A Study Of The Microfinance Penetration Imbalance In India

Avika Saraf

University of California, Berkeley

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Advisor: Professor Aprajit Mahajan

Abstract

Microfinance has provided loans to approximately 28 million clients in India and is often seen as a means for gender empowerment and poverty alleviation. However, there is a huge imbalance in the penetration of Microfinance both across and within countries. In this paper, using data for MFI penetration and demographic, socio-economic and historical determinants, I examine possible explanations for the high concentration of MFIs in South India. The research is built using data from 2010 and 2011. Important variables include female literacy and measure of wealth. Using OLS regressions, I find that wealth has a positive and significant correlation to the presence of MFIs. I find a more complex relationship with female literacy. This research will provide a platform upon which future studies of determinants of MFI locations can be developed.

Acknowledgement

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Introduction

Microfinance was first instituted during 1950-1980, with the purpose of alleviating poverty by extending small loans to local villagers who did not possess meaningful collateral (tangible or intangible collateral such as real estate or stocks).[1] It was developed by organizations such as the Grameen Bank in Bangladesh, Self Employed Women's Association (SEWA) Bank in India, and ACCION International in Latin America.[2] Ideally, advocates of Microfinance would want the Microfinance Industry to be present across all developing and poor countries where the underprivileged do not have access to formal credit. However, we observe a large penetration imbalance across as well as within countries.

As of December 2014, the Microfinance Industry in India provided microcredit to over 28.7 million clients.[3] South India with 20% of India's total population accounts for 52% of all Microfinance clients and 54% of all Microfinance loan portfolios. In comparison, the Western, Eastern, Northeastern, Northern and Central regions with 20%, 22%, 4%, 25% and 8%[4] of India's total population (respectively) have extremely underdeveloped microfinance sectors, accounting for 10%, 23%, 3%, 6%, and 6% of client outreach respectively.[5] Microfinance in India can be divided into four categories: NGO-MFIs, non-profit Section 25 NBFC-MFIs, cooperative MFIs and for profit MBFC-MFIs.[6]

There has been a lot of debate about the impact and benefits of microfinance on gender empowerment and improving the wealth of districts. Banerjee et al (2012), in The

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[1] Sundaresan, Suresh M. "The Changing Landscape of Microfinance." Introduction. *Microfinance: Emerging Trends and Challenges*. Cheltenham, UK: Edward Elgar, 2008. 4. Print

[2] ibid

[3] MFIN. "Introduction: Highlights." Introduction. *The Micrometer*. Vol. 12. N.p.: n.p., n.d. N. pag. *Microfinance Institutions Network*. Web

[4] Census of India 2011

[5] Champatiray, Amulya Krishna, Parul Agarwal, and Santadarshan Sadhu. "Map of Microfinance Distribution in India." *Centre for Microfinance, IFMR Research Chennai and Bankers Institute of Rural Development (BIRD) Report, Lucknow, India [Retrieved on May 12, 2013]* (2010).

[6] Karmakar, K. G., ed. *Microfinance in India*. SAGE Publications India, 2008.59

Miracle of Microfinance, documented the first randomized evaluation of the impact of microcredit lending in Hyderabad (India). They found that there were no changes to women's empowerment, health or education in the treatment group that received microfinance services.[7] On the other hand, there is some evidence that Microfinance helps improve the power of decision making among women, that is, they have more say in matters pertaining to themselves as well as their household. An observational study conducted by the Women's Empowerment Program in Nepal that developed a Microfinance model based on credit unions, found positive results for gender empowerment:

> "The Women's Empowerment Program in Nepal, conducted a study that showed an average of 89,000 out of 130,000 or 68 percent of women in its program experienced an increase in their decision-making roles in the areas of family planning, children's marriage, buying and selling property, and sending their daughters to school—all areas of decision making traditionally dominated by men."[8]

Similarly, some studies validate that access to financial services ameliorates the households' economic position by granting more access to assets as well as improving income levels. A study conducted on the impact of Share Microfinance in Andhra Pradesh reveals that access to Microfinance improves their asset base and encourages clients to diversify into higher return occupations.[9] In contrast, Banerjee et al (2012) found that even though Microfinance helps expand the business of those that borrow, it is not a tool for

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[7] Banerjee, Abhijit V., et al. "The miracle of microfinance? Evidence from a randomized evaluation." (2013)
[8] Cheston, Susy, and Lisa Kuhn. "2/Targeting Women." *Empowering Women through Microfinance*. New Delhi: Discovery Pub. House, 2012. N. pag. Web.
[9] Todd, H. "Paths Out of Poverty: The Impacts of SHARE Microfin Ltd in Andhra Pradesh." *Imp-Act report* (2001).

escaping poverty, as there are no significant changes in household wealth or consumption.[10] Thus, there exists a lot of literature on the impact of the Microfinance Industry; yet there is no previous research for the conditions of heterogeneous rates of diffusion of Microfinance to different locations.

Through this paper, I sought to explore the reasons behind this imbalance, concentrating on India as a case study. Was it just a matter of chance that the Microfinance industry diffused particularly to one part of India, and not to the others? Or are there certain variables that could explain this?

In order to discover the determinants of setting up a Microfinance Institute (MFI) within India, I consider the key characteristics of a location that make it conducive to MFIs, so as to understand the latter's regional distribution. The main consideration for this paper will test whether female education is a strong predictor for the extensive presence of MFIs in a particular region. This inference rests upon the fact that the overall literacy rate for women is significantly higher in the South as compared to the rest of India. Further, I will consider the correlation between local economic development and the presence of MFIs. This relationship is less evident than the one between female literacy rates and MFIs, since many MFIs declare their purpose is to serve the poor, and thus they desire to work in areas that house this demographic. Additionally, I will use qualitative evidence from a thorough literature review to assert that Southern India's political history makes it better suited for the establishment of MFIs than any other region in India. Before discussing the impact of the degree of local economic development and the long-lasting effects of South India's history, however, I shall return to the primary argument of this thesis that links MFIs with female literacy rates.

[10] Banerjee, Abhijit V., et al. "The miracle of microfinance? Evidence from a randomized evaluation." (2013)

Most MFIs are targeted towards women (98% of the 23 million clients Microfinance serves are women.[11]) and thus, I primarily look at literacy rates related to women. There is a huge disparity between the literacy rate of males and females at a national level. According to the Census of India, the effective literacy rate can be defined as the number of literate persons aged 7 and above divided by the Population aged 7 and above. As of 2011, the total number of female literates calculated as per the definition above is 65.46%, as compared to total male literacy, at 82.14%.[12] Further, there has also been a lot of debate on the reach of Microfinance, whether it targets the poorest of the poor or caters to a better off section of the poor.[13] I look at these topics in detail in the literature review.

The research conducted in my thesis serves to discover the boundaries and limitations of the scope of Microfinance, not from the perspective of impact, but from the perspective of establishment in different locations.

Data & Methodology

I collected district level data for 15 states from the Census of India 2011 and IFMR LEAD. Through the census I gathered information on female literacy, male literacy, female population, male population, sex ratio, asset use, access to water and lighting sources. I collected data for the penetration of Microfinance at the district level for the year 2010 through IFMR LEAD. This included information on 103 MFIs across India, belonging to the 4 different categories mentioned in the Introduction (NGO-MFIs, non-profit Section 25 NBFC-MFIs, cooperative MFIs and for profit MBFC-MFIs).

IFMR LEAD categorizes the different regions as: East region consisting of Bihar, Jharkhand, Orissa, West Bengal and Andaman and Nicobar Islands; West region consists of

[11] MFIN. "Introduction: Highlights." Introduction. *The Micrometer*. Vol. 12. N.p.: n.p., n.d. N. pag. *Microfinance Institutions Network*. Web

[12] State of Literacy." *Census of India 2011*. N.p., n.d. Web.

[13] Dichter, Thomas W., and Malcolm Harper. "Is Micro Debt Good for Poor People? A Note on the Dark Side of Microfinance." *What's Wrong with Microfinance?* Rugby, Warwickshire, UK: Practical Action Pub., 2007. 19. Print.

