Impact of Culture on the Financial Sustainability and Outreach of Microfinance Firms

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Abstract

The study is regarding the impact of the culture on financial sustainability and the social objective of outreach to microfinance companies. The study establishes through the GMM-based dynamic panel that the power distance and the long-term orientation ha a negative impact upon the financial sustainability and outreach of microfinance companies. Moreover, the culture significantly impacts the financial inclusion of the poor. Besides, the microfinance regulation passed in 2022 leads to volatility and abnormal returns. COVID-19 also led to the abnormal returns in the stock returns of the microfinance companies. For the significance testing of the hypothesis about the abnormal returns on passing of the Microfinance Regulations Act, 2022, the CAR (Cumulative Abnormal Returns) and BHAR (Buy and Hold Abnormal Returns) have been used. Finally, the study establishes the presence of volatility and its persistence in the stock market returns during COVID-19 through the ARCH and GARCH processes.

Keywords: microfinance, financial sustainability, financial inclusion, cultural factors

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1. Introduction

COVID-19 has impacted the volatility of the stock markets and particularly, the nascent microfinance sector. Because of COVID-19, investors in microfinance markets are facing the biggest risk ever. The COVID-19 pandemic started in March 2020, resulting in large-scale market volatility. (Albulescu, 2021) highlighted that the COVID-19 pandemic can lead to severe institutional issues, volatility, and financial issues in the market. (Hartwell, 2018) highlights that market uncertainty leads to an increase in market volatility. (Onan et al., 2014) found that COVID-19 resulted in both short-term and long-term volatility in the stock markets. COVID-19 interrupted the financial operations of the firm throughout the world. COVID-19 badly impacted the productivity of the economy, and many microfinance institutions struggled to break even or rake in a reasonable return on investment. This research study aims to find out the impact of COVID-19 on the market performance of Microfinance institutions. Microfinance firms, play an extremely important role in providing access to poor people and marginalized women, who do not have any access to financial resources and physical collateral. In India in the last 10 years, few microfinance firms, have been provided the mandate to finance the poor on a priority lending mandate. In India, the 8 most prominent microfinance firms have been listed on the National Stock Exchange (NSE), including Spandana Sphoorty, Fusion Micro Finance, Credit Access Grameen, and Satin Credit Care. This study aims to measure the impact of COVID-19 on the market volatility of the stocks of Microfinance institutions. In India, the micro borrowers who seek finance from the markets are those who do not have any kind of collateral and about whom the banks and financial institutions do not have any information about creditworthiness. COVID-19 disrupted the financial markets, leading to more volatility. This paper aims to examine the market volatility in the stocks of microfinance institutions. In this study, the ARCH & GARCH (1,1) econometric models on the daily time series returns date ranging from March 2018 to July 2023. The results prove the presence of volatility persistence in the microfinance sector during the COVID-19 pandemic. Further, the study using Hofstede's model and the theoretical lens of the cultural theory intends to measure the impact of cultural factors such as the power distance index, individualism versus collectivism, masculinity versus feminity, uncertainty avoidance, long-term versus short-term orientation, indulgence versus restraint on the financial inclusion or credit behavior, in terms of borrowing from the small and medium enterprises and microfinance institutions. The operational definition of the dimensions of the Hofstede model, (Hofstede, 1980; Hofstede, 2001; Hofstede, 2010) are given below:

Masculinity: The social ramifications of gender are the subject of masculinity/femininity. When emotional gender roles are well defined, society is considered masculine: men are expected to be harsh, assertive, and materialistic. Women are expected to be more modest, sensitive, and life-quality-conscious than males.

Uncertainty: Uncertainty refers to the extent to which members of a culture feel threatened by the uncertain and unknown situation. A low uncertainty avoidance indicates a high tolerance for uncertainty and risk-taking and vice versa.

Long-term orientation: The extent to which the societies plan and considers the time horizon of its decision is called long-term orientation. Societies that prioritize long-term orientation prioritize future outcomes and postpone the immediate achievement of their goals. In societies with a long-term orientation, virtues like persistence, endurance, and sustained growth are of utmost importance. While the short-term orientation emphasizes short-term success or gratification.

Indulgence/ Restraint: In an indulgent society, the satisfaction of human desires and needs is important. While in a restrained society, the members take pride in curbing the desires and withholding the pleasures.

Power distance: Power distance refers to the extent of inequality prevailing and accepted within the society. In power power-centric society, the people in power consider themselves or are perceived by others to be at a higher level, leading to unequal distribution of power.

Individualism/ Collectivism: Individualistic societies emphasize the importance of personal achievements, and rights and highlight the need for prioritizing the needs of immediate families. Collectivism highlights the importance of the achievement of group goals. Collectivism refers to the society in which emphasis is laid on the goals and well-being of the group.

Besides, the study also intends to measure the impact of cultural factors on the performance of microfinance institutions. The research questions have been studied using the dynamic panel random effects model.

2. Literature review

Microfinance institutions have played an extremely important role in the provision of microfinance services like credit, insurance, and savings to the people at the bottom of the pyramid. Microfinance institution plays an extremely important role in reducing information asymmetry. It provides a substitute to the informal loan to the poor and thus facilitates the financial inclusion of the poor, (The Economics of Microfinance,2010). (Chatterjee & Sarangi, 2006) further argue that many times the MFIs know more about the borrowers than the formal institutions due to the local presence and knowledge, this helps to reduce information asymmetry and hence the cost of banking for the poor people (Armendariz & Morduch, 2010). (North, 1992) in his research study has highlighted the importance of cultural factors in impacting access to microfinance. The study analyzes the impact of cultural factors on both the demand and supply side of microfinance, (Anyangwe, Vanroose & Fanta, 2022). The demand side refers to the number of people who have taken loans from small and medium-term enterprises and microfinance institutions per 1,000 sq km. Since the majority of borrowers who are borrowing the loan are taking the loan for entrepreneurial purposes, hence the number of people

who have taken loans from small and medium-term enterprises and microfinance institutions per 1,000 sq. km is the proxy for the entrepreneurial activity. Thus, no separate factor as entrepreneurial activity is included in the study. The proxy for the supply side of microfinance in this study is the issues relating to the mission drift that include the trade-off between the financial sustainability, proxied by the return on equity, and the social performance that includes the outreach, which is proxied by the alpb (average loan per borrowers). In the Indian scenario, MFIs (Microfinance institutions) products have a lack of differentiation, because of the terms on which these loans are granted. Thus, product differentiation and design is not taken as a factor impacting the supply of microfinance. Regarding the delivery of microfinance, the channels of delivering microfinance are group-based and individual models. This study only takes into account social performance and does not take into account the channel of delivery. The research study aims to measure the impact of the cultural factors on trade-off between the financial sustainability and social outreach on the supply side and the access and usage of financial services in the microfinance space on the demand side.

RQ1: The impact of the cultural factors suggested by (Hofstede, G, 1991) dimensions of the power distance and individualism on the trade-off between the financial sustainability and social outreach of microfinance.

