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Impact of urban microfinance on the livelihood strategies of borrower slum dwellers in the Dhaka city, Bangladesh

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ABSTRACT

This paper scrutinizes the impact of urban microfinance on livelihood strategies of borrower slum dwellers of Dhaka, Bangladesh (with primary and secondary data). The primary data was collected through a structured questionnaire on a total of 200 sample slum households of three slums (Korail, Jurain and WASA Colony slum) of Dhaka city (by a systematic random sampling). This paper uses econometric techniques of difference in differences (DID) and the probit model to analyze the data. The key finding is that urban microfinance has a statistically significant positive impact on some income or expenditure variables such as savings, educational expenditure, and transportation expenditure, but not with regards to all the income and expenditure variables. The probability of changing occupations of the microfinance borrowers is statistically significantly higher compared to the case of the non-microfinance borrowers. Microfinance also improved housing, utility usages, water and sanitation of the borrowers compared to the case of the non-borrowers. This paper would encourage the global microfinance institutions (MFIs) to expand their activities among the urban slum dwellers to obtain positive changes in the livelihood strategies of them.

1. Introduction

Bangladesh, located in eastern South Asia, is geographically relatively small, whereas it is the 8th highest populous country of the world with a population of around 168 million (World Population Review, 2019). It has also experienced rapid urbanization as a percentage of urban population has increased from a small 4% in 1950 to 34% in 2015 and is expected to reach 56% by the year 2050 (UNDP, 2016, Table 15, pp. 239). Dhaka, the capital city of Bangladesh, has a population of 18.2 million; most of them have migrated from different divisions of the country (World Population Review, 2019). Dhaka, centrally located in the country precisely at its middle point, attracts people from all over the country as a *growth magnet*, is highly densely populated, and it already contains around 10% of the population of the entire country by now, and the number is increasing. However, due to the high cost of living in the capital city, the lower-income people dependent on the urban informal sector for their earnings have to seek housing in the urban slum areas. The characteristics of these slums in terms of physical and environmental situation, facilities of public utilities, water and sanitation, are far below standard. Also, slum residents suffer from poverty and income vulnerabilities accompanied by continuous threats of eviction as well as infectious diseases and social negligence (see Hossain, 2011).

Several microfinance institutions (MFIs) have been engaged in microfinance programs. These include both financial and non-financial services among the urban slum dwellers of the Dhaka city. This paper intends to examine the impact of MFI interventions

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among these borrower urban slum dwellers.

1.1. Microfinance in urban Bangladesh

Microfinance comprises both financial and social tools. Microfinance services include savings and credit schemes, insurance, enterprise development, self-reliance and skills development, training, marketing, and management capabilities and social intermediation services, such as literacy training and health care (Ledgerwood (1999), pp. 1-2). Microcredit is the part of microfinance that provides microloans for a particular period. The repayment time is set as weekly and monthly. The poor people who are deprived of formal financial services (such as banks) are the target group of these microfinance institutions (Lendwithcare, 2018).

Currently, about 707 licensed microfinance institutions (MFIs) are working in Bangladesh (MRA, 2018). They provide microfinance services in the rural as well as the urban areas. The rural areas cover the villages while the urban areas include the urban slums and shanties in town (cited earlier). Moreover, the rural microfinance programs have been operating in the country since 1976. Out of 707 MFIs, about 70% are working in rural areas.

Meanwhile, the urban microfinance programs (UMP) have been operating in Bangladesh since 1984 that was initiated by one non-governmental organization (NGO) named Manabik Shahajya Sangstha (MSS) first-time in the Dhaka city (MSS, 2018). Out of the 707 MFIs, as mentioned above, about 30% of MFIs are working in urban areas (MRA, 2018). Overall MFIs have 19% urban borrowers from among the slum dwellers (CDF, 2016a,b). Urban microfinance programs pose a greater challenge for the MFIs compared to the rural microfinance programs. Since the urban environment has some added elements of risks such as residents of urban slums are more prone to changes of residences and mobility across cities or towns, so this acts as an additional risk factor for the MFIs with regards to credit disbursements. It is the reason the MFIs were more comfortable with microcredit disbursements in the rural areas, whereas they were reluctant to proceed to the urban areas. Over time, this has been resolved as it has been evidenced by the recent data of microcredit disbursements (cited earlier).

To note that, in addition to the microfinance institutions. Several commercial banks also provide microcredit in the urban areas of Bangladesh. Such as state-owned Sonali Bank and BASIC Bank (Basic Bank, 2018; Sonali Bank, 2018). Additionally, among the private commercial banks, the Islami Bank Bangladesh Ltd offers 'urban poor development scheme' (UPDS) since 2012 (IBBL, 2018; InM, 2013).

Furthermore, urban microfinance growth has exhibited an upward trend during the last four years, from 2014 to 2017. By 2017, the urban microfinance programs covered 4.98 million active members– 4.29 million women and 0.68 million men. Recent statistics reveal that during 2011-2017 periods, the number of urban microfinance members grew by 45.61%, which was higher than the corresponding rural number of 11.82% (CDF, 2017). In 2017 the total disbursement of urban microfinance loan was BDT 176,153 million (USD 2.17 billion), and the savings of the members reached BDT 37,914 million (USD 0.468 billion). Besides, the average number of members per MFI in the urban areas (12.94%) grew more than the corresponding number of rural regions (9.96%). The yearly average growth rate of volume of urban microfinance (18.99%) was also higher than that of the rural areas (12.03%) (CDF, 2016a; CDF, 2016b).

1.2. Urban slums of Dhaka City and the coverage of the microfinance institutions (MFI)

The concept of 'slum" can be delineated as a unit of the house having a minimum of five to ten households or a unit of a mess having at least 25 members. It generally represents a vulnerable residence that develops in state owned, and private vacant property, room gathering with higher levels of population concentration, inadequate utility services, particularly water and sanitation, lower socioeconomic position of the majority of residents, threat to or no tenure security (CUS, 2006, pp. 11). On the other hand, Bangladesh Bureau of Statistics (BBS) defined "slum" as a cluster of close housing of 5 or more households that are usually established very unevenly and unsystematically on a state-owned and privately-owned vacant plot in a harmful situation and environment. Slums are also established on the owner based household places (BBS, 2015, pp. 15).

Currently, an estimated 2.23 million people are living in the urban slums of Bangladesh (BBS, 2015, pp. xxi). Among them, the largest portion, an estimated total of 1.06 million slum people are living in the slums of the Dhaka city that is 24.39% of the total slum population of the country. Moreover, slum inhabitants rise mainly for eight causes: *river erosion, rooted out, forced out, abandoned, inadequate earnings, insecurity, migration for livelihood and other causes* (cited earlier, pp. 75).[1] Bangladesh reduced the overall extreme poverty rate by 68.32% during 1992-2016 periods at the first goal of SDGs (GED-BD, 2018). Conversely, though the rate of poverty declines but the number of slum population increases in Bangladesh through urbanization. Besides, Bangladesh takes measures of actions to reduce the affected of climate changes. Among migrated slum dwellers, the victims of river erosion decline between 1997 and 2015. The leading responsible factors of migration by the slum dwellers (between 1997 and 2015) are highlighted in Table 1.

Most of the slum residents are engaged in the informal sector, and their sources of funds are relatives, friends, local informal money lenders and microfinance institutions. Along with microcredit, MFIs also provide micro-savings, micro-insurance, education, training and skill development, health care, maternity care, water and sanitation programs aimed at improving the living standards of

[1] With regards to causes of migration to slums, a highest 59.66% of the Dhaka South City Corporation (DSCC) slum respondents mentioned search for job, 27.53% mentioned poverty, 5.86% mentioned river erosion, and 4.43% mentioned other reasons. On the other hand, a highest 50.36% of the Dhaka North City Corporation (DNCC) slum respondents mentioned search for jobs, 27.94% poverty, 8.96% other reasons, 7.58% river erosion, 3.71% eviction/lack of security (BBS, 2015, pp. 75).

the slum population.

