instance, had this arrangement with its contract farmers who borrowed from the SSFDP. The contracting companies also provide extension and technical assistance to their farmers and, therefore, these farmers do not "need" the SSFDP extension services; a potential saving in cost. One of these enterprises,

Table 23. Self-Supporting Farmers' Development Program:
Percentage Distribution of Number and Value of
Loans by Enterprise, 1975 and 1980

Enterprise	No of Loans			Value of Loans		
	1975	1980	Change	1975	1980	Change
<u>All Livestock</u>	53.6	50.7	-2.9	68.4	64.4	-4.0
Cattle	16.0	16.0	0.0	21.7	26.6	4.9
Poultry	9.2	7.7	-1.5	15.2	9.0	-6.2
Pigs	13.5	22.2	11.7	15.3	26.3	11.0
Goats	8.4	.5	-7.9	8.4	.5	-7.9
Other Livestock	6.5	1.3	-5.2	7.8	2.0	-5.8
<u>All Crops</u>	46.4	49.3	2.9	31.6	35.6	4.0
Bananas	19.9	2.7	-17.2	11.9	2.5	-9.4
Food Crops	14.0	13.1	-.9	11.6	10.5	-1.1
Vegetables	2.3	14.4	12.1	1.2	5.4	4.2
Tobacco	0.0	5.7	5.7	0.0	9.6	9.6
Other Crops	10.2	13.4	3.2	6.9	7.6	.7

Source: Computed with unpublished data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Kingston, Jamaica.

tobacco, did in fact increase its share of the number of loans (by 6 percent) and value of loans (by 10 percent); while the other (poultry) declined by almost 2 percent for number of loans and 6 percent for value of loans.

Changes in the percentage distribution of the number and value of loans by farm-size is presented next in Table 24. Even though the largest farm-size category (those greater than 25 acres) gained in both number and value of loans (about 2 percent and 7 percent respectively), the smallest farm-size group (5 acres or less) gained even more - 16 percent and 13 percent of number and value of loans respectively. It does not appear, therefore, that there was a concerted effort on the part of the SSFDP to concentrate the loan portfolio into larger sized farms. This could also be a reflection of the government mandating the SSFDP to lend to the beneficiaries of the government's Land Lease program. The average farm size of the beneficiaries is less than 5 acres. At December 1979, the average arable acreage of the beneficiaries was less than 2 (acres) [68(1979, p. 73)].

As shown in Table 25, short term loans' percentage share of number of loans granted, increased from 0 to 61 percent and of the value of loans to 49 percent. Medium and long term loans' percentage shares declined, however, with the long term loans' decline being the greatest - 40 percent in the number of loans and 36 percent in value of

Table 24. Self-Supporting Farmers' Development Program:
Percentage Distribution of Number and Value of
Loans by Farm-Size, 1975 and 1980

Farm-Size	No of Loans			Value of Loans		
	1975	1980	Change	1975	1980	Change
5 Acres or Less	11.5	17.0	15.5	12.5	25.4	12.9
5.1 to 10 Acres	31.6	28.1	-3.5	24.9	19.7	-5.2
10.1 to 15 Acres	19.0	13.1	-5.9	18.1	11.5	-6.6
15.1 to 25 Acres	21.2	13.3	-7.9	22.2	14.3	-7.9
Greater Than 25 Acres	16.7	18.5	1.8	22.3	29.1	6.8
ALL FARMS	100.0	100.0	---	100.0	100.0	---

Source: Computed with unpublished data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Kingston, Jamaica.

Table 25. Self-Supporting Farmers' Development Program:
Percentage Distribution of Number and Value
of Loans by Term-Structure, 1975 and 1980

Term Structure	No of Loans			Value of Loans		
	1975	1980	Change	1975	1980	Change
Short Term ^{a/}	0.0	60.5	60.5	0.0	48.9	48.9
Medium Term ^{b/}	43.3	23.0	-20.3	36.6	23.4	-13.2
Long Term ^{c/}	56.7	16.5	-40.2	63.4	27.7	-35.7
ALL LOANS	100.0	100.0	----	100.0	100.0	----

a/ Short Term < 2 years

b/ 2 < Medium Term < 7 years

c/ Long Term > 7 years

Source: Computed with unpublished data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Kingston, Jamaica.

loans. This is a clear indication of the shortening of the term structure of the loans from 1975 to 1980 as postulated.