Goa, Gujarat, Maharashtra and Rajasthan; Central region consisting of Chhattisgarh and Madhya Pradesh; Northern region consisting of Chandigarh, Jammu and Kashmir, Delhi, Punjab, Uttar Pradesh, Uttarakhand, Haryana and Himachal Pradesh; Northeast region consisting of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura; and the Southern region consisting of Andhra Pradesh, Karnataka, Kerala and Tamil Nadu.[14] In my data set I have information on all states in the Southern Region, 2 states in the Eastern region (Bihar and Orissa), one state in the Western region (Rajasthan), all states except for the union territory of Chandigarh for the Northern region, and Madhya Pradesh for the Central region. In total I have examined data from 420 districts across the states mentioned above. While conducting my analysis I excluded Jammu and Kashmir (the Northern most state) from my data due to reasons that I will discuss in the Literature Review.

I visited Microfinance offices in Northern and Southern India, specifically New Delhi and Chennai to obtain qualitative information on MFIs as well as acquire a deeper understanding about the regional disparity. In Chennai I visited Belstar, Mohanas, Lok Capital, Impact World Vision India and Asirvad. In Delhi I visited BSFL and Capital Trust. I interviewed a number of different employees, which helped me formulate my research question.

To support my hypotheses, I look at two linear models with different outcome variables: *existence* of MFIs and *number* of MFIs. The two main explanatory variables are percentage of female literates in a district and the wealth index.

Due to the lack of data on district level income, I used the Principal Components Analysis developed by Filmer and Pritchett to develop a proxy for wealth. According to Filmer and Pritchett, "A proxy for wealth not only is useful in examining effects of wealth,

[14] Champatiray, Amulya Krishna, Parul Agarwal, and Santadarshan Sadhu. "Map of Microfinance Distribution in India." *Centre for Microfinance, IFMR Research Chennai and Bankers Institute of Rural Development (BIRD) Report, Lucknow, India [Retrieved on May 12, 2013]* (2010).

but also is needed as a "control" variable in estimating effects of variables potentially correlated with household wealth."[15] I created this proxy using the following factors:

Ownership of Assets	**Access to Water**	**Light source**
Radio, TV	Covered well	Electricity
Mobile, Landline	Tube well	Kerosene
Scooter, Car	Hand pump	
Computer, internet	Treated tap water	

The PCA analysis is used on the covariance or correlation matrix to extract the directions in the multivariate space that have the greatest variability and are thus the most informative.[16] To generate a wealth index, I used the first component, which explains the largest variance is the sample. Each subsequent component is uncorrelated with the each other. The lower the wealth index score, the higher is the household poverty level. [17]

Background

Microfinance penetration amongst women as well as the total population is the highest in Southern Indian states. 11 percent of all adult women in Southern India are served by the Microfinance industry and, of the entire population in Southern India, 6 percent was served by Microfinance services as of 2010. [18] Some Southern states show higher concentration than the others - mainly Andhra Pradesh, Karnataka and Tamil Nadu. In the Northern, Eastern and Western states this penetration level is much lower.

The graph below visually expresses the regional penetration level across total population, female population, and households.

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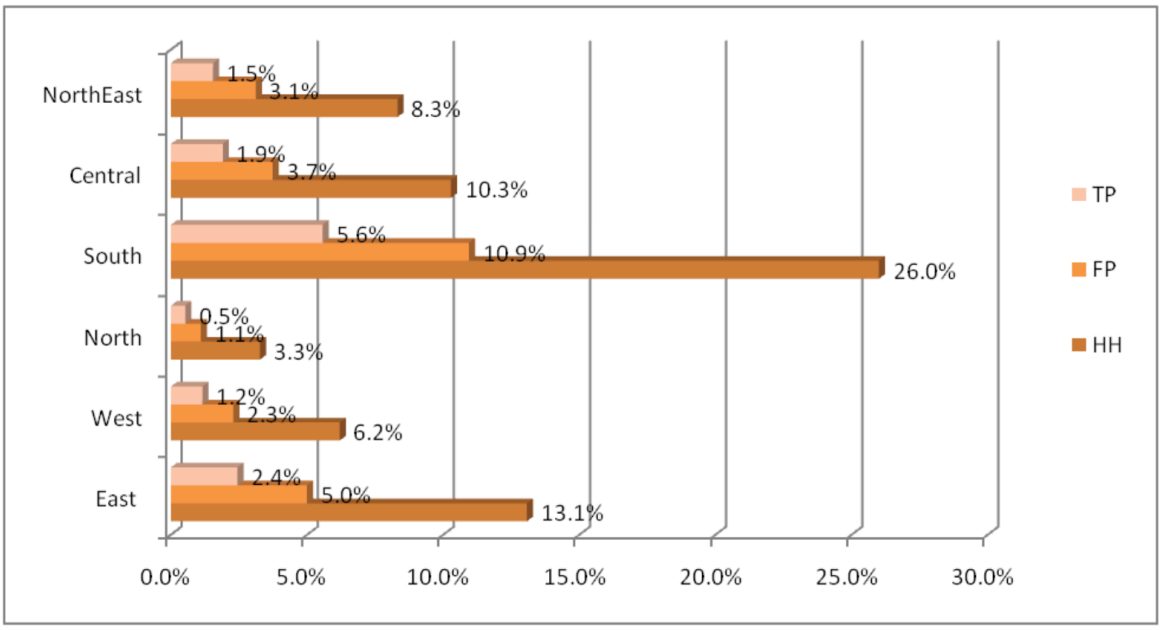
[15] Filmer, Deon, and Lant H. Pritchett. "Estimating wealth effects without expenditure data—or tears: An application to educational enrollments in states of India*." *Demography* 38.1 (2001): 115-132.
[16] Kolenikov, Stanislav, and Gustavo Angeles. "The use of discrete data in principal component analysis for socio-economic status evaluation." *Retrieved Nov* 21 (2005): 2013.
[17] Ghalib, Asad K. "Does Microfinance reach the poorest of the poor? Empirical evidence of program outreach (2010): n. pag. Chronic Poverty Research Center. Web
[18] Champatiray, Amulya Krishna, Parul Agarwal, and Santadarshan Sadhu. "Map of Microfinance Distribution in India." *Centre for Microfinance, IFMR Research Chennai and Bankers Institute of Rural Development (BIRD) Report, Lucknow, India [Retrieved on May 12, 2013]* (2010).

Graph 1



[19]

In the graph 'TP', 'FP', 'HH' represent Total Population, Female Population and Household respectively. The female population and total population penetration is the lowest (1.1% and 0.5% respectively) in the North and is 10.4 and 4.5 percentage points lower than the penetration for the same in the South. We can observe a similar pattern with the total households that engage in Microfinance. It is the highest for the South, and lowest for Northeastern states followed by the North.

Even though the data for MFI penetration used in this analysis is for the beginning of 2010, which is before the Andhra Pradesh crisis, seeds of the crisis were planted before 2010; there were instances of Microfinance shutdowns in 2006. The number of Microfinance

[19] ibid

institutes in the beginning of 2010 in Andhra Pradesh may be less than expected, and this can undermine the expected extent of MFI concentration in the South. For instance, the first grave warning came for the Krishna district in 2006, where 50 branches of two major MFIs were shut down due to high interest rates and forced loan repayment.[20] These warnings were ignored consistently in other areas such as in Kolar (Karnataka) and Idduki (Kerala) before 2010.[21] Thus, as Microfinance in Andhra Pradesh expanded extremely rapidly, there were accounts of borrowers committing suicide due to high default rates and coercive repayment techniques.[22] Following these instances, Andhra Pradesh Micro Finance Institutions (regulation of money lending) Ordinance, 2010, was passed. This placed stringent new regulations to closely monitor how MFIs operate.[23] This ordinance led to a dramatic drop in loans disbursed and an overall decline in the number of operating institutes in Andhra Pradesh. In the future, this could potentially increase the spread of Microfinance institutes to other regions as the capital of the Microfinance Industry in India has now essentially been diminished.[24]

Literature Review

Through primary and secondary sources, I will examine previous research that is relevant to my empirical analysis: Jammu and Kashmir as an outlier, historical background of Microfinance, Microfinance's focus on women and its target socioeconomic group. Discussing these qualitative details will assist in understanding the quantitative section and help put the numbers and correlations into perspective.

