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Labour Market Participation of Women in Rural Bangladesh: The Role of Microfinance

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ABSTRACT *Using a large panel dataset on the labour supply behaviours of women and men within households in rural Bangladesh, we find robust evidence that the effects of microfinance on the labour supply are not symmetrical for women and men across different occupations. We also find that giving households access to microfinance helps to smooth out the seasonality in the labour supply via on-farm self-employment-based activities. Within households, the male members' participation in off-farm activities increased significantly, while the women's improved but still remained at a low level. Overall, the results suggest that microfinance improves labour market activities for men more than for women, even though the credit is targeted mainly at women.*

1. Introduction

The historical social segregation of men and women in Bangladesh has had long-lasting effects on the participation of the latter in the formal labour market, which still remains divided along gender lines (Kabeer, 2001; Karim, 2011). Even when women are willing to participate in off-farm non-agricultural activities, their employment opportunities are limited by the socio-cultural barriers that dictate their inheritance, their right to borrow capital from formal institutions, and their options for participation in the labour market (Amin, 1997). Over the last two decades, though, Bangladesh has witnessed a rapid growth in the participation of women in the labour market, due in part to the phenomenal expansion of microfinance programmes in rural areas (Arun, Hulme, Matin, & Rutherford, 2009).

Microfinance in Bangladesh is generally targeted towards women, with the aim of promoting self-employment and generating additional economic activities within the household. A large number of studies have examined the impact of microfinance on households' socio-economic wellbeing. The results from these studies suggest that microfinance has a positive impact on farm activities and asset holding (Hossain, Malek, Hossain, Reza, & Ahmed, 2019; Islam, 2011) and reduced dependence on informal lending (Islam, Nguyen, & Smyth, 2015), the expansion of existing business enterprises (Banerjee, Duflo, Glennerster, & Kinnan, 2015), and increases in business profits (Crepon, Devoto, Duflo, & Pariente, 2015; De Mel, McKenzie, & Woodruff, 2008; Skoufias, Leite, & Narita, 2013).[1] An access to loans from microfinance programmes is also expected to smooth the income and consumption of poor rural households (Gertler, Levine, & Moretti, 2009; Islam & Maitra, 2012) by allowing them to diversify into self-employment-based activities, thus generating additional income streams (Pitt & Khandker, 2002), particularly during lean seasons.

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However, previous studies have largely ignored the effects of microfinance on the labour supply decisions of individuals within the households. We contribute to the literature by filling this important gap using a large household-level panel dataset from Bangladesh. To the best of our knowledge, this is the first paper to examine the labour supply behaviour of women and men within households using long-term panel datasets of microfinance programmes. The availability of detailed seasonal data in each of the survey rounds, collected over an eight-year period, also allows us to study seasonality in the labour supply. In particular, we also examine whether microfinance helps households smooth their labour supply across seasons separately for male and female members of the households.

There are a number of reasons why studying the effects of microfinance on labour supply within households are imperative. First, microfinance encourages business owned by its (female) borrowers, and their direct involvement in the activities using loans. Studies have shown that access to microfinance results in greater levels of income, consumption and wealth. Some studies provided positive outcomes of women empowerment, such as increase in women's participation in decision making, ownership of household assets, freedom and mobility, political awareness (Hashemi, Schuler, & Riley, 1996; Pitt, Khandker, & Cartwright, 2006). Increase in income and assets controlled or managed by women could increase their bargaining power within the household. It is also likely to increase their opportunity cost of working at home, and in turn increase women's participation in off-farm and market-based activity. On the other hand, an increase in household income could reduce women's labour force participation, and reinforce the socio-cultural barriers that limit women to the household via the income effect.

However, there are several studies which document passive control of loan by women and no change in management of cash within households (for example, Goetz & Gupta, 1996; Montgomery, Bhattacharya, Hulme, & Mosley, 1996). If microfinance is controlled by men then male members might increase their labour market activities more while there might not be any noticeable improvement of women's labour market participation or labour supply behaviour. Thus, access to microfinance can either increase or decrease women's labour supply, depending on situations such as the substitution effect or the income effect, and changing the bargaining power of women within households.

Our results shed some light on whether an access to microfinance reinforces women's traditional roles or promotes gender equality within the household. We find robust evidence that households that have access to microfinance are more likely to diversify into off-farm non-agricultural activities. However, our results indicate that the impact of microfinance is more pronounced for men's labour supply behaviours, even though the operations of microfinance institutions (MFI) are targeted primarily at women. We observe that labour market participation of women increased among households that participated in a microfinance programme compared to the households that did not participate in a program. However, we also observe that the increase in participation of male members are significantly higher compared to female members within the treated households. Since women are the primary member as far as the microfinance is concerned, the results shed an important light that men have been able to increase their labour market activities significantly more than women. Overall our results suggest an increase in economic activity by both men and women in participating households compared to the men and women members from non-participating households. We also find that, to some extent, the labour supply behaviours in farm and off-farm activities are countercyclical in nature, meaning that an access to microfinance could smooth out the seasonality in the labour supply significantly via off-farm self-employment-based activities.

2. The microfinance program and the data

The microfinance sector in Bangladesh is one of the largest and oldest in the world. Beginning in the late 1980s, the growth in the number of microfinance institutions (hereafter MFIs), as well as the total membership, has been phenomenal. We use a dataset that covers a range of MFIs, a few of which are significantly large in terms of their loan disbursements and outreach. The most notable of these are ASA

and Proshikha, which are the third- and fourth-largest MFIs in Bangladesh, and the Society for Social Services (SSS) and Thengamar Mohila Sabuj Sangha (TMSS), which are among the top fifty MFIs in Bangladesh. The other MFIs are relatively small, but all of them follow Grameen Bank style lending procedures, assigning credit mainly to groups of women who are jointly liable for the repayment of the loan. There is also no collateral requirement, as such group-lending programmes replace the need for physical collateral with a sort of 'social collateral' (Turnell, 2010). Households in these microfinance programmes received loans, primarily in the range of US$40–$150, for any profitable and socially acceptable income-generating activities, with members being allowed to take out larger loans once they have repaid their first loan.

This dataset covers about 3,000 households, selected from 91 program and control villages spread over 23 thanas (sub-districts) from 13 of Bangladesh's 64 districts. The first survey was administered after a census of all households in these 91 villages in October 1997. The participating households were drawn from 13 different MFIs, all of which are members of the Palli Karma-Sahayak Foundation[2] (hereafter PKSF). In the first round there were only total of only 11 control villages, as not enough control villages could be found in some areas. Then, in subsequent rounds of the survey it turned out that some of the control villages had changed into program villages, so the final round of the survey included only eight control villages. As a result, the comparison group consists of non-participants – households who never participated in any microfinance program – from treatment villages and households in control villages. We focus on the results based on the matched sample of households controlling for observed characteristics that are likely determinants for participation in a microfinance program for a household.

The data were collected primarily for the PKSF by the Bangladesh Institute of Development Studies (BIDS), with financial assistance from the World Bank. Conducted over four rounds of surveys in 1997–98, 1998–99, 1999–2000 and 2004–05, the BIDS-PKSF dataset contains detailed information regarding each of the respondents' personal and household characteristics, occupational background, income and expenditure, and housing and living conditions. The seasonal (past) labour supply information was collected (retrospectively) through household surveys for each season over the past year.[3] Of the four rounds of the survey that were conducted, our analysis uses data only from the first, third and fourth rounds, as the second round did not collect information on labour supply. Each of the surveys was conducted in the period between December and April.