The percentage distribution of the number and value of loans by region is presented in Table 26. The regional division of the SSFDP was on Land Authority basis in 1975 and on a Parish basis in 1980. Although there were 13 Land Authorities and 13 Parishes, there is not a one to one correspondence between the two divisions. Christiana and Mandeville (Land Authorities), for instance, make up Manchester Parish; while Grange Hill Land Authority translates, more or less, into the Hanover and Westmoreland Parishes. For this reason, no information is presented for Christiana, Grange Hill and Mandeville for 1980. The Land Authorities are arranged in ascending order of better arrears performance (during the fiscal 1975 to fiscal 1979 period). Port Antonio, for example, had the worst arrears performance while Claremont had the best performance in terms of arrears. Table 26 reveals that, in spite of this, the percentage share of the value of loans of Claremont declined by 2 percent. Falmouth, the next best region with respect to arrears, saw its share of number of loans decline by 4 percent and its share of value of loans by 3 percent. Cambridge was next in line in better arrears performance and it, too, experienced a decline in its share of number and value of loans. Earlier in Table 23, it was shown that the importance of bananas declined 17 percent in number of loans

Table 26. Self-Supporting Farmers' Development Program:
Percentage Distribution of Number and Value of
Loans by Region (Land Authority), 1975 and 1980

Region	No of Loans			Amount of Loans		
	1975	1980	Change	1975	1980	Change
Port Antonio	11.5	2.3	-9.2	8.1	2.3	-5.8
Linstead	9.5	12.8	3.3	12.0	12.8	.8
Yallahs Valley	3.0	3.6	.6	3.9	2.6	-1.3
Morant Bay	2.3	5.4	3.1	2.0	3.1	1.1
May Pen	8.0	8.5	.5	9.6	10.9	1.3
Port Maria	6.1	4.4	-1.7	5.5	6.1	.6
Christiana	7.1	*	-	7.7	*	*
Grange Hill	6.9	*	-	6.6	*	*
Santa Cruz	7.2	16.2	9.0	7.2	16.4	9.2
Cambridge	11.1	5.0	-6.1	9.9	4.1	-5.8
Mandeville	6.7	*	-	6.0	*	*
Falmouth	10.3	6.4	-3.9	10.0	7.2	-2.8
Claremont	10.3	12.3	2.0	11.5	9.1	-2.4
ALL REGIONS*	100.0	100.0	-	100.0	100.0	-

* There is not a one to one correspondence between Land Authority (1975) and Parish (1980) regional breakdowns. In total, Christiana, Grange Hill, and Mandeville accounted for 23% and 25% of the number of loans and value of loans respectively in 1980.

Source: Computed with unpublished data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Kingston, Jamaica.

and 9 percent in value of loans in the SSFDP portfolio. A probable explanation for this is the extension of credit by the Banana Board to the banana growers, and may not have necessarily been a deliberate effort on the part of the SSFDP. Port Antonio is a major banana producing area, therefore, the decline (seen in Table 26) in the share of its number of loans (minus 9 percent) and value of loans (minus 6 percent) might not be a result of its bad arrears performance, but rather a reflection of the decline of banana loans in the portfolio. It can be concluded, therefore, that the SSFDP did not allocate loans on a regional basis to minimize risk (i.e., delinquencies and default).

Interviews with SSFDP officials concerning the tightening or loosening of collateral requirements in the face of the massive delinquencies and default point to the latter. To support this fact, some of the officials point to the involvement of the SSFDP in lending to farmers participating in the government's Land Lease Program. As part of this program, farmers in the Charlemont Development Project, for example, were to receive SSFDP loans. The officials complained about the lack of their involvement in the selection of the project's farmer participants and the minimal control they have on who receives loans.

The picture that emerges from the foregoing is that, either through choice or through political pressure from the government (and possibly the IDB) or some combination of

these factors, there was no concerted or consistent effort on the part of the SSFDP to ration credit by non-price means in attempt to reduce the risks and the costs in its portfolio. Given this, it should not be surprising then that the SSFDP saw a rise in costs and subsidies, a rise in arrears and, as shown below in Table 27, an erosion in the real value or purchasing power of the portfolio over time. In real terms, the portfolio only grew 3 percent from 1974 to 1980 (\$9.7 million to \$10 million) and declined by 28 percent from 1977 to 1980. This occurred in the face of a large increase in the nominal value of the portfolio outstanding over this period, from \$9.7 million in 1974 to almost \$26 million in 1980

Two of the hypotheses tested in this section dealt with whether or not the SSFDP reduced number of loans made and/or increased its loan sizes, to reduce costs. The estimated cost function presented in the next section sheds some light on the validity of these hypotheses.

