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**THE IMPACT OF GRAMEEN BANK CREDIT  
ON THE LEVELS OF INCOME, EMPLOYMENT, AND PRODUCTIVITY  
OF POOR LANDLESS HOUSEHOLDS IN RURAL BANGLADESH**

**BY**

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**DISSERTATION**

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This dissertation prepared under my direction by:

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# CHAPTER 1

## INTRODUCTION

### 1.1 Background To the Study

In the realm of development economics, the mitigation of the impoverished conditions of people the world over remains an elusive goal. Millions of people still live in absolute poverty and the discrepancy between the rich and the poor grows by the day. The problem is most acute in developing countries, and Bangladesh is a primary example. Despite sustained domestic and international efforts to improve the economic and demographic conditions and prospects of the nation, Bangladesh remains one of the poorest, most densely populated, and least developed countries in the world.

In Bangladesh, development efforts of the past have consistently and systematically bypassed two important and often overlapping groups: the rural landless poor and women. At the bottom of the economic, social and political hierarchy, these men and women are generally considered the poorest of the poor. Lack of employment opportunities and of seed capital for self-employment prevents them from utilizing their labor resources to rise above poverty. For reasons described in Chapter 2, this group is virtually shut out from the two traditional credit sources – both the formal credit sector comprised of government and commercial banks, and the informal credit sector comprised mainly of village moneylenders.

In recent years, the need to address the particular financial requirements of the very poor and to fill the gap caused by failures in the traditional credit markets have led to the rise of alternative banking systems. These institutions are collectively known as the “semiformal” credit sector. A pioneer in this new sector has been the Grameen Bank of Bangladesh. The Grameen Bank is an innovative credit delivery system that disburses small loans to poor individuals in rural Bangladesh. Proclaimed a developing world wonder, the Grameen Bank scheme and success story have set off a string of replication efforts throughout the world, including several in the United States.<sup>1</sup> The prominence of the Grameen Bank and other similar micro-finance institutions, particularly in developing nations, points to the rise of the semiformal credit sector as a new and vital piece of the development puzzle. Today, semiformal credit institutions are growing and expanding throughout the world as a response to a demand for credit by those who are not able to gain access to or feasibly partake of existing credit sources.

The Grameen Bank was begun as an experiment in 1976 by economist Mohammad Yunus. The Bank was conceived as an institution that provides small amounts of collateral-free interest-bearing loans to the most needy, those who are generally considered completely unworthy of credit by the commercial and government banks in Bangladesh. From the outset, the Grameen Bank emphasized that it is not a program to administer grants or handouts to the poor. On the contrary, the Grameen Bank philosophy holds that the poor have many productive and survival skills that can be applied towards income generating activities. This philosophy also rests on the important

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<sup>1</sup> Appendix A provides a partial list of Grameen Bank replications in other countries.

assumption that the poor know best how to utilize their own resources. The fundamental idea, therefore, is that the most promising way to enable the poor to emerge from the grips of poverty is to help them start their own income-earning projects by providing them with credit.

The target group of the Grameen Bank consists of poor landless and near-landless men and women in rural Bangladesh. In keeping with current development literature, the Grameen Bank describes the term “landless” as any person who owns less than 0.5 acre of cultivable land, and the value of all the family assets together does not exceed the value of one acre of medium quality land. Today the Grameen Bank has over two million borrowers, with over a thousand branches that reach more than half of all the villages in Bangladesh. The cumulative amount of loans disbursed as of 2000 was US \$3520.65 million. In a nation that is traditionally culturally conservative and male-dominated, women surprisingly comprise 95% of all borrowers. Most interestingly, the Bank boasts an astounding average loan recovery rate of 97% (Grameen Bank Annual Report, 2000).

## **1.2 Objectives of the Study**

Broadly speaking, the purpose of this study is to examine the economic impact of Grameen Bank loans on poverty alleviation in Bangladesh. More specifically, this research focuses on the role played by credit on the liquidity constraints faced by the very poor, and consequently on their economic well-being. The study seeks to address the

following research question: **How does the provision and application of small loans offered at a reasonable rate of interest by the Grameen Bank affect the levels of employment, income and productivity of poor households in rural Bangladesh?** In line with this theme, I hypothesize that there is a positive relationship between micro-credit to the very poor and their economic well-being, characterized by enhanced labor use, higher incomes and greater productivity. I attempt to test this hypothesis by adopting a fragmented economy framework for developing nations as described McKinnon (1973). I then apply a variant of the credit market model [developed by Ahmed and Randolph (1995)] that focuses on a relationship among credit, labor, and income.

### **1.3 The Structure of the Study**

This study is structured into seven chapters. Following this introductory chapter, Chapter 2 provides a background of the landless poor in rural Bangladesh and the role of credit in their lives. Specifically, the chapter focuses on the major development efforts of the past and discusses how and why the rural landless poor have been systematically marginalized by a deeply entrenched culture of poverty. This chapter also describes the traditional formal and informal sources of credit in Bangladesh, and sheds light on the acute liquidity constraints faced by the rural landless poor.

Chapter 3 elucidates the unique credit delivery system of the Grameen Bank. It describes how the Bank manages the issues of screening, incentives, and enforcement through the innovative features of group lending, staggered disbursement, peer

monitoring and social collateral. Drawing on current literature on the experiences of the Grameen Bank, this chapter also discusses the socio-economic impact of the Bank's lending program, and focuses particularly on the participation of women. In addition, this chapter addresses challenges to the Grameen Bank's remarkable banking record and reporting accuracy, and looks into questions of the program's long-term financial viability. This chapter is based partly on interviews with Grameen Bank staff and borrowers, and on a field trip that I took to a branch in Narsingdi during an internship at the Bank in the summer of 1997.

Chapter 4 examines the theory of the impact of credit on the rural labor market. Specifically, it describes the labor market model to be used as the theoretical basis for this study. In addition, the chapter focuses on the theoretical predictions of the effects that credit will have on the levels of employment, income and labor productivity of poor households in rural Bangladesh.

Chapter 5 presents the estimating equations and also provides the model predictions and theoretical testing on employment, income, and productivity. In addition, it describes the type and sources of data to be used in this study, defining all the explanatory and dependent variables. Chapter 6 presents a summary of the empirical evidence on the effects of Grameen Bank credit on the levels of employment, income and productivity of poor rural households in Bangladesh. Finally, Chapter 7 draws together the findings and conclusions of the study.

## CHAPTER 2

# THE RURAL LANDLESS POOR AND THE ROLE OF CREDIT IN BANGLADESH

### 2.1 Introduction

This chapter examines the condition of the landless and near landless people in rural Bangladesh.<sup>2</sup> For this purpose, particular attention is given to how and why this group of men and women has been systematically marginalized by a deeply entrenched culture of poverty. The potential for the economic growth of this group is also discussed. In addition, the important role of credit in the lives of poor people in rural Bangladesh is addressed, with specific focus on the acute liquidity constraints that the poor face. In this context, the traditional sources of formal and informal credit available to the rural population in Bangladesh are described in detail.

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<sup>2</sup> In this study, the term "landless" is used to describe any person who owns less than 0.5 acres of cultivable land, and the value of his/her family assets together does not exceed the value of one acre of medium quality land (Grameen Bank, 1996).



## **2.2 A Profile of the Rural Landless Poor in Bangladesh**

In Bangladesh, a large section of the population experiences material deprivation and uncertainty of livelihood for some, if not most, parts of the year. For many of these poor people, life is precariously balanced between subsistence and destitution (Osmani, 1991). According to BRAC (1994), the level of absolute poverty in Bangladesh is staggering. This grim reality is reflected by high infant mortality (90.6 per thousand live births), high illiteracy (75 percent of all ages), low average calorie intake (85 percent of the requirement), and a high head count measure of poverty (49 percent of the population in 1988-89). At the bottom of the economic, social and political hierarchy in Bangladesh are the rural landless and near-landless people, generally considered the poorest of the poor.

Comprising nearly 85 percent of the total land area, the rural sector represents a significant portion of the Bangladeshi economy. According to the study by BRAC (1994), an estimated 53 percent of the rural population was landless in 1988-1989. Specifically, 53 percent of rural households either owned absolutely no land, owned homesteads only, or owned less than half an acre of cultivable land. These rural households, unable to rely on land as a source of income, face persistent vulnerability to hunger and dispossession due to the workings and whims of everyday life. As a result, factors such as illness, a general recession, or the mere seasonality of work often lead to the loss of physical productivity and income-earning opportunities. In this regard, greater shocks such as the death of an earning member of the family, crop failure, and natural calamities can bear disastrous consequences.

The most marginalized group of the rural landless poor comprises women, who suffer a double disadvantage by virtue of their class and their gender. In Bangladesh, women's life expectancy is lower than men's (54 for women and 55 for men), a phenomenon not seen outside South Asia. Furthermore, women's literacy rate is half that of men (less than 15 per cent for women and 31 per cent for men) and poor rural women head more households and are far more active than women at higher levels of income. In the traditionally conservative and male-dominated Bangladeshi society, there are few opportunities for women to earn an income outside the home. When circumstances necessitate such work, it is commonly viewed with social stigma. In general, the effort, skills and contributions that women make to the Bangladeshi economy often go unrecognized and unappreciated.

The condition of being poor and landless or near-landless in rural Bangladesh deserves special attention. The poor often suffer from chronic malnutrition and the tremendous mental and physical impact of hard labor. Poor children are typically under-nourished and drop out of school at an early age to contribute to family income. Young girls are often married off to lessen a family's financial burden. The opportunity of poor children to rise beyond their parents' circumstances is bleak. Chandler and Fuglesang (1988) describe a "culture of poverty" created and perpetuated by an aggregate of socio-economic forces which are outside the control of the poor. In Bangladesh, households generally associate in clusters or groups. These informal social factions are based on political allegiances, kinship ties and/or geographical proximity that often play an important role in regulating inter-household behavior and cooperation. Members of a

faction provide each other with mutual support when there is conflict and engage in casual loan transactions, mutual labor exchanges and information exchanges. While solidarity within a faction is strong, divisions between factions make large-scale economic and social cooperation among the poor extremely difficult. This social discontinuity leaves the poor defenseless to exploitation by those more well-to-do even within the same faction.

The internal hierarchy of a faction is structured vertically, with the poorest households obligated to be subservient to the moneyed landowners who play the role of benefactor and protector.<sup>3</sup> In Bangladesh, the landless are particularly vulnerable in times of famine. Famine can be brought about by various natural factors such as the timing of rain, lack of rain entirely, pest infestations of crops, tidal waves and flooding. The practice of stockpiling, when larger landowners often join forces to maintain informal monopoly control of the food supply, can aggravate the food shortages that arise during such times.. As shortages appear, more supplies are diverted into storage and prices begin to rise. In addition, agricultural production often falls, resulting in a decline in demand for farm labor. Hence, the poor are generally hit with both lower wages and higher prices. In times of such hardship landless tenants and wage employees are often forced to appeal to wealthy landowners to make ends meet. The likelihood of repaying such consumption loans is usually very low, frequently leading to the transfer of land, jewelry and other

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<sup>3</sup> In Bhaduri's (1973) model of semi-feudalism in West Bengal, India, landlords have two sources of income: rent and usury. The landlords oppose any changes, technical or institutional, which by increasing the tenant's income would markedly reduce their own usury income or would free their tenant from the indebtedness that forms the basis of the landlord's economic authority. This can be applied to the case of the landless and near-landless in Bangladesh who, even if they may not be tenants, operate within a similar power structure.

assets as compensation. The severity of the situation is worst for the poorest as the village social structure prevents suffering to be borne equally by all community members. In effect, the social discontinuity, dependence relationships and seasonal occurrence of deep economic distress collude in a continuous process of land and asset transfer from the poorest part of the population to the most wealthy. Consequently, the landless poor in Bangladesh remain in a state of perpetual distress and indebtedness.

### **2.3 The Potential for Economic Growth**

In Bangladesh, traditional economic development efforts have rarely addressed the specific needs of the absolute poor. The group that has been virtually overlooked is the rural landless sector, particularly landless women.<sup>4</sup> Examination of international and domestic development efforts to reduce poverty provides some economic insight into this troubling fact. Contemporary analyses on the causes of poverty throughout the world have largely focused on why some countries are poor, rather than why certain segments of the population within a given country live below the poverty line. In particular, practical development strategies, such as large-scale urban industrialization and the “green revolution” of the 1960s and 1970s, have generally failed to solve the problems of employment and poverty. By and large, researchers and policy-makers alike have failed to recognize the significance of the rural landless sector in a developing economy such as Bangladesh.

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<sup>4</sup> Dasgupta and Ray (1986), Fields (1980), Reutlinger and Selowsky (1976), and DaCosta (1971), among others, suggest that the absolute poor are among the landless and near landless people.

In the context of this study, two broad economic philosophies can be identified to shed light on factors that may have led to the neglect of this important group. The first theory postulates that income inequality within a nation is beneficial to growth.<sup>5</sup> Looking towards the developed world, this theory certainly seemed to hold true.<sup>6</sup> Beginning in the 1960's, the idea that income inequality within a country is growth enhancing also dominated poverty alleviation efforts in many developing nations. However, this conventional wisdom has been challenged by several empirical studies in recent years. Surprisingly, the results of these studies [by Benabou (1996), Alesina and Rodrik (1994), Persson and Tabellini (1994), Perotti (1996), Ahgion, Caroli, Garcia-Penalosa, 1999, among others] consistently show a negative correlation between the average rate of growth and a number of measures of inequality.<sup>7</sup> Taken together, these studies contradict the traditional view and strongly suggest that equality is beneficial to growth and redistribution can foster development.

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<sup>5</sup> This view is based on the so-called Kuznets' Hypothesis, which purported an inverted U-shaped relation between income inequality and GNP per head (Kuznets, 1963). The idea was that in the process of moving from a rural to an industrialized economy, income inequality in a nation would initially increase as a result of increasing incentives, greater investments by the rich, and greater urbanization and mechanization. As a nation developed further, income inequality would decrease as larger proportions of the rural labor force became absorbed by a growing industrial sector. For developing nations, the implication of this hypothesis was to drive economic growth by advancing the urban sector through up-graded technology and large-scale industrialization. The increasing income inequality between the urban and rural sectors was seen as a natural, and ultimately healthy, economic phenomenon.

<sup>6</sup> In the United States, for example, the share of total wealth owned by the 10 percent richest households rose from 50 percent around 1770, to about 75 percent around 1870, and then receded back to 50 percent in 1970.

<sup>7</sup> Roland Benabou (1996), looking at the case of South Korea versus the Philippines, followed the growth and development of the two countries over a thirty-year period starting in the early 1960s. At the beginning of this period, the major economic indicators of the two countries (GDP per capita, investment per capita, average saving rates) were very similar. They differed significantly in the degree of inequality, with the ratio of the income share of the top 20 percent to the bottom 40 percent being twice as large for the Philippines than for South Korea. Over the next thirty years, contrary to expectation, the output level in South Korea grew fivefold whereas in the Philippines it barely doubled.

The second theory presumes that the rural segment of a nation is a monosectoral economy comprised of agriculture. Typically, traditional advancement efforts have equated “rural” or “village” activities/sector with “agricultural” or “farm” activities/sector. This view assumes that all rural people are landowners engaged in some type of farming occupation, with labor being allocated between two major activities, agriculture and non-work or leisure. Even theories that recognize a more accurate depiction of rural life generally postulate that with economic growth, the rural non-agricultural sector would inevitably decline.<sup>8</sup> For developing nations, the implication of this hypothesis is that the key to rural development is through the active and exclusive promotion of agriculture. This view has also been challenged in recent years.<sup>9</sup> Several studies [Anderson and Leiserson (1980) and Chuta and Liedholm (1984)] show that although it is an area that has generally been neglected by policy makers, the rural non-agricultural sector merits special attention. Particularly in countries like Bangladesh where agriculture is the predominant sector of economic activity, the role of rural non-agricultural or non-farm activities has emerged as an important research concern in development economics.

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<sup>8</sup> Hymer and Resnick (1969) indicated that time devoted to agriculture and leisure did not account for total labor time. The remainder of the time was assumed to be engaged in various activities such as “processing, manufacturing, construction, transportation, and service activities to satisfy the needs for food, clothing, shelter, entertainment and ceremony.” Looking at economies in the colonial era, the Hymer-Resnick model predicted that as a rural economy became increasingly linked to the world economy, two important developments would occur. First, labor engaged in rural industry would be reallocated to the new profitable export activities that opened up in the world market. Second, superior imported goods would replace domestically manufactured industrial goods, inducing labor to move out of rural industry to focus on the production of cash crops for export.

<sup>9</sup> Bautista (1970) and Fabella (1990) have developed models that challenge the eventual decline of the rural industrial sector as predicted by Hymer and Resnick. Ranis and Stewart (1991) revisit the Hymer-Resnick model and determine that many assumptions no longer apply in the post-colonial era.

These two theories help to explain why economic development efforts in Bangladesh may have neglected the poorest segment of the population. It is useful, therefore, to look at the problem of rural poverty anew.

Although agricultural activity is the single most important economic activity in rural areas, in Bangladesh more than fifty percent of the rural population are landless. About two-thirds of this rural population are engaged in non-farm or non-agricultural activities. Chuta and Liedholm (1984) report that in Bangladesh, 70 percent of industrial establishments are located in rural areas. While farming offers seasonal or part-time work to the landless poor as wage employees or sharecroppers, a majority of these people are self-employed. Most engage in countless diverse non-farm economic activities such as bamboo and cane works, paddy and pulse husking, rickshaw transport, cloth weaving, embroidery, book binding, fish-net making, signboard painting, masonry, etc.<sup>10</sup> These activities are the primary source of employment and income for the rural landless poor.

In a country that ranks among the highest in terms of population density, there are limits to what agriculture can provide. A 1983 World Bank study on employment problems in Bangladesh estimated that even a 3.7% rate of growth in crop production, which is ambitious considering the historical record, can absorb only about a quarter of the increase in the labor force. The report concluded that most of the increase in employment would be taken by underemployed family workers, and predicted that the problem of the landless would get worse unless they are productively absorbed in non-agricultural activities.

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<sup>10</sup> Appendix B provides a list of typical non-farm activities in Bangladesh.

In general, non-farm activities in rural regions expand quite rapidly in response to agricultural development. Often, increases in rural labor incomes for the lowest income groups depend heavily on growth in the demand for rural labor outside of agriculture. Non-farm activities supply a tremendous range of goods and services to agriculture and the rural population in general, contributing to the growth of agricultural output as well as the improvement of living conditions in rural areas. In addition, the concentration and growth of non-farm activities in rural areas localize employment opportunities for people who choose to or are forced to leave agriculture. This localization can also stimulate a degree of decentralization of urban expansion.

It appears that there exists a strong positive relationship between the achievement of dynamic balanced rural growth and success in the overall development effort for a system as a whole. In formulating effective and equitable policy for rural progress, closer attention must be paid to the non-farm sector as well as to agriculture, and to the landless population as well as to the wealthier landlords. Thorough scrutiny reveals a complex and interdependent web of relationships between the two major rural economic groups. The literature reviewed indicate that a real promise in the advancement of Bangladesh lies in the development of the rural non-agricultural sector, the landless and near-landless men and women representing a huge untapped asset. Therefore, the mobilization of this large rural sector, by engaging the landless population and fostering small-scale non-farm activities, is vital to the future economic prosperity of Bangladesh as a whole.



## **2.4 The Rural Landless Poor and The Credit Market**

In Bangladesh, however, there exists very little recourse for the landless and near-landless population to break out of the oppressive culture of poverty. Without land to depend on as a source of income, the poor are left to rely solely on their own labor, which is generally undernourished and underpaid. To outsiders, poverty is often seen as a self-inflicted, self-generating phenomenon. The poor are typified as lazy, unskilled and unambitious people who are incapable of making sound economic decisions and must be told what is good for them. According to Yunus (1981), although they may be illiterate, the poor are tremendously hardworking, possess many skills that often cannot be employed as earning potential for lack of proper opportunity, and have an indomitable instinct for survival in the face of great obstacles and adversity. The hidden virtue of the landless may lie in the fact that they are not tied to the land and are therefore likely to be more enterprising, mobile and receptive to new ideas as a matter of basic survival.

