

Theory and Evidence on
Women, Education, and Microfinance:
Understanding the History of Microfinance and the
Strongest Influencing Factors on Microfinance Default
Status for Women in Tamil Nadu, India

by

Sophie Elisa Frank

An honors thesis submitted in partial fulfillment

of the requirements for the degree of

Bachelor of Science

Undergraduate College

Leonard N. Stern School of Business

New York University

May 2017

Professor Marti G. Subrahmanyam

Faculty Adviser and Thesis Advisor

Abstract:

This paper identifies the factors that most greatly influence women's default status on microfinance loans. The study considers qualitative, in-person, research and a statistical analysis of randomly selected, quantitative, member data from Madura Microfinance, based in Tamil Nadu, India.

Thesis/Hypothesis:

Women are less likely to be in arrears or default on a loan if they have more years of education, if their fathers had more education, if they have greater access to major roads, if they have greater access to bank branches, and live in a region that has a higher literacy rate.

Preliminary research collected exemplified that women make better borrowers and microfinance is an effective means to generate wealth in most Indian communities. My study took about 1000 randomly selected data points, scattered throughout the state of Tamil Nadu, from Madura's member base and analyzed the most influential factors on the likelihood that a member will return her loan in full. Loan return was listed as a member having a "regular" return status of being "in arrears." In this study the regular return status is represented with a "1" and in arrears is represented with a "0."

I found that educational factors have the strongest influence on female borrowers. I ran multiple logistic regressions and found that the two independent variables with the most consistent statistical significance were years of education of the member and the literacy rate of the member's village. The outcomes of the regressions indicate that education is an essential element of effective borrowing.

Introduction:

I decided to write this thesis because of the personal interest I have in female microfinance. I have had a keen interest in how female entrepreneurs can be empowered and enabled to achieve economic success. Throughout my college career, I learned that women make better borrowers because they are more likely than men to reinvest in their families. With the knowledge that paying particular attention to the economic empowerment of women had a positive influence on communities in the developing world, I wanted to delve deeper into an investigation of microfinance.

Microfinance was created by Muhammad Yunus in Bangladesh to allow a way for micro-entrepreneurs in rural areas to have access to capital without the exploitation of their funds by loan sharks and other abusive lenders¹. Grameen Bank was founded in 1976 in Dhaka as an effort to abolish poverty by offering micro loans to low-income individuals with easier terms and a structure to support higher risk clients². The concept of microfinance has now been popularized in developing nations around the world, holding women as the core tenant to small, jointly collateralized loans. This thesis looks at Madura microfinance in particular, which has over 200 branches throughout the state of India.

Women in Tamil Nadu have historically had less access to financial capital, loans, and education. Education level and literacy are important components of this thesis. In an April 2016 article in *The Wire*, Tamil Nadu has a higher percentage of female entrepreneurs, at just over 13%, than any state. Also, female literacy in Tamil Nadu is at 73.4%.³ Unfortunately, there is

¹ https://www.nobelprize.org/nobel_prizes/peace/laureates/2006/grameen-facts.html

² https://www.nobelprize.org/nobel_prizes/peace/laureates/2006/grameen-facts.html

³ <https://thewire.in/70675/kerala-leads-leads-nation-in-female-literacy-tamil-nadu-has-most-women-entrepreneurs/>

still a staggering difference in the literacy rate for males, resting at 86.8% in 2011.⁴ Additionally, in Tamil Nadu, 77% of women have received at least ten years of formal education.

Unfortunately in the past several decades, female participation in the workforce has declined dramatically.⁵ I have analyzed how literacy and education affect or influence a member's likelihood to repay their loans. These aforementioned statistics played a strong role in my understanding and interpretation of the data collected.

This thesis explores the effect that demographic and education information has on women's ability to repay microfinance loans. More specifically the study identified the immediate influences of that affect on the likelihood of a loan being in arrears and the connection between economic progress in the state and the growth of microfinance. Contextual research from Madura Microfinance is the basis for this research and further data was collected in Chennai by interviewing female borrowers in the area. The data analysis performed for this study will build off of historical census data and a data set of 997 randomly selected members of Madura living in Tamil Nadu.

⁴ India Economic Census 2011

⁵ <https://thewire.in/70675/kerala-leads-leads-nation-in-female-literacy-tamil-nadu-has-most-women-entrepreneurs/>

I. Supplemental Research

IA. Why Empowering Women is Necessary

Could microfinance be a means to give women independence that is impossible to find elsewhere? There is a widespread problem of women not having any ownership over land or other assets, but access to capital could alter this, albeit a larger problem. Nicholas Kristof is a journalist for the New York Times who has claimed that the challenge of this century is the fight women and girls face against sex brutality, acts of hatred, and limited access to affect politics and communities in many places. Kristof calls on the ancient Chinese phrase, which describes women as holding “half the sky.” Without empowering women and alleviating poverty for women around the world, economic development cannot be achieved. In an August, 2009 article in the New York Times, Kristof stated that many of the most impoverished countries in the world are also those in which women are most “marginalized” and girls “undereducated.”