This study covers three slums, namely, *Korail*, *Jurain* and *WASA Colony* slum in the Dhaka city where a total of 12 MFIs have been providing their services. In three slums, among 100 borrower respondents, 97% of borrowers received both the microcredit and micro-savings services. Besides, only 3% of borrowers obtained educational services, whereas only 1% of borrowers participated in training and skill development programs other than the microcredit and micro-savings services.

Urban slum, microfinance and the land titling program in Bangladesh

Land titling refers to a form of land reforms where property rights are transferred to the individual and the family, of the land which has been previously occupied by them. This reform is a form of poverty alleviation program in which the user of the land obtains the right to use the land as collateral to get better access to credit. Besides, the land titling program helps strengthens the security of the land tenure and build up a functioning land market (Atuahene, 2006; Larmour, 2002). This land titling program has been employed as a tool of poverty alleviation in many countries around the world, including China, Argentina, Zambia, Bolivia, and many African countries (Galiani & Schargrodsky, 2010; Payne, Durand-Lasserve, & Rakodi, 2007). Furthermore, the land titling program facilitates the landholder (land as collateral) for both formal and informal credit (de Soto, 2000; Fontana, 2016, Haldar, 2015) whereas microfinance provides credit without collateral, but based on trust and group guarantee (Yunus, 2007).

However, this study is not related to the land titling program. The slum people in Bangladesh reside in the government vacant land illegally and in the private land with rental arrangements. But they cannot use their living place as collateral to get access to microcredit, because they have no ownership of this land.

1.3. An overview of the concept of "livelihood strategies"

In the literature, *livelihood* refers to the way of earning money to pay for food, living place, clothing etc. (Cambridge, 2018). Also, *livelihood* is the means to secure the necessities of living (Oxford, 2018). Besides, Chambers & Conway (1991) defined livelihood as the abilities, properties (stocks, capitals, rights and entrance) and activities essential to lead the lives. Furthermore, The International Federation of Red Cross and Red Crescent Societies (IFRC) (2018) state the *livelihood* as the means of support for a living. It comprises the abilities of asset building, earnings and actions required to manage the necessities of life.

UNDP and IRP (2015) explain that "livelihood strategy" refers to the ways by which a person accesses and uses the capital (human, societal, natural, physical, and economic) at the social, economic, political and ecological spheres to meet the necessities of life. Alamgir, Jabbar, and Islam (2009) explained that the livelihood strategies encompass aspects such as occupational status, income, consumption, clothing, housing expenditure, medical treatment, education level, household asset building, knowledge and skill, housing condition, decision-making ability, women empowerment, and participation in social activity.

Taking into consideration the above discussions, this paper scrutinizes impact of urban microfinance on the livelihood strategies of the urban slum dwellers that include their income (job, business, charity, relief, social safety net program receipts, *zakat* and remittances), occupational status, consumption expenditure (food, clothing, healthcare, transportation, housing, utility services, water and sanitation) and savings.

2. Overview of the literature

There are several studies that have been done on the impact of microfinance (see Cull, Demirguc-kunt and Morduch (2018) for a recent paper). Most of these studies are done on rural borrowers or combined rural and urban borrowers, but separate research was not done on the analysis of the impact of urban microfinance on the urban borrowers in Bangladesh, the main reason probably being the unavailability of data regarding this sub-sector. Recently the Institute of Microfinance (InM) and Credit & Development Forum (CDF) have published some separate statistical data on the urban microfinance programs.

Literature on urban microfinance

Matin et al., 2002 urges the MFIs to put more emphasis on urban microfinance programs because urban poverty has been increasing fast. Khan and Rahaman (2007) show that urban microfinance improved the living standard of the borrowers of the Chittagong district of Bangladesh by reducing poverty and making them capable financially of starting new small businesses and expand old businesses. Faruqee and Badruddoza (2011, pp. 27) mention that the three largest MFIs (ASA, BRAC and Grameen Bank) of the country jointly have control of almost three-fourths of the market of microfinance services in both the rural and the urban areas, thereby there is some form of oligopoly structure in this market.

Bashar and Rashid (2012) explain the characteristics of urban microfinance within urban low-income groups and their significance. They emphasize on the urban microfinance program because of the increasing trend of urban poverty (BBS, 2017). One research of InM (2013) reveals that the members of the urban microfinance program have risen sharply since 2005. In another article, Bashar and Rashid (2015) examine the potential of urban microfinance in Bangladesh. A high 95% recovery rate of urban microfinance has made the MFIs capable of building their financial capital over time. They also assessed through the previous findings that urban microfinance has a positive impact on income and building assets, creating employment opportunity, developing skill and entrepreneurship, and reducing vulnerability. Hence, they suggested three new directions for urban microfinance. These are infrastructure and housing, informal sector labour and nursing education.

Interestingly Bashar and Rashid (2012) examined the impact of microfinance through researching thirteen major cities on 1,500

members, who has been involved with MFIs since 2005 or earlier and found mixed results. Besides, Bhattacharjee (2016) measures the effect of microfinance on 35 women slum dwellers of the Sylhet division and found that most of the women had no knowledge of diversified uses of micro-loans and were not conscious of making these effective. They only used micro-loans for family consumption instead of investment.

Literature on comparative study on the borrowers and the non-borrowers' income and expenditures in Bangladesh

Several studies have been done by exposing the differences in the income and consumption expenditures between the borrowers and non-borrowers. Hossain (1984, 1988) tested the differences in per capita income of both borrowers and the non-borrowers and found 30.9% and 39.7% differences between the two groups. Zohir (2001) stated 5.3% differences in per capita wage income. Besides, one Bangladesh Institute of Development Studies study (Bhattacharya (1990)) mentioned about 45.6% and 82.3% differences regarding the income per household between the borrowers and the non-borrowers. Furthermore, Rahman (2005), Khalily and Latif, 2010, and Rabbani and Hasan, 2011 found 49.1%, 10.1% and 34.7% differences in the annual income per household, respectively. Again, Khalily and Khaleque, 2011 found 17% differences in the monthly income per household between the borrowers and the non-borrowers.

Also, the differences in consumption expenditure between the borrowers and non-borrowers were determined by many researchers. Khandker (1998) got 16.5% and 23.8% differences in the per capita expenditures, while Rahman (1995) found 10.9% differences in the expenses per household. Moreover, Haldar, 2015 revealed 27.2% difference in the per capita expenditure, while BIDS (1999) mentioned 8.2% differences in the per capita expenditure of borrowers and non-borrowers. Similarly, Khandker (2003) mentions only 2.2% differences (see Badruddoza, 2011).

It can be concluded that the earlier research on urban microfinance showed some positive, little, negative or sometimes no impact on the livelihood of its borrowers. The theme of this paper differs from the previous researches in a point is that it aims to inspect the effect of urban microfinance programs on the livelihood strategies of borrower slum dwellers in Dhaka city, which has been absent in the literature.

3. Methodology

3.1. Research design, sampling, sample size and method of analysis

This is a quantitative research that has been done by collecting both primary and secondary data. The background data were compiled from reliable secondary sources, including different books, research articles, reports, brochures and newspaper articles.

Primary data were collected through a sample survey by administering a face-to-face structured questionnaire survey of some selected slum dwellers of three slums of Dhaka city, namely *Korail*, *Jurain* and *WASA Colony* slum. These are categorized by large, medium and small in terms of area and population size, respectively. The data were collected through the structured questionnaire on the livelihood conditions of the 100 borrowers (treatment group) and the 100 non-borrowers (control group) for the year 2010 and 2015, respectively. Key informant interview (KII) was also done from some key persons of the selected slums. These key persons were the local government councillors, school teachers, community leaders and representatives of religious institutions. Sample respondents were selected through systematic random sampling by visiting several houses, places, corners, markets in the slums. The extensive data on households' information were collected during December 2015 and January 2016. Two survey groups of four members, including one co-author of this paper, collected data in the field survey. Data was then edited, checked for error and stored in SPSS and Microsoft Excel software and was analyzed on stata 13.

