The impact and accessibility of agricultural credit: A case study of small-scale farmers in the Northern Province of South Africa

By

KOJO SPIO

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Faculty of Natural and Agricultural Sciences
University of Pretoria
Pretoria

Promotor: Professor Gerhard Coetzee

Co-promotor: Professor J.A. Groenewald

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KOJO SPIO

TO MY LOVELY CHILDREN

MAAME ESI ESSIAM MABEL SPIO

AND

JOJO AYIAA SPIO

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THE IMPACT AND ACCESSIBILITY OF AGRICULTURAL CREDIT: A CASE STUDY OF SMALL-SCALE FARMERS IN THE LIMPOPO PROVINCE OF SOUTH AFRICA

by

KOJO SPIO

DEGREE: PhD (Agric) Agricultural Economics

DEPARTMENT: Agricultural Economics, Extension and Rural Development

PROMOTOR: Professor Gerhard Coetzee

CO-PROMOTOR: Professor J.A. Groenewald

ABSTRACT

This study is an exploratory analysis of the impact and accessibility of formal agricultural credit to small-scale farmers, based on data collected from a sample of farmers in two regions of South Africa's Limpopo Province. The main aims of the research were to:

- Determine the impact of credit and its shadow price
- Investigate the efficiency of the rural financial market.
- Determine the characteristics and factors that influence the accessibility of credit in the small-scale farming sector, as well as the differential access to credit within the sector.

The results of the study indicate that productivity differs between borrowers and non-borrowers. The difference of 40% in favour of borrowers is caused both by credit use (21%) and the farmers' inherent characteristics. Thus, credit can increase a randomly selected farmer's output by 21 per cent.

The marginal credit return rate is 2.10 at zero loan, implying a 110 per cent shadow price of capital. The hypothesis that non-borrowers are credit constrained is empirically supported. The marginal credit effect at mean loan size is 1.35, indicating that the average loan size is below income-maximising size. This implies that loan-quantity rationing is still prevalent among borrowers, and that it is possible that borrowers may still be liquidity constrained but to a lesser degree than non-borrowers. The estimated shadow price of credit (35%) exceeds the average interest rate (18%) also suggesting that the rural credit markets in the survey areas are not operating in the most efficient manner. It also indicates that the farmers in the study area can afford to pay the prevailing market interest rate.

About 29.4 % of the farmers sampled for the study had access to formal credit. More than 57% of the credit used by small farmers comes from informal credit. Access to formal credit is also highly skewed, and shows greater ease of access for large farm size than smaller groups. Factors such as area cultivated, family labour, title deed, non-farm income, remittances and pensions (social benefits), awareness of the availability of credit, and repayment records are found to be important variables in predicting accessibility of credit to small scale farmers in the study area.

The main findings are:

♦ Small-scale farmers have limited and differential access to credit; those with holdings approaching commercial size are better-off.
♦ Rural agricultural financial markets are inefficient. Borrowers and non-borrowers alike are credit constrained.
♦ Credit is not too expensive to be used profitably; its effects on productivity can improve the welfare of small-scale farmers.

In view of these findings, the following policy proposals are suggested. Firstly, the policy of not providing interest rate subsidies for loans is justified. Credit subsidisation, with its unfortunate history, should be avoided. Secondly, there is the need to restructure costly and poorly performing rural financial institutions to effectively and efficiently

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provide the needed services to its clientele. To ensure rapid credit delivery, it is also imperative that agricultural institutions are encouraged to decentralise their activities. Expansion of banking outlets is one of the most important surge factors affecting financial services. In addition, policy makers should also focus on critical elements of the financial infrastructure, such as the information system and training facilities, which are necessary for the development of the rural financial system in South Africa.

Finally, the threshold for entry into the financial market is simply too high for many. Hence, creating a conducive environment in rural areas is one of the areas that will require more attention. Investment in rural infrastructure will also act as catalyst for the establishment of some of the missing institutions that cause market failures in rural financial markets.

Key Words

Agricultural credit: accessibility

Agricultural credit: impact

Small-scale farmers

Productivity

Rural financial institutions

Differential credit

Borrowers

Non-borrowers

Loan size

Subsidisation

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CHAPTER ONE: INTRODUCTION

1.1   BACKGROUND

In South Africa, the small-scale farming sector continues to battle with the daunting task of moving from a "subsistence syndrome" to the "plane of entrepreneurship". Smallholdings play a very important role in African agriculture, both in terms of their number and the numbers of people involved (1989)

The "poor but efficient" hypothesis of Theodore W. Schultz has attracted much attention since the 1960's. Schultz made the statement that it was neither the perverse economic behaviour of farmers (including small-scale farmers), nor the fecundity of man that was to blame for agricultural woes. "In my judgment, the real culprit causing the poor performance of agriculture in the less developed countries is the lack of economic opportunities in agriculture, opportunities that are rewarding to farmers. It is the lack of viable opportunities that is the crux of the matter" (Schultz, 1964). Schultz (1964) contended that farmers in "traditional" agriculture, using "age-old techniques", are generally efficient in their resource use, although they are poor.

Although they note methodological reservations in this regard, Eicher & Baker (1982) quote a large number of studies in which marginal value product and marginal factor costs of inputs in African agriculture were found not to differ significantly from each other. This lends support to Schultz's "poor but efficient" hypothesis. Van Rooyen *et al.*, (1987) conclude that small farmers in traditional agriculture will generally be capable of making rational economic decisions if the technical and economic constraints they face are removed. In Southern Africa, the Farmer Support Programmes, financed by the Development Bank of Southern Africa, are largely based on this premise (Coetzee, 1997:35). Economists like Falcon, Mellor, Ruttan and Timmer have made it clear that agricultural development is important and that new technologies, price incentives and supporting infrastructure are its primary determinants. The work of these economists convinced most policy makers that farmers respond to production incentives (cf. Coetzee, 1997:35). However, these constraints continue to be treated in an

uncoordinated way, encouraging their recurrence over time. One of these constraints is the access to financial services. This element forms the basis of this thesis.

Apart from the efforts of the government to ensure that small-scale farmers have access to financial services, the provision of financial services to the small-scale farming sector has generally been static and has even declined in some parts of the developing countries because of the risks involved in dealing with farmers and the incompetence of some service providers in dealing with smallholders (Kuhn et al., 2000:68). Access to financial services has been limited by the following factors:

1. A lack of repayment discipline; and the resultant extensive losses have weakened many institutions (Kuhn & Darroch, 1999). Loan delinquency and default have plagued agricultural credit programmes in low income countries, especially with respect to loans provided by agricultural development banks (Spio, 1995; Braverman & Gausch, 1986).

2. Low interest rates for credit normally lead to low interest rates on deposits, thereby hampering the growth of savings and preventing financial institutions from becoming financially independent (Mohane et al., 2000:731; Spio & Groenewald, 1998:165).

3. High loan transaction costs have discouraged lenders from serving certain groups of farmers (Fenwick & Lyne, 1998).

4. Credit is conditioned chiefly by providing securities in the form of land or other assets. Most small-scale farmers are not able to satisfy this requirement because of poverty and the tenure arrangements associated with their land assets.

5. The cost of borrowing, including the risk of failing to obtain credit or obtaining it too late (for example after planting) was high. Studies have shown that borrowers' cost of acquiring formal loans can be substantially larger than the normal interest payment (Gonzalez-Vega et al, 1997).

6. Bureaucratic red tape: The complicated, cumbersome and time consuming operating procedures of, particularly, state or parastatal institutions result in delays in approval, and loans are not made available when required.

As the drive to boost agricultural production becomes desperate in the face of rising population, the small-scale farming sector continues to live in a "dilemma of financial problems"; it continues to be excluded from enjoying the benefits of using financial services. These problems contribute to low per capita food supplies, hence most of the small-scale farmers survive on family remittances or move out of agriculture. However, the "poor but efficient" hypothesis of Theodore W. Schultz should convince policy-makers of the need to design and implement policies and programmes directly aimed at improving access to financial services and the other above-mentioned primary determinants in the small-scale farming sector.

Provision of financial services helps farmers and microenterprises to avoid being caught in a traditional Schultzian low-return-to-investment trap (Batterham & Majid, 1987). It helps smallholder farmers to offset the risk of adopting new technologies and to buy improved input; thereby increasing their productivity and generating their own capital for investment. Other advantages of providing efficient financial services are:

- It increases the productivity of available resources, that is, it improves efficiency in resource allocation;
- It increases the flow of savings and investment, thus contributing to faster economic growth;
- It favours stability, through greater market integration and opportunities for risk management;
- It improves income distribution by making available to those with few resources of their own, purchasing power with which to take advantage of their productive opportunities, which otherwise would have to be forgone; and
- It ameliorates life cycle problems, in which the young need to acquire farm and household assets, often by borrowing from established persons in the community who have accumulated savings. Normally loans enable borrowers to use somebody else's savings (Sharma & Zeller, 2000:2; Levine, 1997:698; Montiel, 1996; Coetzee, 1993:1; Gonzalez-Vega, 1989).

The supply of and the demand for financial services to farmers and microenterprises hold the potential of substantially increasing the overall pace of investment and development. Cross-country and firm-level data continue to tell a compelling story:

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finance matters (World Bank, 1992:1). However, a key requirement for this to occur is to reduce or remove if possible, most of the constraints encountered by the major role players in the financial markets.

1.2   MOTIVATION

One of the major factors hampering the development of rural areas is the limited access to appropriate financial services. The development of the rural economy in developing countries depends on growth in agriculture and other small and medium enterprises. These enterprises constitute the engine of growth, employment and income for the rural community. In an effort to make the landscape of rural finance more attractive and to fulfill the national objectives of increased production, policymakers and donors adopted the conventional approach of advancing credit, where all practices and operational procedures were geared towards the interests of the borrower.

Credit programmes were seen as the solution for a quick impact on agricultural production problems, as well as for low productivity and poverty in rural areas. They were also seen as the tool for an effective compensation for the urban bias, as well as for encouraging rural people to ignore the "exploitative" informal sources by taking part in the formal targeted cheap credit programmes. In addition, they were seen to encourage small farmers to take up new technology. Thus, these programmes were seen as the ideal measure to advance credit to the small-scale farmer and the rural poor (Coetzee, 1993:2). The unfortunate thing about this approach was that the viability of financial institutions and the interests of depositors were not regarded as prime objectives.

In the early 1970s, warning signals started to emanate from these programmes. Problems were encountered with loan recovery, and default rates ranging from 40-90 per cent were recorded in some programmes. High operating costs were common among most established institutions, and it was quite clear that these institutions could only continue operations with massive capital injections from governments and donors. The policies applied in these programmes made it possible for the funds to land in the pockets of

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larger farmers rather than the small farmers and the poor (Proenza, 1997:1; Coetzee, 1993:3).

Strategies used by the credit programmes were flawed in the following respects (Von Pischke, 1991:93-115):

- Overemphasis on credit - The programmes ignored saving mobilisation, disregarded alternative means of stimulating investments and were characterised by the absence of a clear concept of risk in their operations. These missing elements produced bad loans which made most of the credit programmes unsustainable.

- Use of target and credit quotas or ceilings - Governments used these devices to push lenders through the frontier at a faster pace than they would otherwise have undertaken. These resulted in bad loans because the approach did not address the problems that made lenders reluctant to advance loans voluntarily.

- Neglected transaction costs - The credit programme policies paradoxically increased loan applicants' and depositors' transaction costs. These increases made borrowers' and depositors' cost of funds roughly equal to the cost of the alternative funds/savings that they could obtain/deposit elsewhere. In addition, the credit programmes were designed without reference to the cost of implementation. The overall effect of some of the devices increased the spread between gross costs of borrowing and net returns to lenders.

- Overlooked incentives - Most of the credit programmes initiated to serve the financial frontier disregarded the incentives that motivate individuals and institutions. Incentives were not properly examined. Most of the established institutions did not command confidence; they were perceived as a lien and transitory by the local community, and as a result, the ideal of linking savings and credit in retail financial institutions did not materialise.

- Emphasis on institutions rather than instruments - Governments and donors were more interested in establishing specialised institutions than in finance itself. They became involved with the establishment of agricultural credit institutions, co-operative credit societies, small enterprises, development banks and special credit programmes, among others, at the expense of financial products and

services which are the financial vehicles needed to ensure sound transactions. Emphasis on institutions was logical in every sense; however, the neglect of instruments and innovations inhibited good lending and effective financial management.

- Provision of cheap credit - The attitude regarding the appropriate interest rate for agricultural loans has been that they should be kept low to promote agricultural development and to assist the rural poor. Rates of interest on some agricultural loans were zero in nominal terms, whilst others often did not exceed 12 per cent per annum in most low-income countries. Interest rates assigned to savings were simultaneously less than the concessionary rate charged on loans (Spio, 1995:16).

These policies invariably resulted in distortions in the financial markets, and reduced the number of financial products and services that the farmers, micro-entrepreneurs and the poor could obtain in the markets. The deficiencies in and the results of programmes conducted according to the traditional vision led to a change of approach in the analysis and the promotion of rural financial markets (Gonzalez-Vega, 1989). This new approach predicates a system in which numerous and diverse market participants are linked through flows of funds and of information. The problem of limited financial services still exists despite the fact that initiatives such as the emphasis on project appraisal, relaxing collateral requirements and charging of close to market interest rates (Aveyard, 1999; Rhyne & Otero, 1992) have been taken into consideration in most of the new credit programmes.

In South Africa, the past policies of apartheid created structural imbalances in the whole socio-economic fibre of the society, causing different racial groups to have different social contexts and access to wealth. The policies resulted in the disempowerment' of rural communities, where about 40% of the population lives - blacks constitute about 91% of the rural communities (Spio, 1995:54). Financial intermediaries directed their attention to commercial farmers at the expense and neglect of the small and emerging farmers, and microenterprises.

Apart from these policies, the financial intermediaries have not been able to serve their rural clientele easily because it is a costly, risky and difficult task. Local lenders were faced with covariant risks and high transaction costs and therefore became reluctant to lend to the poor (Kuhn *et al*, 2000:68). Lack of information prevented large formal lenders who had the capacity to serve the small farmers and the poor from doing so. The lack of information made them prone to problems of adverse selection, moral hazard, and high enforcement costs. In addition, their rural clientele are heterogeneous, geographically dispersed; deal in small transactions; and their activity is highly dependent on exogenous forces (Spio, 1995). The methods and practices of most banks did not meet the needs and characteristics of their clients. Regarding savings, there has been a neglect of rural savings for various reasons. These reasons are well documented in international literature (Spio & Groenewald, 1998; Coetzee, 1997; Fernando, 1991; Meyer, 1989; Vogel, 1984). Informal intermediaries, who are supposed to supplement the financial services provided by the formal sector, also lack in-depth intermediation; and charge high interest rates.

Various studies suggest that who one is and where one lives and works, has an important effect on access to credit. Rural people generally have weaker access and those without a formal sector source of income have the weakest access. In addition, rural people have weaker access to long-term credit in the form of mortgage finance, often due to a lack of security of tenure (Strauss Commission, 1996). The effect of discrimination was apparent as the probability of debt and the average size of debt depends on the variables of race, location and gender. Hence, policy reform is needed to increase the ability of disadvantaged groups, especially rural households, to acquire more loans at a reasonable cost.

The contribution of appropriate rural financial services to economic development, as well as social welfare, peace and stability can be substantial, if the importance of other development determinants of financial markets is recognised and addressed. It is believed that the reduction or avoidance of government interventions and market failures in the rural financial markets is only possible if certain supply and demand constraints, which affect the delivery of financial services, are addressed. The need for this study is therefore to examine the accessibility and effect of financial services on agricultural

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production of small scale farmers, and to make suggestions that may reduce, if not avoid, government interventions and market failures in the South African rural financial markets.

1.3   PURPOSE OF THE STUDY

The main objective of this study is to examine the accessibility and effect of financial services, especially credit, on agricultural production of small-scale farmers in the Limpopo Province of South Africa. The specific objectives are to:

1.   Determine the impact of credit on small farmer agricultural production and the shadow price of credit
2.   Determine the characteristics and factors that influence the accessibility of credit in the small-scale farming sector; and
3.   Investigate the efficiency of the rural financial market.

1.4   HYPOTHESES

The preceding discussions have brought forth several issues that need to be examined in terms of the accessibility and impact of credit on small-scale farmers. Firstly, it has been shown that small-scale farmers' access to credit is limited. Financial intermediaries seem reluctant to provide more services to rural areas and to small clients largely because of the risk involved. Even within the small-scale farming sector, different size groups have different access to formal credit.

Secondly, rural financial institutions are inefficient as most small-scale farmers are credit constrained. The issue is whether relaxing the credit constraint will result in farmers taking advantage of the opportunity to increase the net economic benefits envisaged by access to credit. Thirdly, arguments for subsidised credit in rural financial markets have been numerous and convictions about it are deeply held. As a result, one of the key elements of agricultural credit policy in the past in many parts of the world was a low interest rate policy, which was based on the assumption that the poor cannot

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pay market rates of interest. The question is: is this assumption right? If yes, then the shadow price of credit should not exceed the social opportunity cost of capital.

Finally, understanding the impact of credit on the production behaviour of small-scale farmers is essential in terms of directing policy regarding the rural financial markets in the country. However, the impact of improved credit access on small farm production is only weakly understood because of identification problems, which hamper the measurement and estimation of credit's effects. Given the issues discussed, the hypotheses that will be tested in this study are:

Hypothesis 1: Access to credit to small farmers is limited, and within the small farmers' group, the farmers closer to the upper limit in terms of farm size are relatively well off in terms of access to credit, resulting in differential access to formal credit institutions among small farmers.

Hypothesis 2: Rural agricultural financial markets are inefficient in that borrowers are credit constrained.

Hypothesis 3: Interest rates in the markets are very high, meaning that the shadow price is in excess of the social opportunity cost of capital; hence, credit must be subsidised.

Hypothesis 4: Credit has direct productivity effects.

1.5 RESEARCH METHODOLOGY

To achieve those objectives and to test those hypotheses, an examination of both international and South African rural financial markets was firstly carried out. Issues considered were the structure of rural financial markets (RFMs), major policies that influence rural financial market activities, rural financial market public sector objectives and performances, and institutional and economic environments within which most credit programmes operate, especially within the South African context.

Secondly, cross-section data were obtained through a farm household survey, covering 153 small-scale farmers in the Lowveld and Northern regions of the Limpopo Province. Thirdly, two econometric models were developed: an endogenous switching regression model which was applied to determine the impact of credit and its shadow price, while a logistic regression model was used to assess the accessibility of credit to small-scale farmers in the two regions under investigation. Tabular analysis was also used to determine the differential access to credit within the small-scale farming sector.

1.6   LIMITATIONS

It is worth noting that one of the limitations of empirical analysis is that the behaviour of only 153 households in a random sample is under consideration and generalised to the rest of the small scale farmers in Limpopo Province, and that due to the different contexts of the provinces the findings of this study cannot be readily generalised to the rest of South Africa.

The accuracy of the data depends on the information given by the respondents. Any bias on their part would affect the results. In general, one should note the difficulty of obtaining accurate financial data from respondents. However, all the appropriate scientific approaches to ensure that the confidence levels are high enough were implemented.

1.7   DELINEATION OF RESEARCH

The study limits itself to rural financial markets. It also concentrates more on the micro aspects of rural finance. In terms of the financial services, only credit components are analysed. Other services were not considered.

1.8   ORGANISATION OF THE STUDY

In Chapter 2, the relationship between financial services and development is discussed. The relationship between real growth and financial development is examined. Three

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patterns are identified between these two sectors, namely: demand-following, supply-leading and the hybrid approach. An analysis of the role of finance is also given, in addition to the effect of financial services, especially credit, on small-scale farmer development. Approaches that have been used by governments and other development institutions are discussed. The chapter concludes with a discussion of hindrances to the development of financial systems in developing countries. Among issues highlighted as hindrances are: a lack of rural infrastructure, the political environment, institutional environment and the policy environment.

In Chapter 3, consideration is given to the features of rural credit markets and their relationship to credit accessibility. It also discusses four principal features which distinguish credit markets from other credit markets: segmented/fragmented markets, problem with collateral security, underdeveloped complementary institutions, and the presence of inter-linkages between markets. Some of the major constraints to credit accessibility in the formal financial markets are also covered. Among these constraints are: Risk and credit rationing, transaction costs, delinquency and default, interest rates and collaterals

Chapter 4 briefly presents an overview of the small-scale farming sector in South Africa, with specific reference to previous policies, productivity and efficiency. Perspectives from both the province and the study area are discussed. The chapter ends with brief discussion on two of the major lending institutions in the study area.

In Chapter 5, empirical tests of the various hypotheses are conducted and the results discussed. It covers two major analyses, namely, differential accessibility of loans to small-scale farmers, and the evaluation of the impact of credit on small-scale farmers' productivity.

Chapter 6 presents the summary and conclusions of the major empirical findings, and recommendations for future research

CHAPTER TWO: FINANCIAL SERVICES AND DEVELOPMENT

2.1 INTRODUCTION

Financial services create value that contributes to economic growth (Coetzee, 1997:1). Various authors, among them Levine *et al*, 2000, King & Levine (1997) and Montiel (1996), argue that financial institutions contribute to shaping the pattern of industrial progress in many countries. According to Coetzee (1997:1), the growth of the mining and industrial sectors in South Africa was facilitated by the development of the financial markets. In the case of the agricultural sector, specialised credit institutions facilitated this. The role of financial markets in mobilising savings and channeling funds into productive investment has therefore been the strategy central to economic growth and human development. At the macroeconomic level, the raising of productive capacity is essential if real GDP is to rise through time, while at the microeconomic level, there are analogous issues. Individual producers and households require credit facilities to enable the expansion of productive capacity and to generate income-earning possibilities.

The chapter reviews the relationship between real growth and financial development, the role of finance in economic growth (both from the macro- and microeconomic point of view), and the various financial approaches that are being used by governments of developing countries in achieving economic growth.

2.2 THE FINANCIAL SYSTEM AND ECONOMIC GROWTH

Economists hold different views and opinions regarding the importance of the financial system for economic growth. There has been a tendency among some pioneers of development economics to neglect finance in the mainstream of economic development thought. Some economists inadvertently undervalued the role that finance plays in determining the pace and pattern of growth (Gurley & Shaw, 1955:516). Lucas (1988:6) asserts that economists "badly over-stress" the role of financial factors in economic growth, while development economists frequently express their scepticism about the role of the financial system by ignoring it (Levine, 1997:688). Economic development has commonly been discussed in terms of wealth, labour force, output and income. These real or "good" aspects of development have been the centre of attention in

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economic literature, to the comparative neglect of financial aspects (Gurley & Shaw, 1955:515). None of the pioneers among development economists (Bauer, Colin Clark, Hirschman, Lewis, Myrdal, Prebisch, Rosenstein-Roden, Rostow, Singer and Tinbergen) even went as far as to listing finance as a factor in development (Stiglitz, 1998; Chandavarkar, 1992:134). The work of Franco Modigliani and Merton Miller in 1958 gave impetus to the "non relevance of the financial structure" proposition. Their model was based on four assumptions: first, that firms can be identified by "risk class"; second, that individual borrowing can substitute for firm borrowing; third, that investors have full information about the returns of the firm; and fourth, that there are no taxes, or at least that tax policy does not treat debt and equity differentially (for a detailed discussion see Stiglitz, 1988).

A number of studies, however, have attempted to clarify the hypothesis that financial structure matters and that improvements in the financial intermediation process are preconditions for economic growth. For example, Schumpeter (1912:58-74) and McKinnon (1973:5-18) provide broad descriptions of the roles of the financial system in economic development. Schumpeter used the relationship between banker and industralist to illustrate the importance of the financial system in choosing and adopting new technologies, and McKinnon highlighted its importance in promoting the use of better agricultural techniques.

Donors and policy makers in both developed and developing countries have now started to recognise that efficient financial systems help growth, partly by mobilising additional financial resources and partly by attracting those resources to the best uses. In other words, finance matters. According to Gurley and Shaw (1955:515), development is associated with a debt issue, accretions of financial assets and the "institutionalisation of savings and investment" that diversifies channels for the flow of loanable funds and multiplies varieties of financial claims at some point in the economic system. Development involves finance as well as goods. It must, however, be pointed out that the financial system's contribution to economic development depends upon the quantity and quality of its services and the efficiency with which it provides them.

2.3   ROLE OF FINANCE

Evidence based on the combination of firm-level and cross-country data is beginning to show conclusively that finance is important in development. Results from such studies are remarkable. The exogenous component of financial depth - banks and the private sector - explains a large part of growth, which is unexplained by many variables and policies commonly thought to determine economic growth (World Bank, 1992). Clarity on the role of finance in economic development was enhanced by the studies of Edward Shaw and Roland McKinnon, who challenged the Keynesian growth models that ignored finance (1988). These two economists coined the terms "financial deepening" and "financial repression". According to McKinnon, financial repression fosters dualism in developing countries and is responsible for greater income inequality and less than optimal investment efficiency. The policy implications of these models are that economic growth can be increased by abolishing institutional interest rate ceilings and other restrictions on the functioning of financial markets, to ensure that the financial system operates competitively under conditions of free entry (Coetzee, 1997:15).

Recent developments in theoretical literature by Levine (2000; 1997; 1996), and King & Levine (1993) are of importance in answering the question concerning the contribution of financial services to economic growth. These authors show conclusive evidence that finance makes a substantial contribution to economic growth. Levine (1997; 2000) created a simple framework with which to conceptualize the role of the financial system for economic growth (see Figure 2.1). According to this model, the costs of acquiring information and making transactions create incentives for the emergence of financial markets and institutions. Different types and combinations of information and transaction costs motivate distinct financial contracts, markets, and institutions. In ameliorating transaction and information costs, financial systems serve one primary function: they facilitate the allocation of resources, across space and time, in an uncertain environment (Merton & Bodie, 1995:12). This primary function is divided into five basic functions as illustrated in Figure 2.1. These functions when carried out lead to capital accumulation and technological innovation, which invariably affect economic growth.

The financial system is a key component of the institutional infrastructure that is required for the efficient operation of both product and service markets. It has the ability to induce a larger size and foster a larger degree of integration of the markets for goods and services, factors of production, and other assets. This ability is achieved by providing monetisation services and efficient management of the payment system, the development of services of intermediation between surplus and deficit economic agents, and the accumulation of store of value, the management of liquidity, and the transformation, sharing, pooling, and diversification of risk (Gonzalez-Vega, 1994:5).

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┌──────────────────────────────────────┐
│           Market frictions           │
│     •   Information costs            │
│     •   Transaction costs           │
├──────────────────────────────────────┤
│ Financial markets and intermediaries │
│                                      │
└──────────────────────────────────────┘
                    │
                    ▼
┌──────────────────────────────────────┐
│          Financial functions         │
│ Mobilise savings                     │
│ Allocate resources                   │
│ Exert corporate control              │
│ Facilitate risk management           │
│ Ease trading of goods, services, contracts │
└──────────────────────────────────────┘
                    │
                    ▼
┌──────────────────────────────────────┐
│          Channels of growth          │
│ Capital accumulation                 │
│ Technological innovation             │
│                                      │
└──────────────────────────────────────┘
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┌──────────────────────────────────────┐
│                Growth                │
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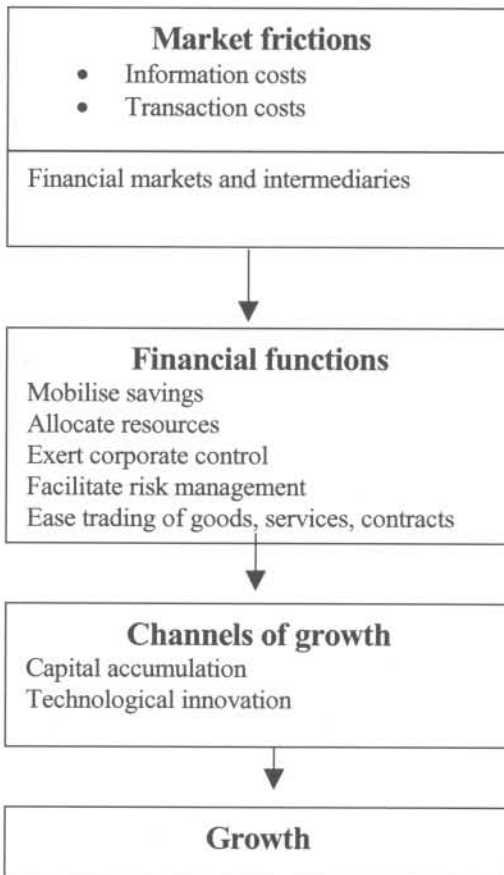
Figure 2. 1:   A theoretical approach to finance and growth

Source: Levine, 1997:691

The financial system contributes to economic development by providing access to a wide range of financial services for a wide range of the population. This is achieved through the provision of a growing range of services, including loans for different purposes as well as deposit facilities, mechanisms for the transfer of funds and currency

exchange, as well as other specialised services once the market size grows sufficiently (Gonzalez-Vega, 1989:8).