In the same article, Kristof told the story of Saima Mohammad, of Pakistan. Saima was abused by her family and stuck in a situation of cyclical abuse, debt, and inability to provide for her children. The Kashf microfinance foundation was her salvation. A small loan, of \$65, from Kashf allowed her to start her own embroidery business in Lahore. This loan is what jump-started a life free from her husband’s debt and the threat of losing her children. Saima’s life transformed following this borrowing, because she became more highly regarded by her husband and in her community and was able to mend relationships that had been unfairly broken due to her financial position.⁶

Women face economic inequities as well as larger injustices in India. In the mid 2000s bride burnings became a common practice to punish women for factors outside of their control

⁶ Nicholas. "The Women’s Crusade." *The New York Times*. The New York Times, 22 Aug. 2009. Web. 16 Apr. 2017.

so that men would be able to remarry to a woman who would offer them more fertility or a larger dowry. Additionally, human sex trafficking forces many women to fall victim to a life enslaved in the sex trade. These problems are not directly ameliorated by microfinance loans, but women's heightened ability to start businesses and have economic independence, lessens the threat and likelihood of such harmful conditions. When these conditions prevail, microfinance can serve as the sole source of empowerment in order for many women to change their position in society.⁷

The Indian government bought into the benefits of microfinance, as well--previously referred to as micro credit. In 2013 Palaniappan Chidambaram, the Finance Minister of India at the time, added a significant portion of the budget to create a bank that was run by women and served poor women throughout India. At the time of this political maneuver, the long-term effects of microfinance were still unknown, and many claimed that this was a political move by the finance ministry, rather than an action that was intended to better the lives of women in the country. Bankers were weary of microfinance because it evades many traditional tactics of collateral and historical analytics to anticipate returns. This has been a factor that microfinance institutions have had to overcome, but it is built into their business models.⁸

The History of and Reasoning Behind Microfinance:

The pioneer of microfinance as a means for women in the developing world to access capital is Mohammad Yunus. He conceived of this idea in Bangladesh when he noted that many working individuals in Bangladesh were earning only cents a day because of the way that informal banking by wealthier individuals would rip them off in order for them to buy materials

⁷ Parker, James. "Empowering Women Through Microfinance in India." *The Diplomat*. The Diplomat, 13 Mar. 2013. Web. 16 Apr. 2017.

⁸ Kumar, Sanjay. "The Forces that Divide." *The Diplomat*. The Diplomat, 10 Jan. 2013. Web. 16 Apr. 2017.

for the task that allowed them to earn any money at all.⁹ Formal banks did not accept low-income individuals as borrowers, because many of them were illiterate and unable to complete the appropriate paperwork and had little to no credit history for the bank to rely on for credit trustworthiness. Yunus identified this gap and attempted to offer small loans to the individuals who were working long hours to barely earn enough to make a profit.¹⁰ When Yunus started this practice, it took him a long time to gain the approval of local banks and beat the many skeptics, but it was quickly evident that his methods offered low risk and high return opportunities for the people of Bangladesh. Yunus quickly realized that the female borrowers were more trustworthy than the male borrowers. His research found that women are more likely to pass the benefits of the loans off to their children and men, but men in Bangladesh were overwhelmingly opposed to granting women greater access to credit. Yunus attempted to market heavily to women and gear the program towards loans for women, but this proved difficult because many women were closely controlled by the demands of their husbands and were not always allowed to have money for themselves. To combat the fear many women felt in approaching this borrowing opportunity, Yunus began employing women at the bank, which helped female borrowers find the bank to be more approachable and gain trust with local women.

Many researchers and economic development organizations and professionals have held microfinance as the panacea that the development world has long searched for, but there also many skeptics of using microfinance as the primary means to alleviate poverty within a developing economy. New York Times journalist, Nicholas Kristof, identifies the importance of

⁹ Yunus, Muhannad. *Banker to the poor*. N.p.: Public Affairs, 1999. Print.

¹⁰ Yunus, Muhannad. *Banker to the poor*. N.p.: Public Affairs, 1999. Print.

lending to women because of the immediate effects it has in increased investment in child education and health¹¹.

There is a great deal of evidence that suggests that women are the most important recipients of microfinance loans in addressing poverty. According to the International Labour Office, 70% of the world's poor are women and women also typically face a more difficult time attempting to get credit from traditional banks. Additional research from the ILO, identified that women have a significantly higher rate of return on microfinance loans.¹²

In Tamil Nadu there is an organization called the Tamil Nadu Women Development Project. This is a self-help group (SHG) that women in rural India have come to use as financial intermediaries. There are more than 12,000 SHG federations operating under the Tamil Nadu Corporation for the Development of Women (TNCDW).¹³ Women in rural India have found that by collaborating in a group and offering joint collateral, they have greater access to financial capital. Women come together and save in a group setting, which offers greater accountability to continue to put some money aside. Research has found that the SHGs offer many women a greater sense of confidence and agency over their funds and have also led to greater innovation within rural communities.¹⁴ This study primarily focuses on the importance of microfinance loans to women in Tamil Nadu, India.

¹¹ Nicholas. "Sewing Her Way Out of Poverty." *The New York Times*. The New York Times, 14 Sept. 2011. Web. 16 Apr. 2017.

¹²http://www.ilo.org/wcmsp5/groups/public/@dgreports/@gender/documents/meetingdocument/wcms_091581.pdf

¹³ *Microfinance in India* edited by K.G. Kamakar; excerpt: "Emerging SHG Federations and Challenges" by C.S. Reddy.

¹⁴ <https://www.fordfoundation.org/ideas/equals-change-blog/posts/how-womens-self-help-groups-are-transforming-rural-india/>

There is some difficulty in finding data in support of these claims because the rural areas of the world—that are most in need of microfinance access—are also “data dark” areas. For example, only 16% of people living in India leave a digital footprint¹⁵.