Microfinance institutions face an important trade-off between financial sustainability and outreach. Financial sustainability refers to whether the financial institution is capable of generating sufficient profits or revenues to cover its operational expenses as well as the cost of interest, which includes the cost of financing. (Forster et al., 2003) in his research study highlights that microfinance institutions earn sufficient revenue to cover the expenses and cost of operation and finance. (Armendariz & Szafarz,, 2009) further highlights the mission drift faced by microfinance institutions in meeting the economic and financial objectives in terms of higher rate of profitability and the social objectives in terms of improving financial inclusion by providing finance to the poor at the bottom of the pyramid. Thus, this research question aims to study the impact of the culture in meeting the trade-off between the outreach of microfinance institutions. Here the culture refers to two dimensions as suggested by Hofstede, the power distance and individualism, (Hofstede, G, 1991). This study aims to analyze and understand the impact of power distance and individualism on the outreach and profitability of microfinance institutions, (Fogel et al., 2011). Finally, the study explores the impact of culture on financial inclusion through microfinance access in the form of loans by small and medium enterprises and microfinance institutions, (Delfiner & Peron, 2007).

RQ2: The cultural factors, i.e. the six dimensions suggested by Hofstede namely power distance, masculinity, unavoidance of uncertainty, long-term orientation, and indulgence have an impact on the demand for microfinance

In this study, besides the cultural factors, the attribution theory is used to analyze the impact of social factors on the credit behavior of individuals. The study hypothesizes that the external factors in the form of culture have a deep impact on credit behavior and thus demand for the various forms

of credit. The literature lacks an analysis on impact of the COVID-19 on the demand and supply of credit of microfinance firms and the impact of culture on society. Cultural factor refers to the values of a society, in terms of preferences for various traits such as masculinity, power distance, long term orientation, indulgence and uncertainity, (North, 1992). In this research paper, Hofstede's cultural dimensions have been used to measure the impact of culture on the performance of microfinance organizations. The database has used six dimensions namely power distance, individualism/ collectivism, masculinity/feminity, uncertainty avoidance, term orientation and indulgence/ restraint. As per (Hofstede et. al., 2010), power distance measures the extent to which the powerful members in an institution or organization accept that the power is distributed equally among the members of the society. Individualism refers to the extent to which the members prefer the relationship with the other members or the members of the group. In an individualistic society the members are required to look after themselves, while in a collective society the members in the group look after each other. The gender of the individuals have an important impact on the access to microfinance. Masculinity or Feminity refers to the impact of the gender on the society. Women are supposed to be more tender, sensitive, and soft, whereas men are supposed to be forceful, power-focused, and tough. Uncertainty avoidance refers to the extent to which the people feel threatened by the existence of other cultures.Long term orientation deals with the worldview of the culture. Some cultures have a short term orientation, while there are some cultures have long term orientation. Moreover, some cultures are indulgent that believe that it is good to be indulgent and follow one's impulses, while other cultures are more conservative. Based, on cultural theory framework the study examines, the impact of culture on the adoption of credit, and the adoption of social networks through leveraging the social network and the social capital. For the purpose of study informal finance involves taking credit from the money lender, shops, and semiformal sources like joint liability groups, and the formal sources involve lending from banks and financial institutions. On the demand side, the study examines the impact of cultural factors on the demand for microfinance, which includes the demand for loans from small and medium enterprises (SMEs) and microfinance institutions (MFIs). Figure 1 provides a snapshot of the theoretical framework for demand and supply for microfinance.
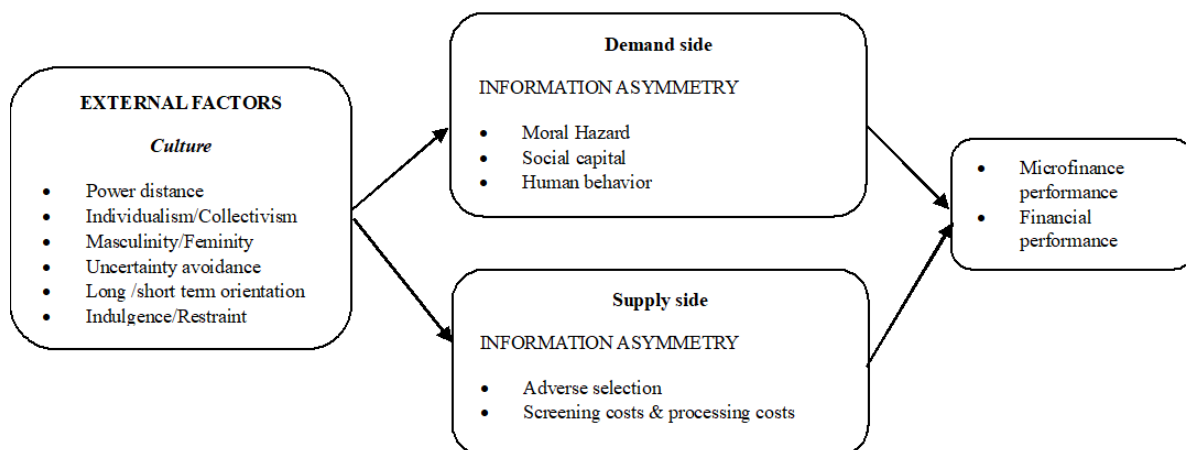

Figure 1. Impact of external factors such as Culture on demand & supply for microfinance; (Source: By Authors)
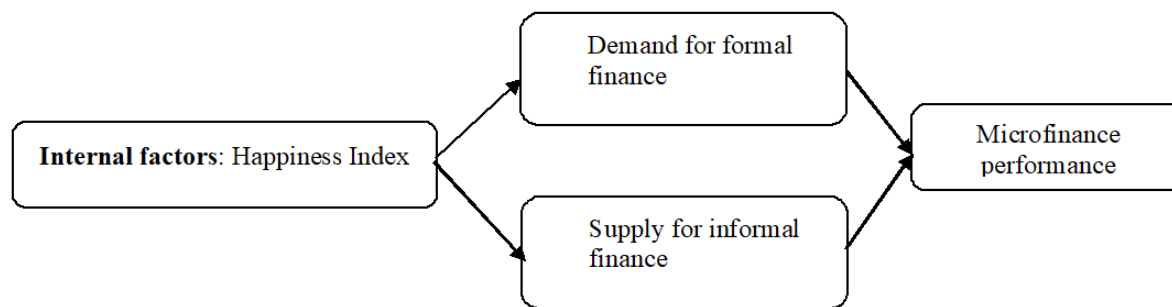
Figure 2. Impact of internal factor such as happiness index on the supply of microfinance; (Source: By Authors)

The study hypothesizes that the external and internal environment and the social factors have a deep impact on the demand for microfinance and microfinance performance. In order, to empirically test the hypothesis regarding the impact of demand and supply of microfinance on credit behavior.

