Sustainable anti-poverty strategies in times of crisis: a comparison between formal credit through transfers and microfinance versus informal saving mechanisms

Ahmad Nawaz*, Mahin Jahangir†, Asad Kamran Ghalib‡

Abstract

Crises do hit hard on the marginalized households exacerbating their vulnerabilities. The usual credit interventions come from state through transfers and grants and also in the form of micro-credit from formal institutions. In addition, access to informal saving mechanism of Rotating Saving & Credit Associations (ROSCAs) also plays an important role in mitigating the negative consequences of crisis. In this backdrop, this study investigates the efficacy of the afore-mentioned credit interventions in reducing income and food vulnerabilities of households during the crisis times. We exploit a primary household survey data collected in the summer of 2021 when the pandemic was at its peak. The sample consists of 508 households residing in five towns in a semi-urban area of Lahore City of Punjab Province. Our findings show that informal access to credit through ROSCAs had the maximum impact in reducing income and food vulnerabilities of households followed by the state-led transfer and grants. Whereas microfinance interventions were the least effective in mitigating the negative consequences during the crisis. It may suggest that ROSCA participants were more resilient in withstanding idiosyncratic shocks thus better and hence they managed to smoothen their consumption levels, thus ensuring their income and food security. In other words, the unconditional credit interventions may be more effective than conditional cash transfers schemes in crisis times. Therefore, this study calls for hybrid credit interventions having a feature of both conditional and unconditional cash transfers to better cater to the marginalized communities' wellbeing during the crisis times in sustainable way.

Keywords: Vulnerabilities, Microfinance, ROSCAs, Impact Analysis, COVID Times

1. Introduction

The COVID-19 pandemic had such a profound impact on the global economy that it was declared a public health emergency (Coibion et al.,2020). The pandemic called for drastic changes in day to day interactions due to the lockdown and curfews imposed by the national governments resulting in loss of millions of jobs (Sangwan et al.,2020). 7 million people were forced into unemployment and poverty during this time (World Bank, 2020). At the same time, many national Governments had to provide financial assistance to help mitigate the negative consequences of high unemployment levels (Boramy & Grabowskly, 2020).

Needless to say, the formal interventions on the part of the money-starved governments around the world to absorb the negative shocks of COVID were not enough to provide a cushion to the affected households. Microfinance has played a pivotal role in providing financial services to low-income individuals who have been excluded from formal institutions for years. Microfinance institutions aim to alleviate poverty by providing loans, financial services, and insurance allowing individuals to set up a small-scale business, invest in an already operating business, smooth consumption, and manage risks (Aghion & Murdoch, 2005; Robinson, 2001). Murdoch (1999) reports access to microcredit has a spillover effect as it further provides employment to family and community

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* Associate Professor, Faculty of Economics & Graduate Institute of Development Studies, Lahore School of Economics, Ahmad.nawaz@lahoreschool.edu.pk

† MPhil Scholar, Graduate Institute of Development Studies, Lahore School of Economics, mahinjahangeer@gmail.com

‡ Principle Lecturer, Department of Management Sciences, Liverpool Hope University, Liverpool, UK, ghaliba@hope.ac.uk

members and helps individuals retain profit. Studies conducted in the early 90s by Pitt and Khandker (1996) second this finding with their study conducted in Bangladesh. They learned that for every 100 takas lent to a woman, the annual household expenditure increased by 18 takas. This proved to be of great success for 5% of the clientele of this program as they managed to lift out of poverty (Khandker, 1998).

Despite the existence of microfinance institutions in providing credit to the poor, studies have estimated that 2.7 billion adults in developing nations remain unbanked (CGAP, 2009). Even those who do have access to basic banking services face significant credit constraints (Banerjee and Duflo, 2004). The microfinance model of lending relies heavily on payment of predetermined fixed interest rates on the microloans. The success of this model is contingent on several factors such as the management of loan repayment schedules and interest rates (Kiva, 2020). Ghosh (2013) highlights how Microfinance institutions charge high interest rates to cover operational costs thereby burdening the borrowers. Similarly, Karlan and Zinman (2011) in their research provide evidence that microfinance does not lead to improvements in household welfare raising concerns about the effectiveness of these programs.

However, the negative side of this mechanism has received less attention. Despite being a popular mechanism in developing countries, microfinance faces criticism for not reaching the core poor (Weiss & Montgomery, 2005). Shaw (2004) finds that microcredit did not have a significant impact on poverty reduction. A study conducted by Bateman (2007; 2010) in Bosnia revealed that clients of Microfinance Institutions reported a high failure rate, in fact, clients went into deeper poverty than they were before taking the loan. Therefore, Microfinance in reality is a poverty trap that damages local economic and social development (Bateman, 2010: 5). Other than this Microfinance is criticised because of its commercialization and the high interest rates (Karnani, 2007; Bateman 2010). Biswas (2010) talks about suicides by microcredit clients in Andhra Pardesh, India due to shame encountered from not being able to pay back the loan (The Economist, 2006b). Montgomery (1996) criticizes the debt collection strategies Microfinance institutions use and the fake claims about women's empowerment (Rahman, 1999; 2001).

Therefore, the informal form of interventions may provide a substitute but their efficacy is still not very clear due to the lack of empirical evidence. Among many of those informal saving mechanisms is Rotating and Saving Credit Associations (ROSCAs), which is a form of community-saving groups. This mechanism remained instrumental in providing financial support to millions of households during this calamity.

ROSCAs are informal savings mechanisms formed through social networks and provide interest-free loans to those who participate. Each participant contributes a fixed sum to a collective fund and receives a full sum at least once (Armendariz & Morduch, 2005). These groups consist of people from the same neighbourhood (Rutherford, 1997), with the cycle lasting a year. The funds help cover expenses such as school fees or household items (Gurgerty, 2007). ROSCAs play an important role in meeting life cycle needs. These are appropriate for dealing with idiosyncratic events rather than saving for old age. Aggarwal et al. (2018) suggest that the benefit of joining ROSCAs isn't constrained to the purchase of durable goods but also to develop a source of excessive earnings. Individuals also join ROSCA to save and invest (Gugerty, 2007).

