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Does Access to Finance Matter in Microenterprise Growth?

Evidence from Bangladesh

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Abstract

In less-developed economies such as Bangladesh, the farm sector is the major source of employment and income, while the rural nonfarm sector provides as an additional source of income. But the rural nonfarm sector increasingly plays an important role in fostering the development of the rural economy. A significant share of this sector is made up of microenterprise activities, which requires investment and access to adequate funds. This paper investigates the role access to finance plays in promoting the efficiency and growth of microenterprise activities. The findings suggest that households engaged in microenterprise activities, in addition to farm and other nonfarm activities, are much better off (in terms of income, expenditure and poverty) than those not engaged in such activities. Fewer than 10 percent of the enterprises have access to institutional finance (formal banks or microcredit), although the rate of return on microenterprise investments is more than sufficient (36 percent per year) to repay institutional loans. The research suggests that credit constraints may reduce the enterprises' profit margin by as much as 13.6 percent per year. As the returns to microenterprise investment are found to be high, microfinance institutions can play a larger role in supporting microenterprise growth in Bangladesh.

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Does Access to Finance Matter in Microenterprise Growth? Evidence from Bangladesh

1. Introduction

Recent studies have pointed to the importance of the rural nonfarm sector (RNF) in developing economies. Rural nonfarm growth helps expand employment and income, provides forward and backward linkages with both the farm and modern sectors, and thereby leads to broad-based poverty reduction. Growth in the farm sector, with improved seed and other agricultural innovations, has been a major source of rural poverty reduction (Becerril and Abdulai, 2010, Mwabu1, Mwangi and Nyangito, 2006). However, this is not enough to absorb the burgeoning rural labor force in many countries where the modern sector is growing slowly. Therefore, development economics is paying increased attention to expansion of the rural nonfarm sector in order to generate additional productive employment before the modern sector of the economy can absorb the surplus labor (Timmer, 2002, Chawanote and Barrett, 2012). Moreover, given the increased pressure on land due to increasing population density, labor-intensive nonfarm activities can provide avenues for poverty reduction, without further stressing the land. In many East Asian economies, for example, the rural nonfarm sector has been the driver of overall economic growth during the early stage of development (Estudillo et al, 2012; Lanjouw and Lanjouw, 2001; Lin and Yao, 1999; McCulloch, Timmer and Weisbrod, 2007).

In a setting such as Bangladesh where the farm sector traditionally dominates, the RNF sector seems to be playing an important role in the growth of its rural economy (World Bank, 2007, Mahmud, 1996; Sen, 1996; Bhattacharya, 1996). While it is difficult to capture all of the activities that are considered part of the RNF sector, it is usually defined as all activities located in villages,

rural towns, and peri-urban areas, excluding the primary production of crops, fish, trees, and livestock. The more organized part of the RNF sector consists of micro, small, and medium enterprises (simply termed microenterprises).[2]

There were some 4 million rural microenterprises in Bangladesh in 2003 (a number that has certainly increased) accounting for 30 percent of overall manufacturing value-added and 70 percent of the nonagricultural labor force (World Bank, 2007). Given the scope of this sector both in terms of employment and income, growth in the nonfarm sector, especially in microenterprises, can play a significant role in furthering Bangladesh's overall growth and poverty reduction. Growth in microenterprises seems to suffer from a variety of factors, of which lack of access to finance, infrastructure, and markets, and poor quality technology and regulatory barriers appear to be most common (World Bank, 2004; World Bank, 2007). Income from microenterprise sources, however, seems to have a greater effect on poverty reduction. For instance, using cross-sectional data from Sri Lanka, Deininger et al. (2007) find that self-employment in the RNF sector has a significant impact on poverty reduction and is not simply used by those unable to find gainful employment elsewhere. They also find that perceived constraints related to infrastructure and access to finance hinder micro-enterprise adoption.

This paper addresses the role of finance as a barrier to microfinance growth in Bangladesh. Microenterprise investment is financed largely by informal sources such as individual savings and informal loans from friends and relatives. Institutional credit can play a role, but it has until recently been marginal, as found in our analysis. With the advent of microfinance institutions, microcredit is expected to play a bigger role in supporting microenterprise development in rural areas. However, scaling-up microcredit to support progressive microenterprises with diversified loan and competitive

[2] By microenterprise, we mean manufacturing and processing industries, transport, trade, services and other miscellaneous activities. This does not include farm-related activities such as poultry raising, cow fattening, and other small activities.

products has not been forthcoming as expected. Thus, access to finance may still be a major hurdle for microenterprise growth. Using household survey data over a period of 10 years (2000-2010), this paper addresses a number of issues critical for understanding the sources and potential of microenterprise growth, such as whether and how better access to finance matters in the profitability and further growth of microenterprise in Bangladesh.

Our approach in this paper is related to a broader literature on access to finance and its role in microenterprise growth. A large literature has documented that access to better finance (in terms of better terms and conditions of loans as well as a reliable source of finance) is an essential predictor of improved productivity and growth in any economy. For example, Butler and Cornaggia (2009) find that in countries with better access to finance, corn producers increased productivity when there was an exogenous increase in ethanol demand. Thus, financial sector development is a robust determinant of growth (e.g., Johnson et al., 2002, Levine et al., 2000, McMillan and Woodruff, 2002, and Cull and Xu, 2005). While other obstacles are also important, lack of access to finance consistently emerges as one of the most important and robust underlying factors constraining firm growth. Better access to finance fosters greater firm innovation and dynamism, entrepreneurship, more efficient asset allocation and the ability to exploit growth opportunities, and growth of incumbent firms to a larger size (Beck, Demirguc-Kunt and Honohan, 2006; Beck, Demirguc-Kunt and Maksimovic, 2005).

Studies in varied settings show that access to finance also promotes a firm's entry into the market and thus contributes to growth. For example, Mukherjee and Zhang (2007, 2005) explore the factors that affect the share of rural non-farm employment in total employment over time in both China and India, finding that the RNF sector has followed different paths in China and India over the past two decades simply because of differential access to institutional finance. Similarly, Sawada and Zhang (2012) find that nonfarm entrepreneurs perceive access to finance to be a

constraint for nonfarm enterprise growth in Yemen. Wang (2008) finds that an exogenous shock/loosening of credit constraints allowed households in urban China to switch from salaried state employment to self-employment.

We attempt to document how access to finance affects microenterprise profitability and growth in Bangladesh. We also examine the role of finance in the participation of microenterprise and return on enterprise. We address a set of pertinent questions for raising microenterprise growth and productivity: Do the returns on such micro-investment justify the cost of capital? How do such returns vary across various microenterprise activities? What underlying factors might be affecting the profitability of microenterprises?

Our paper also examines the impact of the adoption of microenterprises on income, expenditures, and poverty. We examine the trend of productivity in rural microenterprises by sector for households that are credit and non-credit constrained to predict how the release of credit and other constraints will allow non-farm economies to contribute more by increasing income growth and reducing poverty. Thus we provide an explanation of how finance, RNF growth, and poverty reduction are interrelated.

This paper analyzes the nationally-representative Household Income and Expenditure Surveys (HIES) from Bangladesh, consisting of three rounds of HIES (2000, 2005 and 2010) data sets. There are 5,027 rural households included in the 2000 HIES round, 6,027 rural households in the 2005 round, and 7,830 rural households in 2010. The central theme of the paper is to critically examine the sources of growth, focusing on the role of finance in enhancing microenterprise growth and productivity.

The paper is organized as follows. Section two presents a discussion of the role of microenterprise in rural economy, and trends and determinants of microenterprise expansion. Section three discusses why growth in microenterprise matters. Section four shows average

estimates of returns to investment in the microenterprise sector using productivity measures. Section five presents estimates of marginal returns to investment using a profit function approach. Both approaches show essentially higher rates of return to investment in microenterprise sector. Section six discusses the constraints faced by microenterprises and presents estimates of the effects of constraints, especially lack of access to finance, on profit margin and profitability. Section seven analyzes the extent of cost-effectiveness of microenterprise investment supported under financial institutions, especially microcredit agencies. Section eight concludes.

2. The role of microenterprise in rural economy and its trend and determinants

This section examines the role of the microenterprise sector in rural income and productivity growth and the underlying characteristics and determinants of microenterprises in Bangladesh. Using the data sets of three rounds of the Household Income and Expenditure Surveys (HIES) conducted by the Bangladesh Bureau of Statistics (BBS), we considered the rates of income growth and poverty reduction over time as a pretext to understand the scope of microenterprise growth in overall rural income growth (Table 1). Overall income grew at a rate of 1.2 percent per year during the period of 2000 and 2005 and 7.5 percent per year during 2005 and 2010 with an overall growth rate of 4.5 percent per year. Interestingly, while the share of nonfarm income in total rural income has increased from 36 percent to 38 percent over this period, moderate and extreme poverty in rural areas have substantially declined. While rural moderate poverty was 56 percent in 2000, it dropped to 33 percent in 2010, implying an average of 2.3 percent reduction of poverty per year over this period. During the same period, extreme poverty declined by about the same rate (2.2 percent per year). Hence, expansion in both farm and non-farm income over this period is likely to have played a role in reducing rural poverty.

