Malaysian Journal of Economic Studies 53(2): 173–193, 2016 ISSN 1511-4554

The Effect of Formal Banks on Household Income and Poverty in Bangladesh

Md. Kabir Ahmed[a]
Bangladesh Bank

M. Niaz Asadullah[b]
University of Malaya

Uma Kambhampati[c]
University of Reading

Abstract: This paper examines the effects of rural financial development, measured in terms of number of formal bank branches in a sub-district, on household poverty in Bangladesh. The analysis is based on a hybrid data set which we created by combining sub-district level information on bank branch availability and the presence of microcredit providers with household level information on poverty, assets, expenditure and so on. The latter was obtained from the nationally representative Household Income Expenditure Survey (HIES) for the year 2005 which sampled 6,400 rural households. We studied the effect of formal banks by estimating Least Square (OLS) regression models of household per capita expenditure and sub-district level headcount poverty. We found a statistically significant and positive relationship between the number of formal bank branches and household per capita expenditure and a negative association with the proportion of people living below the poverty line. These results were very robust to differences in household assets, occupation and demographic structure. In addition, differential access to NGO programs in the village and microfinance schemes at the sub-district level did not wash out the effects of formal banks on household expenditure. Formal banking coverage also remained negatively associated with headcount measures of poverty at the sub-district level even after controlling for remoteness, vulnerability to natural disasters and access to microfinance schemes. Overall, our results suggest that policies that improve access to financial services (e.g. presence of formal banks) in rural areas can complement government efforts to reduce poverty and improve rural welfare in developing countries.

Keywords: Financial development, formal banks, microfinance, NGOs, poverty
JEL classification: O16, O50, G21

1. Introduction

Financial development has long been accepted as an important factor influencing economic growth (Honohan, 2004). Poor countries with greater financial intermediation experience higher growth rates in the long-run (Aghion, Howitt & Mayer-Foulkes, 2005;

[a] Bangladesh Financial Intelligence Unit (BFIU), Bangladesh Bank, Head Office Dhaka, Bangladesh. Email: *kabir.ahmed@bb.org.bd*

[b] Centre for Poverty and Development Studies (CPDS), Faculty of Economics and Administration, University of Malaya, 51900 KL, Malaysia. Email: *m.niaz@um.edu.my* (Corresponding author).

[c] Department of Economics, University of Reading, Reading RG6 6AA, UK.
Email: *u.kambhampati@reading.ac.uk*

Kim, Huang, Lin & Yeh, 2010). In the context of development, of course, it is not only its influence on agricultural and industrial growth that is significant but also its impact on poverty. A number of studies have argued that financial development helps individuals to exit poverty (Banerjee & Newman, 1993; Aghion & Bolton, 1997). If this is the case, then constraints to finance are likely to make the growth process less pro-poor. Such theoretical arguments have motivated researchers to empirically investigate the nexus between financial development on the one hand and growth, poverty and inequality on the other (Vaona & Patuelli, 2008; Guiso, Beck, Demirguc-Kunt & Levine, 2007; Sapienza & Zingales,2004; Clarke, Xu & Zou, 2003; Li, Squire & Zou, 1998). Despite these studies, our knowledge of the link between access to finance and household poverty in the developing world remains limited (Claessens, 2006).

Financial development in low income countries is usually achieved through government policy which uses the placement of new government bank branches and the introduction of specialised credit schemes as instruments. This is because private financial institutions often exclude the poor and marginalised for two reasons. On the one hand, branches are placed conditional on regional growth prospects leaving behind economically lagging regions. On the other hand, within these regions, the poor lack the wherewithal (knowledge, collateral etc.) to access the services of these institutions. For these reasons and because it is acknowledged as important for macroeconomic growth, the financial development of the formal sector has been facilitated through the development of public sector financial institutions and non-governmental organisation-run microfinancial institutions (MFIs).

In this paper, we analyse the role of formal bank branches in influencing household expenditure and poverty levels in Bangladesh. A pre-existing network of formal banks throughout the country presents an appropriate setting in which to test the role of formal banks in influencing income and poverty levels. The impact of formal banks on household income and poverty levels can arise through a number of channels. To begin with, regions with more bank branches benefit from lower transaction costs associated with lending and borrowing. However, we might expect that since only asset-rich households have access to formal loans, landless households are unlikely to benefit from the presence of formal bank branches. Our results in this paper indicate that this is not entirely true. Second, as regions become more financially developed, the poor may be encouraged to save for the future and these savings help both with consumption smoothing and future investment. Third, access to financial institutions may lead to increased entrepreneurial activities amongst the non-poor which would increase employment, thereby benefiting the poor. In other words, despite limited impact on the borrowing activity of the poor, higher levels of financial development may lead to a spillover effect on the poor and through this lead to lower levels of aggregate poverty in more financially developed regions.

To analyse this, we combined data from a nationally representative household survey with supply-side information on village infrastructure and census records on formal banks (from the Central Bank of Bangladesh) together with data on MFIs at the sub-district level (from the Palli Karma Sahayak Foundation). MFIs are very active in Bangladesh and we might expect their impact to influence the coefficient of formal bank branches. In particular, it is worth noting that as long as MFIs/NGOs target regions discarded by formal banks, this would reduce the estimated size of the formal bank effect in our analysis. However, if MFIs target the same locations, then the formal bank effect may be overstated. To control

for these effects, we extensively control for access to NGO programs and MFIs at village as well as sub-district level.

Our results confirm that the formal banking sector significantly increases household expenditure in the rural regions of Bangladesh. This is true both at the aggregate sub-district level as well as at the household level. The result is robust to controls for geographic characteristics (e.g. soil quality) as well as differential access to NGOs at village level and to MFIs at sub-district level. Most importantly, even for the sub-group of the population that is traditionally considered to be left out of formal sector lending, namely landless households, we find a positive correlation between formal bank branches and household expenditure. This suggests an unexpected poverty effect of formal banking in rural areas.

This paper therefore contributes to the literature on the impact of local financial development and the placement of financial services in a developing country. Despite its importance, there are only a handful of studies on this issue using developing country data and, none to our knowledge, on Bangladesh. We make use of the exogenous 'policy determined' placement of formal bank branches in Bangladesh in the 1970s to capture the potential impact that access to formal credit has on rural welfare. In doing so, we contribute to the growing literature on the importance of finance for economic well-being that models local financial development using number of bank branches as a proxy (e.g. see Guiso et al., 2004; Burgess & Pande, 2005; Kochar, 2008; Fafchamps & Schündeln, 2010; Butler & Cornaggia, 2011). As a by-product, we also revisit the role of microfinance institutions in poverty reduction. Among other things, the paper brings together a range of data sources to analyse these issues – including the Household Income Expenditure Survey (HIES) soil quality data to proxy for rural regional prosperity from the Government of Bangladesh, MFI data from Palli Karma-Sahayak Foundation (PKSF), a parastatal organisation which provides funding to MFIs, and formal banks data from Central Bank of Bangladesh. This large data collating task enables us to control for a range of factors that might influence household expenditure and therefore to identify the impact of formal banks more neatly than has hitherto been done.