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[20] Mader, Philip. "Rise and fall of microfinance in India: The Andhra Pradesh crisis in perspective." *Strategic Change* 22.1-2 (2013): 47-66.

[21] ibid

[22] ibid

[23] Pradesh, Andhra. "Global Implications of the Crisis in Indian Microfinance." *CGAP. November* (2010).

[24] Champatiray, Amulya Krishna, Parul Agarwal, and Santadarshan Sadhu. "Map of Microfinance Distribution in India." *Centre for Microfinance, IFMR Research Chennai and Bankers Institute of Rural Development (BIRD) Report, Lucknow, India [Retrieved on May 12, 2013]* (2010).

a. Jammu and Kashmir: an Outlier

According to the IFMR LEAD interactive map, there are no records of any Microfinance Institutes in Jammu and Kashmir. One reason for this is the underdeveloped nature of the State, largely attributed to the political upheaval and unusual demographics.[25]

Under Article 370 (dated 1949), Jammu and Kashmir is granted special autonomous status by the Indian Constitution. This gives the State the discretion to ratify Parliamentary laws in all matters except for defense, finance, communications and foreign affairs, only after which they will apply to the State.[26] In addition, in 1927 a State Subject Ordinance was passed, a section of which prevents any Non-Kashmiri citizen from buying land in the state.[27]As one might guess, this provides a disincentive for outside investment, including Microfinance Institutes.

Another reason for the political upheaval in Jammu and Kashmir is the thriving insurgency since 1989. The first clear outbreaks of violence were observed when Muslim fundamentalists attacked the minority Kashmiri Pandits in 1986.[28] Even as of 2014, Jammu and Kashmir witnessed 86.6 percent more civilian casualties and an increase in terror activities by 30.58% since the previous years.[29] Hence, the amalgamation of the political upheaval and low economic growth that are unique to the state of Jammu and Kashmir have led to the negligible penetration of Microfinance in the State. To avoid any bias in my empirical analysis I have, thus dropped Jammu and Kashmir from my analysis.

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[25] Rashid, Khaki Audil, and Sangmi Mohi-ud-Din. "Microfinance and Self-Help Groups: An Empirical Study." *Indian Journal Of Management Science (IJMS) Vol. II* 2 (2012).
[26] Full text of the Article can be found at http://india.gov.in/my-government/constitution- India/constitution-India-full-text
[27] National Archives of India Home Department,Political,1922,FileNo.18,*Fortnightly Report for Second Half of August.*
[28] Sharma, Usha. *Cultural, religious and economic life of Jammu, Kashmir, and Ladakh*. Radha Publications, 2001.
Publications, New Delhi, 2001, p.144
[29] "86.6 Percent More Civilian Casualties in J&K in 2014: MHA." *Zee News*. Zee News, 24 Mar. 2015. Web. 06 May 2015.

b. Views of MFI employees in Chennai (Tamil Nadu) and Delhi

I spoke with a number of different employees at Microfinance Institutes in Chennai and Delhi to understand first hand views on the concentration of Microfinance in the South. On the whole, the majority of them based in Chennai felt that Southern India's Government policies, in particular the Government of Andhra Pradesh, as well as its history helped contribute to the concentration of MFIs in this region. Government of Andhra Pradesh's policies under Chandrababu Naidu's leadership made the environment more conducive to the development of Self Help Groups, particularly the program under Velugu that I will expand upon in the next section. The initial models of Self Help Groups were first developed in Karnataka, which also contributed to the overall receptivity and accessibility of Microfinance amongst the Southern Indian clients. Other areas of importance that the management mentioned as potential important factors were female literacy, ease of access to rural areas as well as better infrastructure. However, the management team of MFIs based in Delhi attributed this variation to either the historical background of the South, or to chance. They also cited some examples of narrow mindedness amongst men in North India who would often arrive drunk to meetings and refuse to let their wives take the money. This made it difficult to set up MFIs, particularly in Haryana. Drawing on the experiences of a number of highly talented professionals, I will explore the historical background as a contributing factor to the higher number of Microfinance institutes in South India, along with my chosen explanatory variables (female literacy and wealth).

c. Historical background of Microfinance development in India

A majority of the initial Microfinance and Self Help Group initiatives that began in India were sponsored by or rolled out in South Indian states.

National Policies: Microfinance began to formalize in India with the initiative of the National Bank for Agricultural and Rural Development (NABARD). NABARD was set up in July 1982, to promote agricultural and rural prosperity via effective credit support.[30] Under its developmental functions, NABARD initiated research projects on Self Help Groups. One such project was funded by the government of Karnataka (1986-87), and another was in collaboration with the Asia Pacific Rural and Agricultural Credit Association. The successful results from these projects encouraged NABARD to launch its own pilot project, the SHG linkage project (1993): "The pilot project pioneered an attempt to bring together the mainstream banking system and the rural poor through an exclusively microfinance focused program without subsidy to the poor."[31] States in Southern India had promising results from this project as well.

- Karnataka: "Savings and Credit Management of SHGs", one of NABARD's research projects, was funded by the Mysore Resettlement and Development Agency (MYRADA) along with NABARD in 1986-87. [32]This project provided meaningful findings on topics such as repayment performance, dynamics within the groups and saving habits.[33]
- Kerala: Microfinance began to develop in Kerala in the late 1980s and early 1990s. 'Shreyas' (A social service center aimed at empowering the marginalized) got involved in Microfinance operations in 1988 in Kerala to help promote cooperatives.[34] A community Development Society was launched in Alappuzha, which identified poor families on the basis of a poverty index. This helped members get loans at any time of the year. A project called Kudambashree

[30] Genesis and Mission." *The National Bank for Agriculture and Rural Development*. NABARD, n.d. Web. <https://www.nabard.org/english/mission.aspx>.
[31] Satish, P. "Mainstreaming of Indian microfinance." *Economic and Political Weekly* (2005): 1731-1739.
[32] ibid
[33] Christabell, P. J. *Women empowerment through capacity building: The Role of Microfinance*. Concept Publishing Company, 2009.107
[34] Satish, P. "Mainstreaming of Indian microfinance." *Economic and Political Weekly* (2005): 1731-1739.

was launched in 1998 to empower women through microfinance services.[35] Under the pilot project, Alappuzha promoted 350 groups and extended loans worth Rs. 4.7 million in 1996. [36]

- Tamil Nadu: Professional Assistance for Development Action (PRADAN) in Madurai formed women's SHGs with the longer goal of forming a community banking system. [37]During the pilot project, the Association of Sarva Seva Farms in Chennai promoted 214 groups and extended credit worth Rs. 2.3 million. PRADAN also promoted 313 groups and extended credit worth Rs. 3.9 million. [38]
- Andhra Pradesh: The development of SHGs in Andhra Pradesh dates back to 1979. The Government of India started the 'Development of Women and Children and Rural Areas' aimed at providing assistance to poor rural women by helping them form SHGs. Initially, the program was criticized for its rigidities and gaps. However, in the late 80s and early 90s, the program gained momentum after the district of Ananthpur made modifications to the programme, covering 30,000 women. Additionally, the South Asia Poverty Alleviation Program was launched in 1996 as a government initiative to sponsor SHGs, which covered 66,000 households in Andhra Pradesh. In addition to the reforms and government initiatives of the early 90s, the Andhra Pradesh Government was pro-active in conducting pilot projects across the state. In 2000 the Government of Andhra Pradesh included a social mobilization approach in its major poverty reduction program, Velugu, to be implemented in the 6 poorest districts. This was later extended to the remaining 16 as well.[39]

Thus, we see that most of the early Microfinance initiatives were established in South India. This validates one of my hypotheses that one of the reasons for the high concentration of Microfinance Institutes and SHGs in South India can be explained by the history of

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[35] Christabell, P. J. *Women empowerment through capacity building: The Role of Microfinance*. Concept Publishing Company, 2009.107. 139
[36] Satish, P. "Mainstreaming of Indian microfinance." *Economic and Political Weekly* (2005): 1731-1739.
[37] ibid
[38] ibid
[39] Bhatnagar, Amitabh. "Rural Microfinance and Microenterprise: The Informal Revolution Overview." *Rural Microfinance and Microenterprise: Informal Revolution* (2008): 168

Southern India. Furthermore, the views expressed by a number of Microfinance officers about historical context can be supported through the literary evidence presented.

d. Why does Microfinance focus on women?