Table 2 shows the trend in rural nonfarm income growth during 2000-2010 by breakdown of component sources. Note that nonfarm activity includes both microenterprise activity and other rural nonfarm activities.[3] Thus, while income from microenterprise activities accounted for more than one third (almost 42 percent) of rural nonfarm income in 2000, its overall share in household income is some 15 percent (0.418 x 0.363 from Tables 1 and 2). The respective share in microenterprise growth has slightly stagnated, accounting for just 36 percent of rural nonfarm income (or just 14 percent of total income) in subsequent years. In contrast, the share of nonfarm daily wage income increased from 31.3 percent in 2000 to 35.1 percent in 2010, and the share of salaried nonfarm income also increased from 27.0 percent in 2000 to 28.9 percent in 2010.

In order to understand the role of this sector in the overall rural economy, we first need to examine the characteristics of the microenterprise sector. Table 3 shows the distribution of microenterprise activities in rural Bangladesh. There are 1,427 enterprises observed in 2000 among 5,027 households in 2000, 1,426 enterprises among 6,027 households surveyed in 2005, and 1,909 units among 7,830 rural households covered in 2010. This means that 28.4 percent of households were involved in microenterprises in 2000, compared to 23.7 percent each in 2005 and 2010. The service sector is the most dominant activity in all three years, accounting for 65 percent of all microenterprises in 2000, 75.8 percent in 2005 and 61.5 percent in 2010. Manufacturing and processing is at a distant second among microenterprise activities, accounting for only 13.9 percent in 2010, followed by the transport sector (13.1 percent).

Table 4 presents the salient characteristics of the microenterprises. Some of the characteristics do not change much over time, while others have changed substantially. For example, although the average years of operation did not change much (9-10 years during the three

[3] By the way, there is none in our sample who have microenterprise activity as the only source of income. However, those who do not have farm income as a source of income but adopt microenterprises often draw income from other nonfarm sources such as nonfarm wage and salaries, remittance, and interest income.

periods), the share of registered enterprises increased from 9.9 percent in 2000 to 18.2 percent in 2010. Microenterprises are not usually home based (only about 17 percent in 2010), but do use mostly family labor (hired workers comprise less than 9 percent of the workforce in 2010). The number of workers did not vary much from 2000 to 2010, averaging only 1.5. The microenterprises operate about 10 to 11 months on an average, indicating that many do work year round.

Table 5 shows the distribution of sources of start-up capital. Own resources (savings or inheritance) account for the start-up capital for more than three-quarters of the microenterprises (close to 80 percent).[4] Other major sources include microcredit; however, the share of the enterprises using microcredit as start-up capital was only 3.4 percent in 2000 and 8.2 percent in 2010. The other major source is informal loans from relatives and friends (about 6 percent of the microenterprises use that source). Neither commercial banks nor informal lenders constitute an important source of start-up capital for microenterprises in Bangladesh.

Given that one-quarter of households operate microenterprise activities and more than one third of nonfarm income is generated from these activities, we would like to know what determines household participation in microenterprises. More specifically, we would like to address why certain households participate in nonfarm activities while others do not. The purpose is to distinguish the precise roles of the underlying factors determining microenterprise participation and whether or not financial institutions play any role in such participation.

Consider the following probability function of microenterprise participation (*M*) equation:

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[4] Our findings are not inconsistent with findings from other countries: For example, Raj and Natarajan (2007) find that, the share of borrowed to total capital in smalal and medium edterprises in Keral, India was only 20 percent implying that 80 percent of the capital is personal savings. de Mel and C. Woodruff (2008) find in Sri Lanka that about 69 percent of start-up funds come from personal savings of micro-enterprises owners. Paulson and Townsend (2004) find that in Thailand approximately 60 percent of the total initial investment in household businesses comes from savings. Hernández-Trillo, Pagán, and Paxton (2005) find that micro-entrepreneurs in Mexico mostly use their own resources/savings (60.8%). In Africa, personal savings constitute 55-65% of total capital in mirco-enterprises (Bigsten et. al (2003).

$$\Pr(M_{ijt}) = a^m \tau_t + \beta^m X_{ij} + \gamma^m V_{it} + \mu_{ij} + \mu_{jt} + \eta_j + \mu_{sj} + \varepsilon_{ijt}^m \quad (1)$$

where X_{ij} is a vector of household (i) characteristics influencing the participation in a microenterprise activity; V_{jt} is a vector of village-level characteristics including village electrification, share of irrigated land, prices of consumer goods, program placement of microcredit and other credit programs, and availability of government development programs such Vulnerable Group Feeding and Food-for-Work; τ_t represents the year (2000=1, 2005=2 and 2010=3); α, β and γ are unknown parameters to be estimated; and ε_{ijs} is a zero-mean disturbance term representing the unmeasured determinants of M_{ijt} that vary across households. Note that household participation is also affected by unobserved household heterogeneity and *thana* heterogeneity represented by the error terms μ_{ij} and η_j, respectively, as well as unobserved thana-and year-specific heterogeneity (μ_{sj}).[5] Here, *Pr* measures the probability of microenterprise participation (with a value 1 when a household participates and 0 otherwise).

Table 6 provides estimates of some of the household and community characteristics determining the adoption of an enterprise activity. Note that the regression is a linear probability model of the adoption/participation rate among rural households over the three survey periods (2000, 2005, and 2010). A thana is the lowest common unit in which households were interviewed over the three periods so that a thana level fixed-effects method can be operationalized. This is done in two ways. First a simple thana FE is applied to a single year of survey data (e.g., 2010) to control for thana-level unobserved heterogeneity affecting all households. However, it does not control for unobserved heterogeneity at the thana level that varies within a year (that is, season-specific). Hence, the second method involves a FE where the interaction variable of thana and year

[5] A thana is the lowest geographical administrative unit in rural Bangladesh, consisting of a number of villages.

is chosen as the FE unit and applied to three-year thana-level panel data to control for the time-varying thana-level heterogeneity affecting all households living in a particular thana. In other words, while the first model controls for thana-level unobserved heterogeneity fixed over years, the second model controls for thana-level heterogeneity varying over time within a year. Although we believe that the second model is more appropriate, we present both model estimates to compare the results.

As the results of Table 6 suggest, none of the village-level attributes such as program placement of microcredit or banks are significant except rural electrification, as this matters to the growth of microenterprises. Thus, the presence of electricity in a village increases the adoption rate by 5.8 percent over the period of 10 years, implying that about half a percent of microenterprise growth per year has been due to rural electrification, an indicator of overall village development.

Because microenterprises are mostly family operated, household characteristics play a significant role in their adoption. For example, households with higher land assets are more likely to be engaged in farming, and hence, less likely to be engaged in rural nonfarm activity. In contrast, those with higher non-land assets are more likely to be involved in rural microenterprise activities. Also, as family labor is preferable (as well as cheaper) to hired labor, large family households are more likely to be engaged in nonfarm activities than small family households. With the increase of one family member, the probability of adopting microenterprise activities goes up by almost 2 percent.

3. Why does microenterprise growth matter?

Microenterprise growth matters because it is expected to reduce poverty when it is combined with farm income growth. In fact, majority of households who adopt microenterprise activity have additional sources income from farm activities. Thus, the percentage of microenterprise owners

who draw income from farm sources as well was 69.5 percent 2000, 81.5 percent in 20005, and 82.0 percent in 2010. In this section, we estimate the net contribution of microenterprise in income generation and poverty reduction using the three rounds of HIES survey data. Table 7 presents the relationships between microenterprise participation and household welfare (measured in terms of per capita income and expenditure as well as moderate and extreme poverty) over time.[6]

As Table 7 shows, the percentage of households engaged in microenterprise activities besides farm and other activities has declined from 25.6 percent in 2000 to 21.6 percent in 2010. Yet we find consistently higher growth in per capita income and expenditure among the households engaged in microenterprises, besides farming and other nonfarm activities. For example, in 2010, households with microenterprises as additional sources of income had 36 percent higher per capita income and 12 percent higher per capita expenditure than those without a microenterprise activity as an additional source of income and their differences are statistically significant at more than the 5 percent level.

We also find that both the moderate and the extreme poverty rates are substantially and significantly lower for households with microenterprises than those for households without a microenterprise activity. For example, as Table 7 suggests, in 2010 moderate poverty is 26.5 percent for households with microenterprises compared to 35.1 percent for those who do not have a microenterprise activity. Extreme poverty follows the same trend.