Theoretical perspectives on ROSCAs highlight their function in consumption smoothing and management of risk. Besley, Coate, and Loury (1993) describe ROSCA as a self-enforcing contract where the cyclical distribution of funds incentivizes members to honour their

contributions. Other than facilitating saving, the structure reduces the risk of default. Bouman (1995) mentions how ROSCAs in agrarian economies where income is mostly seasonal enable households to smooth income over the year and make necessary purchases, including food, thereby reducing food insecurities. Nici Nelson, a social anthropologist for 22 years observed a ROSCA in Nairobi, Kenya from 1971 to 1993. She mentions how the number of people in the group initially in 1971 was 20, all women who had houses in the Mathare valley. The group met once a week and contributed K.sh 12 each week from which a total of K.sh 240 was given to a participant of the group. This total was more than the monthly minimum wage in Kenya which at that time was 150. This cycle took 5 months to complete (Nelson 1996, p.54).

The concept of ROSCAs first emerged in the subcontinent in the early 1900s and was popularly known as Kamettis. To date, they are one of the most popular means of saving mainly among women (Ardener & Burman, 1995, Czura & Klonner, 2018). The accounts of ROSCAs are simple as no storage of funds is needed because the money goes from one pocket to another. This process comes in 3 different variants with the first being where members decide who gets the pot. The second is random selection and the third is bidding for a given pot. ROSCAs operate on 3 very important assumptions. The first is that participants of ROSCA wish to buy an indivisible durable good; the second is that these members are impatient to do so. The third assumption is that participants keep turning up and pooling in the pot until every participant has had the chance (Armendariz and Murdoch, 2005). Saving programs such as this are a good alternative for those residing in rural areas as they provide a financial safety net. Participants can use these savings to smooth consumption, deal with illnesses, pay school fees, and even start or expand a small business.

Therefore, the role of ROSCAs as an informal credit-saving mechanism during testing times like the pandemic is critical. These savings acted as an emergency fund for those who had lost their livelihood and helped them cope with financial stress. Savings mobilization is important for individual and societal welfare. At the individual level, they help households' smooth consumption and aid in investing in human and business capital. At the macroeconomic level, savings are an important predictor of future economic growth. For low-income groups and the poor, savings are difficult because of resource scarcity (Laureti & Szafarz, 2014).

Participants of ROSCAs in South Africa revealed how they didn't have to experience hunger or food insecurity after being part of a savings group (Bophela & Khumala, 2019). Savings groups are women's biggest source of resilience. Women part of saving groups were half as likely to report impacts on areas such as livelihood, food, and health compared to those who weren't (CARE, 2022), Anderson and Baland (2002) talk about how ROSCAs are a way of forceful saving. Anderson and Treich (2002) argue that ROSCA communities follow a framework of social obligations where the richer people are obliged to help their poor relatives. By being part of a ROSCA they avoid such obligations.

The success and sustainability of ROSCAs is dependent on social collateral (Handan & Kirtin, 1999). In case a member defaults, he or she may not be accepted as a member of any other. The exclusion is considered a serious deprivation (Brink & Chavas, 1997; Biggart, 2001). Since members are part of a close-knit community, social pressure and peer monitoring reduces the likelihood of defaults. Community based oversight is a powerful mechanism ensuring that participants meet their obligations (Calomiris & Rajaraman, 1998). Biggart (2001) notes how divorced and separated people face difficulty in obtaining a ROSCA membership due to cultural

and social norms. These individuals are viewed as irresponsible and not being able to keep up with promises.

Expenses in emergencies and security issues are an additional threat to poor people's savings. However, according to Collins (2009) poor households save actively. Household surveys have been conducted that show that the poor do have some surplus that they use for non-essential expenditure (Banerjee & Duflo, 2007). Access to savings has multiple benefits, for starters it encourages female empowerment (Ashraf et al., 2010; Guerin, 2006) and female business investment (Dupas & Robinson, 2013a). Savings help people cope with health emergencies (Dupas & Robinson, 2012b). According to Robinson (2001) access to savings is even more important than access to credit.

The World Bank estimates that 100 million people in Pakistan lack access to formal financial services and instead rely on informal channels. A report from Financial Inclusion Insight (2013) shows that 36% of Pakistanis save money, with only 4% saving through formal institutions while 33% use ROSCA. A research by Oraan states that 41% of Pakistanis save through committees whereas Karandaaz estimates the figure to be 34%. Pakistan Institute of Development Economics suggests that the informal economy accounts for 30% of the total economy, this translates into an estimated 4 Trillion rupees in annual committee savings at the base price (Dawn, 2022).

In addition, the pandemic has also posed a serious threat to global food security by disrupting the food supply chains, resulting in a steep decline in the incomes of millions of households worldwide (Scudellari, 2020). The pandemic particularly hit hard for the populations living below and close to the poverty line because the loss of income had severely affected their food security through loss in nutritional level (FAO & CELAC, 2020). Vulnerable people were not able to fulfil basic requirements, less income led to lesser demand for nutrient-rich foods.

Travkina, Froy and Pyne (2013) talk about how participation in ROSCAs also mitigates food insecurity and socioeconomic inequality. The COVID-19 aggravated the food insecurity situation and poverty leading to health consequences globally (Singh et al., 2021).