Access to credit can enable the landless poor to acquire resources and utilize them towards an income-earning endeavor as they see fit. For example, consider a typical woman in rural Bangladesh who is adept in sewing, needlework and crochet. She could borrow a small sum of money at a reasonable rate of interest to purchase cloth, thread, needles, etc. Using her skills, she could produce decorative handkerchiefs, napkins and pillowcases, which she could sell at market or to wealthier local clients in the community. The income from the sale of her products could enable her to feed her family better and accumulate some assets. As an income earner, she would gain self-confidence and esteem, earn respect in the eyes of her husband and children, and expand her base to

negotiate, as a member of both her family and society. Credit, therefore, could allow her to break the vicious cycle of poverty. As Shams (1992) has pointed out, the situation arising from low income, dissavings, disinvestment and still lower income could change with the injection of credit. In such a situation, the injection of credit could lead to savings and investments, higher income, more savings, larger investments, and so on.

Hence, credit seems to be key. In his study, Perotti (1992) found a positive and significant relationship between credit availability and the rate of economic growth. Chuta and Liedholm (1984) have also reported that credit and capital are the greatest assistance needs and perceived bottlenecks to rural entrepreneurs. Furthermore, they indicate that this demand for credit by rural entrepreneurs is quite sizable. However, access to credit is often a constraint in Bangladesh, especially in rural areas. Although it is generally believed that credit could enable the poor to free themselves from the grips of persistent impoverishment, the rural landless poor, by definition, do not possess the assets or capital to obtain the credit to begin an income-earning venture. The entry of potential borrowers to credit market is highly restricted. The rural landless group, in particular, appears to be virtually shut out from the conventional sources of credit.

Traditionally speaking, the rural population in Bangladesh have two basic sources from which to obtain credit, namely: (i) the formal credit market comprised of the commercial and government banks, and/or (ii) the informal credit market comprised mainly of the local moneylenders of the landed gentry, but also including relatives, neighbors, local merchants, etc. These credit sources are described in detail below.

### **2.4.1 The Formal Credit Market**

The history of formal banking in Bangladesh has been dismal to say the least. The Nationalised Commercial Banks (NCBs) typically cater to a literate, well-to-do, urban male clientele. These establishments are often plagued by bureaucratic informalities and are subject to political influence. There is little accountability or transparency. Branches of NCBs in rural areas are generally used to siphon off deposits to urban branches. They are neither intended nor equipped to make credit available to the community in which they operate. In addition to the commercial banks, institutional credit to the rural sector is channeled through several agencies, led by the Bangladesh Krishi (“Agriculture”) Bank. Loans are given specifically to small and large farmers, requiring land or other physical assets as collateral. Typically, loans are applied to tea gardens, fisheries, short-term crop production, shallow tube-wells, cold storage, etc. The recovery rate for the Bangladesh Krishi Bank remains around 65 percent.

In the early 1980s the presumed inefficiencies of most public enterprises led to the rise of several specialized financial institutions designed to serve the credit demands of private entrepreneurs, notably the Bangladesh Shilpa (“Industrial”) Bank and the Bangladesh Shilpa Rin (“Savings”) Institution. The loan repayment performances of private enterprises to these institutions have been poor, with considerable accumulation of overdues in payment liability and its growth over time (Sobhan and Mahmud, 1981). The strategy to build up private entrepreneurship in Bangladesh has shown little progress in regenerating investible resources.

Both the specialized and commercial banks give out loans on the basis of a collateral system of asset ownership and repayment potential. The viability of lenders depends on the likelihood of repayment and the ability to enforce contracts. For formal bankers who generally lack information about rural borrowers, collecting such information is costly. In addition, the appropriate legal system for enforcing contracts and loan recovery does not exist. Poor rural borrowers usually do not possess the appropriate collateral, are often illiterate and have no formal credit history. As such they are considered bad credit risks and are effectively shut out of partaking of formal credit sources.

#### **2.4.2 The Informal Credit Market**

In Bangladesh, the largest source of lenders to the poor are friends, relatives and wealthier neighbors (Islam and Rahman, 1985). In these transactions, personal relationships serve as collateral. These loans are generally not interest-free as might be expected. Often, interest rates charged by friends and relatives are no different from those charged by other lenders. In most instances, the only option for the rural poor is to go to the informal moneylenders, or “mohajans” of the local landed gentry. These wealthy creditors often avoid the problem of asymmetric information and the risk of loan default by lending to neighbors or by selecting borrowers based on patron-client relationships. As such, they are also better able to enforce contracts. Informal moneylenders also often

enjoy monopoly power. As a result, they often pose a credible threat to borrowers to cut off future credit in case of default, thus further increasing borrowers' incentive to repay. This allows informal lenders to charge usurious interest rates; rates of up to two hundred per cent are not uncommon. Repayment of loans by the rural poor is often impossible. In case of default, the transfer of any land, labor, jewelry, agricultural produce, household assets, etc., may be required as compensation, thus further impoverishing the rural poor. There is evidence to suggest that the role of traditional moneylenders is waning, although in some cases a newer class of salaried employees is replacing it (Banik, 1993). Historically accounting for about eighty per cent of all rural credit, informal money-lending is an age-old institution dictated by rural power structure that is so entrenched that neither the lenders nor the borrowers seem to notice the highly oppressive nature of the contracts.

In effect, it can be said that the poor rural landless population in Bangladesh remain isolated and oppressed by a "culture of poverty". Although they constitute a large segment of rural society and are most in need of credit for mere physical survival, these disadvantaged men and women mainly reside outside the scope of traditional credit systems. The last two decades, however, have seen the rise of new banking institutions that attempt to fill the gap caused by failures in the traditional credit markets. In the next chapter, the focus turns to a pioneer in this new sector: the Grameen Bank of Bangladesh.

## **CHAPTER 3**

### **THE GRAMEEN BANK : A REVIEW**

#### **3.1 Introduction**

This chapter presents a general overview of the Grameen Bank in Bangladesh. Towards this end, a brief background of the Grameen Bank and its unique credit delivery system is provided. In particular, the distinctive features of group lending, peer monitoring, staggered loan disbursements, and weekly repayments are discussed in detail. Following this, a select review of prominent literature on the Grameen Bank is presented. Three primary areas of research are identified here. The first strand of literature examines how the Grameen Bank mechanism manages the issues of screening, incentives and enforcement associated with all loan contracts. The second strand focuses on the socio-economic impact of Grameen Bank credit on borrowers, particularly on women. Finally, a third strand addresses some pertinent questions regarding the Bank's record and reporting accuracy, as well as its long-term financial viability.

### 3.2 The Grameen Bank Institutional Organization

The Grameen (“Rural”) Bank was conceived in 1976 as an experimental action-project to address a local problem.<sup>11</sup> Specifically, the Grameen Bank project was an attempt “to find ways of providing credit for income-generating purposes to people at extreme levels of poverty, who were without means to provide physical collateral for loans, and unable to profitably borrow at the high interest rates prevalent in informal credit markets” (Ameen, 1996). The first loans from the Grameen Bank lending scheme were given out in 1976 to a handful of landless men and women in the village of Jobra in Chittagong. From the beginning it was specified that these small amounts of credit were not to be handouts or grants.

The rural poor had little to offer as collateral, had no credit history, displayed low savings propensities, and were too costly to reach. In effect, they were considered very bad credit risks. The conventional wisdom, based on past experience and prevalent attitudes in Bangladesh, expected the lending scheme to fail. However, contrary to these expectations, the borrowers put their loans towards productive uses and paid their loans back on time. Despite many challenges and criticisms from both the established banking system and the traditional social structure, the experiment continued to increase in number of borrowers and expanded to neighboring villages. In 1983, the Grameen Bank officially began operations as a full-fledged institution dedicated to serving the banking needs of the landless and near-landless poor in Bangladesh.

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<sup>11</sup> The idea came to Dr. Mohammad Yunus (a professor of economics at Chittagong University in Bangladesh), who noted that the rural area around campus was primarily inhabited by poor landless peasants. Furthermore, he realized that although these men and women had an acute need for credit, no institutional credit would ever reach them.

The performance of the Grameen Bank since then has captured the attention of researchers, policy-makers and development-oriented agencies around the world. In the last two decades, the presence of the Grameen Bank has grown exponentially throughout Bangladesh. By November 2001, the Bank had operations in 40,428 of Bangladesh's 68,000 villages, employing over 11,000 people. The official loan recovery rate is an astounding 97 percent, compared to the 50 percent recovery rate of other commercial banks in Bangladesh.<sup>12</sup> In a nation that is traditionally culturally conservative and male-dominated, women surprisingly comprise 95 percent of all borrowers. Challenging conventional wisdom, the Grameen Bank has shown that the poor are clearly bankable.

The Bank's general loans are given to individuals for a period of one year at a nominal interest rate of 20 percent. First time borrowers receive loans of about Taka (Tk.) 2,000 to 2,500 (approximately US \$40 to \$50).<sup>13</sup> Households are limited to one Grameen Bank loan at a time. Provided a borrower makes timely repayments, the loan amount is increased each year by Tk. 500 to 1,000. The average loan size in 2001 was US \$100. These loans are generally put to various small-scale income generating activities such as processing grain, raising milch cow, making earthenware pots, trading, etc.<sup>14</sup> For further information on different types of Grameen Bank loans and current activities, see Appendix C.

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<sup>12</sup> The official figures have been challenged by Murdoch (1999), among others, as being exaggerated. Murdoch's criticisms are discussed further in section 3. 5.

<sup>13</sup> Bangladesh's per capita GNP was about US \$300 in 1992 and US \$370 in 2000.

<sup>14</sup> General loans cannot be used for agricultural purposes. Larger collective loans may be given to a group or groups of borrowers to lease land for farming, for example, provided the group(s) has good standing with the bank.



## The Credit Delivery System

The target group of the Grameen Bank is the rural landless and near-landless poor.<sup>15</sup> These people are assessed to be the most indigent and marginalized of all people in Bangladesh, and are most in need of credit for basic survival.<sup>16</sup> However, they remain outside the orbit of institutional credit. They lack physical collateral, are generally illiterate and unfamiliar with paperwork, and are seldom treated with dignity by officials and bureaucrats. Women, commonly confined to the homestead by tradition, are especially unaccustomed to public work and interaction. Thus, the task for the poor of approaching a bank for even a small loan can be very intimidating.

In the Grameen Bank lending scheme, the first step is not to wait for clientele, but to “go to the people” in order to reach them. To start a new branch, Bank officials survey a locale to determine the proportion of landless residents in the area. A public meeting is held to acquaint villagers with the Grameen Bank philosophy and scheme, and to explain the various features of the credit delivery system. Interested people are then invited to approach the Bank.

The fundamental component of the Grameen Bank credit delivery system is “group lending”. Under this mechanism, potential borrowers are asked to form groups of five people of their own choice. A group must be formed with people from the same village who, according to Gibbons (1995), are “like-minded, are in similar economic condition and enjoy mutual trust and confidence”. Members of a group cannot be of the

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<sup>15</sup> In Bangladesh, more than 50 percent of the rural population is assessed to fall into this category (BRAC, 1994).

<sup>16</sup> Yunus (1994) has called credit a basic human right that brings access to all other rights.

same family, but they must be of the same sex. Before loans are given out, all members must undergo an intensive one-week training program to ensure that the philosophy, rules and procedures of the Grameen Bank credit delivery system are thoroughly understood. As part of its holistic approach to development, the Grameen Bank simultaneously undertakes a social development agenda. As a result, all borrowers are encouraged to engage in socially and environmentally progressive practices such as keeping families small, educating their children (especially girls), eschewing dowry, growing vegetables, building and using pit latrines, etc.<sup>17</sup>

Once prospective members have satisfactorily met the eligibility and training requirements, they can then apply for loans. Group members then exchange ideas with one another and with a Grameen Bank program officer (a field-level bank employee) about how best to invest their first loan. Any income generating activity that is deemed viable can thus be undertaken. Loans are made to individual members, and each individual selects his or her own project. Loan applications are simple and do not require many details about the project to be undertaken. Loans are disbursed shortly after application and are given for one year. All loans must be repaid in 50 weekly installments starting a week after loan disbursement, with all interest due in the last two weeks of the year. Loans are expected to be utilized in a way that yields daily or weekly income streams which make it possible for members to repay the entire loan in weekly installments.

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<sup>17</sup> See Appendix C for a list of the Bank's "Sixteen Decisions" social program, which includes among other things, issues related to dowry, family planning, and sanitation.

Each group must also elect a Chairperson whose role is to maintain constant contact with the Bank. It is also the Chairperson's responsibility to ensure that loans are properly utilized in income generating activities and are repaid on time. All members of a group must take turns to preside as Chairperson. All members must also attend weekly center meetings with a Grameen Bank Program Officer. This is where most of the "business" between Bank officials and borrowers take place. Loans are disbursed, weekly installments are repaid, and savings are collected. Borrowers also discuss pertinent economic and social issues amongst themselves and with the program officer. Topics may include loan proposals, schooling needs for children, and family planning.

Another important feature of the Grameen Bank credit delivery system is "staggered disbursement". Members of a group will receive loans in a staggered 2-2-1 format. This format means that two members of the group will first receive their loans. If they are successful in repaying their first two or three installments, the next two members will receive their loans. The Chairperson is the last to receive a loan. All five members of a group are jointly responsible for the repayment of the loans. In this regard, the group is expected to work together to ensure the timely weekly repayments of all members. Failure by any member of the group to repay his or her loan means that the entire group will be penalized, resulting in all members being denied future loans. Timely repayments, on the other hand, imply that all group members will qualify to receive larger loans in the future.

### 3.3 Issues of Screening, Incentives and Enforcement

In financial economic theory, every loan contract involves the lender giving up a sum of money in one period in exchange for the borrower's promise to repay the money plus an interest amount in a future period. To maximize the likelihood of repayment, the lender must try to screen out "bad borrowers", those who are more likely to default. That is, the lender must assess the creditworthiness of potential borrowers. In essence, this process implies that the lender strives to ensure two things: (1) a borrower's ability to repay, generally by investigating the candidate's credit history and productive incentives; and (2) a borrower's a willingness to repay, generally by securing collateral and relying on legal enforcement.

The Grameen Bank, as with any lending institution, has to overcome these problems of screening, incentives and enforcement.<sup>18</sup> In the face of asymmetric information about their borrowers, and the absence of effective legal sanctions or securable physical collateral, this is a challenge. Since its inception, the Grameen Bank has tackled these problems through a set of dynamic incentives. In fact, the success of the Bank's unique credit delivery and recovery system is primarily attributed to several innovative and inter-related features. These features include borrower selection, group

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<sup>18</sup> Hoff and Stiglitz (1990) stipulate that the new views of rural credit markets are based on the following three observations: (1) Borrowers differ in the likelihood that they will default, and it is costly to determine the extent of that risk for each borrower. This is conventionally known as the *screening* problem. (2) It is costly to ensure that borrowers take those actions which make repayment most likely. This is the *incentives* problem. (3) It is difficult to compel repayment. This is the *enforcement* problem. The new view holds that it is the market's response to these three problems, singly or in combination, that explain many of the observed features of rural credit markets, and they must therefore inform the policy perspective for designing specific interventions.

lending, peer selection and peer monitoring, staggered disbursement and weekly repayments of loans, and are discussed in greater detail below.

### **Reaching the target clientele**

The main task of the Grameen Bank is to ensure that credit earmarked for the poor actually reach them. In this regard, the Bank engages in a thorough borrower selection process involving several inter-related steps. First, all candidates not in the target group, namely those who have more than 0.5 acres of land or assets exceeding the value of 1.0 acre of medium quality land, are excluded. Second, candidates are asked to form groups of five of their own choice, ensuring that members enjoy mutual sympathy and trust. Third, only those groups that satisfactorily pass through the rigorous training period are considered to be the most serious in undertaking loans and making sound investments, given the Bank's specific credit scheme and policies. Wealthier villagers would generally deem it unseemly to borrow money in such a public manner. The extensive commitment of time and effort required on the part of the borrowers also eliminates those who may have a higher opportunity cost of time and leisure. Also the general loan sizes are quite small, thus limiting the scope for large-scale projects. Unwanted borrowers are therefore typically screened out.<sup>19</sup>

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<sup>19</sup> The high participation of women in the Grameen Bank lending scheme speaks to the fact that there are customarily more employment and credit alternatives for men than for women in Bangladesh.

The Grameen Bank allows one borrower per nuclear family. Assuming an average family size of five members, it can be said that the Bank currently reaches more than 10 million people. This is over 8 percent of Bangladesh's population of 120 million people. Given that about 50 percent of total population are estimated to be landless and near-landless, it can be concluded that the Bank has reached over 17 percent of its target group in Bangladesh. However, the question of Grameen Bank's success in serving its target clientele is debatable. As a case in point, a study by Hossain (1988) found that 4.2 percent of the borrowers belong to households are not in the target group. A more recent study by Morduch (1999) found this rate to be much higher at 30 percent. Average land holdings by households that receive Grameen Bank loans are also reported to be 1.5 acres, although whether this land is cultivable is not specified. In addition, it is not clear how long households have borrowed from the Grameen Bank.<sup>20</sup>

### **Staggered Disbursement and Weekly Repayments**

As described earlier, loans are disbursed in a staggered 2-2-1 format. A study by Ameen (1996) showed that when loan disbursement is staggered, the probability of loan recovery is higher when borrowers are linked together in a group than when there is no such group linkage. In essence this is because borrowers in a group have an incentive to invest in a previous borrower's project in order to increase their own probability of receiving a loan.

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<sup>20</sup> Members in good standing are eligible to receive larger loans under the Grameen Bank program. As members acquire enough assets or wealth to exceed the criteria for being landless, they are supposed to be gradually phased out of the program. In practice, however, this has rarely happened.

Despite substantial transaction costs of recovering weekly installments on loans, the Grameen Bank strictly enforces this rule. The idea behind such compulsion is that people have a higher propensity to consume at low incomes and this rule helps to forcibly divert money away from consumption, thereby avoiding repayment difficulties later. The role of weekly repayment is viewed as a way of enforcing financial discipline. Individual loan sizes are small and repayment in fifty-two smaller weekly installments is much more attractive than repaying a hefty lump sum at the end of the year. In addition, the guarantee of larger future loans in the case of the successful repayment of the first loan further encourages repayment. Looking from an administrative point of view, Rutherford (1995) has noted that a weekly repayment schedule may also translate into better cash flow for the Bank.

### **Peer Selection and Peer Monitoring**

A cornerstone of the Grameen Bank credit delivery and recovery scheme is the group lending mechanism. As mentioned earlier, group members are predictably from the same background, social class and often neighborhood. The peer selection process is significant as successful group lending requires that members trust one another. In other words, members have an incentive to associate with those they have a personal knowledge about, and whose ability and willingness to repay they can rely on.

Several studies (Ghatak 1999; Armendariz and Gollier, 1997; and Varian, 1990) have focused on the mechanism of peer selection in group-lending schemes such as the Grameen Bank. Looking at the informational advantages of group lending, Stiglitz (1990) found that a borrower's ability to repay is increased when group members have better information about individuals' efforts and abilities. Taken together, these works show that the process of homogenous group formation can be instrumental in improving repayment rates, allowing for lower interest rates, raising social welfare and lowering problems created by adverse selection.<sup>21</sup>

To engender the borrower's ability to repay, the Grameen Bank officials try to guide and support borrowers towards productive and less risky investments by providing adequate preparation, information and counseling. However, much of the responsibility of supervision and discipline falls on the borrowers themselves. All five members of a group are together responsible for the default of any one borrower and are in danger of not receiving larger loans in the future. This fact increases their incentive to make good on their investments. To ensure timely repayments, group members "monitor and supervise each other, and perhaps even invest in each other's projects" (Khandker, et al. 1996). If tardy or inappropriate loan utilization is observed, remedial steps are taken by the group members to deal with it. Therefore, peer monitoring serves both to pressure and mutually assist one's fellow group members.