In the next section, we will consider the literature in this area before we go on to discuss the data used, the identification methodology and the results.

2. Literature Review

There is much literature on the role of finance in facilitating economic progress (Aghion & Bolton, 1997).[1] More specific Asian evidence has been provided by Habibullah and Eng (2006) and Jalil and Feridun (2011). The former analysed data for 13 Asian countries between 1990 and 1998 to confirm that financial development promotes growth, while the latter considers the experience of Pakistan between 1975-2008. There is also significant policy interest in this issue with governments both in developed and developing countries working to improve access to financial services. Despite this widespread acceptance of the role played by the banking sector, there is limited empirical evidence based on individual country experience. In cross-country studies, Beck, Demirguc-Kunt and Levine (2007) found that financial development reduces income inequality while Clarke, Xu and Zou (2003) extend this finding to argue that financial development therefore helps to reduce

[1] For the theoretical link between poverty and access to finance, see Banerjee and Newman (1993), Conning and Udry (2007), Karlan and Morduch (2010) and Fafchamps (2014).

poverty. Li et al. (1998) also found that financial depth contributes significantly to lower inequality and raise the average income of the lower 80% of the population.

Early studies on this relationship between financial development and income/welfare (see Claessens (2006) for a review) were plagued by the inability to find an exogenous measure of credit availability. Since then, a number of authors (Burgess & Pande, 2005; Kochar, 2008; Fafchamps & Schundeln, 2010) have used policy-determined bank branch placements to overcome this problem. In a study of the impact of financial development on rural poverty in 16 states in India, Burgess and Pande (2005) used bank branches as a proxy for financial development on the grounds that branch expansion in India had been determined by government policy rather than commercial imperatives making it exogenous to local income. They found that such financial development significantly decreased rural poverty in India. Burgess, Wong and Pande (2005) also found that enforcement of directed bank lending requirements is associated with increased bank borrowing among the poor, especially the low caste and tribal groups. Kochar (2008) hypothesised that if the wealthy are best placed to benefit from expansion of banking infrastructure, then the latter is likely to increase income inequality. Analysing this in the state of UP in India, she found empirical evidence in favour of her hypothesis showing that the number of rural bank branches had a larger effect on the per capita expenditure of non-poor households. This finding is not surprising considering the fact that formal banks apply stringent loan criteria that discriminates against small sized loans and poor asset starved borrowers. In one of the few studies outside India, Fafchamps and Schundeln (2010) use lagged local bank availability at commune level as a proxy for access to finance in Morocco.

Our review reveals that while there are a number of studies relating to the NGO financial sector in Bangladesh, there are none on the formal banking system. Equally, there is no study, to our knowledge, that examines the poverty impact of formal banking while simultaneously controlling for the presence of MFIs. In this paper, we aim to plug this gap by analysing the impact of formal financial development on rural welfare in Bangladesh while taking into account the presence of MFIs. We also consider the differential impact that formal bank branches have on households with and without collateral (i.e. land). In the next section, we discuss formal bank branch distribution in Bangladesh.

3. Study Background: Banking Sector and MFIs in Bangladesh

Rural banking in Bangladesh largely relies on four state owned banks, namely Rupali, Sonali, Agrani and Janata, two agricultural banks (BKB and RAKUB) and three private commercial banks (Uttara, Pubali and Islami). Currently there are altogether 4686 branches spread across over 460 sub-districts. However, there has not been any growth in the number of state-owned bank branches in the recent past. Between 1977 (following the famine in Bangladesh which caused 1.5 million deaths) and 1982, the Government of Bangladesh targeted its policy to reach individuals in unbanked interior regions. This was a developmental rather than a commercial priority and was driven through the expansion of state-owned rural banks. The current location of bank branches in Bangladesh is therefore predetermined as it predates our analysis by two or even three decades. In addition, since it was policy determined, the placement of these branches was not a response even to contemporaneous economic conditions. Thus, this variable is both pre-determined and exogenous.

Figure 1 above confirms that most state owned commercial bank branches in rural Bangladesh had been established by the early 1980s. In fact, from 1977 onwards, there

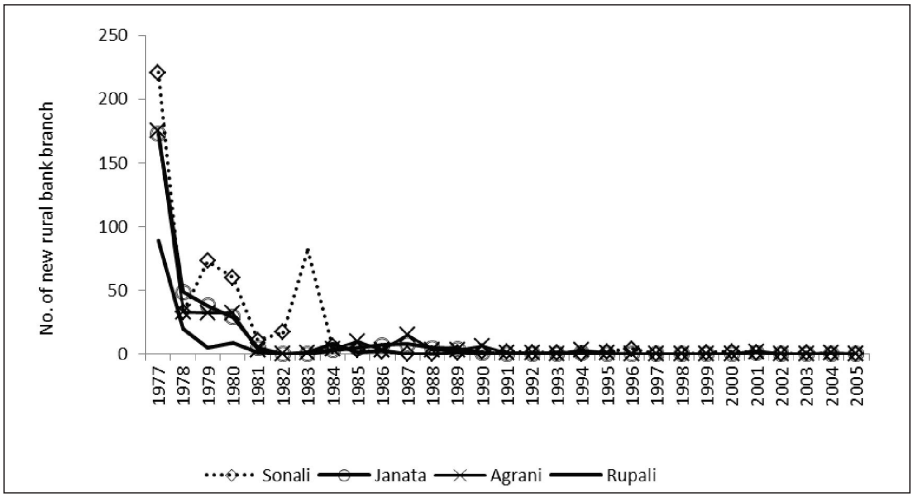

Figure 1. *Expansion of state owned commercial banks*

Table 1. Regional distribution of formal bank and MFI branches

	Formal banks					MFIs
Division Name	2001	2002	2003	2004	2005	2005
Barisal	3.85	3.85	3.85	3.89	3.89	9.27
Chittagong	5.29	5.30	5.37	5.40	5.43	6.08
Dhaka	5.26	5.26	5.27	5.29	5.30	8.70
Khulna	4.73	4.73	4.77	4.77	4.78	8.53
Rajshahi	5.70	5.83	5.84	5.84	5.89	8.24
Sylhet	3.93	3.93	3.93	3.93	3.95	4.32
National	4.79	4.82	4.84	4.85	4.87	7.86

Note: (1) Figures are in per hundred thousand acres of land ; (2) Data on MFIs is available only for the year 2005.

was a decline in the number of new branches rather than an increase and by about 1985, there were less than a handful of new branches being set up each year in rural Bangladesh. Thus, most of these branch openings significantly predate our study year (2005). Table 1 reinforces this picture confirming that the number of bank branches per 100,000 acres has hardly changed between 2001 and 2005 in the 6 regions in our sample. The national average increased from 4.79 to 4.87 per 100,000 acres between 2001 and 2005, with the largest increase being in Rajshahi (from 5.7 to 5.89).