Data were analyzed through the econometric technique of difference-in-differences (DID) model as well as the probit model. The DID estimator represents the differences between the pre-post, within-subjects' differences in the treatment and control groups (see Branas, Cheney, & et. al., 2011; Callaway & Sant'anna, 2018). Besides, the econometric technique of probit regression model was also used to examine the data. The probit model helped to appropriately examine the impact of the urban microfinance program on the probability of changes in the occupational status of the borrower respondents, holding all other factors constant (see Wooldridge, 2016).

3.2. Background of the Study Area

Currently, around 1.06 million slum people are living in the 3,399 slum clusters of the Dhaka city (BBS, 2015).To note that Dhaka city is divided into two city corporations called the Dhaka North City Corporation (DNCC) and the Dhaka South City Corporation (DSCC). In this study, three sample slums called *Korail*, *Jurain* and *WASA Colony* slum of Dhaka city were selected as large, medium and small in terms of size from two city corporations of Dhaka city. *Korail* is the largest slum of Dhaka city in terms of population, area and coverage of MFIs (here chosen as a large category slum) (See Image 4).

According to the population census 2011, more than 80,000 people lived in this slum. It is situated in the Gulshan area under the Dhaka North City Corporation. *Jurain* slum is located within Shyampur which is the largest slum of the Dhaka South City Corporation where an estimated 30,000 people lived (here chosen as a medium category slum). The *WASA Colony* slum is situated in Sutrapur under Dhaka South City Corporation where 9,000 people are estimated to dwell (here chosen as a small category firm). Jurain slum is situated adjacent to the rail line of Jurain, Shyampur. MFIs have strong coverage in this slum. Also, MFIs has extensive coverage in the WASA Colony slum.

Table 1
The leading Factors of Migration by the Slum Dwellers (between 1997 and 2015

Causes of Migration of Slum Dwellers	Slum Census 1997 (In percentage)	Slum Census 2015 (In percentage)
Job	39.53	56
poverty or lower income	19.97	28
climate change or river erosion	17.2	7
Uprooted, abandoned, insecurity,	18.18	2
others	5.12	7

Source:(BBS, 1997; BBS, 2015)

These slums are established in the state-owned vacant land. Korail slum is situated at the empty government-owned land adjacent to the Gulshan Lake. Jurain slum was established on the land of government besides the rail line. WASA colony was allocated as the residence for the third and fourth class workers Water Supply and Sewerage Authority (WASA) but they rented the single room of their houses to each single-family. Two or three families live in each home. And each family shares the kitchen and toilet. Though it was a structured residential colony, now it converted to slum (see definition of the slum).

3.3. Data analysis and interpretations

Respondents' information

The household information of the 200 respondents is illustrated in Table 2. Out of the total 200 respondents; most of the respondents were from *Korail* slum (90) followed by *Jurain* slum (70) and *WASA Colony* slum (40). Most of the respondents were women (69%). Most of the respondents were in the age group of 30-39 years among borrowers (46%) and non-borrowers (45%) accordingly. Besides, 87% of the non-borrowers and 83% of the borrowers were married. Among the 100 non-borrowers, 36% of

Table 2
Basic profile of the respondent borrowers and non-borrowers.

		Non-borrowers	Borrowers			Non-borrowers	Borrowers
Variable	classification	Frequency (N = 100 + 100 = 200)		Variable	classification	Frequency (N = 100 + 100 = 200)	
Residence Area	Korail	45	45	Occupation	Housewife	21	27
	Jurain	35	35	(Respondent)	House maid	29	17
	Wasa Colony	20	20		Rickshaw pulling	9	13
Gender	Male 62 (31%) and Female 138 (69%)				Hawking	-	2
Respondent's Age	15–18 years	2	5		Small Business	5	12
	20–29 years	18	19		Private Service/Job	2	7
	30–39 years	45	46		CNG/Car Driver	6	4
	40–49 years	18	14		Garments Worker	1	2
	50–59 years	17	16		Transportation Worker	-	2
Marital Status	Married	87	83		Govt. Service/Job	-	1
	Unmarried	2	10		Construction Labourer	6	1
	Widow/er	9	5		Sewing/Tailoring	1	1
	Divorced	1	1		Begging	1	1
	Separated	1	1		Day Labourer	5	-
Education Achieved (Respondent)	0 (No Education)	64	45		Cleaner	2	-
	Class 1 to 5	25	30		Cook	2	-
	Class 6 to 9	9	17		Electrician	2	-
	SSC	2	3		*Tokai*/garbage collecting street boy	2	-
	HSC or more	0	5		Shoe Repairing	1	-
Number of Members Within the Household	2 members	5	1		Carpenter	1	-
	3 members	22	24		Unemployed (Student)	4	10
	4 members	36	22	Household	Current	12,340	14,140
	5 members	21	23	Income	*(st. dev.)*	*(5,617)*	*(6,360)*
	6 members	7	16	(Average)	5 Year Ago	4,882	5,880
	7 members	5	10	(Monthly, BDT)	*(st. dev.)*	*(3,015)*	*(2,906)*
	8 members	3	1				
	9 members	1	3				
	Average	4.35	4.78				
	(standard error)	*(0.14)*	*(0.15)*				

families had four members followed by three members in the 22% of families. Besides, out of 100 borrowers, 24% of borrower families had three members in the families followed by the five members in the 23% families.

The average number of household size is 4.57. In contrast, the average size for the borrower households have been 4.78, and the corresponding figure for the non-borrower households have been 4.35 (larger average household size for borrower households with t-statistic = -2.06 and p value = 0.041, statistically significant at 5% level). We note that this average household size of 4.57 is found to be higher compared to the nationally representative data for Dhaka division urban areas which were 3.71 (BBS, 2016, pp. 15).

Among the survey respondents, a total of 109 (54%) respondents had no education while only 5% of respondents completed their secondary school education. Since the 69% respondent were women. So the percentage of uneducated among the women respondents is also higher. The observations of author during data collection reveals that migration from village to city, lack of or no opportunity of education from family due to lower-income, socially discouraged because of poor status, and to manage the earnings for family due to migration or lower-income are the main causes of not obtaining education by the women of slum. According to the Education statistics-2018, in Bangladesh, most of the women are uneducated because of financial insolvency, early marriage, no family support, socially discouragement (BES, 2018). Within the occupational status, a maximum of 24% of respondents were housewives who worked for their own family while 23% were housemaids who worked in the houses of families in exchange for money. To note that occupation changed during the previous five years for 46% of borrower respondents (associated with microcredit involvement), whereas it changed for only 7% of non-borrowers (because of a new job or new investment funded by the relatives). With regards to the question of *why did they change occupation* a total of 40 microcredit-borrower respondents out of the 46 respondents whose occupation had changed, mentioned *microcredit loans*, and the remaining six respondents mentioned *finding a new job*. Not a single respondent mentioned himself/herself being the recipient of remittances. On the other hand, only a total of six respondents said themselves as being recipients of the Social Safety Net Programs (SSNPs) (government social safety net support), 4 out of 100 borrower respondents and 2 out of non-borrower respondents. On a different note, a total of 39 respondents reported of receiving some form of charity or *zakat* (Islamic form of charity) – 25 or out of 100 borrowers and 14 out of 100 non-borrowers. The 14 non-borrowers who received charity or zakat received on an average BDT 5,487 (USD 69) per year per household, whereas 25 borrowers who received charity or *zakat* received on a BDT 10,900 (USD 136) per year per household, and the mean difference is statistically significantly different from zero (t-statistic = -3.344 and p-value = 0.0019, statistically significant at 5% level). The average household monthly income during the time of the survey was reported to be BDT 14,140 (USD 177) for the borrower households and BDT 12,340 (USD 154) for the non-borrower households (means t-test exhibits statistically significantly higher average current monthly income for the borrower households compared to the non-borrower households (t-statistic = -2.12 and p-value is 0.0351, so significant at 5% level). With regards to the average household monthly income five years earlier, the reported number for borrowers was BDT 5,882. For non-borrowers, it was BDT 4,882, again the borrower households on average used to earn statistically significantly higher income five years earlier (t-statistic = - 2.38 and p-value is 0.0181, so significant at 5% level). We note that, as per the respondent's self-reporting of their income earnings, actually the non-borrower group has been able to reduce their lag behind the borrower group over the previous five year period, keeping in consideration potential problems of memory recall. Regarding high rate of growth of income figures, we need to adjust these numbers taking into calculation inflation rates that has been quite high during the previous years (consumer price index (CPI) inflation rates in the urban areas have been 9.34, 8.70, 8.02, 7.89 and 6.80 during 2010-11, 2011-12, 2012-13, 2013-14 and 2014-15 respectively (Ministry of Finance, 2017, Appendix 7.2, pp. 14)).