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<sup>21</sup> However, the members within a group may be of different skills, education and experience. Bernasek (1991), for example, shows that it may be beneficial for the Bank to induce borrowers of unequal ability to form groups together so as to enable information transfer from the more-skilled to the less-skilled.



Joint liability induces interdependence among Grameen Bank borrowers, meaning that all members within a group will succeed or fail together. Besley and Coate (1992) explored a borrower's willingness to repay by looking at the fact that all group members are treated as being in default if any one member of the group does not repay his or her loan. They established that if social penalties are sufficiently severe, group lending should necessarily yield higher repayment rates than individual lending. Borrower default implies letting down fellow group members and losing face among peers. Indeed in Bangladesh this feature is quite effective because, although institutions have little legal recourse against delinquent borrowers, social sanctions are quite strong.

Hence the Grameen Bank, through group lending and peer monitoring, is able to harness "social collateral" and "group creditworthiness" to replace material collateral and individual creditworthiness.<sup>22</sup> Local knowledge of group members is exploited to promote the ability and willingness of borrowers to repay their loans on time. In effect, the innovative features discussed above create a structure of dynamic incentives that enable the Grameen Bank to obtain sustained performance from their target clientele.

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<sup>22</sup> Pankaj Jain (1995) points out that with the exception of cheap credit policy and targeting credit only to the poor, these elements are nearly identical to those of India's cooperative rural program whose overdue rate exceeds 50 percent. He proposes that the Grameen Bank has been able to enjoy sustained good performance by virtue of its large and effective work force, and by keeping to a minimum the tendency of a few target beneficiaries to corner program benefits and flout organizational norms for their personal benefit. He emphasizes the role of Grameen Bank in promoting "credit conducive organization culture".

### **3.4 The Socio-Economic Impact of Micro-Credit**

In addition to its banking goals, the Grameen Bank promotes an agenda to pursue socio-economic objectives. In particular, the Bank actively encourages all borrowers to engage in socially and environmentally progressive practices as outlined in The Sixteen Decisions. These practices include keeping families small, educating children, eschewing dowry, growing vegetables, building and using pit latrines. The pursuit of these socio-economic goals has achieved some success. For example, Hossain (1988) found that Grameen Bank members, women in particular, have experienced increases in employment and per capita income. In addition, Alam (1988) studied the growth of agricultural productivity among Grameen Bank members. His findings showed that small and marginal farmers who participate in Grameen Bank programs could afford to purchase costly inputs like irrigated water, pesticides and relatively large doses of fertilizers. As a result they can allocate a higher percentage of their land for the cultivation of high-yielding varieties and thus increase their agricultural productivity. In their study on the impact of Grameen Bank loans on housing, Rahman and Hasnat (1993) found that the quality of housing had definitely improved for borrowers, especially since the implementation of the housing loan program in 1984. In a follow-up study, Rahman (1986) looked into the nutritional impact of Grameen Bank loans on borrowers by comparing data from 1981 and 1986. He found that a member of a Grameen Bank household in 1986 was not only better off in terms of food intake in absolute amounts than a fellow poor person of 1981 but was also better off than the non-member of 1986.

Using data from 1985-1986, Ahmed and Randolph (1995) examined the role played by liquidity constraints in determining non-agricultural employment and output among poor landless households in Bangladesh. Their study found that even small amounts of Grameen Bank credit could substantially enhance labor use and income for poor households. Foster (1995) and Menon (1999) also studied the long run benefits of Grameen Bank credit on inter-seasonal consumption differences. Their findings indicated that participating in the program is effective in smoothing consumption from one crop season to the next.

### **The Grameen Bank and Women**

In the traditionally conservative and patriarchal Bangladeshi society, rural landless women are the most marginalized of all. They suffer a double disadvantage by virtue of their class and their gender. Often they are confined by the custom of “purdah” to their homesteads.<sup>23</sup> Hence, there are few opportunities for women to earn an income outside the home. When circumstances necessitate such work, it is generally viewed with social stigma. Despite the obstacles facing rural women in Bangladesh, the Grameen Bank has in many ways revolutionized the rural peoples’ attitude towards women and work. In particular, the Bank has emphasized the role of women in the labor market, the family, and the society, thereby succeeding in bringing the poor rural woman to the forefront. A woman participating in the Grameen Bank program can now have some

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<sup>23</sup> The custom of “purdah” (literally “curtain”) screens women from the sight of strangers.

control over resources, often for the first time in her life. She can utilize her skills towards some productive activity. As an income earner, she can gain self-confidence and esteem, earn respect in the eyes of her husband and children, and expand her base to negotiate, as a member of both her family and society.

The impact of Grameen Bank loans appears to be deeper and more dramatic for women than for men. Indeed, the fact that women comprise 94 percent of all Grameen Bank borrowers is no accident. During the early experimental stage of the Grameen Bank, women were found to be better credit risks. The focus on women in Bangladesh has several advantages. First, the dynamic incentives are greater for rural women than for men as they have fewer alternatives to obtain credit. Second, women in general are closely tied to their home and unlikely to abscond with the money that they borrow. Third, women tend to allocate more resources towards the health and nutrition of their family, especially children.

Several studies have closely examined the impact of Grameen Bank credit and social development agenda on rural women in Bangladesh. Pitt and Khandker (1998) estimate that for every Tk. 100 lent to a woman, household consumption increases by Tk. 18. This increase is Tk.11 for a man. Non-land assets and schooling of girls also increase when women borrow from the Grameen Bank. They find that Grameen Bank credit has positive impact on variables associated with household wealth and women's independence, girl's schooling, contraceptive use, women's labor supply and total household expenditure. Work by Hashemi, Schuler and Riley (1996) has found significant effects on different dimensions of women's empowerment. Among other

things, they showed that relative to a non-member, women participating in the credit scheme enjoy greater economic security, greater mobility, greater ability to make small and large purchases, and greater involvement in major decision-making. They also emphasized that participating women undergo more literacy training and skill development and exhibit greater political and social awareness. In their study, Goetz and Sen Gupta (1995) have also pointed to the remarkable achievement of Grameen Bank activities on women, especially considering the extreme socio-cultural constraints on women's productivity and their access to capital. Goetz and Sen Gupta also reported that, despite this impact, a significant proportion of women's loans are controverted to and controlled by their male relatives. Hashemi et al (1996), in contrast, reported that women in general do retain control over loans and subsequent incomes, and experience relative freedom from domination from family. In particular, they reported that the Grameen Bank model was more effective than programs that profess to combat gender inequality more directly, both in demonstrated ability to reach poor women in large numbers and in its potential to empower women.

### **3.5 Financial Viability vs. Social Welfare**

The Grameen Bank serves a dual role as a source of credit for the rural poor and as a program for poverty alleviation. Rather than pure commercial profit, its primary concern is the economic and social progress of its target clientele. However, the

attainment of financial viability of the institution as a whole, enabling it to fully fund its credit program as well as meet all internal operating costs, remains high on the agenda of the Grameen Bank. Although one of its long-term goals is financial self-sufficiency, the Grameen Bank has yet to become a viable institution. The Bank generally obtains most of its funds at concessionary rates from the Bangladesh Bank (the central bank of Bangladesh) and several donor agencies including the International Fund for Agricultural Development (IFAD) and the Ford Foundation. In working towards the potential viability of its credit operations, the Bank strives to ensure extremely high repayment performance. In addition, it mobilizes borrower deposits in saving accounts. As of January 1999, the cumulative amount of savings was over US \$128 million.

However the question remains whether the Grameen Bank can survive without subsidies. Morduch (1999) calculates a subsidy dependence index that yields an estimate of the percentage increase in the interest rate required in order for a bank to operate without a subsidy of any kind. The Grameen Bank's loans are currently disbursed at a nominal interest rate of 20 percent, up from the initial nominal interest rate of 16 percent.<sup>24</sup> Morduch finds that the Grameen Bank can attain the break-even point by raising its nominal interest rate to 32 percent. He suggests that this increase would not necessarily drive away borrowers, citing the example of the Bangladesh Rural Advancement Committee (BRAC) that lends to a similar clientele at a nominal interest rate of 30 percent. There are examples of micro-credit institutions that have been successful in achieving financial self-sufficiency (some are discussed in Appendix 3). It

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<sup>24</sup> This interest rate has been in effect since 1991. Prevailing interest rates for agricultural loans from commercial banks are below 20 percent. The inflation rate in Bangladesh is currently 5 percent.

should be pointed out, however, that these banks are generally not sharply focused on poverty alleviation and disburse loans that on average are much larger than Grameen Bank loans. Morduch also advocates further increasing efficiency by reducing administrative and training costs. The possibility of cutting workers' wages, however, is highly unlikely given that salaries are linked to the government pay scale.

The Grameen Bank has also come under fire recently, from various quarters, for overstating its own success. Critics say that the Bank's unusual accounting practices conceal financial weakness, especially in regard to its purported repayments rates.<sup>25</sup> In addition, the Bank also faces other problems such as the growing attrition rates of its hardworking field staff and higher default rate of borrowers as a result of greater competition from other micro-finance institutions. These are certainly valid concerns, for both the Grameen Bank itself and those who follow the progress of the Bank closely. However, to its credit, in a country where little can be effected without political influence and direct government involvement, the Grameen Bank's has accomplished a great deal: reaching poor borrowers; designing a mechanism of dynamic incentives to drive efficient performance; inspiring a movement in micro-lending. Whether the Grameen Bank can maintain its commitment to serving the credit needs of the poorest men and women in Bangladesh and also achieve long run financial viability remains to be seen.

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<sup>25</sup> The Bank calculates its repayment rate as the ratio between the amount remaining unrepaid after 104 weeks from the date of disbursement and the total loan amount outstanding. Under these terms, the repayment rate for 2001 was 90%. The Grameen Bank insists this is a "snag" in its performance and an opportunity to learn from past experience.

## **CHAPTER 4**

### **THE THEORY OF THE IMPACT OF CREDIT ON THE RURAL LABOR MARKET**

#### **4.1 Introduction**

The literature review presented in Chapter 2 highlights the situation that, despite dire need, poor landless and near landless households in rural Bangladesh are typically unable to borrow even small sums of money at reasonable rates of interest from conventional credit sources. This predicament points to the growing role of alternative financial institutions such as the Grameen Bank in filling this gap. In light of new financial opportunities, this chapter focuses on the theory of the impact of credit on the rural labor market. To set the stage, the next section describes the economic fragmentation characteristic of many underdeveloped nations. It is useful to examine this condition closely, as it is the backdrop against which economic forces in Bangladesh typically operate. Then, the theoretical predictions of the effects of credit on the levels of employment, income and productivity of poor rural households are presented. Here, the nature of the theoretical arguments and their predictions are discussed in detail. Finally, the discussion is extended to consider credit as an impetus to technological advancement in the rural economy.



## 4.2 The Fragmented Economy

In economic theory on financial processes, both Keynesian and monetarist models hold that capital markets are essentially “perfect,” with a single rate of interest or a term structure of interests. The implication of this assumption is that all private rates of return are equalized, that indivisibilities are not important, and that entrepreneurs have similar production opportunities. However, Ronald McKinnon (1973) points out that although these theories are naturally accepted in the highly developed nations of the world, they cannot fully explain the operation of capital markets in poor, underdeveloped countries. A salient fact observed by McKinnon is that, unlike advanced economies, most underdeveloped economies are characterized by deep fragmentation.

Certainly, this is the case for Bangladesh. The Bangladeshi economy displays many of the quintessential symptoms of fragmentation. The economy is fragmented in that firms and households face different effective prices for the basic resources of land, labor, and capital. Commodity prices are often distorted. Severe shortages in some labor skills coexist with unemployment among the highly educated. Both small household enterprises and large corporate firms produce similar products with different factor proportions and very different levels of technological efficiency. Mechanization on farms and in factories is present with heavy rural and urban unemployment. In an economy known to be short of capital and to suffer from specific bottlenecks, excess plant and equipment with underutilized capacity are surprisingly common. Traditional and modern technologies coexist and it is seldom clear which have the highest rate of return.

Much of the general population of Bangladesh, especially in rural areas, remains at the periphery of the formal market economy. Poor rural entrepreneurs are mostly illiterate and have little skilled labor. Often, these individuals have limited access to capital and no means of acquiring advanced technologies. In rural regions, tiny landholdings are often split up into small parcels, with little incentives for agricultural land reforms. Landlessness is pervasive and signals the acute need for employment opportunities that are not related directly to agriculture.

The severe fragmentation in the underdeveloped economy of Bangladesh has put tremendous pressure on government authorities to correct the perceived imperfections or malfunctions in the various markets. There has been a small amount of success in introducing certain new industrial activities (such as textiles) and in mobilizing some domestic factors of production. However, public policy and intervention measures have generally accomplished very little at best. On the contrary, these measures have often aggravated the situation, or worse, met with disastrous results. Government efforts have taken the form of manipulating commodity prices through tactics such as intervening directly to help some individuals or sectors of the economy at the expense of others. For example, an operator of a small local machine shop may find it impossible to get bank credit to finance his inventories, whereas an exclusively licensed importer of competitive machine parts has easy access to foreign trade credit at a subsidized rate of 6 percent. Tariff protection, import licenses, tax concessions, and low-cost bank financing commonly go to small urban elites and create great income inequality between the wealthy few and the poverty-stricken many.

It can be said that modern fragmentation has largely been the result of public policy. In Bangladesh, such policies and intervention measures to remedy market imperfections or to alleviate poverty have been administered by the domestic government and international agencies and donors on the implicit assumption of "perfect" capital markets. Prevailing financial theories aptly characterize advanced economies where individual savers and investors are quite free to select whatever portfolios of physical and financial assets they choose. However, in an underdeveloped economy such as Bangladesh neither individuals nor the government have a common menu of physical assets with objectively defined probability distributions of rates of return. McKinnon (1973) asserts that "fragmentation in the capital market – endemic in the underdeveloped environment without carefully considered public policy – causes the misuse of labor and land, suppresses entrepreneurial development, and condemns important sectors of the economy to inferior technologies." Thus he stresses the importance of withdrawing unwise public intervention from commodity markets and establishing appropriate policy in the domestic capital market in the road to sound economic development.

In economic theory, the scope for intertemporal decision-making, within which the entrepreneur maximizes his utility, can usefully be reduced to three components: (1) his endowment or owned deployable capital; (2) his own peculiar productive or investment opportunity; and (3) his market opportunities for external lending or borrowing. In a fragmented capital market, however, these three components are badly correlated. These fragments in an underdeveloped economy must be pulled together so that the efficient division of labor prevails. Since individuals cannot rely on initial

endowments to supply capital, supplemental financing from outside the individual enterprise is of critical importance in determining whether or not high-productivity investments are undertaken. This is especially true of poor economies that need to break out of past habits of using capital and establish more efficient investment and reinvestment patterns. Unfortunately, the reality is such that outside financing is either unavailable or extremely limited in the underdeveloped economy. For example, although a weaver may foresee an annual return of 60 percent in purchasing a new loom, he is unable to take advantage of this opportunity as his only option to obtain external financing is to borrow from a local money-lender who wants 100 percent interest on any loan he provides. Typically, entrepreneurs with potential production opportunities generally lack resources of their own and are unable to obtain any external financing. This capital constraint impinges on the decision-making capacities of entrepreneurs, often severely.

### **4.3 The Impact of Credit on Rural Landless Households**

This section focuses on the theory of the impact of credit on poor rural households in Bangladesh. Although a “household” can generally be defined as all who eat from the same hearth, further specification of the term is required. In a fragmented underdeveloped economy, income categories are not well defined and the processes of saving and investment are not specialized. Rather, there is a large self-financed household or “unorganized” sector and an imperfectly financed corporate or “organized” sector.

Although there is tremendous diversity in skills and talent throughout rural areas, in an underdeveloped economy such as Bangladesh, they are attached to small firm-households and not easily identified. Many entrepreneur-households provide labor, make technical decisions, consume, save and invest. These individual entrepreneur-households more or less have unique production functions dependent on their specialized knowledge (such as farming, fishing, weaving, retailing, etc.) and on the factors of production (such as family labor, landholdings, physical structures, tools, etc.) available to them. The question then becomes whether an entrepreneur-household is able to invest in human and physical capital to exploit its production possibilities. As mentioned earlier, in a fragmented economy endowments do not necessarily correspond to opportunity and supplemental financing from outside becomes critically important. With that in mind, the focus here is on the theoretical predictions of the effects that credit will have on the levels of employment, income and labor productivity of the rural landless poor population in Bangladesh.

In Bangladesh, two groups of poor households can be identified. For people in the first group, income is so low that they struggle to eke out even two proper meals per day: often they go hungry. When considering these destitute households, low consumption means that their nutritional levels are also low. In development literature, the significant connection between consumption and productivity is well established and recognized.<sup>26</sup>

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<sup>26</sup> This relationship is fundamental in the concept of a "vicious circle of poverty". As Myrdal (1968) put it: "The main cause of undernourishment and malnutrition in South Asia is, of course, poverty and, in particular, the low productivity of man and land. The remedy is development, but the way will not be easy, partly because the dietary deficiencies themselves have reduced people's ability on the one hand. On the other hand, as the nutritional deficiencies tend to lower labour input and efficiency and to decrease vitality in general, they themselves constitute one of the obstacles standing in the way of development."

The idea that at low levels of income there is a technically determined relationship between nutrition and productivity is particularly applicable to the landless poor in Bangladesh.<sup>27</sup> For households in the second group, income is not so low as to compromise nutrition. However, these households are unlikely to own even a minimal stock of production capital. With a fixed amount of capital available to be utilized by their labor, productivity of labor is expected to be low. Even if there is a high possibility of substitution between labor and capital in these households, liquidity to purchase intermediate inputs may be insufficient to fully utilize available fixed capital. In some cases, although a household may own a stock of production capital adequate to engender a basic return, liquidity may be insufficient to allow even small improvements in technology that could further enhance household productivity, employment and income.

Hence, poor landless and near-landless households often face financial constraints that limit their labor use, the productivity of their labor, their output and consequently their income. Although credit holds the potential to remove liquidity constraints faced by poor households, both imperfect access to credit and the terms of credit limit this potential (as seen in Chapter 2). However, with the advent of alternative credit sources such as the Grameen Bank in Bangladesh, there is greater opportunity for poor rural households to secure external financing.

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<sup>27</sup> This hypothesis, known as the Efficiency Wage Theory, was first formalized by Mirlees (1976) and by Stiglitz (1976). It posits that a threshold level of consumption is required to enable someone to undertake any work as opposed to merely existing. Once that basic consumption has been provided there are increasing returns to consumption and then later diminishing returns. According to Bliss and Stern (1978a, 1978b) and Dasgupta and Ray (1986), among others, the productivity or efficiency of labor is directly related to the level of consumption. The empirical evidence provided by several studies (Martorell and Arroyave, 1984; Strauss, 1986; and Deolalikar, 1988) substantiate this theory.

Here the impact of Grameen Bank credit on the labor use, labor productivity, and income of the landless poor in Bangladesh is systematically explored. Following Bliss and Stern (1978) and Ahmed and Randolph (1995), we can differentiate labor by clock hours and efficiency hours. Efficiency units ( $l$ ) are defined as the number of clock hours ( $L$ ) times the productivity index ( $\theta$ ). Productivity ( $\theta$ ) depends on nutrition and is a function of consumption, which in turn depends on income level ( $Y$ ).

Therefore, we have:

$$l = \theta L \quad (1)$$

where  $\theta = f(Y) \quad (2)$

and  $l =$  labor in efficiency units (productivity of  $L$  per hour)

$L =$  number of clock hours

$\theta =$  productivity index

$Y =$  income level.