Estimated Cost Function

One of the explanatory variables in the original model - R (arrears rate) - was dropped from the final estimated model due to multicollinearity problems.^{2/} Ordinary least-squares was applied after logarithmic transformation of the model. The estimated equation is:

$$\begin{aligned} \hat{\text{Log C}} = & 20.16 + .30(\text{Log N}) - 1.51(\text{Log S}) \\ & + .64(\text{Log W}) + 2.14(\text{Log M}) \end{aligned} \quad (7.1)$$

^{2/} See equation 5.10, Chapter V.

Table 27. Self-Supporting Farmers' Development Program:
Loans Outstanding At End of Year in Constant
Prices, 1974-1980 (Thousand \$)

Year	Loan Balance	
	Nominal	Real ^{a/}
1974	9,739	9,739
1975	11,764	9,723
1976	15,782	11,777
1977	20,912	13,941
1978	24,939	13,195
1979	24,437	11,108
1980	25,618	10,007

^{a/} In constant 1974 prices. The implicit GDP Deflator (see Appendix A) was used in deflating the current figures.

Source: Computed with unpublished data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Kingston, Jamaica.

These parameter estimates and related statistics are presented in Table 28. As shown in the table, the number of loans and materials price index are significant at the 1 percent level while the average size of loans and wage index are significant at the 5 percent level. All the variables had the expected signs. The equation explains a substantial portion ($R^2 = .99$) of the variation in the dependent variable, administrative cost. The overall model is significant at the 1 percent level.

The results lead to the conclusion that the number of loans is an appropriate measure of the output of the bank (SSFDP) and that increasing the number of loans increases administrative costs. The significance of the factor prices (wage index and materials price index) supports the theory that, *ceteris paribus*, increasing factor prices increases costs. The negative coefficient for the average size of loans indicates that, in fact, costs can be decreased by increasing the size of loans. The results also lend credence to the earlier hypothesis that lenders in attempting to contain costs may reduce the number of loans made and/or increase the average size of their loans.

Average and marginal costs for specific levels of output (number of loans) can be generated from the total cost function (7.1). Dividing equation (7.1) by the number of loans will yield the average cost function (AC):

Table 28. Parameter Estimates and Related Statistics of the Estimated Cost Function, Self-Supporting Farmers' Development Program, 1974-1980

Explanatory Variables	Parameter Estimates	Standard Error	T-Ratio
Intercept	20.16	2.62	
Number of Loans (N)	.30	.02	16.97**
Average Size of Loans(S)	-1.51	.26	5.84*
Wage Index (W)	.64	.21	3.09*
Materials Price Index(M)	2.14	.25	8.72**
R ²	.99		
F-Ratio	529.09**		

* Significant at 5 percent level

** Significant at 1 percent level

Source: Computed with published data from the Jamaica Development Bank's Self-Supporting Farmers' Development Program, Kingston, Jamaica.

$$\begin{aligned} \text{Log AC} = & 20.16 - .70(\text{Log N}) - 1.51(\text{Log S}) + .64(\text{Log W}) \\ & + 2.14(\text{Log M}) \end{aligned} \quad (7.2)$$

Using geometric means of S, W, and M, the logarithmic values of the variables can be placed into equation (7.2) and multiplied by their respective parameters. Substituting all of the variables plus the constant in equation (7.2) will yield the average cost for the specific level of N.

Marginal cost may be estimated from the average cost. As was shown in equation (5.11) in Chapter V, this may be accomplished by multiplying the parameter estimate for the number of loans (.30) by the average cost. It needs to be said that this procedure only estimates cost. Although the equation has a high R^2 , the procedure cannot be expected to yield completely accurate estimates of costs. Differences in estimated and actual cost may be due, for example, to errors in measurement. Any substantial changes in efficiency on the part of management and staff may also be responsible for unexplained variation.