RQ3: The stock market returns for the microfinance institutions witnessed vast volatility during the COVID-19

3. Methodology

3.1 Hypothesis for RQ1a: Impact of cultural factors on financial performance of MFIs

Empirical evidence of the culture and the happiness index on the credit behavior is given below: H0: Power distance has an impact on the demand for microfinance - (Fogel et al., 2011; Bansasz & Csepregi, 2017) in his study analyzes the six dimensions given by Hofstede to measure the impact of the cultural factors. (Stanton & McCumber, 2020), further highlights that cultural factors have a deep impact on the legal status of microfinance as a profit or not-for-profit organization. The study hypothesizes that power distance has an impact on the supply of microfinance, (Isidore Minani, 2013). The study hypothesizes that the power distance has a positive impact on the financial sustainability of microfinance firms, represented by the ROA (Return on Assets) and OSS (Operational Self Sustainability) ratio.

H1: Individualism/Collectivism has an impact on the financial performance of the microfinance institutions - (Kasoga, 2017) further highlights that the success of microfinance lending products depends upon the culture. The study argues that microfinance will perform well in the regions where the society is more collective, i.e., emphasizes group achievements and are not individualistic. (Fogel et al., 2011) find the mixed impact of individualism and collectivism on the microfinance performance in terms of demand (Number of Active Borrowers). (Scanlon et al., 2017) find an important and positive relationship between individualism and social performance. (Burzynska & Berggren, 2015) further, analyze the impact of individualism on the financial performance of microfinance institutions. The study hypothesizes that individualism as compared to the collectivism has a positive impact upon the ROA (Return on Assets), OSS (Operational Self Sustainability) effect, NAB (Number of Active Borrowers), and Number of Female Borrowers (NFB).

H2: Masculinity/Feminity has an impact on the financial performance of microfinance institutions - (Kittilaksanawong & Zhao, 2018) further highlights the impact of the gender in form of masculinity or feminity in form of achievement, heroism, and assertiveness on the financial performance of the microfinance institutions.

H3: Uncertainty Avoidance has a negative impact on the financial performance of the microfinance institutions - Various authors such as (Fogel et al. 2011) highlight that the uncertainity avoidance has a positive impact on the microfinance performance of the MFIs (Microfinance Institutions). The societies are characterized by the rules and regulations, norms that are prevailing in the society. The literature highlights that uncertainty avoidance has a positive impact on the financial performance of microfinance institutions. Within the purview of masculinity dimensions such as achievement, heroism, and rewards have a positive impact on the financial performance of microfinance institutions. (Boubakri & Sakar, 2016), on this basis, the study hypothesizes that uncertainty avoidance has a positive impact on the performance of microfinance institutions. Uncertainty avoidance has a positive impact on the NAB (Number of active borrowers) and NFB (Number of female borrowers)

H4: Long-term or short-term orientation has an impact on the financial performance of microfinance institutions - (Manos & Tsytrinbaum, 2014) highlight that the long-term or short-term orientation has an impact on the financial performance of microfinance institutions. (Stanton & McCumber, 2020). The social performance of microfinance institutions is proxied by the size of the loan. The study hypothesizes that the long-term orientation of microfinance institutions effect has a positive impact on the ROA (Return on assets), OSS (Operational Self Sustainability Ratio), NAB (Number of active borrowers), NFB (Number of female borrowers), and the ALB (Average loan per borrower).

H5: Indulgence/Restraint has an impact on the financial performance of the microfinance institutions in India - Indulgence is a proxy for the level of immersion and following of the instinct. The various studies argue that the indulgence is an indicator of happiness. The literature argues that the level of indulgence has a positive impact on the financial performance and outreach of microfinance institutions in India, (Stanton & McCumber, 2020) or in other words indulgence has a positive impact on the NAB (Number of active borrowers) and NFB (Number of female borrowers).

3.1.1 Data, findings & discussion

The dataset for the study was taken from the MIX Market database for the period 2012 -2018. Moreover, the data was taken from the Hofstede cultural database to obtain the scores regarding the cultural scores of the different nations. To estimate the impact of the culture and the happiness on the demand and supply of microfinance credit the empirical strategy used is given below:

Performance of MFI$_{ijt}$ = α + β. Cultural dimension$_{jt}$ + γ. M$_{it}$ + λ. X$_{it}$ + ε$_{ijt}$………………… (1)

The financial performance of MFI refers to the performance of MFIs i, in country j at time t. The financial performance of the microfinance institutions is denoted by the ROA (Return on assets), and ROE (Return on Equity), and social performance is denoted by ALPB (Average loan of borrowing). εit refers to the composite error term which comprises, the random effects or the unobserved MFI-specific attributes that might impact the financial performance of the microfinance institutions, for e.g., the geographic indicators that might impact financial performance of microfinance institutions. The random effects capture the time-inconsistent or invariant factors that impact the financial performance of microfinance institutions. Moreover, for the estimation of the random effects, the error terms should be uncorrelated with the explanatory variables. Thus, to estimate the impact of cultural factors on the financial performance of microfinance institutions, pooled regression is used.

Table 1. Variables used in the study

Particulars	Indicator
(1) Dependent Variables	
Return on assets	ROA
	ROE
Return on equity	
(2) Explanatory variables	
Power distance	Six cultural dimensions
Individualism/Collectivism	
Uncertainty avoidance	
Masculinity/Feminity	
Long-term/Short term orientation	
Indulgence/Restraint	
(3) MFI Specific performance factors	ALPB
ALPB (Average loan per borrower)	

Table 2. Results of pooled regression

Particulars	Log roe	Log roa
log. long term orientation	-3.259***	1.926
log. uncertainty avoidance	0.019	4.868***
log. Individuality	2.780***	-7.045***
log. power distance	-12.964***	-47.716***
log. Indulgent	2.780***	-7.045***
log. Alpb	-3.291***	-0.729***
log. Roa	0.655***	
log. Roe		0.918***
Constant	28.954***	103.81***

The pooled regression exhibits that power distance and long-term orientation negatively impact the financial performance of microfinance institutions. Whereas individuality and indulgence positively impact the financial performance of microfinance institutions. Thus, the microfinance institutions that are operating in regions where individual orientation dominates over the collective orientation, the financial performance of the microfinance is improved. Power distance harms the financial performance of microfinance institutions (Kittilaksanawong & Zhao, 2018).

3.2 Hypothesis development for RQ1b: A trade-off between the financial performance and social outreach and empirical model

Financial performance refers to the ability of the microfinance institutions to cover the operational and financial expenses of the microfinance institutions, (Quayes, 2012). The financial performance of the microfinance institutions' operations can be measured through indicators such as ROE (Return on equity) and ROA (Return on Assets; Yaron 1992; Copestake, 2007). Most of the literature argues that there is a trade-off between financial performance and the social welfare objectives of microfinance institutions, (Rhyne, 1998). The literature argues that providing loans to unorganized micropoors increases operational costs. Thus, catering to poor people is an extremely strategic decision and the firms have to make a trade-off between financial sustainability and social outreach. There is a trade-off between the financial sustainability and social welfare objectives of microfinance institutions. Thus, microfinance institutions have to make a trade-off between the financial performance indicators like return on equity, return on assets, and the social objectives or outreach indicated by the average loan per borrower. Since there is reverse causality in the data, we have used the GMM Dynamic Panel model. The study aims to find the relationship between the social performance and financial performance of MFI. The financial sustainability as measured by the ROE (Return on Equity). Thus, the equation for the impact of cultural factors such as Power distance and individuality is mentioned below:

$$lnROE_{it} = \alpha_0 + \lambda_1 \ln ALPB_{it} + \alpha_2 \text{ Power distance}_{it} + \alpha_3 \text{ Individuality }_{it} + \varepsilon_{it}$$