Figure 2 indicates that this trend also holds for the other rural banks in Bangladesh. Thus, five other banks – BKB, RAKUB (which are both agricultural banks) and Uttara, Pubali and Islamic – set up very few new branches after 1985. It is also useful to note that BKB and RAKUB, being agricultural banks, were also subject to similar placement rules as the

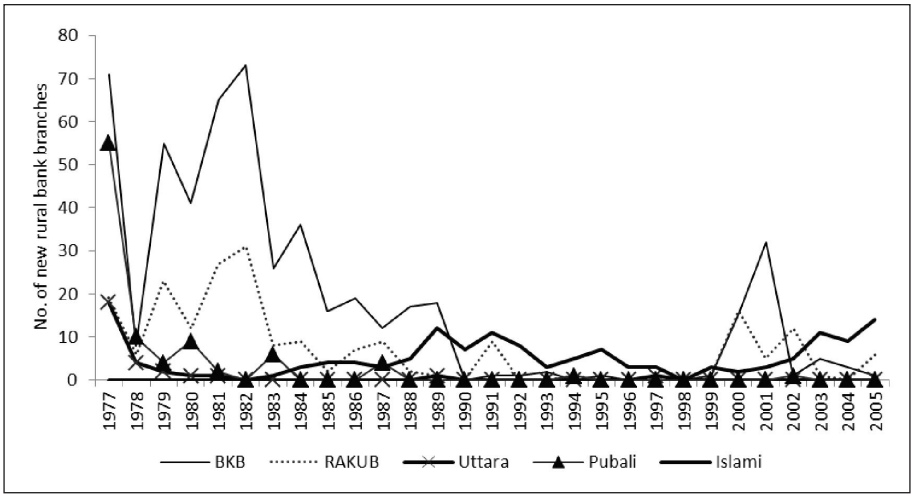

Figure 1. *Expansion of state owned commercial banks*

Table 2. Regional distribution of formal bank branches (rural and semi-urban)

Division	Semi urban					Rural				
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005
Barisal	0.63	0.63	0.63	0.63	0.63	2.84	2.84	2.84	2.86	2.86
Chittagong	0.85	0.85	0.85	0.85	0.87	4.03	4.04	4.08	4.10	4.12
Dhaka	1.07	1.08	1.08	1.08	1.09	3.94	3.95	3.95	3.96	3.97
Khulna	0.79	0.79	0.79	0.79	0.80	3.97	3.97	3.97	3.99	3.99
Rajshahi	0.56	0.56	0.56	0.56	0.59	4.80	4.88	4.89	4.89	4.93
Sylhet	0.52	0.52	0.52	0.52	0.52	2.90	2.90	2.90	2.90	2.90
National	0.74	0.74	0.74	0.74	0.75	3.75	3.76	3.77	3.78	3.80

Note: Figures are in per hundred thousand acres of land.

state-owned banks. In addition, Uttara and Pubali banks were state-owned until the early 1990s and were only de-nationalised at this point.

These state-owned commercial banks and the agricultural banks were the principal sources of small loans for farmers and traders before the arrival of the Grameen Bank and other MFIs. Today these institutions continue to provide some small loans to selected clients but not normally to the poor (Alamgir, 2009). According to Table 1, Barisal division, widely known as the poorest region of the country, has the lowest number of formal banks. On the other hand, Dhaka and Rajshahi have very large numbers of formal banks while Sylhet, which despite benefiting from overseas remittances, has the second lowest number of formal banks.

Given the government's developmental objectives, it is not surprising to see (Table 2) that while the national mean of semi-urban bank branches in 2001 was 0.74 per one hundred thousand acres of land, it was 3.75 for rural areas. We also see that in every

region, there were many more bank branches on average in the rural regions than in the semi-urban regions.

As pointed out earlier, Burgess and Pande (2005) used the exogenously determined branch placements in the unbanked interiors as an instrument for financial development in India. This method has also been used by Fafchamps and Schündeln (2010); Kochar (2008) and Guiso et al. (2004). For Bangladesh too, the figures and tables above indicate that the location of bank branches was largely policy determined. In addition, it was also mostly determined at least two decades before the period in which our current study was carried out. Our primary explanatory variable of interest therefore is the number of bank branches[2] in a sub-district per one hundred thousand acres of land. Despite being pre-determined from the supply-side, we do not rule out the possibility that households over time can move into more banked regions. This remains a limitation of the study.

Finally, the rural population in Bangladesh has experienced improved access to credit following the rise of micro finance institutions (MFIs). Since the early 1990s, NGOs like Grameen Bank, BRAC and ASA have increased geographic coverage. These three very large NGOs dominate the microfinance sector, each reportedly having more than 7 million members/clients in 2008 (ASA 7.28 million; BRAC 8.15 million in March 2009 and Grameen Bank 7.67 million), all products combined (Alamgir, 2009b) The three combined have 8,547 branches and loan outstanding of Taka 125,876 million. It is therefore essential to control for these financial institutions if we are to identify the true impact of formal bank branches.

4. Data and Methodology

4.1 Data and Sample Description

To analyse the impact of formal bank branches on rural welfare, we used data from HIES 2005 which covered 64 districts and 358 sub-districts in Bangladesh. The sample comprised 10,080 households; 6400 of them drawn from rural areas and the rest from urban areas. The survey contained 48,969 household members and provided individual as well as household level information. The data extracted from this survey included households' demographic and socio-economic characteristics such as gender, age, education, occupation, religion, land holding size and household expenditure. Supplementing the household questionnaire was a community survey which provided information on village level availability of NGOs, electricity, club, playground and distance of public phone, local banks as well as growth centres from the local community.

Though the HIES has information on the presence of rural formal banks, this is only the case when the bank is present in the sample village. Since banks generally have a catchment area that is wider than a village, we cannot rely on this data alone for access to a bank as the HIES data would underestimate the level of formal bank presence. We therefore supplemented this data with information on the number of bank branches available in a rural sub-district. The latter information was obtained from the Central Bank of Bangladesh which provides information on the annual number of formal bank branches in 401 sub-districts of Bangladesh that were established between 1977 and 2005.

Similarly, since the HIES does not provide information on complete coverage of

[2] This includes both private and public bank branches.

MFIs in the sample sub-districts, we needed to bring in sub-district-wise data on the number of MFIs from Palli Karma-Sahayak Foundation (PKSF), a parastatal organisation which provides funding to MFIs for their microcredit programs. The data came from the 2006 edition of Maps on Microcredit Coverage in Upazilas of Bangladesh which provides information on microcredit coverage at the sub-district level for the year 2005. Finally, sub-district level soil quality is defined as percentage of organic matter in the soil. This information was collected from the national soil survey reports, produced by soil scientists under the supervision of Soil Resource Development Institute (SRDI) of the government of Bangladesh.[3] Appendix Table 1 presents the summary statistics for the hybrid data file which has information on households and communities sampled in HIES 2005 along with the financial profile of sample sub-districts.