According to FAO (2017) food security can be described as a situation when people have physical, economic and social access to safe, nutritious and sufficient food that meets their dietary needs for a healthier lifestyle. ROSCAs enhance food security by allowing members to use their resources and purchase food in bulk thereby reducing per unit costs and ensuring a steady supply of staples. The cyclical nature of ROSCAs provide financial resilience and help households maintain levels of food consumptions during times of income stability (Besley et al., 1993). In agrarian economies income is seasonal, ROSCAs smooth income over the year and enables households to make food purchases and mitigate food insecurity (Bouman, 1995).

The resilience strategies through informal saving mechanisms such as ROSCAs in the communities residing in semi-urban areas and its comparison with the formal credit intervention schemes is an interesting avenue of research. Particularly in the context of Pakistan, there is limited research addressing the role of ROSCAS in mitigating vulnerabilities during COVID-19. Therefore, this study aims to fill in the void by taking the focus on formal interventions such as Microfinance in reducing vulnerabilities towards the informal saving strategies of ROSCAs. It would be highly imperative to see the findings of this study which can be used for informed policy making. The paper adopts a quantitative approach to look at the impact of ROSCAs in reducing vulnerabilities in semi-urban settings. The sample of this study includes 508 micro-entrepreneurs who have access to various credit schemes including formal microfinance and informal ROSCAs.

The research question, therefore is "Does access to informal savings (ROSCAS) help reduce household vulnerabilities during the pandemic COVID-19 controlling for household characteristics compared to formal microfinance?"

This section comprising introduction and literature review is followed by the Methodology in section 2. Section 3 discusses the descriptive and empirical analysis and finally, Section 4 provides the conclusion.

2. Methodology

2.1 Data and its Sources

The survey was conducted in the summer of 2021 during COVID-19 and employs cross-sectional data. This quantitative study comprises 508 households residing in semi-urban towns of Lahore (Atto Asal, Azad Town, Sue Asal, Khanoharni, Julky Sharif Park) Punjab. Self-administered Survey was conducted by a team of enumerators and based on the respondents' answers, questionnaires were filled in. All participants have access to various credit schemes that include Microfinance, Informal ROSCAS, and transfer grants. The figure 1 shows the sample distribution of 508 households. 39.17% of the sample labelled as "None" are those not part of any formal or informal scheme. 31.5% are participants of Microfinance schemes whereas 17.3% are ROSCA participants. Only 12% of these respondents are part of both ROSCA and Microfinance schemes.
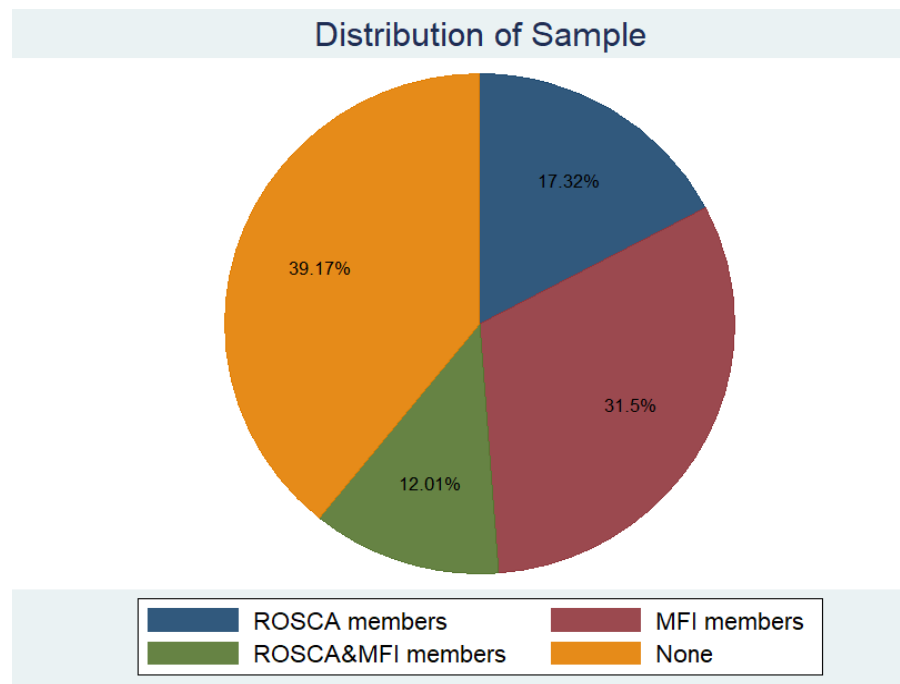

Figure 1: Sample Distribution of Households

Figure 2 explains the bifurcation of the households by occupation. One-fourth of the sample respondents are salaried workers while 26.38% are Non-farm business/traders. 48.43% of the respondents are skilled labourers and are the majority.

Table 1 explains the variables used in this study in detail. The dependent variable in this study is Food and Income vulnerability whereas the independent variable is divided into four cohorts – households' part of ROSCA, households' part of Microfinance schemes, households' part

of both Microfinance and ROSCA, and lastly those not part of any scheme. Other than this, controlling variables used in this study are total household income, asset value, house ownership, and household size.
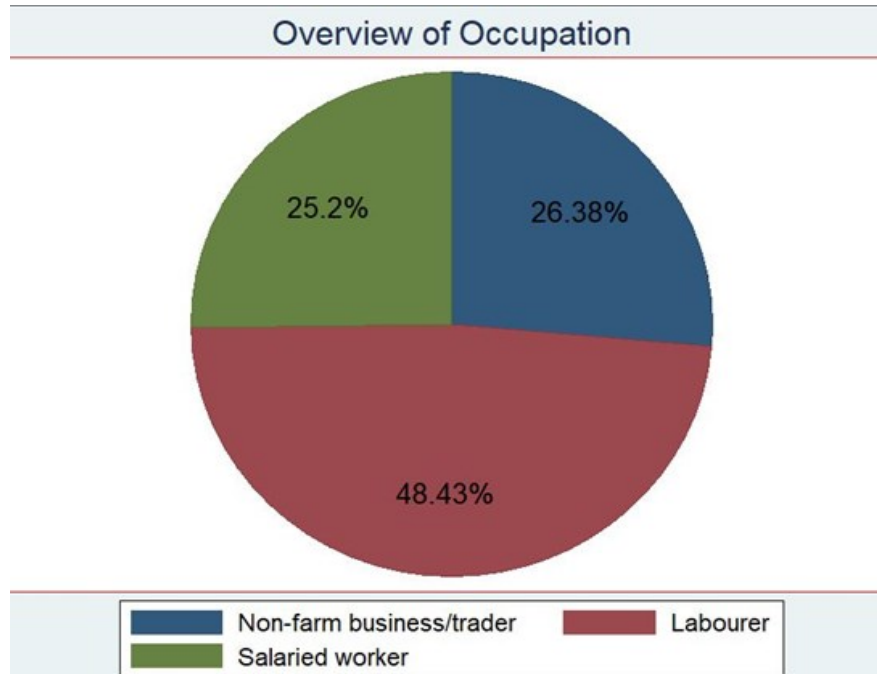