CHAPTER VIII
SUMMARY, CONCLUSIONS AND IMPLICATIONS

Summary

The general objective of this study was to document the lending costs of the Jamaica Development Bank's Self-Supporting Farmer's Development Program (SSFDP), assess the financial viability of the program and investigate its credit rationing behavior in the face of interest rate controls in an inflationary environment. The specific objectives were to: 1) identify and measure the main components of the costs of lending to farmers; 2) evaluate the factors influencing these costs; 3) assess the influence of the structure and level of lending costs on the financial viability of the credit agency; 4) assess the adequacy of internal information flows for the effective control and management of lending costs; 5) investigate the existence of credit rationing; and 6) estimate a cost function for institutional lending to agriculture.

The data used in this study were obtained from the SSFDP. I spent a total of nine months (July 1980-March 1981) inside the Jamaica Development Bank in Jamaica collecting the data. The principal sources are audited and

unaudited financial statements; monthly expenditure statements, including individual employee salary expense accounts; loan account files, and other records, documents and files of the bank. Extensive interviews with bank officials and staff were conducted in the central office in Kingston and some of the parish (branch) offices. These interviews, a survey of the bank's borrowers in St. Catherine, and informal discussions with bank staff and borrowers were helpful in gaining indepth appreciation of the operations of the institution.

By its nature and scope, a major part of the study's objectives were met by the use of descriptive or tabular analysis. The cost function was estimated using a Cobb-Douglas type regression model employing the ordinary least squares (OLS) estimation technique.

Findings and Conclusions

The results of the study showed that the SSFDP experienced high levels of lending costs which increased substantially from 1974 to 1980. The total cost of lending ranged from about 23 percent of loans outstanding to almost 49 percent for a period average of 26 to 35 percent. Risk cost was the major contributor to this high cost of lending averaging between 12 and 26 percent; followed by administrative costs (period average of more than 11 percent) and cost

of funds; for the entire period. Salaries and wages constituted the main operating expense. The high administrative costs were, in part, a result of relative inefficiency in the operation of the program and, most importantly, because of the nature of the program, i.e., a supervised credit program. Supervision and technical assistance to its farmer clientele accounted for a third of the operating expenses of the SSFDP.

The high risk costs were a result of massive and pervasive delinquency and defaults stemming from the farmers' unwillingness to honor their contractual loan obligations, and/or the ineffectiveness of the SSFDP to collect delinquent loans. Flaws in the initial design and implementation of the program, and possible political interference in the administration of the program contributed to this problem. By design, the administrative and risk costs of the program are borne by the Government of Jamaica out of budgetary allocations. As part of the agreement between the government and the Inter-American Development Bank (IDB)--the foreign donor agency of the program--the government is supposed to reimburse the SSFDP for any uncollectable loans. This escape valve may have weakened the resolve and accountability of the managers of the program. They may not have been effective in containing delinquencies and defaults because, in the end, the government covers all operating

expenses (including risk costs) and repays the IDB through other funds.

From its inception the major objective of the program has been to introduce modern production methods to small and medium sized farmers through long term loans. The emphasis has always been on "targeting" the loans to designated enterprise type and farm size clients with a specified level of net worth. Evaluation of the alleged impact of the loans on farm output and income is almost the sole criterion used by the IDB to judge the programs success. Rarely, if ever, has prompt and effective loan recovery been highlighted as an important indicator of program success. Thus one would expect less attention and concern about delinquency and default among those responsible for the program. There is an obvious trade-off between a viability goal that emphasizes tight financial management with low arrears and a basic needs goal that emphasizes increased income for a targeted group of farmers. One cannot emphasize one except, to some greater or lesser extent, at the expense of the other. The findings of this study suggest that the SSFDP emphasized the latter at the expense of the former.

A further indication of the low ranking given to loan recovery is the lack of any sanctions, penalties or disciplinary actions exercised on the SSFDP itself either by the government or the IDB. Despite the evidence of rising delinquency and default, the IDB and the government have

continued to pass on new loan tranches and overhead subsidies through the years with a minimum of hassle. Given the low priority of loan recovery in the determination of program success, and the fact that substantial arrears do not jeopardize continued loans and subsidies from the IDB and the government, it is not surprising to note the lack of any concerted effort to control growing delinquency and the high cost of lending. This ostensible credit program has become, in time, an expensive income transfer program derived from a grants mentality operating both within the donor agency and the SSFDP itself.