For poor households whose nutrition is compromised, credit may increase output even if it is simply used for consumption purposes. Bliss and Stern (1978a) and Moene (1992) assume that there is a minimum level of consumption below which productivity is zero. In order to have positive productivity, households must have a threshold level of income ( $Y_0$ ) to allow the threshold consumption level ( $C_0$ ), so that available household labor achieves the threshold level of productivity ( $\theta_0$ ). If household income is

insufficient to allow this consumption level, the household could increase labor use, by borrowing to finance food consumption. As food consumption increases beyond the threshold level of productivity, labor productivity continues to increase (and with it output), although at a decreasing rate. Eventually, increased food consumption ceases to increase labor productivity ( $\theta = 1$ ). At this point, credit allocated to consumption ceases to increase labor use, labor productivity or output.

However, if additional credit is allocated to increase the capital stock or purchase intermediate inputs, further increases in labor use, labor productivity and output can be obtained. Capital inputs can enhance labor use and productivity even when non-agricultural activities utilize traditional, indigenous technologies. For example, fisheries require boats and nets, textile production requires looms, and transport businesses require vehicles and other implements for hauling goods and services. As will be discussed in greater detail in Section 4.4, credit can also enable non-agricultural producers to upgrade technology and therefore increase productivity. For example, outboard motors can greatly increase the yield from fisheries. Carts for carrying wares can increase both the scale of activity and market for petty traders who previously relied on baskets alone. Such capital investments permit more household members to work (more looms enable more household members to weave) as well as increase the productivity of those currently working. Even when fixed capital is sufficient to employ all available household labor, a shortage of intermediate inputs often constrains productivity. The scope for substitution between intermediate inputs and labor is limited. For example, in rug making, although



there may be some scope to combine a cheaper, poorer quality yarn with additional inputs, the scope for substituting labor for yarn is quite limited.

It is useful to examine the budget constraint faced by households when considering the role of credit. The general budget constraint facing a household at the beginning of the production period can be specified as follows:

$$S_{-1} + R - (1+r)R_{-1} > p_c C + p_i I + p_r K \quad (3)$$

Liquidity (left hand side) equals the household's savings from the previous period ( $S_{-1}$ ) plus an exogenously fixed amount of loan ( $R$ ) borrowed at a given interest rate  $r$ , minus the repayment of any debt for the last period. In keeping with the Grameen Bank scheme, we assume that the household always pays off the debt from the previous period along with interest payments first, as this qualifies it to receive credit in the current period. The household production expenses (right hand side) to be covered by this amount are food consumption ( $p_c C$ ) enhancing the productivity of labor, the purchase of intermediate inputs ( $p_i I$ ) for production, and the purchase or rental of capital equipment ( $p_r K$ ). The prices of consumable foods,  $C$ , intermediate inputs,  $I$ , and capital equipment,  $K$ , are  $p_c$ ,  $p_i$ , and  $p_r$  respectively.

The budget constraint states that liquidity at the beginning of the production period must at least cover production expenditure incurred before output comes on line. High interest rates lower liquidity. Increased access to credit ( $R > R_{-1}$ ) increases liquidity.

Note that credit ( $R$ ) can be used for consumption ( $R_c$ ), the purchase of intermediate inputs ( $R_i$ ), or the purchase of fixed capital ( $R_k$ ). It is expected that the proportion of credit allocated to each purpose will differ by household type, as will the impact of credit on labor use, labor productivity and output.

Below I distinguish among three types of households: destitute households, poor households and non-poor households.

### **Destitute Households**

Destitute households are defined as those households who without credit are unable to consume enough to realize the threshold level of productivity ( $\theta_0$ ). Before receiving credit,  $R$ , these households are unable to produce anything; productivity is zero. Credit offers such households a means to ensure survival, and perhaps also an opportunity to become self-sufficient. The size of the loan and the interest rate charged determine whether self-sufficiency can be realized.

If a destitute household receives credit, an amount  $R_0$  will be allocated to consumption to realize  $C(Y_0)$ , and the threshold level of productivity will be achieved. The amount of the loan  $R$  must at least equal  $R_0$ . Otherwise positive output will not occur and the household will not be able to repay the loan even if the interest rate is zero. Assuming that the loan amount is adequate to at least realize the threshold level of productivity, the household will optimally allocate the remainder of the credit between more consumption or the purchase of non-food productive inputs, since productivity can be further increased by either.

The interest rate will determine whether the value of the output produced is sufficient to cover the cost of the loan so that the household is eligible to receive a loan in the next period. Even if the value of output produced exceeds the cost of the loan and inputs used in production, the interest rate will determine whether the household is able to achieve self-sufficiency. If the interest rate is too high, after paying off the debt and interest on the loan, the household may be left with less liquidity than is needed to attain  $\theta_0$  in the next period. Whether or not the household attains self-sufficiency in the next period, the provision of credit to destitute households is expected to substantially increase labor use, labor productivity, output and income in the current period.

### **Poor Households**

Poor households are defined as those whose liquidity without credit is greater than  $Y_0$  so that  $\theta_0$  can be realized, but for whom liquidity is not sufficient to make optimal use of inputs. Two cases are considered: the short run when capital stock is fixed and the long run when the capital stock is variable.

For poor households, income is not sufficient to allow the consumption of enough food to make  $\theta = 1$ , such that clock hours are equal to efficiency hours, and/or not sufficient to allow the purchase of enough working capital to optimally utilize fixed capital. In the short run, greater access to credit will increase labor productivity and output. However, whether it will increase labor use in clock hours is unclear. On the one hand, credit allows greater food consumption, increasing the productivity of labor

measured in clock hours, and so reducing the number of clock hours to produce one unit of output. On the other hand, credit allows more intermediate inputs to be purchased and this increases labor requirements measured in efficiency units.

For poor households, fixed capital is inadequate to fully employ household labor when  $\theta = 1$ . In the long run, however, credit allows capital investment to be made so that available household labor can be fully employed when clock hours equal efficiency hours. Taking both the short and long run into account, credit in poor households unambiguously increases labor use measured in clock hours as well as labor productivity and income.

The amount of credit and the rate of interest charged on it affect the strength of these effects. If the loan is small, in the short run the household will either be unable to ensure  $\theta = 1$  for all working household members, or purchase enough intermediate inputs to fully utilize existing capital, or both. In the long run, the household will be unable to expand the scale of production sufficiently to fully employ its labor resources. In both cases realized household output will be lower than potential household output. Similarly higher interest rates have a negative impact on labor use and productivity, intermediate and physical capital use, and consequently output, since higher interest payments reduce liquidity for purchasing food, intermediate inputs and physical capital. If the interest rate is too high, the increase in the value of output derived from the loan may not be sufficient to cover the cost of the loan so that the loan will not prove viable.

### **Non-poor Households**

Non-poor households are defined as those households whose liquidity without credit is sufficient to consume a nutritionally adequate diet such that  $\theta = 1$ . Liquidity is also sufficient to buy intermediate inputs to fully employ household labor with the available fixed capital stock. For these households, credit can increase the productivity of household labor and output in the long run, but will not increase household labor use since it is already being fully employed. By providing liquidity to purchase additional capital equipment and hire labor, credit enables non-poor households to expand the scale of production and accordingly, output. By enabling the household to upgrade technology, credit can increase the productivity of household labor, as well as output. As with destitute and poor households, the amount and terms of credit matter. The scale of production can be expanded further, the larger the amount of the loan. The interest rate influences whether it is profitable to expand the scale of production.

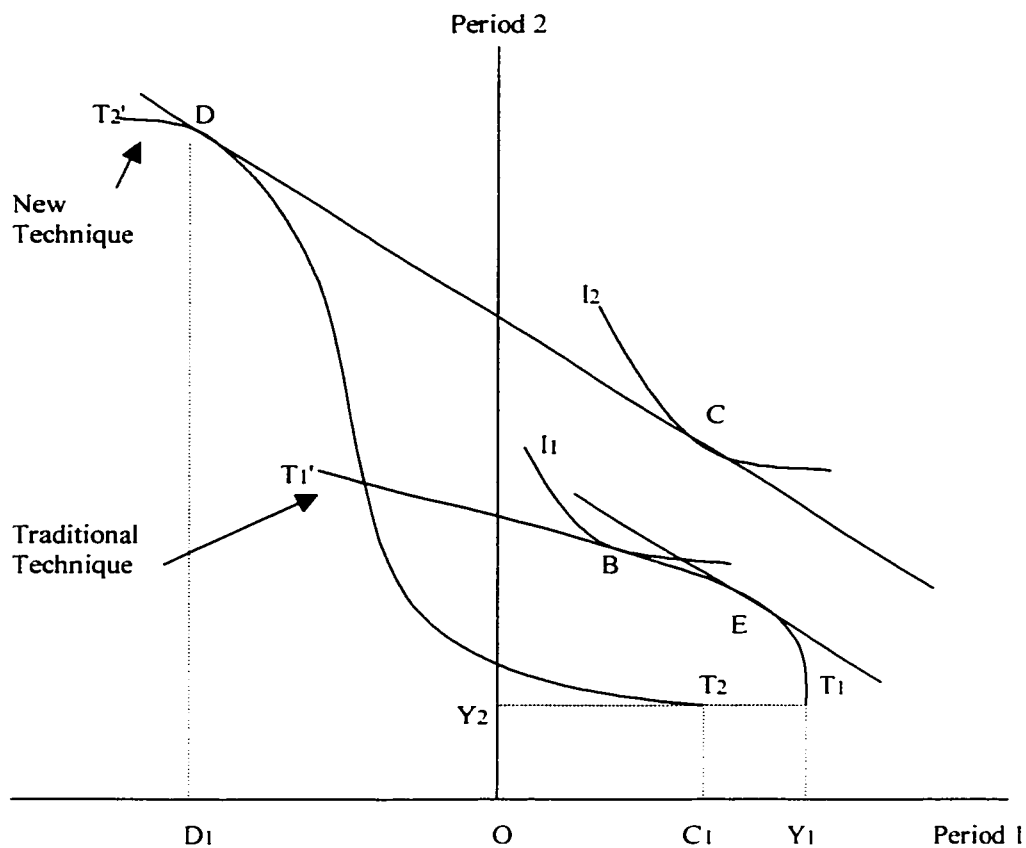
Thus, it can be said that depending on their income class, households are likely to allocate credit differently depending on their income class. As a result, the impact of credit on a household's level of labor use, productivity and income is likely to differ by income class as well. Destitute households in particular are expected to divert a portion of their credit to consumption and realize output gains by doing so. Both destitute and poor households are expected to use credit towards intermediate inputs and capital investments, leading to further gains in output. In general, the impact of credit is expected to be greatest for the poorest households.

#### 4.4 Credit and Technological Advancement

Going back to McKinnon's (1973) model of fragmented investment opportunities, here the problem of "indivisibilities" is considered. For small-scale household-entrepreneurs, investments in markedly improved technology can be quite an undertaking. For example, investing in an improved breed of dairy cattle, buying a sewing machine or a small fishing boat can require a household to divert cash from a net income that may be barely sustaining the household. Typically, poor households are unable to borrow from outside sources to finance such discrete increases in expenditures. Although marginal innovative investments by poor but thrifty entrepreneurs could thrive (as divisible investments could be financed directly by small reductions in current consumption), this is generally not the case in practice. For even the simplest productive innovations, the question of indivisibilities is important. It is extremely difficult for a poor household to finance from its current savings the whole of the balanced investment needed to adopt a new technology. As a result, access to external financing is critical and likely to be necessary over the one or two years when the change takes place. However, financially isolated household-entrepreneurs (such as poor landless men and women in Bangladesh) can easily be caught in a low-level equilibrium trap, where such innovative investment is practically impossible.

The problem of allocating investment and consumption over time can be graphically illustrated in a two-period diagram shown below in Figure 4.1.

Figure 4.1  
The Relation of Investments to the Choice between  
Traditional and New Techniques



Households may abstain from consumption to invest in period one in order to increase their consumable output in period two. Income,  $Y$ , and consumption,  $C$ , in period one are measured on the horizontal axis. Investment in the first period increases the income flow in the second, which is measured on the vertical axis. Internal investment opportunities, initial endowments, and the possibilities for borrowing and lending externally can all be encompassed by the diagram.

To illustrate the problem of “indivisibilities”, it is assumed that household investments can be made only in the context of two distinct technologies.  $T_1T_1'$  is a traditional technology (such as sewing by hand) with continually diminishing returns to investment beginning at  $T_1$ .  $T_1T_1'$  defines the household's trade-off between reducing consumption in period one in order to increase it in period two, without significant innovations in technology. In contrast,  $T_2T_2'$  may represent a more mechanized technique (such as using a sewing machine). There is a discontinuity in returns – associated with the purchase of the initial equipment – since an investment of  $T_1T_2$  is required before one can get any output from the second technique. Once this investment is made, however, returns are very high and begin to diminish as one moves along  $T_2T_2'$  well into the second quadrant.

$Y_1$  represents the household's beginning endowment, which consists of consumable capital carried over from the past and current income in period one.  $Y_2$  can be interpreted as unimproved income accruing in period two if no investments were made in period one. Thus the level of current investment from the initial endowment is measured from  $Y_1$  or  $T_1$  to the left. The slope of  $T_1T_2'$  gives the profitability of each dollar of current investment in increasing period two's consumable income.<sup>28</sup> The fact that the investment locus extends to the left into the second quadrant indicates simply that investment opportunities exceed the current endowment.

The limited initial endowment relative to consumption needs of the household can bias the choice of technique if the household is restricted to self-finance. First and second

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<sup>28</sup> This two-period model is well established in the literature. See Hirshleifer, *Investment, Interest and Capital* for further clarification of the underlying concepts.



period consumption can be positive in a balanced fashion at B only when the household uses the traditional technology; whereas first period consumption would have to be negative – an economic impossibility- if the economies of scale of the superior technique were effectively utilized. The consumption indifference curves of the entrepreneur-household are given the conventional convex shapes in  $I_1$  and  $I_2$ . Consumption must be positive in both periods, and this consumption constraint is expected to bind severely in poor economies. In the case portrayed in Figure 4.1, the consumption constraint and limited endowment lock the household into an inferior technology at point B.

Access to external borrowing, however, will permit the household to break out of the traditional pattern with higher production, using new technology at D and with much improved consumption at C. That is, if it can borrow a sufficient amount at the rate of interest given by the slope of the straight line DC, this external finance will permit him to invest  $Y_1D_1$  in the new technology and increase consumption in period one. The gain in private and social productivity permits the household to repay the loan in period two. Notice that the slope of DC, which defines the rate at which the entrepreneur-household can borrow, is greater than the marginal productivity of self-financed investment at point B, under the traditional technology.

In an idyllic “fully developed” economy, such intertemporal transactions would take place freely so that neither consumption limitations nor sparse initial endowment would inhibit high-return investments where “lumpiness” or indivisibilities were important. In short, poverty would be no barrier to the efficient use of the country's limited resources.

## **CHAPTER 5**

### **THE IMPACT OF GRAMEEN BANK CREDIT ON THE LEVELS OF EMPLOYMENT, INCOME AND PRODUCTIVITY OF POOR LANDLESS HOUSEHOLDS RURAL IN BANGLADESH: AN EMPIRICAL ANALYSIS**

#### **5.1 Introduction**

This chapter provides the basic framework and essential details of the empirical analysis that is being undertaken for this study. Accordingly, the next section outlines the general research design and the formulation of the hypotheses to be investigated. This is followed by a description of the methodology and model to be used. Here, the estimating equations for theoretical testing on employment, income and productivity are presented. Also, the corresponding model predictions are given for each estimating equation. Then the source and nature of the data set are discussed, with particular focus on variable definitions and measures.

## **5.2 Research Design and Formulation of Hypothesis**

In Bangladesh, traditional international and domestic approaches to reduce poverty have virtually disregarded the most disadvantaged sector of the economy, the rural landless and near-landless population. The men and women who make up this large and important group lack cultivable land and often other important resources. Typically, these individuals are unable to utilize formal credit sources for want of adequate physical assets to put up as collateral. Informal credit sources such as local moneylenders and wealthier community members often charge interest rates that are prohibitively high. As a result, the landless poor in rural Bangladesh often face severe liquidity constraints that affect their economic well being. More specifically, the inability to access credit at reasonable rates of interest limits their opportunities to rise above poverty by restricting their labor use, income and productivity.

This study examines the role of credit on the economic welfare of the rural landless poor in Bangladesh. More specifically, the study seeks to address the following research question: How does the provision and application of small loans offered at a reasonable rate by the Grameen Bank affect the liquidity constraints faced by the rural landless poor in Bangladesh and their levels of productivity, employment, and income? It is hypothesized that there is a positive relationship between Grameen Bank micro-credit to the poor and their economic well being. That is, the application of small loans from the Grameen Bank is expected to have a positive impact on the levels of employment, income and productivity of the landless and near-landless poor in rural Bangladesh.

### 5.3 Methodology and Model Specification

To investigate the hypotheses put forth above, I use a labor market model to test for the specific effects mentioned. The framework for this model is simple and stylized and focuses on a relationship among credit, income and employment. It is a variant of the labor market model developed by Bliss and Stern (1978) and applied most recently by Ahmed and Randolph (1996). I extend the model as used by the latter to fit the specific objectives of this study.

In concept, a household is non-poor and therefore ineligible to receive Grameen Bank loans if the value of its wealth is above a certain minimum threshold level. As a result, labor use, income, and productivity equations with credit as a variable are estimated for destitute and poor households only. Also, as individual Grameen Bank loans are short term, to be repaid in fifty-two weekly installments, they are not suitable for major investments in fixed capital. Therefore, I specifically examine the effects of Grameen Bank credit on the levels of labor use, income and productivity for rural destitute and poor households in the short run. To control for these empirical tests, I also estimate labor, income and productivity levels for target households (that is, households that qualify for loans) that either have access to Grameen Bank credit but choose not to borrow or do not have access to Grameen Bank credit and so are unable to borrow. Similar tests are carried out for non-target, and therefore non-poor, households that also have not borrowed from the Grameen Bank.

The key assumptions, equations and predictions of the model are given in the following three sections.

### 5.3.1 Model Predictions and Theoretical Testing on Employment

This section presents the equation to be used to estimate the effects of Grameen Bank loans on employment. In specifying this labor equation, factors other than credit (R) that affect the number of clock hours of labor used by the household must also be considered. First, the number of potential workers in the household or family (F) influences the amount of labor the household can apply. A significant positive relationship between the family variable (F) and labor use is expected here. Second, the value of physical assets or wealth (W) owned by the household will affect labor use. The direction of the influence, however, is uncertain since in addition to allowing households to increase the scale of production, households can substitute capital for labor in production. As some households whose primary occupation(s) are non-agricultural may also engage in agriculture as a sideline activity, land ownership and/or access to land must be considered. Therefore the amount of land (L) at the household's disposal will affect its total labor use. Here also the direction of influence is uncertain given that both scale and substitution effects are at work. The interest rate charged<sup>29</sup> on the loan is expected to influence the level of household employment as well. However, as the interest rate charged by the Grameen Bank is the same for all households, this has been omitted from the equation.

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<sup>29</sup> The current interest rate charged by the Grameen Bank on general loans is 20 percent .

Accordingly, the employment (N) or labor equation can be specified as follows:

$$(1) \quad \ln N_j = a_{0j} + a_{1j} \ln R + a_{2j} \ln F + a_{3j} \ln W + a_{4j} \ln L + e_j$$

where N = clock hours of labor used in household production

R = amount of Grameen Bank credit

F = number of potential workers in the household

W = value of physical assets or wealth

and L = value of land at household's disposal.

The expected results of the Employment (N) Equation are summarized in Table 5.1.

**Table 5.1**

**Summary of Expected Results: Employment (N) Equation**

Dependent Variable: Effects on  $\ln N_j$

<u>Independent Variable</u>	<u>Variable Definition</u>	<u>Predicted Effect</u>
R	Credit	Positive
F	Workers per family	Positive
W	Wealth	Uncertain
L	Land	Uncertain

### 5.2.2 Model predictions and Theoretical Testing on Income

This section presents the equation to be used to estimate the effects of Grameen Bank loans on net household income (gross income minus cost of production). Several factors may influence a household's disposable income. Credit (R) is expected to positively affect income through its impact on the ability of a household to purchase food and intermediate inputs. Here also, the impact of interest rate has been omitted from the equation. The level of household employment (N) is also expected to directly affect income; the greater the number of hours worked, the greater a household's earnings. The impact of household savings (S) at the beginning of the production period on income is uncertain. Household savings are expected to be positive determinant of income if it is applied towards the household's purchase of food and inputs for production. However, if past savings are not reinvested, it is not expected to have an impact on the level of income. Ceteris paribus, household income is expected to be greater the greater the value of physical assets or wealth (W). Finally, access to land (L) is also expected to positively influence household income. Accordingly, the estimating equation for disposable income is specified as follows:

$$(2) \quad \ln Y_j = b_{j0} + b_{1j} \ln R + b_{2j} \ln N + b_{3j} \ln S + b_{4j} \ln W + b_{5j} \ln L + e_j$$

where Y = household income

and S = household savings from the previous period.