Figure 2: Households bifurcated by Occupation

The main independent variable **"Participation"** is a categorical variable bifurcated in 4 categories. The first category pertains to those households' who are a member of ROSCAs. The second category is microfinance beneficiaries, third category relates to those households' part of both ROSCA and Microfinance schemes. Finally, the last category also the reference category is those not part of any scheme.

Whereas, the dependent variables are Income vulnerability (difference between income and expenditures) and Food vulnerabilities (standardized food security questions). Besides these the control variables are household ownership (categorical variable where 1= Own house, 2= Rented); Value of household Assets (in rupees), Occupation which is categorical variable (1=labourer, 2=Salaried, 3=Non-farm business/trading) Household size and Total Household income.

Table 1: Variables and their Description

Variable	Variable Name	Variable Measurement	Variable Definition
Dependent Variable, Y			
Income Vulnerability	BF, DU	BF(Income–Expenses before COVID), DU(Income–Expenses during COVID)	1. Total household income 2. Total monthly expenditure 3.Total expenditure before COVID and the lockdown (in rupees)
Food Vulnerability Index	FD1,FD2,FD3,FD4,FD5,FD6,FD7,FD8	Standardized food security questions	FD1: During the last seven days how many days did you have mutton, chicken or beef? FD2: During the last seven days how many days did you cook vegetables and lentils? FD3: How many weeks of wheat/flour stock do you have? FD4: How many weeks of rice stock do you have? FD5: Food purchased did not last and you did not have money to get more FD6: You could not afford to eat a balanced meal FD7: Did you or other households ever cut the size of the meal or skip meals because there wasn't enough money for food? FD8: Did you ever eat less than you wanted because there wasn't enough money for food?
Independent Variable (X)			
Participation in informal schemes	ROSCA = 1	Categorical Variable where: ROSCA=1, MFI=2 ROSCA&MFI=3 NONE=4	Is the person participating in any committee scheme?
Participation in Microfinance schemes	MFI=2	Categorical Variable where: ROSCA=1, MFI=2 ROSCA&MFI=3, NONE=4	Is the person part of the microfinance scheme?
Participation in ROSCA and Microfinance Schemes	ROSCA&MFI	Categorical Variable where: ROSCA=1, MFI=2 ROSCA&MFI=3, NONE=4	Is the person part of both ROSCA and Microfinance Schemes
Participation in none of the informal/formal schemes	NONE	Categorical Variable where: ROSCA=1, MFI=2 ROSCA&MFI=3, NONE=4	Is the person part of any informal/formal scheme?
Controlling Variables			
Occupation	Occupation	Type of Occupation: Laborer, Salaried Worker and Non-farm business/trader	
Household Size	HHS	Total Adults + Total Children	Total number of members in the household
Value of Assets	Asset Value	In rupees	Total value of Assets
Household Income	Income	In rupees	Total Household Income

2.2. Empirical Model

This study first provides a descriptive analysis which includes summary statistics, pair wise correlations of all the variables used in the study. Further the T test of mean differences among the four cohorts of participation of households bifurcated by their income and food vulnerabilities is provided. For empirical analysis this study employs simple OLS regression rather than treatment effect model because our survey data is collected at one point of time and it doesn't have the dynamic aspect of panel data. Statistical significance of the relationship between ROSCA participation with food and income vulnerability is assessed. This model was controlled for other demographic-related variables such as occupation, household ownership, and value of assets, household income, and household size. Data analysis was done using the STATA 14.0 version

employing the regression technique to estimate coefficients and access robustness. Equation (1) presents the functional form of the model for estimating participation in formal/informal schemes.

$$Y_{ij} = \alpha + \theta \text{ (Participation) }_{ij} + \beta_1 \text{ (Occupation)}_{ij} + \beta_2 \text{ (Assets) }_{ij} + \beta_3 \text{ (HHs) }_{ij} + \beta_4 \text{ (HouseOwn) }_{ij} + \epsilon \qquad (1)$$

Where, Y_{ij} = **Food and Income Vulnerability (Dependent Variable) is estimated separately. Participation is a categorical variable taking on values from 1 to 4 (**1= ROSCA, 2= MFI, 3= ROSCA&MFI and 4= NONE (those not part of any scheme)); **HHs** is **Household Size** (number of individuals in a household); Occupation is a **categorical variable** (1=Laborer, 2 =Salaried, 3=Non-Farm Business/traders (reference category)). **Assets** are the **Total Value of Household Assets** in rupees. **House Ownership** is a categorical variable where 1= Rented, 2= Own House (reference category).

3. The Analysis and its Discussion

This chapter is divided into two sections Descriptive analysis and Empirical analysis. The first section relates to descriptive analysis which discusses the Summary statistics, correlations, and Mean averages of variables used. The second section provides the results of the regression analysis performed for households' part of ROSCAs, households' part of Microfinance schemes, and those part of both ROSCA and Microfinance.