Borrowing behavior of borrowers and non-borrowers

A total of 13 MFIs were providing their services in these three slums during the time of the survey. The names of MFIs by acronyms were DSK, Shakti, BRAC, Buro, Arban, Manobik, ASA, Heed Bangla, Sathi, Grameen Bank, CBO, and PSTC. The largest commercial bank of Bangladesh (Islami Bank Bangladesh Limited (IBBL)) provided microfinance in the slum.

Microfinance Institution makes a mandatory presence in the weekly meeting. Besides, MFIs charges Membership fee as the security money for lending at future, and not for switching to another MFIs. They claim that the higher operational cost and misuse of loan is another cause of taking membership fee (Hossain & Wadood, 2018; Rahman, 2015).

The 85%loan borrowers received microfinance services from a single MFI while 15% and 2% received services from the two and three MFIs simultaneously. As explained by the respondents, 93% borrower took the loans from more than one MFI because of insufficient amount of the loan and the remaining 7% took the loan to pay the loan of another MFI. The Majority percent of the borrowers received the services from the DSK (20%) followed by ASA (17%), BRAC (13%), Shakti (10%), Arban (8%), Sathi (5%), Heed Bangla (3%), IBBL (2%), Grameen Bank (2%), Buro (2%) and CBO (1%) respectively. Furthermore; 42% of borrowers have been received Microfinance services for five years. Among the remaining 58%, 15% has been received for four years, another 15% received for three years, 24% received for two years, while only 4% for one year.

The amount of current loan is 281% higher than the first loan. The amount of the first loan varied from BDT 2,000 to BDT 25,000 while the existing loan ranges from BDT 5, 000 to BDT 70,000. The average loan amount varied widely from a small amount of BDT 2,000 (USD 25) to a large amount of BDT 70,000 (USD 864).

The range of microfinance interest rate was between 15 and 38% and loan repayment period was 46 - 48 weeks. The 100 borrowers reported to use the microfinance credit for the following purposes: investment in the business (44%), buying a rickshaw (22%), buying a house (11%), house repairing (6%), training financed by MFIs (6%), starting a dispensary business (6%), buying a rickshaw van (3%), and buying a boat (2%).

However, the 100 non-borrowers did not participate in the microfinance programs due to following self-reported causes: fear of failure to repay loan (31%), high-interest rate (17%), they deemed the loan to be not necessary (16%), they needed the loan, but MFIs did not provide loans (15%), they had some alternative ways to get the required loan (4%) and do not know about Microfinance

program (2%). Due to the lower extent and coverage or absence of MFIs, many non-borrowers do not know about microfinance. Data depict that only 13 MFIs provide microloans among the 1,19,000 slum dwellers in three slums. The primary sources of funding of the non-borrowers were neighbours (33%) followed by relatives (32%), friends (20%), job place (7%), informal money lender (5%), local co-operative (2%) and private bank (1%).

The loan amount varies from BDT 500 (USD 6.25) to BDT 40,000 (USD 500), and the interest rate ranges from 5% to 30% monthly. The monthly repayment system is executed here. Out of the 100 non-borrowers, four non-borrowers reportedly discontinued from microfinance programs due to high-interest rates that they had to pay.

Income and savings status of the respondents

The average monthly household income of the 100 borrowers and 100 non-borrowers was BDT 14,140 (USD 177) and BDT 12,340 (USD 154) respectively. The average monthly income of borrowers' increased by 140% after receiving the microfinance loans. Around 81% of borrowers reported that their income increased because of microcredit loan (interestingly, average monthly household income increased for the non-borrower group as well, and even in a higher rate, such as, by 153%). Besides, the savings of the borrowers increased after receiving microfinance as compared to the case of the non-borrowers. Before receiving the microfinance loans, 89% of borrowers had no saving at all while only 11% of borrowers had a minimal amount of savings per month that varied from BDT 50 to BDT 200 only.

However, this study collected data on their income and expenditure for 2010 and 2015. The data revealed that 1% and 33% of borrowers were extremely poor[2] and moderate poor[3] in 2010, respectively. The data of income on 2015 disclose that all of them overcame the extreme and moderate poverty line in korail, Jurain and WASA colony slum in this period respectively. Still, their earning is very low because of a) insufficient capital and small business b) no or inadequate educational qualification and thus engaged in low wages job (cleaner, peon, etc.) or self-employment (rickshaw or van driver, small business, hawkers). Such lower-income profession continues the intergenerational poverty either in extreme or moderate format among the slum population. According to the words of respondents, the dwellers of Jurain slum evicted several times compared to the Korail and WASA slum.

In contrast, during the survey, out of 100 borrowers, 99 borrowers had micro-saving per month that varied from BDT 80 to BDT 400. But the non-financial services of the MFIs were very limited compared to the financial (microcredit) services that are shown in Table 3. Table 3 reveals the scenario of the microfinance services in the three slums of Dhaka city (see Table 4).

However, microfinance had some effects on its borrowers as data reveals that the housing and utilities (gas, electricity) conditions improved for the 93% of borrowers after receiving the microfinance. Similarly, water and sanitation conditions also improved for 95% of borrowers.

Open comments regarding microfinance by the respondents

More specifically; Fig. 1 and Fig. 2 are self-explanatory and represents the open comments of 100 borrowers and 100 non-borrowers about microfinance and MFIs.

Comments of the respondents regarding microfinance and MFIs

Additionally, Appendix 1 exhibits some images of housing arrangements from the slum dwellings during the time of the survey.

Effects of microfinance: at a glance

Table 4 depicts this result. Another findings is that, difference in BDT (Bangladeshi Taka) is positive for 9 (out of 11) categories and negative for 2 (out of 11) categories for borrowers. But the borrowers' growth rate is less than the non-borrowers for 9 (out of 11) categories and greater than the non-borrower for 2 (out of 11) categories only.

In contrast, microfinance has a positive impact in livelihood strategy by creating employment, improving housing and utilities (gas, electricity) conditions and water and sanitation conditions of borrowers. Table 5 illustrates this result. Occupation changes for 46% borrowers; among them, 40% get funds from MFIs and invested in the business. Besides, 12% of borrowers do a secondary job and small business (financed by MFIs). Furthermore, housing and utilities (gas, electricity) condition improved for 93% and water and sanitation conditions improved for 95% borrowers. Besides, housing and utilities (gas, electricity) conditions improving rate is 29.03% and water and sanitation conditions improving rate is 31.57% higher for the borrower than the non-borrower.

Moreover, Slum dwellers take Microfinance because it is useful for them in a sense that it provides collateral-free loan for livelihood means. While the formal banking sector does not offer credit for slum population. The Fig. 1 and two depicts that 53% of borrowers and 13% non-borrowers considered microfinance as helpful because microloans finances their livelihood means, small business, houses, etc.

4. Results and discussion

4.1. Difference-in-differences model equations and the estimated results

This study estimate nine Differences-in-Difference (DID) models for three slums of Dhaka City on Income, overall consumption

[2] less than $1.25 income per day in 2015.
[3] less than $2 income per day in 2015.

Table 3
Microfinance Services in the Three slums: At a glance.