The PKSF household survey has a separate module that is dedicated to the collection of detailed information on the labour force participation of each member of a household. More importantly, it contains information about the numbers of days and hours worked by each individual member of the household, including men and women, adults and children, in various occupations, broadly categorised here as: (i) self-employment on the farm; (ii) wage employment (in both agriculture and non-agriculture); and (iii) self-employment in non-agricultural work.

The dataset consists of 2,691 households from the first round, 2,657 from the third, and 2,575 from the last. The attrition rate from the survey is very low, and is not a major concern for our analysis.[4] The number of observations used in each regression differs slightly depending on outcome of interests, and whether the results are reported based on matched sample or not. The sample comparison of the means of the demographic and other socioeconomic variables reveals that the attritors are not different between treatment and comparison groups (see Table A1 of Appendix). We also conducted the analysis separately for those who left the survey and those who stayed with respect to labour supply behaviour, but did not find any difference between the two groups. The results reported here are not corrected for an attrition bias. The final dataset consists of an unbalanced panel of a total of 94,295 individual seasonal observations, covering each of the five seasons[5] from the three rounds of the survey.

We use each household's microfinance program participation status during a given round to examine the differences in their labour supply behaviours. We define a household/member as a participant (part of the treatment group) during a particular survey round if any individual in the household is a member of one or more of the MFIs. For this purpose, we focus only on individuals

aged 7^{+}–60 years[6] at the time of the survey. We consider adult individuals (aged 15^{+} to 60) and children (aged below 15 years) separately. Labour supply is defined in terms of both the incidence (activity) and the total number of hours worked per month in each occupation and season. An individual is classified as being self-employed on the farm if he/she reports having worked strictly positive hours in that particular sector and season. We also use the total amounts borrowed by participating households in any particular year as an alternative definition of program participation.[7]

Table 1 reports the descriptive statistics for labour supply in different occupations over the three survey rounds for the treatment and control groups.[8] The top panel presents the participation rates (in percentage points), while the bottom panel reports the labour supply (measured in hours worked per month) by treatment statuses. Men are more likely to work as wage labourers or to be self-employed in the non-agricultural sector, whereas women are predominantly self-employed in the farm sector.[9] Only 9–17 per cent of females aged 15^{+}–60 are engaged in market-oriented activities, compared to 65–80 per cent for males – about one fifth as many. Moreover, while men tend to work in multiple occupations, women are more likely to specialise in household-based activities.[10] Thus, the male–female ratio of the labour supply (total hours worked) per season is lowest for farm-based self-employment activities and highest for self-employment in the non-agricultural sector. Figure 1 presents the hours worked per month in different occupation sectors by treatment statuses for different survey rounds, and Figure 2 then presents the distribution of the labour supply across these sectors separately for adults and children from both the treatment and control groups. Both the incidence and the extent of households' labour supply are found to vary according to the ages and genders of the household members, the sectors in which they are employed, and their participation status in a microfinance program.

3. Estimation methodologies

There are a number of potential sources of bias that need to be accounted for when examining the effects of participation in microfinance programs. First, participants are likely to differ from non-participants in terms of the distribution of their observed characteristics, leading to a 'selection-on-observables' bias. There are also concerns that programs may be placed in a non-random sample of villages, and households may self-select into the programs. Thus, there could be unobservable individual-, household- and village-level characteristics that influence both a household's decision to participate in the program and an MFI's decision to operate in a particular village. This means that the issues of non-random program placement and the self-selection of households into the programs must be addressed in order to estimate the true impact of microfinance program participation on the labour supply.

We address the issue of endogeneity in a number of ways. First, we use household- and individual-level panel datasets and apply fixed effects regressions to tackle the selection biases that occur as a result of time-invariant unobservables at the individual or household level. We also go a step further and match treatment and control households based on observed characteristics. In particular, we use the propensity score matching (PSM) method proposed by Rosenbaum and Rubin (1983). Our estimation equation involves the running of fixed effect regressions for treatment and control households who could be matched using PSM. Thus, we address the selection bias by combining the household/individual fixed effects regression with the PSM. Our approach is similar to the conditional difference-in-difference PSM method proposed by Heckman, Ichimura, Smith, and Todd (1998).

We begin by estimating propensity scores for each household using a standard logit model, by regressing the participation status of the household in the first round of the survey on a set of household- and village-level observable characteristics. The variables that are used for estimating these propensity scores are those that are most likely to influence a household's decision to participate in a microfinance program (see Appendix Table A3 for the variables used for estimating the propensity scores). We then use these propensity scores to match individuals from the

Table 1. Descriptive statistics for the participation rates and labour supply in different occupations

Variables of Interest	Round I: 1997–1998			Round III: 1999–2000			Round IV: 2004–2005		
	Treatment	Control	Diff	Treatment	Control	Diff	Treatment	Control	Diff
Panel A: Participation in different occupations (in percentage points)									
Self-employment on the farm	65.37	65.29	0.08	72.76	74.21	–1.45***	59.95	64.93	–4.98***
Adult Men	54.23	56.90	–2.67***	57.79	59.69	–1.9**	42.55	50.07	–7.52***
Adult Women	75.98	72.59	3.39***	89.36	89.28	0.08	84.55	85.08	–0.53
Wage employment	18.71	19.31	–0.6	19.09	19.16	–0.07	21.38	22.19	–0.81*
Adult Men	32.24	35.86	–3.62***	31.27	32.7	–1.43*	31.56	34.09	–2.53***
Adult Women	5.82	4.89	0.93**	5.58	5.12	0.46**	6.98	6.04	0.94
Self-employment in non-agriculture	25.86	16.16	9.7***	28.66	20.03	8.63***	29.92	23.38	6.54***
Adult Men	42.28	29.85	12.43***	44.47	33.91	10.56***	45.68	36.46	9.22***
Adult Women	10.22	4.24	5.98***	11.14	5.61	5.53***	7.64	5.65	1.99***
Total labour force participation	87.3	84.49	2.81***	93.97	92.91	1.06***	94.46	93.17	1.29***
Adult Men	94.89	94.72	0.17	94.41	93.42	0.99**	95.87	95.23	0.64**
Adult Women	80.08	75.59	4.49***	93.48	92.37	1.11**	92.46	90.38	2.08***
Panel B: Labour supply (in hours worked per month)									
Self-employment on the farm	29.00	31.46	–2.46***	18.18	18.24	–0.06	24.41	26.98	–2.57***
Adult Men	37.35	43.79	–6.44***	22.41	23.70	–1.29**	26.56	30.15	–3.59***
Adult Women	21.05	20.73	0.32	13.50	12.57	0.93***	21.38	22.68	–1.30**
Wage employment	29.85	31.94	–2.09**	26.08	27.58	–1.50**	31.81	31.93	–0.12
Adult Men	53.24	61.48	–8.24***	44.90	48.82	–3.92***	48.10	50.17	–2.07
Adult Women	7.58	6.22	1.36**	5.22	5.53	–0.31	8.78	7.20	1.58***
Self-employment in non-agriculture	42.18	25.81	16.37***	43.57	31.30	12.27***	55.65	42.81	12.84***
Adult Men	73.67	50.31	23.36***	73.99	56.84	17.15***	89.76	70.08	19.68***
Adult Women	12.19	4.49	7.70***	9.85	4.81	5.04***	7.44	5.84	1.60***
Total labour force participation	101.03	89.22	11.81***	87.83	77.12	10.71***	111.88	101.72	10.16***
Adult Men	164.27	155.57	8.70***	141.30	129.36	11.94***	164.42	150.40	14.02***
Adult Women	40.82	31.45	9.37***	28.58	22.91	5.67***	37.60	35.72	1.88**