Table 2: Summary Statistics

Variable	Unit	Obs.	Mean	Standard Dev	Min	Max
Savings before COVID	In Rupees	508	6628.878	6345.152	-5000	40000
Savings during COVID	In Rupees	508	2905.02	5723.146	-20,000	30000
FD 1	Days	508	0.257	0.516	0	3
FD 2	Days	508	6.655	0.915	0	7
FD 3	Weeks	508	4.576	12.89	0	53
FD 4	Weeks	508	1.950	7.93	0	52
FD 5	Scale (1-3)	508	1.614	0.603	1	3
FD 6	Scale (1-3)	508	1.616	0.637	1	3
FD 7	Scale (1-2)	508	1.840	0.366	1	2
FD 8	Scale (1-2)	508	1.137	0.345	1	2
Household Size	In Numbers	508	6.00	2.228	0	22
Asset Value	In Rupees	508	27169.59	35565.02	0	300000
Total Household Income	In Rupees	508	17934.55	7761.215	0	60000

3.1 Descriptive Analysis

Table 2 gives an overview of the summary statistics of variables used in this study. It summarizes various statistics related to savings before and during the pandemic, components of food vulnerabilities and demographic variables during COVID-19. Clearly the savings during the pandemic times have significantly declined from their pre-COVID levels falling from 6628.7 rupees to 2905 rupees. There is an increase in dissaving which is evident from the stats provided in the table. There was a deduction in maximum savings during COVID indicating that those with

higher incomes experienced a reduction. Both periods depict high variability in savings (Standard Deviation of 6345.15 and 5,723.15) indicating a wide disparity in how households experienced debts and savings.

For FD1 (Access to meat calculated in days) the mean is only 0.25 days whereas it is 6.65 for FD2 (Access to lentils). Mean average for household size during COVID was 6 members per household. Further, mean averages for Assets is 27169 and total household income is 17934 during COVID. Food security indicators show limited access to essential food items and disparities in food availability and affordability. The data underscores considerable variability in incomes, household size and asset values reflecting disparities in economic resilience and financial stability during the pandemic.

3.1.2. Income Vulnerability among the Cohorts

Figure 3 presents a comparative analysis of savings behaviour across different savings groups: ROSCA, MFI, ROSCA & MFI and None. The data is segmented in two periods: Savings before COVID and savings during COVID depicted by blue and red bars. For the first group that includes participation in ROSCA savings before COVID are 8738.3 but reduced to 5147.72 during COVID. This means that there is a 41.1% decline in income during the pandemic. For the second group which is participation in Microfinance schemes, the savings reduced from 7006.25 to 2592.19. This means that savings decreased by 63% for this group. Similarly, for the last two groups savings also decreased. For participants' part of both ROSCA and MFI, the savings decreased from 8459.02 to 3368.84 indicating a deduction of 60.2%.
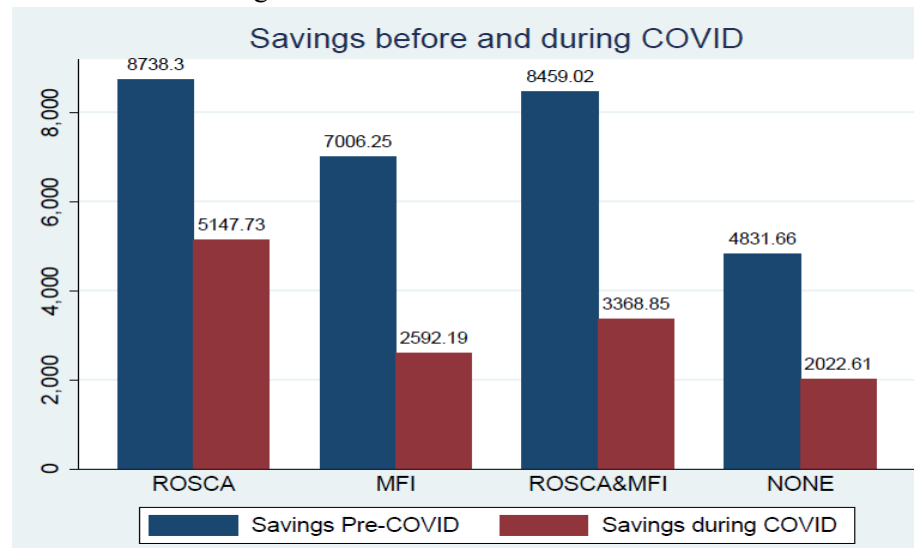

Figure 3: Savings before and during COVID (Bifurcated by ROSCA, MFI, ROSCA&MFI and NONE)

Overall there is a downward trend in savings across all groups during the COVID-19 pandemic. This means that the pandemic had a widespread economic impact resulting in reduced savings irrespective of the type of saving mechanism used. However, the most affected group of the lot is the participants' part of the Microfinance schemes. The MFI group experienced the highest percentage decline in savings indicating that those reliant on microfinance faced more severe economic challenges and had less financial resilience during the pandemic. Although all groups faced significant declines, the least affected group is ROSCAs as it has the lowest percentage decrease. This implies that informal saving mechanisms such as ROSCAs act as a financial buffer

against economic disruptions in challenging times such as COVID-19. Those part of both ROSCAs and Microfinance schemes saw a decline in income by 60.2% which suggests that a combination of formal and informal mechanisms did not offer better protection against the economic impacts of COVID-19.