4.1.1 Choice of dependent variables

Our analysis used three dependent variables – household expenditure and two headcount measures of poverty. Household expenditure is the main outcome variable and it is therefore worth considering how household expenditure is measured using the HIES data. The dependent variable, per capita real expenditure, was constructed from data on individual expenditures on all food and non-food items over two weeks available in the HIES 2005. To do this, lumpy expenditure (e.g. wedding expenses) were excluded and then a household's total expenditure was normalised by household size. We scaled this variable by regional price level for 2005 where Dhaka rural price level was the base.[4] In addition, we normalised the number of bank branches per rural sub-district by one hundred thousand acres of land.

In addition to looking at the effect of formal banks on household welfare, we used another set of dependent variables – two head count measures of sub-district level poverty – to assess the aggregate effect of formal bank branches on household welfare. To this end, we used a sub-district poverty data set compiled by the Bangladesh Bureau of Statistics (BBS) and the World Bank, in collaboration with the World Food Programme (WFP). This corresponds to the poverty incidence map based on the Household Income and Expenditure Survey (HIES) of 2005 and the Population Census of 2001 (Yoshida, 2009).

4.2 Methodology

We began by analysing the impact of formal bank branches at household level. Our base specifications controlled for a range of household and regional factors. We also analysed the sensitivity of our results to two other factors - the occupation of the household head and ownership of land. We ended our analysis by analysing the impact of formal banks on poverty rates at aggregate sub-district level.

---

[3] Usually soil quality is considered to be very high if the percentage of organic matter contained is above 5.5 (SRDI, 2008).

[4] Indeed a household's needs are heterogeneous and can be influenced by age and other factors. As a household's size increases, a household can enjoy economies of scale. Using consumption per adult equivalent scale can capture those differences. But this scale is not without controversy and cannot be estimated satisfactorily (World Bank, 2009). Our empirical approach is in keeping with the literature on poverty estimation in Bangladesh which also avoids adult equivalence correction and instead considers per capita real expenditure as a measure of households' welfare (see Wodon, 2000).

To analyse the impact of formal banks on household expenditure levels, we estimated the following model using ordinary least square (OLS) regression:

$$Y_{i,n} = a + \Sigma_j bj X_{ij,n} + cLFD_n + \Sigma_n \delta_n Z_{ij,n} + \Sigma_n f_\kappa D_K + u_{i.n} \ldots\ldots\ldots \quad (1)$$

where $Y_{i,n}$ is log of per capita real expenditure of household *i* in sub-district *n*. $X_{ij,n}$ is a set of household-specific demographic and socio-economic characteristics (*j*) such as age, sex, household size, educational attainment, land ownership (i.e. owing more than 0.5 acre of land) and occupation. LFD_n represents the total number of formal bank branches in sub-district *n*. Two dummy indicators, agricultural self-employment and non-agricultural self-employment were used to capture occupational status of the household head (wage labour/employee being the base category). D_k measures a set of district specific fixed effects and $U_{i,n}$ is the error term. We estimated a number of variants of this model – with and without occupation of the household head, with and without sub-district dummies and with and without village controls.

Our estimations controlled for a range of demographic and socio-economic characteristics of the household and its head including gender, age, education and size of landholding. We also included a number of variables that captured household size and structure including the number of babies, children and adults within the household and the marital status of the household head. In addition to the above household controls, we included regional variables $Z_{ij,n}$ to control for regional heterogeneity at both the sub-district and village levels. Controlling for district and village prosperity is important so that the *LFD* variable in equation (1) does not pick up the effects of such prosperity. To do this, we included a range of village factors like the availability of electricity, public phones, distance to market, NGO services[5], distance to banks as well as the number of MFI branches at the sub-district level. All of these infrastructure variables are likely to reflect village prosperity levels, with more prosperous villages being more likely to be connected to electricity, to markets etc. In addition to this, we also controlled for agricultural prosperity by including the soil quality variable as a proxy. This controlled for the fact that villages with better soil quality at a sub-district level, *ceteris paribus*, were likely to be better off and therefore enjoy higher household expenditure.[6] Collectively these village and sub-district level controls reduced scope for a variety of omitted variable-related biases in the estimated effect of *LFD*. Finally, we also included district dummies to capture other systematic regional effects that had not been controlled for. To the extent that household expenditure is influenced by the general prosperity of the region and the levels of development within it, these variables will help to pick up that effect, leaving the coefficient of the *LFD* variable to pick up the specific effect of financial access.

Despite employing a rich specification and the pre-determined nature of formal bank branches in Bangladesh, estimates obtained from model 1 and its variants are likely to be

[5] Different NGO programs may have different impacts on per capita expenditure. However, our objective here is not to assess the contribution of these programs on household welfare. We only intend to account for differential village-level access to NGO programs so that the estimated influence of formal bank branches on household expenditure does not spuriously reflect differential access to NGO programs.

[6] It is possible that the government opened a few bank branches in areas where prospects for crop production was high. If this is so, it could cause an endogeneity problem which we indirectly addressed by controlling for local agricultural productivity.

biased owing to the possibility of endogenous sorting of households into more banked villages. This problem is likely to be less serious when ranking sub-districts in terms of poverty. Anecdotal evidence indicates that permanent migration of an entire household across Bangladeshi sub-districts is limited. Therefore we also estimated the impact of formal bank branches on aggregate measures of poverty at the sub-district level (see Section 5 for the results). These regressions are able to control for a host of sub-district characteristics (such as quality of soil in the district, disaster exposure, distance to nearest road, and travel time to the nearest city and concentration of MFIs) and district dummies. The sub-district level estimation of formal bank branches is also superior to household level analysis in that the former captures potential spillover effect (if any) of formal banks. In the presence of such effects (e.g. because of demand complementarities), formal bank branches may reduce aggregate poverty even though it only directly benefits few households in the sub-district in terms of greater access to finance.

5. Results

In this section, we will begin by presenting the results for our baseline model of household expenditure in Section 5.1. We will then test the robustness of these results to changes in the sample (landless, male, female) and to changes in the controls (occupation, inclusion of sub-district dummies).

5.1 Impact on Household Expenditure

We will begin by discussing how our controls influence household expenditure in rural Bangladesh. Our results indicate that amongst our regional variables, soil quality is very robust and has a significant positive impact on household expenditure. Thus, regions with better soil and more prosperous agriculture are likely to have higher household expenditure. Of the village level variables, electricity connection and distance to bank were found to be significant, though not always. Where electricity is significant, it is positive indicating that villages connected by electricity enjoy higher standards of living and therefore higher household expenditure. On the other hand, the further the distance of the village to a bank, the lower is household expenditure. Similarly, the further the household is from Dhaka, the lower is the household's expenditure indicating the centrality of Dhaka to prosperity in Bangladesh.