As of November 2013, 98% of the 23 million clients Microfinance serves are women.[40] Despite declining poverty and increasing women empowerment, according to the World bank (2013) only 27% of females that are above the age of 15 are economically active - those who supply labor for the production of goods and services.[41] In developing countries such as India, women are assigned gender specific roles from an early age.[42] According to a study conducted by the World Bank, gender equality is a core development issue, and gender inequality thus inhibits the growth of a country.[43] One reason that Microfinance targets women is to promote gender equality. Additionally, in the United Nations Capital Development Fund's report on Special Unit on Microfinance, Deshpanda explains, "Women's success benefits more than one person. Several institutions confirmed the well-documented fact that women are more likely than men to spend their profits on household and family needs. Assisting women therefore generates a multiplier effect that enlarges the impact of the institutions' activities".[44] A woman's better judgment in spending on family needs is another reason why MFIs target women.

Thus, in order to bridge the gap between genders that undermines development, Microfinance services often target women. In the quantitative section of my thesis, I will use data to demonstrate the relation between the female population of an area and the decision of an MFI to set up.

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[40] MFIN. "Introduction: Highlights." Introduction. *The Micrometer*. Vol. 12. N.p.: n.p., n.d. N. pag. *Microfinance Institutions Network*. Web

[41] World Bank indicators

[42] Christabell, P. J. *Women empowerment through capacity building: The Role of Microfinance*. Concept Publishing Company, 2009.26

[43] King, Elizabeth M., and Andrew David Mason. "Engendering development through gender equality in rights resources and voice. Summary." (2001).

[44] United Nations Capital Development Fund

e. Microfinance doesn't effect the poorest of the poor

The 'Six Randomized Evaluations of Microcredit: Introduction and Further Steps', discusses the existence of conflicting views about the positive effect of expanding access to credit to the poor. Of the six studies conducted across Bosnia, Ethiopia, India, Mexico, Mongolia and Morocco, Banerjee et al (2014) find that expanding access to the poor does increase business activity. Surprisingly, however none of them found statistically significant increases in household income.[45] On the other hand, Banerjee and Duflo found that directly transferring assets such as livestock and training to the poorest of the poor help in elevating the economic situation of the poor. They conducted a pilot program in Murshidabad, India, under Bandhan Microfinance's initiative, 'Targeting the Hardcore Poor Program'.[46] Hence, there seems to be some discussion about whether MFIs *should* serve the poorest of the poor or not.

According to Thomas Ditcher and Malcolm Harper in What's Wrong with Microfinance, "MFIs virtually never work with the poorest - the mentally and physically disabled, the elderly, street children, the destitute and refugees - and many MFIs have high proportions of clients who are non-poor." [47]For example, in one of the interviews they conducted in Nyeri, Kenya, all 13 of the 13 group members they interviewed owned cars.[48] The reasons behind this could include: self-exclusion, as the extremely poor may fear the debt that may arise due to non-repayment; the group members may also be unwilling to include the extremely poor in fear of risking their own repayment; and finally, the Microfinance Institute's policy may not allow it.[49] Microfinance can create unfavorable

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[45] Banerjee, Abhijit, Dean Karlan, and Jonathan Zinman. "Six Randomized Evaluations of Microcredit: Introduction and Further Steps." *American Economic Journal: Applied Economics* 7.1 (2001): 1-21.
[46] Banerjee, Abhijit, et al. "Targeting the hard-core poor: an impact assessment." *draft report* (2011).
[47] Dichter, Thomas W., and Malcolm Harper. "Is Micro Debt Good for Poor People? A Note on the Dark Side of Microfinance." *What's Wrong with Microfinance?* Rugby, Warwickshire, UK: Practical Action Pub., 2007. 19. Print.
[48] ibid
[49] Bhatnagar, Amitabh. "Rural Microfinance and Micro Enterprises." (2008).17

circumstances for the poor due to situations beyond their control. This includes environmental and economic shocks such as droughts, flood, thefts, lack of skills, poor health etc.[50] Another study conducted in Bolivia to analyze the outreach for five MFIs found that most of the poor households that were served by MFIs were close to the poverty line, that is, they were the richest of the poor. [51]

In the following sections I will contextualize this quantitatively by discussing the relation between the wealth index of a state and the presence of MFI.

Development of Models

In order to identify variables that have an effect on determining the location of Microfinance Institutes in an area, I study two different outcome variables, the *existence of MFI* and the *number of MFIs*. I start with a single variable, and then look at multi variable regressions with the explanatory and control variables. I also explore the difference in results for the South as compared to the other regions and finally I control for variations across states.

I. Outcome Variable 1: The existence of MFIs

This model tests to see the variables that have a correlation with the *existence of MFIs*. In order to implement this, I have used a linear regression model. The dependent variable is MFIdummy, a dummy for Microfinance Institutes, that is 1 for the existence of Microfinance Institutes in a district and 0 for none.

The explanatory and control variables include: female percentage literacy, wealth index, sex ratio measured as females per 1000 males, female population, Southern region

[50] Dichter, Thomas W., and Malcolm Harper. "Is Micro Debt Good for Poor People? A Note on the Dark Side of Microfinance." *What's Wrong with Microfinance?* Rugby, Warwickshire, UK: Practical Action Pub., 2007. 19. Print.
[51] Navajas, Sergio, et al. "Microcredit and the Poorest of the Poor: Theory and Evidence from Bolivia." *World development* 28.2 (2000): 333-346.

(Andhra Pradesh, Kerala, Tamil Nadu and Karnataka), regions other than the South and total population.

a. **Linear model, with single variable**

I start with the simplest model to test for correlation between female literacy and the existence of an MFI in an area

$$\boldsymbol{Y_{it} = \beta_o + \beta_1 X_i + \varepsilon_{it}}$$

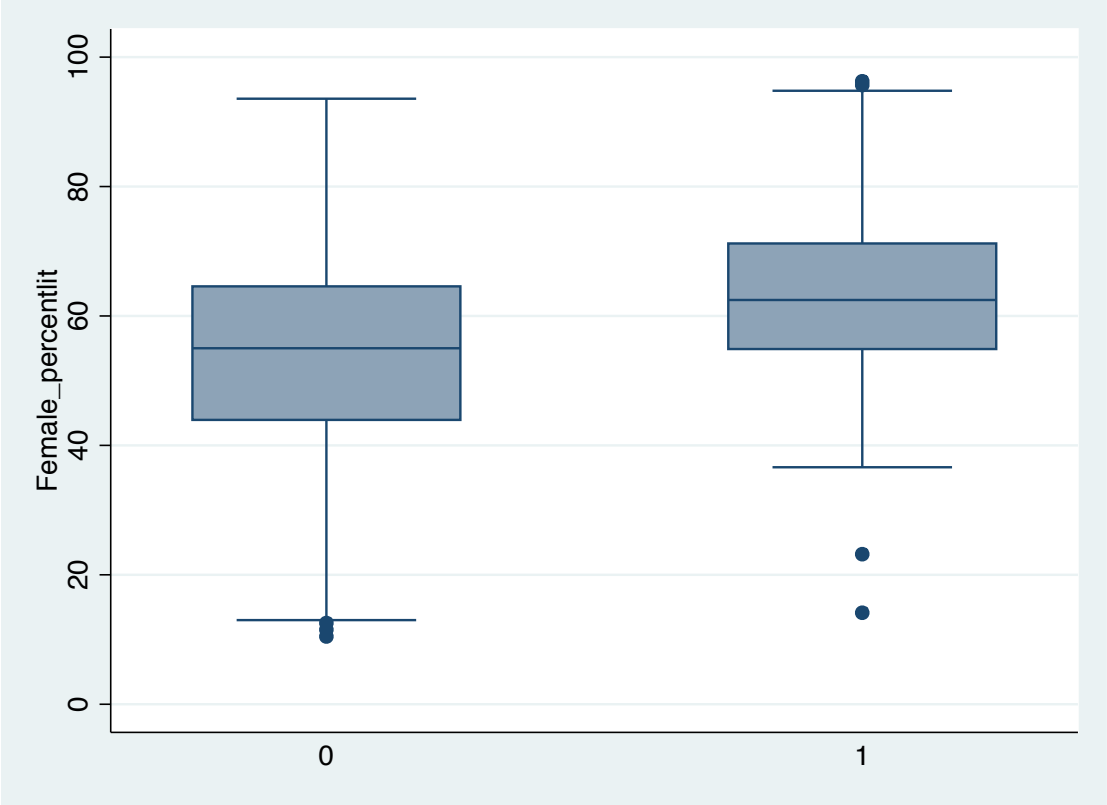
Where, Y_{it} is the MFI dummy over time t and district i