Data Darkness:

One of the most difficult aspects of microfinance research is that the loans are most essential in areas that are “data dark.” The population that is most in need of small lending and cannot access traditional banking institutions typically partakes in informal business. Businesses such as small-scale farming, tailoring, textiles, fruit sales, etc. are also critical aspects of the economy in India.¹⁶

This study focuses on data from a random sample of Madura Microfinance customers in Tamil Nadu, India. Much of Tamil Nadu is known to be “data dark,” which means that there is little reliable data on the intricacies of the state’s population. Census data is infrequent and does not cover everything that is needed for this study. Much of the difficulty in microfinance in Tamil Nadu is trying to understand the borrowing history of the individuals who intend to benefit most from microfinance loans. Traditional banking stands to benefit from intensive lending history data, but microfinance institutions rarely have the ability to collect such data.

Madura Microfinance takes many steps to overcome the difficulty in readily accessing data. In order to identify sound borrowing conditions, Madura Microfinance conducts hefty contextual research, which involves face-to-face interviewing and intensive research on the ground where the loans are provided. Another difficult aspect of describing the average borrower in the Indian population is that common questions such as age, employment/profession, and

¹⁵ [http://www.livemint.com/Opinion/JZ95vbh4jS5KI1l4kjcIO/Indias-challenge-of-dark-data.html?ct=\(Newsletter_Test_19_2_2016\)](http://www.livemint.com/Opinion/JZ95vbh4jS5KI1l4kjcIO/Indias-challenge-of-dark-data.html?ct=(Newsletter_Test_19_2_2016))

¹⁶ "Borrower Profiles: The Data Dilemma." *Madura*. N.p., n.d. Web. 16 Apr. 2017.

education are not described in a uniform way and are often difficult to know entirely. Age is difficult to estimate because not all citizens have accessible birth documentation and tracking. Employment is difficult to characterize because often times people will work one profession for several months of the year, but work more informally in the remaining months, but by some standards, they would be considered unemployed. From the perspective of tracking loans and predicting repayment, standard employment metrics are useful, but Madura has worked on ways to circumvent this issue.¹⁷

Every month Madura releases a data insights report, which offers several indicators and studies on member information. Demographic data and differences are important variables in the Madura member base. The most common demographic for Madura borrowers is middle-aged women—median age of 38—with fewer than ten years of formal education—and many having never received formal education—and have assets totaling less than Rs 1 lakh (equivalent to about \$1644).¹⁸ There is a noted direct correlation between number of years of schooling and volume of assets that the borrower base individuals have. The majority of asset wealth is derived from vehicle ownership, followed by house and appliances, livestock, and phones. In the data points analyzed for the purpose of this paper, nearly all members had access to at least one cell phone. Although these are the conditions for the majority of borrowers that Madura lends to, there are also many other demographic groupings, which must be analyzed in order to understand the needs and conditions under which women in Tamil Nadu borrow from microfinance institutions.¹⁹

¹⁷ Interview, Tara Thiagarajan, Founder of Madura, 26 May 2016

¹⁸ Madura DATA INSIGHTS Newsletter

¹⁹ "Borrower Profiles: The Data Dilemma." *Madura*. N.p., n.d. Web. 16 Apr. 2017.

Previous studies on the effectiveness of microfinance have investigated the relationship between female borrowers and financial stability after borrowing. Ranjula Bali Swain performed and explained several studies in *The Microfinance Impact*. The most useful of these studies for the research put forth in this thesis is the impact assessment of microfinance in Tamil Nadu. This research was leveraged as a foundation for the contextual research performed throughout this thesis study.

The Self Help Bank Linage Programme works to ensure continuity and communication between impoverished populations and governments and banking institutions in India. This system has proved to have greater outreach than stand-alone microfinance institutions (MFIs) overtime, but has shown more stagnant results in the past five to ten years. Partner organizations found that the self-help group lending programs (SHGs) were effective in helping female borrowers to gain confidence in approaching societal challenges and in taming violence in the home, in addition to an augmented financial position.²⁰

Due to ongoing debate and conflicting results of the extent to which microfinance can alleviate poverty, the Swain study also measures “household vulnerability.” Household vulnerability is a measure of reduction to future shocks and ability to “cope with” future shocks. This is necessarily an “*ex-ante*” analysis of borrowers’ positions.²¹ Measuring household vulnerability and ability to cope with future shocks aids in the understanding of the infrastructure and benefit of microfinance.

One of the most essential elements of female microfinance borrowing is the concept of Self Help Groups, or SHGs. SHGs are groups of 10-20 women who serve as joint collateral for a

²⁰ The World Bank. *Implementation Status and Results India: Tamil Nadu Empowerment and Poverty Reduction*. 18 November 2010. Data Report.

²¹ Swain, Ranjula Bali. *The Microfinance Impact*. Routledge. 2012, Abingdon.

given loan. This system has become extremely popular in India because it offers microfinance lenders more security of loan return. It has also been found that women have more easily formed into SHGs, because of external factors leading them to coalesce more easily.

The Ford Foundation has offered ongoing support to an organization in India, PRADAN—Professional Assistance for Development Action—that emphasized the unifying nature and effectiveness of Self Help Groups. Women in rural India were encouraged to jointly save money and share resources across the groups. The federation of women’s self help groups has created an expansive network and supported the development of more organizations like PRADAN. SHGs also offer a community to empower women and provide a heightened sense of security within their communities, where they are often otherwise marginalized.²²

Madura microfinance utilizes the concept of SHGs and joint collateral, as well and it also has a component of the organization called Teach 70, which offers online training videos so that business people in its areas of work in India understand the necessary measures to maintain an organized business structure. Madura finds it important that educational resources accompany financing.