On the other hand, the study intends to measure the impact of social outreach denoted by ALPB (Average Loan Per Borrower) on the financial sustainability of the microfinance institutions, denoted by ROE (Return on Equity).

$$lnALPB_{it} = \alpha_0 + \lambda_1 \ln ROE_t + \alpha_2 \text{ Power distance}_{it} + \alpha_3 \text{ Individuality }_{it} + \varepsilon_{it}$$

H6: The culture in the form of power distance and individual orientation impacts the outreach of the microfinance institutions

H7: The culture in the form of power distance and individual orientation impacts the financial sustainability of the microfinance institutions

Table 3. Impact of cultural factors on Outreach and Financial sustainability of MFIs

	Logalpb		Logroe
Logalpb.l1	0.964***	**Logroe.l1**	-0.051
Logpd	1.860***	**Logpd**	-0.962***
Logind	-0.652***	**Logind**	2.614
Logroe	0.0759***	**Logroa**	0.962***
Logroa	-0.168***	**Logalpb**	1.183***
Constant	-2.32***	**Constant**	11.95***
Sargan	0.148	*Sargan*	0.495

The results of the study indicate that there is a trade-off between the financial sustainability and outreach of microfinance firms. The power distance has a positive impact on the outreach of microfinance institutions and individuality has a negative impact on the financial performance of the microfinance institutions. There is a persistence in the data and the lagged value of the average loan per borrower has a significant impact on the size of the loan. Further, the analysis of the data signifies that the higher the profitability of the microfinance institutions, the higher the loan size. Thus, to make profits the firms have to provide large-size loans. Similarly, the size of the loans has a positive impact on the profitability of microfinance institutions. Thus, there is a trade-off between financial sustainability and the social outreach of microfinance institutions.

3.3 *Hypothesis development for RQ2: The cultural factors dimensions such as power distance, individuality, masculinity, unavoidance, long-term orientation, and indulgence have an impact on the financial inclusion of the poor through loans from small and medium-term enterprises and the microfinance institutions*

H8: Cultural dimensions do not have any impact on the financial performance of MFIs

In this study, the objective is to assess the impact of the cultural factors suggested by Hofstede on the financial inclusion of the poor. The empirical strategy is to find out the impact of various cultural factors and dimensions suggested by Hofstede on the number of debit cards per 1000 adults, and the number of mobile and internet transactions.

Loan from the $SME_{it} = \beta + \alpha_2$ Power distance$_{it} + \alpha_3$ Individuality $_{it} + \alpha_4$ Masculinity $+ \alpha_5$ Unavoidance $+ \alpha_6$ longterm orientation $+ \alpha_7$ Indulgence $+ \alpha_8$ log commercial bank $+ \alpha_9$ log ATM $+ \alpha_{10}$logdeposit $+ \alpha_{11}$no of mobile connections $+ \alpha_{12}$ no of lic per 1000 sq $+ \alpha_{13}$ number of debit cards $+ \varepsilon_{it}$

3.3.1 Data and findings

The dataset for analysis was taken from the World Bank, FAS (Financial Access Survey) from 2012 to 2019. The objective of the study is to indicate or explore the impact of cultural factors such as power distance, individuality, unavoidance, long-term orientation, indulgence, and

masculinity/feminity on access to finance from small and medium enterprises and microfinance institutions. The empirical strategy for the analysis

$$FI_{it} = \beta_{it} + \alpha_{it}\,Culture_{it} + \lambda_{it}\,Access\ to\ finance + \varepsilon_{it}$$

Culture refers to the various dimensions of culture as provided by Hofstede, such as power avoidance, uncertainty avoidance, masculinity or feminity, individuality or collectivism, long-term orientation, and indulgence. The access to finance is denoted by the number of mobile connections per 1,000 sq. km., the number of lic per 1,000 sq. km., the number of commercial banks, the number of ATMs per 1,000 sq. km. and the number of debit cards per 1,000 sq. km.

Table 4. Impact of culture on financial inclusion

Dependent Variable	SME	MFI
Log power distance	-0.979***	4.127***
log individuality	-2.571***	0.848***
log masculinity	-0.047	-0.472
log unavoidance	0.417	1.622***
log long-term orientation	0.934	-2.79***
log indulgence	0.044	-3.861***
log commercial bank	0.122	0.487***
log atm	-0.296***	0.204***
log. Deposit	1.155***	-0.007
No mobile connections per 1,000 sq. km	-0.0001	
No of LIC per 1000 sq. km	0.000	
No of debit card users per 1,000 sq. km	0.001***	
Constant	0.499	0.341

The results of the analysis indicate that power distance, masculinity, and individuality hurt the level of financial inclusion. Similarly, the number of ATMs (Density of ATMs) hurts financial inclusion in the form of loans taken by SMEs (Small and medium enterprises) and a positive impact on the loans taken from microfinance institutions.

3.4 Hypothesis development for RQ3: The impact of COVID-19 on the volatility in the stock market returns of the microfinance institutions

H9: COVID-19 did not impact the volatility of stock markets

The study intends to examine the impact of the COVID-19 pandemic on the daily stock returns of the MFIs (Microfinance institutions), that are listed on the stock exchange. There are in total 11 microfinance institutions that are listed on the stock exchange. To test for the ARCH and GARCH impact, the daily stock prices were taken from *Yahoo Finance.* Volatility the barometer of the uncertainty and the financial risk in the financial assets, which leads to the concern among the various stakeholders including the regulators, the fund managers, investors, (Beck et al.). (Awadhi et al., 2020) highlight the significant increase in the level risk, volatility, and shock among the financial markets and the stock markets during the COVID-19. The objective of the study was to measure the impact

of COVID-19 on the stock market returns volatility. In this study, the ARCH and GARCH effects have been used to measure the presence of volatility in the stock market returns of the listed microfinance institutions. To measure the impact of COVID-19 on the stock market returns of the listed microfinance firms, the time series plot is created. The graph shows the clustered volatility in the model, which highlights the presence of stock market volatility in the returns. Thus, the ARCH Model can be used for measuring the volatility in the stock market returns of the listed microfinance companies. The literature on the nature of volatility in the stock markets is not scarce. Given the lack of knowledge in this domain, the study analyzes the impact of COVID-19 on the volatility of the stock market returns of microfinance companies.

3.4.1 The Black Swan Theory & Prospect Theory

The Black Swan theory propagates, that the uncertainty in the stock markets in the form of the pandemic or COVID-19 can lead to volatility in the stock markets. With the financial crisis, the impact of the pandemic has permeated into the stock markets, in the form of stock market volatility. (Kahneman & Tversky, 1979) in their research study have highlighted the negative relationship between the stock market returns and the pandemic or COVID-19. The policymakers are baffled by the financial repercussions of the black swan events.