Turning to the impact of formal banks on household expenditure, we find a significant positive impact of bank branches on household expenditure in all our specifications as shown in Table 3. Irrespective of the controls included, the coefficient of formal bank branches is in the region of 0.013-0.014 for Models 1-6. The inclusion of distance from Dhaka halves the bank branch coefficient to about 0.007 (see Model 7 in Table 3) indicating that this variable picks up some of the effect of being close to the capital city. In Model 8, we also controlled for the number of MFI branches in the sub-district but found that this has no significant impact on the coefficient of the bank branch variable and is insignificant in itself. Given that bank branches in Bangladesh historically tended to be set up in less prosperous regions for developmental purposes, the positive coefficient here confirms the success of this policy.

Table 3. OLS estimates of the determinants of household per capita expenditure (in logs) in rural Bangladesh

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
# of formal bank branches (sub-district level)	0.014	0.013	0.014	0.013	0.013	0.013	0.007	0.008
	(6.93)**	(6.36)**	(6.57)**	(6.00)**	(6.06)**	(5.71)**	(3.11)**	(3.16)**
Soil quality (sub-district level)		0.033	0.034	0.034	0.034	0.032	0.029	0.028
		(4.34)**	(4.44)**	(4.45)**	(4.46)**	(4.23)**	(3.86)**	(3.80)**
Presence of NGO programs (village level)			-0.015	-0.011	-0.013	-0.035	-0.001	-0.002
			(0.61)	(0.48)	(0.57)	(1.49)	(0.05)	(0.09)
Electricity availability (village level)				0.042	0.041	0.04	0.022	0.024
				(3.03)**	(2.94)**	(2.90)**	(1.57)	(1.69)+
Distance to bank (village level)					-0.004	-0.003	-0.007	-0.007
					(1.44)	(1.33)	(2.75)**	(2.67)**
Distance to phone (village level)						0	0	0
						(0.47)	(0.52)	(0.47)
Distance to Dhaka (village level)							-0.02	-0.021
							(8.75)**	(8.74)**
# of MFI branches (sub-district level)								-0.001
								(0.61)
Division dummy								
Barisal	-0.355	-0.342	-0.331	-0.318	-0.315	-0.317	-0.237	-0.231
	(11.28)**	(10.79)**	(10.58)**	(10.18)**	(10.08)**	(10.11)**	(7.24)**	(6.86)**
Chittagong	-0.083	-0.062	-0.059	-0.055	-0.054	-0.055	-0.059	-0.059
	(3.34)**	(2.36)*	(2.26)*	(2.13)*	(2.10)*	(2.13)*	(2.26)*	(2.28)*
Dhaka	-0.108	-0.091	-0.083	-0.074	-0.074	-0.079	-0.138	-0.136
	(4.22)**	(3.49)**	(3.21)**	(2.84)**	(2.86)**	(3.07)**	(5.25)**	(5.11)**
Khulna	-0.269	-0.262	-0.258	-0.249	-0.25	-0.253	-0.248	-0.243
	(10.13)**	(9.79)**	(9.72)**	(9.41)**	(9.42)**	(9.54)**	(9.36)**	(8.83)**
Rajshahi	-0.328	-0.294	-0.286	-0.279	-0.28	-0.279	-0.284	-0.283
	(13.03)**	(10.85)**	(10.62)**	(10.38)**	(10.41)**	(10.39)**	(10.59)**	(10.52)**
Household attribute controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5294	5294	5294	5294	5294	5254	5254	5233
Adjusted R-squared	0.37	0.37	0.37	0.37	0.37	0.37	0.38	0.38

Notes: (a) Robust t-statistics in parentheses; (b) + significant at 10%; * significant at 5%; ** significant at 1%; (c) Household attributes include controls for female headship, household head's education, spousal education, head's age, dependency ratio, household size and a dummy for non-Muslim households; (d) See Appendix Table 1 for definition of control variables; (e) Standard errors clustered at sub-district level.

5.2 Robustness Tests

5.2.1 Impact by Occupational Status of the Household Head

The literature argues that financial exclusion is correlated with other forms of exclusion (Kabeer, 2009). If this is true, then the impact of credit varies with the occupation of the head of the household. Credit might be more crucial to the operation of some businesses or some occupations than in others. Equally, those working in certain sectors/occupations maybe better equipped to benefit from financial institutions. To control for this, we re-estimated the model with occupation of the household head (see Appendix Table 3). There are three occupational categories – agricultural self-employment, non-agricultural self-employment and wage employment (our base category). Re-estimating the model with these occupations, we found that they are robustly significant in increasing household expenditure. However, including them has no influence on the coefficient of bank branches (Models 1-7). Turning to consider whether bank branches have a differential impact on the different occupational groups, we found that neither of the occupation-interacted variables is significant in influencing household expenditure. However, the inclusion of these variables decreases the coefficient of bank branches and makes it marginally significant. The literature argues that financial exclusion correlates with other forms of exclusion (e.g. employment and education) but our results indicate that while financial development, education and employment are all individually significant, they do not seem to have a joint impact on household expenditure. Again, MFI is also not significant in this model and the coefficient on bank branch variable decreases to 0.006 once we include distance to Dhaka.

5.2.2 Inclusion of District Dummies

Finally, running the model with district dummies (Appendix Table 2) reduces the size of the bank branch coefficient only slightly (from 0.013 to 0.011-0.013). These district dummies control for all regional factors that are not explicitly included in the model. The unchanged coefficient of bank branch even after including these dummies indicates that this variable is not picking up the effect of these variables. We can therefore conclude that bank branch has a significant positive impact on household expenditure irrespective of the controls that we include in the model.

5.2.3 Impact of Landlessness

It is often argued that the formal banking sector caters to a different clientele than the informal (MFI) sector. This is particularly true because the formal sector requires collateral on loans which can usually be offered by better-off households which have land or other assets to offer as collateral. We might therefore expect the landless to be excluded from such services. To analyse whether bank branches exclude certain groups of households (specifically those without assets), we re-estimated our model separately for landless[7] households. In addition to this, we also simultaneously separated the sample into male-dominated and female-headed households (Table 4).

[7] Households who own less than 0.5 acre of land are defined as functionally landless.

Table 4. OLS estimates of the determinants of household per capita expenditure (in logs) in rural Bangladesh amongst landless households

	Female head				Male head			
	(1)		(2)		(1)		(2)	
# of formal bank branches	0.01	-0.001	0.013	0.003	0.01	0.005	0.011	0.006
(sub-district level)	(1.29)	(0.07)	(1.66)+	(0.36)	(4.03)**	(1.72)+	(3.98)**	(1.95)+
Soil quality		0.058		0.055		0.019		0.019
(sub-district level)		(1.44)		(1.36)		(2.01)*		(1.94)
Presence of NGO program		0.15		0.133		0.026		0.023
(village level)		(1.71)+		(1.52)		(0.79)		(0.72)
Electricity availability		0.029		0.056		0.022		0.026
(village level)		(0.45)		(0.85)		(1.18)		(1.37)
Distance to bank		0.012		0.016		-0.006		-0.005
(village level)		(1.11)		(1.34)		(1.60)		(1.46)
Distance to phone		-0.001		-0.002		0		0
(village level)		(0.63)		(0.83)		(0.54)		(0.43)
Distance to Dhaka		-0.025		-0.027		-0.017		-0.017
(village level)		(2.60)**		(2.77)**		(5.77)**		(5.90)**
# of MFI branches			-0.009	-0.014			-0.001	-0.003
(sub-district level)			(1.43)	(2.22)*			(0.62)	(1.34)
Household attributes included?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	470	468	468	466	2536	2523	2525	2512
Adjusted R-squared	0.33	0.35	0.33	0.35	0.42	0.44	0.42	0.44

Notes: (a) Robust t-statistics in parentheses; (b) + significant at 10%; * significant at 5%; ** significant at 1%; (c) Household attributes include controls for female headship, household head's education, spousal education, head's age, dependency ratio, household size and a dummy for non-Muslim households.