SHGs existed for about a decade before they were leveraged as a major banking vehicle in India.²³ IFMR Lead performed a study on the effectiveness of SHGs for microfinance in Tamil Nadu in conjunction with the NGO, Hand in Hand. The study identified the effect that microfinance borrowing combined with educational training--as is the practice of Madura--had on well-being of borrowers and the larger implications on consumption, savings and borrowings,

²² Ford Foundation SHGs. <<https://www.fordfoundation.org/ideas/equals-change-blog/posts/how-womens-self-help-groups-are-transforming-rural-india/>>.

²³ IFMR LEAD (Leveraging Evidence for Access and Development) Vertical Mobility in Access to Finance: A Study on Long-Term Microfinance Client Graduation. <<http://ifmrlead.org/vertical-mobility-in-access-to-finance-a-study-on-long-term-microfinance-client-graduation/>>.

vulnerability to future shocks, and accessibility to basic needs. Previous studies demonstrate that SHGs have increased a sense of empowerment for women who are involved and is correlated with enhanced nutritional intake.

Madura studies have identified a widely varied industrialized worker rate between different regions in which it offers its services. In Kamakata, a state in southern India, the industrialized worker rate varies from about 13% to almost 75% in the areas where data was collected. This variance makes it exceedingly difficult to develop uniform services or create blanket products for borrowers, because borrowing needs vary so dramatically.

The distance members must travel to the nearest tertiary road was also explored as an important factor towards economic success. As noted in the Madura data insights newsletter: “A significant challenge to the delivery of products and services into rural India is the cost of getting there.” It is costly for business people to get their products to market, unless readily close to a road network. Madura observed that “the cost of the last mile” is the additional energy and time required to bring a product to market when the closest road network is either far from other channels, or winding and inefficiently laid out.

Women have been more involved and integrated into economic society in Tamil Nadu over the past decade and microfinance has played a large role in this. Beginning in the late twentieth century, more organizations were built around economic equality for women in Tamil Nadu. In 1983, the Tamil Nadu Corporation for the Development of Women was founded and it has since bolstered NGO and public support for female advancement projects.²⁴ Self-help groups in Tamil Nadu today assist 50 lakes of women, with 3 lakes SHGs throughout the state from different microfinance organizations and companies.²⁵

²⁴ A. Seenivasan, A. A.V.C. College Mayiladuthurai, Tamil Nadu.

²⁵ A. Seenivasan, A. A.V.C. College Mayiladuthurai, Tamil Nadu.

Background on Madura Microfinance:

I performed my data analysis with a data set from Madura microfinance and interviewed Madura members in January of 2017 in Madurai and Chennai. Madura offers many unique characteristics compared to other microfinance companies in the state of India, and particularly in southern India. Below are the most important insights and feedback from interviewing employee of Madura who work with the data science division of the company and member interviews.

Meeting with Juliet from Data Excellence:

There are two offices in Chennai. One office is the smaller, original office and many employees telework there. Madura was created as a non-profit, but then became a for-profit microfinance institution in 2005, because that structure was better for operations. It is very difficult to structure a finance company as a non-profit, but the company strives to stick to non-profit roots in terms of purpose and mission. The company still thrives off of the benefit provided to members and prioritizes client needs above all else. Tara Thiagarajan was the founder Madura was created in Madurai, which is why it is called Madura Microfinance. There are fewer clients in the more urban settings, because there are other options of financial accessibility that do not exist in more rural communities. The Chennai office is point of contact and more relaxing, but the bigger office is the one slightly outside the city center.

Data darkness accompanied by other forms of risk make it difficult to secure the loans and are the reason for sometimes exorbitant interest rates. The interest rates have come down over the course of the company's history as it has been better suited to mitigate and anticipate certain risk factors. The microfinance industry is referred to as a "value aspect industry." There

is more value added than purely the monetary benefit of providing loans. The microfinance industry is highly regulated and there is immense pressure for the loans to be cost effective, but this is more difficult than it is for a traditional loan. Each field officer is responsible for self-conducting training for borrowers. There is sometimes difficulty adjusting to market needs and the difference of just several hundred rupees can make a substantial difference for borrowers. Microenterprises don't have economies of scale so finding funding is difficult without microloans. These businesses do not compete on price. Many micro businesses specialize in knowledge and form groups based on this particular knowledge. Often SHGs are formed with women who are able to share their unique knowledge base and have a shared understanding of the business environment in that specific community.

Madura follows a partnership model with large banking institutions, such as ICICI, which provide the capital for Madura loans. Madura also offers a one-year training program, which teaches accounting and banking basics. This program is similar to a mini-MBA in the guidance and structure it provides for business learning. As clients are vetted, there is a system for testing each individual's ability to repay by offering small, interim loans. The intention of microfinance and Madura in particular is to create an ecosystem to help rural India create thriving business.

All entrepreneurs fail at a high rate, so any entrepreneurial finance is a risk in this sense. The major difference between general entrepreneurs and the micro entrepreneurs for whom Madura works is that there is significantly less access to business education and capital resources in rural Indian communities. One of the greatest difficulties of such isolated business is with marketing goods and services. To combat this difficulty, Madura offers a product that organizes classified ads for micro entrepreneurs to advertise their work and have larger market opportunities than the confines of their immediate communities.