This leads us to ask whether participation in a microenterprise activity indeed causes income and expenditure to rise and poverty to fall. The relationships reported in Table 7 are not causal in the sense that it is not clear whether income or expenditure have increased because of

[6] The calculation of moderate poverty is based on the official poverty line, which includes the food poverty line and an allowance for nonfood expenditures. The food poverty line is calculated by estimating the cost of a food basket needed to maintain the per capita daily caloric requirement (2,120 calories) recommended by Food and Agricultural Organization (FAO) and the World Health Organization (WHO) (FAO/WHO 1973). For Bangladesh, the food basket contains mostly rice, as well as other food items including pulse, milk, meat, fish, fruits, and vegetables in specific quantities. The cost of the food basket is calculated according to local prices. Extreme poverty, in contrast, is defined by the household's total consumption expenditure on food and nonfood falling short of the food poverty line.

microenterprise participation. In other words, we do not know if the households that adopt microenterprise are better off to begin with, or whether it is the adoption of microenterprise activities that actually leads to growth in income, expenditure, and poverty reduction. In order to understand the causality, we must estimate the net effect of microenterprise participation on these household outcomes after controlling for other factors, including the decision to participate in a microenterprise activity.

Consider the following standard welfare outcome variable Y_{ijt} (per capita income, consumption, the indicator of whether or not a household is moderate or extreme poor) measuring the outcome of household *i* in thana *j* in year *t*) conditional on the participation in a microenterprise activity (M_{ijt}):

$$\ln Y_{ijt} = a^{y}\tau_{t} + \beta^{y} \ln X_{ijt} + \delta M_{ijt} + \mu_{ij} + \mu_{jt} + \eta_{j} + \varepsilon^{y}_{ijt} \qquad (2)$$

where δ measures the estimates of microenterprise adoption, and other variables are as defined in the earlier section. The participation equation is stated earlier in equation (1).

The distinction between the participation equation (1) and an outcome equation (2) is whether or not village-level characteristics are included in the equation (2). If we assume that the program placement of institutional credit including microcredit at the village level only directly affects the adoption of a microenterprise activity of a household, but does not directly affect household income, expenditure and poverty, we could then use the program placement variables as instruments to estimate the impacts of microenterprise adoption on the outcomes of equation (2). That is, we predict the adoption of microenterprise using equation (1), which includes the program placement variables, and get the predicted value of microenterprise adoption, which we use in the

outcome equation (2) to estimate the effect of microenterprise on household welfare.[7] To operationalize, we use instrumental variable techniques in a fixed-effects model.[8]

The results are shown in Table 8. We present the endogeneity test statistics, which show that adoption of microenterprise activity as an additional activity is endogenously determined (at least for two outcomes as per capita expenditure and extreme poverty) by the same characteristics affecting the outcomes itself. Thus, we find that household adoption of a microenterprise activity causally increases both income and expenditure, and thus reduces poverty. For example, the adoption of microenterprise activities increases household per capita expenditure by over 50 percent. If we assume that the growth in income or expenditure has been accumulated over the duration of microenterprise operation, which is an average of 10 years, we can infer that a household's adoption of an enterprise activity increases per capita income by 6 percent per year and per capita consumption by 5 percent per year. Consequently, the reductions in moderate and extreme poverty have been 2.4 percent and 3.6 percent per year, respectively, because of microenterprise adoption. These findings bolster our hypothesis that besides farm income growth, microenterprise expansion is an effective way to accelerate poverty reduction in rural Bangladesh.

4. Rates of return to investment using productivity measures

To understand whether income and consumption gains (or alternatively poverty reduction) are substantial with microenterprise growth, we must analyze the profitability of microenterprise investment, or alternatively the rates of return to investment in microenterprise, as it is the return

[7] The instruments are the program placement of microcredit, commercial and other development banks in a village. We also interact these variables with household characteristics (head's age, education, land and non-land assets) to create additional instruments. It is assumed that the availability of a credit program in a village is expected to influence household welfare such as income, consumption, and poverty only through adoption of enterprise and its growth and performance.

[8] We use 'thana times year' as the unit for fixed-effects as it is more appropriate than simple thana-level FE.

from these activities that determines the income or expenditure growth. Before we examine the profitability and return in details we examine various types of costs related to enterprise operations.

Table 9 presents the basic data on profit, revenue and cost of microenterprises by year and sector. It also shows their running or working capital and enterprise asset. The cost has two elements: operating cost and family labor cost. "Operating cost" is defined as the cost that the enterprises actually incurred, and includes all costs to conduct enterprise activities, such as the cost of rent, raw materials, fuels (e.g., kerosene, electricity etc.), finished goods purchased for reselling, hired labor, transport, interest payment, taxes and so on. Although rural microenterprises do not incur any cost for the labor provided by family members, the calculation of operating cost should include family labor, as there is an opportunity cost for it. The cost for family labor is calculated by multiplying total man days of labor provided by family members with the prevailing daily nonfarm wage in the village. As Table 9 shows, the cost of family labor is very low, and constitutes not more than 5 percent of the operating cost. Profit is revenue generated in 12 months minus the cost. We create two measures of profit – one that uses operating cost only and another that takes the family labor cost into account as well.[9] The working capital and value of enterprise together make the total enterprise asset, which we use next to calculate enterprise rate of return.[10]

Opinions vary on how to measure rates of return from microenterprises, because many rural microenterprises are informal and the actual cost of their inputs and outputs is often difficult to assess. The most common measure is the rate of return on enterprise assets (ROA), which is the enterprise profit as a percentage of enterprise assets, and measures how well the enterprise utilizes

[9] This second measure of profit will be used for subsequent analysis as it represents the true cost to enterprise.

[10] The value of enterprise in the data contains some outliers and is underestimated, so for those households we imputed the value of enterprise. To do so, we regress the value of the enterprise on a set of variables that explains the value for a sub-sample of households that does not contain any outliers. For example, the covariates include duration of the enterprise, number of months the enterprise was operating in the past year, whether the enterprise is registered with local government, whether the enterprise is household based, dummy variables for its activity type and sources of startup capital, and so on. We then make an out-of-sample prediction for the outliers, and finally, we replace the outliers with the predicted value of enterprise. Then we create an imputed value of enterprise equal to the value reported by the owner, and then replace the outliers with predicted values of enterprise.

assets to generate profits. This widely used productivity measure helps creditors and investors make lending or investment decisions, as it is assessed as proxy for repayment and compared with the opportunity cost of the capital.

Different studies use different definitions of capital assets. For example, the LSMS survey usually asks for information about both fixed assets (land, building, equipment and machinery, furniture, small or large tools, vehicles, and other durable goods) as well as raw material and finished-goods inventory, but does not generally collect information on financial working capital such as cash (Grosh and Glewwe, 2000). In their study of the return to capital in Sri Lanka, de Mel, McKenzie, and Woodruff (2009) include both fixed and working capital. Samphantharak and Townsend (2011) have done a comprehensive analysis of rate of return using the Townsend Thai Monthly Survey. They presented ten different measures of household enterprise income or enterprise assets, and their associated rates of ROA. This strategy allows them to study the sensitivity of ROA when only one component of either profit or assets is changed.

Following their work, we first calculate the profit (accounting for the cost of family labor). We then take a measure of capital assets by combining the working capital and the imputed value of the enterprise. Finally, we divide the profit by this imputed value of assets to generate rate of return. We also define a second measure of productivity, which is the profit margin, and defined by profit as a percentage of revenue. The profit margin is an indicator of an enterprise's pricing strategies and how well it controls costs; that is, how cost-effectiveness its performance is across sectors. A higher profit margin indicates a high margin of safety. The two measures of productivity for different enterprise activities are reported in Table 10.

As Table 10 indicates, the transport sector has the highest profit margin across all three survey years, indicating that it is performing well. It also earns the highest rate of return on assets, on average, compared to enterprises in other sectors. This is because probably road infrastructure was

improved, leading to better subsequent returns from investments in transport vehicles or businesses relating to transportation. The service and the trade sectors fare the worst in terms of profit margin, which is also revealed in the rate of return earned on assets in all three survey years, indicating that there is room for performance improvement. The return on assets in the service sector is 61.3 percent in 2000, 62.5 percent in 2005, and 50 percent in 2010. The corresponding figures for the trade sector are 59.9 percent, 54.2 percent, and 52.6 percent respectively. The manufacturing sector seems to be exposed to high risk, as reflected in its relatively low profit margin, and the rate of return in this sector also tends to be around the average for all enterprises in all activities.

Our estimates of average rates of return to assets are consistent with findings from other countries. For example, Kremer, Lee, and Robinson (2008) take advantage of the characteristics of the retail industry in rural Kenya to create estimates and bounds on the rate of return to inventory capital in a set of retail firms. Using administrative data on whether firms purchased enough to take advantage of quantity discounts from wholesalers, they estimate a lower bound on rates of return for the median shop of greater than 100 percent per year. McKenzie and Woodruff (2006) similarly find large returns to small entrepreneurs. Exploiting county-level variation in credit supply due to the Community Reinvestment Act, Zinman (2002) estimates gross rates of return to capital in the US on the order of 20-58 percent per year. In a recent study, Anagol and Udry (2006) take the elegant approach of using data on prices of used car parts of varying expected lifetimes to estimate a lower bound to the opportunity cost of capital of 60 percent for taxi drivers in Ghana. Banerjee and Duflo (2005) compute the rate of return to capital in the economy to be about 22 percent in India, and Caselli and Freyer (2007) calculate the marginal product of capital to be at most 19 percent for Sri Lanka.