The high cost of lending found in this study coupled with administered low interest rates and high levels of inflation compromised the financial viability and potential of the SSFDP. With the cost of lending of the magnitude discussed above, the SSFDP was only allowed to charge an interest on loans of 4 percent from 1974 to 1977 when it was "given permission" to raise its interest rate to 7 percent. Income to the SSFDP was below its operating expenses for all the years studied. In all the years, expenses were more than two times the income, and in three of the years they were at least three times this income. Even total receipts (interest income plus principal repayments) fell below operating expenses for all the years, except 1975. Without subsidies, the program was not only not generating enough

income to cover costs but also a massive erosion of its capital base was taking place.

Government subsidies to the SSFDP to cover operating expenses (recurrent expenditure) were found to have risen from a mere \$760 thousand in 1974 to a remarkably high \$2.7 million in 1978. As high as these subsidies were, they were not enough to cover all the operating expenses. In fact, in contravention of the original design of the program, the government often authorized the administrators of the SSFDP to meet the difference between the operating expenses and voted subsidies by dipping into the accumulated funds of the program. This and frequent battles between the government and the administrators of the SSFDP, with respect to adequate funding for the operation of the program, in part, reflect the government's later dissatisfaction with the high lending costs of the SSFDP and the government's own inability to support the high costs due to budgetary constraints.

It was thought that with high costs of lending and interest rate ceilings (restricting the capacity to meet those high and rising costs), the SSFDP would alter the growth and composition of its portfolio so as to minimize its losses and contain the rate of increases of subsidies needed to function or actually reduce them. The findings of this study showed that this was not the case. It was concluded that either through choice or through political pressure from the government (and possibly the IDB) or some

combination of all, there was not a concerted or consistent effort on the part of the SSFDP to ration credit by non-price means in attempt to reduce the risks and costs in its portfolio. Given this state of affairs, it is not surprising that the SSFDP saw a rise in arrears, a rise in costs and subsidies and an erosion in the real value or purchasing power of its loan portfolio. It was found that, in real terms, the portfolio only grew by 3 percent from 1974 to 1980 and declined by 28 percent from 1977 to 1980. This occurred in the face of a large increase in the nominal value of the portfolio outstanding over this period.

Results from the estimated cost function confirms the influence of salaries and wages on the administrative costs of the program. The importance of inflation in increasing operating expenses was also ascertained. The results also lend credence to the earlier hypothesis that lenders in attempting to contain costs may reduce the number of loans made and/or increase the average size of their loans.

Even though there existed enough data for a study of this kind, my overall assessment is that there is an inadequacy of internal information flows for the effective control and management of the lending costs of the SSFDP. The SSFDP accounting system was not structured in a way to allow a functional breakdown of operating expenses as was done in this study. Neither was it structured to permit one to determine easily arrears on amounts due, which shows more

sharply the severity of arrears problems for early detection. A probable reason for this lack of adequate internal information flows might be simply because the IDB or the government did not require it. This points again to the low priority accorded effective control of costs and of viability in the design of the program.

Finally, something needs to be said about the social costs inherent in the operation of the SSFDP and other supply-leading institutions like it. These social costs are mainly subsidies from governments. For the SSFDP, these include its operating expenses or recurrent expenditure since these are met from government budgetary allocations, and the amounts the government reimburses the program for uncollectable loans. The remaining subsidies are those implicit in the concessionary interest paid on loanable funds from the government, and the fact that the institution does not pay government taxes. It goes without saying that these subsidies are enjoyed primarily by the ones that receive the underpriced credit from these institutions.

Government revenues, from which these subsidies come, are mainly from taxes. Most LICs have a regressive tax structure since they usually do not have an efficient tax system and are, therefore, forced by convenience to rely heavily on indirect taxes and/or inflationary financing. The indirect taxes may include low prices paid primary producers by commodity boards, import and export duties, and

excise taxes. The incidence of this regressive tax structure is onerous on the poor since they pay proportionately more of their incomes than the rich in such a tax system. This has equity implications since the direct beneficiaries of the subsidies are probably better off than the people bearing the majority of the taxes.

Implications and Recommendations

The main thrust of the recommendations of this study concerns the long run viability and growth of the SSFDP. To ensure the viability and growth of the SSFDP would require interest rate revaluation and drastic decreases in the cost of lending, especially the risk cost. Actions are obviously needed on both fronts, but cost reductions come first since there will not be a realistic interest rate when default costs are as overwhelming as they have been. Recovery and other lending costs are unnecessary and socially wasteful when the degree of default effectively converts the credit program into an income transfer program.