X_i is the Female literacy for district i measured in percentages

ε_{it} is the error term, which may include other variables not mentioned

Graph 2 explains the simple relation between Female literacy levels and existence if MFIs. The X-axis represents MFIdummy and the Y-axis is the percentage of literate females in a district. When MFI =1, the median of female literacy is a higher than when it is 0, implying that the female literacy is positively correlated with MFI existence. The circles outside the plot represent outliers. This information is presented numerically in *Table 1 (Appendix 1)*. Keeping everything else constant, percentage of literate females in a district is positively correlated with the existence of Microfinance Institutes. It is also statistically significant at the 1% level. However, the R squared is low, at 10.64% implying that there may be other factors that are causing the higher existence of MFI (Omitted Variable Bias). I will now add other control variables to see if the result is still significant.

Graph 2



b. Linear model, with multiple variables

Adding on to the single variable model, I test to see the correlation between percentage of literate females in a district and the existence of MFI after controlling for female population, sex ratio, total population and wealth index.

Equations:

$\boldsymbol{Y_{it} = \beta_o + \beta_1 X_{i1} + \beta_2 X_{i2} + \varepsilon_{it}}$: where X_{i1} is the percentage of literate females in a district, X_{i2} is the log of female population.

$\boldsymbol{Y_{it} = \beta_o + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3}\ \varepsilon_{it}}$: where X_{i1} is the percentage of literate females in a district and X_{i2} is Sexratio, defined as females per 1000 males and X_{i3} is the log of total population.

$\boldsymbol{Y_{it} = \beta_o + \beta_1 X_{i1} + \varepsilon_{it}}$: where X_{i1} is the wealth index.

$\boldsymbol{Y_{it} = \beta_o + \beta_1 X_{i1} + \beta_2 X_{i2} + \varepsilon_{it}}$**:** where X_{i1} is the percentage of literate females in a district and X_{i2} is the wealth index.

In the multi variable model, the percentage of literate females in a district is still positively correlated with the existence of MFI and is significant at the 1% level, after controlling for female population, sex ratio total population and wealth. The wealth index has a positive correlation that is statistically significant with the existence of an MFI. This is true even after controlling for female literacy. *Table 2* summarizes these results.

Table 2

	(1)	(2)	(3)	(4)
	MFIdummy	MFIdummy	MFIdummy	MFIdummy
Female_percentlit	0.00975***	0.00861***		0.00934***
	(7.51)	(6.13)		(6.47)
lnFemale_pop	0.176***			
	(5.80)			
Sexratio		0.000930*		
		(2.18)		
lnTot_pop		0.175***		
		(5.65)		
wealthindex			0.0725***	0.0372*
			(3.71)	(2.00)
_cons	-2.311***	-3.237***	0.668***	0.107
	(-5.76)	(-6.07)	(28.67)	(1.19)
N	396	396	395	395
R squared	0.1726	0.1826	0.0367	0.1174

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

c. **Linear model, difference in South versus other areas**

I test to explain the difference in results for when you are in the South versus other regions. I created a dummy variable for the South, which is =1 when the States are Andhra Pradesh, Karnataka, Kerala and Tamil Nadu and 0 for the remaining 10 states (Bihar, Delhi, Haryana, Himachal Pradesh, Madhya Pradesh, Odisha, Punjab, Rajasthan, Uttar Pradesh and

Uttarakhand). Similarly, I created a dummy variable for regions that are not in the South.

$\boldsymbol{Y_{it} = \beta_o + \beta_1 X_{i1} + \varepsilon_{it}}$: Where, X_{i1} is the dummy variable for South

$\boldsymbol{Y_{it} = \beta_o + \beta_1 X_{i1} + \beta_2 X_{i2} + \varepsilon_{it}}$: Where, X_{i1} is the dummy variable for South and X_{i2} is the variable for percentage of female literacy. β_1 can be interpreted as the effect of being in the South holding female literacy constant.

$\boldsymbol{Y_{it} = \beta_o + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \varepsilon_{it}}$**:** where X_{i1} is South and X_{i2} is the variable for percentage of female literacy. X_{i3} is an interaction between the dummy variable South, and continuous variable Female percentage literacy. β_3 can be interpreted as the change in the existence of Microfinance due to a 1% change in female percentage literacy when you are in the South

Being in the South has a positive and significant correlation with the existence of Microfinance institutes, even after I control for percentage of female literates in a district. However, the interaction term between female literacy and South is negative and significant, implying that if you are in the South, a 1% increase in Female literacy has a negative correlation with the existence of Microfinance in the South. The results are shown in *Table 3*.

Being in areas other than the South has a negative and significant correlation with the existence of Microfinance institutes, even after you control for % female literacy. However, the interaction term between female literacy and areas other than the South is positive and significant, implying that if you are not in the South, a 1% increase in Female literacy has a positive correlation with the existence of Microfinance in the South. The results are shown in *Table 4*.

Table 3

	(1)	(2)	(3)
	MFIdummy	MFIdummy	MFIdummy
South	0.320***	0.216***	0.969***
	(7.86)	(4.75)	(4.66)
Female_percentlit		0.00780***	0.0103***
		(5.23)	(6.03)
interaction1(South*Female_percentlit)			-0.0112***
			(-3.59)
_cons	0.589***	0.147	0.00779
	(20.59)	(1.67)	(0.08)
N	396	396	396