Notes: The data are measured in terms of hours worked per month in a given survey round and season. The reported *p*-values are from the two-tailed test with the null hypothesis that the group means are equal. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

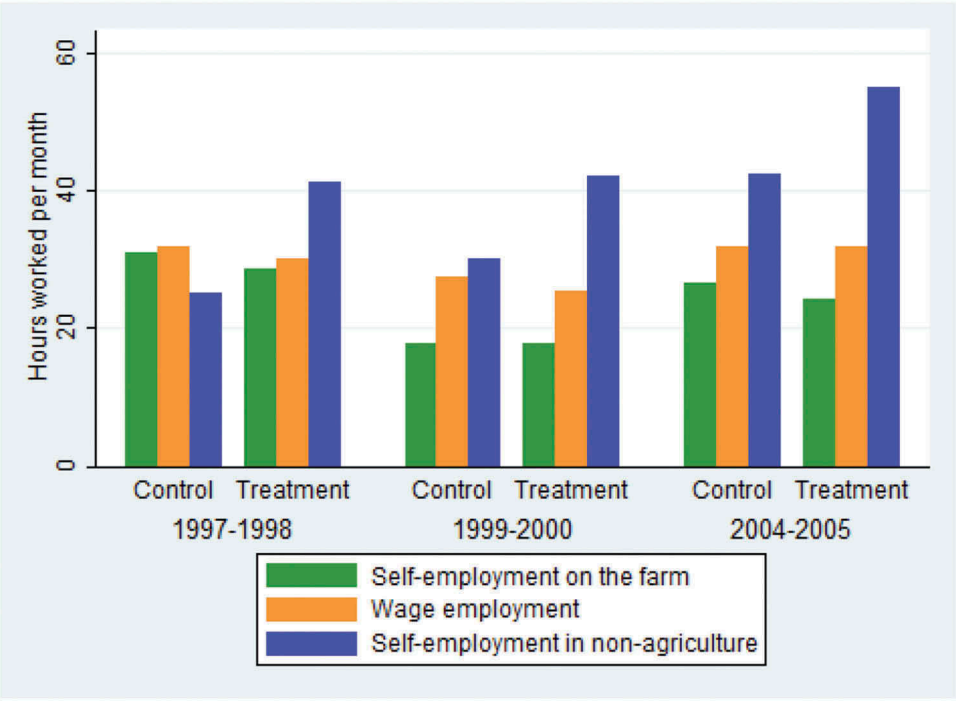

Figure 1. Labour supply in rural Bangladesh by participation status over the years.

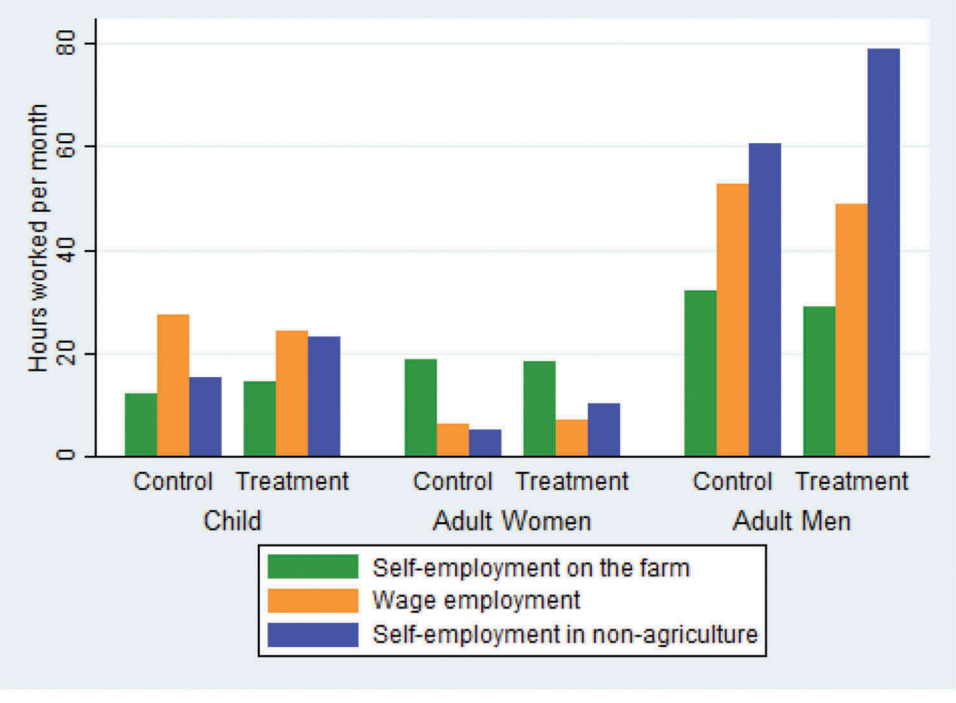

Figure 2. Labour supply in rural Bangladesh by age group, gender and participation status.
Note: A child is someone aged between 7^{+} and 15, while an adult is aged between 15^{+} and 60 years.

participating and non-participating households. We use the nearest neighbour (NN) matching estimator, and choose to use the five nearest neighbours for matching. We match individuals[11] that lie within the common support or overlapping region. Both the *t*-test for the equality of means for the participating and non-participating groups and the standardised bias test suggest that the covariate distributions across the matched groups are well balanced after matching (Becker & Ichino, 2002). The results from the balancing test are provided in Table A3 of the Appendix.[12]

We estimate the following fixed effects regression on matched samples:

$$L_{ijt} = \alpha_i + \beta_1 X_{ijt} + \beta_2 H_{ijt} + \gamma D_{it} + \theta S_j + \lambda \tau_t + \vartheta\left(S_j \times \tau_t\right) + \varepsilon_{ijt}, \tag{1}$$

where L_{ijt} is the outcome of interest, and captures both the participation (incidence) and the number of hours worked per month on different activities by individual i during season j of year t; X_{ijt} is a vector of individual-specific characteristics (such as age, gender of the respondent and their education level); and H_{ijt} is a vector of household-level characteristics (household size, total arable land owned, gender and age composition of the members of the household). α_i captures individual-level fixed effects, and the parameter θ picks up the seasonal fixed effects. The term τ_t represents the year fixed effects, while $(S_j \times \tau_t)$ can be interpreted as the seasonal-year fixed effects. As the participation decision is made at the household level, we are able to control for unobserved characteristics at both the household and individual levels using individual-level fixed effects. Moreover, the year and seasonal fixed effects, and their interactions, allow us to control for both time-variant unobservables, including macroeconomic conditions, and shocks such as rainfall variability and disasters across different seasons and years.