Our results in Table 4 indicate that after controlling for a range of household, village and regional variables, we found that the formal bank branch has a marginally significant positive impact on the expenditure of landless, male-headed households.[8] It has no significant impact on the expenditure of female-headed households though it marginally increases the expenditure of landless female-headed households. Our results indicate that the formal financial sector serves male-headed households better than female-headed ones. However, they also indicate that the formal financial sector does not completely exclude landless households. If anything, it has a positive impact on the expenditure even of landless households, the group it might be considered least likely to affect.

[8] This finding is consistent with Kochar (2008) who found that the number of rural bank branches in UP/India had a larger effect on the per capita expenditure of non-poor households.

Table 5. OLS estimates of the determinants of sub-district level poverty in rural Bangladesh

	Dependant variable: Proportion of people below lower poverty line				Dependant variable: Proportion of people below the the upper poverty line			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
# of formal bank branches	-0.019 (6.01)**	-0.01 (4.20)**	-0.019 (6.02)**	-0.009 (4.04)**	-0.015 (5.36)**	-0.008 (3.62)**	-0.017 (5.60)**	-0.007 (3.41)**
Soil quality		-0.025 (3.16)**		-0.024 (3.03)**		-0.023 (3.12)**		-0.022 (2.93)**
Distance to nearest road		0.03 (1.11)		0.029 (1.07)		0.013 (0.53)		0.012 (0.47)
Vulnerability to natural disasters		0.001 (3.38)**		0.001 (3.35)**		0.001 (2.95)**		0.001 (2.91)**
Travel time to nearest major city		0 (0.44)		0 (0.41)		0 (0.05)		0 (0.11)
# of MFI branches			0.002 (1.06)	-0.001 (0.51)			0.004 (1.84)+	-0.002 (0.95)
District dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	254	237	253	237	254	237	253	237
Adjusted R-squared	0.12	0.79	0.12	0.79	0.1	0.78	0.11	0.78

Notes: (a) Robust t statistics in parentheses; (b) + significant at 10%; * significant at 5%; ** significant at 1%; (c) Since MFI clients are mostly landless, MFI data is left un-scaled by land size; (d) Sub-district poverty data is from Yoshida (2009); (e) 'Vulnerability to natural disasters' is defined as % of areas within each sub-district prone to severe disasters-- flood, river erosion, drought and cyclone; data source: Local Government Engineering Department (LGED) and the Bangladesh Space Research and Remote Sensing Organization (SPARRSO); (f) 'Travel time to nearest major city' in minutes (16 major cities were selected) and is for the year 2000; data source: LGED; (g) 'Distance to nearest road' is for the year 2000 and measures % of areas under each sub-district within 2.5 km from major roads (national highway, regional highway, feeder road A and feeder road B); data source: LGED; (h) Poverty data is from (Yoshida, 2009).

5.3 Macro-Level Impact: The Impact on Aggregate Poverty

Before we conclude, we will analyse the impact of bank branch on aggregate poverty levels in Bangladesh at a regional level based on two head count measures - the proportion of people in the sub-district living below the national upper poverty line and the lower poverty line. The latter is used by the BBS to measure extreme poverty in the country based on a food basket providing minimal nutritional requirements corresponding to 2122 kcal/day/person (Narayan, Yoshida & Zaman 2007). We estimated the model controlling for the number of MFI branches and without this control.

Analysing the aggregate effects of formal bank branches on poverty at sub-district level (see Table 5), we found that irrespective of the measure of poverty used, the bank branch variable significantly reduces rural poverty. Our results indicate that whether we control for other factors (Models 2-4) or not (Model 1), bank branch has a robust impact on decreasing poverty. The impact of formal banks on extreme poverty is especially noteworthy because it is unexpected. Though sub-districts with better soil quality and

higher exposure to natural disasters have significantly lower and higher poverty rates respectively, the effect of bank branch variable remains favourable even after controlling for these factors and holding common the determinants of poverty at the district level. The impact of this variable remains unchanged even when we control for the presence of MFIs in the region, confirming that the bank branch coefficient is not picking up the effect of alternative sources of finance. Notwithstanding the limitations of our data, these findings add to the growing literature on the lack of impact of microfinance on poverty outcomes (Banerjee, 2013; Banerjee, Duflo, Glennerster & Kinnan, 2015).

6. Conclusion

In this paper, we contributed to the literature on the impact of the availability of finance through local bank branches on household expenditure at a micro level and on aggregate rural poverty using data from Bangladesh, where both state and non-state providers run financial institutions in rural locations. Our results indicate that the number of bank branches in a region at the start of the period have a highly robust effect on household expenditure irrespective of the controls included in the models and the sub-samples chosen. Moreover, the impact is positive and highly robust at all levels. These results are not driven by the differential demographic profile of the sample households and they remain consistent even when comparison is limited to households drawn from the same district and similar geographic characteristics. More importantly, our results confirm that the impact of formal bank branches is unaffected by access to NGOs and to microfinance schemes. We found the formal bank effect to be also significant on landless households who are usually excluded by formal banks. This suggests that the effect we saw on aggregate poverty (in Table 6) arises through an indirect channel. This effect is absent amongst female-headed landless households who are employed in low wage activities that are unlikely to benefit from formal banking induced economic activities.

While our results lend support to the existing developing country studies (e.g. Burgess & Pande 2005; Burgess, Pande & Wong 2005; Beck, Demirgüç-Kunt & Levine, 2007) on the importance of financial development in reducing poverty, the lack of evidence on the significance of MFIs is somewhat puzzling. It is because the latter have widespread presence in rural Bangladesh and are known for well-targeted lending practices. We conjecture that this result is likely to be driven by the selective branch placement policy of MFIs whereby they concentrate more in areas that enjoy a relatively more developed formal banking infrastructure. This claim is supported by the fact that even amongst landless households, we found a positive albeit indirect link between per capita expenditure and formal bank branches in the sub-district whilst the corresponding link with MFIs remained insignificant. Our results therefore highlight the need to take into account the larger setting when evaluating the effectiveness of microcredit schemes in low income countries.