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

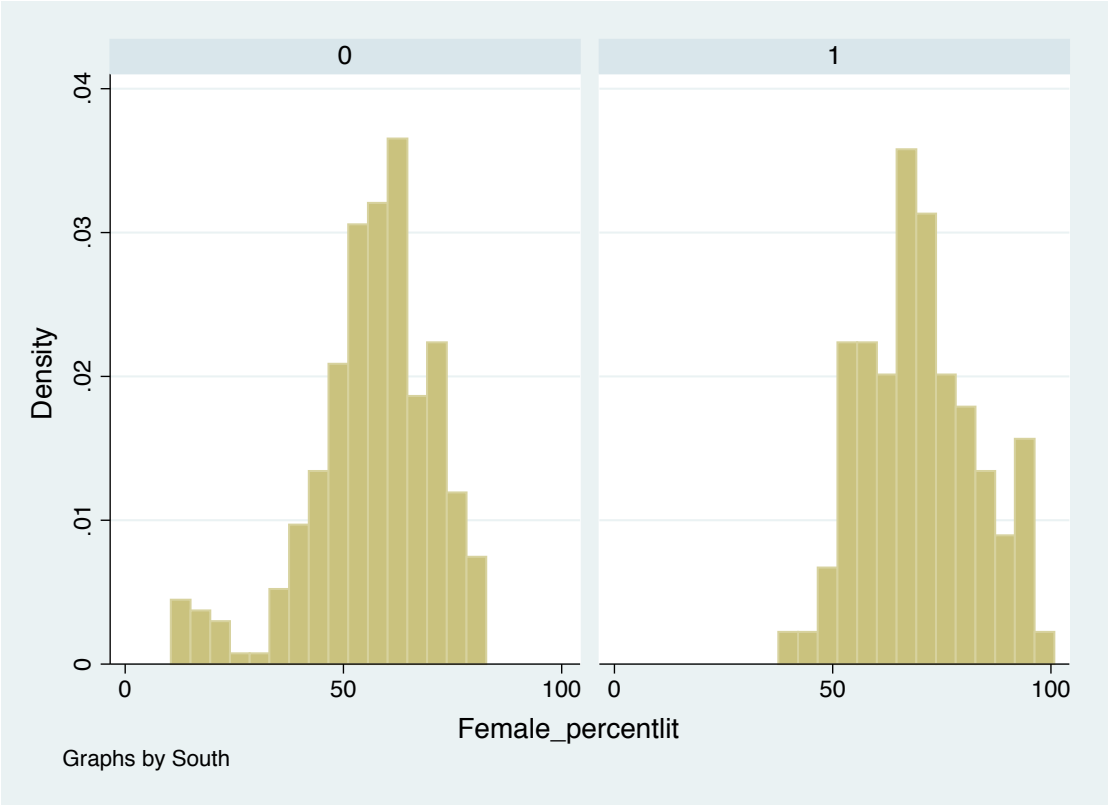
Table 4

	(1)	(2)	(3)
	MFIdummy	MFIdummy	MFIdummy
notSouth	-0.320***	-0.216***	-0.969***
	(-7.86)	(-4.75)	(-4.66)
Female_percentlit		0.00780***	-0.000970
		(5.23)	(-0.37)
interaction2(notSouth*Female_percentlit)			0.0112***
			(3.59)
_cons	0.909***	0.363***	0.977***
	(31.38)	(3.40)	(5.34)
N	396	396	396

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Thus, there is an interesting relation here, if you are in the South every percentage increase in female literacy has a negative correlation with the existence of MFIs, but the opposite is true for areas other than the South. One argument for this could be that female literacy is already much higher in the South in comparison to other regions *(Graph 3)*. Microfinance Institutes need not necessarily pick between an area with 50% literacy, versus 70% within the South. Thus, they could be indifferent to the level of literacy within the South while setting up MFIs.

Graph 3



This graph showcases the distribution of percentage of female literates in the Southern region, versus others. The graph on the left is the percentage of female literates for all states that are not in the South, and the one on the right is for the Southern states. Additionally, female literacy starts at a much higher level for the South, and the average percentage of female literacy in the South is 70.6% and in Non-South regions is 56.7%.

To further explain the negative relation between female literacy and MFIs for Southern regions, I explore the effect of increase in literacy at different thresholds. For example, the result of an increase in female literacy at 40% and 60% for both regions. In order to examine this relation, I generated a new variable Female_cutpercent, which breaks up female literacy into different bins (10,20,30,40,50,60,70,80,90,100), to infer the results at different levels.

From the results presented in *Table 5a,* I conclude that once I control for wealth index in the South, percentage of female literacy seems to have a negative correlation with the existence of MFIs, except for the 50% level. However, these results are neither statistically significant nor significantly different from 0. To strengthen this finding, I conducted a joint hypothesis and obtained a F statistic of 0.78 with a significance level of 0.56, and strongly fail to reject the hypothesis that there is no difference between the coefficients of different levels of literacy in the South for existence of MFIs. Hence, for the South I deduce, that the relation between percentage of female literacy and existence of MFIs can be explained by a flat line, implying that MFIs are indifferent to the literacy levels in the South while thinking about setting up.

I generated a similar table for states that are not in the Southern region (*Table 5b*). After controlling for wealth index, female percentage literacy has a positive and statistically significant correlation with the existence of MFI after 40%. Thus, a percentage increase in female literacy is positively correlated with the presence of an MFI in areas other than the South.

Additionally, once I control for female literacy at specific levels, the wealth index is positive and significant at the 10% level for both South and Non-South regions. I can conclude that wealth at the household level for the districts is positively correlated with the existence of MFIs in both South and North. This relates back to the debate on the reach of MFIs. Do they working in communities with the poorest or do they prefer working with communities that are slightly better off.

Table 5a

SOUTH =1	(1)
	MFIdummy
50% Female_cutpercent	0.151
	(1.03)
60% Female_cutpercent	-0.0250
	(-0.16)
70% Female_cutpercent	-0.0650
	(-0.38)
80% Female_cutpercent	-0.203
	(-1.08)
90% Female_cutpercent	-0.111
	(-0.58)
wealthindex	0.162
	(1.93)
_cons	0.765***
	(5.92)
N	99
R squared	0.0776

Table 5b

SOUTH=0	(1)
	MFIdummy
20% Female_cutpercent	0.0977
	(0.39)
30% Female_cutpercent	0.408
	(1.91)
40% Female_cutpercent	0.488**
	(2.72)
50% Female_cutpercent	0.703***
	(4.17)
60 % Female_cutpercent	0.731***
	(4.51)
70% Female_cutpercent	0.624***
	(3.87)
80% Female_cutpercent	0.631**
	(2.62)
wealthindex	0.0562
	(1.89)
_cons	-0.00428
	(-0.03)
N	296
R squared	0.1144

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

d. Linear Model, with state fixed affects

After controlling for state fixed effects, I see that both wealth index and female percentage literacy are positive and statistically significant. *(Table 6& 7, See Appendix 2)*. Through state fixed effects I control for any unobserved characteristics that may differ across states. These unobserved characteristics could be culture, climate, geographical conditions and language. I explain a few of them below:

The cultural characteristics are well explained in a paper by Dyson. In, 'On Kinship Structure, Female Autonomy, and Demographic Behavior in India, the main regions of India can be divided into 2 broad regimes: the North and the South. In North India, women don't have the right to property, marriages don't take place within the family and the spouses are often unrelated, and there are significant restrictions on potential occupations for women. The wife-givers are almost always inferior to the wife takers and dowry continues to be a problem. In contrast, in South India women may own property and there is often cross-cousin marriage. As a result dowry isn't as important because the marriage is between extended families, and there are less social limitations on careers that women may pursue.[52]Dyson also claims that Southern kinship is associated with higher female autonomy in comparison to Northern kinship. Female autonomy can be explained as the power to control ones own surrounding. [53]Thus, one may assume that these differences have a correlation with existence of MFIs. The Southern part of India seems to have relatively less gender inequality, and since one of the primary motivations of MFIs is to bridge the gap in gender inequality one may think that MFIs would prefer setting up in the north. But after I control for these through state fixed effects, I can rule that out as a potential confounding factor.

Similarly there are significant climatic differences within different regions in India, which may potentially prove to be either conducive to or a hindrance for MFI operations. For instance, over the last 3 decades there has been sharp rises in temperature in Northern India (Comprising of North Central, North, East, Northwestern regions) but not a similar rise in Southern India. Even in pre and post monsoon periods the highest fluctuation is observed in northern India.[54]However, this difference in climate can be ruled out as a factor that may be

[52]Dyson, Tim, and Mick Moore. "On kinship structure, female autonomy, and demographic behavior in India." *Population and development review* (1983): 35-60.
[53] ibid.
[54] Dash, S. K., and J. C. R. Hunt. "Variability of climate change in India." *Current Science* 93.6 (2007): 782-788.

contributing to correlations with existence of MFIs due to the results of our regression on State fixed effects.

II. Outcome Variable 2: The number of MFI:

Next, in this model I will test the variables that have a correlation with the *number of Microfinance institutes*. In order to implement this, I have used a linear regression model. The dependent variable is MFI, the number of Microfinance Institutes. The explanatory and control variables are the same as the previous model.

a. Linear Model with multiple variables

I test to see the correlation between Female literacy while controlling for sex ratio, female population, total population and wealth index (from the PCA). The results are presented in *Table 8 (Appendix 3)*. These regressions have similar results to the first model; percentage of female literates in a district has a positive and statistically significant correlation with the number of Microfinance Institutes in an area after controlling for a number of factors. Similarly, wealth of households also has a positive and significant relation with the number of MFIs after controlling for Female literacy.

b. Linear model, difference in South versus other areas

I test to explain the difference in results for when you are in the South versus other regions, by using the regional dummies created previously.

Similar to the 1st model, the interaction term between female literacy and South is negative and significant, implying that if you are in the South, a 1% increase in Female literacy has a negative correlation with the existence of Microfinance in the South. These results are presented in *Table 9 (Appendix 4)*. Not being in the Southern region has a negative and significant correlation with the existence of Microfinance institutes, even after you control for % female literacy. However, the interaction term between percentage of female

literacy and regions other than the South is positive and significant, implying that if you are not in the South, a 1% increase in Female literacy has a positive correlation with the existence of Microfinance in the regions other than the South *(Table 10, Appendix 5)*.