We are particularly interested in the sign and value of the parameter γ that is associated with the treatment variable D_{it}, which is the participation status of the household for individual i in year t. ε_{ijt} is the individual-specific error term, which is non-systematic and varies across individuals. We account for any correlations in errors across villages and years by computing clustered robust standard errors at the village–year level.[13]

We also examine whether participation in microfinance programmes affects the seasonal distribution of the labour supply. Seasonality in the labour supply in rural Bangladesh is driven mainly by the local rainfall variability and the labour demand for rice production. Even though the rice crop calendar varies slightly across the country depending on the region's physiography and land type, the cropping pattern is generally organised around three major rice-growing seasons: Aman, Aus and Boro, so named by the local farmers after the specific crops grown in each season. Aman, traditionally the most important rice in Bangladesh,[14] is planted in May/June–August and harvested in November–December, and is completely rain-watered. Aus is the second most important rice crop, and is sown in March/April–May and harvested in June–August, requiring supplementary irrigation in the initial stages even though it is primarily rain-watered (Mahmood, 1997). Finally, Boro rice is planted in November/December–February and reaped in April-May, and is partly dependent on irrigation (FAO, 2008; MacLean, Dawe, Hardy, & Hettel, 2002).

Owing to the traditional cropping pattern in rural Bangladesh, there used to be two major lean seasons in September–November and March–April, right after the Aman and Boro crops had been transplanted, when there was temporarily no demand for agricultural labour. The first lean period refers mainly to Season 2, but the effect can also be felt during Season 3, due to the severity of the phenomenon. The second lean period refers to Season 5 (FAO, 2008).[15] However, the situation has improved significantly in recent years with the expansion of Boro cultivation in rural Bangladesh, with the incidence of the lean period between March and April in particular having reduced. However, the lean season between late September and early November still exists to some extent, particularly in northwest Bangladesh (Khandker & Mahmud, 2012). The annual phenomenon[16] of 'seasonal unemployment', characterised by poverty and food deprivation, is therefore most severe during the lean season between late September and early November. In summary, the Aman harvesting period falls during Season 1, while we identify the Aus and Boro harvesting periods as Seasons 3 and 4, respectively.

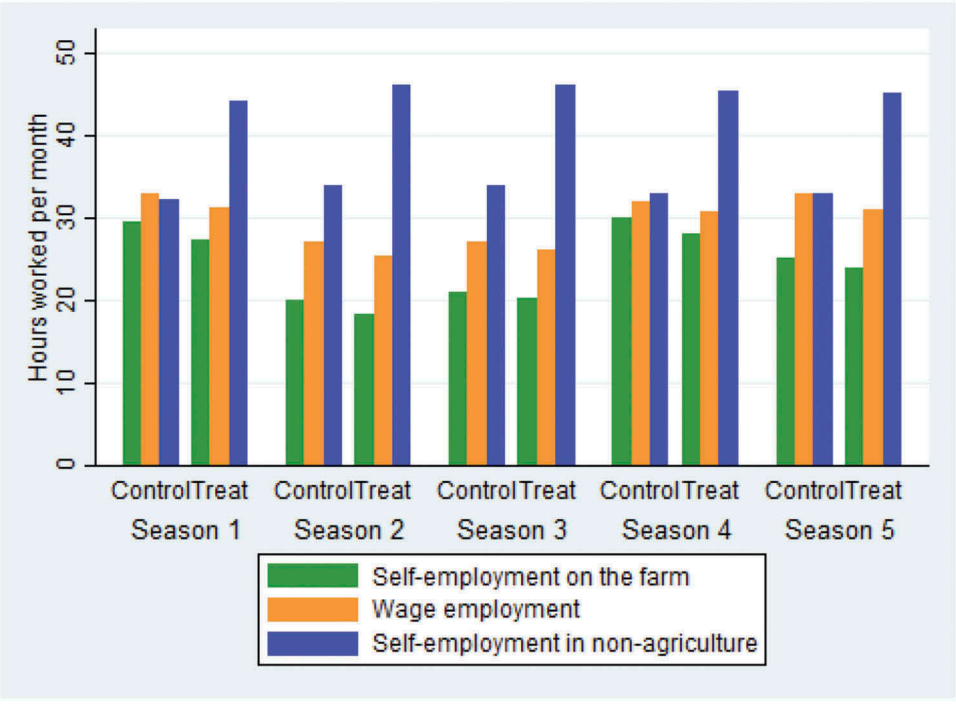

Figure 3. Seasonal variation in labour supply by participation status.

Figure 3 shows the seasonality in the numbers of hours worked per month for self-employment-based activities on the farm and in the non-agricultural sector for both treatment and control households. The seasonality in 'self-employment on the farm' is clearly evident from Figure 3, irrespective of the households' treatment statuses. However, we do not find much seasonality in the labour supply for 'self-employment in non-agriculture', even though there appear to be substantial differences between participating and non-participating households in terms of numbers of hours worked in self-employment-based off-farm activities.

We run the following regression to examine whether the seasonality in the labour supply differs by households' participation in microfinance programmes.

$$L_{ijt} = \alpha_i + \beta_1 X_{ijt} + \beta_2 H_{ijt} + \gamma D_{it} + \theta S_j + \varphi\left(S_j \times D_{it}\right) + \lambda\tau_t + \vartheta\left(S_j \times \tau_t\right) + \varepsilon_{ijt} \quad (2)$$

This specification is an extension of Equation (1). Equation (2) captures the seasonal variation that is inherent in the rural agricultural and non-agricultural labour supplies; that is, if rural households' labour supplies vary across seasons, the coefficient θ will be significantly different from zero. In addition, it also captures the variation in seasonality across households' treatment statuses. φ is associated with the interaction term between the treatment status of the household and the seasonal dummies, and captures the impact of program participation on the seasonality in labour supply.

4. Main results

The results of our basic estimation equation are presented in Tables 2 and 3. Table 2 displays the effect of the program on participation in different occupations (in percentage points) estimated using Equation (1). Table 3 reports the coefficients using the number of hours of work per month as the

Table 2. PSM regression results: effects on participation in different occupations

Regression adjusted estimates of	Self-employment on the farm	Wage employment (in both agriculture and non-agriculture)	Self-employment in non-agriculture	Total labour force participation
Adult Men and Women	–0.47	–2.22***	6.83***	1.45***
	(0.73)	(0.68)	(0.81)	(0.39)
Adjusted R^2	0.07	0.11	0.07	0.06
Number of observations	88,075	88,075	88,075	88,075
Adult Men	–1.58	–5.16***	9.23***	0.44
	(1.15)	(1.00)	(1.15)	(0.36)
Adjusted R^2	0.08	0.12	0.03	0.01
Number of observations	46,300	46,300	46,300	46,300
Adult Women	1.21	0.32	4.47***	2.62***
	(0.79)	(0.64)	(0.88)	(0.70)
Adjusted R^2	0.07	0.04	0.02	0.07
Number of observations	41,775	41,775	41,775	41,775
Child labour	2.01	–3.69	3.48	2.37
	(3.33)	(2.95)	(3.16)	(1.91)
Adjusted R^2	0.18	0.15	0.07	0.02
Number of observations	3,835	3,835	3,835	3,835