Financial intermediation increases the productivity of available resources. It allows those with better productive opportunities but insufficient resource ownership to take full advantage of socially and privately profitable alternatives, while those without opportunities can benefit by making their resources available to others (Amable & Chalelain, 2001; Gonzalez-Vega & Graham, 1995:3; King & Levine, 1993). This occurs through changes in ownership and composition (changing unproductive assets to productive assets). In the developing world, a considerable portion of tangible wealth is held in the form of unproductive assets. Storage and spoilage costs, in addition to the risks of price fluctuations are very high. According to Patrick (1966:179) the amount involved in such costs can be substantial. It is reasonable to think of ratios of tangible wealth to GNP, even excluding land, of 2 or 3. He estimated that a re-allocation of as much as 10% of this wealth to more productive forms would be equivalent to 20% or 30% of GNP and would raise the level of output by 10%. This projection was based on a simple assumption that the marginal capital-output ratio for such re-allocated capital is in the order of 2 to 3. An efficient composition of real wealth is obtained through the creation of financial assets and liabilities which provide the incentive for savers to hold their wealth in financial form and for investors to hold more productive real assets than they would have done in the absence of the financial system.

Several empirical studies have supported the notion that intermediation is an important aspect of development. It has been shown in Latin America that the "depth" of financial markets (measured as the ratio of savings deposits to nominal GNP) is positively correlated with the rate of gross capital formation. It has also been shown that the real interest rate (measured as the rate paid on deposit less inflation) is positively correlated with growth rates in nineteen Asian developing countries (Tybout, 1983:598). It therefore becomes clear that poor financial intermediation drastically reduces the "quality" of capital formation, and can thus damage a country's development prospects. Intermediaries can promote growth by increasing the fraction of resources that society saves or by improving the way in which society allocates savings, or by diversifying risks and exploiting economies of scale (World Bank, 1992). For example, a firm may

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want to fund a large project with high-expected returns, but the investment may require a large lump-sum capital outlay. Such profitable opportunities often go unexploited without intermediaries that mobilise and allocate savings. Under situations where i) not all individual savers (surplus spending units) rate among the most efficient investors (deficit spending units) in terms of the optimum allocation of investment; ii) savers are not willing to make the full amount of their savings directly available to the most efficient investors; and iii) investors are not able to invest as much as they would like, the financial system has an important function in providing a market mechanism for the transfer of claims on the real resources from savers to the most efficient investors, and for diversifying and pooling of the default risk of individual deficit spending units (Patrick, 1966:182). In this way, deposits substitute for less attractive uses of the funds, while loans make better uses possible (Sirri & Tufano, 1995:86).

All economic activities are subject to a wide variety of risks (technical, economic and financial risks) (Bencivenga *et al*, 1995:160). Many of these can be covered by straightforward insurance policies, others not. The financial system can help to overcome or reduce some risks by redistributing them among market participants, or through portfolio diversification and hedging using an appropriate instrument, such as forward contracts or options. In countries where farmers cannot participate in the world futures markets (especially developing countries) to hedge the substantial risks associated with fluctuations in the world prices of their crops, the only alternative for them is to invest less and produce less; this invariably impairs economic growth (World Bank, 1992:34).

The financial system contributes to growth by providing a medium of exchange. Money (the standard unit of accounting) facilitates specialisation by reducing trading costs and linking different markets. This is not true in a barter economy, in which a mutual coincidence of wants is required. Specialisation is discouraged in economies with no medium of exchange; this results in low productivity and corresponding losses in efficiency. Without financial services, an economy would be confined to self-sufficiency or barter, which would inhibit the specialisation in production upon which economies depend. These services make it cheaper and less risky to trade goods and services and

also to borrow and lend money (Demetriacles & Hussein, 1996; World Bank, 1989:25-26), because the financial system provides payment services.

The financial system can provide a variety of incentives to investors, which invariably stimulate growth. Among these are:

i)   The availability of funds from financial institutions enables the efficient entrepreneur to assume a greater debt position than he could otherwise and concurrently enables him to engage in a larger amount of productive investment.

ii) Monetisation encourages the shift from subsistence to commercial production, with attendant increases in output due to specialisation, increased work effort, emphasis on high-income crops, and enhanced responsiveness to changes in relative prices of different crops.

iii) The financial system provides services that reduce or increase the profitability of productive real investment projects.

iv) A competitive, efficient system causes a narrowing of the margin between institutions' borrowing and lending rates. The result is advantageous for both investors and borrowers, and this acts as an incentive for transactions.

In a nutshell, the financial system can induce an increase in the rate of accumulation of capital, by reducing transaction costs, and thus providing increased incentives to save, invest and work. Stiglitz (1994:23) articulates the role of finance as follows:...." it can be thought of as the brain of the economic system, the central locus of decision-making. If it fails, not only will the sector's profits be lower than they would otherwise have been, but the performance of the entire economic system may be impaired".

Financial services contribute to more efficient household and firm inter-temporal decisions about savings (postponing consumption), the accumulation of assets, and investment. Such services facilitate a more cost-effective management of risk, liquidity and the accumulation of stores of value for precautionary and speculative purposes. However, it is important to emphasised that for the financial system to achieve those effects on the economy, the quality and quantity of services and the efficiency with which services are provided is vital.

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2.4   EFFECTS OF FINANCIAL SERVICES ON SMALL SCALE FARMER

Access to credit and other financial services has the potential to make the difference between grinding poverty and an economically secure life. Access to financial services, especially credit is believed to have a significant impact on various aggregate and household-levels outcomes, including agricultural productivity, technology adoption, food security, nutrition, health, and overall household welfare (Diagne & Zeller, 2001:1; Diagne, 1998).

According to Diagne and Zeller (2001:2), access to credit affects household welfare outcomes through three pathways. The first pathway is through the alleviation of the capital constraints on agricultural households. Access to credit increases the ability of poor households with little or no savings to acquire agricultural inputs. Furthermore, easing potential capital constraints through the granting of credit reduces the opportunity costs of capital-intensive assets relative to family labour, thus encouraging the adoption of labour-saving, higher-yielding technologies and therefore increasing land and labour productivity, a crucial factor in encouraging development (Diagne & Zeller, 2001:2; Freeman *et al*, 1996:15; Fuentes, 1996:189). Furthermore, credit could significantly influence a farm household's income by helping its members to tap economic opportunities, thereby assisting them to get out of poverty (Adugna & Heidues, 2000:27; Binswanger & Khandker, 1995:334).

Various studies (e.g. Carter, 1989) corroborate the centrality of credit access to the evolution of the agricultural sector. However, most profit maximising banks have continuously and systematically rationed small farms out of formal credit markets. The implications of this unequal credit access are well documented in the international literature. According to Carter (1989:15), the implications are that agricultural productivity, income distribution and other facets of the agrarian structure are critically shaped by these credit rationing rules. This, according to him, has led to systematic expropriation, marginalisation, and impoverishment of the small scale farming sector. A number of the theoretical studies that have been carried out on the above mentioned questions suggest that credit indeed has a positive impact on small farm production.

Binswanger and Sillers (1983) showed that poor access to credit was one of the constraining factors in the adoption of new technology on small-scale farms. Eswaran and Kotwal (1986) argued that varying access to credit by different farm size categories is a critical factor in shaping the organisational structure of agrarian production. A study done in Nicaragua by Carter (1989) also indicated a significant effect of credit on input use.

The second pathway according to Diagne and Zeller (2001:2), is by increasing a household's risk-bearing ability and by altering its risks-coping strategies. Access to credit and other financial services enables households to adopt more effective precautionary savings strategies, thereby enhancing such households' capacity to invest in more risky but more profitable technology and enterprises. The third pathway is that credit enables households to smooth consumption (Diagne & Zeller, 2001:2; Adugna & Heidues, 2000:27 and Binswanger & Khandker, 1995:334). By doing so it maintains the productive capacity of households. As the World Bank (1989) observes: "improved consumption is also an investment in the productivity of farm households". All these three functions help increase agricultural productivity, the rate of technology adoption, food security, nutrition, health, and overall household welfare.

2.5   RURAL FINANCE AND ECONOMIC DEVELOPMENT

Rural financial markets have been at the centre of policy intervention over the past four decades. Providing affordable financial services to the rural population has been an important component of development strategy during this period. Direct interventions in rural financial markets to stimulate growth and reduce poverty – through a blend of targeted credit programmes, interest subsidies, and other government policies – became widespread in the 1950s, when Keynesian economics inspired many governments to design fiscal interventions at the macroeconomic level (Yaron *et al*, 1998:147; Heidhues, 1995:106). This section puts into perspectives the various financial approaches and interventions that governments of the developing world have tried to use to achieve economic growth and to enjoy the benefits of the financial system.

2.5.1 The supply-led approach/Directed credit programmes

During the early stages of government intervention, credit has always occupied a special place in mainstream thinking on agricultural and rural development. Most donors and policy makers regarded the supply of credit to farmers as one of the answers to production related problems. It was seen as an instrument for breaking the vicious circle of low incomes, low savings and low productivity. Developing countries' governments have consequently played a large role in credit allocation. For example, by 1986, seventy percent of new lending by the national banks in Pakistan was as a result of demands by government. In India, about one-half of bank assets had to be placed in reserve requirements or government bonds, and forty percent of the remainder had to be lent to priority sectors at controlled interest rates. In the early 1980s, directed credit in Malaysia accounted for an estimated thirty percent of bank portfolios. Directed credit programmes usually targeted industry, state-owned enterprises, agriculture, small and medium-scale firms, and (to a lesser extent) housing, exports and underdeveloped regions (World Bank, 1989:55-56).

Governments and donors have promoted and continuously supported supply-led rural financial institutions as devices to neutralise or mitigate the distorted "urban biased" macro-economic policies that adversely affected the rural sector. Many institutions have been involved in channelling funds to farmers. The most popular institutional ways of organising credit include state agricultural banks, multi-purpose development agencies, crop and project authorities, commercial banks and co-operative and farmer's groups. The financial landscape became dotted with these organisations, while hundreds of billions of dollars were poured into countless projects that all claimed to have the well-being of the poorer strata of the rural society at heart. It was the era of "small is beautiful", when low priced small farmers' credit became a tool for rural development. This approach was based on a number of assumptions (Proenza, 1997:3; Spio, 1995; Bouman & Hospes, 1994:10). During these periods, the credit policies and programmes of many devloping countries were designed to achieve the following objectives:

i)   To alleviate the lack of cash needed to make farm investment; this is a critical constraint hampering growth in agricultural output;

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ii)   To replace the fragmented and incomplete rural financial market represented by private moneylenders; these credit sources are supposed to have the effect of impoverishing their clients rather than assisting them to improve their productivity;

iii)   To accelerate the adoption of new technology;

iv)   To assist small farmers to overcome their inability to borrow from commercial banks or informal credit sources, due to lack of collateral and lack of information;

v)   To address equity goals, whether these are related to intra-rural, inter-rural or rural-urban income distribution;

vi)   To offset the disincentive effects for small farmers of policies unfavourable to them, including low output prices, over-valued exchange rates and inefficient market interventions by the state;

vii)   To gain favour with farmers for political purposes; and

viii)   To take advantage of the sometimes overwhelming generosity of foreign aid donors, who seemed to be prepared to endlessly pump large amounts of money into rural credit projects (Barham *et al,* 1996; Ellis, 1994:155).

The financial strategy adopted was credit disbursement rather than saving mobilisation. It chose the road of credit dependency rather than self-reliance through self-financing (Vogel & Adams, 1997:364). To accomplish these enormous tasks, the governments of most developing countries assumed the roles of planner, banker, supplier and marketing agency (Seibel, 1992:2).

2.5.1.1   *Effects of directed programmes*

The results of the directed credit programmes have generally been disappointing and have tended to lowered, rather than promote the development of financial services in rural and developing areas. The most recognisable effects of the direct credit programmes encountered in many developing countries are discussed below.

The programmes mistrusted the market and minimised the role of interest rates as a major instrument of resource allocation (Proenza, 1997:4; Gonzalez-Vega, 1989).

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Subsidised credit, more often than not, failed to reach its intended beneficiaries. Within the priority sectors, large and more influential borrowers benefited most. In Columbia, nearly half the funds intended for small-scale farmers were found to have been diverted to other uses (World Bank, 1989:59). By limiting the availability of credit to non-priority borrowers, directed credit programmes crowded such borrowers out of the formal credit markets and forced them to rely on retained earnings or more expensive borrowing from informal sources (World Bank, 1989:59).

The most serious consequence is the inability of intermediaries to become financially viable. Many credits became non-performing loans. The ability to borrow at cheap rates encouraged less productive investments, leading to the attendant problem of high delinquency rates. The distorted allocation of resources and the erosion of financial discipline left intermediaries unprofitable and, in many cases, insolvent. The criteria used in these programmes have not necessarily been compatible with the institution's survival (Spio, 1995:16). This also reduced the need for financial institutions involved in subsidized credit programmes to mobilise resources on their own, thereby leading to lower levels of financial intermediation.

Other criticisms were i) that the direct credit programmes increased the transaction costs for both borrowers and lenders; ii) that credit subsidies and associated taxes were distributive regressively; iii) that the direct credit programmes had a weak and ambiguous effect on production and investment decisions; and iv) that evaluation of the direct credit projects gave a misleading results (Vogel &Adams, 1997:367). The end result was that these programmes impeded the development of capital markets (World Bank, 1989:60).

2.5.1.2   Criteria and principles for addressing disadvantages

The deficiencies in and the results of direct credit programmes have led to the incorporation of certain criteria and principles into the existing approach to the credit delivery system. The alternative approach has been labeled "the financial market paradigm" (Vogel & Adams, 1997:361 or "the market performance view" (Graham, 1992:138) or the financial system approach (Rhyne & Otero, 1992:1561).

The emerging techniques and criteria for offering financial services are directed at the following goals: Good loan recovery; low transaction costs in lending and deposit mobilisation; increasing the proportion of total funding coming from locally mobilised deposits; increased accessibility to financial services; and assurance of the self-sustainability of financial intermediaries (Spio & Groenewald, 1998:165; Spio, 1995:17; Graham, 1992:138). The new perspective is a clear departure from the old approach; the emphasis is more on the ability of financial institutions to provide services on a sustainable and widespread basis; it focuses on measures to increase access to financial services.

Three principles are necessary in the "new thinking" (Rosegrant & Hazell, 2000: 10; Rhyne & Otero, 1992:1563):

i)   Knowing the market - because of time and mobility constraints, borrowers need services that are located close to their place of business, and that can process transactions quickly. Transaction costs for borrowers and savers are lowered by locating banking outlets near the clients.

ii)   Innovating techniques that will slash administration costs to a level commensurate with loan size. This may involve the use of the simplest procedures for the smallest loans and decentralised approvals without them being based on a formal business appraisal, but rather on readily verifiable eligibility criteria.

iii)   Innovating techniques that will motivate repayment. Roles assigned to security and loan appraisal may be taken up by a) group guarantees or pressure from social networks, b) the promise of repeat loans and increasing the amount, and c) savings requirements.

Other principles include:

i)   The identification of the expected real rate of interest, as well as unsubsidised interest rates, as a major determinant of borrower, saver and lender behaviour. The interest rates must be high enough to compensate depositors adequately and

low enough to enable lenders to cover their costs (Vogel & Adams, 1997:375; Spio, 1995:18; and Graham, 1992:138).

ii)   The emphasise on mobilisation of domestic deposits and savings as a strategic ingredient for building healthy financial institutions (Graham, 1992:138). To realise this objective, the instruments used must offer safety, convenience, ready access to money and a positive real return. Adams and Vogel (1984:367) point out that in the absence of these criteria, the rural poor are forced to hold a variety of inflation hedges, many of which earn low or negative rates of return, and to pay an inflation tax on cash that is held to meet current obligations. A recognition of the importance of savings argues strongly that it should be given equal weight in finance programmes.

iii)   Discarding the use of packaging loans and other similar non-market rationing devices such as fixed quotas, loans in kind or efforts to specify the ultimate use of loans, since these diminish the most attractive and useful property of finance, namely fungibility (Von Pischke & Adams, 1980:720).

iv)   A strong recognition of the informal financial markets and use of some of the informal markets' innovative techniques to reduce risk and improve accessibility.

However, it must be pointed out that with all these virtues, this approach also has some limitations. In its purest form, very few loans go beyond the most risk-free clients. There is a need to arrive at some reasonable compromise between the default-ridden, borrower-dominated development bank model, which has collapsed into bankruptcy in practically all countries of Sub-Saharan Africa on the one hand and the extremely risk-averse, saver-dominated private bank model on the other. Some balance of risk and returns is required to arrive at a compromise. That criterion in the new thinking does not necessarily mean that the small-farm or enterprise bias or the state-led character of credit policy should disappear. It may therefore be argued that the full potential for the financial institutions to grow, spread and achieve greater financial self-sufficiency may be achieved through institution-building, capacity-enhancing inputs and a friendly policy setting (Graham, 1992:139).

2.5.2   Deregulation of the financial system

Experience has shown that government intervention in the operation of the financial markets often does not achieve the intended aims and objectives, but rather results in distorted resource allocations. It is the belief of many economists that deregulation may help to remove or minimise these distortions. The idea of financial liberalisation has therefore become today's new orthodoxy both in the academic world and the major international institutions that offer policy advice to developing countries (Bhattacharya *et al,* 1198; Alawode & Ikhide, 1997). A number of Third World countries that find themselves in situations of debt burden and dwindling foreign exchange earnings, have also adopted policies to deregulate their economies, and in particular the financial markets as part of structural adjustment programmes aimed at ensuring that the forces of demand and supply are assigned larger roles than hitherto in the allocation of resources (Brownbridge & Kirkpatrick, 2000; Jaramillo-Vallego, 1995:54; Soyibo & Adekanye, 1992:2). The more recent literature advocates privatisation of financial institutions (including participation by moneylenders), lower reserve requirements, elimination of ceilings on interest rates and indexing interest rates to inflation rates, the raising of deposit and lending rates, and the removal of credit quotas (DTI, 2000; Caprio & Demirgiic-Kunt, 1998).

It is hypothesised that i) low interest rate ceilings suppress the savings rate, thereby reducing the availability of loanable funds and investments, which in turn lower the growth rate; and ii) low interest rate ceilings and repressed financial systems result in poor allocative efficiency of credit (McKinnon, 1973). In other words, higher interest rates and reduced government interventions in the financial sector are expected to improve the allocative efficiency of credit, as well as savings (Cho, 1988:104). Many empirical studies have tested the validity of the McKinnon-Shaw hypotheses (for example Soyibo & Adekanye, 1992 and Cho, 1988). Financial liberalisation has induced many financial markets to become more competitive and integrated, hence leading to similar costs of borrowing for different borrowers except for risk premiums or transaction costs. It has also encouraged better savings mobilization.

However, the soundness of financial liberalisation has been questioned by some economists (e.g. Taylor, 1979). Most of the criticism has been based on the experiences of countries that have embarked on liberalisation. In some cases, it has accentuated the urban bias of financial systems in developing countries, which siphon rural savings into urban credit, as manifested in the dichotomy of commercial bank branches into mostly rural net deposit centres whose deposits are in excess of local credit, and the largely urban credit centres, with credit in excess of local deposits. It has in addition, not led to a splurge of market-induced financial innovation in the developing countries, which is comparable to the creation of new instruments in the developed countries (Chandavarkar, 1992:136).

2.6 HINDRANCES TO THE DEVELOPMENT OF THE FINANCIAL SYSTEM IN DEVELOPING COUNTRIES

Developing countries, especially in Asia and Africa, enjoyed relative financial stability under colonial rule until the end of World War II. However, their financial systems suffered from colonial neglect and stagnation. Most of these financial systems were heavily oriented towards agricultural exports, other primary production and foreign trade; they catered principally for expatriate communities, and financial services to the indigenous communities were limited. In most developing countries, the financial system was underdeveloped until independence; it consisted of a few foreign banks, co-operative societies, post office savings banks, and moneylenders. South Africa, Zimbabwe and Namibia have extensive banking systems. However, these banks have not provided any noteworthy services other than savings mobilisation (Strauss Commission, 1996) to the regions in which small scale farming by blacks predominated. Provision of financial services to small-scale farmers and microenterprises remained underdeveloped.

Among the contributing factors to poor service delivery to small-scale farmers and microenterprises are:

i)   Lack of rural infrastructure. Financial institutions in the rural areas of most developing countries are beset by problems resulting from poor or the absence of

infrastructure (Asian Development Bank, 2000:9; Spio *et al*, 1995:257). A lack of ready access to social amenities such as water, electricity and communication facilities renders it relatively unattractive for qualified personnel to man the rural financial system (Spio *et al*, 1995:257).

ii)   The political environment. The use of the financial system as a tool for disbursing political patronage creates strong disincentives for repayment and diminishes the confidence of the savers. The pattern of "politically giving and forgiving" credit has undermined trust in the credit system (Von Braun, 1992:128; Spio *et al*, 1995:257).

iii) Institutional weakness. This results partly from information problems and partly from human capital problems. Valuable repayment records that would allow the reconstruction of credit histories as a tool for future risk management are not available. Financial repression has frequently caused banks to under-invest in information capital (Brownbridge, 1998; Gonzalez-Vega & Graham, 1995:31). Supervision of financial institutions has not kept pace with their expansion and development, and this has led to corruption and other abuses, rendering depositors and investors unprotected. Appropriate technology has not been adopted, resulting in high transaction costs, both in monetary and non-monetary terms. The important effects of a failure to provide education - creation of human capital - cannot be over-emphasised (Asian Development Bank, 2000:9). The differences in worker productivity in developing and developed countries have been partly attributed to the human capital factor. Neither has the quality of bank management employees improved to a desirable level. The inadequacy in terms of management and density of rural financial institutions has resulted in market failures in most countries. This brings into play the attendant problem of under-capitalisation of the rural economy (Musinguzi & Smith, 2000:126; Von Braun, 1992:128).

iv)   The physical environment. The physical environment in which the clients of the rural financial system operate is full of uncertainties. Widespread drought in most developing countries has led to periodic, wholesale decapitalisation, which is a particularly severe hindrance where financial markets are still in their infancy (Von Braun, 1992:128). Many, if not most, donors and policy makers saw the supply of credit to farmers in less developed countries as an important

solution to production related problems, and therefore threw much cheap money into that sector. However, the unpleasant environment in which these farmers operated, contributed to huge delinquencies and defaults, turning many financial institutions into "white elephants" (cf. Spio, 1995:14). Uncertainty in land tenure and land markets inhibited the efficient utilisation of land as collateral. Deficiencies in delivery systems for agricultural inputs, and relatively drastic seasonal price fluctuations of major food and export crops, have probably contributed significantly to the poor development of rural financial markets (Spio & Groenewald, 1998:12).

v)   The policy environment. Lipton (1976) apportions part of the blame to private investors, aid donors, or the too-powerful administrators for the rural deprivation that have been found in most developing countries. Urban interest, pressures and ideologies have dominated policy formulation. Policies are designed to allocate greater shares of developmental resources to urban areas. The policy environment pertaining in most developing countries has been a stumbling block in the development of the financial system (Asian Development Bank, 2000:8). The overall level of development of a country, and especially any lack of recent growth, does not provide an incentive climate in which finance and financial institutions can function well. High rates of inflation and instability in foreign exchange rates have been the order of the day. Financial repression regarding interest rates and the existence of widespread directed credit programmes have affected the ability of financial institutions to achieve a substantial outreach and attain viability (Yaron *et al*, 1998:152). The legal framework has also contributed significantly to the slow growth of the financial sector in developing countries, because it often lacks provisions to ensure enforcement of loan contracts (Spio, 1995). Other policies, like linking rural credit to agricultural input delivery systems, have also affected the rural financial markets. One of the two often hinders the other because of internal weaknesses in both systems (Von Braun, 1992:133). The interest rate policy has furthermore had a great effect on the development of the rural financial markets. A detailed dsicussions on interest rate is provided in chapter 3.

2.8   CONCLUSION

A growing body of empirical analyses (some already discussed above) clearly indicate how financial markets and institutions affect – and are affected by – economic development There is a strong positive link between the functioning of the financial system and the long run economic growth. Theory and evidence make it difficult to conclude that the financial system merely – and automatically – responds to industralization and economic activity or that financial development is an inconsequential addendum to the process of economic growth.

Economist have come a long way since the time when many viewed the financial system as a sideshow, or a passive channel that allocate scarce resources to the most efficient uses. Today, almost everyone agrees that the financial system is essential for development. However, the recent East Asian financial crisis indicates that the causal link between finance and growth is determined by the nature and operations of the financial institutions and policies pursued.

Improved access to financial services can have two principal effects on farm households. First, it can raise the expected value of income, and therefore of consumption, future investments and asset accumulation. Second, it can decrease the downward risk of too low an income to satisfy basic consumption needs. These two effects tend to have significant impacts on various aggregate and household-level outcomes, including agricultural productivity, technology adoption, food security, nutrition, health, and overall household welfare.

Interventions by governments have been pervasive in developing countries. The success of these interventions has been mixed, with the scale weighing heavily towards the side of failures and undesirable effects. What is clear from this review is that an efficient allocation of resources can be achieved only through a sound financial structure, which must embody prudential regulation, supervision and control; appropriate institutions and institutional philosophy; financial instruments that are consistent with savers' and borrowers' preferences and needs; and a rational structure of positive real interest rates.

CHAPTER THREE: ACCESSIBILITY OF FINANCIAL SERVICES AND ITS IMPACT

3.1   INTRODUCTION

The task of providing financial services, especially credit, at reasonable cost to small-scale farmers who have limited assets has not been easy. Until the 1980s in many developing countries, state-run agricultural development banks took the lead in establishing formal credit markets in rural areas. However, the shortcomings of the banking principles that they were based on – collateralized lending, an organisational setup without any incentive to do business with the poor, excessive dependence on government funding, and pervasive political patronage – severely handicapped their performance (Ledgerwoood, 1999:42; Zeller & Sharma, 1998:7).

Lack of access to a broader set of financial options represents a potential constraint to entrepreneurship and the ability to undertake socially and privately profitable investment projects (Asian Development Bank, 2000:5). If formal lenders are going to play any role in the delivery of microfinancial services the reasons for any early failure must be well understood. The lessons that may thus be drawn would be useful in determining when and where it may be worthwhile to restructure the rural financial systems in order to convert them into viable rural financial markets. Von Pischke (1983:12-12) argues that "a well-functioning rural finance market requires institutions that are healthy and expanding and the costs of financial services should fall as a result of financial innovation".

The objective of this chapter is to study a range of issues that affect accessibility of credit and the current thinking on these issues. As pointed out in Chapter 2, the link between financial services and agricultural growth is determined by the nature and operations of the financial institutions and the policies that are being pursued. Section 2 presents discussions on the main features of rural credit markets in developing countries. This background is necessary as a building block; as it tends to bring out some of the issues that need to be considered when one attempts to look at the impact and

accessibility of rural financial services. Section 3 focuses on some of the determinants of accessibility in rural financial markets. Six factors are discussed in this review: risk, credit rationing, transaction costs, delinquency and default rates, interest rates and collateral. The last section presents an overview of the paradigm shift towards a new South African development financial system.

3.2   FEATURES OF RURAL CREDIT MARKETS

The major roles of financial markets are to transfer capital from savers to borrowers, agglomerate capital, select projects, monitor investments, enforce contracts, transfer, share and pool risks, and to record transactions (run the medium of exchange). Capital markets deal not only with intertemporal trade, but also with risk and information (Stiglitz, 1994:23). It is sometimes argued that rural credit markets do not behave like classical competitive markets and that there is therefore no likelihood of them being efficient. According to Llanto (1990:138), transactions in credit markets are not similar to transactions in other markets where a transaction is terminated once payment is received. The commodity seller does not care who the buyer is or what happens to the commodity after the sale, as long as he/she gets paid. However, in credit markets, a great deal of information is required, both on the personal characteristics of the borrower and on the project for which an application for financing is lodged. It is crucial for the bank or other lender to know the viability of the project, the loan purpose, the credit-worthiness of the borrower and his/her strategic behaviour. Credit markets diverge from an idealised market because they are information dependent. According to Hoff & Stiglitz (1990:237-248) rural credit markets behave the way they do because of the problems of screening, incentives, contract enforcement, information asymmetry and monitoring.