3.1.3. Food Vulnerability among the Cohorts

Figure 4 explains averages of Food vulnerabilities of all the groups' part of the data set. It illustrates the number of days of access to various food items across the groups: ROSCA, MFI, ROSCA and MFI and NONE. The categories of food items include access to meat, access to lentils/vegetables, wheat/flour and rice. For the first group in the set which includes participants of ROSCA, the number of days for meat consumption is 0.39 whereas days for lentils and vegetables is 6.63. For stock of wheat and flour the mean average is 71.54 days whereas for rice it is 41.84
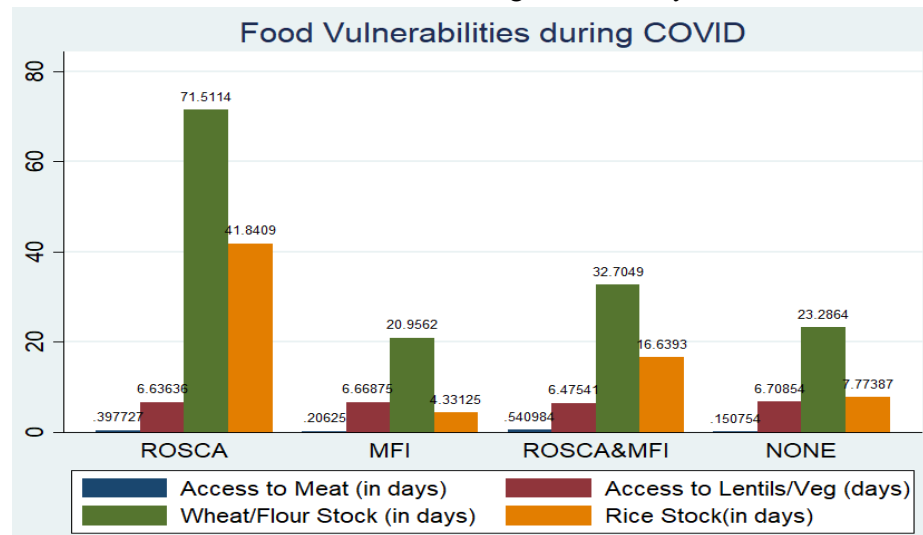

Figure 4: Food Vulnerabilities (calculated in days)

days. For participants of Microfinance schemes, the mean average for access to meat is 0.206 days whereas for vegetable access it is 6.68 days. For stock of wheat and flour the mean average is 20.5 days and for rice it is 4.33 days. Those parts of ROSCA and Microfinance schemes could access meat for 0.54 days. The mean average for access to lentils is 6.47 days and it is 32.7 days for stock of wheat/flour. The mean average for the stock of rice is 16.6 days. Lastly, we have the group labelled None which includes respondents not part of any scheme. For the None category mean average for access to meat is 0.15 days, and access to vegetables is 6.70 days. The stock of wheat/flour average is 23.2 days and rice stock is 7.7 days. From the above figure, it is evident that participants of ROSCA have the best food security in terms of wheat/flour and rice stock. Participants of Microfinance schemes have the lowest food security for rice stock and meat access. Participants of both Microfinance and ROSCA schemes have moderate stocks of wheat and rice. The last category which is None has limited access to meat and rice but better access to wheat/flour in comparison to Microfinance participants.

3.2. Empirical Analysis

This section provides the regression results and their discussion in light of the literature. Table 3. below highlight the empirical findings pertaining to 10 regression equations. The first two equations (1 and 2) relate to income vulnerability (IV) as a dependent variable before and during

the COVID respectively whereas equations 3 to 10 present results of food vulnerabilities as the dependent variable.

Table 3: Programs Participations and their Impact on the Vulnerabilities

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VAR	IV (BF)	IV (DU)	FD1	FD2	FD3	FD4	FD5	FD6	FD7	FD8
Participation ROSCA	1.647**	1.594**	0.135*	0.25	-0.75	-1.49	0.00261	0.0211	-0.0368	-0.0634
	(2.07)	(2.26)	(1.74)	(0.03)	(1.74)	(2.29)	(0.03)	(0.25)	(-0.75)	(-1.49)
MFI	1.425**	-0.052.64	0.015	-0.016	-1.534	-0.979**	-0.122*	-0.157**	-0.00697	-0.0814**
	(2.32)	(-0.09)	(0.31)	(-0.15)	(-1.31)	(-2.10)	(-1.94)	(-2.42)	(0.19)	(-2.34)
ROS/MFI	1.662**	-0.2253	0.294***	-0.173	-1.617	-0.130	0.0940	0.113	0.0366	-0.0463
	(2.44)	(-0.03)	(3.59)	(-1.63)	(-.94)	(-.10)	(1.10)	(1.13)	(0.67)	(-0.99)
HH Size	0.1592	-0.0141	0.00520	0.008	-0.319	-0.0274	-0.00378	0.00545	-0.036***	-0.00154
	(1.49)	(-0.11)	(0.51)	(0.52)	(-1.56)	(-0.20)	(-0.32)	(0.45)	(-4.18)	(-0.22)
Salaried	-2.779***	-2.412***	-0.0514	0.145	-4.771***	-2.551***	0.0579	0.107	0.087**	0.104***
	(-3.39)	(-1.77)	(0.59)	(1.13)	(-2.90)	(-2.54)	(-1.54)	(1.33)	(0.71)	(-.0.45)
Labourer	-2.390***	-1.247*	0.0406	0.130	-5.093***	-2.786**	-0.104	0.0932	0.0333	-0.0155
	(-4.15)	(-4.33)	(-0.90)	(1.22)	(-2.89)	(-2.63)	(0.89)	(1.55)	(2.00)	(3.03)
Asset Value	0.00064***	0.00034***	3.52e-06***	-1.74e-06*	9.94e-05***	4.83e-05**	2.66e-06***	3.00e-06***	7.16e-07*	2.41e-06***
	(7.73)	(3.39)	(4.36)	(-1.69)	(4.31)	(2.23)	(3.47)	(3.64)	(1.75)	(5.38)
House (Rented)	-0.5112	-1.296**	-0.0243	0.0262	-2.90***	-0.0772	-0.0558	-0.0106	-0.0718**	-0.0394
	(-0.98)	(-2.32)	(-0.53)	(0.32)	(-3.17)	(-0.11)	(-0.97)	(-0.17)	(-1.99)	(-1.19)
Constant	5.102***	3.673***	0.0897	6.56***	8.361***	2.541*	1.606***	1.462***	2.013***	1.089***
Obs	508	508	508	508	508	508	508	508	508	508
F Value	18.67	7.07	6.97	1.46	6.23	2.39	3.67	3.54	3.21	6.10
Prob > F	0.0000	0.0000	0.0000	0.1709	0.1704	0.0154	0.0004	0.0005	0.0014	0.0000
R-squared	0.248	0.141	0.135	0.017	0.170	0.132	0.050	0.052	0.065	0.080