5. Rates of return using a profit function approach

Several studies measure marginal returns as opposed to average returns through experimental design; e.g., by increasing capital stocks through cash or capital grants. When natural experiments are not possible, a few studies estimated returns to capital with a production function (typically translog and Cobb-Douglas) using OLS regression, or instrumenting capital with price. Using this methodology Bigsten et al. (2000) estimate returns to physical and human capital in five African countries and find rates of returns ranging from 10 to 32 percent. McKenzie and Woodruff (2003), estimating both parametric and non-parametric relationships between firm earnings and firm capital, find huge returns to capital for small firms with less than $200 invested: a rate of return of 15 percent per *month*, well above the informal interest rates in pawn shops or through microcredit programs (which are on the order of 3 percent monthly). Their estimated rates of return decline with investment but still remain high – that is, 7 to 10 percent for firms with investments between $200 and $500, and 5 percent for firms with investments between $500 and $1,000).

The production function approaches suffer from serious methodological weaknesses, however. First, the investment levels are likely to be correlated with omitted variables. For example, in a world without credit constraints, investment will be positively correlated with the expected returns to investment, generating a positive "ability bias" (Olley and Pakes (1996)). McKenzie and Woodruff (2006, 2003) attempt to control for managerial ability by including the firm owner's wage in previous employment, but this may only resolve the issue partly if individuals choose to enter self-employment with a higher expected return than their productivity in a salaried job. Conversely, there could be a negative ability bias if capital is allocated to firms in order to avoid failure. Banerjee and Duflo (2004) take advantage of a change in the definition of the so-called "priority sector" in India, which changed the eligibility of firms to apply for low-interest loans, thus allowing them access to capital to circumvent these difficulties. They use the variation in the eligibility rule over time to construct an instrumental variable for access to capital and estimate the impact of working capital on

sales and profits. They estimate that the returns to capital for these firms must be at least 74 percent. A study in the Philippines finds the net return to the fixed assets rate to be 10 percent for farm machinery products and over 30 percent for ready-made garment products (Onchan 2001). The same study finds the rate of return on total capital ranging from 10 percent (for farm carts) to 44 percent (for ready-made garment products).

We utilized a profit function approach to estimate the rate of return to capital. Unlike the production function approach, which suffers from an omitted variable or simultaneity bias, the profit function approach has a number of advantages. This follows a standard production framework model, where we derive profit as revenue less all variable costs, which is a function of fixed assets and other attributes (household, enterprise, and community level) and which can influence the production technology and environment in which the enterprise operates. Thus, the estimated marginal returns, unlike the average returns calculated in the earlier section using productivity measures, are net of the effects of factors influencing the production and profitability of an enterprise other than capital.[11] Consider the following profit equation in semi-logarithmic form:

$$\ln \Pi_{kjt} = \alpha \tau_t + \beta \sum_k K_{kjt} + \gamma H_{kjt} + \mu_{kj} + \eta_{jk} + \eta_{jt} + \varepsilon_{jkt} \qquad (3)$$

Here Π_{kjt} is the profit of *k-th* type of enterprise located in *j-th* thana in year *t*; τ is the year variable; K_{kjt} is the fixed assets utilized in the enterprise; and H_{kjt} is the vector of household-, enterprise- and village-level characteristics. Profit is also influenced by unobserved enterprise or household-level heterogeneity (μ_{kj}), thana-level enterprise specific heterogeneity (η_{jk}) and thana-level heterogeneity (η_{jt}) common to all households living in a thana but varying over time. Similar to the enterprise participation equation, a fixed-effects model with thana times year as fixed-effects unit is run to

[11] Moreover, household and community characteristics are used to control the endogeneity of assets employed in an enterprise.

estimate the profit equation that takes control of unobserved common thana and household-level heterogeneity.

Table 11 shows regression results from estimating the effects of enterprise characteristics, enterprise-owning households' characteristics, and village characteristics on enterprise profit. We take the log of the profit variable to interpret the coefficients as elasticity. Enterprise characteristics included in the regression are years of operation and its squared term, whether the enterprise is registered, and whether it is home-based. We also control for the number of months of operation per year, share of hired labor among workers, the type of enterprise activity (we use dummy variables for manufacturing and processing, transport, trading, service, or other miscellaneous activity), and different sources of startup capital such as own resources, loan from microcredit, loan from commercial banks, and loan from relatives and friends or other sources. Most importantly, we use enterprise total asset (in log form) to capture return to profit (or rate of return).

We also control for household characteristics such as sex, age and years of education of household head (indicator of owner ability), household size (indicator of available family labor), land asset measured in decimals (indicates whether agricultural activity could be an alternative for the household), and non-landed assets (indicates household wealth, which can help the household accumulate resources to be used as inputs to enterprise activity). We control for the same village characteristics that were used in microenterprise participation equation (Table 6). To capture the effects of enterprise assets on profit we use two models – one with enterprise assets just by itself and the other with enterprise assets interacted with activity dummy variables to capture activity-specific returns to profit.

As Table 11 shows, years of operation has a positive effect on profit, although the effect increases at a declining rate as indicated by the negative coefficient of the squared term of years of operation. Regression results also indicate that the home-based enterprises tend to have lower profits.

For example, home-based enterprises earn about 50 percent less profit than those located in a designated premise away from home. It is intuitive that those enterprises operated from their own premises would be more formal and efficient than those operated from home.

As Model 1 in Table 11 shows, enterprise assets have a large and significant impact on enterprise profit. An increase of 10 percent in enterprise assets increases enterprise profit by about 10.8 percent. Model 2 shows that return to profit is high for all activities. For example, a 10 percent increase in manufacturing activity raises profit by almost 12 percent. According to model 1, transport activity seems to be highly profitable relative to other activities, giving a 7.5 percent profit growth for a 10 percent increase in enterprise assets. This is consistent with what we find using the rate of return estimates based on productivity measures. From the regression results reported in Table 11, we also find that compared to the enterprises that use loans from money lenders to start the enterprises, the enterprises that used other sources to acquire startup capital tend to have higher profits. For example, profits are at least 115 percent higher for enterprises that borrowed from MFIs compared to those that borrowed from informal lenders. Loans from commercial banks provide an even higher profit – 121 to 130 percent higher than that for enterprises that borrow from informal lenders.

The returns (profits) to enterprise assets reported in Table 11 are in elasticity form (log-log); that is, they do not report marginal return on enterprise assets.[12] Marginal return is defined as the increase in profit level for an additional amount of asset. Table 12 reports the marginal returns of profit to enterprise assets based on the findings reported in Table 11. Marginal return to enterprise profit for all activities, based on Model 1, is 36.7 percent; that is, for a Tk.100 increase in enterprise assets the annual profit goes up by Tk.36.7. Service activities have the highest marginal return of 24.5 percent, followed by manufacturing activities (4.9 percent). Our estimates of returns are consistent

[12] Marginal return from the log-log equation $\log Y=\beta \log X$ can be calculated from the formula, $\frac{dY}{dX} = \beta \frac{\overline{Y}}{\overline{X}}$ where $\overline{X}$ and $\overline{Y}$ are sample means of X and Y respectively.

with findings in the literature. For example, McKenzie and Woodruff (2008) estimated a significantly higher marginal rate of return (20-33 percent per month) for the retail sector in Mexico. Anagol and Udry (2006) estimated a marginal rate of return of 60 percent per year for the informal auto parts sector in Ghana. Bigsten, Isaksson, Soderbom and Al (2000) estimated a marginal effect of 10 percent per year for the manufacturing sector in Zambia, compared to 4.9 percent found in our estimate.[13]

6. Constraints to microenterprise expansion and productivity: Does access to finance matter?

Now that we have seen that there are substantial rates of return from microenterprises, we need to analyze what factors limit this sector's growth. More specifically, we would like to see if microenterprise growth in rural Bangladesh is constrained by lack of access to finance and other constraints. Constraints limit the ability of the enterprises to operate at their optimal level, thereby lowering their productivity and ability to repay loans meant for carrying out enterprise operations. As Table 13 shows, the extent of constraint for rural enterprises is pervasive: in 2000, as many as 67 percent of the enterprises were constrained, although this declined to 50.3 percent in 2010. Among the various types of constraints in 2010, credit or inadequate capital appears most frequently (more than 20 percent of the sample), followed by inadequate demand for products and services (7 percent), transport (5 percent), and high operating cost (3.6 percent).

Table 14 shows the extent of credit and non-credit constraints by enterprise activity. On average, over the 10-year period of 2000-2010, the service sector is constrained the most (68 percent), followed by the manufacturing sector (59 percent), miscellaneous activities (58 percent), trade (47 percent) and transport (45 percent). Among constrained enterprises, 39 percent are credit constrained.