The SHGs host two meetings each month. At the first meeting, the group receives the disbursement for the month and at the second meeting, everyone in the group receives educational materials. The first time an SHG receives disbursements, the Madura employees at the local center explain the terms and conditions of the loan. The second meeting educational materials are the same for every SHG and include information on topics such as, potential health risks, health care precautions, how to protect their assets against dowries for their children, and educational opportunities for children. Each group has between ten and twenty members. Each individual member of the group receives a check and the group then offers the joint collateral of ensuring repayment for the full amount that has been disbursed.

Recently, the Indian Prime Minister, Modi, enacted a law that enforced the demonetization of the 500 and 1000 rupee note throughout the state of India. The 500 note was replaced with a new note, but the 1000 is no longer a note in circulation. This was performed to push the economy towards going cashless and to cut down on the money laundering that leads to crimes entangled with acts of terrorism. The effects of demonetization were much more grave than anticipated, because there was a significant lag in replacing the bills that were taken away and the overall money flow throughout the country was greatly slowed. This process affected the disbursement process for Madura, because many of the members of Madura exist in a cash-centered economy and do not use their phones or credit cards for payments. Although all disbursements are completed with checks--to tighten security and allow for better tracking of each payment--most members then immediately exchange this check for cash to pay for repeat expenses.

Madura displayed research that more than 90% of working people in India work in the informal economy, which means that there is a heavy focus on cash transactions and little record

is taken on business performance or interaction. The 90% of the workforce in the informal economy is also lacking access to finances beyond daily wages. This is also one of the leading reasons for the data darkness that challenges Madura's data tracking and proof of concept to the larger population and financial sector.

Madura has the lowest interest rate in the industry and works to continuously lower it, having achieved a one percent decrease in the past six months. Since the company's inception in 2003, technology has greatly improved, there are now more competitors in the industry, expanded work to more states in India, and now more than 14 banks support Madura. The data excellence team at Madura performs intensive interviews during which they identify why people may leave Madura, understand the factors that lead to default, and understand what the loans are primarily used for.

The Data Excellence team at Madura is run out of the headquarters. The process team handles daily tasks related to understanding the business and understanding where they are facing challenges, in order to offer directly relevant solutions. Madura follows two different models: the branch and cluster models. The branch model hires only full-time staff and is separated by corporate office, regions, and branches. In a branch model, a member relationship associate is the full-time staff responsible for forming groups within each community.

This model is better fit for new geographies in which full-time staff must become familiar with the communities and businesses there before moving to the cluster model. The cluster model includes employees who are mostly women and working part-time, mapped to a specific cluster. These women are from SHGs themselves and thus know the intricacies of building the group from scratch extremely well. Madura was built on a cluster model with different regions in the field. The cluster model follows corporate, region, cluster offices and cluster centers. The

women employed in the cluster model are referred to as member welfare associate and they are responsible for building the self-help groups within the geography of each cluster office.

Interview with Ravi Shankar from Madura:

The process to ensure there is a paper and electronic trail for every customer is extremely important to Madura. The first step of the process is to create a unique identifier for each potential customer and create a “know your customer” document, which details all pertinent information about each individual. After a crisis of over-lending about ten years ago in the microfinance industry, conditions have tightened for borrowers. Now borrowers may only receive two different loans amounting to no more than 60,000 rupees. The Madura processing team looks at the know your customer paperwork and checks that the aforementioned conditions are met and then the group moves forward with processing and sanctioning the loan. The main web application, Shakti Sangamam, allows Madura to have all necessary information computerized and electronically available at the corporate and local offices.

Madura also offers a retail segment business, which offers loans to small scale retailers. These are individual customers, male or female, who do not fit into the SHG structure, but are still unbanked and in need of small loans. The larger picture effects of Madura, according to many executives of the company, are that these loans allow for more purchasing power and market connectivity, due to more capital. This work also allows small business owners to imagine the business differently. Inevitably this also means that more money is circulating through the economy. The long tail of the Indian economy is many millions of people who are running individual businesses and identifying ways to make the long tail economic contributors thrive is what moves the economy forward. The federal bank of India, RBM, is the watchdog of the industry, and closely scrutinizes the work that is done in the realm of microfinance.

Microfinance is a \$22 billion in India and \$11 billion are in the development of self-help groups, alone. Microfinance also helps larger financial institutions that are actually providing the capital because they benefit from the upside, without the downside risk of providing loans in “hard to reach” communities. The large scale microfinance of 2008-2010 was related to the rise in suicide rates of women who could not repay loans, but steps have been taken by regulatory agencies to protect women from exposing themselves to such hefty risk of default.

Interview with Usha from Madura Teach 70 Media Team:

Usha Rajeswari Thiagarajan is a head media consultant for Madura Microfinance and has been spearheading the Teach 70 program, which trains members on business-specific skills to enhance the usefulness of their loans. Usha has been a part of the Madura community from the beginning. I had the opportunity to meet with her when I visited Chennai and she described the many changes that the company has undergone. In the earlier system, the group had to save money first and after six months they would lend that money to each other. After one year the group could get borrowings from a bank and jointly repay this sum as they each reinvested the money in their individual businesses.

Usha spoke about the way that the group element of self help groups empowered each woman as an individual. A woman alone may not be listened to, but a group of ten to twenty women who are financially capable and communally engaged, receives much more respect.

There have been several threats to the success of microfinance. Usha described how many of these problems took form and how Madura has addressed each of them. One issue that arose within microfinance was that women would continue receiving loans beyond what they needed to perform business functions and would begin loaning excess capital to other peers at exorbitantly high rates, essentially mimicking loan sharks. Microcredit took away the need for a

middleman and decreased the ability for third parties to manipulate the lending practices of individuals. Microfinance had a small adverse effect of allowing women to abuse the direct access to capital, but Madura was able to circumvent this issue. Madura focused on starting with smaller loan amounts and incrementally increasing, as opposed to relatively large upfront offerings.