Four principal features distinguish credit markets in developing countries from other credit markets:

- Segmented/fragmented markets - Credit markets in developing countries are segmented; different borrowers or participants face different capital prices for land, labour, commodities and capital (McKinnon, 1973). In other words,

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different interest rate policy are pursued by different lenders in the rural financial markets.

In credit markets, interest rates may not equilibrate supply and demand because of their dual function of setting price on one hand, and on the other, as instruments for regulating the risk composition of the lender's portfolio. However, these imperfections may be removed by allowing the interest rate to reflect the market price. The cost of segmentation is that it causes funds to fail to flow across regions or groups of individuals even though there are potential gains from doing so, as when needs for credit differ across locations (Black *et al*, 1997; Herath, 1996; Besley, 1994:32 ; Bhatt 1979).

- Collateral security[1] - Works by Herath, 1996; Barro (1976); Benjamin (1978) and Plaut (1985) demonstrate that, ceteris paribus, collateral increases the amount of credit offered to a given borrower and/or reduces the rate of interest charged. It increases the expected returns of the lender and creates an incentive for borrowers to avoid intentional default. Collateral pledged in exchange for a loan directly reduces the cost to the lender of default on the loan; it can reduce the moral hazard associated with lending by providing an added incentive for the borrower to repay; and it can alleviate the problem of adverse selection by screening out those borrowers most likely to default (Udry, 1990:252). Since collateral can be damaged or moved before the creditor seizes it, land can be expected to be the most common and appropriate collateral in developing countries, especially in rural areas (Binswanger & Rosenzweig, 1986). However, such assets are hard to come by in those areas, partly because the borrowers often are too poor to have assets that could be collateralised, partly because poorly developed property rights render appropriation of collateral in the event of default difficult in the rural areas of many developing countries (Besley, 1994:31), and partly also because in certain rural areas legal constraints exist on mortgaging of agricultural land (Feder *et al*, 1988):231). Often, the political cost of foreclosing on debtors with collateral is significant.

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[1] *See Section 3.4.6 for detailed discussions on collateral.*

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- Underdeveloped complementary institutions - Certain other markets must function well if rural financial markets are to function properly. In rural less developed areas, these institutions are missing or weak even where they exist. For example, equity markets that provide a mechanism for sharing risks are limiting and weak in most rural areas of developing countries. The virtual absence of insurance markets to mitigate the problems of income uncertainty is also evident in most rural credit markets. The operations of financial institutions in rural areas are beset by problems that often are the result of an absence of or weakness in infrastructure. More often than not savings mobilisation is frustrated because social amenities such as water, electricity, communication facilities and roads are not within ready access (Spio *et al*, 1995). Deficiencies in complementary institutions are mostly ancillary to the credit market and suggest the need for a policy intervention of their own.

3.3   DETERMINANTS OF CREDIT ACCESSIBILITY

Although an increasing number of private and public agencies are involved in raising the efficiency of financial intermediaries targeting the poorer clientele, their effectiveness in improving the poor's access to financial services, especially credit, is below expectations (Schrieder, 2000:385; Zeller, 2000: 1; CGAP, 1995:1). As a result the majority of small-scale farmers are left out of the rural financial system. Rural financial intermediation is expensive because participants are geographically scattered, financial transactions are small and rural incomes tend to be unstable (Lariviere & Martin, 1999:2). Clearly defined collateral[2] is often not available and rural people are usually less well educated than urban people. In addition, it is costly to collect information about rural borrowers. The substantial costs naturally impede financial markets from making contact with rural people, especially the poor (Schrieder, 2000:389; Lariviere & Martin, 1999:2).

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[2]   *Collateral in formal finance excludes collateral substitutes.*

According to Lipton (1976) these problems result from an urban bias. To him, urban interests conspire against the rural poor and deny them access to significant amounts of credit. Gonzalez-Vega (1989) directs his explanation to the supply allocation problems within financial institutions. He argues that widely used concessional interest rate policies, combined with relatively larger lender loan transaction costs for servicing small or new borrowers, discourage financial institutions from lending more to the rural poor. Another explanation is that most poor and rural households do not seek formal credit because they lack profitable investment opportunities, are not aware of the availability of formal credit, or are too timid to request formal loans. It is also argued that the differences in borrowing costs among various types of formal borrowers play a role in the accessibility of formal credit. These differential costs strongly affect the willingness of the rural poor to seek loans from formal lenders. This section discusses some of the factors, which influences the accessibility of credit to small-scale farmers.

3.3.1   Risk

"Risk is the essential element of finance.... This is paradoxical because it is risk that unseats systems, institutions and projects that issue excessive credit,... risk translates otherwise than rational behaviour into forces that depreciate credit contracts and destroy credit institutions. Debtors are unable to repay, creditors are unable to collect or both. But risk is a blessing as well as the curse of finance…. It motivates lenders' efforts to remain liquid so that payments are honoured on demand and to remain solvent by using profits to build capital" (Von Pischke, 1994:57-58).

The sources of risk for an intermediary include: i) credit risk from potential delinquency or default by borrowers, ii) investment risk from capital gains or losses on securities sold before maturity, iii) liquidity risk from possible losses of funding sources, iv) cost of funds risk from unanticipated changes in the cost of funds, v) financial risk from intermediaries' high financial leverage, and vi) regulatory risk from unanticipated changes in the regulatory environment (Herath, 1996:243; Barry & Lee, 1983:945). However, in this literature review, one will limit itself to credit risk, which embraces the possibility that the purpose for which credit is provided may not be remunerative,

leaving the borrower with insufficient funds with which to repay, and also the possibility that the borrower may attempt to avoid repayment in spite of having funds available.

Information asymmetry is one source of credit risk that is more prominent in rural credit markets. Imperfect information about the probability of default has several fundamental implications for the nature of credit markets (Herath, 1996:243; Blinder & Stiglitz, 1983:299). It gives rise to institutions that specialise in acquiring information about default risk, hence influencing the behaviour of the lender towards its clients. A lender with superior information can more easily distinguish between good and bad risks. Such superiority improves the lender's ability to identify the borrowers with the best investment opportunities. When information is poor, lenders can discriminate between borrowers only in very broad terms, and will indiscriminately adopt rational and/ or irrational methods to reduce risk.

To cover risk, lenders may raise interest rates charged on loans. This approach may lead to adverse selection, in that more creditworthy borrowers may choose not to borrow, which leaves the lender with less creditworthy ones; it may also induce borrowers to undertake riskier projects (moral hazard/incentive effect). In some cases, lenders may devise non-price mechanisms for screening out untrustworthy borrowers (Yazdani & Gunjai, 1998:148; Herath, 1996:243). Both approaches are discussed in detail in the preceding sections. In other situations, lenders may devise contracts that will provide a strong incentive not to default, thus devising contracts in which both the rate charged and the availability of credit at a later stage depend on the borrower's previous performance. This eventually creates a "customer market" - linking particular borrowers to particular lenders.

Other ways the lenders may choose to counter risks are: i) diversifying assets and liabilities in order to spread risks over various types of loans, investments, and funding resources; ii) diversifying geographically to spread credit risks over wide areas; iii) developing loan participation and loss-sharing agreements with other institutions; iv) utilising loan insurance, government guarantees, security requirements, customer counselling, documentation, supervision and avoiding loan risk and other activities

(Barry & Lee, 1983:945). Some of these approaches have reduced credit accessibility to small-scale farmers.

To be able to manage risk effectively and efficiently, information should be sufficient and adequate. The greater the amount of relevant, valid and timely data about the affairs of a loan applicant and the markets in which the applicant operates, the more refined the rational credit or investment decision. In fact, it is used to create confidence in financial markets (Von Pishke, 1994:59).

3.3.2   Credit rationing

The rationale, mechanisms and effects of credit rationing on both borrowers and lenders have attracted a good deal of attention in recent times; partly because of the move by various governments and donor agencies to advance credit to small farmers, micro-enterprises, and the poor; and partly because of the information asymmetric nature of most rural credit markets. The objective of this section is to explore the following questions:

- Why do banks ration credit and how rational it is for banks to ration credit by mechanisms other than price?
- Why do banks ration out small clients in favour of larger clients?

The exploration of these questions requires a clarification of the meaning of credit rationing. Credit rationing may be defined as a "situation in which demand for commercial loans exceeds the supply of these loans at the commercial loan rates quoted by the banks" (Jaffee & Modigliani, 1969:851). According to Bester (1985:850), credit rationing occurs when some borrowers receive a loan and others do not, although the latter would be willing to pay even higher interest or to offer an increase in collateral. According to Jaffee and Russell (1976:651), credit rationing occurs when lenders quote an interest rate on loans and then proceed to supply a smaller loan size than demanded

by the borrowers. These definitions bring into focus two types of rationing, namely, loan quantity and loan size rationing[3].

3.3.2.1 *Rationing and its rationality*

If the basic tenets of economics are to be followed then credit rationing will not exist. Market equilibrium results when demand equates to supply. If prices perform their job well, then credit rationing is not possible (Stiglitz & Weiss, 1981:393). However, it does exist in real life. Stiglitz and Weiss (1981:393) explain this phenomenon on the basis of the idea of a short or long-term disequilibrium. In the short term, it is viewed as a temporary disequilibrium phenomenon. The economy is said to have incurred an exogenous shock, hence there is some stickiness in the price of capital (interest rates), so that there is a transitional period during which rationing of credit occurs. Long term credit rationing is explained by governmental constraints such as usury laws. Allocation of credit under competition in the form of rationing seems to be induced by a variety of factors (Schrieder & Theesfeld, 2000:394; Braverman & Guasch, 1986:1260):

i)   *Finiteness of borrower's wealth*

It is postulated that the borrowers' liabilities are bound by an amount no greater than their wealth, hence lenders find it optimal to set credit limits. It is commonplace for the borrower's equity to provide the lender with some protection against loss from default (Bradford *et al,* 1996:794*)*. On an unsecured loan, it is the borrower's overall equity position, which is relevant, usually measured by the ratio of total equity to total debt. On a secured loan it is the down payment (margin between the size of loan and the value of collateral) that is relevant, usually measured by the ratio of down payment to value. In general, the supply of credit is a positive function of these ratios, since the larger the borrower's own investment or equity relative to his/her borrowed funds, the less the risk to the lender that adverse circumstances will reduce the value of the collateral below the outstanding principal of the loan and thus lead to default.

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[3] *Loan quantity rationing results when the number of loans lent to borrowers are reduced, while loan size rationing is said to occur when the amounts lent are*

The demand for credit tends to be a negative function of these ratios because of the existence of "marginal" borrowers for whom equity or down payment requirements represent an effective constraint on borrowing and spending (Bradford *et al*, 1996:795; Guttentag, 1959:220).

ii)   *Adverse selection and incentive effects*

In a world of perfect and costless information, the lender is able to stipulate precisely all the actions that the borrower will undertake which might affect the returns of the loan given to him. However, in the presence of asymmetric information, the situation pertaining in most rural financial markets in developing areas, the lender is not able to directly control all the actions of the borrower. In a bid to protect its interest and attract low risk borrowers, the lender may use a variety of screening devices in the formulation of the loan contract. The use of the interest rate and other contractual terms as a screening device brings into play i) adverse selection - since only borrowers with riskier investments will apply for loans at a higher interest rate, and ii) an incentive effect that induces borrowers to undertake riskier projects (Herath, 1996:242; Bradford *et al*, 1996:794; Chaves & Gonzalez-Vega, 1996:71; Bester, 1985:850; Blinder & Stiglitz, 1983:299; Stiglitz & Weiss, 1981:293).

The use of the interest rate to clear the market may only be appropriate if the prevailing interest rate is below the "bank optimal rate". Under such conditions the use of the interest rate as a screening device to reduce excess demand will be rational, because increasing the rate would increase the expected returns to the bank (See Figure 3.1).

At the optimal bank rate, an increase in interest rate payments may be self-defeating, even though at that point demand for funds exceeds the supply of funds. An increase in interest rates now increases the riskiness of the pool of loans. Again, increases in the collateral requirements of lenders beyond some point, may also lead to a decrease in the returns to the bank either by decreasing the average degree of risk aversion of the pool of

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reduced in size.

borrowers, or in a multi-period model, by inducing individual investors to undertake riskier projects.
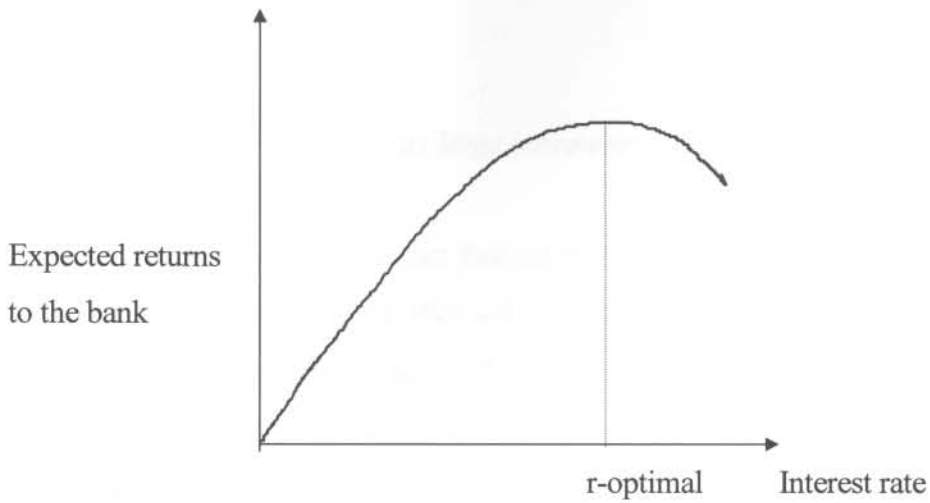
Figure 3. 1:   **Bank optimal interest rate**

Source: Stiglitz and Weiss (1981:394)

In the absence of price rationing, some other aspects of rationing would be used (Bradford *et al,* 1996:795). These may include the maturity period of loan, length and value of the customer relationship, amount of compensating balance, and risk of partial or complete default on the loan. According to Stiglitz and Weiss (1981:395), the allocation of credit induced by non-price rationing is perceived as a temporary phenomenon or a deviation from the equilibrium path. One school of thought is that the normal stringency of rationing reflects rational behaviour, but an "extra tightness of rationing" which persists for more than a short period reflects irrational behaviour. Such changes can only be temporary.

However, Guttentag (1959), pointed out that non-price rationing processes should be viewed as the application of an array of non-interest rate lending terms, and that credit rationing is a pervasive phenomenon in the private sector of the capital market. According to him, it should be assumed that one or more lending terms are relevant to all loan transactions involving private parties and that there is no need to assume that lenders set arbitrary limits on the amount of credit they will extend, since the prevailing terms and the borrower's characteristics automatically determine the volume of credit

for which any borrower qualifies. According to the analysis by Stiglitz and Weiss (1981), credit rationing will be profitable, even in the long-run equilibrium, as long as there is uncertainty about loan repayment and banks cannot discriminate perfectly between customers.

3.3.2.2   *Small borrowers versus large borrowers*

Ample evidence points to the fact that rationing has an unfavourable impact on small farmers, as a result of the high risks and costs associated with lending to them (Bradford *et al*, 1996:795; Gonzalez-Vega, 1984:79). If lenders have a choice between lending to large farmers and lending to small ones, they will lend to small ones (at the margin) only if they can charge the proportionally large transaction costs of small loans to the small borrowers as either a fixed fee or an increased interest rate. If they cannot shift costs, the market for small borrowers will cease to exist from the suppliers' side (Binswanger & Sillers, 1983:14).

Lenders "statistically discriminate" against small farmers when they rely on farm size as an (imperfect) indicator of individual farm characteristics. Because farms are imputed to possess the average characteristics for their group, relatively productive and low risk small farms are offered discriminatory contracts, which discourage credit use. Other things being equal, this distorts equilibrium credit allocation away from small farms. Correction of this distortion, which is based on informational problems, would require credit lenders who can efficiently collect better information (Carter, 1989:91).

According to Carter (1989:91), lenders ration out the small farm by the imposition of two contractual restrictions, namely, the imposition of a collateral ceiling and high interest rates. Most small farms have uncertain legal title, and this allows them only limited net collateral value, hence restricting feasible loan terms. If interest rate restrictions are exogenously imposed, the conventional result applies a fortiori. With the interest rate restricted, and high collateral not an option, there may be no contract which can be offered to small farms so as to yield the requisite expected profit level. If the interest rate ceiling is binding, then banks would simply refuse to make loans to small farms and would shift their lending to better collateralised and on average, safer and

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more productive large farms. Even if the same collateral ceiling applied, lenders would still prefer lending to large farms rather than to small farms and would ration credit accordingly. The key factor of credit rationing is the variability in production, which makes small farm loans risky and unprofitable, while the availability of credit to large farms is explained by the systematic outcome of profit maximising behaviour of competitive lenders (Carter, 1989:102).

3.3.3 Transaction costs: Their effects and the implications for credit accessibility

According to Gonzalez-Vega (1993:32), improved access to financial services is determined by changes in the environment in which financial institutions operate, changes in the policies that regulate their behaviour, changes in their organisational design and operational procedures, and changes in financial technologies. Transaction costs constitute one of the major determinants in such policies. It is argued that high transaction costs have discouraged many of the rural poor in developing countries from using formal loans. Transaction costs have clearly had an important impact on the structure of rural financial markets and the behaviour of the participants (Olomola, 1999:98; Gonzalez-Vega, 1993:32).

Transaction costs are an appropriate measure of the degree of "friction" in the functioning of these markets. The higher the transaction costs of financial intermediation, the less efficient is the performance of the financial markets, and the more constrained is their contribution to development. They play a particularly important role in limiting the services that the financial institutions are willing to provide in rural areas, to poor people and their new clients. Excessive transaction costs encountered by clients of financial institutions discourage them from seeking loans and making deposits. Sustaining and expanding financial services heavily depend on decreasing these costs, both for the institutions and their clients (Adams, 1992).

Information on transaction costs provides insights into how efficiently and equitably rural financial markets are functioning. If rural financial market participants are incurring substantial total transaction costs, it is likely that relatively few people are being served by these markets and that the quality of services provided to clients will not

be robust. It also indicates that intermediaries are inflicting extensive transaction costs on non-preferred clients, and one can be sure that interest rates are not doing an efficient job of rationing financial services. A decline in total transaction costs is a sign that intermediaries are successfully innovating, that more people have access to financial services and that the quality of financial services is increasing (Adams & Higurashi, 1987:15).

It is common knowledge that borrowers and lenders do not share the costs of financial intermediation in fixed proportions. The intermediaries can transfer, absorb, or in some cases increase transaction costs incurred by various classes of individuals through a rationing device, depending on whether they are preferred or non-preferred clients (Adams, 1978:5).

3.3.3.1 *Transaction costs to small clients*

Evidence from research indicates that transaction cost is a function of the size of the loan. Small clients are made to pay proportionally bigger transaction costs than large clients. Saito and Villanueva (1980:634) advance three reasons: Firstly, administrative costs are fairly constant regardless of the size of the loan recipient. Lack of information on most small clients makes satisfactory evaluation more difficult and time consuming. The consequence is that the administrative cost as a percentage of the size of the loan declines as the size of the loan increases. Secondly, default risk expenses decrease with increasing size of the borrower. Large firms are better known and tend to exhibit good repayment records. They are likely to be more diversified in their operations, thus further enhancing their ability to pay back loans. Thirdly, most loans to large clients are collateralized, making it unnecessary or even undesirable to set aside large sums to cover the possibility of default. However, a great number of loans to small clients are unsecured; a risk premium is therefore added to cover the higher probability of non-payment of principal and interest, hence swelling the transaction costs.

The most important cost for the small client is the opportunity cost of time. While both small and large borrowers pay the same rates of interest on their loans, the effective borrowing cost rate, with borrower's transaction costs included, is higher for the small

farmer. In a study in Belize, for example, it was 3 to 4 times that of the large borrower (Adams & Higurashi, 1987:6).

3.3.3.2 Causes and effects of high transaction costs

The nature and extent of financial regulations affect intermediation costs in several ways. The availability, characteristics, terms and conditions, and effective rates of return of financial instruments are greatly determined by existing financial regulations, and by the ability and willingness of the monetary authority to enforce them (Lariviere & Martin, 1999:2; Bradford et al, 1996:795; Cuevas, 1988:14). Policies such as reserve requirements, interest rate controls, and credit allocations that are designed to achieve certain economic objectives can also increase intermediation costs (Olomola, 1999:95; Srinivasan & Meyer, 1988:2). For instance, lenders often allocate transaction costs to ration financial services when financial markets are repressed by interest rate restrictions. Because of the inability to use interest rates to ration intermediary services under financial repression, intermediaries reallocate transaction costs and adjust collateral requirements to increase the effective costs for non-preferred clients, while at the same time reducing the effective costs for preferred clients (Adams & Higurashi, 1987:5).

It is clear that transaction costs have an important impact on the structure of financial markets in rural areas. The fragmentation of capital markets arises because of the varying transaction costs with respect to the different classes of borrowers (Bhatt, 1979:98). Lenders with credit delivery systems that embody high lender transaction costs will gravitate towards larger loans, whereas those with low costs will be content to make smaller loans. Likewise, borrowers seeking smaller loans will often prefer to work with lenders who charge high interest rates but who impose low transaction costs upon borrowers. When seeking larger loans, borrowers may prefer to work with lenders who impose larger transaction costs but charge a lower interest rate. This results in segmentation of the rural financial markets. High transaction costs for both borrowers and lenders reduce the size of credit markets and restrict loan access for many rural producers (Gonzalez-Vega, 1984:121). If borrowers' transaction costs are raised as a result of the bank's actions, some potential borrowers would rather go to other lenders or

go without credit. Because more farmers would now prefer to borrow from moneylenders, there would be a corresponding shift in the moneylenders' share of the overall market.

3.3.3.3 *Ways to lower transaction costs*

Transaction costs form a key variable in determining the type of institution that is most appropriate for a given situation. Commercial and development banks are large, impersonal, highly regulated, bureaucratic institutions. They are most efficient in handling large, complex transactions. They are expensive to operate with regard to small client lending. They are not cost effective in offering simple, low transaction cost services to the poorest, geographically isolated households. Therefore, there are definite limits to the extent that bank branching can resolve the problem of access to financial services for rural clients. Various grassroots institutions have been identified as cost and risk reducing channels through which financial services could be offered at a lower cost. ROSCAs (rotating savings and credit societies), credit unions, and informal self-help groups can inexpensively provide simple financial services. Some of their transaction costs are transferred to their members, who are prepared to absorb them in order to receive financial services otherwise unavailable to them. Additional use could be made of the informal sources that operate in interlinked markets (Meyer, 1988:17). According to Meyer (1988:17) the key to ensuring lower transaction costs is to encourage the most simple organisations to emerge at the lowest level, and to provide increased linkages between institutions and between the formal and informal sectors so that the limitations of the simple organisations can be overcome. This will help in strengthening the rural organisations.

The economic environment in which the rural financial participants operate must be substantially improved. Increasing the farmers' incentives through the improvement of product prices and marketing infrastructure can do this. Improvement in infrastructure such as farm to market roads, irrigation, availability of better farm inputs and equipment, better education for farmers, and modern techniques of farming will go a long way in increasing farm productivity and improving the incomes of rural households. Such

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environments will reduce risk-related costs of rural financial intermediaries, and thus their transaction costs.

Improvement in financial policies will also help reduce transaction costs. The deregulation or reduced regulation of interest rates reduces disincentives to rural lending (Teodoro & Cuevas, 1988:51; Meyer, 1988:77). Financial institutions should be able to adjust to local circumstances. In a period of co-variant risk, such as drought, no efforts on the part of the institution would result in repayment if the client's source of income had declined to zero. If these clients are accommodated, by rescheduling for example, the long term relationship between the lender and borrowers could be improved, with a recurring decrease in the transaction costs of both the borrower and the lender in the long term (Coetzee *et al*, 1994:5).

Knowledge of the cost structure of financial institutions is essential for analysing institutions' performance and assessing the adequacy of financial policies. Lenders need to monitor cost indicators carefully in order to evaluate the performance of their institutions over time and in comparison to their competitors, and to assess the profitability of different bank services. Policy-makers, on the other hand, should consider the cost structure and technological parameters of financial institutions when deciding on policy measures that affect the financial system. More than one bank failure can be traced to inadequate policies that have either under-estimated the costs of providing certain financial services, or over-estimated the market potential of specific areas of activity (Cuevas, 1988:1). It may therefore be argued that inasmuch as transaction costs play a crucial role in rural financial markets, influencing both the participants and the size of the market, there are other factors which also need to be addressed in order to make the drive to reduce transaction costs meaningful.

3.3.4 Delinquency and default: Causes, and effects on credit availability

Smallholder agricultural credit repayment still remains a major problem in less developed countries (Chirwa, 1997:107). Loan delinquency and default are among the most critical and threatening problems facing formal lenders in most developing countries. Delinquency and default not only decapitalise the institutions and increase

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their reliance on donors and governments, but also discourage lending to specific target groups (Sharma and Zeller 2001:1). Many developing countries' credit institutions and programmes have become illiquid because of poor loan repayment. These massive default and delinquencies have destroyed the long-run efforts to create viable small farmer lending institutions.

Repayment is essential. If none is expected, there is no place for credit and, in fact, whatever funds are advanced cannot be defined as credit. If credit does not return to the lender, revolving funds will not revolve. Even worse, new money will not come forth from the original source (savers). Excessive arrears and default rates indicate inefficiency of one kind or another. The financial institution has either financed unproductive investment or it has failed to press for loan repayment (Hunte, 1996:46; Fry, 1988:27; Bouman, 1979:111).

The inability of borrowers to repay their debts on time (delinquency) or to repay them at all (default), is a serious problem and has been a widespread experience for the past few decades. The problem of delinquencies and defaults in rural financial markets can be explained from different perspectives, including: institutional, economic and structural deficiencies in agriculture, and political and socio-cultural factors.

3.3.4.1   *Institutional deficiencies*

Research has shown in many cases that the lenders are to be blamed for poor collection performance. Some of the institutional deficiencies are discussed below.

Defective loan policies: In many cases, lenders delay loan disbursement. The result is that the proceeds in cash or in kind reach the farmer at the wrong time, with the result that farmers often divert the loans to other uses (Olomola, 2000:4; Nelson & Cruz, 1991:20; Fry, 1988:275). Further, the schedule of repayment is often not adapted to the flow of receipts, while loan allocation processes often depart from financial optima. Poor credit decisions may also be made because of information problems and the lack of the decision makers' experience in lending to specific target groups.

Poor accounting and management systems: Poor loan collection may reflect the fact that a significant portion of loans may be improperly documented. Poor accounting makes it difficult for lenders to know exactly the repayment position of specific borrowers (Von Pischke *et al*, 1998:150; Boakye-Dankwa, 1979:247). Concentration and emphasis on the disbursement side of the credit equation ignores issues such as the creation of confidence between borrower and lender, measurement and management of risk, and the creation of accounting and procedural infrastructure for loan administration. Von Pischke (1991:95) points out that when these issues do not receive the same attention, which is devoted to disbursement, arrears mount and bad debt losses take their toll.

Lack of savings mobilisation: Another missing link is "the forgotten half of finance", or savings mobilisation. It is an effective antidote to the problem of repayment, because it adds value to the relationship between intermediaries and their clients. It is a powerful incentive to a borrower to repay promptly, and a positive incentive for lenders to keep their financial housekeeping in good order, to take responsibility for loan recovery, and to innovate so as to retain and attract funds when they know that resources come from neighbours rather than from some distant government agency or donor (Von Pischke, 1991:96).

Lack of enforcement discipline ((Von Pischke *et al*, 1998:172). The effectiveness of contract enforcement may also be seen as a missing link in dealing with this problem. Many of the rural financial markets suffer from a non-repayment mentality. Lenders and borrowers alike accept the slightest pretext for farmers/clients not to repay. Unfavourable natural conditions and poorly designed loans feed this attitude. Loans have been made, especially to larger farmers, on a political basis and therefore a lot of borrowers assumed they had the right not to repay because they know that legal pressure would not be brought against them (Njoku & Odii, 1991; Ladman & Tinnermeier, 1977:962). Where loan contracts cannot be enforced, credit easily converts to grants (Von Pischke, 1991:96).