Lastly, given the evidence of impact on household as well as aggregate (i.e. sub-district level) poverty, our findings are important in light of the recent changes in government policy towards rural banking in Bangladesh. The government has formulated a new policy emphasising equitable access to finance by all types of rural households including the landless, share-croppers, marginal and smallholders. In the fiscal year 2012, taka 80.64 billion has been disbursed to 2.1 million marginal and small farmers. Irrespective of wealth holding; farmers are allowed to open bank accounts by providing a nominal fee

(taka 10) only. Women borrowers who were previously neglected by rural financial services have been given priority over their male counterparts. In order to ensure transparency, rural banks are required to disburse a part of their rural credit publicly. Expansion of credit services in remote locations has, once again, been emphasised. Given our findings in this paper, we might expect these policy reforms to have a significant impact in reducing poverty in Bangladesh.

References

Aghion, P., & Bolton, P. (1997). A theory of trickle-down growth and development. *Review of Economic Studies*, *64*(2), 151-72.

Aghion, P., Howitt, P. & Mayer-Foulkes, D. (2005). The effect of financial development on convergence: Theory and evidence. *The Quarterly Journal of Economics*, *120*(1), 173-222.

Alamgir, Dewan A.H. (2009 a). *State of microfinance in Bangladesh 2009*. Report prepared for the Institute of Microfinance, Dhaka.

Alamgir, Dewan A.H. (2009 b). *Microfinance in SAARC 20 Region: Bangladesh Country Report*. Institute of Microfinance, Dhaka, Bangladesh.

Banerjee, A.V. & Newman, A. F. (1993). Occupational choice and the process of development. *The Journal of Political Economy, 10*1(2), 274-298.

Banerjee, A. V. (2013). Microcredit under the microscope: What have we learnt in the last two decades, what do we need to know? *Annual Review of Economics*, *5*, 487-591

Banerjee, A., Duflo, E. Glennerster, R. & Kinnan, C. (2015). The miracle of microfinance? Evidence from a randomized evaluation. *American Economic Journal: Applied Economics*, *7*(1), 22-53.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. *Journal of Economic Growth*, *12*(1), 27-49.

Burgess, R., & Pande, R. (2005). Do rural banks matter? Evidence from the Indian social banking experiment. *The American Economic Review, 95*(3), 780-795.

Burgess, R., Wong, G., & Pande, R. (2005). Banking for the poor: Evidence from India. *Journal of the European Economic Association, 3*(2-3), 268-278.

Butler, A. W., & Cornaggia, J. (2011). Does access to external finance improve productivity? Evidence from a natural experiment. *Journal of Financial Economics*, *99*, 184-203.

Claessens, S. (2006). Access to financial services: A review of the issues and public policy objectives. *World Bank Research Observer , 21*(2), 207-240.

Clarke, G., Xu, L.C., & Zou, H-F (2003). *Finance and income inequality: A test of altenative theories.* Policy Research Working Paper 2984, World Bank, Washington, D.C.

Conning, J., & Udry, C. (2007). Rural financial markets in developing countries. *Handbook of Agricultural Economics*, *3*, 2857–2908.

Fafchamps, M., & Schündeln, M. (2010). *Local financial development and firm performance: evidence from Morocco.* CSAE Working Paper WPS/2011-02, pp. 1-46.

Fafchamps, M. (2014). Credit constraints, collateral and lending to the poor. *Revue d'économie du développement*, *22*(HS01), 71-89.

Guiso, L., Sapienza, P., & Zingales, L. (2004) Does local financial development matter? *The Quarterly Journal of Economics, 119*(3), 929-969.

Habibullah, M.S., & Eng, Y-K. (2007). Does financial development cause economic growth? A panel data dynamic analysis for the Asian developing countries. *Journal of the Asia Pacific Economy*, *11*(4), 377-393.

Honohan, P. (2003). Financial development, growth and poverty: how close are the links? Paper presented to the British Association Festival of Science, Salford University, Manchester, UK.

Jalil, A., & Feridun, M. (2011). Impact of financial development on economic growth: empirical evidence from Pakistan. *Journal of the Asia Pacific Economy*, *16*(1), 71-80.

Kabeer, N. (2009). Poverty, social exclusion and the MDGs: The challenge of 'durable inequalities' in the Asian context. *IDS Bulletin*, *37*(3), 64-78.

Karlan, D., & Morduch, J. (2010). Access to finance, Chap 71. In *Handbook of Development Economics*, 5, 4703-4784.

Kochar, A. (2008). *The distributive consequences of social banking: a micro-empirical analysis of the Indian experience* (mimeo). Stanford University, US.

Kim, D.H., Huang, H.C., Lin, S.-C., & Yeh, C.-C. (2010). Financial development on growth convergence, *Scottish Journal of Political Economy*, *57*(4), 493-514.

Li, H., Squire, L., & Zou, H.-F. (1998). Explaining international and intertemporal variations in income inequality. *Economic Journal*, *108*(1), 26-43.

Morduch, J., & Hayley, B. (2002). *Analysis of the effects of microfinance on poverty reductio*n. NYU Wagner Working Paper 1014. New York: NYU:

Narayan, A., Yoshida N., & Zaman H. (2007). Trends and *patterns of poverty in Bangladesh in recent years*. A backgound paper for Bangladesh Poverty Assessment (2007), South Asia Region. World bank: Washington D.C.

Soil Resource Development Institute (SRDI)(2008). Krishikhamar Sarak, Dhaka, Bangladesh.

Pitt, Mark M., & Khandker, S. (1998). The Impact of group-based credit programs on poor households in Bangladesh: does the gender of participants matter? *Journal of Political Economy*, *106*(5), 958-996.

Vaona, A., & Patuelli, R. (2008). New empirical evidence on local financial development and growth. *AStA Wirtschafts- und Sozialstatistisches Archiv*, *1*(2), 147-157.

Wodon, Q.T. (2000). Microdeterminants of consumption, poverty, growth, and inequality in Bangladesh. *Applied Economics*, *32*, 1337-1352.

World Bank (2009). *Handbook on poverty and inequality,* Chap 2. The World Bank Institute.

Yoshida, N. (2009). Updating Bangladesh Poverty Maps. *http://home.wfp.org/stellent/groups/public/documents/liaison_offices/wfp201414.pdf* (Accessed 30 July 2013).