Number of MFIs operating in the slums	4 (Korail),11 (Jurain),4 (WASA Colony
Name of MFIs by acronyms (active in these three slums)	ASA, DSK, Buro, Arban, Sathi, Shakti, BRAC,GrameenBank, IBBL, Heed Bangla, PSTC, Manobik and CBO
The range of annual loan size to a borrower	BDT 2,000 (USD 25) to BDT 70,000 (USD 875)
Microcredit interest rate	15–38%
Percent of borrower respondents who do not know the actual savings interest rate offered by MFI[a]	94
Per cent of borrower respondents with both microcredit as well as micro-savings	97
Per cent of borrower respondents who have education service as well as microcredit and micro-savings	3
Per cent of borrower respondents who have training and skill development training program, along with microcredit and micro-savings	1
Per cent of borrower respondents who have only micro-savings	3

[a] Out of 13 microfinance institutions, only BRAC discloses their savings interest rate.

Table 4
Impact of urban microfinance on the borrowers.

Categories	Difference Between Borrower (treatment group) and Non-borrower (Control group) (BDT)	Difference in Increasing rate (%)
Average Monthly Income	+802	−12.29
Average Monthly Overall Expenditure	+776.9	−10.76
Average Monthly Food Expenditure	−43	−6.64
Average Monthly Cloth Expenditure	−30.4	−59.51
Average Monthly Housing and Utility Expenditure	+27.8	−1.53
Average Monthly Education Expenditure	+891	−86.42
Average Monthly Healthcare Expenditure	+143.2	−27.99
Average Monthly Transport Expenditure	+172	−115.50
Average Monthly Savings	+166.9	+886.49
Average Asset Value	+17,885	+135.69

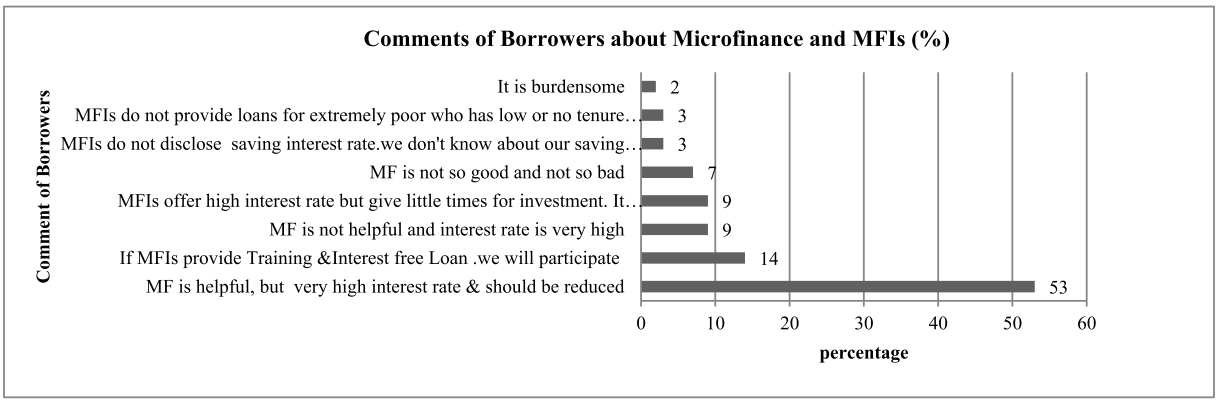

Fig. 1. Comments of borrowers about microfinance and MFIs(%).

expenditure, asset value, savings, housing and utility expenditure, food expenditure, educational expenditure, healthcare expenditure and transportation expenditure respectively. These model specifications are presented through the following equations:

a) The income model equation: $Y = \beta_0 + \delta_0 2015 + \beta_1 T + \delta_1 2015T + e_i$
b) The expenditure model equation: $Yex = \alpha_0 + \theta_0 2015 + \alpha_1 T + \theta_1 2015T + e_i$
c) The asset value model equation: $\omega av = \Phi_0 + \lambda_0 2015 + \Phi_1 T + \lambda_1 2015T + e_i$
d) The savings model equation: $S = \mu_0 + \rho_0 2015 + \mu_1 T + \rho_1 2015T + e_i$
e) The housing and utility expenditure model equation: $Hex = \Omega_0 + \pi_0 2015 + \Omega_1 T + \pi_1 2015T + e_i$
f) The food expenditure model equation: $Fex = \Theta_0 + \phi_0 2015 + \Theta_1 T + \phi_1 2015T + e_i$
g) The educational expenditure model equation: $Eex = \chi_0 + \partial_0 2015 + \chi_1 T + \partial_1 2015T + e_i$
h) The healthcare expenditure model equation: $\hat{H} = \kappa_0 + \varpi_0 2015 + \kappa_1 T + \varpi_1 2015T + e_i$

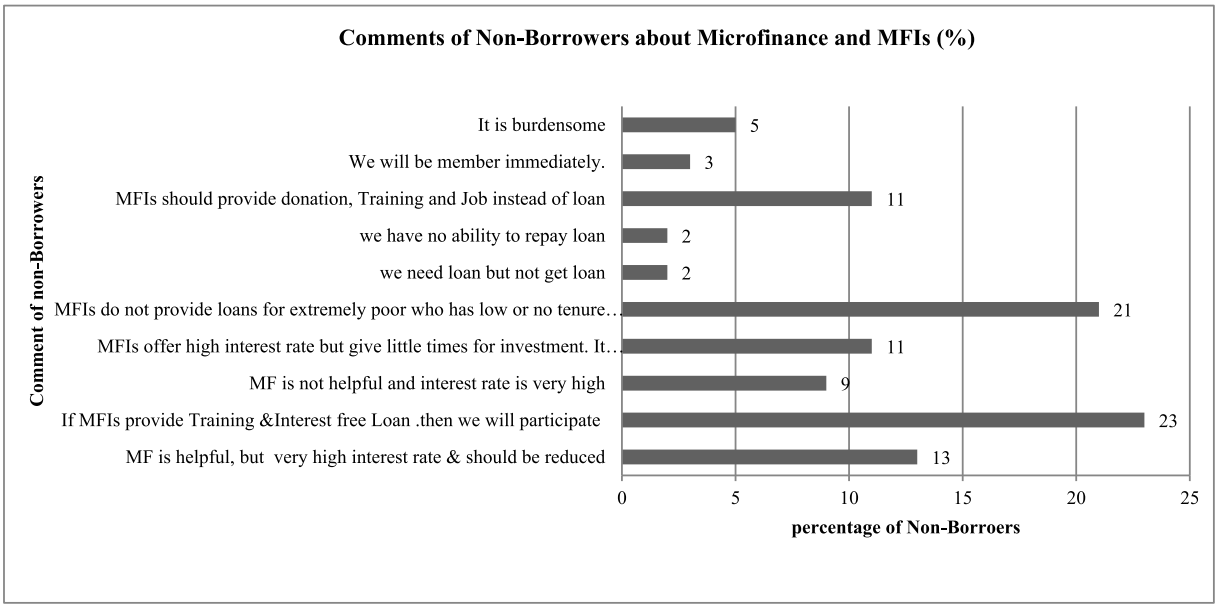

Fig. 2. Comments of non-borrowers about microfinance and MFIs(%).

i) The transportation expenditure model equation: $Tex = \Phi_0 + \vartheta_0 2015 + \Phi_1 T + \vartheta_1 2015T + e_i$

Herein the Income Model Equation: $Y = \beta_0 + \delta_0 2015 + \beta_1 T + \delta_1 2015T + e_i$

Here, Y= dependent variable and monthly income of the borrower. It measures the Impact of urban microfinance on Income; 2015 denotes the Year 2015, 1 and 2 represent the first and second period. Moreover, T and C stand for the treatment group and the control group respectively, β_0= Income of non-borrower (control group) in 2010. β_1= It measures the differences in the income of treatment (borrower) and control group (non-borrower) before receiving the Microfinance in 2010.δ_0 = It includes the change in Income of both groups: control (non-borrower) and treatment (borrower) groups between 2010 and 2015. δ_1 =this is called as 'difference in differences estimator'. It shows the change in income of the treatment (borrower) group between 2010 and 2015. Besides, it measures the effect of the treatment on the average monthly income (Y).e_i=error term.