3.3.4.2 *Economic and financial policies*

The World Bank (1989) suggests that many the credit policies of the developing world spring from the increasing use of lenders as tools of development policy. Low subsidised interest rates, negative in real terms, they provide a strong incentive to postpone loan repayment (Fry, 1988:277). The concessional interest rate policy encourages borrowers to seek credit for ostensibly agricultural purposes, which in fact is directed to other activities or investments (agricultural illusion) (Ladman & Tinnermeier, 1977:962; Boakye-Dankwa, 1979:248). It is also suggested that the forced lending requirement used as the basis of selective credit policies is a recipe for high arrears. A critical component has been the lack of adopting financial policies, chosen with the purpose of protecting the viability of institutions (Chaves & Gonzalez-Vega, 1996:73).

3.3.4.3 *Deficiencies in the agrarian structure and its characteristics*

One of the underlying factors of non-repayment of loans is expressed in terms of non-viable farm units, which often refer to the small size of farm units. This results in the condition where the amount of the loan to be repaid exceeds the farmer's cash savings. A series of factors can contribute to this. Inadequate land and other agricultural inputs, and deficiencies in supportive services are some of the reasons for an income inadequate to repay loans. Land tenure conditions, such as the size of the holding and rental arrangements; the productivity potential of the land holding and irrigation facilities; the availability of inputs of good quality at reasonable prices and at the required time; satisfactory marketing channels and remunerative prices are among the important factors which have bearing on the revenue and productivity of the landholding, and determine whether the farmer's income is adequate to meet his basic living expenses and repay the loan taken Spio & Groenewald, 1998).

3.3.4.4   Socio-cultural and Political factors

Cultural factors undoubtedly play an important role in the unwillingness of borrowers to repay their loans. The concept of repayment of loans associated with government and donor agencies is unfamiliar.

Political intervention in the allocation of rural loans is quite common in developing countries. The government intervenes in the rural lending decision-making process as a tool for getting re-elected. The distribution and recovery of target loans is constrained by financial policies, which permit the government to formally intervene in the lending and recovery programme of rural branches of financial institutions. The major policies used are the interest rate, interest rate exemption and cancellation of debts (Von Pischke *et al*, 1998:173).

The following facts were established when research was conducted on the various proxies for political intervention in the rural financial markets in Bangladesh. A regression analysis showed, first, that interest rate exemption programmes positively influenced the recovery rate at least in the short run, while informal and formal intervention negatively affected the recovery rate. Secondly, the inflation rate discouraged borrowers from repaying loans because it reduced the real interest rate and created future expectations of high inflation. High real interest rates can therefore be expected to increase the recovery rate. Thirdly, the effect of intervention outweighed the effect of the inflation rate on loan recovery rates. The study shows that the effectiveness of high rates appears to be undermined by the interventions associated with the political objective of getting re-elected (Khalily & Meyer, 1993:34-35).

3.3.4.5   Consequences of delinquency and default

Low default and delinquency rates are said to be particularly praiseworthy because they indicate that lenders are careful in their selection of borrowers and forceful in their collection of loans. Good repayment records are also said to indicate that loans are being allocated to productive activities because enough additional income is being generated

to repay the loans (Vogel, 1981:58). Several problems arise from an inability to recover loaned funds. It is a serious financial burden to lenders and governments. Without a flow of funds, the capacity to supply and make available an increase in lending to small farmers is restricted. High delinquency and default rates directly affect the financial viability of lenders, borrowers and savers. This causes most lenders to be heavily dependent on governments for subsidies in order to survive. For most of them, costs exceed revenues; inflation plus default erodes their capital structure. This results in a perverse selection of borrowers. Borrowers, who are supposed to be the main beneficiaries of the credit system, are in fact rationed more stringently in their access to credit. And in most cases, the small clients (farmers) and the poor are rationed out of the credit system in favour of the larger borrowers who are the worst offenders in terms of delinquency and default (Bradford *et al*, 1996:800; Ladman & Tinnermeier, 1977:966; Boakye-Dankwa, 1979:239.

From an overall economic point of view, defaults are transfer payments to defaulting clients/farmers. But this is one of the least desirable and, simultaneously, least equitable forms of carrying out income transfers. Apart from destroying the financial viability of lenders, loans tend to go to larger clients/farmers, as shown by many studies on farmer credit schemes. Credit does not therefore appear to be an efficient mechanism for income transfer; creditworthiness and need are the opposite extremes of the social welfare spectrum (Olomola, 2000:6; Boakye-Dankwa, 1979:240). Another undesirable feature of defaulting is that it tends to spread. The attraction of default is greater when farmers perceive a credit programme as temporary. There is some sort of vicious cycle here since it is the impact of default as much as any other factors which causes many farm credit programmes to be curtailed, reorganised or ended.

3.4.4.6 *Approaches to reduce delinquency and default rates*

Various measures have been suggested. The solution to the problem of deficiencies of agrarian structure requires an integrated approach. For instance, where the basic problem is the small size of holdings, a land redistribution policy or a policy to consolidate holdings would be necessary. Inadequate marketing facilities may be remedied by the provision of new marketing channels, improvement of roads and transport, and the provision of other essential infrastructure. Crop insurance has been suggested as a

possible way to improve loan repayment by protecting both the borrower and lender against the vagaries of nature. It enables farmers to repay loans from indemnities obtained at times of crop failure.

There is no denying that in many cases, poor recovery rates are due to financial problems faced by borrowers. But, in addition, borrowers often do not repay loans and lenders cannot energetically recover loans because of government interventions. A failure to address this dimension in loan recovery analysis may lead to incorrect policy prescriptions. Reduction in these interventions will probably increase the effectiveness of financial policies, particularly interest rates, in improving rural loan allocation and recovery (Khalily & Meyer, 1993:35). The efficiency of lenders in terms of loan recovery could be improved through the use of group-based organisations, which could serve as a sanction enforcement agent in the recovery of loans. Using the group approach, a part of the lack of information reflected in the bad debt provision is internalised by the group. A group approach or similar character-based, joint liability approach, which relies on peer monitoring and other group advantages, can dramatically decrease bad debt provision and administrative costs.

3.3.5   Interest rate sensitivity and the availability of financial services

The interest rate is the rent or level of compensation a borrower of funds must pay a supplier, or the compensation a lender gives to a saver. The level of this rate acts as a regulatory device, and it controls the flow of funds between suppliers and demanders, and/or keepers and savers. Thus, the interest rate represents the cost of money. It is a key variable that influences the actions of financial institutions, borrowers and savers (Mohane *et al,* 2000:730).

The most common characteristic of conventional credit programmes is the subsidisation of interest rates. Arguments for subsidised credit in rural financial markets were numerous and convictions about its desirability deeply held. The artificial low interest rate policies have been justified on the following grounds: i) they serve as an income transfer device to help the poor, who cannot afford expensive credit; ii) high rates contribute to inflation; iii) low interest rates induce borrowers to adopt new technologies

and increase production; iv) such policies have been adopted in advanced economies, so why not in developing countries? v) the concessions provided by development agencies should be passed on to farmers; vi) religious and ethical values; and vii) they are the second best alternative if the government cannot improve the economy (Lariviere & Martin, 1999:2; Ellis, 1994; Von Pischke, 1991).

3.3.5.1 Defects of the artificial/subsidised interest rates

The low interest rate policies have failed to achieve their primary objectives of promoting agricultural production and assisting the poor. As pointed out by Von Pischke *et al.* (1983), "Subsidised credit is not a cost effective means for promoting those activities mentioned above. Credit, subsidised or not, cannot make unprofitable investment profitable. Loans do not create (non-existent) technologies, do not make the required (unavailable) inputs accessible, do not build the (missing) infrastructure (roads, storage facilities), do not create the (absent) markets, do not engender comparative advantages, and do not reduce yield uncertainty. In particular, credit does not modify relative (social and private) profitabilities, or create investment opportunities that do not exist. Credit merely transfers generalised purchasing power to borrowers who still face the same investment options". With the passage of time, it became clear that subsidised credit was a particularly weak instrument to achieve most of the intended objectives. Again, evidence from most developing countries indicates that subsidised credit cannot compensate for high input prices, low product prices, unstable input supplies, poor information and transportation systems, and complicated rules and regulations that favour large enterprises (Meyer & Nagarajan, 1988:372).

When interest rates do not reflect the social opportunity cost of the claims on resources transferred, there is an implicit subsidy (Gonzalez-Vega, 1993:2 and Vogel, 1984). Contrary to their good intentions, subsidised interest rates had regressive implications for the distribution of wealth in rural areas. Small farmer loan portfolios showed much concentration, as a few of the borrowers captured the largest portion of the funds disbursed and the associated subsidies (Gonzalez-Vega, 1993:18). Other effects of low interest rates are well documented in the international literature (Mohane *et al*, 2000; Strauss Commission, 1996; Spio *et al*, 1995).

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3.4.5.2   *Effect of Interest rate sensitivity on credit*

The impact of financial intermediation and interest rate ceilings on credit is depicted in Figures 3.2, 3.3 and 3.4. In Figure 3.2 the horizontal axis measures the quantity of borrowing or lending per unit of time (X), and the vertical axis measures the cost of borrowing and the return to lending.

The demand for credit is represented by the downward-sloping curve labelled D. Its negative slope indicates, in part, the increasing quantity of profitable investment as the cost of borrowing declines. The supply of credit is represented by the supply curve S. Its positive slope reflects, in part, the increasing share of the total savings provided for financial assets as their return rises relative to the return on real assets or investment.
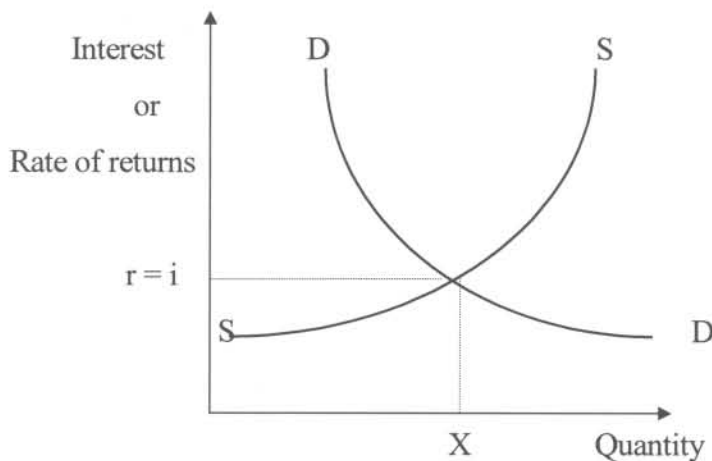
Figure 3. 2:   The supply of and demand for credit

Figure 3.3 shows the effect of an interest rate ceiling (The horizontal line i_1). At the ceiling interest rate, the amount demanded by borrowers is Xo. If the ceiling is applied to deposit rates, it will reduce the amount lent to X_1 and raise the cost of borrowers to r_i. If the ceiling applies to lending rates, lenders will set deposit rates at i_i deducting transaction costs. The amount deposited (and lent, when abstracting from reserve requirements) will be Xi^1. The excess demand for credit $(X_o\text{-}X_i^1)$ cannot be satisfied, and lenders will ration the available supply.

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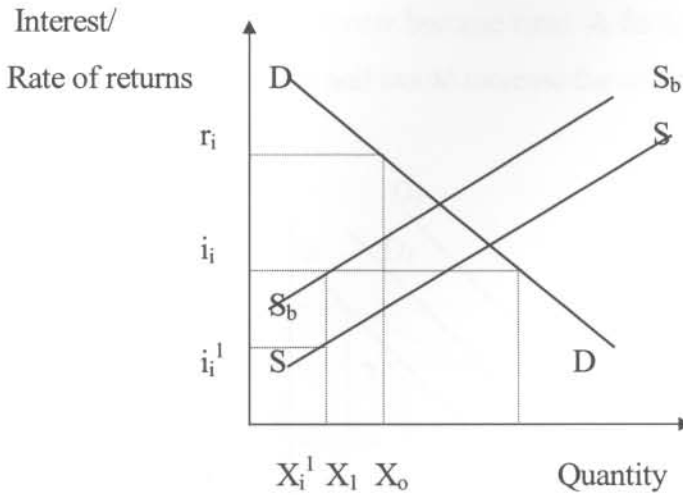
Figure 3. 3:   **Effect of an interest rate ceiling**

Concesssionary interest rates lead to lower revenues for the lenders if the demand for credit is inelastic and /or the supply of loanable funds is restricted over the relevant range of the demand schedule. This, in combination with the well-recognised high costs of administering agricultural credit for small clients programmes, will seriously jeopardise a credit institution's financial viability (Ladman & Tinnermeier, 1981:69). The implementation of concessionary interest rates for agricultural loans also leads to agricultural illusion - a situation where some agricultural loans have the appearance of going to that sector, but in fact go elsewhere.

Figure 3.3 presents a countrywide demand curve DD for credit from agricultural lenders to be used for agricultural purposes when interest rates are equalised throughout the economy. Assuming the market related interest rate is r, farmers would demand $0C_1$ credit. Suppose that the government subsidised the loans by means of concessionary interest rate, r_1 for agricultural loans, but the non-agricultural interest rate remains the same. Two effects would occur. First, borrowers would increase the quantity of funds demanded for agricultural purposes from C_1 to C_2, and if non-price rationing were not employed, the borrower would receive a subsidy or income transfer of $r_1$rab. Secondly, since money is fungible, agricultural illusion may occur. With relatively lower interest rates for agricultural loans, borrowers will be expected to behave in this manner, especially those with multiple occupations and knowledge of other investment opportunities. The demand for credit from agricultural lenders would shift right to D_1D_1.

Borrowers would want to use C_2C_3 quantity of credit to practice agricultural illusion. Total concessionary transfer would now become r_1rac. A further concessionary transfer would shift DD further to the right and would increase the concessionary transfers.
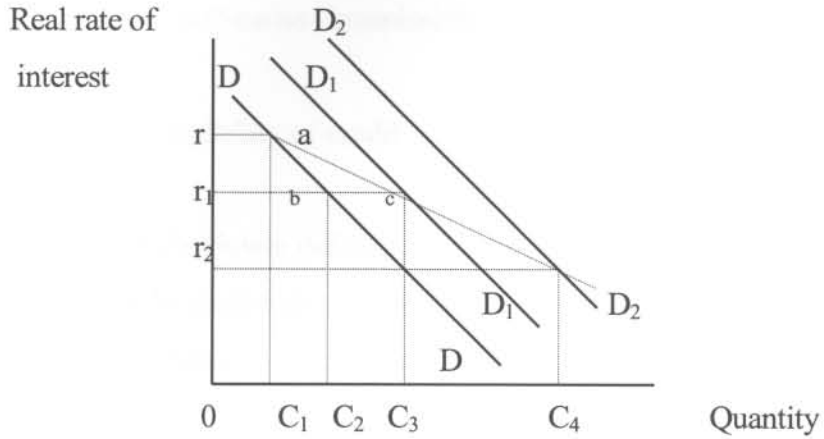
Figure 3. 4:   **Effect of subsisided credit**

3.3.5.3   *Conclusion*

It must therefore be stressed that low interest rates cannot eliminate the monopoly of moneylenders in rural areas, since they restrict access to formal credit. Low interest rates cannot create the missing physical inputs, the missing markets, or the missing technologies that keep the productivity of farmers low in many developing countries. Once the inputs, markets and technologies are available, subsidised credit cannot stimulate adoption of the innovations unless large enough loans are granted to large numbers of farmers. Subsidised rates, however, lead to rationing and exclusion.

There is no a prior economic justification for the general subsidisation of lending interest rates in the rural economy, even for the rural poor. Scarce resources will however, be required to finance the start-up activities and institutional strengthening of emerging rural finance institutions. When income redistribution is pursued, grants are preferable to interest rate subsidies. Subsidies create a bias towards accepting investment projects with low returns. They encourage the substitution of credit for the borrower's own funds (or the funds of other lenders), promote excessive indebtedness, skew incentives in favour of capital-intensive techniques of production, encourage corruption

and the rationing of credit, and weaken borrowers' incentives to repay and lenders'
incentives for debt recovery. They also result in lower returns to savers and higher costs
for non-subsidised borrowers, unless the subsidy is fully paid through the fiscus instead
of the banks. Finally, interest rates subsidies have added significantly to fiscal deficits
and inflation in many countries (Strauss Commission, 1996:119).

3.3.6   Collateral and accessibility of credit

Lending involves the risk of borrower default, and lenders pursue various procedures to
reduce default risk and to minimise the losses, which may be incurred in the case of
default. The utilisation of collateral and guarantees is one of the universal procedures
designed to increase the lender's expected profitability from a loan transaction, apart
from screening potential borrowers according to creditworthiness criteria and credit
rationing (Feder *et al*, 1988:23). At a given interest rate, collateral has three effects: i) it
increases the expected return of the lender and reduces the expected return for the
borrower, ii) it partly or fully shifts the risk of losing the principal from the lender to the
borrower (Bradford *et al,* 1996:795), and iii) it provides those borrowers who have low
disutility of default with an additional incentive to repay a loan (Binswanger and Sillers,
1983:16). An additional risk-reducing element, implicit in collateral, is the fact that it
reduces the borrower's ability to incur additional institutional debt (Von Pischke *et al,*
1998:150).

Collateral is defined as an asset that upon liquidation is adequate to cover most or all of
the lender's risk exposure, including principal, accrued interest and collection costs
(Larr, 1994:8). Most of the definitions of collateral in formal finance fail to include
collateral substitutes, which are used more often in the informal financial markets. To
extend these definitions of collateral to include these substitutes, we may define
collateral as an asset that a borrower agrees to forfeit in the event of loan default, or an
asset that has the qualities to enforce loan repayment (FAO, 1996:3).

To fulfill the above requirement, collateral should have certain attributes. These are:

- Appropriability - the ease of liquidation in the event of default by the lender.

- Absence of collateral-specific risks - it should have low risk or be properly insured.
- Accrual of the returns to the borrower during the loan period (Binswanger *et al*, 1986).
- Value - it should be valuable to both the borrower and lender.

In general, physical assets such as land and real estate are used as collateral. However, where the market environment renders most assets less acceptable as collateral or where borrowers possess few collateralisable assets, credit market participants employ a variety of collateral substitutes such as third party guarantees, threat of loss of future borrowing opportunities, tied contracts, loss of reputation and social ostracism.

3.4.6.1 *Role of collateral*[4]

The role of collateral in lending is discussed extensively in the literature on rural credit markets. The various theoretical models (Stiglitz & Weiss, 1981; Bester, 1985, 1987 and Plaut, 1985) have defined the functions of collateral as i) signaling and ii) enforcement functions.

The signaling function: In these models, borrowers with a low probability of default are projected to be more inclined to accept an increase in collateral requirements for a certain reduction in loan interest rates than those with a high probability of default. Borrowers therefore show their risk types by revealing their preferences between collateral and interest rates. Increases in collateral requirements always favour low risk borrowers over high risk borrowers and signalling costs are therefore larger for high risk borrowers. However, collateral fails to perform the signalling function in the presence of the following conditions (Devinney, 1986):

i)   If interest rates are sticky;

ii)   If the marginal collateralisation costs for high risk borrowers are less than for low risk borrowers so that they prefer to offer more collateral for a reduction in loan terms;

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[4]   *This section draws on the work of Nagarajan and Meyer, 1995.*

iii)   If low risk borrowers have less wealth that can be offered as collateral than high risk borrowers;

iv)   When lenders are not diligent in loan collection, high risk borrowers will be prepared to offer more collateral for lower interest with the hope that they can escape repayment and foreclosure of collateral; and

v)   In the presence of re-negotiations on loan extension and collateral foreclosing at the end of a contract.

The enforcement function: The theoretical models of enforcement rest on the assumption of a legal environment that facilitates loan enforcement and marketability of assets offered as collateral. The enforcement function is done by collateral either by reducing the lender's default loss or by making it costly for the borrower to default. It is therefore proposed that high-risk borrowers be made to offer more collateral for a given loan size than low risk borrowers.

3.3.6.2   *Collateral and its effects on credit availability*

If collateral is not practically enforceable in rural economies of developing countries one would expect the practice to vanish, or if collateral is used because of bureaucratic inertia, it would actually not affect lending decisions. Collateral affects i) loan size and loan quantity rationing, and ii) the interest rate charged (Bradford *et al*, 1996:795). There is sufficient evidence for this statement. A study done in India indicates that the probability of obtaining loans from formal lenders was determined by the amount and the form of the borrower's assets that have high collateral value, and by the borrower's personal characteristics. Increases in the borrower's wealth were also found to increase the likelihood of getting better loan terms and a larger loan size (Binswanger *et al*, 1986). Evidence from an econometric analysis of institutional credit supply and demand in Thailand indicates that the pledging of land collateral significantly increases the amount of credit offered by institutional lenders. It also reveals that farmers providing land collateral obtain more institutional credit than farmers providing a group guarantee or no security at all. Where land collateral is legal, institutional lenders prefer land collateral to other loan securities,. A study on 34 banks in the Philippines indicates that

the probability of quantity rationing by these banks is lower when the ratio of the value of the collateral offered to the loan size is large (Llanto & Dingcong, 1994).

There is an inverse relationship between collateral and interest rate. The higher the value of collateral, the lower the interest rates charged. A survey conducted in some Indian villages indicated that in informal markets the highest rates of interest were charged for loans without collateral. The next highest were loans secured with movable assets, while the lowest were charged for immovable assets. Binswanger *et al.* (1986) also found that formal lenders gave smaller size loans and charged higher interest rates for borrowers without collateral. However, they gave larger loans at lower interest rates to borrowers in good standing or with large amounts of collateral. The relationship between the collateral, loan size, loan quantity and interest rates depends on the following factors: i) limits on the assets available as collateral, ii) limits on loanable funds by lenders, iii) costs of collateralization, iv) the institutional environment, and v) the availability of markets to liquidate collateral in case of loan default (Nagarajan & Meyer, 1995:13).

3.3.6.3 *The use of land as collateral*

Land is the least risky collateral and it is more commonly used than other forms of security, except in places where legal inhibitions exist on mortgaging agricultural land. The utility of land collateral in rural areas depends on the extent to which the legal system as well as the socio-political environment enables actual foreclosure on agricultural land (Feder *et al*, 1988:233). In countries where property rights are clearly defined, foreclosure is easier to accomplish.

Some institutional lenders in areas where land is not acceptable collateral have used movalbe assets and crops. However, maintaining of these assets and crops has been very difficult.[5] Other tradable assets used are savings funds, guarantee funds, warehouse receipts and insurance policies. In some cases, collateral substitutes are used. These

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[5] *This is only feasible where you have legally bonded warehouses or grain elevators where stored crops can be monitored and ownership transferred easily. Without this institutional framework, crops are not a reliable collateral in the formal financial markets.*

include third party guarantees, group guarantees and reputation. The information asymmetry between lenders and their clients makes land the most suitable collateral to use. There is a lack of familial connection or long-term relationship between institutional lenders and borrowers. Because institutional lenders are heavily regulated, and in most cases have to abide by usury laws, which dictate a relatively low rate of interest, they cannot charge higher interest rates to compensate for the risk posed by other forms of collateral or collateral substitutes. Because land is less risky, it has been found in many studies that the pledging of land collateral increases the amount of institutional credit offered. For instance, in Thailand, it was found that institutional credit increased by 43 per cent (disequilibrium model) or 55 per cent (equilibrium model) as compared to a loan without security (see details in Feder *et al*, 1988:242). An efficiency loss is likely to result from a ban on land collateral as it will force lenders to spend more resources (at the margin) on the assessment of creditworthiness, less lending to farmers may take place as lenders shift funds to other borrowers who are less risky at the margin (Feder *et al*, 1988:243).

3.4.6.4   Conclusion

Inadequate conventional collateral, like land, often results in restricted access to institutional credit for rural borrowers. Formal lenders need to consider using assets other than land to help improve access to formal loans, as has been the case in the informal financial markets. Alternative collateral (collateral substitute) arrangements, which are more appropriate at the local level, should be applied. These in essence revolve around character-based collateral, referrals, linked contracts and building a relationship between borrowers and lenders (Coetzee *et al,* 1994). Trying to solve the problem of asymmetrical information persisting in the rural financial markets would also help to reduce the use of collateral in loan transactions.

3.4.7   Implications for policy

Special efforts to develop financial markets in Africa and other developing world deserve a high priority. Broader and deeper financial markets yield major gains by mobilising and intermediating savings more efficiently. At the micro-level, providing

secure and remunerative deposit facilities for storing liquidity and accumulating savings will generate direct utility gains. With improved access to finance, entrepreneurs can take advantage of income-generating opportunities, and smooth out income fluctuations (Bolnick, 1992:65). Policymakers should bear in mind that credit is a double-edged tool. While loans can accelerate the development of small enterprises, they can also be a fatal burden when used indiscreetly. The goal is, therefore, not only to extend credit to clients, but rather to make an efficient mix of competitive financial services - both deposits and loans - more widely available through financially sound formal, semi formal and informal institutions.

The non-financial policies and other dimensions of the environment (including the existing physical and institutional infrastructure) that influence the creditworthiness (profitable opportunities that create capacity to repay) and saving capacity of the rural clients are critical for the success of financial intermediaries. Some of the policies worth considering are: i) an emphasis on the importance of deposit mobilisation, ii) a shift in the focus for the evaluation of credit projects from the measurement of what happens at the borrower level to an assessment of the performance of the financial institutions, iii) an increased appreciation of the merits of (endogenous) informal arrangements and iv) the need to devote resources to the development of cost-effective financial technologies to reach marginal clientele (Gonzalez-Vega, 1993:22-23). Branches should be small. Decentralised decision-making should rule at the branch level. Performance based remuneration should prevail, based on criteria including profits, number of loans, loan recovery, and deposit mobilisation.

The successful reorientation of credit policy in the future requires an imaginative and experimental approach to institutional innovation. Rural credit provision needs to be located in the context of diverse institutions providing lots of different services, not a single bureaucracy providing just one kind of service. The few case studies of successful credit institutions show that devices like regular small savings collected on the doorstep, group lending and group accountability for loan repayment, and improved incentive and performance methods within financial institutions, provide potential ways forward.

3.4 A PARADIGM SHIFT: TOWARDS A NEW SOUTH AFRICAN DEVELOPMENT FINANCIAL SYSTEM[6]

The provision of financial services to the rural households in South Africa has to be seen against the backgroud of the past government intervention in the economy, that was characterised by distorted financial policies and institutional impediments. These interventions have resulted in a dualism in the rural and broader financial sector, with only a few South Africans enjoying a highly modern and sophisticated financial system that serves to provide a full range of financial services at the expense of the majority (Mohane *et al*, 2000:733). A lot of initiatives have been put into the rural financial markets to help address these imbalances. This section discusses the major features of the old paradigm of the South African rural financial market as well as providing a brief summary of the proposal put forward by the Strauss Commission (1996), to addresss the defects of the old system. Proposals regarding the requirements of a new South African development financial system is also presented.

3.4.1 The old development finance system

In response to some of the perceived market and government failures as well as the political and socio-economic objectives of the past, the previous government was instrumental in setting up an array of public utilities and development finance institutions, which made up the general development finance system (DFS). These included:

- Public utilities such as Telcom, Escom and Transnet on the national level, and a host of water boards/authorities, and broadcasting, electricity and transport corporations at the regional and provincial level.

- National development finance institutions such as the Industrial Development Corporation (IDC), the Development Bank of Southern Africa (DBSA), the

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[6] *This section draws on the work of Coetzee, 1997.*

Khula Enterprise Finance, the Land and Agricultural Bank and the National Housing Finance corporation.

- A host of development corporations and agricultural banks at the provincial levels.

The extent of the intervention has varied from indirect measures aimed at improving the policy environment (for example, by addressing incentive problems and regulating financial intermediaries) to direct steps to increase or supplant credit provided by the private sector. In South Africa, most of the government interventions still echo the supply led approach to rural finance. One other prominent feature of the South African DFS is the lack of a healthy partnership between the government and private sector organisations. The interventionist credit programmes have generally had a limited outreach (either in terms of location and services offered) and resulted in huge cost, with little identifiable impact at the small-scale farm level. Some of the other effects associated with the supply-led interventions have already been discussed in Section 2.

To address these imbalances and deficiences of previous policies, various policy documents from both the present government and financial institutions were formulated, which culminated in the establishment of the Strauss Commission to investigate and make recommendations to the government on the rural financial market in South Africa. A number of proposals were put forward by the Strauss Commission. Some of the proposals attended to the access problem and the expansion of retail financial services in the provinces. Others addressed the national level responsibility for providing capital and support to provincial level institutions. A further set of proposals aimed to structure national level support for rural finance retail institutions in the form of a Land Bank.

The crux of the Strauss Commission was the rejection of the supply-led system of rural credit. In place of this, the commission emphasised that a broad range of services should be made accessible within a demand driven system. It further emphasised the importance of a retail network in rural areas in achieving access to these services. The commission also argued that although subsidies are necessary, they should be

implemented within strict rules and be finite in nature. The discussions on the report are well documented in Coetzee (1997).