[13] The marginal returns are lower than average returns for all types of activities, meaning diminishing returns to investment. For example, the marginal return to investment is 4.9 percent (see table 12) compared to average return of 47.7 percent for manufacturing (see table 10).

Among the different sectors, trade is most credit constrained, followed by the service, miscellaneous, manufacturing, and transport sectors.

Next we examine if the constraints affect enterprise productivity. Table 15 shows the distribution of rates of return for constrained and non-constrained enterprises.[14] This distribution is shown by sector. In theory, when an enterprise is constrained, its resource allocation is likely inefficient and hence less productive. Thus, it is more likely that the constrained enterprises will have lower rates of return to assets than those that are not constrained. However, under certain conditions, constrained enterprises may have higher returns than non-constrained enterprises. For example, if the market is distorted and the factors are not getting market-cleared prices, it is possible that returns to investments are higher in activities that are constrained than in those which are not constrained. Indeed, we find that rates of returns are marginally higher in constrained enterprises than in non-constrained enterprises over the 10-year period (Table 15) similar to what was found in the case of Sri Lanka (McKenzie and Woodruff, 2008). The average rate of return is 59.4 percent for constrained enterprises compared to 55.7 percent for enterprises not constrained. Among the constrained enterprises, rates of returns are the highest in the transport sector (74.7 percent) followed by miscellaneous activities (69.4 percent), trade (67 percent), service (65 percent) and manufacturing (64.5 percent). The rates of returns also vary across type of constraints. The returns are slightly higher for credit-constrained enterprises (60.6 percent) than for non-credit constrained enterprises (58.7 percent).

Next we examine the impacts of credit and non-credit constraints on enterprise productivity. Estimating an equation similar to equation (3) by adding dummy variables for credit and non-credit constraints, we find that while the overall constraints (either credit or non-credit) have no significant

[14] McKenzie and Woodruff (2008) in the case of Sri Lanka find high rates of returns (70-79 percent) for enterprises that are credit constrained and much lower returns for firms without credit constraints. They also report that the possibility of no return for non-credit-constrained firms cannot be rejected.

effects on the level of profit, they have significant negative effects on profit margin (Table 16). Model 1, which includes constraint terms and no interactions with activity dummies, shows that credit constraints lower the profit margin more than do non-credit constraints: 6.5 percentage points versus 3.7 percentage points, respectively. In Model 2, constraints are interacted with the activity type to examine the effects of constraint by activities. For example, among the credit-constrained enterprises, the profit margin is 10.7 percentage points higher for manufacturing activities than for miscellaneous activities. Such heterogeneity in returns is not observed for non-credit constrained enterprises.[15]

7. Can better access to finance promote microenterprise growth?

We observe from the previous section that credit is a constraint for microenterprise profitability; however, we would like to know whether better access to finance through MFIs, for example, can be a solution to this perceived credit constraint. Micro-entrepreneurs in rural Bangladesh generally lack access to loans from formal financial institutions, and instead rely on their own savings, and perhaps on informal loans from family members, friends or informal lenders. Informal moneylenders, however, charge exorbitant interest rates, in the range of 180 to 240 percent a year (as shown in Table 17), which make it difficult for micro-enterprises to sustain borrowing from these types of informal sources. Semi-formal institutions such as microfinance institutions (MFIs), which have large network in rural Bangladesh, have the potential to alleviate microenterprises' credit constraints. There is concern among policymakers in Bangladesh and throughout the world, however, that interest rates charged by MFIs are also high and impose a burden on poor households (e.g., Faruqee and Khalily 2011).

[15] This is not unlikely, as unlike credit constraint, non-credit constraint is not a uniform variable. There are different types of non-credit constraints lumped into this variable.

As Table 17 shows, MFIs do charge interest rates that are higher than commercial banks, both in Bangladesh and in other comparable Asian countries. However, rural micro-enterprises in Bangladesh typically do not have access to commercial bank loans, due to their lack of collateral, connections, and financial literacy. Table 17 also shows that MFIs in Bangladesh charge annual interest rates in the range of 20-35 percent, which fall in between the rates charged by commercial banks and informal lenders. So in the short run, i.e., until commercial banks are reformed or somehow become more accessible to rural microenterprises, it is more practical to compare the interest charged by MFI to the return of microenterprises than comparing with the interest rate charged by commercial banks.

Therefore, we need to check whether the rate of return of micro-enterprises is higher than their total cost of borrowing (if funds were borrowed) from MFIs, which includes interest rates and other fees that MFIs charge their borrowers, to analyze if microenterprises can borrow sustainably from MFIs to support microenterprise growth and profitability.

The effective interest rate for MFI loans is determined not only by the stated interest rate but also by the method used to calculate the interest and other fees charged with the loan. The interest rate can be simple or compound. Two general techniques are widely used by MFIs for charging interest in respect to principal: the declining balance method and the "flat" method (for details, see Faruqee and Khalily 2011). The declining balance method imposes lower costs on the borrower than does the flat method. The calculation of the effective interest rate is thus based on the details of the repayment schedule for the client. The higher the number of installments, the higher the effective interest rate, as the calculation has to take into account any variables in the timing of repayments and all fees, compensating balances and additional charges paid by the client. In order to compare the cost of borrowing from MFIs with the rate of return on assets of micro-

enterprises we need to control for the fact that some MFIs use a flat rate method to calculate interest rate while some use a declining balance method.

Table 18 shows the effective interest rate for 25 MFIs that borrow from the country's premier wholesale microcredit agency (PKSF) to make the microloans available to their borrowers. The calculation of effective interest rate takes into account all fees and additional charges paid by the borrower. The average effective interest rate charged to microenterprises is 26.65 percent if they repay on a monthly basis, while it is 31.59 percent if they pay on a weekly basis. The average effective interest rate charged for rural microcredit programs in general is 32.05 percent.

The average rate of return earned by Bangladeshi microenterprises in our sample falls in the range of 40 to 50 percent, depending on the sector of activity of the microenterprise. Therefore, although MFIs charge higher interest rates than commercial banks, expansion of lending by these institutions to microenterprises could serve to eradicate credit constraints faced by micro-entrepreneurs. However, we also have to keep in mind that effective interest rates vary quite significantly by the size of MFIs and their sources of funding. For example, those who borrow from PKSF and obtain donations from foreign organizations can afford to charge low effective interest rates (see Table 19). Thus, to ensure that the MFIs remain a sustainable source of borrowing for microenterprises, efforts need to be made to keep the average effective interest rates lower than the average rate of return for these enterprises.[16]

[16] Using the nationally representative household survey data over 10 years, we attempted to estimate the average rates of returns to microenterprises and found that the rates of returns are not necessarily lower than the average interest rates charged by financial institutions, including MFIs. However, the rates of interest charged by MFIs are yet found high over this period, as many argued. Realizing this, in 2010, the country's Microcredit Regulatory Authority (MRA) set a ceiling on interest rates at 27 percent which has forced some MFIs (charging higher rates) to reduce their interest rates below 27 percent. A recent study from Institute of Microfinance (InM) analyzed the cost of MFIS and found that given 7% cost of fund, the average break-even rate of MFIs is 23-24 percent and thus there is still room for lowering the ceiling interest rate further (Faruqee and Khalily, 2011). Also the discrepancy between average cost of borrowing and average rate of return may be wider (meaning lower return against higher cost of capital) for certain activities, although on an average we found returns are higher than the average interest charged by financial institutions including MFIs.

The rate of interest microenterprise owners will receive if they save the money in the bank instead of using it for microenterprise investment. For example, Grameen Bank pays its depositors an interest rate of 8 percent (Faruqee and Khalily, 2011), while the interest rate on savings in commercial banks ranges from 7.5-8.0 percent. Many other organizations pay interest rates below the market rate (Hossain and Ahmed, 2000), which is much lower than the average rate of return earned by microenterprises. However, because sometimes the needed startup capital is much higher than a micro-entrepreneur's own savings, many households are constrained in starting up their enterprises. Therefore, expanding credit access is critical.

8. Conclusion

This paper examines the nationally-representative data from three large household surveys conducted during the period 2000-2010 to study whether inadequate access to finance constrains microenterprise growth and profitability in Bangladesh. In doing so, we also address why microenterprise growth is important for a country such as Bangladesh. We find that rural households draw some 36 percent of income from an average microenterprise activity. Data show that households with income from microenterprises as an additional source of income are much better off in terms of income, consumption, and poverty than their counterparts that do not operate such income-earning activities. An econometric analysis that establishes the causality between microenterprise participation and household welfare shows that a household's participation in a microenterprise activity raises income additionally by 6 percent and consumption by 5 percent, and consequently reduces moderate poverty by 2 percent and extreme poverty by some 4 percent per year. If microenterprise does help to reduce poverty by raising rural income, the question arises as to why microenterprise expansion does not occur more quickly.