Notes: The sample size used in every regression is presented at the bottom of each panel. Only individuals from matched households are considered in these regressions. There are a total of 91,910 individuals from matched households (46, 300 adult men, 41,775 adult women and 3,835 children). Household based work (both agricultural and non-agricultural) refers to cultivation in fields, crops processing, cultivation vegetables and nursery in homestead, rearing hens and ducks, rearing livestock and cultivating fish in pond while wage employment (agricultural and non-agriculture) work is cultivation in fields, crops processing, house repair, digging earth, road work, guards, cottage industry labour, brick breaking, transport worker run by machine, other transport labour, bidi labour, labour in small industry, helper/non-agricultural day labour. Self-employment in non-agriculture refers to potter, weaver, mason, fisherman, boatman, blacksmiths, cobbler, rickshaw/van driver, car driver, other small business, business (mid-level or big), production oriented small business, production oriented business (mid-level or big). All specifications include the following covariates: age of the individual, marital status, education level (whether illiterate, can read only, can sign only, can read and write), age of the household head, number of adult working people in the household, household size, highest grade/class passed by any family member, total arable land owned by household (in decimals), number of children aged 0–15 in the household, number of women in the household, number of people aged over 60 in the household, number of married people in the household and whether a woman is the head of the household. All specifications also control for year, seasonal, year-seasonal interaction and individual fixed effects. We correct standard errors for village–year clusters. Clustered standard errors are presented in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

dependent variable. The regressions use the full set of controls (see the footnote to Table 2), and include seasonal fixed effects, year fixed effects and seasonal–year fixed effects. As we are interested primarily in the impact of program participation[17] on the labour supply decision, we focus on the sign and value of the parameter γ. If microfinance does have a positive effect on the incidence and on hours worked, $\hat{\gamma}$ should be positive and statistically significant. Given that microfinance's impact on the marginal returns to labour is heterogeneous across sectors (and across household members and seasons), we can expect the impact of an access to microfinance on the labour supply to be asymmetric. Therefore, we report our results by individuals' genders and occupations, and for adults and children separately. Each row in the table is associated with a different set of individuals, and only the coefficient $\hat{\gamma}$ is reported.

Table 3. PSM regression results: effects on labour supply

Regression adjusted estimates of	Self-employment on the farm	Wage employment (in both agriculture and non-agriculture)	Self-employment in non-agriculture	Total labour force participation
Adult Men and Women	–0.35	–3.85***	10.97***	6.77***
	(0.77)	(1.21)	(1.41)	(1.33)
Adjusted R^2	0.08	0.10	0.08	0.21
Number of observations	88,075	88,075	88,075	88,075
Adult Men	–0.98	–8.82***	17.17***	7.36***
	(1.13)	(1.95)	(2.32)	(2.00)
Adjusted R^2	0.10	0.11	0.04	0.07
Number of observations	46,300	46,300	46,300	46,300
Adult Women	0.70	0.27	4.40***	5.37***
	(0.61)	(0.89)	(0.96)	(1.29)
Adjusted R^2	0.07	0.04	0.02	0.04
Number of observations	41,775	41,775	41,775	41,775
Child labour	2.79*	–6.23	6.51*	3.07
	(1.63)	(4.19)	(3.72)	(4.65)
Adjusted R^2	0.13	0.12	0.08	0.22
Number of observations	3,835	3,835	3,835	3,835

Note: See the footnote to Table 2.

Table 2 shows that participation in microfinance programmes lowers the probability of being employed as a wage labourer significantly, but increases the probability of participation in self-employment-based non-agricultural activities. However, the effect is not symmetrical for males and females. Adult men benefit disproportionately more from their household's participation in microfinance programmes (in absolute terms), as their participation in off-farm self-employment activities increases by 9.23 per cent – a significant increase of about 23 per cent relative to their baseline participation rate in the non-agricultural self-employment sector – and their participation in the labour force as wage labourers decreases by 5.16%. However, we find no such significant effect on their overall labour force participation rate (LFPR), which rises by just 0.44 per cent and is not statistically significant. On the other hand, microfinance increases the participation of females from program households in self-employment-based non-agricultural work significantly, by 4.47 per cent – an increase of about 58 per cent compared to the baseline rate for women – while their overall LFPR increases by 2.62%. Thus, the male members of the participating households experience much greater increases in participation in self-employment activities (in absolute terms) than their female counterparts who actually receive the loans from the MFIs, while women experience significant increases in relative terms, compared to their baseline participation rates. Finally, the results show that participation in microfinance programmes does not have any effect on the incidence of child (aged below 15 years) labour.

The impact of microfinance program participation on the seasonal labour supply (measured in hours per month) is presented in Table 3. The results are similar to what we find in Table 2. Microfinance increases both the labour supply for self-employment-based off-farm activities and the total labour supply significantly, but decreases the hours worked as a wage labourer. This effect also varies widely by gender and across different age groups. Adult men from participating households work about 17.17 hours more per month in self-employment-based activities in the non-agricultural sector – an increase of about 24 per cent compared to the baseline level of work hours – and about 8.82 hours less in wage employment than their counterparts in the non-participating households. This is significantly

greater than the increase in hours dedicated to off-farm self-employment by women from the treatment households (an increase of just 4.4 hours) – a significant increase of about 55 per cent relative to their baseline level of hours worked in off-farm self-employment-based activities. The total labour supply of women from participating households is about 5.37 hours higher, which is less than the increase for men, whose total labour supply per month increases by more than 7.36 hours.

Overall, the results suggest that both the male and female labour supplies increase for the participating households. However, men experience a redistribution of the labour supply from wage employment to self-employment-based off-farm activities, whereas women experience an 'added effect' due to an increase in their work in self-employment-based activities in the non-agricultural sector without any corresponding reduction in the number of hours worked in wage employment.

Even though the overall results reported in Table 3 are very similar to those in Table 2, there are a few interesting differences. Children aged 7^{+}–15^{-} years from participating households are found to work significantly longer hours per month in self-employment-based off-farm (6.51 hours) and on-farm (2.79 hours) activities than children in non-participating households (both significant at the 10% level). However, there is no significant effect of program participation on either the incidence of child labour (as presented in the last column of Table 2) or children's total labour supply (last column of Table 3). Participating households are found to use significantly more child labour-hours,[18] particularly in off-farm self-employment-based activities, in order to diversify into more productive work and smooth household income and consumption.

Finally, we estimate Equation (1) using the standard fixed effects regression that uses the full sample. The results are presented in Table A5 of Appendix, and are very similar to those reported in Table 3. Overall, we find that, for adult men, a participation in microfinance programmes is associated with both a significant increase in market-oriented self-employment activities (by 17.4 hours) and a decline in the number of hours worked in wage employment (by 8.57 hours). Similar results were found for adult women, who experienced an increase in the number of hours dedicated to off-farm self-employment (by 4.39 hours). Finally, we find evidence of an increase in the labour supply of children from the participating households in both on-farm (2.11 hours, though not significant) and off-farm (7.07 hours) self-employment-based activities. We have also used an alternative definition of child labour to check the robustness of our results. As the second alternative, we have used a stricter definition that defines 'adult' as anyone in the 18^{+} to 55 age group. The results presented in Table A6 of Appendix suggest that the labour supply of children aged below 18 years increases significantly by 6.72 hours for participating households, due in particular to an increase in off-farm self-employment-based activities among children in the 15^{+} to 18 age group.

4.1. Effect on spousal labour supply

We now report the results related to the effect of program participation on the member's own and their spouse's labour supply. This subsection restricts the sample to household heads and their spouses, in order to assess the effects of women's participation in microfinance programmes on their own and their husbands' labour supply directly. As most borrowers of microfinance (about 90% in our sample) are female, we also focus only on households with female MFI members. Table 4 presents the results.