Other variables are as defined in equation (1).

The expected results of the Income (Y) Equation are summarized in Table 5.2.

**Table 5.2**  
**Summary of Expected Results: Income (Y) Equation**

Dependent Variable: Effects on  $\ln Y_j$

<u>Independent Variable</u>	<u>Variable Definition</u>	<u>Predicted Effect</u>
R	Credit	Positive
N	Employment	Positive
S	Savings	Uncertain
W	Wealth	Positive
L	Land	Positive

### 5.3.3 Model Predictions and Theoretical Testing on Productivity

This section presents the equation to be used to estimate the effects of Grameen Bank loans on productivity. In this study, two measures of productivity are defined: (1) Total Factor Productivity and (2) Labor Productivity. In specifying the productivity equations, factors other than credit (R) that affect household productivity must be considered. The level of education (E) is expected to increase the productivity of labor. Ceteris paribus, labor productivity is expected to be greater the greater the value of land (L) and the wealth (W). Accordingly, the estimating equation for productivity (P) is specified as follows:



$$(3) \quad \ln P_j = c_{j0} + c_{1j}R + c_{2j}E + c_{3j}W + c_{4j}L + e_j$$

where P = household productivity

and E = maximum years of formal education of household member.

All other variables are as defined in equation (1). The expected results of the two productivity equations are summarized in Table 5.3.1 and Table 5.3.2.

**Table 5.3.1**

**Summary of Expected Results: Total Factor Productivity (TPF)**

<u>Independent Variable</u>	<u>Variable Definition</u>	<u>Predicted Effect</u>
R	Credit	Positive
E	Education	Positive
W	Physical Assets	Uncertain
L	Land	Positive

**Table 5.3.2**

**Summary of Expected Results: Labor Productivity (NP)**

<u>Independent Variable</u>	<u>Variable Definition</u>	<u>Predicted Effect</u>
R	Credit	Positive
E	Education	Positive
W	Physical Assets	Uncertain
L	Land	Positive

The above equations for Employment, Income and Productivity are estimated for three separate groups or types: (1) poor landless households that are receiving credit from the Grameen Bank, heretofore known as “target participating households”; (2) poor landless households that are not receiving credit from the Grameen Bank or any other source, heretofore known as “target non-participating households”; and (3) non-poor households that are not receiving credit from any source, heretofore known as “non-target non-participating households”. The subscript  $j$  refers to the household type and  $e$  is the classical error term. The size of the coefficients ( $b$ 's) is expected to differ by household type. These equations are tested for each group in the full data set and also in the subset of households that reside in villages where the Grameen Bank is present.

## **5.4 Data Sources and Description**

In this section, the source and nature of data set are described. Specifically, noteworthy characteristics of the data set and measurement issues associated with this study are discussed. In addition, all dependent and explanatory variables are defined.

### **5.4.1 Data Source and Background**

The data used in this analysis were collected as rural household survey data in Bangladesh during 1991-1992. The survey design covered a "program group" comprised of households which had the choice to join a credit program (the Grameen Bank) that may impact their behavior in response to the program, and a "control group" comprised

of households which did not have the choice of joining the program but might have similar behavior. The overall sample used in this study is drawn from 13 randomly selected "thanas" (sub-districts), of which 8 had Grameen Bank micro-credit programs in operation, and 5 had none. Three villages in each thana were then randomly selected, although in the program thanas, villages were randomly selected on the basis of their having a program in operation for three or more years. Households within the selected villages were then identified as "target" (those who were qualified to join the program) or "non-target", and then participants and non-participants among the target households were separately identified.

A comprehensive questionnaire, designed by the World Bank and translated and pre-tested by the Bangladesh Institute of Development Studies (BIDS), was administered to each household in three separate rounds corresponding to the three major crop seasons in Bangladesh, helping to reduce the problems associated with memory recall. The questionnaire contained different sections for various individual and household level information. Employment information was collected on all household members over the age of ten years. To estimate the returns on economic activities, data on input use and output of all household enterprises were gathered. Data pertinent to this study include: wage-employment and self-employment; land and livestock assets/ revenues/expenses; non-farm enterprise assets/revenues/expenses; and credit and savings. Education and basic ability tests, developed by the BIDS and the World Bank researchers, were also done in order to assess basic educational skills and needs in rural Bangladesh.

It should be noted that while these data provide a basis for estimating the impact of credit on household labor use, income and productivity, they were not collected expressly for this purpose. Accordingly, only those households that appeared in all three rounds of this survey and that provide adequate information on all of the variables pertinent to this study have been included. As such, data from 301 participating target households, 250 non-participating target households, and 82 non-target households are used in this study. Below, the variables used in the estimations are defined and described in detail.

### **5.3.2 Variable Names and Definitions**

#### ***Household Employment (N)***

In this study, the employment (N) variable is defined as labor use in clock hours. It refers to the how much time, in a typical (average) week, was devoted by each household member to a list of specific agricultural and non-agricultural activities on a seasonal and/or permanent basis. Activities include farming, livestock and fisheries, manufacturing and processing, trade and shop-keeping, transport business, collective enterprise activities, etc. The sum of the time spent by each household member in each of these activities is recorded as the household's labor use and is the measure of N.

### ***Household Income (Y)***

This variable is defined as the household's net income, i.e. gross income minus the direct costs of production. It is derived by estimating the income from different economic activities by all the members of the household for the year. It includes income earned from farming, livestock and fisheries, manufacturing and processing, trade and shop-keeping, transport business, and other non-farm enterprise activities. Income from agriculture did not include food produced and directly consumed by the household. Accordingly, for households with access to agricultural land, net household income is underestimated. The sum of net income in takas (the local currency) from all sources, minus interest payments and credit, is coded as household income.

### ***Household Productivity (P)***

As stated earlier, two measures of productivity are defined in this study: Total Factor Productivity and (2) Labor Productivity. The first productivity index (TFP) is measured as the yearly income of the household from all sources divided by total operating costs for that year. Operating costs for agricultural and livestock activities include expenses for irrigation, labor, seeds, fertilizer, pesticides, power or animal tillage, animal feed, maintenance, veterinarian and medicine, and other related expenditures. Operating costs for non-farm activities include expenses for raw materials, wages and salaries, building/land rental, electricity, fuel/oil/gas, transportation, inventory, and duty/tax/license fees. The labor productivity index (NP) is measured simply as the household's yearly income divided by its total labor use (N).

***Credit (R)***

The variable credit (R) is measured as the amount of credit taken from the Grameen Bank during the year, in takas. Households receiving loans from the Grameen Bank are not permitted to take credit from other sources (and there is no evidence to suggest they do); thus all credit should be accounted for. Also, borrowers are charged a flat interest rate. Unfortunately, this precludes the exploration of the effect of the interest rate on labor use, income and productivity.

***Household Savings (S)***

The survey did not collect any information on household savings at the beginning of the year or household income for the previous year. Therefore, current savings during each of the three crop seasons are averaged to give the household savings level for the 1991-1992 year. This figure is assumed to approximate the household savings pattern and is thus used as a proxy for the savings variable.

***Number of Potential Workers in the Household (F)***

This variable is also called the family (F) variable. The survey recorded information on the number of household members and their respective ages. All household members between the ages of fifteen and sixty-five are considered to be potential workers, whether part-time or full-time.

***Wealth (W)***

This variable is defined as the value of non-land assets owned by the household. It is measured by the current value, in takas, of livestock and non-livestock assets at the time of the survey. Livestock included poultry, cattle, and fisheries, while non-livestock assets included the homestead/house, boats, carts, rickshaws, cycles, radios, clocks, watches, beds, tables, utensils, etc. Thus, the variable for wealth includes capital goods used in production as well as non-productive assets. The value of non-land wealth may be thought of as a proxy for the value of capital stock. The value of capital goods included in wealth is anticipated to be greater in households with greater wealth.

***Land (L)***

As noted earlier, the survey collected information on the value of agricultural land owned as well as leased or rented in the crop year 1991-1992. As agricultural production may take place on land rented or leased as well as owned, the agricultural land variable should be thought of as measuring land access, as opposed to ownership.

***Education (E)***

The survey data includes information on the number of years of schooling received by each member of the household. The highest education level (in years) completed by any household member, male or female, is assumed to reflect the overall educational level of each household. This number is used to measure the education variable.

Table 5.4 provides summary statistics on the variables described above for all 633 households used in this study. Table 5.5 provides a comparison of summary statistics on all the variables among the three household types in the full data set. Table 5.6 provides a similar comparison of households in villages where Grameen Bank is present.

**Table 5.4: Variable Definitions and Descriptive Statistics**

Variable	Description	Obs	Mean	Std Dev	Min	Max
R	CREDIT	301	7344	4369	1000	26500
N	LABOR	633	7783	4886	1104	41464
Y	INCOME	633	29412	12394	8466	88280
W	WEALTH	633	10362	8582	550	77253
L	LAND	633	12612	15176	500	95000
F	HH SIZE	633	3.26	1.56	1	12
E	EDUCATION	633	3.29	3.28	0	16
S	SAVINGS	633	878	1305	0	9600
TFP	INCOME/LABOR	633	5.07	3.55	.510	23.83
NP	INCOME/COSTS	633	7.45	6.38	1.30	39.44

Note: Figures for CREDIT, INCOME, SAVINGS, WEALTH and LAND are denoted in Bangladeshi Takas. LABOR is denoted in hours. Education is denoted in years.



**TABLE 5.5: Mean Statistics for All Households: 633 Observations**

Variable	Description	Target Members	Target Non-Members	Non-Target Non-Members
	Observations	301	250	82
R	CREDIT	7344.35	0	0
N	EMPLOYMENT	8110.15	7428.68	7631.76
Y	INCOME	30223.3	25506.4	46252.6
W	WEALTH	11579.9	7466.42	14728.6
L	LAND	10062.4	6824.10	39357.1
F	FAMILY	3.229	3.012	4.108
E	EDUCATION	3.382	2.556	5.289
S	SAVINGS	853.558	356.780	2613.54

**Note:** Figures for CREDIT, INCOME, SAVINGS, WEALTH and LAND are denoted in Bangladeshi Takas. LABOR is denoted in hours. EDUCATION is denoted in years.

**TABLE 5.6: Mean Statistics for All Households in Districts with Grameen Bank Presence: 442 Observations**

Variable	Description	Target Members	Target Non-Members	Non-Target Non-Members
	Observations	301	88	53
R	CREDIT	7344.35	0	0
N	EMPLOYMENT	8110.15	7756.36	7836.76
Y	INCOME	30223.3	24979.7	37529.3
W	WEALTH	11579.9	8410.23	15522.6
L	LAND	10062.4	7531.05	37357.1
F	FAMILY	3.229	3.19	4.21
E	EDUCATION	3.382	2.89	5.60
S	SAVINGS	853.558	350.070	2347.56

**Note:** Figures for CREDIT, INCOME, SAVINGS, WEALTH and LAND are denoted in Bangladeshi Takas. LABOR is denoted in hours. EDUCATION is denoted in years.

The table below provides cross-correlations between all major variables in the study.

**Table 5.7: Cross-correlations for Explanatory Variables  
All Households: 633 Observations**

	R	Y	N	W	L	F	E	S
<b>R CREDIT</b>	1.000							
<b>Y INCOME</b>	0.108	1.000						
<b>N EMPLOYMENT</b>	0.137	0.084	1.000					
<b>W WEALTH</b>	0.183	0.170	0.160	1.000				
<b>L LAND</b>	-0.116	0.235	0.044	0.232	1.000			
<b>F FAMILY</b>	0.060	0.156	0.509	0.265	0.225	1.000		
<b>E EDUCATION</b>	0.053	0.155	0.280	0.293	0.245	0.299	1.000	
<b>S SAVINGS</b>	0.032	0.192	0.031	0.188	0.403	0.158	0.238	1.000

As can be seen from Tables 5.5 and 5.6, when considering both the full data set and the subset of households in Grameen Bank districts, the level of household income is higher for the non-target (therefore, "non-poor") group than for the target group. Among "target" households, income levels are higher for those that participate in the Grameen Bank program than those that do not. This pattern holds true for all variables except employment. The level of household employment is highest for "target" households that receive Grameen Bank credit, followed by "non-target" households, and then "target" households that do not receive Grameen Bank credit. Table 5.7 shows that, as can be expected, there is a significant correlation between employment (N) and the number of potential workers in the family (F). All other variables are not highly correlated.

In addition to the data described above, other data are used to determine regional (thana-level) characteristics. Some of this data is taken from the World Bank / BIDS survey and some gathered by the author. These regional variables include dummy variables for each thana, and the distance from each thana to the nearest town, the capital city of Dhaka, the nearest river, the coast, and the nearest railway. For thanas where the Grameen Bank operates, the following variables are also taken into consideration: the number of years that the Bank has been in operation in each thana, the number of years a household has been a member of the Bank and the average (and household) distance to the Bank. For details on these regional variables, please see Appendix D.

## CHAPTER 6

### REGRESSION RESULTS ON EMPLOYMENT, INCOME AND PRODUCTIVITY: A SUMMARY OF THE EMPIRICAL EVIDENCE

#### 6.1 Introduction

This chapter presents the empirical evidence on the impact of micro-credit on the liquidity constraints faced by poor rural households in Bangladesh and their levels of employment, income and productivity. For this purpose, Section 2 discusses the econometric approach used in this research. Section 3 discusses the issue of causality. Sections 4, 5 and 6 present regression results on employment, income and productivity respectively. Section 7 provides an appraisal of the empirical findings.

As noted in Chapter 5, the full data set of 633 households can be divided into three subsamples: (1) the 301 households that qualified for and received Grameen Bank loans, i.e. "target participating" households; (2) the 250 households that qualified for but did not receive Grameen Bank loans, i.e. "target non-participating" households; and (3) the 82 households that did not qualify and therefore did not receive Grameen Bank loans, i.e. "non-target non-participating" households. The full data set can be further broken down into looking at these groups in the 8 districts where Grameen Bank is present.

## 6.2 Econometric Approach

In this study, the predictive implications of the models presented in the previous chapters are tested by the three different statistical approaches: ordinary least squares (OLS), loglinear least squares, and two-stage least squares (2SLS). Regarding the first two types of approaches, the method of least squares has some attractive statistical properties that make it a simple yet powerful tool of regression analysis. Least square estimators produce consistent and efficient estimators, provided there is no simultaneity problem. However, an examination of the cross sectional data used for this study suggests that such straightforward methodology may not be appropriate. The nature of this data set (termed "quasi-experimental" by its designers as a complete random sample was not possible), indicates selection bias. Also, given that the dependant variable in the labor equation appears as a regressor in the income equation suggests that simultaneity is present. In such a case, OLS estimators would not even be consistent. It might be useful, therefore, to consider the model as a system of equations that must be estimated simultaneously. As a result, the method of two-stage least squares (2SLS) and the use of instrumental variables is more suitable to estimate the equations. Oddly, if this alternative method is applied when there is in fact no simultaneity, this method will yield estimators that are consistent but not efficient (i.e. with smaller variance). So long as the other regressors are exogenous, the two-stage least squares (2SLS) estimation of the model is appropriate and preferred to other IV estimators given its advantages in terms of asymptotic efficiency among single equation (as opposed to full system) estimators.

The issue of causality is central to this study. It is important to know, for example, whether credit leads to greater success for households (as shown by enhanced labor use, income, and productivity), or whether households that are already successful are rewarded with credit.<sup>30</sup> Therefore, to further investigate this question, it is useful to determine the value of residual credit and look at its impact on the levels of household employment and income. As the residual credit represents the "unexpected" or "surprise" credit that households receive, the results of this approach should be a good indication of the real impact of credit.

The estimating equations are estimated separately for the full sample and for each subsamples. In all cases, tests for heteroscedasticity and specification are undertaken.

### **Heteroscedasticity**

In cross-sectional data such as that used for this study, heteroscedasticity can arise where the scale of the dependant variable and the explanatory variables of the model tend to vary across observations (Greene, 1993). To test whether heteroscedasticity is a problem, the Cook-Weisberg Test is used. The tests statistics obtained follow a chi-squared distribution. In all cases, none of the results are significant at the 5 per cent level, implying homoscedasticity.

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<sup>30</sup> Unfortunately, as the data is cross-sectional, it precludes the use of a test such as the Granger Causality Test that would indicate the direction of influence.

### **Specification Error**

The simultaneity problem can arise if some of the regressors are endogenous and are therefore likely to be correlated with the disturbance, or error, term (Gujarati, 1995). A test for simultaneity, therefore, is essentially a test of whether an endogenous regressor is correlated with the error term. As noted above, the 2SLS method and the use of instrumental variables is assumed to be appropriate for the purposes of this study. Since the 2SLS method will only yield consistent estimates provided all variables assumed to be exogenous are in fact exogenous, the Hausman test (Hausman, 1978) is used to test for exogeneity. The Hausman test results indicate that the 2SLS method is not as efficient as the simpler OLS method, and therefore the OLS results should not be rejected. It appears that the instrumental variables available for this study are simply not good "proxies" for the explanatory variables in question. As a result, once evidence of causality (from credit to employment and income) is established, OLS estimates of the impact of credit are also reported.

The results of this study are given as follows: Section 6.3 give the findings on the impact of credit on household employment and income using the 2SLS approach and the residual credit approach to establish causality. Sections 6.4, 6.5 and 6.6 give the findings, respectively, on the impact of credit on household employment, income and productivity using ordinary least squares.

### 6.3 Establishing Causality

To establish causality between credit and the major explanatory variables, first two stage least squares (2SLS) regressions on household employment and household income are carried out. The results of the 2SLS estimates on employment and income are presented in Tables 6.1A and 6.1B respectively. Separate regressions are carried out for the full data set (633 households), the sub-set of Grameen Bank sub-districts (422 households), and the Grameen Bank members only (301 households). For the employment equation, credit is instrumented using regional variables. For the income equation, credit and employment are both instrumented using regional variables. For details on the regional variables, please see Appendix D.

For all three data groups, the results indicate that credit has a positive and significant impact on the level of household employment. The family variable (F) also has a strong positive impact on household labor use, as expected. The results for wealth and land are not significant. For all three data groups, the results indicate that the effect on credit on household income, while not significant, is positive. Wealth is also a positive and significant determinant of household income when considering the full data set. Land is a positive and significant determinant of household income when considering the full data set and the sub-set of Grameen Bank regions. For the 301 Grameen Bank member households (which are generally landless and own less physical assets relative to non-poor households), the impact of wealth and land are not significant.

Table 6.1C gives a summary of the 2SLS effects of credit on household employment and income.



**TABLE 6.1A: SUMMARY OF 2SLS ESTIMATES ON EMPLOYMENT (N)**

Regressor	Definition	ALL districts	GB districts	GB households
C	Constant	1499 (2.689)	808.3 (0.936)	2048 (2.842)
R	Credit	<b>.4296</b> (3.065)	<b>.4605</b> (2.893)	<b>.2552</b> (2.253)
F	Family	<b>1563</b> (12.91)	<b>1492</b> (11.95)	<b>1317</b> (10.41)
W	Wealth	-.0268 (-0.981)	-.0316 (-1.200)	-.0231 (-0.849)
L	Land	-.0028 (-0.194)	.0214 (1.123)	<b>.0199</b> (2.842)
Number of Observations		633	422	301
R-squared		0.18	0.20	0.36

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold** print.