And in the other equations:

Y*ex*, *ωa v*, S, H*e x*, F*ex*, E*e x*, $\hat{H}$, T*ex*= dependent variable and monthly overall consumption expenditure, asset value, monthly savings, monthly housing and utility expenditure, food expenditure, education, healthcare and transportation expenditure of the borrower. It measures the impact of urban microfinance on these categories;

α_0, Φ_0 , μ_0, Ω_0, Θ_0, χ_0, κ_0, Φ_0= monthly overall consumption expenditure, asset value, monthly savings, monthly housing and utility expenditure, Food expenditure, Educational, healthcare and transportation expenditure of the non-borrower (control group) in 2010.

α_1, Φ_1 , μ_1, Ω_1, Θ_1, χ_1, κ_1, Φ_1= it measures the differences in the monthly overall consumption expenditure, asset value, monthly savings, monthly housing and utility expenditure, Food expenditure, Educational, healthcare and transportation expenditure of treatment (borrower) and control group (non-borrower)before receiving the Microfinance in 2010.

θ_0, λ_0, ρ_0, π_0, ϕ_0, ∂_0, ϖ_0, ϑ_0= It includes the change in monthly overall consumption expenditure, asset value, monthly savings, monthly housing and utility expenditure, Food expenditure, Educational, healthcare and transportation expenditure of both groups: Control (non-borrower) and treatment (borrower) group between 2010 and 2015.

θ_1, λ_1 , ρ_1, π_1, ϕ_1, ∂_1, ϖ_1, ϑ_1= this is called as difference in differences estimators. It shothe ws the change in monthly overall consumption expenditure, asset value, monthly savings, monthly housing and utility expenditure, Food expenditure, Educational, healthcare and transportation expenditure of treatment (borrower) group between 2010 and 2015. Besides, it measures the effect of the treatment on the monthly consumption expenditure, asset value, monthly savings, monthly housing and utility expenditure, food

Table 5
Impact of Urban Microfinance on the employment, housing, water and sanitation conditions.

Category	Borrower	Non-borrower	Difference
Primary Occupation Changed	46	7	+39
Secondary Occupation Started	12	4	+8
Housing and Utilities (gas, electricity) Conditions Improved	93	66	+27
Water and Sanitation Conditions Improved	95	65	+30

Table 6
Difference-in-Differences Model Estimation Results for 100 Borrowers and 100 Non-borrowers in the three slums: Korail, Jurain and WASA Colony slum (showing only p-values).

Category	a	b	c	d
	Three slums: Diff-in-Diff P > |t|	Korail slum: Diff-in-Diff P > |t|	Jurain slum: Diff-in-Diff P > |t|	WASA slum: Diff-in-Diff P > |t|
Income	0.397	0.583	0.374	0.287
Income with covariance	0.396	0.562	0.374	0.290
Expenditure (overall)	0.403	0.459	0.271	0.291
Asset value	0.203	0.176	0.239	0.806
Savings	0.000***	0.000***	0.001***	0.001***
Housing and utility expenditure	0.910	0.416	0.566	0.630
Food expenditure	0.910	-	-	-
Educational expenditure	0.013**	0.071*	0.177	0.245
Healthcare expenditure	0.198	0.232	0.760	0.498
Transportation expenditure	0.005***	0.000***	0.471	0.021**

Inference: ***p < 0.01; **p < 0.05; *p < 0.1.

expenditure, educational, healthcare and transportation expenditure. e_i=error term.

The estimation results of the models have been presented in Table 6. The DID model was estimated for 4 cases. The first case (Table 6, column-a) combines the three slums whereas the second, third and fourth case draw the model for *Korail* (Table 6,column-b), *Jurain* (Table 6,column-c) and the WASA Colony slum (Table 6,column-d) separately.

In Table 3, the first column depicts the difference-in-differences (DID) model estimated p-values for three slums combined. The estimated p-values have been found to be statistically significant for savings changes (at the 1% level of significance), educational expenses (5% level of significance) and transportation spending (at the 1% level of significance).

The second column shows the result for the *Korail* slum only. Out of eight categories, difference-in-differences (DID) model estimated p-values were found to be statistically significant for savings changes (at the 1% level of significance), educational expenses (10% level of significance) and transportation spending (1% level of significance) respectively. With regards to Jurain slum only (third column), the result was found significant for savings changes at the 1% level of significance. In case of the WASA colony slum only (fourth column), the estimated coefficients were found to be statistically significant only for savings changes (at the 1% level of significance) and transportation expenses (5% level of significance). It can be summarized that there has not been any clear advancements of the micro-credit borrower group over the micro-credit non-borrower group that have developed during the five year period under consideration, except for some particular areas of livelihood, such as, educational expenses, transportation expenses and most importantly, savings behavior. Since micro-credit ties up compulsory savings component, this actually translates into higher amount of family savings for borrower households. *One issue that has not been examined in the DID estimation is the case of changes in occupation. We examine the case of changes in occupation with the help of the probit model.*

4.2. The probit model of changing the occupations of the respondents and the estimated results

The following model is a model of respondent's occupation change, where the observed binary dependent variable ($Occchngr_i$) is defined as follows (see Wooldridge, 2016, pp. 524–536, Gujarati 2011, pp. 151–153):

$Occchngr_i = 1$ if the occupation changed for the i-th respondent, $Occchngr_i = 0$ if the occupation did not change. The purpose of this model is to inspect the impact of slum location, age, gender, marital status, family size, microfinance borrowing, education, charity, value of assets five years ago, positive amount of savings if any five years ago, average monthly household income five years ago, on the probability of changing the occupation of the respondent.

$$\begin{aligned}\Pr(occchngr_i = 1|X) = G(&\beta_o + \beta_1 korail_i + \beta_2 jurain_i + \beta_3 age_i + \beta_4 agera50_i + \beta_5 agerb30and50_i \\ &+\beta_6 female_i + \beta_7 married_i + \beta_8 fammember_i + \beta_9 borw\_type_i \\ &+\beta_{10} edursome_i \\ &+\beta_{11} edu2some_i + \beta_{12} charitysome_i + \beta_{13} positsaving5yrago_i \\ &+\beta_{14} lnvasset5yrago_i + \beta_{15} lnincome5yrago_i)\end{aligned}$$

(G is a function taking on values strictly between zero and one, $0 < G(z) < 1$, for all real numbers z). This is to note that the error term in the probit model has the normal distribution. With the help of this normality assumption, the probability that I_i^* is $\leq I_i$ is calculated from the standard normal cumulative distribution function (CDF) such as,

$$P_i = \Pr(Y = 1|X) = \Pr(I_i^* \leq I_i) = \Pr(Z_i \leq BX) = F(BX)$$

here $\Pr(Y = 1|X)$ means the probability that the event occurs (such as the respondent changes his/her occupation), given the values of the regressor X variables and Z is the standard normal variable with zero mean and unit variance, and F is the standard normal CDF.

Here, with regards to the construction of this econometric specification, we have selected some regressor variables which we assume to be able to explain the probability variations of the dependent variable, occchngr$_i$), assuming standard normal distribution for the error term. We assume *slum locations* (such as two slum dummies) to matter with respect to change of occupations, in the sense that the probably may differ across slums. We assume *age category* variables to explain some variations too, since it is expected that with higher age, probability of change of occupation may fall. We also assume some particular *family characteristics* may influence the probability as well, such as being female, being married, number of family members, education of the respondent himself/herself and that of his/her spouse. *Previous income and wealth variables* are expected to influence probability of change of occupation, such as whether positive amount of savings was there five years earlier, natural log of valuation of household assets five years ago, natural log of average monthly household income five years earlier, and also some charity or zakaat has been received by the household or not. Finally we expect *microcredit borrowing status* to influence probability (use dummy for being a microcredit borrower or not).