3.4.2 Data and Analysis

The study uses data about the stock market returns of the listed microfinance companies. The data was collected from the Yahoo Finance website. The period for the collection of the data is from 2012-2019.

In this study, to start with the stock market returns are calculated by using the formula

$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Where Pt is the price of the stock i at the time t. Rt is the return of the variable i at the time t. Initially, the time series stationarity is tested using the ADF (Augmented Dickey-Fuller) test. Moreover, through the graphic presentation, the data is validated for the presence of volatility clustering. This is to substantiate that one volatile period is followed by another volatile period, or the volatile periods in the data are clustered. Statistically, the volatility clustering implies that the presence of the time-varying conditional variance or the big volatility (variance) today may lead to the big volatility tomorrow. The ARCH (1) process, where rt is return and et is the white noise with zero mean and variance of one. The error term might or might not follow the normal distribution. In the data, there is sufficient correlation of the variances of the error terms, due to which the AR(1) process is appropriate. The error terms in an ARCH (1) model are normally distributed with a mean 0 and a variance of $a_{0} + a_{1\,\varepsilon_{t-1}^2}$, where

$$\varepsilon_t \sim N(a_0 + a_1\varepsilon_{t-1}^2)$$

In order to test for ARCH (1) Conditional Heteroskedasticity, regress the squared residuals from each period squared residuals. Then the square of the residuals are regressed on the lag value of the squared residuals. If the estimated slope coefficient α is statistically different from zero, the data shows the ARCH (1) effect and thus there is need to correct for Heteroskedicity, and the variance for the error terms for the time (t+1) can be predicted.

Further the stock market volatility for each of the nation is calculated using the ARCH – GARCH model. ARCH Model is given as follows:

$$h_t = b_0 + \sum_{i=1}^{q} b1 u_{t-1}^2$$

The ARCH (q) model exhibits that the variance or the volatility in a given period depends on the squared errors in the past q periods. It simultaneously examines the mean variance of a variable. The ARCH model is further modified by imposing a geometric log structure in the following form

$$h_t = \varphi + \alpha_{1\,h_{t-1}} + b_{1\,u_{t-1}^2}$$

This is a GARCH (1,1) model contains 1 lagged term of the conditional variance (h) and 1 lagged term of the squared error u^2.

Test for the volatility clustering in the data

Initially, the stock market returns are calculated for the listed stock prices for the microfinance firms in India for the period 2012 till 2019.

(1) After the calculation of the returns, then the stock market returns are checked for the volatility clustering in the data.

(2) The graphic representation of the stock market returns validates the presence of the volatility clustering in the data.

The data during 2019 to 2020, show the presence of volatility clustering in the data. Due to COVID-19 or during any black swan event, the stocks of the microfinance institutions suffer from stock market volatility, that particularly impacts the stock prices of the microfinance institutions in India. This study will be immensely useful for the policymakers and the investors. The measurement of volatility is extremely important for the performance of the financial markets, (Liu et al., 2020). The literature has not yet discussed how the black swan events such as COVID-19 have impacted the financial performance of the stock markets. The measurement of volatility is extremely important in financial modeling. Higher volatility is often associated with a higher probability of the bearish trend in the markets, whereas the lower volatility is linked with increased chances of the bullish trends in the markets, (Ang and Na, 2007). In this study, the ARCH model has been used to measure the impact of the pandemic on volatility of the stock markets, (Engle, 1982). The normality test is further used

to test if the normality can be described by the conditional error distribution. The diagnostic tests reveal that the GARCH (1,1) model with AR(1) is the most appropriate for all the proposed models.

3.4.3. Testing for the ARCH effect in the model

To test for the robustness, the null hypothesis tested is that there is no ARCH effect in the data. The results of the ARCH LM test signifies that the probability value of the onserved r squared values is less than 0.05 and thus, the hypothesis can be rejected that there is no ARCH effect in the model, (Bera & Higgins, 1993).
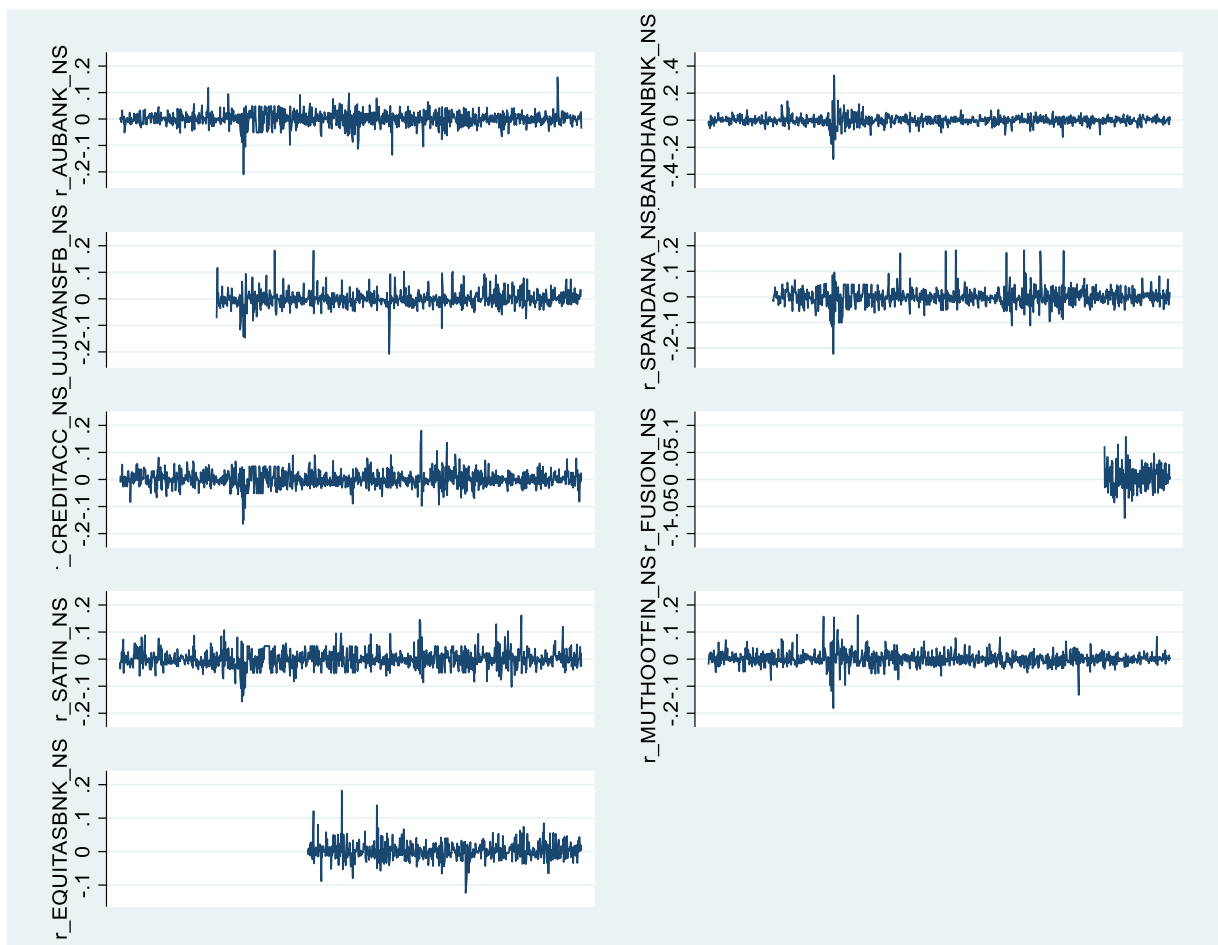