Appendix Table 1. Selected summary statistics for household level analysis

Variable	Description	Full sample (rural households)	
		Mean	Std. Dev.
Household level dependant variable			
Per capita household expenditure	Scaled by regional price level for 2005 (where Dhaka rural price level is the base)	1092.11	832.73
Household level control variables			
Female head*	Female headed household	0.11	0.31
Head edu dummy*	Household head unschooled	0.40	0.49
Head education	Years of schooling: household head	2.91	3.95
Head age	Household head's age	46.06	13.88
Non-muslim*	Non-Muslim household	0.13	0.34
Community/village level control variables			
Presence of NGO program*	Village has at least one development program run by BRAC/Grameen Bank/Asha/Proshika	0.06	0.24
Electricity availability*		0.76	0.43
Distance to bank	Distance to bank from village centre	0.90	2.09
Distance to phone	Distance to public phone from village centre	6.06	7.34
Distance to capital city	Distance to Dhaka from village centre	6.13	3.50
Sub-district level control variables			
# of formal bank branches		5.01	2.79
Total land area (in '00,000 acres)		2.10	1.29
Tbbr_01	Total bank branch # in 2001	8.75	4.13
Pctbbr_01	Per capita bank branch # in 2001	3.77	1.81
Soil quality	% of organic matter in the soil	1.92	0.98
Number of MFIs	Total MFI branches in 2005	13.26	
N		5294	

Notes: (a) * Indicates a dummy variable; (b) soil quality is defined in terms of organic matter high content of which keeps soil soft and easier to prepare for cultivation. Organic matter increases the soil's water absorption capacity and retains the soil's nutrient ingredients.

Appendix Table 2. OLS estimates of the determinants of household expenditure (in logs) in rural Bangladesh (with district dummies)

	1	2	3	4	5	6	7	8
# of formal bank branches (sub-district level)	0.009	0.01	0.011	0.01	0.011	0.011	0.009	0.009
	(3.64)**	(3.83)**	(4.22)**	(3.68)**	(4.12)**	(4.17)**	(3.30)**	(3.45)**
Soil quality (sub-district level)		0.035	0.036	0.035	0.037	0.038	0.033	0.035
		(3.95)**	(4.04)**	(3.92)**	(4.22)**	(4.31)**	(3.76)**	(3.85)**
Presence of NGO program (village level) d			0.098	0.099	0.093	0.074	0.087	0.083
			(3.50)**	(3.57)**	(3.38)**	(2.60)**	(3.08)**	(2.92)**
Electricity availability (village level)				0.044	0.042	0.042	0.031	0.034
				(2.79)**	(2.68)**	(2.66)**	(1.92)+	(2.15)*
Distance to bank (village level)					-0.011	-0.011	-0.013	-0.013
					(4.22)**	(4.34)**	(5.04)**	(4.72)**
Distance to phone (village level)						0.001	0.001	0.001
						(0.96)	(1.79)+	(1.62)
Distance to Dhaka (village level)							-0.017	-0.017
							(5.37)**	(5.43)**
Number of MFI branches (sub-district level)								-0.004
								(1.89)+
District Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household attributes included?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5294	5294	5294	5294	5294	5254	5254	5233
Adjusted R-squared	0.4	0.4	0.41	0.41	0.41	0.41	0.42	0.42

Notes: (1) Robust t-statistics in parentheses; (2) + significant at 10%; * significant at 5%; ** significant at 1%; (3) Household attributes include controls for female headship, household head's education, spousal education, head's age, dependency ratio, household size and a dummy for non-Muslim households; (4) The superscript (d) indicates dummy variable.

Appendix Table 3. OLS estimates of the determinants of household expenditure (in logs) in rural Bangladesh (with additional controls for occupational status)

	1	2	3	4	5	6	7	8	9
Occupation:									
Agricultural self-employment[d]	0.047	0.046	0.046	0.047	0.047	0.049	0.049	0.048	0.008
	(2.71)**	(2.71)**	(2.69)**	(2.73)**	(2.77)**	(2.87)**	(2.84)**	(2.79)**	-0.28
Occupation:									
Non-agricultural self-employment[d]	0.141	0.141	0.14	0.137	0.138	0.139	0.14	0.139	0.125
	(8.67)**	(8.67)**	(8.62)**	(8.49)**	(8.50)**	(8.55)**	(8.68)**	(8.59)**	(3.75)**
# of formal bank branches									
(sub-district level)	0.014	0.013	0.013	0.012	0.013	0.012	0.007	0.007	0.005
	(6.81)**	(6.23)**	(6.43)**	(5.93)**	(6.01)**	(5.64)**	(3.01)**	(3.06)**	(1.80)+
Soil quality (sub-district level)	0.033	0.034	0.033	0.034	0.032	0.028	0.028	0.028	
		(4.40)**	(4.49)**	(4.50)**	(4.51)**	(4.27)**	(3.88)**	(3.83)**	(3.79)**
Presence of NGO program (village level)[d]			-0.014	-0.011	-0.014	-0.036	-0.002	-0.003	-0.002
			(0.60)	(0.49)	(0.59)	(1.54)	(0.09)	(0.13)	(0.09)
Electricity availability (village level)[d]				0.037	0.036	0.035	0.017	0.018	0.019
				(2.69)**	(2.60)**	(2.55)*	(1.20)	(1.31)	(1.37)
Distance to bank (village level)					-0.004	-0.004	-0.007	-0.007	-0.007
					(1.55)	(1.42)	(2.86)**	(2.79)**	(2.87)**
Distance to phone (village level)						0	0	0	0
						(0.57)	(0.44)	(0.41)	(0.38)
Distance to Dhaka (village level)							-0.02	-0.021	-0.021
							(8.88)**	(8.87)**	(8.91)**
Number of MFI branches (sub-district level)								-0.001	-0.001
								(0.61)	(0.63)
# of formal bank branches *Agricultural self-employment									0.008
									(1.60)
# of formal bank branches *Non-agricultural self-employment									0.003
									(0.45)

Appendix Table 3. Continued

Division dummy									
Barisal	-0.351	-0.338	-0.328	-0.316	-0.313	-0.315	-0.235	-0.229	-0.228
	(11.25)**	(10.76)**	(10.56)**	(10.19)**	(10.09)**	(10.13)**	(7.25)**	(6.86)**	(6.82)**
Chittagong	-0.073	-0.051	-0.048	-0.045	-0.044	-0.045	-0.048	-0.049	-0.047
	(2.94)**	(1.97)*	(1.87)+	(1.75)+	(1.71)+	(1.74)+	(1.87)+	(1.89)+	(1.82)+
Dhaka	-0.115	-0.099	-0.091	-0.082	-0.082	-0.088	-0.147	-0.145	-0.145
	(4.54)**	(3.80)**	(3.53)**	(3.17)**	(3.19)**	(3.42)**	(5.60)**	(5.45)**	(5.45)**
Khulna	-0.266	-0.259	-0.256	-0.247	-0.248	-0.251	-0.246	-0.241	-0.241
	(10.12)**	(9.77)**	(9.70)**	(9.39)**	(9.41)**	(9.54)**	(9.35)**	(8.82)**	(8.83)**
Rajshahi	-0.328	-0.293	-0.286	-0.28	-0.281	-0.28	-0.285	-0.283	-0.284
	(13.16)**	(10.94)**	(10.71)**	(10.47)**	(10.50)**	(10.50)**	(10.70)**	(10.60)**	(10.63)**
Household attributes included?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5294	5294	5294	5294	5294	5254	5254	5233	5233
Adjusted R-squared	0.38	0.38	0.38	0.38	0.38	0.38	0.39	0.39	0.39

Notes: See Appendix Table 2.