With regards to the notations for the regressor variables:

korail$_i$: dummy, whether i-th respondent is a resident of *korail* slum (1 = yes, 0 = not).
jurain$_i$: dummy, whether i-th respondent is a resident of *jurain* slum (1 = yes, 0 = not).
age$_i$: age of the i-th respondent.
agera50$_i$: dummy, whether age of the respondent is above 50 (1 = yes, 0 = not).
agerb30and50$_i$: dummy, whether age of the respondent is in between 30 and 50(1 = yes, 0 = not).
female$_i$: dummy, whether i-th respondent is a female (1 = yes, 0 = not).
married$_i$: dummy, whether i-th respondent is married (1 = yes, 0 = not).
fammember$_i$: number of family members of the i-th respondent.
edursome$_i$: dummy, whether i-th respondent has some education (1 = yes, 0 = not).
edu2some$_i$: dummy, whether spouse of the i-th respondent has some education (1 = yes, 0 = not).
charitysome$_i$: dummy, whether i-th respondent family receives some charity or zakaat(1 = yes, 0 = not).
positsaving5yrago$_i$: dummy, whether i-th respondent has positive savings 5 years ago (1 = yes, 0 = not).
lnvasset5yrago$_i$: natural log of value of household assets 5 years ago.
lnincome5yrago$_i$: natural log of average household monthly income 5 years ago.

Tables 7to8 and Fig. 3 exhibit results from the abovementioned probit regression model (we also examined logit regression models and the outcomes are very similar). Table 7 exhibits that regressors with high impact on probability of occupation change are

Table 7
Probit regression results.

Probit regression Log pseudolikelihood = - 80.349		Number of obs = 200 Wald chi2 (15) = 53.67 Prob > chi2 = 0.000 Pseudo R2 = 0.305		
occchangr	coefficients	Robust std. err.	z	p > |z|
korail	0.466	0.428	1.09	0.276
jurain	0.627*	0.380	1.65	0.099
age	- 0.065***	0.022	- 3.02	0.003
agera50	1.793**	0.771	2.33	0.020
agerb30and50	0.851**	0.380	2.24	0.025
female	- 0.103	0.269	- 0.38	0.701
married	0.192	0.325	0.59	0.554
fammember	- 0.174**	0.086	- 2.01	0.044
borw_type	1.459***	0.278	5.25	0.000
edursome	0.013	0.268	0.05	0.963
edu2some	0.410*	0.237	1.73	0.084
charitysome	0.419	0.274	1.53	0.126
positsaving5yrago	0.434	0.411	1.06	0.291
lnvasset5yrago	0.170	0.140	1.22	0.224
lnincome5yrago	−0.355	0.368	−0.96	0.335
constant	1.40	2.877	0.49	0.626

Joint significance tests:

(1) test korail jurain:	chi2 (2) = 2.92,	prob > chi2 = 0.232
(2) test age agera50 agerb30and50:	chi2 (3) = 9.95**,	prob > chi2 = 0.019
(3) test female married fammember:	chi2 (3) = 5.06,	prob > chi2 = 0.167
(4) test borw_type:	chi2 (1) = 27.57***,	prob > chi2 = 0.000
(5) test edursome edu2some:	chi2 (2) = 3.27,	prob > chi2 = 0.195
(6) test charitysome:	chi2 (1) = 2.34,	prob > chi2 = 0.126
(7) test positsaving5yrago lnvasset5yrago lnincome5yrago:	chi2 (3) = 2.29,	prob > chi2 = 0.514
estat classification result:		
correctly classified: 82.00%		

Inference: ***p < 0.01; **p < 0.05; *p < 0.1.

Table 8
Marginal effects after probit.

y = Pr(occchngr) (predict)
= 0.178

variable	dy/dx	Std. err.	z	P > |z|	X
korail[a]	0.124	0.113	1.09	0.275	0.45
jurain[a]	0.176	0.110	1.61	0.108	0.35
age	- 0.017***	0.006	- 3.01	0.003	35.735
agera50[a]	0.624***	0.228	2.73	0.006	0.075
agerb30and50[a]	0.187***	0.069	2.70	0.007	0.705
female[a]	- 0.027	0.071	−0.38	0.703	0.645
married[a]	0.047	0.074	0.63	0.526	0.85
fammember	−0.045*	0.024	−1.92	0.055	4.565
borw_type[a]	0.374***	0.06	6.22	0.000	0.5
edursome[a]	0.003	0.070	0.05	0.963	0.455
edu2some[a]	0.107*	0.064	1.68	0.093	0.485
charitysome[a]	0.120	0.087	1.38	0.167	0.225
positsaving5yrago[a]	0.131	0.137	0.96	0.336	0.07
lnvasset5yrago	0.044	0.036	1.23	0.221	8.703
lnincome5yrago	−0.092	0.092	−1.01	0.314	8.444

Inference: ***p < 0.01; **p < 0.05; *p < 0.1.
[a] dy/dx is for discrete change of dummy variable from 0 to 1.

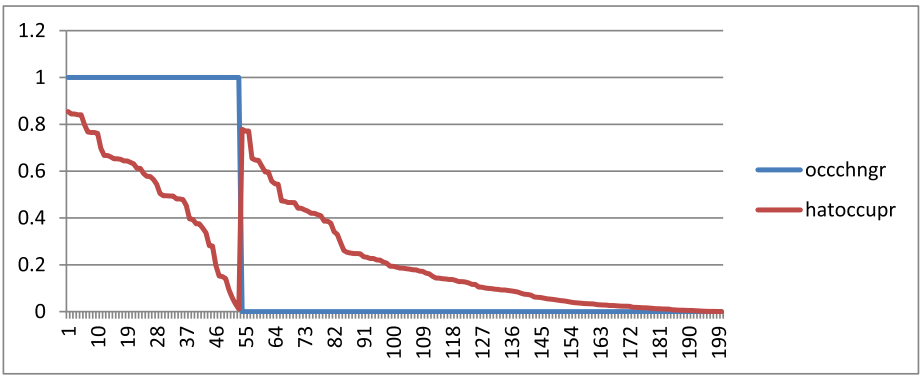

Fig. 3. Actual value of the dependent variable (occchngr, either 1 or 0) and probit model predicted probability values (hatoccupr, in between 0 and 1) (sorted data).

borw_type, *jurain*, *age*, *agera50*, *agerb30and50*, *fammember* and *edu2some*. With Wald chi square value of 53.67 (prob > chi2 = 0.000) and pseudo r square value of 0.305, the model correctly classified the outcomes 82% of the time. With regards to joint significance tests, *location* variables, *family characteristics* variables, *education* variables, *charity* receipts, or *income and savings status of five years ago* were not found to be jointly significant. Only types of variables found significant in the joint significance tests were the *age* variables and the *microcredit borrowing*. Table 5 exhibits the marginal effects after probit. Holding all other factors constant, the probability that the respondent may have changed his/her occupation during the last five years would increase by 37.4% if the respondent is a microcredit borrower rather than a microcredit non-borrower (dy/dx calculated at the mean value of borw_type, such as at X = 0.5). Similarly, the probability that the respondent would have changed his/her occupation during the last five years would actually decrease with one additional year of age of the respondent, by a value of 1.7% (dy/dx calculated at the mean value of age, such as at X = 35.375, controlling for all other variables). To note that higher number of family members lead to lowered probability of change of occupation (at mean value of X = 4.565), and this is statistically significant at 10% level, and this is an expected sign. Interestingly, the probability of occupation change did not differ much across slum locations, such as exhibited by the coefficients of the dummy variables *korail* (p-value = 0.276) and *jurain* (p-value = 0.099). Yet a p-value at around 10% level implies that compared to the base of *wasa colony slum*, the probability of occupation change is bit higher in the case of the *jurain* slum, and somewhat similar in the case of the *korail* slum. We can infer that whether the probability of occupation change will be higher or lower within a slum location, does not depend specifically on the size of the slum itself, but may be on the way microcredit has evolved in that particular slum as compared to other slums, etc. Since slum dwellers depend on the informal sector for their livelihood, education variables did not exhibit much statistical significance. Finally, Fig. 3 exhibits matching of model predicted values of probability of occupation change as compared to the actual decision that was made (only takes values of 0 or 1).