Understanding this requires an analysis of the following questions: (a) Is microenterprise investment profitable? (b) Does lack of access to finance matter in microenterprise growth? and (c) Is borrowing from financial institutions a cost-effective way of supporting microenterprise investment? Our analysis shows that the rate of return to microenterprise investment on average is high at about 36 percent per year. This means that an entrepreneur with an incremental investment of Tk. 1,000 in an activity can obtain Tk. 360 in profit per year. Therefore, rate of return is not a constraint for microenterprise expansion and its growth.

What are the constraints then to microenterprise growth? We find that it is the lack of access to affordable finance rather than the non-credit constraints (e.g., lack of demand or access to transportation and electricity) that matters most in restricting microenterprise growth in Bangladesh. An analysis of the household survey data shows that more than 70 percent of enterprises' start-up capital comes from entrepreneurs' own savings; if we include borrowing from friends and relatives, it explains more than 85 percent of startup capital of rural microenterprises in Bangladesh. That is, the opportunity cost of start-up capital is high, in the sense that households must either save or have wealthy friends and relatives in order to set up an enterprise.

Informal lenders can also provide funds to operate microenterprise activities. However, exorbitant interest rates (as high as 180 percent) make this option infeasible for financing microenterprise investment. On the other hand, formal financial institutions such as commercial banks charge 10 to 12 percent interest rates and could thus be the most cost-effective sources for financing rural enterprises. But they rarely finance rural microenterprise activities because of high transaction costs involved with small loans for micro-entrepreneurs, who often further lack adequate assets as collateral for bank loan guarantees. Our data show that barely 1 percent of the microenterprises borrow from commercial banks to fund startup capital.

In contrast, the country's large microfinance institutions (MFIs) may be a major source of support for microenterprise expansion and growth for a variety of reasons: (a) MFIs have a large network of outreach; (b) they do not require physical collateral to lend; and (c) they charge an effective interest rate close to 32 percent. We find that some 8 percent of microenterprises acquired loans from MFIs to start-up microenterprise activities in 2010. Lack of access to affordable finance for start-up capital is perhaps a barrier for microenterprise growth.[17]

Our findings suggest that improved access to affordable loans through microfinance or other sources would help further microenterprise growth and promote poverty reduction in Bangladesh. As the returns to microenterprise investment are found high and meet the cost of borrowing from microfinance institutions, there are clearly large potentials of microfinance for supporting microenterprise growth in Bangladesh.

[17] It is possible that MFIs support microenterprises by providing working capital. Such information is however, not available from the HIES survey. Note also that MFIs support activities such as poultry raising, livestock, and farm-related activities like gardening are not included in defining microenterprise activities in this paper. erprises is needed to identify the potential of this source of finance for microenterprise growth in Bangladesh.

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Tables

Table 1: Growth in household welfare in rural Bangladesh: 2000-2010

Welfare indicators	2000 (N=5,030)	2005 (N=6,031)	2010 (N=7,840)
Per capita income (Tk./month)	878.8	930.4	1,277.6
Share of nonfarm income (%)	36.3	38.1	38.3
Moderate poverty headcount (%)	56.2	40.8	33.3
Extreme poverty headcount (%)	41.8	26.5	19.6

Note: Income figures are CPI-adjusted (2000=100). For nonfarm income, only income from activities is considered; that is, non-earned income (receipt from remittance, safety net programs, pension and so on). Income from interest, rental of assets, and property are not considered.
Source: HIES 2000, 2005 and 2010

Table 2: Income from nonfarm activities and its components: 2000-2010

Nonfarm income	2000 (N=2,807)	2005 (N=3,325)	2010 (N=4,282)
Per capita nonfarm income (Tk./month)	639.3	668.3	801.8
Share of enterprise income (%)	41.8	36.0	36.1
Share of nonfarm wage income (%)	31.3	35.0	35.1
Share of salaried income (%)	27.0	29.0	28.9

Note: Income figures are CPI-adjusted (2000=100). The sample is restricted to households that are engaged in nonfarm activities.
Source: HIES 2000, 2005 and 2010

Table 3: Distribution of rural microenterprises by activity: 2000-2010

Activities (%)	2000 (N=1,427)	2005 (N=1,426)	2010 (N=1,909)
Manufacturing and processing	11.9	10.3	13.9
Transport	9.3	6.3	13.1
Trading	2.4	2.5	2.3
Service	65.3	75.8	61.5
Other miscellaneous activities	11.1	5.1	9.2

Note: Manufacturing and processing activity includes manufacturing and processing in food and beverages, tobacco, textiles, wood and furniture, rubber/plastic, basic metal and nonmetal products. Transport activity includes operation and rental of various transport vehicles. Trading activity includes wholesale and retail trading of various farm and nonfarm products such as livestock, poultry, vegetables, fruits, rice, furniture, utensils, shoe, clothing, operating stores, shops and so on. Service activity includes skill-based or specialized activities such as that of carpenters, masons,

blacksmiths, electricians, barbers, tailors, real estate agents, social workers, counseling, banking, doctors, restaurant and hotel business, and so on, and the miscellaneous sector includes other small activities.
Source: HIES 2000, 2005 and 2010

Table 4: Salient characteristics of rural microenterprises: 2000-2010

Enterprise characteristics	2000 (N=1,427)	2005 (N=1,426)	2010 (N=1,909)
Years of operation	9.5	9.2	10.0
If the enterprise is registered (%)	9.9	14.7	18.2
If the enterprise is home-based (%)	11.9	14.2	16.7
Months of operation per year	10.3	10.7	10.9
Number of workers	1.6	1.7	1.4
Share of hired labor in total workforce (%)	11.2	10.3	8.7
Owner's sex (1-Male, 0=Female)	96.4	94.8	95.5
Owner's age (years)	44.5	46.1	46.7
Owner's education (years)	3.2	3.5	3.5

Note: Owner's characteristics are that of the head of the household that owns the enterprise.
Source: HIES 2000, 2005 and 2010

Table 5: Distribution of the sources of startup capital of the rural microenterprises: 2000-2010

Share of different sources (%)	2000 (N=1,425)	2005 (N=1,423)	2010 (N=1,902)
Own resource (asset, inheritance, savings, etc.)	78.2	78.5	79.6
Loans from microcredit	3.4	5.9	8.2
Loans from commercial banks	0.8	0.6	1.0
Loans from informal moneylenders	2.4	0.6	1.2
Loans from relatives/friends	5.5	4.0	5.6
Others	9.7	10.4	4.4

Source: HIES 2000, 2005 and 2010

Table 6: FE estimates of household participation in microenterprise activity

Explanatory variables	Thana FE (restricted to 2010)	Thana times year FE	Mean of explanatory variables
Year (1=2000, 2=2005, 3=2010)	-	0.023	2.07
		(0.03)	(0.82)
Head's sex (1=male, 0=female)	0.102	0.087	0.883
	(5.36)	(6.89)	(0.32)
Head's age (years)	0.0003	-0.0002	45.96
	(0.71)	(-0.66)	(14.00)
Head's education (years)	0.002	0.001	4.91
	(0.92)	(0.80)	(2.11)
Household size	0.018	0.016	4.91
	(4.87)	(7.39)	(2.11)
Log of HH land asset (decimal)	-0.046	-0.046	117.38†
	(-9.10)	(-17.26)	(470.96)
Log of HH non-land asset (Tk.)	0.086	0.101	192,119.8†
	(17.12)	(28.31)	(552,265.9)
Village has electricity	0.061	0.058	0. 683
	(1.54)	(1.74)	(0.466)
Proportion of irrigated land in village	-0.058	0.005	0.655
	(-0.42)	(0.06)	(0.289)
Village has agricultural banks (1=yes, 0=no)	0.013	0.001	0.255
	(0.29)	(0.03)	(0.436)
Village has commercial banks (1=yes, 0=no)	0.005	-0.001	0.247
	(0.10)	(-0.03)	(0.431)
Village has microcredit programs (1=yes, 0=no)	-0.044	-0.059	0.931
	(-0.66)	(-1.03)	(0.253)
Village has Food for Work program (1=yes, 0=no)	-0.012	-0.021	0.430
	(-0.19)	(-0.51)	(0.495)
Village has Vulnerable Group Feeding program (1=yes, 0=no)	0.030	0.011	0.580
	(0.40)	(0.22)	(0.494)

R^2	0.126	0.114
Mean of the dependent variable	0.249	0.256
N	4,212	11,200

†These are actual values, not log.

Note: The level of FE is than times year. For the estimation, data from 2000, 2005 and 2010 rounds of HIES are combined and then households from only those thanas that are common to all three rounds are kept. Figures in parentheses are t-statistics in the marginal Impacts column and standard deviations in Mean column. Regressions additionally include community prices of consumer goods, daily wage, etc., and agroclimate characteristics (land elevation, average number of sunny months, and excess rain amount per month).
Sources: HIES surveys, 2000, 2005 and 2010.