Women are typically only interested in fulfilling their immediate needs with the businesses they have created and run. Usha explained that Madura focuses on filling the need, but not forcing beyond this. Family is the absolute most important category to account for in financial security. Having access to microcredit makes many women feel that they are able to care for their immediate family on their own without relying on their husbands or other family members.

The Teach 70 program also prevents many issues from arising due to lack of financial literacy or understanding. Teach 70 encourages and incentivizes clients to participate in learnings on how to be wise consumers and strategic business people. One of the largest difficulties that women still face is that they do not know how to deal with the markets that they are working in. It is challenging to match the infrastructure of larger, formal companies or to express the marketability of the products and services of their businesses. Madura has addressed this difficulty by creating a new product that creates a consolidated booklet of business advertisement that can be distributed throughout localities so that marketing opportunities are more accessible.

--

This interview made me think of an important consideration that I first encountered in *The Alchemist*:

In the book *The Alchemist*, the main character Santiago finds himself in an unfamiliar land working with a crystal shop shopkeeper and introduces the idea of expanding the shop upon the pair experiencing great success and an expanding customer base. The shopkeeper responds with apprehension and states: “The shop is exactly the size that I always wanted it to be.”²⁶ I find this passage to resonate with the world of microfinance because the benefit of each loan does not need, nor do members want it to, reach beyond what is directly needed to continue business and provide for their families.

--

Interview with Maylapan:

I visited the Madurai education and training center where I spoke to a man named Maylapan who has been working with Madura for more than 13 years and explained the diversity in business among members, ranging from petti shops to fruit stands, etc. He explained the process of interviewing women to identify if they are using the loan to make more money from their business and thus be able to repay on time. He emphasized the importance of all of the women within the SHGs knowing each other because there is an implied high level of trust when you are securing each other’s loans. Madurai is where Madura started so it is also the center of many of the most successful and “model branches.” Maylapan detailed the ways in which MFIs offer greater education, access and empowerment for the women they serve. He said that it allows them to be less dependent on their husbands, feel empowered from the group bonding, and it is an opportunity for many women to leave their homes perhaps for the first time.

The model works because the branches and cluster offices are woven into the environments in which these women work. The concept of loan collection is much less daunting

²⁶ Bacigalupi, P., Buckell, T. S., & Drummond, J. K. (2011). *The Alchemist*. Burton, MI: Subterranean Press.

when a member of a trusted group just has to bring payment to a local office with friendly and familiar faces. The offices are accessible and open at all times to answer questions and help with any problems that may arise, but typically the data excellence team are the ones fielding calls and the local offices are just a means to disburse information smoothly and to exemplify that Madura is approachable and exists for the benefit of its members.

Qualitative Member Study:

Madura refers to all of those who use Madura services as members, which intentionally strays from traditional banking terminology. The participation by members is critical to the success of the company as a whole so they are members of the overall entity, often returning as employees of Madura or serving as community organizers for the company.

Sample of Madura Member/Interviewee Profiles:

Member 1:

- Sells toys and other items from a cart
- Loan has allowed her to expand her business to two new carts
- Has had a loan for 16 years
- Gets along well with her group
- Her loans allowed her to afford the marriages of her two sons
- Works from 6am-9pm everyday

Member 2:

- Hotel (restaurant) owner in Madurai
- Has owned this restaurant for 40 years with her family
- She has one daughter and one son

- Chose to use Madura for loans because it is closest to her and has been receiving loans since 2000
- Used loan to buy supplies for her restaurant

Member 3:

- Owns a silks shop
- Lives in the back of the shop
- Works from 4a-9p
- Bought more stock to sell with the loan money
- Has one other loan from another microfinance company

Member 4:

- Has an iron shop
- Used loan for home improvements
- Found some second meeting materials useful
- Has five children and a husband

Member 5:

- Has been running a milk shop for eight years
- Works with husband
- Has two kids at university
- Needs money to run business each day and uses loan for investment

Member 6:

- Very successful tailoring business, which she loves working for
- Used loan to buy a new sewing machine
- Four to six women work in the tailoring shop and are all members of the same SHG

Member 7:

- Makes rope from coconut skin
- Lives in a more rural part of the state outside of Madurai
- Was impoverished before having the loan
- Now she has consistent customers
- The loan allows her to compete more intensely in the market

Member 8:

- Used loan to buy cows
- Doesn't need loan now, but still receives it
- Two children, both have gone to college

Member 9:

- Sells woven banana leaves by contract
- Has been borrowing from Madura for 15 years
- Has two children in college

Key insights from Member Interviews:

Madura is one of the longest standing and most successful microfinance institutions serving members in south India. Madura emphasizes that it is dedicated to serving members and treating them as equals. This is one reason that members are not referred to as clients. The care and investment in the development of members is also exemplified in the number of members who return to Madura as staff, creating and organizing self help groups after many years of being in one. The innovative products, relationship to members, and supplemental educational resources are prized at Madura and differentiate it from many other microfinance companies.

Despite the hefty efforts put forward by Madura to provide educational materials to members each month, few women emphasized the second meeting materials in the benefits they have received from being involved in Madura. The Madura members who I spoke with did, however, highlight how much they have benefitted from the relationships created through the SHGs. Some of the women I spoke with had never had reason to leave their homes before joining Madura. One of the most important ways that Madura empowers its members is by helping them form meaningful cohorts of other women in entrepreneurship and conduct learning together.