**TABLE 6.1B: SUMMARY OF 2SLS ESTIMATES ON INCOME (Y)**

Regressor	Definition	ALL districts	GB districts	GB households
C	Constant	26579 (10.24)	26606 (7.483)	31141 (7.475)
R	Credit	<b>.3393</b> <b>(1.678)</b>	<b>.4405</b> <b>(1.009)</b>	<b>.3728</b> <b>(0.968)</b>
N	Labor	-.3131 (-0.827)	-.3140 (-0.588)	-.6394 (-1.106)
W	Wealth	.1634 (2.419)	.1373 (1.767)	.0318 (0.320)
L	Land	.1896 (5.536)	.1702 (2.970)	<b>.1155</b> <b>(1.286)</b>
Number of Observations		633	422	301
R-squared		0.06	0.04	0.03

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold** print.

**TABLE 6.1C: SUMMARY OF 2SLS EFFECTS OF CREDIT ON EMPLOYMENT AND INCOME**

Group	EMPLOYMENT		INCOME	
		R-squared		R-squared
All Districts 633 Households	<b>.4296</b> <b>(3.065)</b>	0.18	.3393 1.678	0.06
GB Districts 422 Households	<b>.4605</b> <b>(2.893)</b>	0.20	.4405 (1.009)	0.04
All GB members 301 Households	<b>.2552</b> <b>(2.253)</b>	0.36	.3728 (.0968)	0.03

**Note:** *t*-statistics are in parentheses, significance at 5% level are shown in **bold** print.

The second approach in establishing causality between credit and the major explanatory variables involves regressing credit variable on all major and regional variables. The summary of estimates on credit (R), or predicted lending, is given in Table 6.2A. The results indicate that household labor and income are positive, and generally significant, determinants of credit. As credit is found to have a strong positive impact on household labor and income, these results are to be expected. The value of household wealth is also found to effect the amount of credit households receive. These results, however, say little of the direction of impact: whether credit leads to greater employment, income and wealth, or vice versa. Land, on the other hand, appears to have a negative impact on credit, and this effect is significant when considering the full data set and the sub-sample of Grameen Bank districts. This finding is consistent with the fact that the Grameen Bank lends mainly to "landless" households. Whereas land is a generally an asset in obtaining credit, for poor rural households in Bangladesh "landlessness" becomes an asset in obtaining Grameen Bank credit.

From the above regressions, the residual credit is determined and used as a variable in the employment and income equations. As mentioned earlier, the residual credit represents the "unexpected" or "surprise" credit that households receive. The results of the estimates on employment and income, using "unexpected" credit as a variable, are given in Tables 6.2B and 6.2C respectively. The findings indicate that "unexpected credit" does indeed have a positive impact on household employment and income, and that the effect is significant for income. Table 6.2D gives a summary of the impact of residual credit on household employment and income.

**TABLE 6.2A SUMMARY OF ESTIMATES ON CREDIT (R)**

<u>Regressor</u>	<u>All hhs</u>	<u>GB Districts</u>	<u>GB Members</u>
LABOR	.0815 (1.879)	<b>.1758</b> <b>(2.783)</b>	<b>.2230</b> <b>(2.913)</b>
INCOME	<b>.0499</b> <b>(3.368)</b>	<b>.0477</b> <b>(2.618)</b>	<b>.0571</b> <b>(2.885)</b>
FAMILY	-95.85 (-0.693)	-158.6 (-0.912)	37.15 (0.206)
WEALTH	<b>.1106</b> <b>(4.987)</b>	<b>.0816</b> <b>(3.113)</b>	<b>.0981</b> <b>(3.215)</b>
LAND	<b>-.0667</b> <b>(-5.056)</b>	<b>-.0965</b> <b>(-5.476)</b>	-.0454 (-1.538)
SAVINGS	.1464 (0.946)	.3490 (1.543)	<b>.9264</b> <b>(2.828)</b>
EDUCATION	-39.89 (-0.663)	-109.0 (-1.443)	-82.89 (-0.975)
TOWN	15.65 (0.371)	<b>106.9</b> <b>(2.061)</b>	<b>175.0</b> <b>(3.308)</b>
DHAKA	7.793 (1.573)	-10.73 (-1.639)	-23.66 (-3.459)
RIVER	<b>31.34</b> <b>(2.928)</b>	<b>36.43</b> <b>(3.116)</b>	<b>66.34</b> <b>(5.599)</b>
COAST	<b>-17.18</b> <b>(-4.301)</b>	<b>-12.90</b> <b>(-2.464)</b>	-6.346 (-1.158)
TRAIN	-3.034 (-0.127)	-51.88 (1.743)	-1.814 (-0.059)
CONSTANT	<b>2675</b> <b>(2.362)</b>	<b>3559</b> <b>(2.081)</b>	-97.94 (-0.050)
Observations	633	442	301
R-squared	0.16	0.16	0.27

Note: *t*-statistics are in parentheses. significance at 5% level are shown in **bold print**

**TABLE 6.2B: SUMMARY OF ESTIMATES ON EMPLOYMENT (N)**  
**USING RESIDUAL CREDIT**

Regressor	Definition	ALL districts	GB districts	GB households
C	Constant	-2856 (-1.629)	-2046 (-1.288)	-2856 (-1.629)
resR	Residual Credit	<b>.0180</b> (0.476)	<b>.0435</b> (1.279)	<b>.0616</b> (1.453)
preR	Predicted Credit	<b>2.542</b> (12.55)	<b>2.069</b> (9.525)	<b>1.884</b> (7.706)
F	FAMILY	<b>1445</b> (14.61)	<b>1413</b> (14.07)	<b>1274</b> (12.04)
W	WEALTH	<b>-.2806</b> (-9.350)	<b>-.2249</b> (-7.234)	<b>-.2003</b> (-5.758)
L	LAND	<b>.1137</b> (7.343)	<b>.1018</b> (5.889)	<b>.1379</b> (5.251)
		.	.	.
		.	.	.
		.	.	.
	Number of Observations	633	422	301
	R-squared	0.46	0.48	0.51

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold** print.  
 Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.2C: SUMMARY OF ESTIMATES ON INCOME (Y)**  
**USING RESIDUAL CREDIT**

Regressor	Definition	ALL districts	GB districts	GB households
C	<b>Constant</b>	-30405 (-16.85)	-27344 (-12.16)	-45953 (-24.09)
resR	Residual Credit	-2.15e-08 (0.000)	<b>.1353</b> <b>(2.218)</b>	<b>.3127</b> <b>(3.958)</b>
preR	Predicted Credit	<b>18.53</b> <b>(44.00)</b>	<b>15.60</b> <b>(37.21)</b>	<b>15.50</b> <b>(32.09)</b>
N	LABOR	<b>-.8836</b> <b>(-16.02)</b>	<b>-.8989</b> <b>(-12.14)</b>	<b>-.9603</b> <b>(-10.17)</b>
W	WEALTH	<b>-1.554</b> <b>(-32.39)</b>	<b>-1.561</b> <b>(-27.80)</b>	<b>-1.588</b> <b>(-24.12)</b>
L	LAND	<b>1.101</b> <b>(39.55)</b>	<b>1.116</b> <b>(31.60)</b>	<b>1.174</b> <b>(22.32)</b>
S	SAVINGS	<b>-1.560</b> <b>(-7.326)</b>	<b>-1.527</b> <b>(-5.168)</b>	<b>-1.393</b> <b>(-3.099)</b>
		.	.	.
		.	.	.
		.	.	.
Number of Observations		633	422	301
R-squared		0.78	0.78	0.79

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold print**.  
 Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.2D: SUMMARY OF THE EFFECTS OF PREDICTED AND RESIDUAL CREDIT ON EMPLOYMENT AND INCOME**

Group	EMPLOYMENT			INCOME		
	Predicted R	Residual R	R-squared	Predicted R	Residual R	R-squared
All Districts 633 Households	2.452 (12.55)	.0180 (0.476)	0.46	18.53 (44.00)	-2.15e-08 (0.000)	0.78
GB Districts 422 Households	2.069 (9.525)	.0435 (1.279)	0.48	15.60 (37.21)	<b>.1353</b> <b>(2.218)</b>	0.78
All GB members 301 Households	1.884 (7.706)	.0616 (1.453)	0.51	15.50 (32.09)	<b>.3127</b> <b>(3.958)</b>	0.79

**Note:** *t*-statistics are in parentheses, significance at 5% level are shown in **bold** print.



## 6.4 OLS Regression Results on Employment

The results of the OLS estimates on employment are presented in Tables 6.1A, 6.1B, 6.1C, 6.1D and 6.1E. Each table gives the regression results using the loglinear OLS and regular OLS statistical approaches. A third approach, a regular OLS including regional variables, is also used as a comparison to the second method. This approach is useful in determining whether general regional characteristics affect the previous outcome. The appropriate t-statistic for each variable is given in each case.

Table 6.1A presents a summary of estimates on employment for all 633 households in the data set. In particular, the estimating equation seeks to find whether the use of Grameen Bank micro-loans has an impact on the level of household employment. Table 6.1A shows that all the variables have the expected effect on employment. In all three statistical approaches, the results indicate that credit (R) and the number of household members within working age (F) are both significantly positive. The results for family size (F) are not surprising since this study anticipates a close positive relationship between the level of household employment and the number of household members who are available and eligible to work. The results for credit (R) show that the application of small loans does indeed increase the level of household employment, as measured in labor hours. The results also indicate that household wealth (W) does not significantly influence household labor use, although the estimated coefficients are positive. As the measure of household wealth includes a variety of productive and non-productive assets (and therefore cannot be used as a proxy for the household's capital stock), the effect on household employment is uncertain at best. The results for household

land (L) are not significant in the first two approaches but is significant and negative when factoring in the regional dummy variables. A reason for this could be that households substitute land for labor in the short run and that this effect dominates the increased scale of total production that land enables.

Table 6.1B presents a summary of estimates on employment for all 550 "target" households in the data set. Again, the estimating equation seeks to find whether the use of small amounts of credit has an impact on the level of household employment. This time the focus is on all households that are "poor" and therefore eligible for Grameen Bank loans. In all three approaches, the results for family (F) are positive and significant as expected. The results for credit (R), however, show that while credit is positive and significant in the loglinear OLS statistical approach, it is positive but insignificant otherwise. This finding that credit use fails to significantly increase labor use in "poor" households suggest that in poor households the impact of greater liquidity both enhances the efficiency of labor (reducing the time needed to produce a unit of output) and enables the purchase of more intermediate inputs (increasing labor requirements measured in efficiency units), but that these effects tend to offset each other. The results for wealth (W) are not significant. The results for land (L) also are positive and significant in the loglinear OLS statistical approach, and positive but insignificant otherwise. Contrary to the case for the full data set, this finding suggests that access to land positively influences labor use, perhaps by simply increasing agricultural employment opportunities.

Table 6.1C presents a summary of estimates on employment for all 301 "target" households that actually receive Grameen Bank micro-loans. In this case, the estimating equation seeks to find whether the size of the credit received has an impact on the level of household employment. In all three statistical approaches, the results for the family (F) variable are positive and significant as expected. The results for credit (R) are also positive and significant, indicating that the application of small loans does indeed increase the level of household employment. The findings also suggest that larger amounts of credit has greater impact on household labor use. The results for wealth (W) and land (L) are insignificant.

To narrow the focus and further control for differences in regional characteristics, it is useful to look at the eight districts where the Grameen Bank actually operates. Table 6.3D presents a summary of estimates on employment for all 442 households in districts where Grameen Bank is present. The results for this subset is comparable to that of the full data set as given in Table 6.3A. Table 6.3E presents a summary of estimates on employment for the 389 "target" households in districts where Grameen Bank is present. The results for this subset is comparable to that given in Table 6.3B. In both cases, the estimating equation seeks to find whether or not the use of micro-loans has an impact on the level of household employment within Grameen Bank districts. The results from all three approaches indicate that the credit (R) and the number of potential workers in the family (F) have a positive and significant impact on household labor use. The results for wealth (W) and land (L) are not significant.

The results for the employment equation for the full data set and each subset is given below:

**TABLE 6.3A: SUMMARY OF OLS ESTIMATES ON EMPLOYMENT (N)**

**All households: 633 observations**

Regressor	Definition	OLS loglinear	OLS regular	OLS regional
C	Constant	7.760 (31.90)	2344 (5.668)	420.4 (0.558)
R	Credit	<b>.0105</b> <b>(4.067)</b>	<b>.0960</b> <b>(2.658)</b>	<b>.0416</b> <b>(2.120)</b>
F	Family	<b>.6120</b> <b>(13.04)</b>	<b>1607</b> <b>(14.30)</b>	<b>1571</b> <b>(14.31)</b>
W	Wealth	.0236 (0.915)	.0125 (0.598)	.0111 (0.539)
L	Land	.0178 (0.925)	-.0210 (-1.813)	<b>-.0293</b> <b>(-2.565)</b>
				.
				.
				.
	Number of Observations	633	633	633
	R-squared	0.261	0.274	0.329

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold** print.  
Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.3B: SUMMARY OF OLS ESTIMATES ON EMPLOYMENT (N)****All Target Households: 551 Observations**

Regressor	Definition	OLS loglinear	OLS regular	OLS regional
C	Constant	7.491 (26.12)	1859 (3.931)	3737 (4.067)
R	Credit	<b>.0079</b> <b>(2.729)</b>	.0625 (1.595)	.0775 (1.695)
F	Family	<b>.6382</b> <b>(12.47)</b>	<b>1700</b> <b>(13.61)</b>	<b>1653</b> <b>(13.37)</b>
W	Wealth	.0138 (0.487)	.0074 (0.278)	-.0013 (-0.050)
L	Land	<b>.0577</b> <b>(2.455)</b>	.0342 (1.357)	.0271 (1.055)
				.
				.
				.
Number of Observations		551	551	551
R-squared		0.275	0.284	0.336

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold** print.  
Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.3C: SUMMARY OF OLS ESTIMATES ON EMPLOYMENT (N)****All Target Participating Households: 301 observations**

Regressor	Definition	OLS loglinear	OLS regular	2SLS
C	Constant	7.158 (16.16)	2572 (4.831)	1835 (2.755)
R	Credit	<b>.1142</b> <b>(2.825)</b>	<b>.1401</b> <b>(3.388)</b>	<b>.1352</b> <b>(3.024)</b>
F	Family	<b>.6610</b> <b>(11.69)</b>	<b>1370</b> <b>(11.85)</b>	<b>1291</b> <b>(11.24)</b>
W	Wealth	-.0331 (-1.012)	-.0097 (-0.403)	-.0028 (-0.117)
L	Land	.0357 (1.379)	.0196 (0.886)	.0236 (1.033)
				.
				.
				.
	Number of Observations	301	301	301
	R-squared	0.371	0.375	0.423

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold print**.  
Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.3D: SUMMARY OF OLS ESTIMATES ON EMPLOYMENT (N)****All Households in Grameen Bank Districts: 442 Observations**

Regressor	Definition	OLS loglinear	OLS regular	OLS regional
C	Constant	7.876 (27.17)	2369 (5.211)	3868 (5.630)
R	Credit	<b>.0120</b> <b>(3.944)</b>	<b>.1188</b> <b>(3.324)</b>	.0823 (1.873)
F	Family	<b>.6913</b> <b>(13.31)</b>	<b>1537</b> <b>(13.72)</b>	<b>1577</b> <b>(12.28)</b>
W	Wealth	.0045 (0.155)	-0.0003 (-0.013)	-0.0076 (-0.282)
L	Land	.0141 (0.639)	-0.0067 (-0.518)	.0262 (1.028)
				.
				.
				.
Number of Observations		442	442	442
R-squared		0.318	0.332	0.327

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold** print.  
Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.3E: SUMMARY OF OLS ESTIMATES ON EMPLOYMENT (N)****All Target Households in Grameen Bank Districts: 389 Observations**

Regressor	Definition	OLS loglinear	OLS regular	OLS regional
C	Constant	7.801 (23.57)	2304 (4.488)	3788 (4.977)
R	Credit	<b>.0094</b> (2.577)	<b>.0904</b> (2.347)	<b>.0820</b> (2.079)
F	Family	<b>.6913</b> (12.43)	<b>1572</b> (12.91)	<b>1512</b> (12.50)
W	Wealth	-.0048 (-0.152)	-.0035 (-0.138)	.0006 (0.023)
L	Land	.0339 (1.316)	.0194 (0.801)	.0172 (0.699)
				.
				.
				.
	Number of Observations	389	389	389
	R-squared	0.315	0.331	0.372

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold print**.  
Vertical dots indicate that the results for regional variables are not reported.



**TABLE 6.3F: SUMMARY OF PREDICTED AND ASSESSED EFFECTS OF CREDIT ON EMPLOYMENT(N)**

Group	Obs.	Predicted	Assessed	OLS loglinear	OLS normal	OLS regional
All households	633	Increase	Increase	<b>.0105</b> <b>(4.067)</b>	<b>.0960</b> <b>(2.658)</b>	<b>.0416</b> <b>(2.120)</b>
All households in GB districts	442	Increase	Increase	<b>.1142</b> <b>(2.825)</b>	<b>.1401</b> <b>(3.388)</b>	<b>.1352</b> <b>(3.024)</b>
All "target" households	551	Increase	Increase	<b>.0079</b> <b>(2.729)</b>	<b>.0625</b> <b>(1.595)</b>	<b>.0775</b> <b>(1.695)</b>
All "target" households in GB districts	389	Increase	Increase	<b>.0120</b> <b>(3.944)</b>	<b>.1188</b> <b>(3.324)</b>	<b>.0991</b> <b>(2.713)</b>
All GB members	301	Increase	Increase	<b>.0094</b> <b>(2.577)</b>	<b>.0904</b> <b>(2.347)</b>	<b>.0820</b> <b>(2.079)</b>

**Note:** *t*-statistics are in parentheses, significance at 5% level are shown in **bold print**.

## 6.5 OLS Regression Results on Income

The results of the estimates on income are presented in Tables 6.2A, 6.2B, 6.2C, 6.2D and 6.2E. Each table gives the regression results using the loglinear OLS and normal OLS statistical approaches. A third approach, a normal OLS including district dummy variables, is also used as a comparison to the second method. This approach is useful in determining whether general regional characteristics affect the previous outcome. The appropriate t-statistic for each variable is given in each case.

Table 6.2A presents a summary of estimates on income for all 633 households in the data set. In particular, the estimating equation seeks to find whether the use of Grameen Bank micro-loans has an impact on the level of household income. Table 6.1A shows that all variables have the expected effect on income. In all three statistical approaches, the results indicate that the use of small amounts of credit (R) has a significant and positive impact on the level of household income. In general, it appears that household labor use (N) and household wealth (W) positively influence household income. The estimated coefficients are uniformly positive, although they fail to reach significance. As expected household savings (S) are a positive and, except in the loglinear approach, significant determinant of household income. Access to land (L) also significantly increases household income, as hypothesized. It should be noted that the estimated coefficients for land may understate the impact of access to agricultural land since the measure of net household income excludes the value of food produced and consumed directly by the household.

Table 6.2B presents a summary of estimates on employment for all 550 "target" households in the data set. Again, the estimating equation seeks to find whether the use of small amounts of credit has an impact on the level of household employment. This time the focus is on all households that are "poor" and therefore eligible for Grameen Bank loans. In all three approaches, the results show that credit (R) is a positive and significant determinant of the level of household income. The level of household employment (N) is a positive and, in the case of the loglinear approach, significant influence on the level of household income. For the 551 "target" household that comprise this data subset, it appears that the level of household savings (S), wealth (W) and land (L) are not significant.

Table 6.2C presents a summary of estimates on income for all 301 "target" households that actually receive Grameen Bank micro-loans. In this case, the estimating equation seeks to find whether the size of the credit received has an impact on the level of household income. In all three statistical approaches, the results indicate that credit (R) is the only positive and significant determinant of household income for this group.

Table 6.2D presents a summary of estimates on employment for all 442 households in districts where Grameen Bank is present. Table 6.3E presents a summary of estimates on employment for the 389 "target" households in these same districts. In both cases, the results indicate that the use of credit (R) significantly increases the level of household income (except in the loglinear approach of the first group, where it fails to reach significance). The findings also show that access to land (L) positively influences household income, but that this impact is not significant for the 389 "target" households.