The coefficients in panel A of Table 4 are similar to those obtained from the distribution of the labour supply across gender and sectors, discussed in the last subsection (in Tables 2 and 3). A wife's participation in MFIs is associated with an increased engagement in self-employment-based activities both on- and off-farm, thus increasing her overall labour-force participation by 2.66%. However, it also corresponds to a decrease in her spouse's participation in wage employment (by 3.48%), but an increase in his participation in off-farm self-employment-based activities (by 8%). Thus, while it is true that an increased access to microfinance contributes to off-farm self-employment generation for both members and their spouses (as presented in panel A of Table 4), it is found to have a significantly larger positive effect on the labour supply of the husbands (panel C of Table 4) than on that of the participating women (own labour supply) – an increase of 15.26 hours for spouses vis-à-vis 4.38 hours for the women themselves.

Table 4. PSM regression results: Effects on own/spousal and member/non-member labour supply

Regression adjusted estimates of	Self-employment on the farm	Wage employment (in both agriculture and non-agriculture)	Self-employment in non-agriculture	Total labour force participation
Dependent variable: Participation in different occupations (in percentage points)				
Panel A: Effect on own and spousal labour supply				
Own effect	1.62*	1.02	4.70***	2.66***
	(0.85)	(0.70)	(1.00)	(0.70)
Spousal effect	–0.18	–3.48***	8.01***	–0.03
	(1.27)	(1.30)	(1.51)	(0.42)
Panel B: Effect on members and non-members within the same household				
Participation effect	–2.51***	–1.43*	6.22***	0.20
	(0.91)	(0.80)	(0.93)	(0.44)
Membership status ×	5.71***	–2.20***	1.71*	3.49***
Participation effect	(1.07)	(0.78)	(1.00)	(0.60)
Dependent variable: Labour supply (in hours worked per month)				
Panel C: Effect on own and spousal labour supply				
Own effect	0.57	1.16	4.38***	6.11***
	(0.75)	(0.95)	(1.17)	(1.56)
Spousal effect	–1.64	–7.32***	15.26***	6.30**
	(1.43)	(2.37)	(3.21)	(2.52)
Panel D: Effect on members and non-members within the same household				
Participation effect	–2.11**	–2.16	11.23***	6.96***
	(0.90)	(1.48)	(1.76)	(1.56)
Membership status ×	4.93***	–4.75***	–0.72	–0.53
Participation effect	(0.95)	(1.32)	(1.86)	(1.80)

Note: See the footnote to Table 2.

4.2. Effect on the member's labour supply within program households

This subsection investigates the labour supply decision of individuals based on their membership status within the participating households, that is, whether the individual is a member of the microfinance program himself/herself, or merely a MFI non-member from a participating household. The panel B in Table 4 demonstrates that households that participate in microfinance programmes experience significant decreases in wage employment and on-farm self-employment-based activities, but increases in their involvement in off-farm self-employment activities. Within the household itself, the actual members of the program are found to be comparatively more involved in on-farm and off-farm self-employment-based activities than the non-members, and significantly less involved in wage employment.

The panel D of Table 4 shows how the members' labour supply decisions are affected by their program participation. The results reveal that members devote significantly more hours to on-farm self-employment activities and significantly fewer hours to wage employment than non-members from participating households. However, all individuals from the participating households contribute similar working hours towards off-farm self-employment-based activities, irrespective of their membership status in the household. As such, while there is a significant increase in the overall labour supply for participating households, we find no evidence of differences between the hours worked by members and non-members from these participating households. Thus, the effect of microfinance on the labour supply appears to be more asymmetrical across genders than across the membership statuses of the individuals within the participating households. Thus, the positive impact of

microfinance on market-oriented self-employment-based activities is not limited to the recipients of the loans only, or to the recipients and their spouses only, but also spills over to other non-member individuals within the household.

4.2.1. Seasonality in the labour supply. The results for seasonality in the labour supply by treatment status in microfinance institutions are presented in Table 5. As expected, there is a significant decline in employment opportunities in the lean seasons, particularly during season 2 but also during season 3 to a lesser extent. The numbers of hours worked per month in on-farm self-employment-based activities are significantly lower during Seasons 2 (about 9.56 hours less) and 3 (7.98 hours less), relative to the 'Aman' season (Season 1), which is the benchmark cropping season. However, the average decline relative to the 'Aman' season during the second lean period (during Season 5) is only four hours. The labour supplies in both on-farm self-employment and wage employment (in both agriculture and non-agriculture) tend to co-move, as rural households depend heavily on the agricultural sector. The seasonality in the total labour supply also follows the seasonality in on-farm activities closely.

However, the labour supply on self-employment in non-agriculture is countercyclical to seasonality in the agricultural sector to some extent, which suggests that rural households tend to invest in off-farm self-employment-based activities in an attempt to smooth their labour supply and consumption. We find robust evidence that both participating and non-participating households engage in productive off-farm self-employment-based activities that do not seasonally co-vary with agricultural production and can therefore insure households against the significant declines in income and consumption that occur during the lean seasons (Pitt & Khandker, 2002). Even though program participants who have access to loans from these microfinance programmes are more likely to invest in these activities, thus affecting the seasonality in the overall labour supply, this does not necessarily affect the seasonality in all occupation categories. We do not find much difference in the seasonality between treatment and control households, particularly in off-farm self-employment-based activities.

Households who participate in microfinance programmes also tend to smooth the overall seasonality in the labour supply by investing more effort in on-farm self-employment activities such as the cultivation of vegetables and nursery in the homestead, or the rearing of hens and ducks, particularly during the lean periods. The results suggest that opportunities for diversification into off-farm self-employment-based activities are limited,[19] and that households continue to depend mostly on agriculture-based activities for work, particularly during lean periods. Thus, it would be helpful for microfinance repayment schemes to be aligned with the seasonal variation in order to reduce rural households' reliance on local money lenders for repaying their loans during the lean season (see Islam et al., 2015).

4.2.2. Membership duration and labour supply. We now examine the heterogeneous impact on the labour supply of the length of time that each household has participated in the microfinance program. Focusing on the duration of participation enables us to separate the short- and medium-term effects of microfinance program participation from the long-term effects (Islam, 2011; Khandker & Samad, 2013). We sort the participating households into six broad sub-categories based on their dates of joining and/or leaving the program, using the definitions of Islam (2011). The six different groups considered in our analysis are:

(i) *Continuing participants*: Households who have been regular clients of the MFIs during all four rounds of the survey conducted between 1997 and 2005.
(ii) *Newcomers1*: Households who were not clients of the MFIs in 1997 but joined between 1999 and 2001.
(iii) *Newcomers2*: Households who were not members during the first round but joined later, between 2001 and 2004.