Table 7: Household expenditure and poverty by microenterprise adoption: 2000-2010

Indicators	2000		2005		2010	
	HHs with enterprise as an additional activity (N=1,290)	HHs without enterprise as an additional activity (N=3,740)	HHs with enterprise as an additional activity (N=1,317)	HHs without enterprise as an additional activity (N=4,714)	HHs with enterprise as an additional activity (N=1,701)	HHs without enterprise as an additional activity (N=6,139)
Per capita income (Tk./month)	1,168.7	778.9	1,210.4	851.4	1,612.6	1,184.9
	(6.31)		(10.63)		(5.26)	
Per capita expenditure (Tk./month)	788.7	701.5	1,050.6	878.9	1,318.2	1,179.9
	(6.04)		(6.81)		(5.74)	
Moderate poverty headcount (%)	49.6	58.5	33.5	42.8	26.5	35.1
	(-5.54)		(-6.08)		(-6.70)	
Extreme poverty headcount (%)	33.8	44.5	20.5	28.2	15.0	20.9
	(-6.78)		(-5.62)		(-5.41)	
Percentage of households with microenterprise	25.6%		21.8%		21.6%	

Note: Households do not depend solely on microenterprise income. Almost all of the microenterprise owners draw income from farm and/or other nonfarm activities. For example, in 2000, 69.5 percent of the enterprise owners draw income from farm activities. The corresponding figures for 2005 and 2010 are 81.5 percent and 82.0 percent, respectively. Income figures are CPI-adjusted (2000=100). Figures in parentheses are t-statistics of the differences between microenterprise owners and non-owners.
Source: HIES 2000, 2005 and 2010

Table 8: IV-FE estimates of the impacts of microenterprise adoption on expenditure and poverty

Explanatory variables	Log per capita income (Tk./ month)	Log per capita exp. (Tk./ month)	Moderate poverty headcount	Extreme poverty headcount
Year	0.002	-1.767	1.370	1.346
	(0.01)	(-2.64)	(1.98)	(2.20)
Household has microenterprise activity as	0.626	0.505	-0.235	-0.357
an additional activity (1=yes, 0=no)	(1.89)	(2.69)	(-1.21)	(-1.89)
Head's education (years)	0.022	0.020	-0.013	-0.009
	(12.05)	(19.46)	(-12.01)	(-8.63)
Log of land asset (decimal)	0.071	0.071	-0.045	-0.048
	(4.51)	(7.89)	(-4.90)	(-5.31)
Log of non-land asset (Tk.)	0.150	0.092	-0.093	-0.062
	(4.43)	(4.81)	(-4.66)	(-3.19)
Village has electricity	0.057	0.002	0.006	0.023
	(1.00)	(0.05)	(0.18)	(0.71)
Proportion of irrigated land in village	-0.104	0.139	0.008	-0.104
	(-0.69)	(1.62)	(0.09)	(-1.21)
Village has FFW program (1=yes, 0=no)	0.130	-0.082	0.011	0.050
	(1.95)	(-2.17)	(0.28)	(1.32)
Village has VGF program (1=yes, 0=no)	-0.033	0.073	-0.133	-0.014
	(-0.39)	(1.52)	(-2.68)	(-0.29)
R^2	0.201	0.287	0.240	-
Endogeneity test statistics	$\chi^2(1)=1.950$	$\chi^2(1)=7.810$	$\chi^2(1)=1.119$	$\chi^2(1)=3.934$
	p=0.162	p=0.005	p=0.290	p=0.047
N	11,200	11,200	11,200	11,200

Note: The FE unit is thana times year. A household's adoption of microenterprise activity is considered endogenous and so is instrumented using village-level placement of banks and microcredit programs and their interactions with household-level exogenous variables as instruments. For the estimation, data from 2000, 2005 and 2010 rounds of HIES are combined and then households from only those thanas that are common to all three rounds are kept. Figures in parentheses are t-statistics. Regressions additionally include community prices of consumer goods, daily wage, etc., and agroclimate characteristics (land elevation, average number of sunny months, and excess rain amount per month).
Sources: HIES surveys, 2000, 2005 and 2010.

Table 9: Microenterprise financial elements by activity type ('000 Tk./year): 2000-2010

Financial elements	Manuf. and processing	Transport	Trading	Service	Misc. activities	All activities
			2000			
Revenue	161,406.8	76,204.2	202,254.1	206,668.1	156,504.5	183,408.2
Operating cost	125,850.8	43,580.4	105,655.5	158,918.9	119,173.0	138,497.0
Family labor cost (imputed)	5,262.4	4,243.2	6,148.4	5,950.2	5,097.6	5,619.0
Profit (not accounting for family labor)	35,556.0	34,446.0	123,818.3	48,643.8	37,726.9	46,367.1
Profit (accounting for family labor)	30,337.4	30,230.3	118,330.9	42,862.6	32,823.0	40,903.5
Working capital	1,020.8	1,526.3	996.1	809.1	1,388.6	969.7
Value of the enterprise	82,046.1	134,102.0	450,225.8	121,976.2	78,898.2	121,537.8
			2005			
Revenue	220,174.2	39,119.9	246,975.2	254,255.0	132,028.1	230,789.4
Operating cost	179,708.3	17,683.9	214,706.8	215,058.3	10,718.8	193,208.7
Family labor cost (imputed)	10,423.7	5,113.1	10,110.5	7,795.9	7,562.6	7,942.6
Profit (not accounting for family labor)	40,465.9	21,436.0	32,268.4	39,196.8	30,309.3	37,580.7
Profit (accounting for family labor)	32,399.8	16,651.8	24,461.2	32,078.7	23,247.2	30,497.9
Working capital	2,999.4	670.6	646.1	3,525.7	407.3	3,047.3
Value of the enterprise	65,783.5	36,464.2	123,537.4	79,658.5	56,944.0	75,458.1
			2010			
Revenue	149,489.2	54,570.3	88,782.1	223,631.1	134,237.4	178,780.4
Operating cost	115,637.7	23,861.8	57,037.3	180,705.6	95,778.3	140,388.7
Family labor cost (imputed)	8,410.7	6,134.3	8,665.5	9,610.7	19,220.5	9,847.2
Profit (not accounting for family labor)	33,851.5	30,910.9	31,744.8	42,938.7	38,459.2	39,426.4
Profit (accounting for	32,399.8	16,651.8	24,461.2	32,078.7	23,247.2	31,263.9

family labor)						
Working capital	3,239.3	8,004.7	1,285.0	3,031.2	1,756.9	3,557.5
Value of the enterprise	73,327.8	86,196.9	67,478.4	120,897.9	107,755.1	107,303.9

Note: Figures are CPI-adjusted (2000=100). Operating cost includes all business expenses including cost of raw material, rent, fuel, hired labor and other cost incurred by the enterprise. Since family labor cost is not actually incurred by the enterprise it was imputed (calculated) by multiplying man-days spent by family members according to the prevailing wage rate at the village level.

Source: HIES 2000, 2005 and 2010

Table 10: Microenterprise productivity measures by activity: 2000-2010

Productivity measure	Manufacturing and processing	Transport	Trading	Service	Other misc. activities	All activities
2000 (N=1,427)						
Profit margin	35.5	61.6	44.3	26.6	41.3	32.7
Rate of return	0.665	0.758	0.599	0.613	0.662	0.638
2005 (N=1,425)						
Profit margin	39.0	61.6	20.0	20.9	33.1	25.7
Rate of return	0.641	0.757	0.542	0.625	0.540	0.628
2010 (N=1,909)						
Profit margin	31.8	62.3	37.9	31.5	46.6	36.7
Rate of return	0.477	0.683	0.526	0.500	0.466	0.519

Note: Profit accounts for family labor, and this definition of profit has also been used in subsequent tables. The profit margin is defined by the profit as a percentage of the revenue. Rate of return is calculated by dividing profit by the sum of working capital and the value of enterprise assets.