The results for income equation for the full data set and each subset are given below:

**TABLE 6.4A: SUMMARY OF OLS ESTIMATES ON INCOME (Y)**

**All households: 633 observations**

Regressor	Definition	OLS loglinear	OLS regular	OLS regional
C	Constant	9.095 (30.20)	23345 (22.12)	23342 (12.70)
R	Credit	<b>.0046</b> <b>(2.058)</b>	<b>.3036</b> <b>(2.948)</b>	<b>.3339</b> <b>(2.734)</b>
N	Employment	.0480 (1.605)	.1270 (1.296)	.1698 (1.664)
S	Savings	.0070 (0.750)	<b>1.081</b> <b>(2.731)</b>	<b>1.218</b> <b>(2.939)</b>
W	Wealth	.0111 (0.532)	.1116 (1.913)	.1041 (1.750)
L	Land	<b>.0607</b> <b>(3.700)</b>	<b>.1516</b> <b>(4.346)</b>	<b>.1546</b> <b>(4.379)</b>
				.
				.
				.
	Number of Observations	633	633	633
	R-squared	0.049	0.099	0.111

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold** print.  
Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.4B: SUMMARY OF OLS ESTIMATES ON INCOME (Y)****All Target Households: 551 Observations**

Regressor	Definition	OLS loglinear	OLS regular	OLS regional
C	Constant	9.665 (30.21)	24388 (23.22)	23440 (12.73)
R	Credit	<b>.0121</b> <b>(4.903)</b>	<b>.5163</b> <b>(5.004)</b>	<b>.5223</b> <b>(4.321)</b>
N	Employment	<b>.0660</b> <b>(2.161)</b>	.1106 (1.199)	.1584 (1.649)
S	Savings	-.0113 (-1.175)	.2155 (0.308)	-.1434 (-0.183)
W	Wealth	-.0074 (-0.326)	.0103 (0.156)	.0059 (0.088)
L	Land	.0036 (0.188)	.1611 (0.962)	.0815 (1.229)
				.
				.
				.
	Number of Observations	551	551	551
	R-squared	0.059	0.070	0.088

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold print**.  
Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.4C: SUMMARY OF OLS ESTIMATES ON INCOME (Y)****All Target Participating Households: 301 observations**

Regressor	Definition	OLS loglinear	OLS regular	OLS regional
C	Constant	9.341 (18.31)	25293 (12.70)	23333 (8.609)
R	Credit	<b>.0877</b> <b>(2.219)</b>	<b>.4294</b> <b>(2.709)</b>	<b>.4740</b> <b>(2.724)</b>
N	Employment	.0355 (0.791)	.0876 (0.493)	.1777 (0.949)
S	Savings	-.0150 (-0.516)	.3371 (0.408)	.7236 (0.718)
W	Wealth	-.0139 (-0.455)	.0077 (0.087)	.0021 (0.024)
L	Land	.0054 (0.222)	.0685 (0.832)	.0732 (0.842)
				.
				.
				.
	Number of Observations	301	301	301
	R-squared	0.023	0.047	0.059

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold print**.  
Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.4D: SUMMARY OF OLS ESTIMATES ON INCOME (Y)****All Households in Grameen Bank Districts: 442 Observations**

Regressor	Definition	OLS loglinear	OLS regular	OLS regional
C	Constant	8.966 (23.73)	23514 (16.16)	23711 (11.74)
R	Credit	.0038 (1.366)	<b>.2956</b> <b>(2.432)</b>	<b>.3065</b> <b>(2.403)</b>
N	Employment	.0615 (1.696)	.1598 (1.192)	.2073 (1.484)
S	Savings	.0175 (1.462)	.9295 (1.682)	1.030 (1.732)
W	Wealth	.0159 (0.608)	.1163 (1.736)	.0086 (1.600)
L	Land	<b>.0503</b> <b>(2.497)</b>	<b>.1234</b> <b>(2.269)</b>	<b>.1250</b> <b>(2.666)</b>
				.
				.
				.
	Number of Observations	442	442	442
	R-squared	0.044	0.065	0.078

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold** print.  
Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.4E: SUMMARY OF OLS ESTIMATES ON INCOME (Y)****All Target Households in Grameen Bank Districts: 389 Observations**

Regressor	Definition	OLS loglinear	OLS regular	OLS regional
C	Constant	9.371 (23.31)	23849 (15.94)	23233 (11.30)
R	Credit	<b>.0128</b> <b>(3.769)</b>	<b>.4920</b> <b>(3.984)</b>	<b>.4989</b> <b>(3.885)</b>
N	Employment	.0719 (1.940)	.1273 (0.977)	.1703 (1.254)
S	Savings	-.0012 (-0.094)	.5932 (0.764)	.2413 (0.273)
W	Wealth	.0032 (0.116)	.0350 (0.451)	.0288 (0.368)
L	Land	.0119 (0.541)	.0580 (0.779)	.0602 (0.777)
				.
				.
				.
	Number of Observations	389	389	389
	R-squared	0.060	0.068	0.080

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold print**.  
Vertical dots indicate that the results for regional variables are not reported.



**TABLE 6.4F: SUMMARY OF PREDICTED AND ASSESSED EFFECTS OF CREDIT ON INCOME (Y)**

Group	Obs.	Predicted	Assesed	OLS loglinear	OLS normal	OLS regional
All households	633	Increase	Increase	<b>.0046</b> <b>(2.058)</b>	<b>.3036</b> <b>(2.948)</b>	<b>.3339</b> <b>(2.734)</b>
All households in GB districts	442	Increase	Increase	.0038 (1.366)	.2956 (2.432)	.3065 (2.403)
All "target" households	551	Increase	Increase	<b>.0121</b> <b>(4.903)</b>	<b>.5163</b> <b>(5.004)</b>	<b>.5223</b> <b>(4.321)</b>
All "target" households in GB districts	389	Increase	Increase	.0128 (3.769)	.4920 (3.984)	.4989 (3.885)
All GB members	301	Increase	Increase	<b>.0877</b> <b>(2.219)</b>	<b>.4294</b> <b>(2.709)</b>	<b>.4740</b> <b>(2.724)</b>

**Note:** *t*-statistics are in parentheses, significance at 5% level are shown in **bold** print.

## **6.6 OLS Regression Results on Productivity**

For this study, two measures of productivity are looked at: (1) Total Factor Productivity or net household income per operating costs and (2) Labor Productivity or income per hour of labor. The results of the estimates on both measures of productivity are presented in Tables 6.3A, 6.3B, 6.3C, 6.3D and 6.3E. Each table gives the regression results using the normal OLS statistical approach. A second approach, a regular OLS including regional variables, is also used as a comparison to the second method. This approach is useful in determining whether general regional characteristics affect the previous outcome. The appropriate t-statistic for each variable is given in each case.

### **Total Factor Productivity (TFP) Equations**

The results of estimates on total factor productivity (TFP), or net household income per operating costs, for all 633 households in the full dataset and all 442 households in districts where Grameen Bank operates are summarized in Tables 6.3A and 6.3D respectively. In both cases, the results show that none of the explanatory variables are significant determinants of this measure of productivity. As anticipated, the estimated coefficients for credit (R) are positive but fail to reach statistical significance. The coefficients for the education (E), wealth (W) and land (L) variables are all negative and insignificant.

The results of estimates on total factor productivity (TFP) for the 550 "target" households in the full dataset and the 389 "target" households in districts where Grameen Bank operates are summarized in Tables 6.3B and 6.3E respectively. Here the focus is on

households that are "poor" and therefore eligible for Grameen Bank loans. In contrast to the cases above, the results for both groups indicate that the application of small amounts of credit significantly increases household productivity as measured by net household income per operating costs. The results also show that wealth (W) is a significant but negative determinant of productivity. As the measure of household wealth can include a variety of productive and non-productive assets, a plausible explanation could be that these poor households do not own assets that can be put to productive uses. As before, the results for education (E) and land (L) are negative but insignificant.

The results of estimates on total factor productivity (TFP) for all 301 "target" households that actually receive Grameen Bank micro-loans are summarized in Table 6.3C. The results indicate that none of the explanatory variables are significant determinants of this measure of productivity. The coefficients for credit (R) are positive but statistically insignificant. This implies that the size of the credit received does not strongly influence household productivity. Again, the coefficients for the education (E), wealth (W) and land (L) variables are all negative and insignificant.

### **Labor Productivity (NP) Equations**

The results of estimates on labor productivity (NP), or net household income per hour of labor, for all 633 households in the full dataset and all 442 households in districts where Grameen Bank operates are summarized in Tables 6.3A and 6.3D respectively. In both cases, the results show that credit (R) has a strong negative impact on this measure of productivity. With the exception of the regional OLS approach in Grameen Bank

districts, the coefficients for credit are statistically significant. This finding is contrary to the predictions of this study. A plausible explanation could be that as credit has such a strong positive impact on the level of household labor use, by definition this measure of productivity will be smaller in value the greater the increase in household employment. For both groups, the coefficients for education (E) indicate that there is a significant but negative relationship between education and productivity. This finding is plausible when we consider that the men and women that comprise this data set have an extremely low level of education and very little formal training. The results also indicate that land (L) has a strong positive impact on productivity for households in the full data set but not for households that are within Grameen Bank districts. This could imply that, for households in districts where Grameen Bank does not operate, income is heavily dependant on agriculture. For both groups, the results for wealth (W) are insignificant.

The results of estimates on labor productivity (NP) for the 550 "target" households in the full dataset and the 389 "target" households in districts where Grameen Bank operates are summarized in Tables 6.3B and 6.3E respectively. The results of estimates the 301 "target" households that actually receive Grameen Bank micro-loans are summarized in Table 6.3C. The results indicate that none of the variables, with the exception of education (E), are significant determinants of this measure of productivity. In all cases, education (E) appears to have a strong but negative impact on productivity. As above, this can plausibly be attributed to the general lack of education and training of the men and women that comprise this data set.

The results for the employment equation for the full data set and each subset is given below:

**TABLE 6.5A: SUMMARY OF OLS ESTIMATES ON PRODUCTIVITY**

**All households: 633 observations**

Regressor	Definition	<u>Income/Costs</u>		<u>Income/Labor Hour</u>	
		OLS regular	OLS regional	OLS regular	OLS regional
C	Constant	8.017 (16.99)	7.853 (8.306)	5.524 (21.34)	6.197 (12.09)
R	Credit	.0001 (1.819)	.0001 (1.748)	<b>-.0001</b> <b>(-2.032)</b>	-.0001 (-1.565)
E	Education	-0.147 (-1.787)	-0.116 (-1.378)	<b>-0.158</b> <b>(-3.498)</b>	<b>-0.139</b> <b>(-3.033)</b>
W	Wealth	-.00003 (-1.048)	-.00003 (-1.171)	-.00001 (-0.722)	-.00002 (-0.887)
L	Land	-6.8e-06 (-0.385)	-6.1e-06 (-0.343)	<b>.00003</b> <b>(3.358)</b>	<b>.00004</b> <b>(3.724)</b>
			.		.
			.		.
			.		.
	Number of Observations	633	633	633	633
	R-squared	0.049	0.099	0.015	0.040

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold print**. Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.5B: SUMMARY OF OLS ESTIMATES ON PRODUCTIVITY**

All Target Households: 551 Observations

Regressor	Definition	<u>Income/Costs</u>		<u>Income/Labor Hour</u>	
		OLS regular	OLS regional	OLS regular	OLS regional
C	Constant	8.429 (15.67)	8.476 (7.864)	5.667 (20.80)	6.433 (12.08)
R	Credit	<b>.0001</b> <b>(2.874)</b>	<b>.0002</b> <b>(2.651)</b>	-.00003 (-1.113)	-.00004 (-1.205)
E	Education	-0.123 (-1.271)	-0.071 (-0.071)	<b>-0.150</b> <b>(-3.071)</b>	<b>-0.136</b> <b>(-2.777)</b>
W	Wealth	<b>-.0001</b> <b>(-2.234)</b>	<b>-.0001</b> <b>(-2.406)</b>	-7.8e-06 (-0.376)	-5.4e-06 (-0.263)
L	Land	-.00005 (-1.375)	-.00003 (-0.857)	-.00001 (-0.864)	-.00001 (-0.742)
			.		.
			.		.
			.		.
	Number of Observations	551	551	551	551
	R-squared	0.028	0.056	0.031	0.104

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold print**.  
Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.5C: SUMMARY OF OLS ESTIMATES ON PRODUCTIVITY****All Target Participating Households: 301 observations**

Regressor	Definition	<u>Income/Costs</u>		<u>Income/Labor Hour</u>	
		OLS regular	OLS regional	OLS regular	OLS regional
C	Constant	9.584 (8.751)	9.444 (5.672)	5.946 (13.18)	7.182 (10.67)
R	Credit	.0001 (1.020)	.0001 (1.222)	-.0001 (-1.607)	-.0001 (-1.567)
E	Education	-0.237 (-1.555)	-0.202 (-1.282)	<b>-0.162</b> <b>(-2.572)</b>	<b>-0.137</b> <b>(-2.152)</b>
W	Wealth	-.0001 (-1.813)	-.0001 (-1.821)	1.4e-06 (0.057)	-9.5e-06 (-0.400)
L	Land	-.00004 (-0.745)	-.00002 (-0.376)	-.00002 (-0.927)	-.00003 (-1.424)
			.		.
			.		.
			.		.
	Number of Observations	301	301	301	301
	R-squared	0.029	0.064	0.031	0.104

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold** print.  
Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.5D: SUMMARY OF OLS ESTIMATES ON PRODUCTIVITY****All Households in Grameen Bank Districts: 442 Observations**

Regressor	Definition	<u>Income/Costs</u>		<u>Income/Labor Hour</u>	
		OLS regular	OLS regional	OLS regular	OLS regional
C	Constant	8.275 (12.13)	7.907 (7.523)	5.570 (16.70)	6.449 (12.74)
R	Credit	.0001 (1.214)	.0001 (1.527)	<b>-0.0001</b> <b>(-2.037)</b>	<b>-0.0001</b> <b>(-2.085)</b>
E	Education	-0.192 (-1.852)	-0.166 (-1.551)	<b>-0.113</b> <b>(-2.233)</b>	-0.097 (-1.883)
W	Wealth	-0.00002 (-0.655)	-0.00002 (-0.663)	-5.3e-06 (0.286)	-0.00001 (-0.716)
L	Land	-8.7e-06 (-0.357)	-8.3-06 (-0.337)	-9.1e-06 (-0.758)	.00001 (0.913)
			.		.
			.		.
			.		.
	Number of Observations	442	442	442	442
	R-squared	0.016	0.038	0.024	0.074

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold print**.  
Vertical dots indicate that the results for regional variables are not reported.



**TABLE 6.5E: SUMMARY OF OLS ESTIMATES ON PRODUCTIVITY****All Target Households in Grameen Bank Districts: 389 Observations**

Regressor	Definition	<u>Income/Costs</u>		<u>Income/Labor Hour</u>	
		OLS regular	OLS regional	OLS regular	OLS regional
C	Constant	8.615 (11.16)	8.549 (7.183)	5.434 (15.47)	6.472 (12.21)
R	Credit	<b>.0002</b> <b>(2.261)</b>	<b>.0002</b> <b>(2.498)</b>	-.00001 (-0.998)	-.00004 (-1.255)
E	Education	-0.182 (-1.501)	-0.125 (-0.996)	<b>-0.111</b> <b>(-2.015)</b>	-0.103 (-1.853)
W	Wealth	<b>-.0001</b> <b>(-1.976)</b>	-.0001 (-2.104)	2.2e-06 (0.100)	-3.5e-06 (-0.162)
L	Land	-.00003 (-0.827)	-.00002 (-0.492)	-.00002 (-0.969)	-.00003 (-1.369)
			.		.
			.		.
			.		.
	Number of Observations	389	389	389	389
	R-squared	0.030	0.056	0.020	0.087

Note: *t*-statistics are in parentheses, significance at 5% level are shown in **bold print**.  
Vertical dots indicate that the results for regional variables are not reported.

**TABLE 6.5F: SUMMARY OF PREDICTED AND ASSESSED EFFECTS OF CREDIT ON PRODUCTIVITY**

Group	Obs.	Predicted	Assesed	YPC	YPN
All households	633	Increase/Uncertain	Increase/Uncertain	.0001 (1.748)	-.0001 (-1.565)
All households in GB districts	442	Increase/Uncertain	Increase/Uncertain	0001 (1.527)	-.0001 (-2.085)
All "target" households	551	Increase/Uncertain	Increase/Uncertain	.0002 (2.651)	-.00004 (-1.205)
All "target" households in GB districts	389	Increase/Uncertain	Increase/Uncertain	.0002 (2.498)	-.00004 (-1.255)
All GB members	301	Increase/Uncertain	Increase/Uncertain	.0001 (1.222)	-.0001 (-1.567)

**Note:** *t*-statistics are in parentheses, significance at 5% level are shown in **bold print**.

## 6.6 Appraisal of Findings

The regression results presented in the previous sections shed light on the hypothesis that there is a positive relationship between micro-credit to poor rural households in Bangladesh and their economic wellbeing, characterized by enhanced labor use, higher incomes and greater productivity. Most importantly, the results of the 2SLS estimates and the OLS estimates using residual credit as a variable indicate that credit has a strong positive effect on the levels of household employment and productivity. These findings substantiate the hypothesis that the direction of influence runs from credit towards employment and income, and not the other way around. In other words, it is safe to say that credit does indeed lead to greater success for households, and that credit is not rewarded to households based on how successful they already are. Consequently, it may be concluded that the OLS estimates should not be rejected.

In general, the OLS findings indicate that the use of small amounts of credit on reasonable terms has a strong positive impact on the levels of employment and income for poor households. For poor "target" households in both the full data set and the subset of districts where the Grameen Bank actually operates, the results show that whether or not a household receives credit has a significant impact on labor use and income. For the households that received credit, the results show that the size of the credit is important (i.e. the greater the amount of the loan, the greater the influence on employment and income). Credit remains a strong determinant of both employment and income when regional effects are controlled for.

While these results are of particular interest and importance, findings for the two measures of productivity (i.e. income per operating costs and income per hour of labor) give inconsistent results. The results for household income per operating costs indicate that credit in general has a positive influence on this measure of productivity. This impact is significant for the poor "target" households in both the full data set and the subset of districts where the Grameen Bank actually operates. The results for the households that received loans show that while the size of the credit is important, it is not a significant determinant of productivity as measured by income per operating costs. Surprisingly, the results for income per hour of labor indicate that credit in general has a negative influence on this measure of productivity. This impact is significant for all households in both the full data set and the subset of districts where the Grameen Bank actually operates. As mentioned earlier, a reasonable explanation for this unexpected result could be that as credit has such a strong positive impact on the level of household labor use, by definition this measure of productivity will be smaller in value the greater the increase in household employment.

## CHAPTER 7

### CONCLUDING REMARKS

The Grameen Bank lends itself to be explored and investigated in many different ways. Some research has been accomplished on several different aspects of the Grameen Bank: long-term financial sustainability of both the institution itself and of its borrowers; the degree of success of replication efforts throughout the world; the social impact of the credit program; the role of credit in consumption smoothing; game theory applications on group lending dynamics, etc. This particular study looks at the impact of micro-credit on the liquidity constraint faced by poor landless and near-landless households in rural Bangladesh. As outlined in Chapter 1, the objective of the study is to examine whether small interest-bearing loans from the Grameen Bank could help these households to overcome such constraints and utilize their labor resources to rise above poverty. The hypothesis that the provision of small amounts of credit to poor rural households in Bangladesh can reduce poverty by enhancing labor use, income and productivity, is empirically investigated using rural household survey data from Bangladesh.