T values in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0$

Reference Category: For Participation, reference category is those not part of any schemes; For Occupation, reference category is Non-farm business / traders; For House ownership, reference category is Own house.

3.2.1 ROSCA Participation and Income Vulnerability

Table 3 depicts regression results for ROSCA participants. The coefficient is positive for both Income Vulnerability before and during COVID in model (1) and (2) respectively. Model 1 relates to income vulnerability before COVID with a coefficient of 1.647**. The coefficient for model 2, income vulnerability during COVID, is 1.594**. A positive coefficient indicates that members of ROSCA had higher savings before COVID than the reference category which is non-farm business/traders. There is a decrease in savings from 1.647 to 1.594 units but a slight reduction still highlights a robust positive effect of ROSCA participation on saving behaviour. Even during the pandemic, ROSCA participants maintained higher savings relative to non-farm business traders, indicating resilience in their savings capacity. Previous literature states that ROSCA participation has a positive impact on financial resilience as it allows easier access to saving mechanisms (Adams & Von Pishke, 1992). Literature suggests that ROSCAs are an effective savings tool that aids communities with limited access to formal institutions. Anderson and Baland (2002) found that ROSCAs help individuals commit to saving by reducing the temptation to spend on items that aren't essential. Bouman (1995) mentions how ROSCAs besides financial benefits also support social cohesion and mutual support among members. The social pressure also increases commitment to regular savings.

3.2.2 ROSCA Participation and Food Vulnerability

For Food Vulnerability the results showed mixed significance. The coefficients vary across the model for the variables tested. For the first Food vulnerability variable which is FD1 model (3) as depicted in table 3 (During the last seven days how many days did you have mutton, chicken, or

beef), the coefficient is positive. This indicates that people part of ROSCA had access to this food group. Participation in ROSCA improves household food security by providing financial stability and ensuring better budgeting and expenditures on food items including meat. Anderson and Baland (2002) mentioned in their study how ROSCAs help in better allocation of resources thereby leading to improved access to higher quality food.

For FD2 (Access to vegetables/Lentils) the co-efficient is positive but it is insignificant. Naturally, if ROSCA participants are having meat, they are less likely to have lentils and vegetables. The coefficient of ROSCA is statistically significant for FD3 in model (5) and FD4 in model (6) (How many weeks of wheat and rice stock do you have). As a ROSCA participant you have the capacity to stock up on basics such as wheat and flour. Participants of ROSCAs have access to lump sums that are useful to purchase and stockpile essential food items thereby enhancing food security. Gertler, Martinez and Codina (2012) discussed how informal saving groups help manage resources in a better way and ensure availability of food supplies during uncertain times. This underscores the role of informal savings mechanisms in enhancing economic stability and preparedness, especially during challenging times like the COVID-19 pandemic. Further, the results for assets are robust in all regressions, as income rises so does the build-up of assets. This means that higher assets correlate with better financial and food security options. Labourers and Salaried workers both have lower resilience to income and food vulnerability as compared to non-farm businesses/traders with the impact being higher on labourers.

3.2.3. Microfinance Beneficiaries and Income Vulnerability

Participation in Microfinance is associated with higher savings before the pandemic as shown by the significant coefficient value in model (1). Dupas and Robinson (2013) mentioned how microfinance schemes promote financial discipline and increase savings among participants. Savings are encouraged as a prerequisite for obtaining loans. However, in model (2), during COVID, the coefficient was very low at -0.0052 although insignificant. The pandemic caused widespread economic disruptions thereby reducing incomes and resulting in increased expenses. Even with the availability of microfinance, participants are drawn down on their savings to cope with economic shocks. Kansiime et al. (2021) reported on how the pandemic significantly affected savings and consumption patterns.

3.2.4 Microfinance Beneficiaries and Food Vulnerability

Our results show that microfinance participation has insignificant impact on reducing food vulnerabilities. According to Pitt and Khandker (1998), the primary use of microfinance loans is for productive investments rather than immediate consumption needs. For FD4 (stock of rice), the coefficient is negative but statistically significant. Respondents' part of this scheme was not able to stock up on rice. Banerjee et al. (2015) suggest that microfinance participants instead of immediate consumption prioritize business and income-generating activities. Therefore, microfinance participants were less resilient to food vulnerabilities during the pandemic and had to cut down on food consumption.

3.2.5 ROSCA and MFI Beneficiaries and Income Vulnerability

Pre-covid in the model (1), households having both ROCA and MFI beneficiaries have lesser income vulnerability pre-covid however, they become vulnerable during the Covid-times as depicted by the insignificant coefficient in model (2). Increased vulnerability in this case can be attributed to job losses, decrease in business activities and reduction in income levels. The pandemic added to income inequality and increased poverty levels worldwide thereby contributing

to income vulnerability (Sumner et al., 2021). While MFI provides credit to low-income individuals, the loan has to be paid back and the burden of repayment adds to financial vulnerability (Banerjee et al., 2015). The scheme does provide essential credit but also adds to creating potential debt traps if borrowers are not able to pay back.