Figure 1. Time series plot for the 9 listed MFIs in India (Jan2019 to Jul2023)

3.4.4 ARCH and GARCH Effects

The financial time series shows a period of low volatility, which is followed by a period of high volatility, which is volatility clustering. ARCH and GARCH are the most common models to model the volatility of the both financial and time series, (Bollerslev, Tim, 1986). The estimation effects of the stock market return, exhibit the presence of the evidence of ARCH and GARCH effect. The ARCH effect signifies that the stock market volatility in nation i is affected by the shocks of the previous periods and the GARCH effect indicates the market volatility is impacted by the volatility

of the prior periods. There are various measures of volatility, which include the standard deviation, skewness and kurtosis. Though, these measures are based on the assumption that the stock market returns for the microfinance institutions are normally distributed, (Chang et al., 2013; Mei et al., 2017). In this study, the normal distribution graph shows that the data is normal.
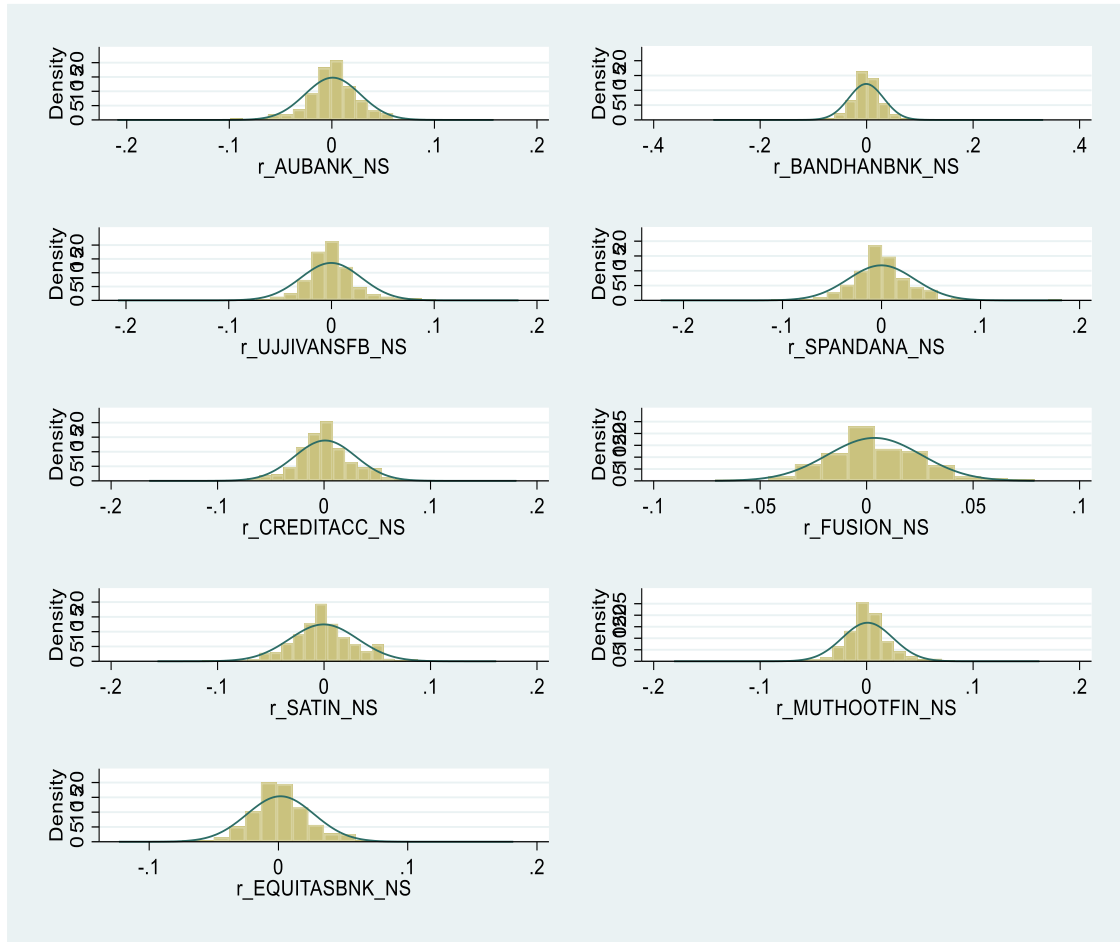
Figure 2. Normal distribution of the stock market returns of the listed securities of the microfinance institutions

From the analysis of the graphs generated for the ARCH processes, the data shows that there is normality and leptokurtic behavior in the data. Thus, the use of the ARCH methodology is appropriate. The presence of volatility clustering and the non-normality in the data strengthens the case for the use of the ARCH and GARCH processes. The LM Model also substantiates the case for GARCH and ARCH processes.

The mean equation for the impact of COVID-19 on the stock price performance of the stocks of microfinance institutions in India is given below:

Table 5. Mean Equation for ARCH & GARCH Models

MEAN EQUATION						
ASSET CLASS	**M**	**S.E.**	**Z stat**	**Prob.**	**LCL**	**UCL**
ESAF	0.0013	0.001	1.25	0.21	-0.00078	0.0035
Fusion Microfinance	0.0036***	0.001	2.07	0.039	0.0001	0.007
Satin Credit Care Network limited	-0.00049	0.0008	-0.59	0.558	-0.002	0.001
Spandana Sphoorty Microfinance	-0.00069	0.0011	-0.62	0.532	-0.002	0.001
Ujjivan Financial Services	-0.0005	0.0009	-0.61	0.545	-0.002	0.001
Muthoot Finance	0.001**	0.0005	1.72	0.085	-0.0001	0.002
Credit Access Grameen Limited	0.0008	0.0007	1.15	0.252	-0.0006	0.002
Bandhan Bank	-0.0003	0.0005	-0.66	0.508	-0.001	0.000
AU Bank Ltd	-0.0008	0.0007	1.17	0.244	-0.0005	-0.002

Table 6. Variance equation for ARCH (1) AND GARCH (1,1)

VARIANCE EQUATION			
ASSET CLASS	ARCH (1)	GARCH (1,1)	M
ESAF	0.030***	-1.195***	0.001***
Fusion microfinances	-0.073	0.688	0.000
Satin credit card network ltd	0.282***	0.465***	0.000***
Spandana Sphoorty Microfinance	0.077***	1.425***	-0.000***
Ujjivan Financial Services	0.351***	-0.094	0.0001***
Muthoot Finance	0.222***	0.422***	0.0001***
Credit Access Grameen Limited	0.360***	0.158**	0.0004***
Bandhan bank	0.357***	0.434***	0.0001***
AU bank ltd	0.267***	0.296**	-0.0003***