Similar to what I constructed in the 1st model, I generated bins for female literacy to understand the relation between percentage of literacy at different intervals and the number of MFIs. I observe that the negative coefficient becomes statistically significant after 80%, unlike the 1st model where I didn't observe this. These results are presented in *Table 11* below. I conducted a joint hypothesis to test the significance of the coefficients to be different from 0. The significance level of this test is 0, which means that we strongly reject the hypothesis that the coefficients are 0. Thus, the relationship cannot be explained by a flat line, but is in fact downward sloping. Therefore, an increase in the level of percentage of literacy amongst females is negatively correlated with the number of MFIs. I explain this using the threshold effect of female literacy. As the number of female literates go up beyond a certain level (a threshold>50%), MFIs may not find it attractive to increase the number of branches in the South, because females may have more access to formal banking. As per the World Bank Finder Survey in 2012, only 35% of Indian adults have access to formal banks. Literacy is known to be one of the biggest barriers to Formal banking. Higher literacy means more awareness, which helps in increasing financial inclusion.[55]Thus, as literacy increases in South, females are more aware about different financial loan offerings and may choose to obtain loans from institutes with lower interest rate. This makes the market for Microfinance industries unattractive when literacy exceeds a certain level. From my quantitative evidence, I see that the result becomes statistically significant at the 80% level.

[55] Sachdeva, Ms Tina, and Smita Gupta. "Financial Inclusion: Triggers and Barriers in Rural India." *International Journal of Multidisciplinary Approach & Studies* 1.6 (2014).

For regions other than the South, I see results that are similar to the 1st model where percentage of female literacy has a positive correlation and is statistically significant to the number of MFIs. *(See Table 12, Appendix 6)*

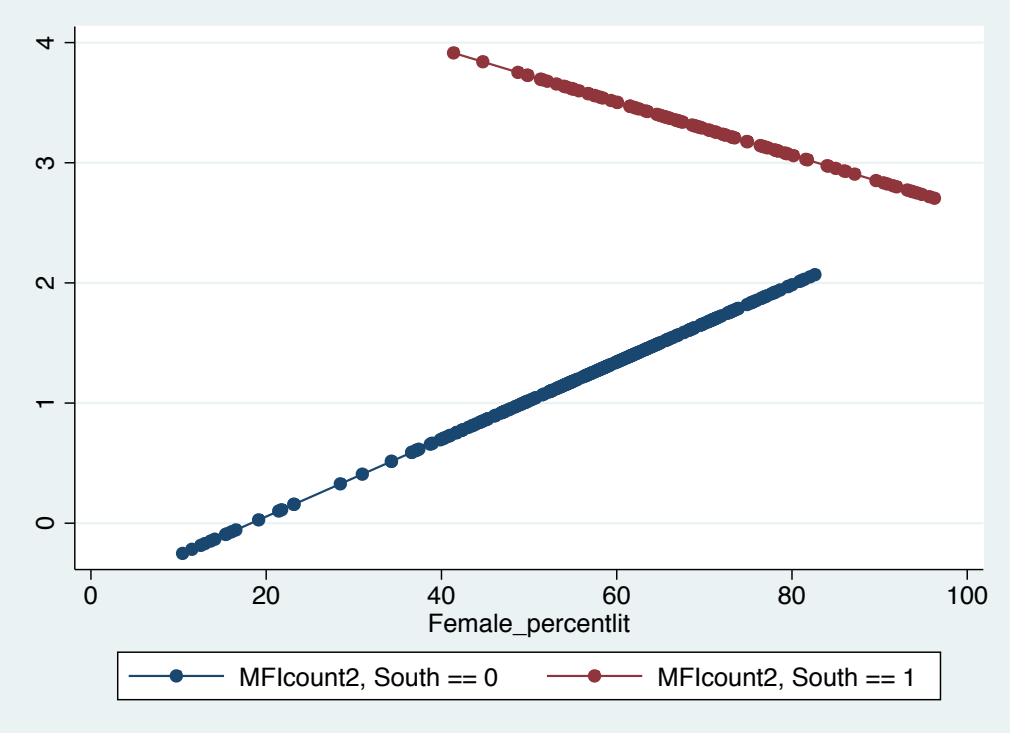
Table 11

	(1)
	MFI
50%.Female_cutpercent	-0.293
	(-0.30)
60%.Female_cutpercent	-0.866
	(-0.86)
70%.Female_cutpercent	-1.747
	(-1.57)
80%.Female_cutpercent	-3.134*
	(-2.53)
90%.Female_cutpercent	-4.667***
	(-3.71)
wealthindex	2.650***
	(4.83)
_cons	2.033*
	(2.40)
N	99
R squared	0.2976

t statistics in parentheses

- $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Graph 4



Graph 4 describes the negative relation between the percentage of female literates in the South and number of Microfinance Institutes (Red line), and positive relation between Female percentage literacy in regions other than the South and number of Microfinance Institutes (blue line). However, the number of Microfinance Institutes in the South is also substantially higher than the number of Microfinance Institutes elsewhere. It is important to note that the graph is also based on predicted scores.

c. State fixed effects

After controlling for any unobserved characteristics that may vary across different states (as explained in the 1st model) I see that percentages of female literacy and wealth index are both positive and statistically significant. *(Table 13, Appendix 7)*

Limitations

The most important limitation of our model is that of Omitted variable bias that arises due to lack of enough control variables. These variables could include ease of access to rural areas measured by the roadway system, safety in the states as Microfinance lending is based on cash, social capital, which leads to higher trust and potentially lowers default, and broad-mindedness of the society (men and elders). Secondly, the time period of the data of the explanatory and control variables is different from the data on MFI penetration. The MFIs are tabulated for 2010, whereas the explanatory variables are tabulated for 2011, due to the census, which is calculated every 10 years. Since I am using a linear regression model and not a randomized control trial, I cannot imply causality and only correlation. Reverse causality can also be a concern. Is higher literacy and higher wealth leading to more MFIs or is it the other way around. I address concerns about reverse causality in the next section. There is also a potential limitation of measurement error due to mis-measurement of some control variables such as ownership of assets, access to water, which may be self-reported and therefore, can be inaccurately recorded. Additionally the number of MFIs is also underreported as the IFMR LEAD website did not contain data on 5 big MFIs.

Ruling out Reverse Causality

There is a lot of contention about the impact of MFI on education and household wealth. In the Miracle of Microfinance, there was no difference in education, household consumption or average profits of business between the treatment village in Hyderabad, in which branches of MFIs were opened, and the control village, in which there were no MFIs.[56] Similarly, in a randomized evaluation in Morocco where the treatment villages were given microcredit at random, there was little or no difference in education levels or consumption.[57] Thus, there is

[56] Banerjee, Abhijit V., et al. "The miracle of microfinance? Evidence from a randomized evaluation." (2013)
[57] Crépon, Bruno, et al. *Impact of microcredit in rural areas of Morocco: Evidence from a Randomized Evaluation*. MIT Working Paper, 2011.

evidence that MFIs don't have an impact on increasing education levels or improving wealth of households, thus ruling out the problem of reverse causality.

Conclusions

To study the excessive concentration of MFIs in the Southern part of India, I looked at certain characteristics of the South that may help describe this. My main hypotheses posit that this larger presence can be correlated to the level of local economic development, the historical background and female literacy.

I find strong evidence supporting my hypothesis that the wealth index of a district, which is used as a proxy for the level of local economic development, is correlated to the presence of MFIs in the South. There is a strong positive correlation between the two, which is also statistically significant. Thus, this statistical correlation supports the argument that Microfinance doesn't cater to the poorest of the poor. This relationship is further consistent with the statistics in South India; on an average the wealth index in the South (1.06) is fairly higher than the wealth index in other regions (-0.357), as is the average number of MFIs in the South (3.2 MFIs versus 1.2).

Second, there is also substantial evidence supporting my hypothesis that the historical background of Southern India makes it more conducive to host more MFIs. The policies implemented by different Southern state governments, as well as the central government helped make the idea of Microfinance more permeable in South India.