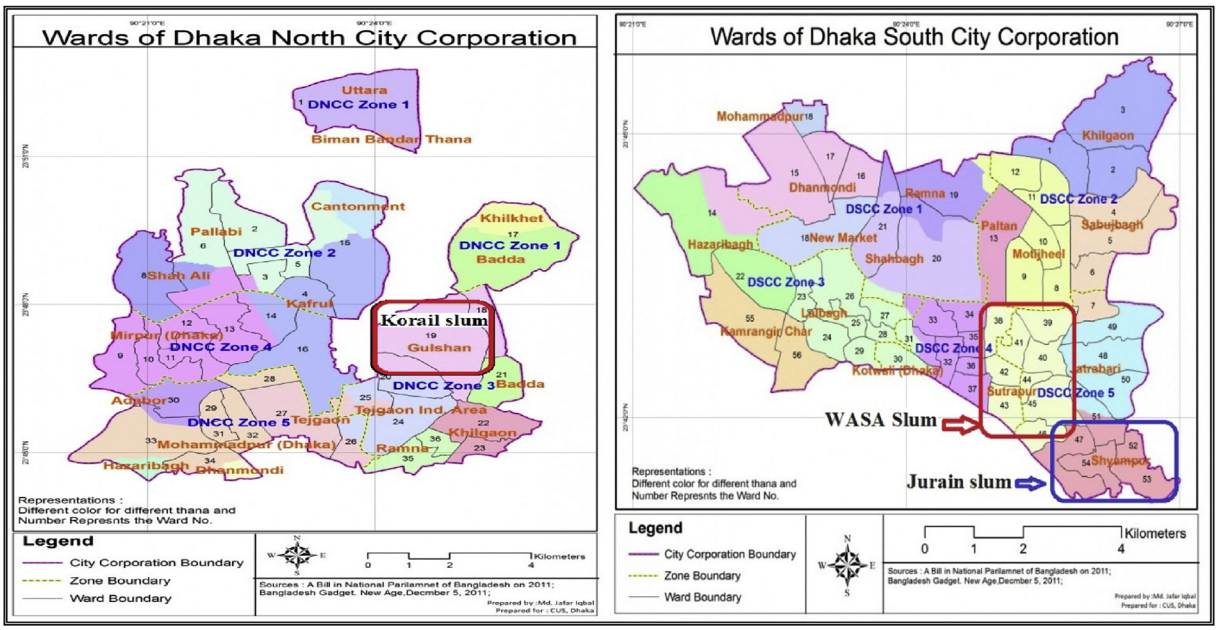

Image 1. Maps of the study area.
Source: Dhaka North and Dhaka South City Corporations.

5. Policy recommendations

It can be said that the urban microfinance has been found to be having some positive impact on the livelihood strategies of borrower slum dwellers of the Dhaka city in Bangladesh. The findings of this paper strengthen the basis of informal financing for the poor people in the metropolitan cities as compared to its counterpart formal financing. Furthermore, this paper recommends some policies in this regard.

i. *Government Policy and Slum Development Program:* It is very difficult for MFIs to provide microcredit to the extremely poor slum dwellers that have no tenure security. since donations does not ensure a long-lasting outcome. So, precise development schemes can be taken for slum dwellers by the Government of Bangladesh and the MFIs. The government should rehabilitate the slum dwellers in the government-owned land by constructing buildings. There can be arrangements that they will pay the rent to the government for the houses with help from the Ministry of Social Welfare.
ii. *Providing other services (other than microcredit) by MFIs*: Only 5% of borrowers got other services (education, training, safe drinking water and sanitation) from MFIs other than microcredit. The MFIs need to emphasize these services including micro-insurance and healthcare services etc. (Discussed in the section 1.2).
iii. *Proving adequate time for realization of microcredit investment:* MFIs should provide adequate time or at least one month for processing the investment so that the borrower may invest money and can gain the profit. Instalment of loan repayment should be started after one month of loan delivery whereas currently, repayment instalment starts after just one week later of receiving Microcredit. Moreover; instalment should be set on a monthly basis instead of weekly. (Discussed in the open comments; pp.17).
iv. *Interest rate (microcredit):* a high 53% of the borrowers and 13% of the non-borrowers of micro-credit complained that the interest rate is very high and it should be reduced. Because the microcredit interest rate (20–38%) has been higher compared to the formal banking interest rate (9–12%) in Bangladesh. Moreover, MFIs should offer interest-free loans or loan at the lowest interest rate for some vulnerable poor people, if there is a scope. The MFIs should apply the declining interest rate instead of a flat interest rate.
v. *Interest rate (savings):* most of these institutions do not disclose the saving interest rate and the savings related information even to the savers (borrowers) in the three slums, as has been claimed by the respondents. Out of 13 microfinance institutions, only BRAC discloses their savings interest rate. Among the respondents, BRAC occupied 13% share (3rd largest share) and remaining share are hold by other MFIs. In Bangladesh, BRAC is the second largest market share with 6.8 million members while ASA has the largest market share with 7.5 million members (CDF, 2019). Lack of monitoring is may be the driving factor or reason behind not exposing savings interest rate. The MFIs need to be more transparent about the savings of the borrowers, which will encourage them to save more.
vi. *The Market for Informal Products:* the government and the MFIs should establish several markets for the informal sector in different areas of the Dhaka city. This market will encourage the slum borrowers to produce and sell their handicraft products and showcase their entrepreneurial talents.

6. Conclusion

This paper summarizes that the slum is the anomaly of the urbanization. The lower-income people who mainly work in the informal sector or migrated from village to city for employment, poverty and the victim of climate change are compelled to live in the slum. It inspects the effect of urban microfinance on the livelihood strategies of 200 sample slum households (100 borrowers and 100 non-borrowers) of three slums (*Korail*, *Jurain* and *WASA Colony slum*) of the Dhaka city, Bangladesh. A sample slum survey was done through a structured questionnaire by systematic random sampling. This paper tested the microfinance impact on its borrower by using econometric techniques *difference in differences* (DID) and the *probit model* in Stata13. This paper finds that the urban microfinance has a significant positive impact on savings, educational expenditure, and transportation expenditure, but not has significant effects on Income generation, overall consumption expenditures, increasing asset value, housing and utility expenditure, food expenditure and healthcare expenditure. Moreover, the probability of changing occupations of the microfinance-borrowers is statistically significantly higher compared to the case of the non-borrowers. Microfinance funds positively contributed to buying the livelihood means such as Rickshaw, Van, Boat, etc. and starting a new business. Besides, Microfinance improved the housing, utility usages, water and sanitation of the borrowers. The findings of this study are consistent with the earlier research results. This study is not related to the land titling program. Besides, recognizes contributions of the microfinance institutions (MFIs) to its slum borrowers in Bangladesh. Finally, this study sort out some points for the development workers and community: a) this study highlights the successes, failures and gaps of MFIs in small financing and reducing extreme poverty among the urban areas especially slum of the Dhaka city, Bangladesh. b) Still slum dwellers are deprived from basic needs and facilities. For instance, education, healthcare, awareness, utility services (electricity, gas, drinking water). The development organizations may work in these regards. c) The slum people urge for training and skill development program (with fee) instead of charity or donation; it is another area for working. d) Women households in slum areas are diligent, and hard workers (as they served as a homemaker, housemaid, part-time in small business) and they are trying to produce handicrafts, local mat with tree-leaf, home appliances, etc. it is another scope for the development community. e) Children of the slum are engaged in informal areas such as garbage collection or working in the garage. The organizations concerned about children may take their project for slum children.

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Appendix 1. Some images of the selected slums

Housing condition of the Dhaka slum: Korail (during survey)

Kitchen room and the common bathroom in the Dhaka slum: Korail (During Survey)

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