3.5 Hypothesis development for RQ 4: The impact of the new microfinance regulation passed in 2022 on the abnormal returns of the microfinance firms

H9: COVID-19 did not impact the volatility of stock markets

The Reserve Bank of India on March 14, 2022, issued the Reserve Bank of India Regulatory framework for Microfinance Loans, Directions, 2022. These regulations came into force on April 1, 2022. This research study aims to measure the impact of the Microfinance regulations on the stock market returns of microfinance institutions in India. In this study, the Constant mean, Market-adjusted rate of return, and the CAPM method has been used. (Ritter, Jay, 1991), in his research paper highlighted that the most popular measure of the long-term performance of the stocks is the BHAR (Buying and Hold abnormal return). (Barber, Brad M. and John D. Lyon, 1997) also, propagate the use of buying and holding abnormal returns because it measures the investor experience. They also recommend the use of the t statistics and hypothesis testing using bootstrapping method. Since in this the objective is to measure the short term performance of the stock, the use of BHAR is a good

methodology. Though there is literature to study both long-run and short-run abnormal returns around events like regulatory changes, the methodologies for the short-run and longlong-rundies are vastly different categorically. . Though the long-horizon returns are difficult to calculate, the short-horizon studies are more insightful, (Kothari et al., 2006; (Ikenberry et al., 1995). There are the number of methods for calculating abnormal returns, using the appropriate benchmark index. (Ikenberry et al, 1995) has suggested the market-adjusted method, which was applied by Markowitz in justifying the Modern Portfolio Theory in 1995. In this study, the short horizon has been used for estimating the abnormal return.

In this study, the constant mean model, market return model and CAPM (Capital Asset Pricing Model) have been used for the purpose of analysis. The Nifty index, NSE (National Stock Exchange) has been used for the purpose of analysis. The event data is taken to be (10 days prior and 10 days after the event). The adjustment period is taken to be 10 days prior to the record date or announcement of the share buyback and the anticipation period is taken to be 10 days after the record date or the announcement of the share buyback. The estimation period is taken to be approximately 30 days prior to the anticipation period of the share buyback announcement or the record. The period considered for the buyback is from 2022 to 2023. The criteria for the selection   of the companies is:

(1) The company must have announced the buyback of the securities

(2) The data is available for the event window and estimation period

The methods for the calculation of the abnormal returns are given as under:

$$\text{Calculation of the return} = \frac{P_t}{P_{t-1}} - 1$$

Both the stock market returns and the market returns are calculated using the formula given above. The method for the calculation of the abnormal returns for assets i in time t, ARit, for the days near the record date or the date of announcement of the share buyback. The broad definition for the buyback is $AR_{it} = R_{it} - E[R_{it}]$

In order to calculate and analyze the abnormal returns around the record date of share repurchase an appropriate event window is to be determined. The event window is generally defined as the anticipation and the adjustment window, before and after the event respectively. In this study, I have taken the event window, adjustment window of 10 days after the announcement of share repurchase and 10 days as the anticipation period before the announcement of share repurchase. (Ikenberry et al., 1995) in their article have prescribed a window of 10 days after and 20 days before the share purchase announcement. In this study, the period considered is 10 days before and 10 days after the share repurchase announcement. Though there is literature to study both long-run and short-run abnormal returns around events like share purchase, the methodologies for the short-run and longlong-rundies are vastly different categorically, three different methods have been used for the calculation of the

abnormal returns. Though the long-horizon returns are difficult to calculate, the short-horizon studies are more insightful, (Kothari et al., 2006; (Ikenberry et al., 1995). There are the number of methods for calculating abnormal returns, using the appropriate benchmark index. (Ikenberry et al, 1995) has suggested the market-adjusted method, which was applied by Markowitz in justifying the Modern Portfolio Theory in 1995.

(1) **Constant Return method** – Under the constant return method the return is calculated by deducting from the stock price the average mean price of the stock, which is calculated by averaging the estimated returns during the estimation period.

(2) **Market return method** – Under the market return method, the return is calculated b subtracting from the stock market price return, the market return (the benchmark).

(3) **CAPM** (Capital Asset Pricing Model) – Under the CAPM (Capital Asset Pricing Model), the following equation has been used for the calculation of the returns. This is the famous model used by Markowitz in his Modern Portfolio Theory.

$$R_{i,t} = \alpha_i + \beta_i \, R_{mt} + e_{i,t}$$

In this equation, Rit is the return on asset class i for time period t. And Rmt is the market return during the same period. For calculating the returns, the intercept is calculated by regressing the stock market return over the market return during the estimation period. Similarly, the slope is calculated by regressing the stock market return over the market return. This gives us the value of the returns as per the CAPM method.

3.6 Aggregation of the abnormal returns
3.6.1 CAR (Cumulative abnormal returns)

To calculate the CAR (Cumulative abnormal returns) over the short-term horizon of 10 days before the event, i.e., the share purchase record date, the anticipation period, and the days after the event, i.e., the share purchase record date, the adjustment period. To calculate the cumulative returns, the CAR (Cumulative abnormal return) method, and BHAR (Buy and Hold Return) method have been used. The cumulative abnormal return is used to aggregate the returns abnormal returns calculated through Constant return, CAPM (Capital Asset Pricing Method) and the Market adjusted return method, over the window of 10 days before (anticipation) and 10 days after (adjustment) window.

3.6.2 BHAR (Buy and Hold Abnormal Return)

The BHAR method is based on the identification of an appropriate benchmark, which refers to the expected returns if the share purchase might not have occurred. In this method, which is also called the characteristic-based matching method, the benchmark portfolio is the perfect proxy for the expected return for the event portfolio. Table 1 reports the calculation for the abnormal returns of the 15 stocks using the constant mean, market-adjusted, and CAPM methods. Initially, the returns for the

stock are calculated as (Pt/Pt-1) *100 as per the price of the stock on the NSE (National Stock Exchange) for the 51-day period, where 10 days are for the period before the stock purchase or anticipation period, 10 days after the stock purchase, the adjustment period and the event. The constant mean method estimates the abnormal returns as the difference between the stock price return on a particular day and the mean of the returns of the stock during the estimation window of the normal period of 30 days. Similarly, the return is calculated for the NIFTY. Market-adjusted returns are calculated as the difference between the stock return and the market return. Abnormal returns are calculated using the slope and intercept of the stock returns and the market returns during the estimation period. The cumulative abnormal returns are calculated using the abnormal returns calculated under the constant returns, market-adjusted returns, and CAPM method. The returns are summed for a the10-day period over the anticipation and the adjustment period. Further, t statistic for the anticipation and adjustment period is calculated by dividing the cumulative returns by the standard deviation for 10-day period. And can be expressed as $\sqrt{n}.\frac{ARt}{SDt}$, where ARt is the abnormal return calculated using the constant return, market mean and CAPM. The cumulative abnormal returns are calculated using the BHAR method, using the formula

$$BHR_{it} = \prod_{t=1}^{T}(1 + r_{it}) - 1$$

$$H0: AR_{(T-10) \text{ to } (T-1)} = 0$$

$$H_1: AR_{(T-10) \text{ to } (T-1)} \neq 0$$

Where AR(T-10) to (T-1) is the average daily abnormal return for the 10 days before (anticipation) and after (adjustment) the event.