The success of Madura members does not influence only the member. Family members and the entire community benefit from Madura loans, when they are implemented and executed successfully. Many of the women had some help in running their business whether from their husbands, children, or other community members, so there is an inherent economic impact beyond only the member. Some of the members I had the chance to meet were able to climb out of poverty because of Madura loans. Many women were able to make better lives for their children because of the loan. I spoke to several members or indicated that the loan allowed them to send their children to college, even though they had never attended college themselves. The difference between a member's personal education level and what they allowed for their children is a key indicator that the loan enabled them to provide for their family members. The members I spoke with and the communities I visited witnessed immediate and longer-term effects from their access to a Madura loan.

I was able to identify several risk factors in the common businesses throughout Tamil Nadu that Madura women engage in. In the more rural locations, the resources are more lacking and clean water is more difficult to access, which influenced agriculturally focused business, in

particular. In addition, recent droughts and lacking water have made many agricultural businesses more difficult. Those with monthly or contract wages have more security than the daily wage earners, but the majority of members rely on daily wages and thus find keeping track of consistent inflows and outflows of cash an income more difficult.

Graphical and Statistical Analysis:

I investigated a data set of 1000 members to understand which factors most heavily influence whether or not a woman will be in arrears or have a regular return status. In this study, I represented “in arrears” with a 0 and a “regular” status with a 1. I received this data from the data insights team at Madura Microfinance. This data includes over 60 independent variables, but I have analyzed the relationship of nine of these variables. The categories of the greatest relevance to this study are the coordinates of a member’s village, the distance between a member’s village and the closest tertiary road, the distance between a member’s village and bank branches, the number of years a member received formal education, the number of years the member’s father received formal education, the literacy rate of the member’s village, the member’s age, and her default status.

First, I calculated or graphed several summary statistics about the data. The members in this study had eight years of formal education or less, and the majority had five or fewer years.²⁷ The average overall literacy rate in the members’ villages was 80% and the average member age was 37. Additionally, on average, female members had received greater years of education than their father.²⁸

I ran several logistic regressions to identify how education, district in which the member lives, bank branch and highway accessibility determine the likelihood that members will default

²⁷ Appendix IV, Chart 1

²⁸ Appendix IV, Table 1

on a loan. I examined how these factors affect the binary result of a loan having regular return status or being in arrears. I primarily looked at the p-values of the independent variables resulting from these regressions to interpret the data.

I ran the logistic regressions in python and the independent variables were: the member's village population in 2011, the literacy rate of the member's village, the percent of business based on agriculture in the member's village, number of KM between member's village and closest tertiary road, the number of private bank branches within 10KM of the member's village, the age of the member, the number of years of education the member has experienced, and the number of years the member's father was educated. The previously mentioned independent variables were tested in a logistic regression to determine if any of these factors predicted whether or not a member was in arrears to default on their loan or if they had a regular return status.

The first regression included all of the previously mentioned variables and returned statistically insignificant p-values for all variables, except the literacy rate of the village and the number of years that the member received formal education, which returned p-values of .003 and .019, respectively. I also ran a regression that only compared literacy rate, member education, and member's father's education. The same was true for this regression, that only literacy rate and member education were significant. The following regression included the percent of business in agriculture in the village, the accessibility to tertiary roads, and accessibility to private banks. This regression returned a negative pseudo R^2 , but demonstrated that percent of business in agriculture and bank accessibility were both statistically significant. Finally, I ran a regression that analyzed private bank accessibility, age of member, number of years of education

for the member, and the number of years of the member's father's education. In this final regression, member education, bank accessibility, and age had significant p-values.²⁹

Implications of Data:

Throughout all of the regressions I ran, the education variables remained statistically significant. There is an obvious conclusion that member education influences the likelihood that she will return her loan on time. The data also suggests that the literacy rate of the surrounding village has an important influence. The literacy rate of the village is likely important because microfinance is a loan system that is reliant on joint collateral and self help groups. Villages with higher overall literacy and education are more likely to support individual members with this model.

This study indicates that education is a key component of financial success. The current discrepancy in the literacy rate of men and women is stifling the ability for women to achieve greater financial success. Microfinance is a tool of empowerment that can also offer a form of education that other sources of capital would not.

The factors that are proven to be the most statistically significant are also outside of Madura's control. Madura offers several forms of internal education, however. Given that education is one of the most important factors for loan return, it makes sense that Madura aims to offer educational tools where there may be existing gaps for members. I was fascinated that the members I spoke to were not more appraising of the second meeting materials, through which Madura offers supplemental learning on everything from health issues to how to participate in their communities. The members who I spoke to from the Teach 70 program found it extremely useful. This program is meant to equip female members with essential business skills and

²⁹ Appendix IV, Logistic Regression Results Summary

financial literacy. I would be interested to see how this program affects a member's likelihood to repay their loan.

In two of the regressions, agriculture was also noted as statistically significant and the coefficient suggests that there is a negative correlation between the percentage of business in agriculture in a village and a woman's ability to repay her loan.³⁰ I conclude that villages that are more reliant on agricultural businesses have less developed economies overall and do not have as highly advanced businesses in place. Female borrowers are therefore working in an environment where it may be generally more difficult to sell their products or services.