3.2.6 ROSCA and MFI Beneficiaries and FOOD Vulnerability

Analysis of Food vulnerability among the ROSCA and Microfinance beneficiaries show that these financial mechanisms influence the ability to afford protein-rich foods such as mutton, chicken and beef. According to Banerjee et al. (2015) microfinance improves household spending patterns including those on food. This theory also aligns with findings from Karlan and Zinman (2010) who state that microfinance borrowers are more likely to invest in improved diet quality. According to Deaton (1997), Microfinance enhances food security by providing financial means to purchase diverse range of foods. And ROSCAs also facilitate members by allowing them to opt for healthier food options (Bouman, 1995). The findings align with existing literature that suggests that microfinance and ROSCAS improve immediate financial liquidity along with quality of food. The impact on broader and chronic food security issues is less pronounced.

3.2.7.   ROSCA Beneficiaries versus ROSCA and MFI Beneficiaries

Based on the results discussed above it is evident that only ROSCA beneficiaries experienced stable income during COVID times in contrast those who are beneficiaries of both Microfinance and ROSCA. Anderson and Baland (2002) mention how ROSCA members commit to saving by creating a regular savings schedule which is beneficial during times of uncertainty. While ROSCAS does not impose any formal conditions, MFI requires formal conditions that have to be fulfilled. Bateman, M. (2010) argues how Microfinance leads to over-indebtedness among those who use it pressurizing individuals to take out new loans to repay old ones. The drop in income during COVID-19 for ROSCA/MFI participants is explained by the financial pressures of repaying MFI loans and the economic hardships induced by COVID-19. Armendariz and Morduch (2010) suggested that debt obligations are inherent in Microfinance and can strain household finances, especially in economic downturns. Banerjee (2015) also supports this finding by stating how microfinance does facilitate business investments but does not necessarily increase household savings and diverts fund away from personal savings to meet loan repayments. The same applies to microfinance participants who faced reduction in incomes during the pandemic.

ROSCA participants in comparison to ROSCA/MFI participants reported access to protein-based diets. The predictable nature of ROSCA pay-outs allows members to plan and purchase food items periodically (Anderson & Baland, 2002). Other than this ROSCA members managed to maintain their stock of staples which include wheat and rice. This stability can be attributed to predictable lump sum pay-outs that enable bulk purchases. Overall ROSCA structure facilitated better financial planning and availability of emergency cash. Social aspects of ROSCA foster a supportive community that provides informal financial support during the crisis (Besley et al.,1993).

4. Conclusion

The objective of this paper is to investigate the role of formal and informal credit in reducing income and food vulnerabilities during the COVID times. To this extent, a survey of 508 households located in semi-urban towns of Lahore, and Punjab was conducted. The households include members' part of informal ROSCAs and formal microfinance institutions. We have employed a simple OLS regression technique and the empirical results in general suggest that

beneficiaries of ROSCAs tend to have lower food and income vulnerabilities during COVID times. Because they generate higher levels of savings which enabled them to withstand idiosyncratic shocks in their consumption patterns during the COVID times in a better way. These ROSCA member households were able to stock up on staple crops such as Wheat and Rice in a sustainable way. However, interestingly households who are Microfinance borrowers became more vulnerable during COVID times because their income had decreased. From the food security perspective, these Microfinance participants were also not able to stock up on essentials such as wheat and rice. Therefore, it may suggest that ROSCA participants were able to withstand idiosyncratic shocks and able to smooth consumption levels relative to microfinance borrowers. On the other hand, households who are members of both ROSCA and Microfinance schemes witnessed increased vulnerabilities. We may relate this result to the fact that microfinance is a conditional credit program that requires borrowers to repay the loan along with the interest amount. During the COVID because of the frequent lockdowns economic activity was at a minimum and therefore microfinance borrowers found it hard to repay loans. In addition, we have found that household assets lead to reduced vulnerabilities.

4.1 Research Implications of the study

The main findings of this research warrant that ROSCA should be supported as an essential community-based financial mechanism at the local level. Besides helping manage financial needs and smooth consumption, these groups foster a sense of community and mutual support. Communities can also be given financial literacy training to inform them about the benefits of ROSCAs and how they can maximize the benefits of their savings and investment through this scheme. Further to enhance the efficiency and security of ROSCAs the use of digital tools can be encouraged as employed by initiatives such as Oraan. Through mobile banking can it be easier to collect and monitor payments thereby reducing the risk of fraud and mismanagement.

Further in the context of Pakistan ROSCA has to be studied from a gender perspective because women demonstrate superior management skills when it comes to household resource allocation. This is reflected in their contributions towards managing the household and directing resources to ensure food and income security for their children. Focusing on women's roles and experiences may discover valuable insights into how ROSCAs can be optimized to better support and empower women in Pakistan. Sustained research on ROSCAs can provide insights for policymakers, microfinance institutions, and community leaders to leverage these community-based mechanisms effectively.

In addition, the study also highlights the downside of microfinancing. Initially microfinance was started as a tool to alleviate poverty however evidence suggests otherwise. This tool traps borrowers by charging high interest rates thereby trapping people in debt instead of economically empowering them. Most of the loans are wasted in personal consumption limiting long-term income generation. The loan recovery practices are aggressive that can add to social pressure, stress and social conflict. Ample research is available that indicates the drawbacks of microfinancing and how it is not a tool that helps in sustained poverty reduction.

4.2 Limitations of the study

This study has a few research limitations. The usual biases during survey data collection are present. The first is social desirability bias as it is a close-knit community and respondents may understate or overstate their plight and miseries. Self-reported information can compromise the validity of the findings. Further, the research is geographically constrained to 5 small towns in

semi-urban areas of Lahore. This geographical limitation affects the generalizability of results as the broader population is compromised. The study also has omitted variable bias as important variables such as gender is missing.

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