3.4.2   The new development finance system

The reports of the Strauss Commission (1996) provided a broad framework and a paradigm shift away from a supply-led approach. The implementation of this framework requires a realistic approach based on objectives to increase sustainability of institutions, while at the same time ensuring a development impact and wide as possible outreach. Specifically, functions of the DFS could be to: i) obtain and channel finance from international and local markets at relatively favourable terms; ii) serve as a conduit for international donor finance and grants from the state budget; iii) create project appraisal and credit-risk analysis capacity; iv) trigger private sector investment; v) build up core expertise; and vi) allocate resources in ways that promote overall socio-economic objectives.

Coetzee (1997) suggested that for the new DFS to achieve the desired impact, institutions at both the retail and wholesale level should fulfill certain requirements. These generic requirements include:

- Development/outreach capacity – This refers to resources of adequate scope and quality to execute the development objectives of the institutions. For financial institutions, they should have the ability to reach a large proportion of the total market in the areas of operation, while still being sustainable (Gurgand *et al*, 1996).

- Full financial self-sufficiency – This is an essential prerequisite for making financial services widely available to demanding clients. It is necessary that institutions be structured and financed in such a way that sustainability is achieved in the longer term. A three-stage process could be adopted to move these institutions towards the commercialization of institutions (Spio & Groenewald, 1998:174). The first step is to develop a cost-covering operation focusing primarily on lending; the second step begins with the expansion of

savings mobilization; and the third step is to move to full independence when concessional sources of finance are longer used and the institution becomes a genuine financial institution.

To facilitate the above objectives, Coetzee (1997), listed certain issues which needed to be considered. First, the government should concentrate on establishing a favourable policy environment that facilitates the smooth functioning of rural financial markets while playing a limited and efficient role in the direct provision of rural financial services. Second, efforts should be made to build up the capacity of the existing institutions, as well as to transform the existing institutional structures to serve the needs of the reconstruction and development process. In addition, the spirit of flexibility should be integral to both the application of sectorally and geographically based proposals on development funding and to the eventual functioning of the DFS. This is critical because of the dynamic nature of developments in South Africa. Third, there is the need to minimise both systemic and institutional risk. In order to promote the stability of the DFS, development finance institutions should preferably be structured to accommodate the spreading of risk over different types of clients, over different sectors and over different geographic areas. Again, sound management information system is most important for minimising institutional risk. Fourth, the DFS should be able to mobilise funds at lowest cost. The nature of the national development financial institutions should therefore allow for the most appropriate and low-cost deposit and financing options. Fifth, coordination of investment to achieve development should be applicable at all levels, including the policy, strategic planning and budgeting, and operational levels.

3.4.3   Conclusion

There is a dichotomous dimension to the challenge of supplying rural finance in South Africa. Finance has to contribute to the revitalization and sustenance of the commercial agricultural sector while simultaneously being a factor in the modernization and development of subsistence or an emerging sector. The optimal provision of financial services will ultimately depend on the successful development and integration of all levels of the financial system.

CHAPTER FOUR: BACKGROUND OF SMALL-SCALE FARMING IN SOUTH AFRICA

4.1   INTRODUCTION

The aim of this chapter is to present a brief overview of the small-scale farming sector in South Africa., as well as the environment under which these farmers operate. Issues discussed include past agricultural policies, accessibility of credit, productivity and efficiency of the small-scale farming sector. The background of the study area is also presented. It focuses on agriculture and land use patterns of the Limpopo Province and the two regions in which the study was undertaken. The chapter finally ends with discussions on two of the major lending institutions in the study areas.

4.2   AN OVERVIEW OF THE SMALL SCALE FARMING SECTOR IN SOUTH AFRICA

The South African agricultural economy is highly diversified. Structural imbalances exist between the commercial and developing sectors, within commercial agriculture and within developing agriculture. The commercial farming sector utilises 84,6 million ha, and exists along side with the subsistence-oriented farming sector which occupies nearly 14,4 million ha. Although each sector employs roughly the same number of people, the area cultivated by the commercial sector covers about six times that of the land under subsistence farming (DBSA, 2000).

The two agricultures share common problems such as the cost-price squeeze, inflation and drought. General problems experienced by small farmers include insecure and fragmented land rights, unviable and small farm units, overstocking and deterioration of land and general lack of support infrastructure, water supplies, transport infrastructure, financial support and extension and support services. Legislative policy and institutional developments have also been inequitable and have aggravated the plight of the small farmers. These problems have contributed to low levels of production and under-

utilisation of arable land resources, despite the relatively high agricultural potential of some of these areas (DBSA, 1994).

South Africa's agricultural policy has until recently had food self-sufficiency as a major objective (Rwelamira & Kleyahans, 1996:3). With growth in agricultural exports exceeding that of imports, South Africa has long experienced a comfortable surplus on the agricultural balance of payments. Despite this self-sufficiency, large inequities, inefficient food distribution network and high levels of malnutrition are experienced. South Africa is therefore characterised by surpluses and exports amidst food shortages - a situation of "hunger and malnutrition next to the granary" is therefore typical (Rwelamira & Kleyahans, 1996:3;Van Zyl & Kirsten 1992).

Access to finance is one of the most important building blocks on which economic growth and development is built, but access to financial service was almost non-existent for South African small-scale farmers. The cause is to be found in the combination of the aforementioned limitations, especially high risk, high transaction costs and low returns that have traditionally discouraged formal banks from dealing with small farmers with regard to credit. The informal financial market has contributed immensely to small farmer financing but with some limitations such as the offering of small amounts of loans and extremely high interest rates. There is, therefore, the need for sound financial policies to reduce these limitations and promote the financing of small-scale farmers by both sectors.

4.2.1   Output and efficiency in the small-scale farming sector

The output of small-scale, and particularly of subsistence agriculture is extremely difficult to measure. South African black farmers are no exception. The 1959-60 agricultural census recorded yields of 9.4 bags (852 kg) on white farms and of only 2.44 bags (221 kg) per hectare on black farms. Thus, the official figures for the 1950s and 1960s show yields as being 3 to 4 times higher on white farms. The limitation in the estimation of the output on the black farms was that the black people begin eating their maize in the soft dough stage and it is difficult to determine the percentage actually harvested as ripe grain. In addition, difficulties in determining plot sizes render estimates

in the former "homelands[7]" inaccurate. The census reported yields of black tenants on their arable plots on white farms as 562 kg per hectare. Kirsten *et al.* (1995) found the average yield of emerging maize farmers in KaNgwane (now part of Mpumalanga Province) to be 1.95 t\ha ,which compares favourably with the average yield of commercial farmers in certain parts of South Africa. Maize yields for the 1992\93 season in Phokane and Kadishi districts of Lebowa (now part of Limpopo Province) were 3.5 and 4.2 tons per hectare respectively (Kirsten *et al.*, 1995). The comparatively lower yields of the black small farmers could be attributed to a lack of access to inputs and finance.

At present, there is mixed evidence on the efficiency of small-scale farming in South Africa. A comparative efficiency of black, small farming versus white, large farming is very difficult to assess. More than a century of policy intervention (protecting the white commecial farming sector) has suppressed the profitability of black farming. The only areas where black farming was condoned were the homelands. Given their location, lack of infrastructure, and support services, generally poor soils, and extreme population pressure, it would be unfair to compare small-scale farming in the homelands with farming in the white areas (World Bank, 1994: 118). Nonetheless, a few cases exist in which black, small-scale farmers were given access to support structures roughly comparable to those of their white colleagues.

The two case studies in the tea and sugar-cane industries by Van Zyl and Vink (1992) serve to confirm the ability of black, small-scale farmers to equally or outperform larger, white farms when given similar treatment. In the tea industry, the case study illustrates that "mini-farming" (where an individual leases a small area planted to tea from a tea estate and is remunerated according to the quantity of acceptable tea produced) shows an increase in yields, income, and profitability of both the estate renting out the land and the mini-farmers. Compared to ordinary pluckers, mini-farmers obtained yields on their 0.5 hectares plots averaging 23% more than the large estate obtained. The same applies to the sugarcane case study in Mpumalanga. The case study reveals that on average

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[7]   *The term homeland refers to the geographical areas of South Africa demarcated before the institution of the present constitution as part of the previous*

small holders obtained 116,8 tons per ha on their plots of 7,1 ha, while on average, large scale farmers adjacent to these small holdings obtained 102,9 tons per ha on 68,6 ha, the average size of their farms. Total cost amounted to R3 286 per hectare for the black small holders and R3 448 per hectare for the white large scale farmers. These case studies and many others, confirm that with the same support structures, small-scale farming is at least as efficient as large scale farming in these specific areas and types of farming.

Theoretical models by Feder (1985) and Carter and Kalfayan (1989), demonstrate that the existence of market imperfections, which tend to favour large farms may negate the inverse relationship between farm size and productivity. Carter (1994) finds that certain financial market disadvantages may render small farms non-competitive. Hence, whereas the small scale farming strategy holds considerable promise from an efficiency perspective, this does not mean that its implementation is easy or can afford to ignore critical policy issues such as resolving the usual constraint on access to credit markets for small farmers. Much literature advises against too much modernisation, restructuring, mechanisation and other similar concepts, implying the use of more capital to labour than that dictated by economic realities.

4.2.2   Resource poor: Homelands farmers

The World Bank studies in South Africa in 1994 indicated among others that most of the traditional farmers did not use improved seed and fertiliser. The study also found that the small farms in Venda (now part of Limpopo province), which average only 1.15 ha to be too small to be viable. In most of the studies, land was found to be the main constraint, effectively limiting output for the vast majority of the farms, while at the other extreme, fertilizer was in surplus to requirements for a large number of farms. Most farmers in the former homelands are "resource poor". They lack the land, water, implements and management necessary to farm successfully. More often than not they live in marginal environments with poor soils, high levels of diseases and pests, low and unreliable rainfall, severe slopes, serious soil erosion and other natural problems. Since

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government'is policy of separate development/apartheid.

agricultural research has traditionally focused on the commercial farming sector, the technology for the resource poor areas has not been well developed. The national research agencies of the previous regime served the more prosperous farmers or concentrated their scarce resources on the areas that would give the greatest production, which are naturally the more productive areas (World Bank, 1994).

4.3   PERSPECTIVES FROM THE PROVINCE AND THE STUDY AREAS

The Limpopo Province is the fourth largest province in South Africa, both by area with 116 824 km^2 and by population of 4 929 368 for 1998. It has one of the highest population densities with 41.3 persons per km^2 when compared with the other South African Provinces. See Table 4.1 for the other socio-economic indicators.

Table 4. 1:   Socio-economic indicators

Indicators	Limpopo Province	South Africa	Limpopo Province/ South Africa (%)
Area (Km^2)	116 824	1 223 201	9.6
Population (1996)	4 929 000	40 583 000	12.15
Population growth, 1985-94 (%)	3.97	2.7	147.0
Functional urbanisation level, 1994 (%)	32.4	57.9	55.9
Literacy rate, 1991 (%)	73.64	82.16	89.6
Life expectancy, 1991 (years)	62.67	62.77	99.8
Human development index, 1991	0.47	0.677	69.4
Labour absorption capacity, 1993 (%)	40.3	50	80.6
Unemployment rate, 1994 (%)	47	32.6	144.0
Personal income per capita, 1994 (in rands)	2 288	8 418	27.2
GDP growth, 1980-91 (%)	6.6	1.3	507.7
Contribution to GDP, 1991 (%)	37	100	37
Real GGP per capita, 1991 (in rands)	2 133	6 438	33.1

Source: Department of Statistical Services, 1998

The Limpopo Province is mainly semi-arid with high rates of evaporation and an irregular incidence of rainfall during summer months. There are two areas of high rainfall - of up to 1000 mm per year or more, namely, the area east of the Drakensberg escarpment near Tzaneen and south of the Soutpansberg - near Louis Trichardt and Thohoyandou. These two areas are part of the study areas. The rainfall is drained by two major river systems, namely the Limpopo and Olifants. Because these rivers are utilised

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close to their ecological and economic limits, severe riverine degradation has already taken place. Table 4.2 presents the land use pattern of the province. Farmlands and grazing lands constitute the highest land use, 88.2 % and 74.0 % respectively.

Table 4.2:   Land use pattern in Limpopo province

Land use	Area in hectares	% of total area
Farm land	10,548,290	88.2
Potentially arable land	1,700,442	14.2
Grazing land	8,847,848	74.2
Nature conservation	1,161,600	9.7
Forestry	65,410	0.5
Others	185,300	1.5

Source: Abstract of Agricultural Statistics, 2001

Before the new dispensation in South Africa, virtually all farmers in the former homeland areas only had a "permission to occupy" certificate given to them by traditional authorities, which prevented them from using land as security (collateral) against which they may borrow money from financial institutions. However, with the current land reform programme, some farmers in the province have acquired title deeds to their land.

The Northern Region

The resource base of the Northern Region shares many characteristics with the adjacent Lowveld Region in being subtropical and part of the Lowveld ecosystem, and in the role played by mountain ranges. The main elements determining the agricultural and forestry resource base and potential of the Northern Region are the availability and reliability of water, the frost free and generally warm climate, and the suitability of soils for cultivation. Water for irrigation is by far the most critical constraint on agricultural production. The extreme heat during the summer months (causing high rates of evaporation), the general aridity of most soils in the area and the irregular incidence of rainfall over even the wetter areas, precludes extensive dryland cultivation.

A major threat to the agricultural and forestry potential of the Region is the high rural population densities in the Thohoyandou, Dzanani and Vuwanil districts (of between 100 and 200 people per square kilometre) and the extent of weakly planned and/or uncontrolled rural settlement patterns. The improved utilisation of limited water and irrigable land available, and the conservation of these resources are critical issues facing the agricultural and forestry industry of the Northern Region (cf. Urban Econ, 1997).

The Lowveld Region

The main elements determining the agricultural resource base of the Lowveld Region are similar to those found in the northern region. Water for irritation is by far the most critical constraint on agricultural production in the Region. The extreme heat during the summer months (causing high rates of evaporation) and the irregular incidence of rainfall during even normal rain seasons precludes extensive dryland cultivation over 90 percent of the land area. Water availability is the highest adjacent to the Drakensberg escarpment where conditions are more favourable for dryland cultivation and forestry, and along the main river courses of the Olifants and Letaba river basins and their ten most important tributaries - all of which flow in a more or less west/east direction towards the Kruger National Park and Mozambique (cf. Urban Econ, 1997).

4.4   FINANCIAL INSTITUTIONS OPERATING IN THE STUDY AREA

Most of the financial institutions in the province are involved in lending, providing technical assistance and advisory services, as well as project management. Some of the prominent ones are listed below.

1. Northern Province Development Corporation (NPDC)
2. Northern Investment Initiative (NII)
3. Agriculture and Rural Development Corporation (ARDC)
4. Land and Agricultural Bank of South Africa
5. PostBank
6. Commercial Banks
7. Co-operatives
8. Small loan industry

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9.   Non-Governmental Organisations (NGOs)

10.   Informal financial institutions

The two major financial institutions serving small-scale farmers in the study area at the time of study are discussed below.

4.4.1   Agricultural and Rural Development Corporation (ARDC)

The Agriculture and Rural Development Corporation (ARDC) was established on 1 April 1996 in terms of the Northern Province Corporation Act No. 5 of 1994. The ARDC is the development arm of the Northern Province Department of Agriculture Land and Environment, and is responsible for the initiating and facilitating of agricultural development and providing support to rural enterprises in the province. The ARDC serves as a conduit/facilitator of development assistance.

Support is provided to all farmers as per definition of the White Paper on Agriculture in South Africa. All farmers, irrespective of the size of their enterprise are supported. Preference is given to farmers who are not in a position to obtain assistance elsewhere. The different groups that are supported by the ARDC can be categorised as service centres; farmer associations; agricultural co-operatives; NGO's; community based organisations; emerging commercial farmers; and small-holder farmers.

The Agricultural and Rural Development Corporation (ARDC) offers three types of production loans. These are the short term (annual or seasonal), medium and long term loans. Some of the short term loans have a revolving facility element. With regards to production loans to small-scale farmers, security is not required. ARDC applies different interest rates for both the emerging and subsistence, and commercial farmers. The commercial farmers' interest rates are equivalent to that of the Land Bank's gold, silver and bronze categories. Due to poor management practices, limited outreach and high default rate of loans; ARDC is virtually non-functioning at the moment.

4.4.2   Land and Agricultural Bank of South Africa

The Land Bank provides funds to the agricultural co-operatives in the province which on-lend to the farmers to finance production credit. From branch level, the bank primarily serves commercial agriculture. The existing policies and rules of the Land Bank emphasise conventional approaches to collateral requirements and loan assessment procedures. However, the Land Bank is in a transformation phase. It has been proposed that the Land Bank should provide wholesale funds to provincial development banks to on-lend to small and emerging commercial farmers.

The Land Bank has neither the expertise and experience nor the capacity to provide financial services to small farmers on a retail basis. At the moment the bank has recruited expertise to take up its new role and it will take some time for it to actively pursue its new role. It follows that unless existing capacity is made more efficient at the provincial level, service delivery may be affected negatively (Coetzee, 1997).

4.5   CONCLUSION

Even though the province is considered to be the least developed province, it is endowed with greater agricultural potential. Accessibility of credit to farmers is skewly distributed with commercial farmers enjoying greater access. Indications are that formal financial institutions in the province lack the capacity to serve small-scale farmers. In addition, there is a limited number of informal financial institutions.

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CHAPTER FIVE: RESEARCH PROCEDURES, METHODOLOGY AND TECHNIQUES

5.1   INTRODUCTION

Cross-sectional data on 153 farmers in the study areas were used. The data were collected by means of personal interviews in a sample survey in 1998. Appendix 1 shows the location of the survey areas. The next section of this chapter discusses the sampling methodology and techniques used in collecting the data. Section three presents a review of theories on the econometric models used in the study.

5.2   SAMPLING METHODOLOGY AND TECHNIQUES

The population from which the data for this study was collected is farmers in the Lowveld and Northern Regions of the Limpopo Province. Simple random and stratified sampling was employed to obtain the sample of small scale/emerging farmers for the study. Stratified sampling was employed because of the low number of borrowers in the study area. A random sample of regions in the province was done to select two regions as primary units. These were the Lowveld Region and the Northern Region. Lists of borrowers were obtained from financial institutions and other related organisations in the two regions, in addition to the list of farmers. At this stage, a stratified sampling was employed to select borrowers and non-borrowers for the study.

Three factors were considered in deciding on the size of the sample.

- The degree of precision required between the sample population and the general population[8].
- The variability of the population.

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[8]   *In deriving the number of farmers to be used for the study, 95% confidence level with a sample precision of ±0.05 was used. Past research done by Mokoena et al, (1997) indicates that 29% of small-scale farmers are borrowers.*

- The method of sampling.

Taking cost considerations and the above factors into account, a sample of 153 farmers was interviewed using a structured questionnaire. Of the 153 households sampled, 45 were borrowers and 108 were non-borrowers. The regional distribution is presented in Table 5.1.

Table 5.1:   Distribution of borrowers and non-borrowers

Region	Borrowers	Non-borrowers	Total
Lowveld Region	25	65	90
Northern Region	20	43	63
Total	45	108	153

The information collected in the survey included data on household demographics, land tenure, agricultural production, livestock ownership, asset ownership, and credit and savings. The agricultural data covers the 1998/99 season. Control questions were included in the questionnaire to verify the consistency of the answers given by the respondents on various questions. In addition, the enumerators were instructed to use other control questions not included in the questionnaire whenever there seemed to be inconsistencies in a respondent's answers. A good deal of time was further spent in the field and in the office checking the consistency of answers to the questions.

5.3   MODEL SPECIFICATION

Two econometric frameworks are described in this section. The impact of credit on small-scale farmers in the Limpopo Province is estimated using an endogenous switching regression model patterned after the models of Maddala 1986 and Quandt (1973). Variants of the model have been used by Freeman *et al* (1998); Sail & Carter (1996) and Lapar *et al* (1995). The second econometric model is the logistic regression, which is used to locate and assess the factors limiting small-scale farmer's acess to institutional credit. Tabular analysis on the differential access to credit among small-scale farmers is also presented.

5.3.1 Switching regression: Measurement of the impact of credit and its shadow price

While credit interventions and credit market liberalisation policies have been justified on the grounds of lack of access to credit, the impact of improved credit access on agricultural production is only weakly understood because of identification problems which hamper the measurement and estimation of credit effects (Carter, 1989:13). Some studies (Taylor *et al,* 1986; Garg *et al*, 1977, among others) attempt to identify the effects of credit by estimating separate production functions for borrowers and non-borrowers and then proceed to compare the estimates. One of the weaknesses in this approach is the implicit assumption that all borrowers and non-borrowers are, respectively, homogenous with respect to their credit demand/supply situations. This assumption is often not valid, since many actually have sufficient liquidity from their own resources. These farmers may not need credit and it cannot automatically be assumed that they cannot obtain credit. Others cannot borrow because they are not creditworthy. Similarly, the marginal effect of credit may actually be zero for borrowers (Feder *et al.*, 1990:1151).

David and Meyer (1980), pointed out that empirical problems may arise from the likely heterogeneity of credit recipients and non-recipients, and this can affect the true credit effect. This method cannot identify what proportion of the differences in productivity is due to differential credit access and what proportion is the result of other characteristics, which systematically differ between recipients and non recipients. The two groups potentially differ in terms of their:

1. observable characteristics such as endowments of land and market access;

2. unobservable characteristics such as endowments of farming; and entrepreneurial skills (Carter, 1989:15).

Carter (1989:16) pointed out that because of their potential differences in endowments, there are four competing (but not mutually exclusive) explanations of the descriptive

statistical association between credit and farm productivity. The association may reflect a true credit effect if credit actually enhances the productivity of either observable or unobservable endowments. Alternatively, the association may reflect spurious correlation induced by the fact that credit recipients enjoy more favourable endowments of either observable or unobservable characteristics, and would exhibit the observed higher productivity even in the absence of credit. Fungibility contributes to the difficulty in obtaining a precise measure of the additional effect of credit.

While credit will in general enhance the opportunities of those who use it, it is very likely that credit recipients would still be performing better than non-recipients, even without credit, because the former may have better inherent characteristics than the latter. It is therefore very important to isolate the effect of credit on productivity from the effects of inherent characteristics of the farmer and farm (Lapar *et al*, 1995; Carter, 1989).

According to Lapar *et al* (1995:2) descriptive statistics often show differences in the average performance of borrowers and non-borrowers but do not measure the proportion of difference attributable to borrowing alone. In an effort to resolve this problem of attribute, some studies (Schultz, 1975, Taylor *et al*, 1986; Rana & Young, 1988) have estimated the effect of credit through single equation econometric models, which control for the influences of other productivity relevant variables which correlate with credit (Sial & Carter, 1996:776). According to Sial and Carter (1996:776), the reliability of such econometric efforts to resolve the attribution problem depends on the ability to measure and control all systematic differences between borrowing and non-borrowing farms and farmers. To them, one reason for questioning the adequacy of these efforts is the likely positive relationship between credit use and factors that are difficult to measure such as entrepreneurial ability, technical know-how and soil quality. They further argue that in the presence of latent factors correlated with credit, inference from a single equation - OLS approach would be subject to the same bias that confronts unconditional descriptive statistical analysis.

In addition to the identification problem, the potential heterogeneity of individual farmers raises further questions about the measurement of credit's effects. What is the

appropriate measure of credit's impact on productivity – i.e. for what type of individual should the productivity effect of credit be defined? For an individual selected at random from the population at large? For an average individual who is a borrower? Or perhaps for the type of individual who is a non-borrower?

In other words, the heterogeneity of individual small-scale farmers implies that credit may have a different impact for the different kinds of small-scale farmers. Following Sial and Carter (1996) and Carter (1989), the following credit effect measures are used in the analysis:

- Random credit effect measure: It determines the effect that credit would have were it given to an individual selected at random from the overall population of small-scale farmers. The expected value of the latent attributes is zero for such an individual. This type of credit effect measure is appropriate for estimating the output supply effects of a generalised loan programme, which managed to break the extant credit allocation regime and achieve a widespread credit allocation.

- Conditional or counterfactual credit effect: it compares the output anticipated by an individual under his/her actual credit status with the output level which would be anticipated for the same individual were he or she observed in their counterfactual state. In other words, the counterfactual credit effect indicates the impact of credit on the output of individuals who choose to be or not to be borrowers. Counterfactual measures are like before and after comparisons. For instance, it can be used to estimate the potential output of a non-borrower when credit is used. Likewise, it can estimate the expected output of a borrower under conditions of no credit use.

- Marginal credit effect: Evaluated at zero loan size, it gives the shadow price of capital in the absence of credit. A shadow price above $1+r$ (r is interest rate) implies that working capital is a binding constraint on small farm profit maximisation, and that non-borrowers are credit constrained to the extent that an additional unit of loan would result in more than a unit increase in output. The marginal credit effect evaluated at average loan size gives an indication of the optimality of loan size.

The econometric framework used to define and measure the impact of credit follows Freeman *et al* (1998); Sial & Carter (1996); Feder *et al* (1990) and Carter (1989). An econometric model that takes into account the non-random sorting of the sample between borrowers and non-borrowers is used to segregate the impact of credit from the impact of latent and observable characteristics of borrowers and non-borrowers. An endogenous switching regression model is used to structure and resolve underlying identification problems (Madalla, 1983:223-228). This approach is an improvement over the conventional use of OLS in estimating the outcome supply equation and deriving credit effects from the estimated coefficients. By correcting for selection bias, this econometric approach yields consistent and unbiased estimates of the parameters.

5.3.1.1 *Development of econometric framework for measuring the impact of credit*

Let the anticipated output supply (P) be defined as a function of loan size "L" and other characteristics. Thus, the analysis is built on the function P = f (L+ other characteristics).

The anticipated output values for individual "i" can be written according to one of the two production regimes.

$$P_i \quad = \quad P_{ic} = (\beta_c{}^i Z_i + \alpha l_i) + (V_{ic} + \varepsilon_{ic}), \text{ if individual 'i' receives loan}$$

$$P_{in} = (\beta_n{}^i Z_i) + (V_{in} + \varepsilon_{in}), \text{ otherwise} . \tag{1}$$

In this switching regressions specification, the base regime, denoted with a subscript "n" applies when the individual does not receive a loan. The second regime, denoted with a subscript "c" applies when the individual receives a loan. The right hand side variables are partitioned into those which are observed and those which are not. The observable variables are Z_i and l_i. Where l_i is a quadratic expression of the loan amount L. The function αl_i gives the impact of loans on output supply and is a non- linear function of L_i which admits diminishing returns to L. The vector Z_l includes market conditions, prices and resources.

The parameters β_k (k = n,c) give the impact of the observable variables on output supply, and are allow to vary between the two regimes in (1) to allow for the possibility

that relaxing financial constraints may permit an individual to earn large returns from a given market opportunity and level of fixed factors. The latent variables are divided into those known to individual 'i' (the V_{ik}) and those which are not (ε_{ik}). The terms V_{ik} (k = c,n) give the impact on output supply of intrinsic farm and farmer attributes such as farming skill and managerial ability. Without loss of generality, it can be assumed that this latent variable is scaled to have a zero mean for an individual selected at random from the overall small farm production of both borrowers and non-borrowers $\varepsilon (V_{ik}) = 0$. The ε_{ik} terms denote conventional, unanticipated random supply shocks, which are unknown to the individual at the time the production decision is made. It is assumed that $E (V_{ik}) = 0$.

Sorting borrowers and non- borrowers into the two regimes involves the decision of the individual to apply for a loan and the decision of the lender to make a loan. This implies two selection criteria functions: the individual decision, whether or not to apply for a loan, and the lender's decision, whether or not to grant the loan. The analysis of model which depends critically on whether the two decisions are independent or correlated, is whether or not the covariance of the error terms in the two criterion functions are zero. If the covariance is zero, implying independence, then the estimation of the parameters of the model is feasible and tractable. However, if the covariance is not zero, implying non-independence, which in the case of borrower and lender decisions is a realistic assumption, the estimation becomes more difficult because the expression of the expected values of the error terms get messy. To go around this messy situation, the bivariate probit method is used if information about the decision making process of the lenders is available.

In the analysis, because of the unavailability of information about lenders' decision-making processes, a second best approach is used. A single probit equation, which is an approximation of the two-probit equation is used. The single probit equation, which includes factors effecting the individual's side aw well as on the borrowers' side is used to infer lender behaviour. Thus, a self-selection approach is used to model credit allocation here, although admission of bank rationing criteria would not alter the analysis.