Table 5. PSM regression results: seasonality in labour supply

Regression adjusted estimates of	Self-employment on the farm		Wage employment (in both agriculture and non-agriculture)		Self-employment in non-agriculture		Total labour force participation	
Seasonal effects	Benchmark model	Interaction model	Benchmark model	Interaction model	Benchmark model	Interaction model	Benchmark model	Interaction model
Participation	–0.35	–1.35	–3.85***	–4.09***	10.97***	10.92***	6.77***	5.48***
	(0.77)	(0.93)	(1.21)	(1.26)	(1.41)	(1.41)	(1.33)	(1.43)
Season 2	–9.56***	–14.39***	–5.91***	–4.86***	2.02***	2.32***	–13.45***	–16.93***
	(0.49)	(1.00)	(0.42)	(0.77)	(0.34)	(0.61)	(0.71)	(1.33)
Season 3	–7.98***	–11.15***	–5.33***	–3.59***	2.04***	3.28***	–11.26***	–11.47***
	(0.40)	(0.84)	(0.46)	(0.84)	(0.52)	(0.95)	(0.62)	(1.10)
Season 4	0.45	1.70	–0.72**	–1.80***	1.11***	1.93***	0.83	1.82
	(0.68)	(1.52)	(0.33)	(0.65)	(0.33)	(0.57)	(0.78)	(1.73)
Season 5	–4.03***	–6.38***	–0.22	–0.37	0.99***	0.89*	–3.26***	–5.86***
	(0.53)	(1.23)	(0.30)	(0.51)	(0.26)	(0.49)	(0.65)	(1.37)
Parti*Season 2		1.30**		0.14		–0.03		1.41*
		(0.55)		(0.53)		(0.49)		(0.85)
Parti*Season 3		2.04***		0.64		0.02		2.69***
		(0.50)		(0.64)		(0.64)		(0.89)
Parti*Season 4		0.37		0.57		0.31		1.25
		(0.74)		(0.53)		(0.53)		(1.03)
Parti*Season 5		1.33*		–0.18		–0.06		1.09
		(0.68)		(0.45)		(0.48)		(0.84)
Adj. R^2	0.08	0.08	0.10	0.10	0.08	0.08	0.21	0.21
No. of obs.	88,075	88,075	88,075	88,075	88,075	88,075	88,075	88,075

Notes: There are five major agricultural seasons in this analysis. Season 1 is the benchmark cropping season. See the footnote to Table 2. Only adult men and women are considered in this analysis.

(iv) *Leavers1*: Households who were clients in 1997 but dropped out after 1998 and never participated in any other MFI again.
(v) *Leavers2*: Recent dropouts, who participated until 2001 and then decided to drop out of the program.
(vi) *Drifters*: The remaining occasional clients who were not classified as either newcomers or leavers.

Of the 1592 households that were clients of MFIs at one point or another, 47.2 per cent were regular clients, while 9 per cent (5%) were Newcomers1 (Newcomers2). Leavers1 represented 11.3 per cent of the sample and Leavers2 11%, and the remaining households were drifters. We estimate the effects of program participation for each of these groups by comparing them with the control group.

The results from the sub-group analysis are presented in Table 6. We are especially interested in the significant differences that we find in labour supply outcomes across the different groups of program participants, particularly in terms of off-farm self-employment activities. While the duration of program participation seems to have no significant effect on the incidence and extent of the labour supply for self-employment on the farm, it increases the participation in non-agricultural self-employment activities for almost all of the groups that we consider in this study, particularly at the extensive margin (presented in Panel A of Table 6). The results show that a greater involvement (in terms of both incidence and intensity) in market-oriented off-farm activities tends to follow from a long-term participation in MFIs, with regular participants experiencing the greatest increase in self-employment activities, which also signals a move away from wage employment. A regular membership in MFIs increases the participation in off-farm self-employment-based activities by 9.26%, and increases the number of hours of labour supply in the same by about 15.44 hours per month. The results for the occasional participants (in Table 6), particularly the leavers and drifters, confirm that the gains from program participation may continue even after participants leave the program, although such benefits are likely to be short-lived, as the coefficients for off-farm self-employment are significant for 'Leavers2′ but not 'Leavers1′. When we consider adult men and women separately using the same specification as in Table 6, the results suggest that the effects are significantly larger for adult men who are regular participants. The results are similar for adult women and children when regular participants are compared to non-participants. However, these results are merely suggestive, as decisions to join or leave the program are likely to be endogenous.

5. Discussion and conclusion

This paper is the first to examine the impact of an access to microfinance on the labour supply behaviours of men and women separately. We find evidence that an access to microfinance results in an increased participation in self-employment-based activities at both the extensive and intensive margins. However, such effects are considerably lower among females than among males (spouses of the MFI clients or otherwise). We also find that women's participation and labour supply still remain quite low, particularly in off-farm or market-oriented work.

The results suggest that, although most of the micro loans provided by MFIs are targeted at women, microfinance actually has a significantly larger effect on the participation and labour supply of males from the treatment households. Overall, our paper shows that the positive effects of microfinance in economic activity, which could result in increase in income, consumption and other welfare indicators within households, is primarily driven by male members of the household. Hence, microcredit to the women borrower served also to male member (for example, husband) in the household enterprises and women's participation in those remained limited.

Our findings suggest that microfinance does benefit the participating households, including higher labour market participation of women albeit less than their men compared to non-participating households. We observe that the effect of microfinance on the labour supply is asymmetric across males and females within the households. This could due to the fact that microfinance encourages

Table 6. PSM regression results: impact of the duration of program participation on labour supply

Regression adjusted estimates of	Regular participants	Drifters	Newcomer1	Newcomer2	Leavers1	Leavers2
Panel A: Participation in different occupations (in percentage points)						
Self-employment on the farm	–0.86	0.25	–1.25	–2.59	–1.26	1.89
	(0.95)	(1.13)	(3.15)	(4.67)	(2.90)	(1.48)
Wage employment	–3.08***	–0.86	–2.68	0.11	1.23	–1.63
	(0.86)	(0.89)	(2.76)	(2.97)	(2.17)	(1.24)
Self-employment in non-agriculture	9.26***	4.18***	7.79**	1.46	4.08	4.39***
	(0.98)	(1.12)	(3.67)	(2.88)	(2.87)	(1.57)
Total labour force participation	2.04***	0.90	–0.17	–0.58	0.91	2.27***
	(0.47)	(0.63)	(1.34)	(2.51)	(1.58)	(0.76)
Number of observations	61,545	51,370	27,170	27,015	30,420	34,460
Panel B: Labour supply (in hours worked per month)						
Self-employment on the farm	–0.63	–0.83	2.64	1.45	–1.67	–0.90
	(0.99)	(0.98)	(2.18)	(4.82)	(2.98)	(1.33)
Wage employment	–5.21***	–1.79	–4.87	0.86	4.30	–2.39
	(1.55)	(1.50)	(4.34)	(5.28)	(3.96)	(2.28)
Self-employment in non-agriculture	15.44***	5.26***	6.65	0.57	3.99	5.47**
	(1.67)	(2.01)	(5.50)	(5.74)	(4.70)	(2.68)
Total labour force participation	9.60***	2.65	4.41	2.88	6.62	2.18
	(1.64)	(1.91)	(4.82)	(7.84)	(4.14)	(2.83)
Number of observations	61,545	51,370	27,170	27,015	30,420	34,460

Note: See the footnote to Table 2.

women to work at family enterprise within home or it could be constraints for women to move from household-based activities to market-oriented activities. There could be social norms or labour market barriers such that women are not able or being discouraged to participate in the off-farm labour market activities despite their increased control over money due to availability of microfinance.