Any realistic attempt to reduce the excessive delinquencies and defaults from the SSFDP portfolio should include freeing the program of possible political interference and emphasizing the resolve and accountability of the administrators of the program to deal with the problem. This will require making the program a complete financial institution and not the retail outlet for credit that it has

been. The solution here is the mobilization of domestic savings by the SSFDP. This will reduce its reliance on the government (and the IDB) as a source of its liabilities and reduce the influence of the government on its credit operations. Savings mobilization can be helpful in other ways. If prospective borrowers are savers at the institution, the institution can cut down on information cost since it will have some information on the borrower; information that might help make better loan appraisals. Borrowers' attitude towards repayment may be different when they are dealing with a depository financial institution. They may be less likely to default if they know they, or others in their community, have their savings in the bank. Consistent with this idea of autonomy for the SSFDP may be a policy to phase out the practice of paying for the program's expenditures out of voted budgetary allocations. Some subsidy may, however, be required in the early stages of such a policy while the institution gets back on its feet.

Further savings in cost can be achieved by cutting down on the personnel involved in the operation of the SSFDP, given the excess capacity and the impact of salaries on operating expenses found in the study. A key candidate for such a cut might be in the supervision and technical assistance area. Despite the massive amount of resources expended in this area, the arrears problem of the program worsened. Some of the SSFDP farmers were found to be

receiving technical assistance from contract buyers of their produce and might therefore not need SSFDP technical assistance. For those needing this service, the Ministry of Agriculture extension agents can be drawn upon here. Until May 1975 the Ministry of Agriculture was responsible for the extension service needs of the farmers. It might be prudent to return this function to the Ministry of Agriculture.

Given the low level of interest the SSFDP is allowed to charge its customers, it might consider having the borrowers pay for stamp duty, registration fees, and service fees. Even though these might not be that much for the individual borrower, they add up for the institution. Another area that should be considered is the charging of interest on arrears on delinquent loans.

It is only when unjustifiable costs like excessive defaults have been curtailed that a realistic interest rate can be charged. This calls for a flexible interest rate policy. The interest rate should cover the cost of funds, administrative costs and a reasonable risk premium. A fourth factor in the interest rate revaluation should be a premium to stem the erosion of the portfolio due to inflation. This might be problematic given the high levels of inflation experienced in Jamaica in recent years. Interest rates based on these factors should not only make the SSFDP viable and growth oriented but reduce its dependence on

government subsidies and free it from political interference.

Finally, the SSFDP should structure the accounting procedure to allow a functional breakdown of administrative costs, and to permit easy determination of arrears on amounts due. Future evaluation of program performance or success should include prompt and effective loan recovery and overall financial viability.

In conclusion, for the SSFDP, and other "supply leading" institutions like it, to contribute to agricultural and rural development, they have to remain financially viable. This will require reforms in the design and implementation of these programs. These reforms should include interest rate reforms that will allow these institutions to charge flexible nominal interest rates that are generally positive in real terms, and also reflect the scarcity of capital in LICs. Critical to this reform is the necessity to make these programs complete institutions that will pay realistic interest on deposits to mobilize domestic savings.

Need For Further Research

Cost studies are useful if they provide managers data from which they can estimate the marginal cost of specific activities. Due to data limitations the present study could not delve enough into this issue. Future research should address this important issue, and attempt to test for the

existence of economies of scale in rural financial institutions lending to agriculture.

The importance of internal information flows for the effective control and management of lending costs was raised in this study. Such information will not be free. Research is needed to delve more into the nature of the information needed, and especially their costs relative to the benefits.

Appendix A: Exchange Rates and The Implicit GDP
Deflator, Jamaica, 1974-1980

Year	Exchange Rate (\$J/US\$)	GDP Deflator
1974	.909	100
1975	.909	121
1976	.909	134
1977	.909	150
1978	1.597	189
1979	1.786	220
1980	1.786	256

Source: National Planning Agency, Jamaica, Economic and Social Survey, (Kingston, Jamaica, 1979); and Department of Statistics, Jamaica, National Income and Product, (Kingston, Jamaica, 1980).

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