Credit status can be represented by the binary variable L_i, which equals one if individual "i" has credit and equals zero otherwise. L_i can be modelled as a result of a latent credit access variable L, which is scaled such that an individual becomes a borrower when $L > 0$. The L is the sum of orthogonal components:

One component systematically related to observable variables, and a second component known to the individual but which is unobserved by the econometrician.

$$L = \gamma^i x_i + \eta_I \tag{2}$$

Where X_I is a vector of variables which influence loan amount, γ is a vector of parameters and η_I is an error component reflecting random and latent factors which influence the loan amount. The observed loan amount, L_i is truncated at zero such that.

$$L_i = \quad 1, \text{ if } L \; \gamma^i x_i + \eta_I > 0 \text{ or } \eta_I > - \gamma^i x_i$$
$$0, \text{ if otherwise} \tag{3}$$

Equation (3) defines the sorting of individuals into borrowers and non-borrowers as a probit process. The expected output supply conditional on the endogenous sample separation process and observable characteristics can be written as:

$$E(P_{ic}|L_I = 1) = \beta c^i Z_i + \alpha l_i + E(V_{ic}|Li = 1) \tag{4a}$$

$$E(P_{in}|L_i = 0) = \beta_n^i Z_i + E(V_{in}|Li = 0) \tag{4b}$$

Where the notation indicating conditioning on observable factor Z has been suppressed. The conditional expectations on the right hand sides of (4a) and (4b) can be rewritten as follows:

$$E(V_{ic}|D_i = 1 \quad = E(V_{ic}|\eta_I = - \gamma x_i \tag{5a}$$

$$E(V_{in}|D_i = 0 \quad = E(V_{in}|\eta_I = - \gamma x_i. \tag{5b}$$

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The problem of intrinsic productivity differences between borrowers and non-borrowers can be clearly seen in (5). If latent productivity attributes are systematically related to credit status, then the conditional expectations in (5) will be zero. For example, an individual with greater skill is likely to realise larger output supply (via V_{ic}) as well have higher probability of obtaining credit under non-random sorting (via η_l) implying that $E(V_{ic}|L_i = 1) > 0$ in the borrowers subsample. OLS estimate of the output supply function under these circumstances, will yield inconsistent estimates of the structural parameters, attributing the direct output effects of latent individual skill to the observed loan amount with which it is correlated. However, OLS gives the best linear estimate of the (gross) output supply gap between non-randomly sorted borrowers and non-borrowers.

This gross output supply gap can be written as:

$$E(P_{ic}|\,V_{ic}) - E(P_{in}|\,V_{in}) = \delta^i Z_i + \alpha l_i + E(V_{ic}|\,Li = 1) - E(V_{in}|\,L_i = 1) \qquad (6)$$

where

$$\delta^i = (\beta_c - \beta_n)$$

The problem of non-random sorting which underlies the inconsistency of OLS fortunately suggests a resolution of the estimation problems. The Problematic correlation between the V_l and Π_l indicates that the latter in fact provides information on the latent variable V_i. By using that information to control for the latent characteristics, V_{ic} and V_{in}, the parameters of interest can be consistently estimate. By assuming that the error vector $(V_{ic,}\ V_{in,}\ \eta_l)$ is multivariate normally distributed with zero expectations and positive definite covariance matrix, a full endogenous switching regressions system can be written as :

$$L_i = \quad 1, \text{ if } \eta_l > -\gamma^i x_i$$
$$0, \text{ if otherwise} \qquad (7a)$$

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$$E(P_{ic}|L_i = 1) = \beta_c^i Z_i + \alpha l_i + \rho_c \lambda_i^c \qquad \text{(7b)}$$

$$E(P_{in}|L_i = 0) = \beta_n^i Z_i + \rho_n \lambda_i^n \qquad \text{(7c)}$$

where:

$\rho_c = \text{Cov}(V_{ic}, \eta_I)/\text{Var}(\eta_I)$ and $\rho_n = \text{Cov}(V_{in}, \eta_I)/\text{Var}(\eta_I)$ are population regression coefficients relating to the V_{ic} and V_{in}, respectively.

$\lambda_i^c = \phi(\phi_i)/\varphi(\phi_i)$ and $\lambda_i^n = \phi(\phi_i)/1-\varphi(\phi_I)$ are the estimates of η_I given borrower type and $\phi_i = \gamma^i x_i/\text{Var}\eta_I$; $\phi(.)/\varphi(.)$ are the standard normal density and cumulative distribution functions, respectively.

A two-steps Heckman procedure is used to estimate the parameters of this system Maximum likelihood methods can also be used. After using a first stage probit estimate of ϕ to contract $\lambda_i^c(\phi_i)$ and a $\lambda_i^n(\phi_i)$, consistent estimates of β and δ^i may be obtained through separated OLS regressions of the two conditional output supply functions in (7a) and (7b)

Alternatively, the following expression can be utilised to define a single regression function easing hypothesis testing.

$$E(P_i) = E(P_i|L_i = 1) \, \text{Prob}(L_i = 1) + E(P_i|L_i = 0) \, \text{Prob}(L_i = 0) \qquad \text{(8)}$$

Substituting from (7) above, equation (8) can be rewritten as:

$$E(P_i) = \beta_c^i Z_i + \delta^i [\varphi(\phi_i)Z_i] + \alpha [\varphi(\phi_i)l_i] + (\rho_c - \rho_n) \phi(\phi_i) \qquad \text{(9)}$$

The parameters of (9) can be consistently estimated by doing OLS on the entire sample using first stage probit estimates of ϕ to contract $\varphi(\phi_I)$ and $\phi(\phi_i)$ for use as regressors (See Madalla, 1983). The specification in (9) allows for the estimation of direct credit effects parameters, the α and the indirect credit effect parameters, the δ^i and the $(\rho_c - \rho_n)$.

While the direct effect parameters give the increase in output supply due to the use of loans, the indirect credit effects represent the additional returns to observable and unobservable endowments when credit is used. If the loans do not enhance the return to other factors, i.e., both δ^i and $(\rho_c - \rho_n)$ are equal to zero, then (9) reduces to the following equation:

$$E(Pi) = \beta_c{}^i Z_i + \alpha[\varphi(\cent_i)l_i]$$
(10)

Equation (10) is a restricted form of (9), where credit has only direct effects, but these effects still cannot be estimated using OLS given the non-random sorting of individuals between production regimes.

Figure 5.1 shows alternative relationships which may exist between credit, L, and output supply with credit, P_i . The dotted line in figure 5.1 has a slope equal to $1 + r$, where r denotes the opportunity cost of capital. If the financial market inefficiency hypothesis is correct, then the slope of the output supply function should exceed $1 + r$ when L = 0, indicating that the additional output obtainable with an incremental increase in credit exceeds the full repayment cost of the loan.
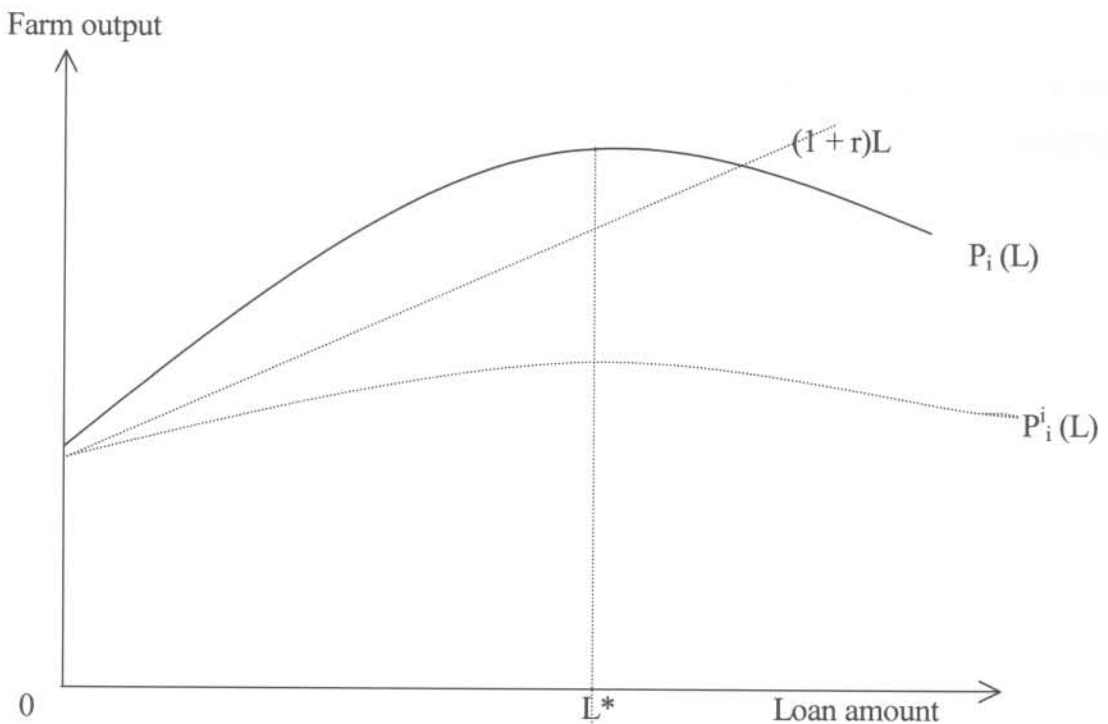
Figure 4. 1:   Hypothetical impact of credit on farm output

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The solid line labeled P_i (L) in the figure shows this possibility. The slope of the output supply function is equal to one plus the shadow price of the loan. Assuming diminishing returns to credit, there exist a loan size "L*" beyond which marginal returns fall below 1 + r. A loan larger than L* (used to purchase additional inputs) would decrease net income as each additional rand borrowed would produce less than 1 + r rands in increased output. Beyond loan size "L*", credit would no longer be a binding constraint on farm net income maximisation at interest rate r.

If the financial market inefficiency hypothesis is incorrect, and farmers are not general credit constrained, then one of two possibilities would describe the function shown in Figure 5.1. First, the output supply function would be completely flat if individuals who obtain credit do something with it other than investing it in agricultural production. Second, individuals could invest the loan in agricultural production despite obtaining marginal returns less than the full repayment cost of credit. While output would increase with loan size in this case, net farm income would decrease if loans were repaid in full. The dashed curve P_i (L) in the figure illustrates this latter possibility.

Definitions of credit measures

- Average or random credit effect-measures the impact credit would have on the productivity of a bundle of resources when farmed by an average individual selected at random from the overall population of individuals.

$$E(Pic\text{-}Pin) = [\beta_c{}^i Z_i + \alpha l_I + E(V_i|L_i > 0)] \text{ - } = [\beta_n{}^i Z_i + E(V_i|L_i < 0)]$$
$$= \delta^i Z_i + \alpha l_i \qquad (11)$$

- Conditional or counterfactual credit effect - compares the output anticipated by an individual under the actual credit status with the output level that would be anticipated by the same individual in the counterfactual status.

$$E(P_{ic}|L_i = 1) \text{ - } E(P_{in}|L_i = 1)$$
$$= [\beta_c{}^i Z_i + \alpha l_I + E(V_{ic}|L_i = 1] \text{ - } = [\beta_n{}^i Z_i + E(V_{in}|L_i = 1)]$$

$$= \delta^i Z_i + (\rho_c - \rho_n)\lambda_i^c + \alpha l_i \ldots\ldots\ldots\text{Borrower} \tag{12a}$$

$$E(P_{ic}|L_i = 0) - E(P_{in}|L_i = 0)$$

$$= [\beta_c^i Z_i + \alpha l_l + E(V_{ic}|L_i = 0] - =[\ \beta_n^i Z_i + E(V_{in}|L_i = 0)]$$

$$= \delta^i Z_i + (\rho_c - \rho_n)\lambda_i^n + \alpha l_l \ldots.\text{Non-borrower} \tag{12b}$$

- Marginal credit effect- Using equation (a) or (10) the partial derivative of output with respect to loan amount defines the marginal credit effect.

$$\partial E(P_i|L_i)/ \partial L_i = \alpha_1 + 2\alpha_2 \, l_i \, [\varphi(\cent_i)] \tag{13}$$

Evaluation of (13) at $L = 0$ gives the shadow price of capital in the absence of a credit programme A shadow prices above $1 + r$ implies that working capital is a binding constraint to small farm profit maximisation and hence provides a justification for credit or other intervention.

Evaluation of (13) at the average loan size renders some insight into the optimality of loan size under the existing credit programme. In addition, while the marginal effects of targeted credit speak to the efficiency of rural financial markets, measures of the total credit effects on output provide insight into the loan programme's economic impact.

5.3.1.2 *Data specifications*

The two stage switching regression model applied in this study uses a probit model in the first stage to determine the relationship between farmers' credit constrained condition and a number of socio-economic and credit variables. In the second stage, separate regression equations are used to model the production behaviour of groups of farmers, conditioned on a specified criterion function. Both the credit status and productivity could be influenced by different explanatory variables. The definitions of these variables and their hypothesized influences on credit status are presented in Table 5.2.

Table 5. 2:   Data Specifications: Credit Status Equation (Probit)

VARIABLE	A PRIORI EXPECTATIONS
Dependent variable: **Credit Status** 1 = Access to loan, 0 = Otherwise.	-
INDEPENDENT VARIABLES	
Age of the household head in years	Age is posited to negatively affect the probability of being a borrower and hence, the loan size, in so far as older farmers may not be as active as younger ones in their farm activities.
Farm income (previous year)	Farm income is posited to negatively affect the probability of being a borrower and hence the loan size. Its sign is expected to be negative.
Non-farm income (previous years)	Non-Farm income is posited to negatively affect the probability of being a borrower and hence the loan size. Its sign is expected to be negative.
Financial assets (savings)	Financial assets (savings) - the sign for savings is indeterminate. It may either influence the lender to grant a loan to the borrower or will make borrowers use its their savings instead of a loan.
Remittances and pension	Remittances and pensions is posited to negatively affect the probability of being a borrower and hence the loan size. Its sign is expected to be negative.
Farm size in hectares	Farm size is posited to positively affect the amount of the loan as there is a greater need for variable cash inputs, and it is expected to increase capital access.
Family labour stock (members involved in farming)	Family labour stock and household size are hypothesised to reduce the amount borrowed because farms with large numbers of family workers might substitute labour for cash inputs.
Land ownership (Dummy: 1 if have title deeds, 0 if others)	Tenure - ownership, as opposed to rental and other forms of access to land is expected to increase the long run investment incentives and the collateral value of the land to lenders.
Regional Variables: (Dummy): 1 if Northern region 0 if Lowveld region	Its sign is indeterminate
Gender (Dummy: 1 if male, 0 if female)	Male are expected to have greater access to credit than female, hence its sign is expected to be positive
Education (Dummy variables) E1 E2 Level 1(no education to Standard 5) 1 0 Level 2 (Standards 6 – 10) 0 1 Level 3 (Above Standard 10) 0 0	Education- higher levels of education imply better technical know-how and farming skills, more information on markets and facilities provided by financial institutions. The coefficient is expected to be positive.
Repayment (Dummy Variable): R1 R2 i) Used credit, with good Record repayment 1 0 ii) Used credit with poor Record repayment 0 1 iii) Never use credit 0 0	Repayment record – It hypothesised that farmers who have repaid back their previous loans are usually perceived to be good clients and are provided with more credit in the following season. Hence, it will affect borrowing positively

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Output Supply Equation

The dependent variable in the second stage regression is the log of total output value per hectare. All other continuous explanatory variables were expressed in logs. Expressing the dependent and continuous explanatory variables in logs provides dimension to measure the responsiveness of productivity to changes in input use. Since the coefficients of the regression equations are estimates of partial production elasticities, the larger the coefficient the higher the response of productivity to marginal changes in input use. Negative coefficients indicate that productivity actually declines as the level of input increases (Freeman *et al*, 1998:38). A quadratic form of the variable loan amount is included to account for the direct effect of credit on output (Sial & Carter, 1996; Lapar *et a*, 1995). The second stage regression did not include a farmers loan repayment records. The maintained hypothesis is that this variable is not likely to directly influenced output level. The definitions of these variables and their hypothesized influences on productivity are presented in Table 5.3.

5.4.2   Analysis of factors limiting small farmers' access to formal credit

The financial constraints on small farmers in applying modern technology optimally arises from their low level of income, as well as lack of savings. The only option left is to borrow from either the formal or informal credit sources or use meagre social benefits (such as pensions). Apart from the hypothesis that access to credit to small farmers is limited, it is also hypothesed that within the small farmer's group, farmers with bigger farms are relatively well off in terms of access to credit, thus, resulting in differential access to formal credit. In analysing differential access to credit among small farmers, the survey sample was divided into two sub-groups, i) operational holdings less than to 2 hectares and ii) those with operational holdings of 2 hectares or more. In addition, the whole sample was further divided into smaller sub-groups. The sub-groups are:

Group A: ≤ 1 ha.

Group B: 1.01 - 2 ha.

Group C: 2.01 - 3 ha

Group D: 3.01 - 4 ha

Group E: > 4 ha.

Table 5. 3:   Data specifications: Output supply equation

VARIABLE	A PRIORI EXPECTATIONS
Dependent variable: Output value	-
INDEPENDENT VARIABLES	
Age of the household head in years	Age – the number of years that a farmer has acted as a farm manager is expected to increase productivity.
Extension (Dummy): 1 if received extension services, o if otherwise	Extension contacts – extension agents in the rural areas have long been a strong arm in enforcing the adoption of innovations by farmers. All things being equal, extension contracts are expected to increase productivity.
Value of fertilizer used/ha (in rands)	Expenditure on variable inputs (seeds, fertilizer and other inputs) – It is hypothesised that farmers with relatively high expenditure on variable inputs are more likely to practice better management involving, among other things, the use of improved inputs.
Labour input/ha (in mandays)	Its sign is expected to be positive
Remittances and pension	Remittances and pensions is expected to affect productivity positively.
Amount of seeds used/ha (in rands)	This variable is expected to affect productivity positively.
Family labour stock (members involved in farming)	Family labour stock – the number of working age adults in the household represents fixed endowments, which will affect productivity positively.
Land ownership (Dummy: 1 if have title deeds, 0 if others)	Land ownership – possession of a legal title increases ownership security, and thereby increases the incentive to invest, which affects productivity positively.
Regional Variables: (Dummy): 1 if Northern region 0 if Lowveld region	Its sign is indeterminate
Gender (Dummy: 1 if male, 0 if female)	Its sign is indeterminate
Education (Dummy variables) E1 E2 Level 1(no education to Standard 5) 1 0 Level 2 (Standards 6 – 10) 0 1 Level 3 (Above Standard 10 0 0	Education – the number of years of formal schooling is an indicator of human capital, which positively affects efficiency.
Value of other inputs used	Input used is expected to affect productivity positively.
Amount of loan (in rands)	-
Loan amount square	-
PDC (probability density function or $\varphi(C)$ in the model	-
Interaction terms of variables and CDF (cumulative density function or $\phi(C)$ in the model)	-

Following Amjad (1993), indicators of small farmers' access to formal credit, and factors affecting this were calculated in the following ways:

i)   The proportion of formal credit received by a particular group to the total formal credit extended.

ii)   By calculating access ratios, determined by the number or amount of loans extended to a particular group and the share of that group in the total sample or the total cultivated area. If the ratio equals one, the group has an average access to formal credit. Any number greater than one means above average access and if it is less than one, then below average access.

The ratios are calculated as follows:

$$Ratio\ 1 = \frac{\text{Proportion of credit (number) received by the group to total formal credit}}{\text{Proportion of that group in the total sample households}}$$

$$Ratio\ 2 = \frac{\text{Proportion of credit (amount) received by the group to total formal credit}}{\text{Proportion of area operated by the group to total area operated}}$$

iii)   Logistic regression analysis was used to locate and assess the factors limiting small farmers' access to institutional credit.

According to Hair et al. (1998:276), logistic regression (logit model) and discriminant analysis are the appropriate statistical techniques when the dependent varaible is categorical (nominal or nonmetric) and the independent variables are metric. In this study logistic regression is used[9]. According to Hair et al. (1998:314), there are several reasons why logistic regression is an attractive alternative to discriminant analysis whenever the dependent variable has only two categories. Discriminant analysis is more appropriate when the dependent variable is nonmetric. However, when the dependent variable has only two groups, logistic regression may be preferred for several reasons.

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[9]   A similar type of analysis has been done by Adugna & Heidhues (2000) for Lume district in Ethiopia; Amjad (1993) for formal credit in North West Frontier Province in Pakistan; Anderson (1990) for Brazilian formal credit for small farmers and Sarap (1990) for rural Orissa in India.

First, discriminant analysis relies on strictly meeting the assumption of multivariate normality and equal variance – covariance matrices across groups – assumptions that are not met in many situations. Logistic regression does not face these strict assumptions and is more robust when these assumptions are not met, making its application appropriate in many situations. Second, logistic regression can handle categorical independent variables easily, whereas in discriminant analysis the use of dummy variables creates problems with the variance/covariance equalities.   Finally, logistic regression results parallel those of multiple regression in terms of their interpretation and the casewise diagnostic measures available for examining residuals.

The use or non-use of formal credit sources is therefore explained with the help of household characteristics using logistic regression analysis. In logistic regression one can directly estimate the probability of an event occurring. This analysis predicts whether an event will or will not occur and identifies the variables useful in making this prediction.

Accordingly, a farm household has either borrowed ($Y = 1$) or not ($Y = 0$) during the year in which the farm survey was carried out. The explanation of this binary variable requires the construction of a probability model that links it to a vector of factors, X (Greene, 1993). The probability of borrowing decision can then be expressed as:

$$\text{Prob}(Y = 1) = F\,(\text{ß' X}) \tag{1}$$

Where ß refers to the vector of parameters that reflect the impact of changes in X on the probability of borrowing decision. The choice of a particular form for the right hand side of the equation (1) leads to an empirical model. Adopting the logit analysis, the probability that a farm household makes a decision to borrow from formal sources is a regression model given by:

$$\text{Prob }(Y=1) = \frac{e^{(\text{ß' X})}}{1 + e^{(\text{ß' X})}} \tag{2}$$

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Using equation (2) the probability of borrowing decision could be written as:

$$\text{Prob } (Y=1) = \frac{1}{1+e^{-(\beta' X)}} \tag{3}$$

Equation (3) is a logistic cumulative distribution function where:

$$\beta' X = \beta_o + \Sigma\beta_i X_i = v_i \tag{4}$$

Where:

$e =$ the natural logarithm

$\beta_o =$ the constant term

$\beta_1 =$ the vector of coefficient

$X_i =$ the vector of explanatory variables, and

$V_i =$ the error term

The estimation of equation (4) using the maximum likelihood method helps to identify statistically significant explanatory variables. In the preceding discussions, a list of factors was identified that influenced accessibility of credit for small-scale farmers. Some of these factors are used in the analysis. It is hypothesised that borrowing from formal sources can depend upon total operated area; tenurial status; family labour; literacy status and age of the head of household; farm income; savings; awareness of formal institution, repayment records; and off-farm income. These characteristics are important in two ways:

a) they can influence the household demand for credit: and

b) potential lenders are likely to base their assessment of borrowers' creditworthiness on these characteristics.

It is difficult to completely separate the variables affecting either demand or access because decision making at both stages is based on almost similar considerations. Therefore, certain variables included in this regression are more related to small-scale

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farmers' demand for rather than access to formal credit. These include: age, farm income, sex of household head, and off-farm income. The data specifications are presented in Table 5.4.

Table 5. 4:   Data Specifications: Credit Status Equation (logistic)

VARIABLE	A PRIORI EXPECTATIONS
Dependent variable: 1 = Access to loan, 0 = Otherwise.	
Independent Variables	
Age of the household head in years	Age of the head of the household is expected to have a negative effect, as comparatively young farmers are supposed to be more active in their farm activities.
Farm income (previous year)	The effect of farm income is indeterminate. A high farm income may reduce the demand for credit needed. On the other hand, it may make the farmer more creditworthy and in some cases, create a demand to expand production.
Non-farm income (previous years)	Non-farm income is assumed to reduce demand for credit and can be used to purchase cash inputs for production and/or even out consumption at times of need.
Financial assets (savings)	The sign for savings is indeterminate; it can influence the supply and demand size differently.
Remittances and pension	Remittances and pensions is assumed to reduce demand for credit
Farm size in hectares	Total area operated is expected to be positively related to access to formal credit because loans are advanced on the basis of ownership of land and bank officers generally expect that plenty of land will give plenty of output, enabling the loan to be repaid quite easily by the borrower.
Family labour stock (members involved in farming)	Family labour; its effect is indeterminate.
Land ownership (Dummy: 1 if have title deeds, 0 if others)	Ownership, as opposed to rental and other forms of access to land is expected to increase the long run investment incentives and the collateral value of the land to lenders.
Awareness of formal credit facilities in the area (Dummy: 1 if Yes, 0 if No)	Farmers' awareness of the formal credit channels available in their area is likely to have a strong bearing on their accessibility to formal credit. Ignorant farmers (of credit facilities) will implicitly squeeze themselves out of the formal credit market.
Gender (Dummy: 1 if male, 0 if female)	Male are expected to have greater access to credit than female, hence the sign is expected to be positive

Education (Dummy variables) E1 E2
Level 1(no education to Standard 6)
        1   0
Level 2   (Standards 7 – 10) 0
        1
Level 3 (Above Standard 10) 0
        0
	Literacy status can also influence farmers' access to formal credit institutions, and this is expected to be positive, because literate farmers are assumed to have better technical know-how and information about market and other facilities provided by the financial institutions.

Repayment (Dummy Variable):
R1 R2) Used credit, with good
Record repayment   1
                0
ii) Used credit with poor
    Record repayment   0
                1
iii) Never use credit   0
                0
	Whether a farmer is eligible for additional formal credit would depend on whether he has any outstanding loan that is overdue, and this variable would influence the demand for credit positively.

5.5   CONCLUDING REMARKS

The econometric frameworks discussed in this section will make it possible to analyse the impact and accessibility of credit on small-scale farmers in the Northern Province of South Africa. The four hypotheses postulated in chapter 1 will be tested with the results of the analyses presented in the next chapter.

CHAPTER SIX: ANALYSIS AND RESULTS

6.1   INTRODUCTION

The empirical results of the study are presented in this chapter. The chapter is divided into three main sections. The data description and analyses are presented in the first section. The second section deals with the estimates of the credit impact on productivity. The discussions focus mainly on three estimates: a) probit equation, b) output supply equation and c) credit effect measures. The last section focuses on the accessibility of credit to small-scale farmers. Indicators and factors influencing accessibility are discussed. Tabular analysis is also used to verify the differential access to credit within the small-scale farming sector. The chapter ends with a summary and conclusions arising out of the analysis.

6.2   DATA DESCRIPTION AND ANALYSES

This sub-section considers three main items, namely demographic characteristics, household production and incomes, and financial transactions of households sampled.

6.2.1   Demographic characteristics of households

Table 6.1 presents the demographic characteristics of the sample households. The analyses were based on the pooled data, credit status and farm size. About 83 per cent of farmers cultivate on communal lands; only 17 per cent have title deeds to their farmlands. The growth in title deeds in the area might be attributed to the land reform programme curently taking place. The average farmily size is 6, while on average two family members are involved in farming. However, with non-borrowers, 3 members of the family are involved in farming. The average age of household heads in the sample is 45, with borrowers being, on average, three years older than non-borrowers (47 versus 44). Some 57% of household heads have either no education or have attended school up to standard 6. Overall, borrowers tend to have higher education than non-borrowers.

6.2.2   Household production and incomes

Houshold production and incomes values are presented in Table 6.2. With the pooled data, the overall average farm size is 2.45 hectares. Borrowers, however, cultivated more than non-borrowers (3.2 hectares versus 1.9 hectares). On average, farm incomes for both borrowers and farmers with an average farm size greater than 2 hectares were higher than non-borrowers and farmers with an average land size of less than 2 hectares. For non-farm income, the opposite was the case; the latter groups have higher non-farm incomes. One conclusion that may be advanced is that most of the members of the latter groups are part-time farmers. Overall, borrowers and farmers with farm size equal or greater than 2 hectares have higher values for most of the chracteristics than non-borrowers and those with farm size less than 2 hectares.

6.2.3   Financial transactions

About 29.4 per cent of the sampled farmers have obtained loans during that particular growing season when the survey was conducted. These loans came from two main sources, namely: the Agricultural and Rural Development Corporation (ARDC) and Land Bank of South Africa (Land Bank). The ARDC constitutes the single largest credit provider in the study areas when the survey was conducted.

Interest rates charged ranged from 15% to 20%. None of the farmers indicated that they were asked to provide collateral before getting the loan. The major requirement was the loan contract which borrowers have to sign. The long processing period before loans can be disbursed was ranked first among the difficulties in applying for loans. Thus, it appears that collateral requirements are not a major factor constraining the access of small-scale farmers to formal loans in the study areas.