The findings of this study demonstrate that the application of small amounts of credit offers scope to reduce poverty among the poorest households in Bangladesh, namely the rural landless and near-landless population. Most interestingly, the results show that the "unexpected" or "surprise" credit (as given by the value of residual credit) households receive have a positive impact on both household labor use and income. In addition, the results of two-stage least squares (2SLS) regressions indicate that credit has a positive impact on both household labor use and household income. Given these findings, it is useful to also bear in mind the results given by the ordinary least squares (OLS) approach. In considering both the full data set (thirteen "thanas") and the subset where Grameen Bank operates (eight "thanas"), the OLS results indicate that credit has a strong significant impact on the levels of household labor use and income. In general, the size of the loan received also appears to be positively related to household labor use and income. These results hold true when controlling for regional characteristics. However, the results for household productivity (as measured by income per operating costs and income per hour of labor) are mixed. Whereas credit appears to have a positive influence on household income per operating costs (and only significantly so for the poor "target" households), it surprisingly seems to have a negative influence on income per hour of labor (significantly so for all households in both the full data set and the Grameen Bank subset). A plausible explanation for this unexpected result could be that as credit has such a strong positive impact on the level of household labor use, by definition this measure of productivity will be smaller in value the greater the increase in household employment.

In the interest of future research in the field, a few weaknesses of the data set should be pointed out. First, as the household survey data is from the 1991-1992 and hence already a decade old, more current and extensive data is imperative. The significant growth and change that has taken place since in the Grameen Bank in particular, and the semi-formal credit sector in general, should be considered. The impact of alternative micro-credit institutions, on both their borrowers and on the Grameen Bank operations, should also be investigated. In addition, better and more accurate measures of productivity (related to specific increases in consumption, intermediate inputs, and/or capital equipment, for example), and the effects of micro-credit on technological change for the household-entrepreneur should be looked at. Second, the household survey data is for a single crop year only. Therefore, time series data would be extremely useful in better assessing the impact of credit on the household. Third, the issues of endogeneity inherent in studying programs such as the Grameen Bank should be further explored. The data from a recent household survey conducted by the World Bank (not yet available to the public) may help address the above concerns.

That said, it is hoped that this study can make the following contributions to economic knowledge and issues that effect the lives of poor men and women in Bangladesh and elsewhere. Although some empirical research exists on the link between deep poverty and the efficient use of labor, surprisingly little has been written about the role of credit in this basic relationship. Therefore, the first contribution of this study is to investigate how the use of credit in small amounts to relax the liquidity constraint effects a household's level of employment, income and productivity. In particular, this analysis

extends the study by Ahmed and Randolph (1995) by using newer household data and looking at measures of productivity. It also incorporates unique regional-level data collected by the author.

A second contribution is to shed some light on the emerging and rapidly growing semi-formal credit sector. In many parts of the world, traditional credit markets either function inadequately or fail to serve the needs of all clientele who seek credit.. This study explores the nature and consequence of credit market failure in rural Bangladesh, and how organizations such as the Grameen Bank seek to address and resolve these issues. The study also points to the importance of creating sound financial institutions which, by mobilizing savings and investments, are necessary to raise workers' labor use and wages and lead economic development in general.

This study also has important implications for policies seeking to reduce rural poverty, particularly in Bangladesh. The findings indicate that one way to reduce rural poverty, increase rural employment and incomes, and discourage migration from rural to urban areas is to engage the rural landless people in productive activities all year round by providing them with small amounts of credit on reasonable terms. Amartya Sen (1981) has emphasized the absence of "entitlement" of the poor, arguing that they must first acquire the capacity, through employment and income, to gain access to food as well as other basic needs. Poverty alleviation in this context would mean institutions, policies and a process of empowerment for the poor. The Grameen Bank of Bangladesh provides a step in this direction.



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## APPENDIX A

### Replications of the Grameen Bank

	Repayment rate (%)	Number of beneficiaries	Cumulative disbursement	Date of establishment	Date of information
Project Dunganon (Philippines)	94.21	6,106	Pesos 5,726,258.85	August 1, 1990	July 1992
ACPC (Philippines)	94.00	2,591	\$ 185,940	August 1990	July 1992
Community Credit Service (Sri Lanka)	95.00	5,952	Rs. 5.7 million	1989	June 1992
Savecred (Sri Lanka)	--	1,184	\$ 61,207	February 1989	June 1991
Projek Usahamaju (Malaysia)	92.85	2,415	\$ 3,071,105	August 1988	June 1992
Karya Usaha Mandin (Indonesia)	--	270	\$8,871	January 1989	June 1991
Presidential Trust Fund (Tanzania)	95.00	189	TSHS 9,692,675	December 1989	June 1992
Microenterprise Loan Program (North Carolina, USA)	86.00	151	\$386,950	September 1989	May 1993
Foundation Contigo (Chile)	98.00	625	\$111,996,958	June 1989	June 1992
Rural Development Organization (India)	100	595	Rs. 565,250	October 1992	March 1993
Lift Above Poverty (Nigeria)	95.00	189	TSHS 9,692,675	June 1989	December 1992
Amanah Ikhtiar (Malaysia)	99.91	13,736	\$2,870,435	September 1989	July 1992
Credit with Education	99.00	11,000	\$414,360	Mali 1988 Honduras 1990 Bolivia 1990 Thailand 1989	June 1992

Source: Gibbons (1995) and Getubig (1991).

## APPENDIX B

### List of Typical Non-farm Activities in Bangladesh

#### **Processing and Manufacturing**

- Bamboo and cane works
- Pottery products
- Repairing works
- Rickshaw making and repair
- Paddy and pulse husking
- Weaving and dying
- Book binding
- Blacksmith works
- Sweetmeat and pickle making
- Spice and oil making

#### **Livestock and Fisheries**

- Milch cow, goat, sheep and poultry raising
- Fishing net making
- Dry fish making
- Apiculture
- Pond excavation

#### **Services**

- Rickshaw
- Barber shop
- Newspaper distribution
- Ferry service
- Construction works

#### **Shopkeeping**

- Grocery shop
- Stationary shop
- Medicine shop
- Tea stall
- Sweetmeat shop

#### **Peddling and Trading**

- Fruits and vegetables
- Clothing and shoes
- Jewelry and cosmetics
- Utensils and pottery products
- Oil and spices

## APPENDIX C

### **The Grameen Bank's "Sixteen Decisions"**

1. The four principles of Grameen Bank – discipline, unity, courage, and hard work – we shall follow and advance in all walks of our lives.
2. We shall bring prosperity to our families.
3. We shall not live in dilapidated houses. We shall repair our houses and work towards constructing new houses as soon as possible.
4. We shall grow vegetables all year round. We shall eat plenty of them and sell the surplus.
5. During the planting seasons, we shall plant as many seedlings as possible.
6. We shall plan to keep our families small. We shall minimize our expenditures. We shall look after our health.
7. We shall educate our children and ensure that they can earn enough to pay for their education.
8. We shall always keep our children and the environment clean.
9. We shall build and use pit latrines.
10. We shall drink tubewell water. If it is not available, we shall boil water or use alum.
11. We shall not take any dowry in our sons' weddings, neither shall we give any dowry in our daughters' weddings. We shall keep the center free from the curse of dowry. We shall not practice child marriage.
12. We shall not inflict injustice on anyone, neither shall we allow anyone to do so.
13. For higher incomes we shall collectively undertake bigger investments.
14. We shall always be ready to help each other. If anyone is in difficulty, we shall all help.
15. If we come to know of any breach of discipline in any center, we shall go there and help restore discipline.
16. We shall introduce physical exercise in all our centers. We shall take part in all social activities collectively.

## **The Grameen Bank Philosophy**

The Grameen Bank philosophy is based on three fundamental ideas.

First, there is faith in the capabilities of the poor. The poor are seen as hardworking intelligent people with a remarkable survival instinct. They are regarded as people with very good understanding of the local markets, local technologies and of their own productive capacities. As a result, they are thought to know best how to assimilate new information and utilize their own skills towards advancement.

Second, the Grameen Bank believes that traditional institutional and societal structures are generally oppressive, are biased against the poor and perpetuate their state of impoverishment. Therefore, the poor are seen to have little control over resources and have little influence in economic/social/political decision-making. Therefore, new enabling institutions must be developed to bring the poorest into the main economic fold, and designed in ways to encourage their participation.

Third, the Grameen Bank conviction is that credit, like food, shelter, health and education, is a basic human right. It is a right that brings access to all other rights. According to Yunus (1994), credit is not simply a facilitator of production or investment, but also a very powerful social, political and economic instrument, all rolled into one. As such, credit should not be a privilege of the wealthy, but an entitlement for all who need it regardless of their asset base.

## **The Administrative Set-up**

The Grameen Bank is a highly decentralized institution. Nearly all of its business activities are conducted at weekly center meetings in the villages where the borrowers live. Unlike common banking practices in Bangladesh, most transactions of the Grameen Bank are public and transparent. The Grameen Bank publishes a full set of accounts in its annual reports. Six to eight groups in an area make up a center, which are therefore comprised of 30 to 40 individual members. A few centers in a given geographical region constitute a Branch, which is the smallest "field-level" unit. A branch office supervises and services the centers located in villages within walking distance of the branch. A branch office may have up to 2,000 borrowers and is independently responsible for its own profit or loss. Almost 80 percent of the Grameen Bank's total staff work at the branch level.

Several branches together fall under the jurisdiction of an Area office. Area managers supervise the work of about fifteen branches and have authority to approve all branch-level loans. Several Areas together constitute a Zone. The final administrative unit is the Head Office, located in the capital city of Dhaka. The Head Office recruits and trains new employees. It also coordinates operations in the different Zones, receives feedback from the "field" and passes it back down to the Zonal, Area and Branch offices. The Head Office also runs an independent Evaluation and Monitoring Unit with which bank workers from the branch offices can communicate directly without going through the entire administrative hierarchy. Problems in remote branches can therefore be brought to the attention of the Head Office and remedied quite swiftly.

### **The Grameen Bank Today**

The Grameen Bank began operations with the exclusive business of disbursing small loans to individual borrowers. At the time a general loan is issued, 5 percent of it is deducted and deposited into a group fund. This amount is used to purchase shares of the Grameen Bank for each member (each share is worth Tk. 100) and for other group activities. Every week each member is to save Tk. 1 as personal savings, Tk. 1 in a children's welfare fund, and Tk. 2 in an emergency fund. Members earn an interest rate of 8 percent on these savings. To date, the borrowers themselves have saved US \$178 million (Grameen Bank Annual Report, 2000). Members can borrow from the group fund in times of extreme difficulty (such as illness or injury) or social ceremony (such as a wedding). An amount equal to 25 percent of the interest is also collected as part of an insurance program whereby members' families receive compensation in case of death or disaster.

Although general loans still make up 75 percent of all loans currently disbursed, over time the Bank has expanded its operations by diversifying into various activities. Today the Bank provides credit not only for general small-scale off-farm activities, but also for seasonal crop production, installation of hand pumps for irrigation and drinking water, and building sanitary latrines. The latter types of credit are collective loans that are usually given to groups of borrowers, sometimes to a whole center, that have demonstrated good loan utilization and repayment performance. The repayment rate on these collective



loans have not been as high as that of the general individual loans, and these loans comprise less than 1 percent of total loans disbursed by the Grameen Bank.

In 1984, the Grameen Bank started to give house-building loans. As a result many of the Bank's clientele have built new homes to replace the dilapidated shacks in which they used to live. House-building loans are much larger than general loans (about Tk. 15,000), are repayable over 10 years and carry an interest rate of 8 percent. Housing loans are also given only to borrowers who have demonstrated good repayment performance on their general loans. About a quarter of total loan disbursement currently goes towards housing loans. Recently, the Grameen Bank has started offering "technology" loans. These loans are often used collectively for larger and more technology-intensive, and therefore more expensive, projects. The idea here is that appropriate technologies need to be not only developed locally, but new organizations and management systems for the application of these technologies need to be devised. A little more than 3 percent of total loan disbursement currently goes towards technology loans.

In addition to its credit programs, there are now several independent affiliated ventures within the Grameen family of organizations. Notable among these are the Grameen Trust, the Grameen Uddog ("Initiative"), the Grameen Krishi ("Agricultural") Foundation and the Grameen Fisheries Foundation. The Grameen Trust is a non-profit organization that aims to disseminate information about Grameen Bank's operations through various seminars and workshops held in Dhaka. It regularly publishes *the Grameen Dialogue*, a newsletter that reports on the efforts of individuals and organizations around the world who are involved in the replication efforts of Grameen-type credit programs. The trust also runs the Programme for Research on Poverty Alleviation, which promotes, sponsors and partially funds costs of local research related to economic development in Bangladesh.

The Grameen Uddog has accomplished a great deal to revive the handloom weaving industry in Bangladesh. Once very prominent, the industry had been languishing for decades. Many skilled weavers lacked seed capital and were unable to access credit to enable them to purchase raw materials. The Grameen Uddog has helped these weavers to secure orders, buy the necessary materials, and market the fabric. This operation has become so successful that the distinctive cotton fabric, available in many plaid patterns, is now called "Grameen Check". The Grameen Uddog has been diversifying into other types of indigenous handicraft works.

The Grameen Krishi Foundation is an entity committed to food security for the poor in Bangladesh. Its mission is two-fold: one, to produce enough food to go around; and two, to create purchasing power for the poor to have access to food. To this end, appropriate technology applications (for water distribution, cultivation patterns, new crops, fertilizer trials, etc.) are tested and implemented. Alternative farm organization and management practices are also developed. The Grameen Fisheries Foundation comprises nearly 2000 acres of inland water area, spread over eight hundred fresh water ponds in the northwestern region of Bangladesh. The goal here is to promote fish farming by re-excavating derelict ponds, treating diseases and intensifying pond management. Fisheries and ponds are revived through the development of low cost fish feed, and the large-scale production of hatchlings and fingerlings in nurseries.

### **The Semi-Formal Credit Sector**

Today semiformal institutions such as the Grameen Bank are growing and expanding throughout the world as a response to a demand for credit by those who are not able to gain easy access to traditional credit sources. These institutions epitomize the idea that structural reform of traditional organizations, reduction of obstacles faced by small entrepreneurs, and investment in infrastructure and human capital will reduce entry barriers of the poor and promote sound economic growth. Many of these institutions serve a well-specified target clientele or give out loans towards certain types of activities. As alternatives to traditional banking methods, semi-formal credit institutions utilize a variety of techniques to achieve their goals. They include group lending programs like that of the Grameen Bank; cooperatives that serve not just credit, but also the technology and marketing needs of its clients; rotating savings and credit associations (ROSCAS) that use the pooled contributions of the borrowers themselves to finance purchases, etc. These institutions may be owned and run by borrowers themselves, by the government, by a private agency, or by some combination of the above. Some are financially self-sufficient and others are heavily subsidized. An overwhelming majority of them fall under the umbrella of micro-credit or micro-finance institutions. Some semi-formal credit institutions are discussed below:

BancoSol in Bolivia is a micro-finance institution that employs the group lending mechanism. It differs from the Grameen Bank in that it disburses loans to all group members simultaneously and charges interest rates that are relatively high. It also offers flexible loan durations as well as flexible repayment schedules. It serves a clientele that is generally better off than Grameen Bank borrowers, with an average loan size of US \$900 compared to the average loan size of US \$100 for the latter. The focus is distinctly on banking, and BancoSol is financially self-sufficient.

Rakyat in Indonesia is a micro-finance institution that aims to earn a profit. It is also financially self-sufficient. It does not use group lending but requires collateral of its borrowers. This eliminates the very poor who have a negligible asset base. Loans are generally therefore made to the better-off poor and non-poor households, with an average loan size of US \$1000. Bank

Kredit Desa of Indonesia is another micro-finance institution that is financially viable. It disburses collateral-free loans only to the poorest households, with an average loan size of US \$71. Loan duration is small, lasting 10 to 12 weeks, and repayments are due weekly. A 10 percent interest on the principal must be paid. This translates to a nominal interest rate of 55 percent and a real interest rate of 46 percent. Bank Kredit Desa has been able to exploit local knowledge through the clear system of authority that stretches from the capital of Jakarta down to the villages. This allows funds to be allocated through village-level management commissions led by village heads.

The Foundation for International Community Assistance (FINCA) model of credit disbursement was founded in Latin America and now has a presence in various parts of the world. It targets a poor, predominantly female clientele. The duration of loans is typically four months and the average loan size is US \$50. This village lending scheme has been able to harness local information and peer pressure without the use of small groups. The FINCA system is not yet viable.

## APPENDIX D

### **Regional Variables**

TOWN	Distance from nearest town : in miles
DHAKA	Distance from Dhaka : in miles
RIVER	Distance from nearest river : in miles
COAST	Distance from coast : in miles
TRAIN	Distance from nearest railway : in miles
GDDIST	Distance to Grameen Bank : in miles
GBAGE	Age of Grameen Bank : in years
YRJOIN	Membership in Grameen Bank : in years
DD1	Dummy variable for thana (sub-district) 1
DD2	Dummy variable for thana (sub-district) 2
DD3	Dummy variable for thana (sub-district) 3
DD4	Dummy variable for thana (sub-district) 4
DD5	Dummy variable for thana (sub-district) 5
DD6	Dummy variable for thana (sub-district) 6
DD7	Dummy variable for thana (sub-district) 7
DD8	Dummy variable for thana (sub-district) 8
DD9	Dummy variable for thana (sub-district) 9
DD10	Dummy variable for thana (sub-district) 10
DD11	Dummy variable for thana (sub-district) 11
DD12	Dummy variable for thana (sub-district) 12
DD13	Dummy variable for thana (sub-district) 13

<u>GB REGION</u>	<u>HHS</u>	<u>TOWN</u>	<u>DHAKA</u>	<u>RIVER</u>	<u>COAST</u>	<u>TRAIN</u>	<u>GBDIST</u>	<u>GBAGE</u>	<u>YRJOIN</u>
1. YES	55	30	160	80	210	5	3.7	3	1.9
2. YES	50	35	210	10	300	10	2.3	7	3.9
3. YES	65	25	105	15	30	40	2.4	7	3.9
4. YES	53	25	210	60	320	5	1.2	9	6.4
5. YES	55	25	85	15	190	5	3.6	4	2.8
6. YES	66	30	55	10	180	25	2.1	5	3.9
7. YES	51	15	15	5	100	15	1.5	5	3.2
8. YES	47	30	65	5	115	10	2.8	8	5.3
9. NO	32	15	50	25	75	5			
10. NO	42	35	100	10	250	15			
11. NO	44	30	70	15	250	10			
12. NO	38	35	100	25	235	20			
13. NO	35	30	135	30	225	5			

Note: Figures for TOWN, DHAKA, RIVER, COAST, TRAIN and GBDIST are denoted in miles. GBAGE and YRJOIN are denoted in years. HH is denoted in number of households within region.

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*The Impact of Grameen Bank Credit on the Levels of Employment, Income and Productivity of Poor Landless Households in Rural Bangladesh*

Dissertation directed by Dominick Salvatore, Ph.D.

This dissertation examines the role of micro-credit on the liquidity constraints faced by poor landless and near-landless households in rural Bangladesh. The objective of the study is to examine whether collateral-free interest-bearing micro-loans from the Grameen Bank can help these households overcome such constraints and utilize their labor resources to rise above poverty. The hypothesis that the provision of small amounts of credit to poor rural households can reduce poverty by enhancing labor use, income and productivity, is empirically investigated using rural household survey data from Bangladesh. The findings of this study indicate that the application of small amounts of credit offers scope to reduce poverty among the poorest households in Bangladesh, namely by having a strong significant effect on employment and income levels. Most interestingly, the results also demonstrate that the "unexpected" or "surprise" credit that households receive have a positive impact on both household labor use and household income.

## VITA

Jhila Zebunnessa Iqbal, daughter of S. A. Mohammad and Naseem Iqbal, was born on December 29, 1969, in Chittagong, Bangladesh. She received a Bachelor of Science degree in 1992 from Angelo State University, where she studied Economics and English as a Carr Academic Scholar. She entered Fordham University as a Bennet Fellowship and Presidential Scholarship recipient, earning her Masters of Arts degree in 1995 and a Ph.D. in 2002, both in Economics. Currently, she teaches Economics at the Fordham College of Liberal Studies.