H10: The microfinance regulation has generated positive abnormal returns at the announcement day

Given what the signaling hypothesis holds, the microfinance regulation witnesses a positive income shock to the stock price returns. The research has seen positive ARs at ton announcement day and the subsequent days. Therefore, the second hypothesis is given as follows:

The microfinance regulation has generated positive abnormal returns at the announcement day

$$H0: AR_{(T) \text{ to } (T \text{ to } 10)} = 0$$
$$H_1: AR_{(T) \text{ to } (T \text{ to } 10)} \neq 0$$

Where AR (T to 10) is the average daily abnormal return for the event day and subsequent 10 days.

3.6.3 Empirical findings

The results of the Market model, the Constant return, and the CAPM Model are given below: The abnormal returns for all the companies were calculated using the formulas mentioned above in equations (1), (2), and (3). Thereafter a simple t-test was conducted to determine whether the mean is significantly different from zero or not. A summary of the tests is presented below:

Table 7. Abnormal returns

			Constant mean	Market	CAPM
AUBANK	CAR	EVENT	0.014	0.007	0.002
		ANTICIPATION	0.033	-0.005	-0.040
		ADJUSTMENT	0.008	0.004	0.001
	t stat	EVENT	0.502	0.321	0.112
		ANTICIPATION	0.373	-0.073	-0.573
		ADJUSTMENT	0.047	0.035	0.011
	BHAR	EVENT	0.014	0.007	0.002
		ANTICIPATION	0.027	-0.011	-0.045
		ADJUSTMENT	0.083	0.048	0.014
	t stat	EVENT	0.502	0.321	0.112
		ANTICIPATION	0.305	-0.156	-0.649
		ADJUSTMENT	0.479	0.352	0.105
BANDHAN BANK	CAR	EVENT	0.008	0.027	0.019
		ANTICIPATION	0.049	0.074	0.026
		ADJUSTMENT	0.044	0.036	-0.005
	t stat	EVENT	0.293	1.221	0.873
		ANTICIPATION	0.566	1.038	0.373
		ADJUSTMENT	0.507	0.514	-0.080
	BHAR	EVENT	0.008	0.027	0.019
		ANTICIPATION	0.028	0.000	-0.040
		ADJUSTMENT	0.045	0.035	-0.007
	t stat	EVENT	0.293	1.221	0.873
		ANTICIPATION	0.319	0.002	-0.559
		ADJUSTMENT	0.515	0.500	-0.100
FUSION	CAR	EVENT	0.010	0.007	-0.007
		ANTICIPATION	-0.005	-0.004	-0.069
		ADJUSTMENT	0.043	0.049	-0.071
	t stat	EVENT	0.382	0.322	-4.740
		ANTICIPATION	-0.065	-0.058	-13.713
		ADJUSTMENT	0.510	0.704	-14.289
	BHAR	EVENT	0.010	0.007	-0.007
		ANTICIPATION	-0.011	-0.010	-0.066
		ADJUSTMENT	0.052	0.056	-0.076
	t stat	EVENT	0.382	0.322	-4.740
		ANTICIPATION	-0.139	-0.141	-13.299
		ADJUSTMENT	0.623	0.799	-15.231
UJJIVAN	CAR	EVENT	-0.000	-0.014	-0.015
		ANTICIPATION	0.023	-0.082	-0.083
		ADJUSTMENT	0.163	0.063	0.064
	t stat	EVENT	-0.014	-0.589	-0.656
		ANTICIPATION	0.238	-1.081	-1.124
		ADJUSTMENT	1.693	0.836	0.866
	BHAR	EVENT	-0.000	-0.014	-0.015

		ANTICIPATION	0.022	-0.079	-0.081
		ADJUSTMENT	0.164	0.056	0.058
	t stat	EVENT	-0.0149	-0.589	-0.656
		ANTICIPATION	0.233	-1.048	-1.094
		ADJUSTMENT	1.702	0.748	0.786
SPANDANA	CAR	EVENT	-0.017	-0.027	0.014
		ANTICIPATION	0.110	0.039	-0.113
		ADJUSTMENT	0.212	0.146	-0.204
	t stat	EVENT	-0.327	-0.587	0.297
		ANTICIPATION	0.667	0.266	-0.760
		ADJUSTMENT	1.281	0.989	-1.374
	BHAR	EVENT	-0.017	-0.027	0.014
		ANTICIPATION	0.093	0.034	-0.098
		ADJUSTMENT	0.207	0.133	-0.204
	t stat	EVENT	-0.327	-0.587	0.297
		ANTICIPATION	0.560	0.232	-0.662
		ADJUSTMENT	1.248	0.901	-1.373
CREDIT ACCESS	CAR	EVENT	-0.000	-0.003	-0.000
		ANTICIPATION	0.112	0.109	-0.0333
		ADJUSTMENT	0.079	0.081	-0.0251
	t stat	EVENT	-0.003	-0.109	-0.053
		ANTICIPATION	0.953	1.049	-1.134
		ADJUSTMENT	0.674	0.784	-0.856
	BHAR	EVENT	-0.000	-0.003	-0.000
		ANTICIPATION	0.104	0.103	-0.033
		ADJUSTMENT	0.081	0.083	-0.024
	t stat	EVENT	-0.003	-0.109	-0.053
		ANTICIPATION	0.886	0.991	-1.145
		ADJUSTMENT	0.689	0.802	-0.848

The empirical findings substantiate that the announcement of the microfinance regulations lead to abnormal returns of the stocks of microfinance companies.

4. Conclusion

The study substantiates that there is a trade-off between the financial sustainability and outreach of microfinance institutions in India. Moreover, the culture has a vast impact on the financial sustainability and outreach of microfinance firms. The power distance has a negative impact on the outreach of the microfinance institutions and the financial sustainability of the microfinance firms. Thus, higher power distance orientation in a nation, the lower is the propensity of the microfinance firms to cater to the poorest of poor. The higher the power distance and long-term orientation negative is the impact on the financial sustainability or the return on assets and return on equity of the microfinance firms. The data analysis further reveals that the microfinance institutions exhibit volatility that persists across the period. Moreover, higher the rate of power distance, individuality,

uncertainty avoidance higher is the propensity to take loans from the microfinance institutions. Higher the long-term orientation and indulgence lower is the orientation to take the loans from the microfinance institutions. Finally, higher the level of financial inclusion in form of access to the debit cards and ATM (Automated Teller Machine) positive will be the impact on the return on assets, return on equity and financial sustainability of the microfinance institutions.

5. Limitation & future research

The study does not differentiate the supply of microfinance on the basis of the product design and delivery channels. Future research can be undertaken to measure the impact of the various channels of product delivery, i.e., groups and individual loans on financial sustainability and outreach of microfinance in India.

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