Table 6. 1: Average demographic characteristics of all sample households and two different sub-samples

Variable	All farmers (n =153)	Borrower (n=45)	Non-Borrower (n=108)	T-test	Group A < 2ha (n=93)	Group B ≥ 2ha (n=60)	T-test
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Education 1 = no education – Std 5 2 = Std 6– Std 12 3 = above Std 12	1= 57% 2= 27% 3=16%	1= 52 2= 33 3= 15	1= 61 2= 24 3= 15	1.7*** 1.27*** 0.06***	1= 53 2= 30 3= 17	1= 61 2= 25 3= 14	1.07
Family Labour	2.39 (1.247)	2.0492 (0.8450)	2.6180 (1.4180)	-3.07**	2.5556 (1.342)	2.1333 (1.049)	2.16*
Land Ownership	0 = 83% 1 = 17%	72 28	92 8	3.75****	0 = 89 1= 11	0 = 75 1= 25	1.02***
Age of Household Head	45 (16.067)	47 (15.672)	44 (16313)	1.10	44.3556 (15.943)	46.30000 (16.315)	-0.72
Sex of Household Head	1= 52% 0= 48%	43 57	59 41	2.34	1= 56 0= 44	1= 43 0= 57	4.99**
Family size	63 (0.02446)	6 (0.2810)	6 (0.2877)	1.22	6 (0.2872)	6 (0.2447)	0.77
Remittances & Pensions	6725.47 (541.06)	3454.59 (992.19)	7029.30 (658.78)	-5.02****	5930.3333 (418.776)	5043.4667 (607.457)	0.99
Savings	1176.97 (2413.84)	2071.08 (3057.43)	564.15 (1599.35)	3.53***	783.9889 (1927.814)	1766.4333 (2918.831)	-2.29*

Standard deviations are in parentheses
Significance levels: p = 0.0001**** ; p = 0.001***; p = 0.01**; p = 0.1*

Table 6. 2: Average household production and incomes of all sample households and two different sub-samples

Variable (1)	All farmers (n =153) (2)	Borrower (n=45) (3)	Non-Borrower (n=108) (4)	T-test (5)	Group A < 2ha (n=93) (6)	Group B ≥ 2ha (n=60) (7)	T-test (8)
Farm Income	2020.97 (542.64)	3236.56 (6661.69)	896.56 (2080.34)	2.66**	800.01 (1653.392)	3420.3833 (6828.686)	-2.92**
Non-Farm Income	2539.01 (1964.88)	2036.70 (1092.90)	3046.21 (2369.73)	1.77*	1154.4111 (2443.065)	365.9167 (605.826)	293**
Area Cultivated	2.45 (2.629)	3.2169 (2.9940)	1.9288 (2.2160)	2.87***	1.18 (0.417)	4.3515 (3.329)	-7.32****
Value of yield per hectare	828.58 (59.1799)	1179.3200 ((81.6505	641.8125 (0.2877)	3.82***	693.8842 (33.7159)	1110.1710 (89.7597)	2.25****
Total loan	1675.60 (363.79832)	4513.1212 (514.8400)	-	-	657.7778 (169.0096)	3601.6670 (574.0405)	3.04****
Value of fertiliser used per hectare	83.40 (4.1703)	114.8852 (5.4238)	69.2022 (3.4285	3.14****	77.0000 (3.7275)	103.9521 (6.2398)	1.27**
Seeds used per hectare	5.89 (0.1131)	6.5377 (0.1512)	5.4843 (0.0985)	2.22**	5.4933 (0.0945)	6.5417 (0.1582)	1.22
Value of other inputs used per hectare	120.29 (5.3247)	153.6.66 (6.6899)	104.0449 (4.5752)	1.66*	113.3333 (4.8472)	140.5000 (7.5518)	2.29****
Labour inputs per hectare (in mandays)	14.48 (0.4184)	16.4590 (0.5934)	13.4494 (0.3878)	3.40****	14.0444 (0.4494	15.6167 (0.5544)	1.79**
Family labour used	2 (0.0949)	2 (0.1503)	3 (0.1503)0	1.95	2 (0.1315)	2 (0.1606)	1.09

Standard deviations are in parentheses
Significance levels: p = 0.0001**** ; p =0.001***; p = 0.01**; p = 0.1*

Table 6. 3: Credit status and sources of credit in the survey area

Items	Number of farmers	% share of total	Interest rate	Collateral
Credit status				
With loan	45	29.4		-
Without loan	108	76.6		-
Total	**153**	**100**		-
Sources of credit				
ARDC	35	77.7	13	No
	10	22.3	15	No
Land bank				

The reasons given for not asking for loans are presented in Table 6.4. The most common reason for not asking for a loan was that the request would be rejected (43%). This is followed by those "still owing" (25%). Thus, it appears that there is a high default rate in the study areas, especially the Northern region (29%). "Not knowing where to apply for a loan" had the third largest share of respondents among the reasons (15%).

Table 6. 4: Reasons for not asking for loan (in percentages)

Reasons	Lowveld	Northern	All
I am still owing	20	29	25
Household has sufficient savings	1	5	3
Do not like to incur debt	5	3	5
Do not know how/where to apply	16	17	15
Do not apply because the request will be rejected	43	43	43
Interest rate too high	15	1	8
Other reasons	-	2	1

About 97.4 per cent of the sampled farmers obtained other financial services from formal financial institutions in the study areas. The most commonly received financial service is savings accounts (about 94.0%). See Table 6.5. The results suggest that there is a high demand for other financial services, particularly savings, among small-scale farmers in the study areas.

Table 6. 5   **Other financial services obtained by the sampled farmers**

Item	Number of farmers	% share of total
Obtained other financial services		
YES	149	97.4
NO	4	2.6
If Yes, type of services obtained		
Savings account	140	94.0
Cheque account	8	5.4
Payments and transfers	1	0.6

6.3   THE IMPACT OF CREDIT ON PRODUCTIVITY

Credit market intervention and credit liberalisation policies have been justified on the ground that they improve access to formal credit for small-scale farmers (Carter, 1989:13). The crux of the matter is: is accessibility to credit really necessary? And if it is, does credit actually enhance productivity of small-scale farmers? It is, however, argued that productivity will be enhanced by relaxing financial constraints through the provision of credit.

As indicated earlier in the previous discussions of the socio-economic characteristics of the target population, borrowers appear to perform better than non-borrowers in terms of productivity (See Table 6.1, columns 3 – 4). The descriptive statistics reported in Table 6.1 reveal a positive association between credit, input use and farm productivity. At first glance, these descriptive statistics seem to imply that limited working capital constrained input use and productivity on non-borrowing farms, ratifying the hypothesis of inefficient rural financial markets. However, such an inference from these statistics would have the serious weakness that it attributes all variations between the groups to the use of credit. Other attributes of farms and farmers in the two sub-samples may be responsible for at least some differences in resource use and productivity (Sail & Carter, 1996: 774). In an effort to resolve this attribution problem, endogenous switching regression is applied. The remainder of this section is divided into three sub-sections, namely: results of the probit analysis, results of the output supply estimation, and estimates of credit effects.

6.3.1   Results of the probit analysis

The results of the probit estimates are presented in Table 6.6. Non-farm income and remittances and pensions are statistically significantly different from zero at P=0.001 and have the theoretically predicted negative signs. The results indicate that the higher the non-farm income, and remittances and pension the farmer has, the less likely it is that he or she will take a loan. This is consistent with the "pecking order theory". The more assets the farmer has, the more likely it is that the farmer will not seek external funds, but utilise internal resources to operate the farm. With the pecking order theory a farmer chooses from a hierarchy of preferences in deciding on the source of finance to utilise. This choice is based on the "safety first principle" with internal funds being the safest (i.e. defined as not potentially causing the farmer to lose control, ownership and decision making in the firm) among the choices (Lapar *et al*, 1995: 9-10). These results validate this statement. Another reason might be poor repayment rates in the area; most might have been denied access to credit because they have defaulted. The significant, negative coefficient of the repayment variable validates this statement. The savings variable also has a negative coefficient, and is significant at p = 0.0001. As pointed out by Fenwick and Lyne (1998:501), formal savings are more of a substitute for credit than a source of information and collateral to lenders.

Farm size has a positive sign and is significant at p= 0.01. The bigger the farm size, the more likely it is that the farmer would obtain loans. Larger farm size affects the amount of the loan needed through a greater need for variable cash inputs, hence increasing the need for credit (Sial & Carter, 1996). These results are consistent with other results (e.g. Sial & Carter, 1996 and Feder *et al*, 1988). Transaction costs associated with many small loans act as a disincentive for lenders and the cost of credit to small farmers is likely to increase. In the presence of fixed transaction costs, the cost of borrowing in the formal credit market is therefore a declining function of the farm size (Mbowa & Nieuwoudt, 1999:337; Binswanger *et al*, 1992:26).

Land ownership has a positive sign and is statistically significant at P = 0.1. Individual ownership of land improves the ability of a farmer to obtain loans. Ownership, as

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opposed to rental or the use of communal lands, increases the size of the loan because it may increase long-run investment incentives and the collateral value of the land to lenders (FAO, 1996). This confirms that the pledging of land collateral significantly increases the amount of credit offered by institutional lenders as compared to cases where there is no collateral. The family stock has a negative coefficient, implying that larger farm families have a smaller tendency to obtain loans. Family members may substitute labour for cash inputs like herbicides, etc., and /or sell additional family labour on the market, and in turn use off-farm income to purchase cash inputs, hence reducing the need for a loan.

The regional variable of the Lowveld region showed a positive coefficient and was significant at p = 0.0001, whilst that of the Northern region had a negative yet significant coefficient. These results imply that small-scale farmers in the Lowveld region are more likely to obtain loans than those in the Northern region. This may be ascribed to the greater number of financial institutions in the Lowveld region than the Northern region, or the greater number of individual owners with title deeds.

The joint hypothesis that all the coefficients of the probit equation are zero is rejected at the P = 0.01. The completed value of –2 (log likelihood ratio) is 169.6867 and this is larger than the P = 0.01 critical value of X^2 (10 degrees of freedom) which is 23.209. Eighty one per cent of the observed variables are properly classified as being credit constrained or unconstrained, implying a fairly good fit. The coefficients of these variables were used to construct the cumulative probability functions and the probability density function, which are used as regressors in the endogenous switching regression estimations.

Table 6. 6:   **Estimated coefficients of the probit equation**

Varaibles	Coefficient
Constant	0.1022
	(0.7266)
Age (years)	0.0007
	(0.0072)
Farm Income	0.0005
	(0.0001)
Non-farm income	-0.0012***
	(0.0001)
Remittances & Pensions	-0.0081***
	(0.0000)
Financial assets	-0.2589****
	(0.0125)
Education	-0.1236
	(0.1889)
Gender	-0.1130
	(0.2785)
Farm Size (Ha)	0.3815**
	(0.1398)
Family labour stock	-0.2589**
	(0.1123)
Landownership	0.5572*
	(0.4519)
Repayment	-0.9661*
	(0.0212)
Regional variable	
Northern	-0.2589**
	(0.0124)
Lowveld	0.7898****
	(0.0211)
Log likehood ratio	-169.6863
Percentage correctly predicted	81.0000

Standard errors are in parentheses
Significance levels: p = 0.0001**** ; p = 0.001***; p = 0.01**; p = 0.1*

6.3.2   Results of the output supply equation

Table 6.7 presents the results of the output supply models. Three variants of the output

supply equation are estimated: the full switching model, the restricted model, and the

OLS model. The difference between the full and the restricted model is that the latter

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ensures that there are no added returns to observable or unobservable characteristics of the farm and the farmer resulting from the use of credit, i.e. the δ

Table 6. 7:   **Estimated coefficients of the endogenous switching regression model**

Variables	OLS	Endogenous Switching Regressions		
		Full Switching Model		Restricted Model
		All Producers	Borrowers Differential	
Constant	14.8749**** (0.2721)	8.2072**** (0.0021)	3.2725 (0.7291)	12.3272****
Age (years)	-1.7946 (1.6426)	-0.0375**** (0.1257)	1.2107 (0.2433)	-2.2288 (0.1078)
Extension	-0.0727 (0.0012)	3.7218**** (1.2789)	4.7821 (2.1111)	0.0078**** (0.0182)
Labour input (Mandays)	1.2742*** (0.0001)	0.0321 (0.0080)	0.7821 (0.1248)	0.0370 (0.0108)
Seed used (Kg per ha).	2.8910**** (0.5344)	0.0234**** (4.2750)	0.0400 (0.0124)	0.1070*** (0.1120)
Remittances	-0.0027 (0.0059)	-0.5478**** (0.7891)	0.05071 (0.1178)	-1.9515 (0.2861)
Value of fertiliser used (R per ha)	4.2443* (1.0415)	0.0029 (1.2701	1.7629 (0.0902)	0.3989*** (0.2128)
Education	8.8597* (1.3588)	-0.0971** (0.0247)	0.8921 (0.1183)	2.1082* (1.2827)
Gender	-7.8787**** (0.0027)	-4.2879 (0.2777)	-6.7811 (2.8912)	-1.2777 (0.2991)
Farm Size (Ha)	15.3399**** (0.3183)	8.0027* (0.1796)	2.0782 (1.8261)	2.8912** (1.2828)
Family labour stock	0.0027*** (0.0012)	1.7823 (0.2861)	3.8795 (1.6666)	4.8007*** (1.2018)
Land ownership	0.0257***** (0.0012)	1.7618**** (0.1928)	1.2674 (0.1007)	2.2411**** (0.1189)
Value of other inputs	3.4949*** (0.7020)	4.7628**** (2.1864)	0.9794 (0.1128)	0.0126*** (0.1246)
Regional variable				
Northern	-0.2361 (0.0251)	-0.6789* (0.1258)	0.9999 (0.5698)	1.2546**** (0.4589)
Lowveld	0.0625**** (0.0347)	0.8572**** (0.4789)	0.2587 (0.1247)	3.5789**** (0.2365)
Loan amount	0.0547 (0.0199)	-	0.0021* (0.0111)	0.0218** (0.1010)
Loan amount square	-0.0001**** (0.0021)	-	0.0005* (0.0001)	0.0010 (0.1201)
Pdf	-	-	-0.9264 (0.2486)	-
R^2 (adjusted)	0.742		0.701	0.730

Standard errors are in parentheses
*Significance levels: p = 0.0001****; p = 0.001***; p = 0.01**; p = 0.1**

δ ;and (ρ_c - ρ_n) parameters are equal to zero. The former therefore allows for the estimation of the direct credit effect parameters (that is, the α) and the indirect effect parameters (that is δ, and (ρ_c - ρ_n)). The direct effect parameters give the increase in output supply due to the use of the loan. Indirect credit effects represent the additional returns to observable and unobservable endowments which occur when credit is used. The full switching regression estimates show that borrowers do not enjoy differential returns from observable endowments as indicated by their estimated δ values, none of which are statistically significant at the P = 0.01 (see Table 6.7). It was also impossible to reject the hypothesis that aside from the direct effect of a loan, borrowers experience no additional returns to their unobservable endowments and attributes, that is the estimated coefficient representing (ρ_c - ρ_n) is not significantly different from zero at p =0.01. The restricted equation was therefore estimated to reflect these restrictions in the full switching model. The discussions will therefore be limited to the restricted model. The OLS model was estimated in order to get parameter estimates to be used in computing the gross output supply gap.

Seed, fertiliser and other inputs usage coefficients are statistically significant at p = 0.001 and have the expected signs. This implies that the more these inputs are used the higher is the output. The results are consistent with other results (e.g. Panin, 1999; Carter, 1989). The land ownership coefficient is positive and significant at p =0.0001. This implies that farmers with individual title deeds are more likely to invest in the land in order to produce more output.

The farm size coefficient has a positive sign and is significant at p =0.01. The bigger the farm sizes, the bigger the expected output to be produced. The results show that large farms are relatively better equipped in human resource capital, and are in a better position to adopt appropriate farming methods (Mbowa & Nieuwoudt, 1999:350). The education coefficient is significant at p= 0.1, which implies that the more educated farmers are more productive. The number of years of schooling is an indicator of human capital, which affects efficiency positively. Higher human capital increases the marginal productivity of variable inputs and the derived demand for cash. The performance of this variable compares favourably with the results obtained in Panin (1999). The results

suggest that education has a positive and significant impact on smallholder crop production systems.

The family labour stock coefficient is statistically significant at p =0.001 and has a positive sign. This implies that as the family size increases output also increases. This is because more labour can be utilised to produce more output. The regional dummy for the Lowveld has a statistically significant positive coefficient, whilst the coefficient for the Northern region dummy has a negative sign. Both are significant at p=0.0001. This implies that farmers in the Lowveld region have a higher output relative to farmers in the Northern region.

The loan amount variable has a positive coefficient. Borrowed funds can affect output by allowing the farmer to use more optimal levels of inputs, newer technology, and more intense input use. Additional funds help farmers overcome financial constraints on the purchase and allocation of optimal inputs, thereby allowing the entrepreneur allocative efficiency and output to increase (Lapar *et al,* 1995:11). The estimated output supply model has an adjusted R^2 value of 0.73, implying that the estimated equation explains 73% of the variations in the value of output.

6.3.3   Estimated credit effects

The credit effects coefficients were calculated using the coefficients of the restricted model. The loan variable was significant at p = 0.01, whilst the loan square variable was insignificant at p = 0.10. The joint hypothesis that the coefficients of the two variables are equal to zero is rejected at p =0.01, hence both coefficients are used in estimating the credit effects. The credit effect measures discussed in Sections 5.4.1 and 5.4.2 are used in the analysis. Table 6.8 presents the estimates for the credit effect measures.

The marginal credit effect at mean loan size is estimated to be 1.35 and is statistically significant at p = 0.0001. This implies that the marginal output effect of one rand of loan is R1.35. The marginal credit effect at mean loan size gives an indication of the optimality of the loan size. The results indicate that the observed mean loan amount is

below the income maximising the size, since the estimated marginal net return of 35 per cent exceeds the average 18 per cent interest charged[10].

Table 6. 8:   Estimates of credit effects on output supply

Credit Effect Measures	Restricted Model	OLS Estimates
Marginal credit effects (per Rand) at mean loan size	1.35** (0.025)	
Marginal credit effects (per rand) at zero loan size	2.10**** (0.121)	
Random credit effects at mean loan size[11]	0.2169**** (0.002)	
Gross Gap: borrower, non-borrower[12]	-	0.4006**** (0.102)
Adams gap	-	0.184

Figures in parenthese are standard errors
*Significance levels: $p = 0.0001$****; $p = 0.001$***; $p = 0.01$**; $p = 0.1$**; $p = 0.1$*

When estimated at zero loan size the marginal credit effect is estimated to be 2.10, implying a potential increase of more than two Rands in output for every R1 of loan. A randomly selected individual with zero formal credit is estimated to be sufficiently capital constrained that he/she would generate an additional R2.10 worth of output with a R1 loan thus indicating a 100 per cent shadow price of the credit for a randomly selected individual who has no credit. The results strengthen the inefficiency hypothesis of rural credit markets.

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[10] *The average interest rate levied on the sampled borrowers was 18 per cent. Information on transaction costs was not collected, hence it was not included in this average interest rate.*

[11] *Under the restricted model specification, counterfactual and random credit effect estimates are the same.*

[12] *In terms of consistent structure parameters in Equation (7) of Chapter 5, the gross output supply gap in equation (6) can be decomposed as follows:* $\delta^i Z_i + \alpha^i l_i +$ $E(V_{ic}| L_i = 1) - E(V_{in}| L_i = 0) = \delta^i Z_i + \alpha^i l + \rho_c \lambda_i^c - \rho_n \lambda_i^n$ *Adding and subtracting* $\rho_n \lambda_i^c$ *and rearranging terms yields:* $[\rho_n(\lambda_i^c - \lambda_i^n)] + [\delta^i Z_i + \alpha^i l] + [(\rho_c - \rho_n)\lambda_i^c]$. *The expected output supply gap between borrowers and non-borrowers is the sum of the Adams Gap, the Random Credit Effects, and the added gains borrowers achieve for the latent attributes when they use credit. The Adams gap is given by the term in the first square bracket and reflects pre-existing differentiation among small holders. The second two terms measure the additional differentiation induced by the credit programme. Given $\rho_n = \rho_c$ (implying no added returns to borrower's latent*

Sial and Carter (1996:771) argue that in such an environment, provision of interest rate subsidies on formal credit is not a rational economic policy since it may reduce, rather than improve, the access to credit. There is also a strong indication that the small-scale farmers are capable of realising such high rates of return on capital that they can potentially pay market rates of interest. In addition, a high shadow price of capital signals the absence or weakness of insurance markets (and their social substitutes), and a reliance upon autarkic insurance strategies under which individuals divert investable wealth from productive investment to assets that generate low or even negative rates of returns.

The random credit effect at the mean loan size is 0.2169, significantly different from zero at $p = 0.0001$. This implies that a hundred per cent increase in loans would yield a 21.7 per cent increase in output. In other words, the credit effect on an individual selected at random from the overall population of small-scale farmers in the study area to join a credit programme would be a 21.7 per cent increase in output. The anticipated output of a self-selecting borrower is also estimated to be 21.7 per cent larger than if the farmer were in the counterfactual state of being a non-borrower. As indicated earlier, the random credit effect and the counterfactual credit effect are equal under the restricted model.

The Adams gap, which reflects the effects arising from pre-existing differences among borrowers and non-borrowers, is computed at 0.184. This implies that borrowers do have an advantage in performance as a result of inherent characteristics compared with non-borrowers, when operating without credit. Thus, about 18.4 per cent of the difference in output between borrowers and non-borrowers is due to pre-existing differences between them. The results confirm the statement of Adams (1988) that borrowers may perform better than non-borrowers even without credit because they are inherently more productive than non-borrowers.

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attributes), the gross output supply gap can be written as the sum of the Adams gap and the Random Credit effects as follows: $[\rho_n(\lambda_i^c - \lambda_i^n)] + [\delta Z_i + \alpha l]$.

The OLS estimate of the gross gap between borrowers and non-borrowers is 40.1 per cent. This is the sum of the Adams gap and the random credit effect. This implies a gross gap of 40.1 per cent between endogenously sorted borrowers and non-borrowers. The results suggest that, overall, borrowers have a higher output than non-borrowers (about 40 per cent higher). This difference is due to both the use of credit and inherent characteristics.

6.4   ACCESS TO FORMAL CREDIT OF SMALL SCALE FARMERS

In this sub-section, two types of analyses are presented: a tabular analysis (to verify the differential access of credit within the small-scale farming sector), and logistic regression (to determine factors affecting small-scale farmers' access to formal credit).

6.4.1   Differential access to formal credit within the small farming sector

The relationship between formal loans and the size of holdings in the study area is shown in Table 6.9. Out of 153 farm holdings 29.4 per cent had borrowed from formal institutions. The proportion of households borrowing was as low as 26.1 per cent in the first group. The table shows that the proportion of household borrowing from formal credit institutions increases as the size of holdings increase. It is highest in the last two groups.

The percentage share of total formal credit received by each group is given in column 5. The values indicate highly skewed access for different size groups. They show greater access for households with larger farm sizes than households with smaller farm sizes. Of the total amount borrowed, only 14.89 percent was borrowed by the farm households operating up to 1 hectare of land, while this group accounts for 30.67 percent of the total sample of farm households. The share of group 2 and group 3 are 16.6% and 10.35% respectively.

Table 6. 9: **Proportion of formal loans according to size of holdings**

Group	Percentage of households in the group	Percentage of farmer borrowing	Percentage of area owned in terms of total area	Size of group's share (%) of total formal credit	Formal loan as percentage of total amount borrowed
1	2	3	4	5	6
Group 1 (Up to 1ha)	30.67	26.1****	17.47	14.89	16.09***
Group 2 (1.01- 2 ha)	32.00	33.3****	19.32	16.60	33.45**
Group 3 (2.01- 3 ha)	14.67	36.4****	15.57	10.35	45.21**
Group 4 (3.01- 4 ha)	10.66	68.8****	16.74	19.18	60.75*
Group 5 (4 ha and above)	12.00	77.8****	30.90	38.98	62.05****
Total	100	29.4	100	100	42.75

*Significance levels: p = 0.0001****; p = 0.001***; p = 0.01**; p = 0.1**; p = 0.1*

Group 4 (3.01 - 4 ha) and Group 5 (above 4 ha) had 19.18 per cent and 38,98 per cent of the total amount borrowed respectively, while these groups constitute only 10.66 per cent and 12 per cent of the households respectively. In absolute terms, this group obtained more credit than the above groups. What this really demonstrates is that farmers with farms greater then 3 hectares, although representing only 22.7 per cent of all farmers, received 68.2 per cent of all loans. In contrast, those farms with less than or equal to 2 hectares, representing 62.7 per cent of farmers, received 31.5 per cent of all loans. The results suggest that credit tends to gravitate towards holders of larger farm sizes. This is in line with other findings (Mbowa & Nieuwoudt, 1999; Amjad (1993). The results in column 6 indicate that more than 57.2 per cent of the funds invested in farming by the sampled small farmers came from informal credit and other sources like pensions and remittances, while formal loans constituted 42.75 per cent of the total.

The access ratio formulas in Section 5.4.2 were also used to analyse the differential access to credit within the small farming sector. Table 6.10 presents the access ratios. The value of ratio 1, for the group with the smallest farms is 0.64; the ratio increases as the size of holding increases. This ratio reaches a maximum of 1.91 for the group with the larger farm sizes, showing a greater access to credit. Ratio 2 shows a similar pattern, the group with smallest farms had the lowest ratio. Examining the pattern of the two ratios, it can be argued that farmers operating up to 3 hectares have less than equal access to formal credit, while those farmers operating above 3 hectares have more than equal access to these sources. Due to the inaccessibility of formal credit, the farmers on smaller holdings have to borrow from informal sources. The ratios show that the group with the smallest farms have a high dependence on informal credit sources.

Table 6. 10:   Access ratios by size of holding

Size of holding	Ratio 1	Ratio 2
Up to 1 ha	0.64	0.85
1.01- 2 ha	0.82	0.86
2.01- 3 ha	0.89	0.66
3.01- 4 ha	1.69	1.45
4 ha and above	1.91	1.26

6.4.2   Factors affecting small farmers' access to formal credit

Now the question arises as to which specific variables influence farm households' access to formal credit. Which economic, demographic and physical factors enhance or limit small-scale farmers' decisions to borrow from formal sources. The use or non-use of formal credit sources is explained by using logistic regression analysis. In logistic regression one can directly estimate the probability of an event occurring. It predicts whether an event will occur or not, and it identifies the variables that are useful in making this prediction. Table 6.11 presents the results of the logistic regression. It includes the results for all sample farmers as well as for group A (farmers operating less than 2 hectares) and group B (farmers operating equal to or more than 2 hectares).

Table 6. 11:   Logistic regression estimates

Explanatory variables	All Farmers	Group A (area < 2 ha)	Group B (area ≥ 2 ha)
Area cultivated	0.0203** (0.0377)	1.3878* (2.6797)	0.1427 (0.4179)
Education	0.4146** (1.5522)	0.2137 (0.2202)	1.3187**** (2.4322)
Farm Income	0.0001 (0.9800)	0.0002 (0.3885)	0.0001 (0.1422)
Family Labour	-0.6145** (6.8722)	-0.8253* (5.8796)	-0.9628* (3.5307)
Tenurial 1 = title deed 0= no title deed	1.1022* (2.2095)	2.3364* (2.8983)	1.3185 (0.9089)
Sex of Head of Household 1 = male, 0 = female	0.2289 (0.2384)	0.6153 (0.8870)	1.5038 (1.6270)
Non Farm Income	-0.0004** (4.5266)	-0.0003* (3.5710)	-0.0016* (2.5342)
Remittance & Pension	-0.004**** (20.2410)	-0.0002** (5.5238)	-0.0011*** (11.5629)
Savings	0.0006*** (10.6794)	0.0005** (6.3400)	0.0010*** (8.6302)
Awareness	0.9669* (0.0257)	1.2380* (1.0587)	0.1478** (0.2587)
Repayment	-0.1478*** (0.1561)	-0.7220 (0.0012)	-0.9658 (0.1587)

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Explanatory variables	All Farmers	Group A (area < 2 ha)	Group B (area ≥ 2 ha)
Age of household	0.0026 (0.0351)	0.0025 (0.0178)	0.0040 (0.0174)
Constant	1.1285** (0.6522)	1.9068 (0.8222)	6.0628* (2.7496)
-2 log likelihood	124.440	68.309	33.445
Model chi-square	78.247****	38.042****	47.317****
% of correct Predictions - Overall - Borrowers	85.33 81.97	84.44 56.00	88.33 88.89
No. of Observations	150	90	60

Figures in parentheses are Wald Statistics
Significance levels: $p = 0.0001$ ****; $p = 0.001$ ***; $p = 0.01$ **; $p = 0.1$ *

Area cultivated has a positive coefficient and it is significant at $p=0.1$ for the whole sample and also for the smaller farm size group (less than 2 ha). This implies that farmers with larger farms have better access to credit. The size of the farm cultivated has been one of the major criteria which formal institutions and intermedaries have used in their provision of credits to farmers. The result is consistent with other results (Mokoena et al, 1997; Kashuliza & Kydd, 1996).