Source: HIES 2000, 2005 and 2010

Table 11: FE estimates of microenterprise rate of return (log of profit)

Explanatory variables	Model 1	Model2	Mean of explanatory variables
Duration of activity	0.028	0.027	9.5
	(3.08)	(3.02)	

Duration of activity squared	-0.0003	-0.0003	179.0
	(-2.04)	(-2.03)	
If the enterprise is registered	-0.134	-0.133	0.147
	(-1.03)	(-1.02)	
If the enterprise is home-based	-0.526	-0.503	0.136
	(-4.03)	(-3.85)	
Months of operation per year	-0.001	-0.0003	10.6
	(-0.08)	(-0.02)	
Share of hired labor among workers	-0.017	-0.006	0.097
	(-0.08)	(-0.03)	
Manufacturing and processing activities	0.763	1.063	0.121
	(3.74)	(0.71)	
Transport activities	0.734	5.554	0.104
	(3.41)	(3.25)	
Trading activities	0.417	(3.704	0.020
	(1.16)	(1.40)	
Service activities	0.379	1.903	0.670
	(2.26)	(1.54)	
Log running capital and value of enterprise (Tk./year)	1.076	-	99.806.2
	(24.32)		
Manufacturing and processing activities X Log running capital and value of enterprise (Tk./year)	-	1.186	1.267
		(12.67)	
Transport activities X Log running capital and value of enterprise (Tk./year)	-	0.750	1.072
		(5.98)	
Trading activities X Log running capital and value of enterprise (Tk./year)	-	0.899	0.202
		(3.87)	
Service activities X Log running capital and value of enterprise (Tk./year)	-	1.070	7.072
		(21.59)	

Miscellaneous small activities X	-	1.217	0.869
Log running capital and value of enterprise		(10.62)	
(Tk./year)			
Source of startup capital is own resource	0.905	0.947	0.797
	(2.41)	(2.51)	
Source of startup capital is loan from microcredit	1.148	1.161	0.055
	(2.82)	(2.84)	
Source of startup capital is loan from	1.207	1.303	0.004
commercial banks	(1.65)	(1.78)	
Source of startup capital is loan from relatives	0.757	0.803	0.052
and friends	(1.82)	(1.93)	
Other sources of startup capital	0.892	0.944	0.079
	(2.23)	(2.35)	
R^2	0.316	0.319	
F statistics for the model	F(45,	F (49,	
	2336)=23.93,	2332)=9.679	
	p>F=0.000	p> F=0.000	
N	2,856	2,856	

Note: Level of FE is thana times year. For the estimation, data from 2000, 2005 and 2010 rounds of HIES are combined and then households from only those thanas that are common to all three rounds are kept. Figures in parentheses are t-statistics. In the activity list excluded category is the small miscellaneous activities, and among the sources of startup capitals excluded category is informal lenders. Regressions additionally include household variables (head's age, sex and education, land and non-landholding), community prices of consumer goods, daily wage, etc., and agroclimate characteristics (land elevation, average number of sunny months, and excess rain amount per month).
Sources: HIES surveys, 2000, 2005 and 2010.

Table 12: Marginal return on enterprise investment

Share of different sources (%)	**Model 1**	**Model 2**
Manufacturing and processing activities	-	0.049**
Transport activities	-	0.027**
Trading activities	-	0.006**
Service activities	-	0.245**
Misc. Small activities	-	0.035**

Aggregate of all activities	0.367**	0.361**

**denotes that the figures are statistically significant at less than 5% level. Note: Marginal return is calculated from the findings of Table 11 and is defined as the return (profit) on each additional taka invested in working capital and the value of the enterprise.
Source: HIES 2000, 2005 and 2010

Table 13: Household distribution by constraints in the operation of microenterprise

Constraint type	**2000**	**2005**	**2010**
No constraints	33.0	23.8	49.7
Inadequate capital or credit	27.1	25.5	22.1
Inadequate knowhow	3.8	3.9	2.2
High operating cost	0.1	0	3.6
Unreliable/inadequate power supply	0.5	1.1	2.9
Problems with equipment/spare parts	1.7	0.6	0.4
Government regulations	2.5	4.0	1.1
Lack of raw materials	10.5	18.2	2.9
Inadequate demand of products	8.3	6.2	7.1
Transport problems	2.5	7.1	5.0
Other miscellaneous problems	10.0	9.6	3.0
N	1424	1418	1904

Source: HIES 2000, 2005, 2010

Table 14: Extent of credit and non-credit constraints by microenterprise activity

Enterprise activity and year	**Enterprises are constrained (%) (N=4,761)**	**Among those enterprises that are constrained (N=3002)**	
		Enterprises are credit-constrained (%)	**Enterprises are non-constrained (%)**
Service			
2000	70.52	45.47	54.53
2005	77.87	35.73	64.27
2010	56.59	47.18	52.82

Average for all 3 years	68.36	42.21	57.79
Manufacturing and processing			
2000	69.17	38.45	61.55
2005	69.55	21.57	78.43
2010	44.44	41.79	58.21
Aggregate	58.98	34.49	65.51
Trade			
2000	55.61	63.74	36.26
2005	55.33	35.33	64.67
2010	30.94	38.49	61.51
Average for all 3 years	47.06	47.58	52.42
Transport			
2000	56.86	10.77	89.23
2005	64.34	13.7	86.3
2010	29.97	23.22	76.78
Average for all 3 years	45.21	15.58	84.42
Misc. small activities			
2000	54.25	25.96	74.04
2005	82.10	40.37	59.63
2010	49.29	42.30	57.70
Average for all 3 years	57.25	35.06	64.94
All activities			
2000	66.92	40.46	59.54
2005	75.81	33.47	66.53
2010	50.14	44.06	55.94
Average for all 3 years	63.48	39.01	60.99

Source: HIES 2000, 2005, 2005

Table 15: Average rate of return by sector and level of constrain in running enterprise (N=3,023)

Activities	Enterprises are not constrained	Enterprises are constrained	Among the enterprises that are constrained (N=1,907)	
			Enterprises are not credit-constrained	Enterprises are credit-constrained
Manufacturing and processing	0.534	0.586	0.544	0.665
Transport	0.691	0.731	0.748	0.641
Trade	0.507	0.597	0.636	0.554
Service	0.525	0.586	0.573	0.604
Miscellaneous small activity	0.529	0.562	0.568	0.550
All activities	0.550	0.594	0.587	0.606

Source: HIES 2000, 2005 and 2010

Table 16: FE estimates of the impacts of credit and non-credit constraints on microenterprise productivity (N=2,849)

Explanatory variables	Model 1		Model 2	
	Log profit (Tk./year)	Profit margin†	Log profit (Tk./year)	Profit margin†
Enterprise is credit constrained	0.053	-0.065	-0.024	-0.136
	(0.45)	(-5.28)	(-0.06)	(-3.51)
Enterprise is non-credit constrained	-0.003	-0.037	-0.185	-0.085
	(-0.02)	(-3.00)	(-0.53)	(-2.37)
Enterprise is credit constrained **X**	-	-	0.579	0.107
Activity is manufacturing and processing			(1.16)	(2.10)
Enterprise is credit constrained **X**	-	-	0.058	-0.033
Activity is transport			(0.09)	(-0.48)

Enterprise is credit constrained **X**	-	-	-0.623	-0.030
Activity is trade			(-0.72)	(-0.33)
Enterprise is credit constrained **X**	-	-	0.048	0.081
Activity is service			(0.12)	(1.99)
Enterprise is non-credit constrained **X**	-	-	0.716	0.040
Activity is manufacturing and processing			(1.64)	(0.90)
Enterprise is non-credit constrained **X**	-	-	-0.071	0.071
Activity is transport			(-0.16)	(1.55)
Enterprise is non-credit constrained **X**	-	-	0.264	0.072
Activity is trade			(0.32)	(0.86)
Enterprise is non-credit constrained **X**	-	-	0.154	0.052
Activity is service			(0.42)	(1.40)
R^2	0.316	0.206	0.317	0.211
Model F statistics	F(47, 2327)=22.82, p>F=0.000	F(47, 2327)=12.85, p>F=0.000	F(55, 2319)=19.61, p>F=0.000	F(55, 2319)=11.24, p>F=0.000

†Profit margin is defined by the ratio of profit to revenue.

Note: Figures in parentheses are t-statistics. Regressions additionally include all variables reported in Table 11 and community prices of consumer goods, daily wage, etc., and agroclimate characteristics (land elevation, average number of sunny months, and excess rain amount per month).
Source: HIES 2000, 2005 and 2010

Table 17: Annual interest rates (%) in selected Asian countries by lender type (2003)

Country	Commercial Banks	MFIs	Informal money lenders
Bangladesh	10-13	20-35	180-240
Cambodia	18	45	120-180
Indonesia	18	28-63	120-720
India	12-15	20-40	24-120
Nepal	15-18	18-24	60-120
Philippines	24-29	60-80	120+

Source: Faruqee and Khalily (2011)

Table 18: Effective annual interest rate (%) of the partner organizations (POs) of PKSF

Loan type	Highest rate	Lowest rate	Average rate
Rural microcredit (regular)	35.75	28.11	32.05
Microenterprise (weekly payment)	34.67	28.39	31.59
Microenterprise (monthly payment)	30.39	25.30	26.65

Note: The effective rate calculation takes into account all fees and additional charges paid by the borrowers, and thus, it correctly reflects the cost of borrowing.

Source: Faruqee and Khalily (2011)

Table 19: Effective interest rates of 50 selected MFIs (%)

Loan type	Category	Number of MFIs	Range of effective Interest rate
Rural microcredit	I	29	28-85
	II	9	31-124
	III	4	32-63
	IV	3	65-72
Micro Enterprise (weekly payment)	I	22	22-65
	II	3	34-50
	III	1	37
	IV	3	38-93
Micro Enterprise (monthly payment)	I	19	21-57
	II	1	45

Note: Categories are defined as follows: I. Top MFIs based on loan outstanding; II. MFIs not financed by PKSF; III. MFIs financed by bank and member savings; IV. Small MFIs with loan outstanding Tk. 4-7 million

Source: Faruqee and Khalily (2011)