Third, there is mixed evidence of female literacy being a strong predictor for the presence of MFI. Without accounting for regional differences, female literacy has a positive relationship that is statistically significant with the presence of MFIs. But when segregated across regions, every percentage increase in female literacy in South India (which starts at 50% as opposed to 20% for other regions) seems to have a negative relation (that is not significantly different from 0) with the *existence* of MFIs. However, with the *number* of

Microfinance Institutes these coefficients are not close to 0 and are statistically significant for values higher than 80% of female literacy. Interestingly, for regions other than the South, I see a positive relation between percentage of female literacy and presence of MFIs, which is statistically significant after the 40% level. Although this correlation by no means implies causation, a possible argument would be that while looking at just *existence*, MFIs are indifferent between areas with 50% or 70% female literacy in the South. However, Higher literacy after a certain level (threshold effect) makes the market unattractive for MFIs to open more branches and therefore negatively impacts the *number* of MFIs set up. higher literacy levels imply more awareness and financial inclusion, which could lead to higher access to formal banks. I look forward to future research on this topic that may provide more causal inferences.

In short my results imply that the wealth and historical background of the Southern region have some correlation with the high number of MFIs in the area. Female literacy seems to have a mixed effect that varies for different regions. Thus, these results to some extent provide a possible explanation for the high concentration of MFIs in the Southern region of India and present the boundaries and limitations of setting up MFIs. That is, it may not be viable to construct MFIs in all developing and poor nations.

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APPENDIX

- ***Appendix 1***

Table 1: Relation between percentage of female literacy and existence of MFIs.

	MFI dummy= Y
Female_percentlit	0.0102***
	(7.60)
_cons	0.0585
	(0.69)
N	396
R squared	0.0102

t statistics in parentheses

- $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- ***Appendix 2: State fixed effects for the existence of MFI***

Table 6: Relationship between percentage of female literacy and existence of MFIs.

	(1)	(2)
	MFIdummy	MFIdummy
Female_percentlit	0.0113***	
	(4.78)	
Bihar	-0.555***	-0.0808
	(-5.23)	(-0.61)
Delhi	-0.825***	-0.944***
	(-5.18)	(-5.97)
Haryana	-0.228	-0.264*
	(-1.89)	(-2.23)
Himachal Pradesh	-1.016***	-0.847***
	(-6.95)	(-6.14)
Karnataka	-0.189	-0.163
	(-1.70)	(-1.51)
Kerala	-0.594***	-0.410**
	(-3.80)	(-3.05)
Madhya Pradesh	-0.260**	-0.0193
	(-2.60)	(-0.19)
Odisha	-0.0446	0.369**
	(-0.40)	(3.03)
Punjab	-0.431**	-1.106***
	(-2.88)	(-8.87)
Rajasthan	-0.310**	-0.206
	(-2.84)	(-1.89)
Tamil Nadu	-0.260*	-0.288**

	(-2.28)	(-2.62)
Uttar Pradesh	-0.432***	-0.131
	(-4.54)	(-1.27)
Uttarakhand	-0.598***	-0.413**
	(-4.26)	(-3.07)
_cons	0.340*	0.873***
	(2.11)	(10.51)
N	396	395

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Relationship between wealth index and existence of MFIs.

	(1)
	MFIdummy
wealthindex	0.221***
	(6.55)
Bihar	-0.0808
	(-0.61)
Delhi	-0.944***
	(-5.97)
Haryana	-0.264*
	(-2.23)
Himachal Pradesh	-0.847***
	(-6.14)
Karnataka	-0.163
	(-1.51)
Kerala	-0.410**
	(-3.05)
Madhya Pradesh	-0.0193
	(-0.19)
Odisha	0.369**
	(3.03)
Punjab	-1.106***
	(-8.87)
Rajasthan	-0.206
	(-1.89)
Tamil Nadu	-0.288**
	(-2.62)
Uttar Pradesh	-0.131
	(-1.27)
Uttarakhand	-0.413**
	(-3.07)

_cons	0.873***
	(10.51)
N	395

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- ***Appendix 3***

Table 8: Relation between Female literacy and number of MFIs.

	(1)	(2)	(3)	(4)
	MFI	MFI	MFI	MFI
Female_percentlit	0.0381***	0.0308***		0.0315***
	(6.99)	(5.41)		(5.76)
lnFemale_pop	0.703***			
	(6.00)			
Sexratio		0.00576***		
		(3.51)		
lnTot_pop		0.697***		
		(5.56)		
wealthindex			0.459***	0.340***
			(5.95)	(4.99)
_cons	-10.12***	-15.55***	1.744***	-0.150
	(-6.14)	(-6.22)	(19.18)	(-0.49)
N	396	396	395	395

t statistics in parentheses
- * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- ***Appendix 4***

Table 9: Relation between female literacy and South with the number of MFIs

	(1)	(2)	(3)
	MFI	MFI	MFI
South	2.047***	1.777***	5.414***
	(8.75)	(7.24)	(4.94)
Female_percentlit		0.0203***	0.0322***
		(3.46)	(5.58)
interaction1			-0.0542***
			(-3.34)
_cons	1.236***	0.0824	-0.588*
	(14.45)	(0.26)	(-1.98)
N	396	396	396

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- ***Appendix 5***

Table 10: Relation between female literacy and not Southern regions with the number of MFIs

	(1)	(2)	(3)
	MFI	MFI	MFI
notSouth	-2.047***	-1.777***	-5.414***
	(-8.75)	(-7.24)	(-4.94)
Female_percentlit		0.0203***	-0.0220
		(3.46)	(-1.46)
interaction2			0.0542***
			(3.34)
_cons	3.283***	1.859***	4.826***
	(15.08)	(4.35)	(4.58)
N	396	396	396

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- ***Appendix 6***

Table 12: Relation between female literacy at different levels in areas other than the South and number of MFIs.

	(1)
	MFI
10 %.Female_cutpercent	0
	(.)
20 %.Female_cutpercent	0.100
	(0.13)
30 %.Female_cutpercent	1.106
	(1.73)
40. %Female_cutpercent	0.746
	(1.38)
50% Female_cutpercent	1.172*
	(2.31)
60. %Female_cutpercent	1.445**
	(2.96)
70% Female_cutpercent	1.828***
	(3.76)
80% Female_cutpercent	2.119**
	(2.93)
wealthindex	0.0440
	(0.49)

_cons	0.0163
	(0.04)
N	296
R squared	0.0983

t statistics in parentheses

- $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- ***Appendix 7: State fixed effects***

Table 13: Relationship between female literacy and number of MFIs.

	(1)
	MFI
Female_percentlit	0.0323***
	(4.07)
Bihar	-1.888***
	(-5.33)
Delhi	-2.411***
	(-4.53)
Haryana	-1.744***
	(-4.31)
Himachal Pradesh	-3.092***
	(-6.32)
Karnataka	0.173
	(0.46)
Kerala	-2.748***
	(-5.27)
Madhya Pradesh	-1.279***
	(-3.83)
Odisha	0.934*
	(2.53)
Punjab	-1.395**
	(-2.79)
Rajasthan	-1.470***
	(-4.03)
Tamil Nadu	1.539***
	(4.04)
Uttar Pradesh	-1.821***
	(-5.73)
Uttarakhand	-1.820***
	(-3.87)
_cons	0.859
	(1.60)
N	396

t statistics in parentheses

- $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 14: Relationship between wealth index and number of MFIs.

	(1)
	MFI
wealth index	0.997***
	(9.37)
Bihar	0.377
	(0.90)
Delhi	-3.214***
	(-6.45)
Haryana	-2.048***
	(-5.49)
Himachal Pradesh	-2.635***
	(-6.06)
Karnataka	0.143
	(0.42)
Kerala	-2.551***
	(-6.01)
Madhya Pradesh	-0.193
	(-0.59)
Odisha	2.754***
	(7.16)
Punjab	-3.743***
	(-9.52)
Rajasthan	-0.859*
	(-2.50)
Tamil Nadu	1.136**
	(3.28)
Uttar Pradesh	-0.479
	(-1.47)
Uttarakhand	-1.214**
	(-2.86)
_cons	2.167***
	(8.28)
N	395

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$