Non-farm income and remittances and pensions (income transfers) have the expected signs, and were significant at $p= 0.01$ and $p= 0.0001$ respectively. Availability of non farm income, and remittances and pensions, are assumed to reduce demand for credit since the funds thus available can be used to purchase inputs for production (Amjad, 1993:7). Family labour has a negative coefficient, and is significant at $p=0.1$. This indicates a negative relation between family labour and accessibility of credit. Its influence to accessibility is similar to that of non-farm income and remittances and pensions, thus it can be used to substitute for credit.

The title deed has a positive sign and is statistically significant at $p= 0.1$. A title deed is expected to be positively related to credit, as formal lenders insist on collateral, particularly ownership rights to land. Thus, tenants have less chance of getting credit than owner cultivators. Savings have a positive coefficient, and are significant at $p= 0.001$. Formal savings aid in consumption smoothing and are expected to substitute for

credit, especially when they are deposited with institutions distinct from those providing credit (Fenwick & Lyne, 1998:499). In the study areas, observed loans were provided by suppliers and not by formal saving institutions. Consequently, savings accounts had little value to lenders as sources of informal collateral. The awareness variable has a positive coefficient; implying that awareness has a strong bearing on accessibility of credit to small-scale farmers. The Repayment variable had an unexpected significant negative coefficient. This unexpected sign might be due to the poor repayment record of the farmers in the study areas.

For the groups A and B, most of the parameters have the expected relationship; the patterns are similar except for the area cultivated under group B, which is not significant. On the whole, area cultivated; family labour; title deed; non-farm income; remittances and pensions (social benefits) and savings are found to be important variables, which could be used to predict accessibility to credit for small scale farmers in the study area.

On the whole the regression is significant with a high prediction rate and high values for the log likelihood ratio and goodness-of-fit statistic. This also rejects the joint hypothesis that all coefficients in the access equation are zero.

6.5   SUMMARY AND CONCLUSION

In this chapter the empirical results of the study were discussed, revealing the following:

- The marginal credit effect at mean loan size is estimated to be 1.35, implying that the marginal output effect of R1 of loan is R1.35. This estimated marginal credit effect indicates that the average loan amount is below the income maximising size since the estimated marginal net return of 35 per cent exceeds the average interest rate of 18 per cent experienced by the sampled borrowers; the marginal return exceeds this by 17 percentage points.

- The marginal credit effect at zero loan size is estimated to be 2.10. A randomly selected individual farmer with zero formal credit would generate an additional

R2.10 worth of output with a R1 loan. The result implies a shadow price of capital of 110 per cent for a randomly selected individual who has no credit; suggesting a potentially high return for loans to small-scale farmers in the study area.

- The random credit effect at mean loan size is estimated to be 0.22 per cent, which implies that a 100 per cent increase in loan would yield a 22 per cent increase in output.

- The OLS estimate of the Gross gap between borrowers and non-borrowers is estimated to be 40.1 per cent, with an Adams gap of about 18.4 per cent. This indicates that both credit use and latent borrower characteristics contribute significantly to productivity.

- About 29.4 % of the farmers sampled for the study had access to formal credit. More than 57% of the credit used by small farmers comes from informal credit and other sources like pensions and remittances. Access to formal credit is also highly skewed, and shows greater access for farmers with larger farm sizes than to those with smaller farm sizes.

- As already pointed out, area cultivated; family labour; title deed; non-farm income; remittances and pensions (social benefits), awareness, and repayment records are found to be important variables, which could be used to predict accessibility of credit to small scale farmers in the study area.

The findings indicate a lack of access to credit in the survey area and a high demand for credit, and that the average loan offered to these farmers is below the income maximising size (i.e. farmers are credit constrained). In addition, they also indicate that small-scale farmers in the survey area are capable of paying the present market rate of interest.

CHAPTER SEVEN: SUMMARY AND CONCLUSIONS

7.1   INTRODUCTION

This study provided extensive discussions on factors influencing access to agricultural credit and thereafter an exploratory analysis of the accessibility, use and impact of such credit on small-scale farmers in the Limpopo Province of South Africa. The positive impact of credit is regarded as a major justification for facilitating access to credit. One of the major factors negatively affecting the development of rural areas is the limited access to appropriate financial services. The stimulation of the rural economy in developing countries depends on economic growth in agriculture and other micro, small and medium enterprises. These enterprises constitute the engine for growth, employment and income for the rural community.

In South Africa, the past policies of apartheid created structural imbalances in the whole socio-economic fibre of the society, causing different racial groups to have different social contexts and access to wealth and services. The policies resulted in disempowerment of rural communities, where about 40% of the population lives - blacks constitute about 91% of the rural communities (Spio, 1995:54). Financial intermediaries directed their attention to commercial farmers at the expense of the small and emerging farmers, and micro-enterprises. However, the delivery mechanisms and the production environment failed to ensure the sound debt carrying capacity of these commercial farmers.

Apart from these policies, the financial intermediaries have not been able to accommodate small-scale rural clientele easily because it is a costly, risky and difficult task. Local lenders were faced with covariant risks and high transaction costs and therefore became reluctant to lend to the poor. Lack of information prevented large formal lenders who had the capacity to serve the small farmers and the poor from doing so. The lack of information made them prone to problems of adverse selection, moral hazard, and high enforcement costs. In addition, their rural clientele were heterogeneous and geographically dispersed; they dealt in small transactions and their activity was

highly dependent on exogenous forces. The methods and practices of most banks did not meet the needs and characteristics of their clients.

Credit market intervention and credit liberalisation policies have been justified on the ground of improving the formal credit access to small-scale farmers (Carter, 1989:13). The question is: does credit actually enhance the productivity of small-scale farmers in the study area and how far is the depth of intermediation? Thus, is access necessary? These questions were addressed in this study.

7.2   DELIMITATIONS, EXECUTION AND RESULTS OF THIS STUDY

The population from which data for this study was collected consists of small-scale farmers in the Lowveld and Northern Regions of the Limpopo Province. Three-stage cluster sampling was employed to obtain a random sample of small-scale farmers. Taking into account the cost considerations and other limiting factors, a sample of 153 farmers was interviewed using a structured questionnaire; 93 from the Lowveld region and 60 from the Northern region.

In an effort to study the accessibility to and impact of credit on small-scale farmers in the Limpopo Province of South Africa, two approaches were followed:

1.   Determination of small-scale farmers' access to formal loans, and differential access within the small farming sector.
2.   Econometric estimates of the shadow price of working capital for, and the effect of credit, on small-scale farmers.

A summary of the results is presented below:

A socio-economic comparison based on the credit status of small-scale farmers indicates that borrowers have significantly higher values than non-borrowers, especially in area cultivated, input usage and productivity. A similar trend was observed when farmers with farm size equal to or greater than two hectares were compared with those with less than two hectares. Those with farm size equal to or greater than two hectares had higher

socio-economic values in farm income, non-farm income, savings, area cultivated and productivity.

The results of the probit regression indicate that small-scale farmers with bigger farm size, good repayment record and who hold title deeds to land are more likely to borrow. On the other hand, farmers with higher family labour stock, higher non-farm income, higher remittances and pensions are less likely to borrow for farming purposes.

The results of the output supply regression show that the following factors affect productivity of small-scale farmers positively: farm size, education, land ownership, seeds usage, fertiliser usage, other inputs usage such as chemicals and family labour stock. The results also reveal that small-scale farmers in the Lowveld region are more productive than those in the Northern region.

The results of the credit effect measures indicate that the difference in productivity between borrowers and non-borrowers is due both to the use of credit and to the pre-existing inherent characteristics of the farmers. The difference measures up to about 40 per cent, of which 21 per cent is due to credit. The hypothesis that latent characteristics of farmers significantly affect output cannot be rejected. The total credit effect, which is determined by the credit random effect, indicates that credit can increase the output of a randomly selected small-scale farmer by 21 per cent.

The marginal credit effect estimated at mean loan size indicates that the average loan size for the small-scale farmers is below the income maximising size, since the estimated marginal net return of 35 per cent exceeds the average interest rate of 18 per cent. The marginal credit effect at zero loan size is estimated to be 2.10. A randomly selected individual farmer with zero formal credit would generate an additional R2.10 worth of output with a R1 loan. The results imply that the shadow price of capital is 110 per cent. This implies that non-borrowers are credit constrained, confirming the hypothesis of the inefficiency of rural credit markets.

More than 57% of the credit used by small farmers comes from informal sources and sources like pensions and remittances. Formal loans constituted 42.75 per cent of all

borrowings. Access to formal credit increases as the size of the holding increases. The two access ratios indicated a differential access to loans by small-scale farmers; accessibility increases as the size of holding increases. The results of the logistic regression shows that area cultivated, family labour, title deeds, non-farm income, awareness, repayment record, remittances and pensions, and savings are important variables which can be used to predict the accessibility of credit.

7.3   CONCLUSION

The empirical results obtained in the study raise several issues pertaining to the small-scale agricultural financial markets. Purposeful research, being hypothesis-oriented, requires conclusions to be made in terms of the formulated hypothesis.

Hypothesis 1: Access to credit to small farmers is limited, and within the small farmers' group, the farmers closer to the upper limit or to the size of commercial farmers are relatively better off in terms of access to credit, thus resulting in differential access to the formal credit institutions.

This finding strengthening the hypothesis that access to formal credit is skewed to large farms (Amjad, 1993); and that there is unequal access to credit, even within the small-scale farming sector. The results indicate a greater access for large size farms than smaller farms.

Hypothesis 2: Rural agricultural financial markets are inefficient; both borrowers and non-borrowers are credit constrained.

The findings of this research certainly provide support for this hypothesis. The marginal credit effect at zero loan size indicates a shadow price of credit of 2.10. This is a useful indicator of the efficacy of the rural financial system (Sial & Carter, 1996:771). The estimated shadow price is far in excess of the social opportunity cost of capital. This is an indication of weak financial intermediation in the financial market. The marginal credit effects at mean loan size also indicate that the average loan size is below the income maximising size. The analysis did not, however, estimate the optimal loan size

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that will give the maximum returns; hence it is not possible to infer whether some of the borrowers are financially constrained. However, most borrowers indicated that the loan size was not large enough to cope with their financial demand.

Hypothesis 3: Interest rates in the markets are very high; thus, the shadow price is not far in excess of the social opportunity cost of capital; credit should therefore be subsidised.

The findings of the research do not provide any support for this hypothesis. The marginal net returns of 35 per cent far exceed the average 18 per cent interest rate charged in the study area. There are strong indications in this study that small-scale farmers are capable of realising high rates of return on capital, and hence they are potentially capable of paying market rates of interest. Subsidised interest rate proposals are therefore not supported.

Hypothesis 4. Credit has direct productivity effects and could be expected to reduce the unbalanced pattern of growth in South African farmers.

This study strengthens the hypothesis that there is a direct relationship between credit and productivity. Provision of credit to small-scale farmers makes them more productive. The results also indicate that other latent characteristics of borrowers, such as managerial skills also contribute to higher productivity. An Adams gap of about 18.4 per cent was obtained. This supports the hypothesis of Adams (1988), that borrowers may still be performing better than non-borrowers even without credit, because borrowers have certain characteristics that make them inherently more productive.

7.4   RECOMMENDATIONS

7.4.1   Policy implications

The provision of financial services, especially credit and saving facilities, plays an important role in the development of the rural economy. Rural households are caught in a vicious cycle of low rates of capital investment and low levels of income that

inevitably lead to low levels of productivity and low levels of savings. This cycle can be broken if the financial markets function efficiently. The role of the institutional financial sector in the developing areas of South Africa has been severely circumscribed by a number of factors, which have rendered the rural financial markets and financial institutions ineffective and inefficient in providing quality financial services to small-scale farmers and the poor. In many, if not most, of the developing areas, it is common to find that the formal financial sector has contracted rather than expanded in its ability to provide financial services, leading to severe credit rationing, to the point that only a very small number of potentially bankable clients receive financial services.

The study raised important issues relating to the accessibility and impact of credit on small-scale farming productivity. First, rural agricultural financial markets in the study are inefficient and participants in the market are credit constrained, as reflected by the excessive shadow price of credit. A shadow price of credit far in excess of the social opportunity cost indicates weak financial intermediation. This implies that markets are not competitive, participants are not fully informed, and that there is not a full set of markets. As pointed out by Sial and Carter (1996:771), the inefficiencies signal the absence of or weakness of insurance markets and their social substitutes. This at times forces participants in the market to rely upon autarkic insurance strategies (for example, individuals diverting investiable wealth from productive investment to assets that generate low or even negative rates of return). In such an environment, provision of a subsidised interest rate policy may not be rational since it will reduce rather than improve access to credit.

Secondly, the marginal returns of small-scale farmers are such that they are capable of paying for a market related interest rate. The provision of credit at a subsidised interest rate is therefore not justified. If farmers pay a market related interest rate, this will enable lenders to cover their full costs, hence ensuring their financial viability. This will in effect reduce rationing of credit by lenders, thus improving credit accessibility in rural financial markets in South Africa. In addition, it may also reduce the segmentation/fragmentation found in rural credit markets. Because participants in the market would be facing similar prices, funds will flow across groups of individuals easily and freely.

Finally, the results also point to the fact that even within the small-scale farming sector itself, farmers low on the farm size ladder are discriminated against in the allocation of credit. This implies that the degree of credit constraints deepens as one moves down the farm size ladder.

7.4.2   Policy proposals

The traditional view of the small-scale farmers or of the poor as passive recipients of subsidized credit and charity has been challenged by the poor themselves. The results of the study have strengthened and demonstrated the role of the poor as economic agents ready to pay for services tailored to their needs. In addition, the study also indicated that having access to credit[13], small-scale farmers could improve their productivity, hence enabling them to pay market related interest rates for credit. Since the experience with subsided credit has been rather unfortunate, both in subsistence and commercial agriculture, this should not be policy. It is a counter-productive tool, and it should be a policy to avoid such subsidisation. The insistence on market rates in the White Paper on Agricultural Policy in South Africa is therefore strongly supported.

However, it must be pointed out that a credit policy, which improves access to formal credit for small farming enterprises is a necessary condition, but not sufficient in itself to solve the inequality and stagnation problems encountered in the small-scale farming sector. It is therefore imperative that the appropriate incentives are provided that will enable farmers to maintain a high level of production and adequate returns on capital investible and labour employed.

It is argued that lack of access to credit can distort the pattern of agriculture growth and income in small-scale farming sector. However, most profit maximising banks have continuously and systematically rationed small farms on the basis of the high cost and

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[13]   Access to credit will mean very little if most of the distortions such as lack of clearly specified property rights, access to effective research and extension services, lack of serviceable and reliable marketing channels, imposition of anti-agricultural price policies by urban based government, and lack of savings and insurance facilities are missing.

riskiness of the enterprise. It is therefore imperative that financial strategies and innovations designed to improve the small-scale farmer's access to credit should first modify the existing rural financial environment by firstly reducing the cost and risk to financial institutions of delivering credit services to small farmers, and secondly, by lowering the cost to small-scale farmers of gaining access to these services. The challenge is therefore to develop strategies that will address these two issues. Among the financial strategies that could improve credit access for small-scale farmers as well as reducing cost and risk to financial institutions are:

- Restructuring of poorly performing financial institutions.
- Development of an effective and efficient financial infrastructure.
- Decentralization of major role-players in agricultural financial markets.
- Credit based on social collateral and other collateral substitutes.
- Development of non-farming economic sectors in rural areas.

Restructuring of poorly performing financial institutions

As the South African rural financial system undertakes a paradigm shift towards a more market-based approach, many participants are still paying the price in the form of costly, poorly performing institutions. The rehabilitation or restructuring or even the possible closure of government owned agricultural and rural banks/institutions that do not enjoy adequate autonomy, and that lack professionalism to improve their services and make them financially viable and sustainable, should be top priority for policy makers.

Most retail level institutions do not have adequate capacity to expand the scope and outreach of their services on a sustainable basis to most of their potential clients. Many institutions:

(i)   Lack capacity to leverage funds, including public deposits, in commercial markets.

(ii)   Are unable to provide a range of products and services compatible with the potential client's characteristics.

(iii)   Do not have adequate network and delivery mechanisms to cost effectively and efficiently reach the poorest of the poor, particularly those concentrated in resource-poor areas and areas with low population densities.

(iv)   Do not show a vision and a commitment to ensure their financial soundness and sustainability within a reasonable period and to become subsidy independent.

There is an urgent need to promote the development of efficient rural financial markets with the institutional capacity to mobilize savings effectively and efficiently, leverage funds, provide credit based on prudent banking principles in cost effective ways, reduce their transaction costs as well as those of their clients, improve management information and accounting systems, and manage risks to expand their services.

The current restructuring of some of the rural financial institutions to effectively and efficiently provide the needed services to its clientele is in the right direction. There is the need to strengthen the human resources and knowledge base through adjustment in the staff skill-mix in the operational departments and offices. Areas worth looking at are:

1. The improvement of staff involved in lending-related work at a general level, including managers of operational units in finance development institutions.

2. Thorough training of staff involved in processing and administration in various aspects of lending, such as product development and design of projects focused on the poorest of the poor and on resource-poor areas.

3. The improvement of the knowledge base of the staff regarding pro-poor financial technology and institutional modalities.

4. Increasing staff exposure to international best practices in agricultural and rural finance.

The institutional development of rural financial institutions needs to encompass the strengthening of the management information systems and accounting policies and practices, efficient management of their loan portfolios to ensure quality and growth, and the development of systems and procedures and financial technology for reducing transaction costs. The existing evidence suggests that there is no best banking

technology. What makes the difference between success and failure in the end is a) the environment in which the lending institutions operate (micro, meso, and macro); b) the quality of governance within the lending institutions; c) the detailed design of financial services and banking technology; and d) the quality of the lending institution's human resources (Lariviere & Martin, 1999:10; Chaves & Gonzalez-Vega, 1996:68)

Development of an effective and efficient financial infrastructure

Financial institutions can develop sustainable commercial services on a permanent basis, and expand their scope of operation and outreach, only if they operate within an appropriate financial infrastructure. Both policy makers and financial institutions should therefore focus on critical elements of financial infrastructure, such as the information systems and training facilities necessary for the development of the rural financial system in South Africa. The legal framework, supervision and regulation of the financial institutions are important because they facilitate sound growth and improve the capacity of financial institutions to leverage funds in the market and provide competition. Policy makers are encouraged to ensure that legal and regulatory systems do not discourage financial innvovations, stunt institutional growth, and allow the emergence of a diverse set of dynamic institutions. For instance, the present legal system systematically prevents collateralization of the type of assets small-scale farmers or micro-entrepreneur have, thereby creating an obstacle to innovative lenders to reach this clientele through the use of non-traditional collateral. The contract enforcement milieu is extremely important in creating the "setting" for lenders to engage in innovative practices to expand access downstream. The results of the marginal credit impact in the study strengthen the argument against the usury law currently in effect in South Africa, since small-scale farmers can pay market related interest rates on loans.

Decentralization of major roleplayers in agricultural financial markets

Expansion of banking outlets contributes to rapid credit delivery, increased credit turnover, and lower administration costs due to economies of scale. By reducing costs, decentralising branches and improving credit evaluation, financial institutions could more easily afford to service small loans and deposit accounts needed by low-income customers.

The need for decentralised structures is rather obvious. Financial institutions which are highly decentralised in their operations, for example Grameen Bank, have achieved much wider coverage and reached a far higher number of borrowers than those operating from a single head office or from a regional office at a distance that may be difficult for some to reach. A centralised system as found in many parts of Africa - and also that of the Land Bank and some development corporations in South Africa - leads to costly delays and high transaction costs. In the event of difficulties leading to prohibitive costs of decentralised structures, the state can consider some subsidisation of operating costs, provided it will have a reasonably short life, for example, eight years, and provided that the subsidisation is systematically reduced according to a predetermined time-scale. While decentralisation will obviously entail more branch offices for some institutions such as the Land Bank, on smaller levels these institutions can be represented by other decentralised structures. These may be local co-operatives, or even local informal borrowing and lending groups. Stokvels may even serve such a purpose.

The proposal regarding the possible emergence of specialised rural institutions does not in any way imply that they should be favoured or given preferential treatment by the state *vis-à-vis* the commercial banking sector. The need for competition implies a level playing field. Thus, if the state decides to fund institutions such as the Land Bank, this should not be in the form of grants, but as loans from the state to these institutions at market-related rates of interest and other loan conditions. Otherwise, the state should confirm the current status quo wherein the Land Bank obtains its funds from the capital market. All impediments to rural actions by the commercial banks and all existing legal arrangements discriminating against them should be withdrawn.

Credit based on social collateral and other collateral substitutes.
Financial institutions should reconsider the conventional concept of security. The dominant form of conventional security is the ownership of land embodied in a title deed to land. The most important norm in extending credit to farmers should be the ability of farmers to repay the loan, and the best motivation to repay a loan will be access to future loans.

Character-based assessment and pragmatic concepts of collateral through group guarantees should be encouraged. The adoption of character references as a borrower screening technology has important implications in terms of operating costs. Character-based lending is an inexpensive technique for two reasons. Firstly, local information about a borrower is a sunk cost, in that it is an asset that does not have a value outside the local financial market. Secondly, such information is acquired in a slow fashion, the only needed expenditure resulting from having been in the location for sufficiently long period of time. Character based lending seems to have been comparatively efficient in avoiding costly mistakes in assessing the probability of loan repayment. Financial institutions should be encouraged to relax requirements for physical collateral and use social collateral in its place.

Guarantee based on self-help organizations (SHOs) is also worth looking at. Apart from providing guarantees for members who negotiate loans with formal financial institutions, most lending to self-help groups is guaranteed mutually by all members. To address the problem of idiosyncratic risks, a group life insurance scheme could be undertaken by the SHOs to cover exceptional cases where default may result, example at the death of a member.

Investment in rural infrastructure

A high shadow price of capital as indicated in the results of the study, signals the absence or weakness of institutions which could assist in the provision of financial services to small-scale farmers. One way in attracting these missing institutions to the rural areas is for the government to invest in both soft and hard infrastructure.

Investments are required in a) physical infrastructure, especially irrigation, roads, communication and electricity (the importance of farm-to-market roads in determining marketing margins, agricultural profitability, and farm diversification cannot be overemphasized); and b) human infrastructure, especially education, nutrition, and health, to increase their well-being and productivity. Investment in infrastructure and communication will help to drive down the transaction costs of providing financial services in rural areas. Investment in rural infrastructure will also act as catalyst for the establishmnt of some of the missing institutions which tends to create market failures in

rural financial markets. The threshold for entry into the financial market is simply too high for many. Hence, creating a conducive environment in rural areas is one of the areas that will require more attention.

7.4.3   Future research

This study did not estimate the average loan amount that will maximise income for borrowers. An analysis of the average loan size would provide some insight into the optimality of the loan size offered by the lenders. Further research into the optimal average loan size for the various farm sizes would also provide useful information to lenders on how much credit should be offered to the various farm size groupings. Apart from the use of the endogenous switching regression method, the use of the linear programming method will generate useful information on the optimal amounts of the various resources that should be used by these small-scale farmers in order to reap the maximum returns from the use of credit.

It was established in the study that both the use of credit and latent borrower characteristics contributed significantly to the productivity of borrowers' farms. The results imply that borrowers do have the advantage in performance over non-borrowers as a result of their inherent characteristics, even when operating without credit. It would be interesting to identify these latent characteristics, which contribute to the increase in farm productivity of the borrowers. The identification of these latent characteristics would have significant implications on policies directed at improving the small-scale farming sector.

Research into the behaviour of credit institutions in the country will also help to explain some of the actions taken by credit institutions as well as assisting policy makers in formulating the appropriate interventions. Lastly, the study relied on cross sectional data; it would be useful if a similar exercise were done using time series data. A comparative analysis could then be done to see which of the two data sets are able to decompose the impact of credit into its direct and indirect effects. In additional, the time series data would provide an insight into the different levels of output in relation to credit use over time.

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MAP SHOWING DISTRICTS OF STUDY AREA
WITHIN THE NORTHERN PROVINCE
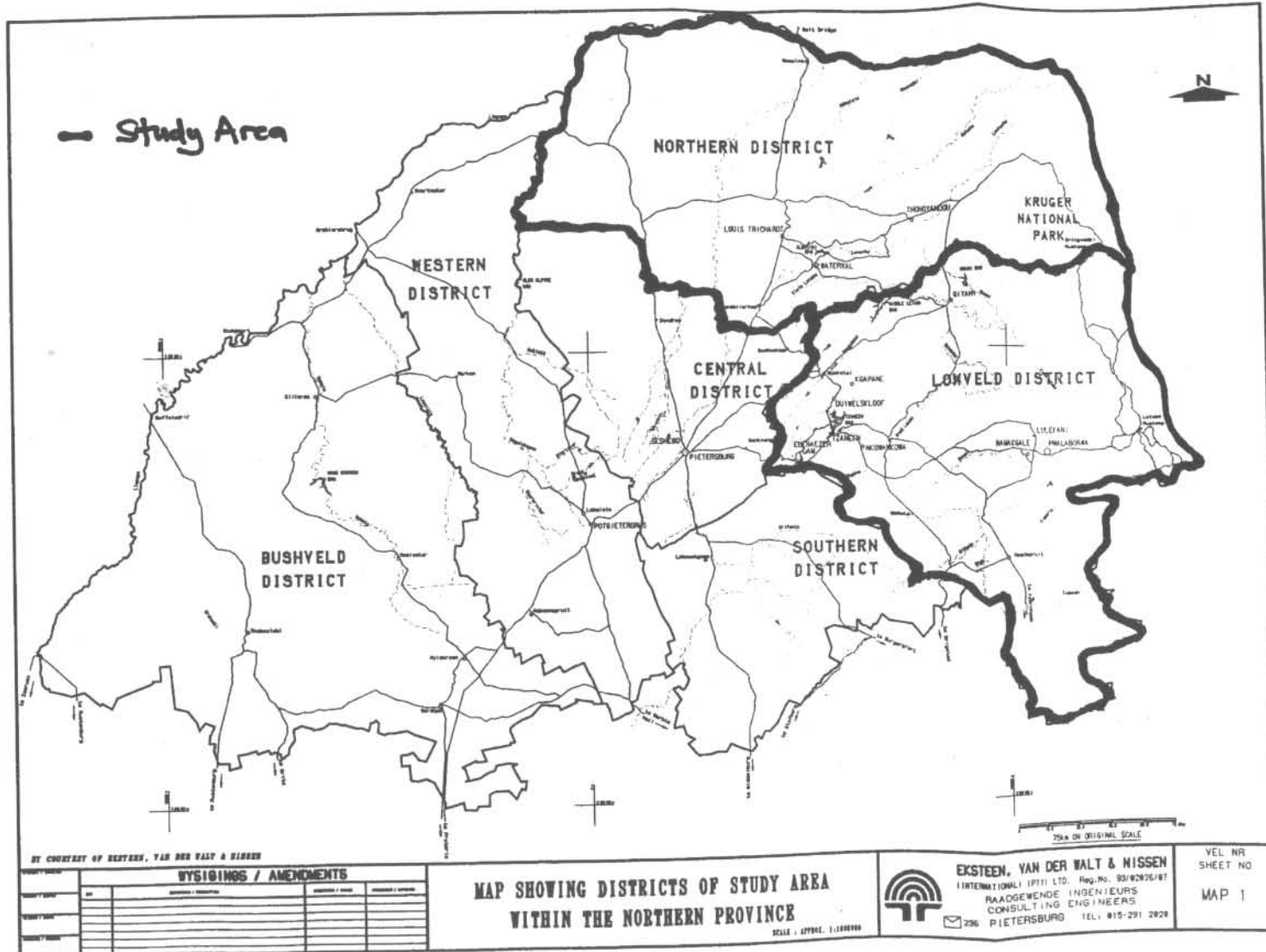
APPENDIX 1: MAP SHOWING THE STUDY AREA

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