The provision of credit by MFIs may not be able to counteract the gender roles specified within the household completely (Johnson, 2004; Kabeer, 1998, 2001; Mayoux, 1999). In the current socio-cultural context, women lack the skills and opportunities that are necessary for carrying out of productive activities beyond what is sanctioned by socially-defined gender norms (Johnson, 2004; Kabeer, 2001; Mayoux, 1999). Without the active cooperation of spouses or male members of the household, who often play a complementary role by marketing and selling the goods produced by the women's small home-based businesses, the women's ability to invest capital in autonomous activities is severely limited (Hashemi et al., 1996; Kabeer, 1998). Thus, while the focus of the MFIs has always been on women, the results suggest that such loans have only a limited impact on the off-farm labour market activities of women in rural Bangladesh. However, there may still be some value to channel funds through women so that the business or activity is a household one, rather than just a male one. It also may have long-lasting impacts on the next generation, either through children's involvement in the family business (rather than school or early marriage) or through girls witnessing more involvement of their mothers in family affairs.

In this paper, we examine only one aspect of the participation of women in a microfinance program- the labour market effects. The welfare gains through changes in household income,

consumption and children's education are perhaps the primary outcomes of microfinance. Hence, we examine only partial aspects of the effects of microfinance. Note, however, that we observe that women from participating households benefit in terms of increased participation in labour market activities compared to households that did not participate. However, our results suggest that male members within the participating households improved their labour market participation significantly more than the female members who are typically the clients of the microcredit.

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Disclosure statement

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Notes

1. Studies have also found that microfinance participation leads to higher incomes and better livelihoods (Imai, Thankom, & Annim, 2010; Islam, 2011; Pitt & Khandker, 1998), results in consumption smoothing and asset building (Islam, 2011; Kaboski & Townsend, 2005; Khandker, 2005), reduces households' vulnerability (Amin, Rai, & Topa, 2003; Islam & Maitra, 2012) and food insecurity (Islam, Maitra, Pakrashi, & Smyth, 2016). The findings also indicate that greater benefits accrue from a long-term participation in such programmes (Berhane & Gardebroek, 2010; Islam, 2011; Khandker & Samad, 2013).
2. The Palli Karma-Sahayak Foundation (PKSF) works as a regulatory organisation for the MFIs in Bangladesh, monitoring their activities, and lending out donor and other funds to its partner organisations (PO) for use in microfinance.
3. Average labour supply (in a particular season of a year) provided by the male members of the households were reported by the male household head and similarly average labour supply of the female members were reported by the female household head and then cross checked with the other members. Male and female specific labour supply was collected separately via the use of gender specific questionnaires. Each individual was asked to recall the total number of days and the number of hours per day that they and others of the same gender had worked in the different sectors over each agricultural season during last year. The labour supply data were collected by trained enumerators, and care was taken to minimise the recall bias. However, there may be an issue with the twelve-month recall in particular to the last recent agricultural season. Any recall bias that remains is assumed to be symmetrical across the participant (treatment) and non-participant (control) households.
4. The attrition between the beginning of the survey in 1997 and the end of the survey in 2005 was less than 10%, or about 1.2 per cent per year.
5. Detailed and extensive information on the average labour supply of each member of the household has been collected separately during each round of the survey for five major agricultural seasons (discussed in detail in Section 3). The total number of hours worked in a particular season was divided by the number of months in that season to arrive at the number of hours worked per month. It is important to note that even though we use average hours worked per month, it is actually the number of days of employment that varies more across seasons.
6. We also use an alternative definition of child labour to check the robustness of the results. As our second alternative, we use a stricter definition that defines 'adult' as anyone in the 18^{+} to 55 age group.
7. The loan amount (expressed in ten thousand taka) is adjusted by the agricultural price index, with 1997–98 as the base year.
8. See also Table A2 in Appendix for descriptive statistics of the key demographic variables (at both the individual and household levels) for the treatment and control households.
9. Overall, the labour burden of rural women exceeds that of men, as it also includes a higher proportion of unpaid household responsibilities relating to food preparation, child rearing activities, and the collection of fuel and water (which are not accounted for in the current dataset). For more information, see C. Moser's definitions on the website http://www.ilo.org/public/english/region/asro/mdtmanila/training/unit1/groles.htm.

10. This is very clear from Table 1, where it can be seen that, while women's activity rates in the three sectors add up to more or less their total participation, the sum of the three male activity rates is significantly higher than their participation in terms of the total labour supply. This is clear evidence that men participate in a number of different occupations at the same time.
11. After balancing, we are left with 2,619 households (1,555 treated and 1,064 untreated) from the first round of the survey.
12. The *t*-test suggests that the difference between the two groups is not statistically significant. Moreover, the biases both before and after matching (Rosenbaum & Rubin, 1985) are less than 5 per cent for every variable of interest. These results are both indicative of a good balance.
13. Our matching estimates use a wide range of controls including household composition as listed in Table A3. Household-level characteristics such as the presence of young-age children could reduce the participation of women in market-based or self-employment activities. Our results remain robust, for example, when we consider separately for women with and without pre-school children. We have also computed standard errors clustered at the village–year–seasonal level to allow for an arbitrary covariance structure within villages over time and seasons, but the results are very similar to those reported.
14. The data is for the period 1997-2005. At the time of the surveys, Aman and Aus were the major rice seasons of Bangladesh based on Mahmood (1997); MacLean et al. (2002) and FAO (2008). In 2018, however, Boro rice was the major rice season of Bangladesh. For example, in 2016-17, 11.0 million ha of land was under all types of rice crop (Aus, Aman and Boro), of which the land under Boro rice was 4.5 million ha that is about 41 per cent BBS. (2018). *Yearbook of agricultural statistics 2011*. Dhaka. Retrieved from http://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/1b1eb817_9325_4354_a756_3d18412203e2/AgriYearbook-2017.pdf. In the same year, the total rice production was 33.8 million tons, of which, 53 per cent (18.0 million tons) was Boro rice.
15. The five seasons mentioned in the questionnaire can be sorted into the following Bengali and English calendar months. Agrahayan–Poush in the Bengali calendar is equivalent to November–January in the English calendar and can be classified as Season 1. Ashwin–Kartik (September–November) will be Season 2, Ashar–Shrabon–Bhadra (June–September) Season 3, Baishak and Jaishta (April and June) Season 4 and Magh–Falgun–Chaitra (January to April) Season 5. The five seasons are not distributed uniformly across the calendar months.
16. This annual phenomenon of seasonal hunger, driven by the strong seasonality of agricultural production, is often referred to as 'Monga' or 'mora kartik', meaning 'the season of death', and is relatively widespread in the northwest region of the country (Khandker & Mahmud, 2012).
17. The results presented in this section are robust to the definition of program participation used. We have also used the total loan amounts borrowed by the households as a robustness check. The loan amount is in ten thousand taka adjusted by the agricultural price index with 1997–98 as the base year and is entered in linear form. The results are very similar to those obtained using treatment effects (see Table A4 in Appendix).
18. Households that access microfinance loans often establish their own household enterprises, which requires extra labour; however, as the loan amounts are not large enough to hire external labour, households may have to employ children directly in the newly-created enterprises, or use them as carers for their siblings, or in farm and livestock duties and other household chores (see Islam & Choe, 2013, for a detailed discussion).
19. Constrained by the lack of availability of suitable productive opportunities during the lean seasons, some households also attempt to stabilise their income and consumption by adopting high yielding variety crops, which they were unable to use previously due to a lack of adequate credit (Government of Bangladesh, 1999; Wozniak, 1993). They also use the available credit to invest in better quality land, improved seeds, fertilisers and better irrigation practices, which significantly increase their productivity and reduce their dependence on seasonal factors (Wahid, 1994). Ahmed (2004) showed that 12.23 per cent of all microfinance is used for agricultural activities.

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