I predicted that the distance to the closest tertiary road would be more consistently statistically significant. The employees who I spoke to from Madura expressed that many members have difficulty marketing their products because their villages are relatively secluded and they do not often travel outside of their own villages. The results of my study indicate that accessibility to roads is less influential than accessibility to private banks. Proximity to banks could be correlated with the general access to financial education and capital so the more banking institutions a member has access to, the more likely that member is to have the expertise to run a business or be surrounded by strategic business people.

Recommendations and Further Research:

Educational background appears to be at the root of appropriate loan handling. For this reason, microfinance institutions should aim to provide engaging and useful resources for members to further their education in order to successfully handle being a borrower. The concept of the self help group is an essential component of members having the ability to repay their

³⁰ Appendix IV, Logistic Regression Results Summary

loans, as proven by the evident influence of educational background of the member's village overall.

In the decade since the microfinance crisis in Tamil Nadu, the know your customer guidelines and other specifications have been enforced to ensure that members are not overly burdened by their borrowings. The information provided in the KYC process helps to reduce data darkness and helps institutions better serve their clients. With the conclusion that education is such an important factor in loan return, education and literacy should be key components of the information collected in the KYC process and institutions should offer supplemental support if borrowers do not have extensive formal education in their backgrounds.

I would still be curious to study how Madura educational tools influence loan repayment and how Madura loans create impact on larger communities. Additionally, I would like to explore what the most meaningful or impactful resources are for borrowers who are associated with self-help groups and how they choose to personally affiliate with their groups. I would like to identify a means to measure empowerment or community involvement to search how SHGs positively contribute to each of these factors.

Microfinance loans are a powerful tool for empowerment and have the ability to positively influence women, as well as the communities that women re-invest in. There is a proven correlation between education and loan repayment and this has grand implications for the world of microfinance as it continues to expand and touch more lives, particularly in Southern India.

APPENDIX**Appendix I:**

Sources:

"Borrower Profiles: The Data Dilemma." *Madura*. N.p., n.d. Web. 16 Apr. 2017.

A. Seenivasan, A. A.V.C. College Mayiladuthurai, Tamil Nadu. (2012). Women Empowerment in Tamil Nadu Emerging Trends and State Initiatives. *Globaljournals.org*, 12(9).

Retrieved April 26, 2017, from https://globaljournals.org/GJHSS_Volume12/4-Women-Empowerment-in-Tamil.pdf.

Bacigalupi, P., Buckell, T. S., & Drummond, J. K. (2011). *The Alchemist*. Burton, MI: Subterranean Press.

Directorate of Census Operations, Tamil Nadu.

Ford Foundation SHGs <<https://www.fordfoundation.org/ideas/equals-change-blog/posts/how-womens-self-help-groups-are-transforming-rural-india/>>.

Grameen Bank Data. <http://www.grameencommunications.net/grameen_bank/>.

http://www.ilo.org/wcmsp5/groups/public/@dgreports/@gender/documents/meetingdocument/wcms_091581.pdf

[http://www.livemint.com/Opinion/JZ95vbh4jS5KI1l4kjcIO/Indias-challenge-of-dark-data.html?ct=t\(Newsletter_Test_19_2_2016\)](http://www.livemint.com/Opinion/JZ95vbh4jS5KI1l4kjcIO/Indias-challenge-of-dark-data.html?ct=t(Newsletter_Test_19_2_2016))

http://www.pradan.net/images/documentation/pradan_annual_report_2015.pdf

<https://www.fordfoundation.org/ideas/equals-change-blog/posts/how-womens-self-help-groups-are-transforming-rural-india/>

Inclusive Growth Through Microfinance and Entrepreneurship Training.

<http://www.ifmrlead.org/wp-content/uploads/2015/01/HHH_Baseline_Report.pdf>.

India Economic Census 2011. <http://censusindia.gov.in/2011-prov->

[results/data_files/tamilnadu/3.Tamil%20Nadu_PPT_2011-BOOK%20FINAL.pdf](http://censusindia.gov.in/2011-prov-results/data_files/tamilnadu/3.Tamil%20Nadu_PPT_2011-BOOK%20FINAL.pdf)

Karmakar, K. G. Microfinance in India. Thousand Oaks: SAGE Publications, 2008. Print.;

Excerpt: "Emerging SHG Federations and Challenges" by C.S. Reddy.

Madura DATA INSIGHTS Newsletter.

Nicholas. "Sewing Her Way Out of Poverty." *The New York Times*. The New York Times, 14

Sept. 2011. Web. 16 Apr. 2017.

Personal Interview, Juliet, Data Insights Team at Madura, 11 January 2017. Chennai, Tamil Nadu, India.

Personal Interview, Ravi Shankar, Madura, 20 December 2016 and 14 January 2017. Chennai, Tamil Nadu, India.

Personal Interview, Tara Thiagarajan, Founder of Madura, 26 May 2016. Arlington, VA.

Personal Interviews, Anonymous Madura Members. 13 and 14 Jan. 2017. Madurai, Tamil Nadu, India.

Pradan Annual Report,

http://www.pradan.net/images/documentation/pradan_annual_report_2015.pdf.

Salve, P. (2016, October 04). Kerala Leads Leads Nation in Female Literacy, Tamil Nadu Has

Most Women Entrepreneurs. Retrieved May 08, 2017, from

<https://thewire.in/70675/kerala-leads-leads-nation-in-female-literacy-tamil-nadu-has-most-women-entrepreneurs/>

Susan Thomas research. <http://www.igidr.ac.in/faculty/susant/PDFDOCS/sue-res.pdf>.

Swain, Ranjula Bali. *The Microfinance Impact*. Routledge. 2012, Abingdon.

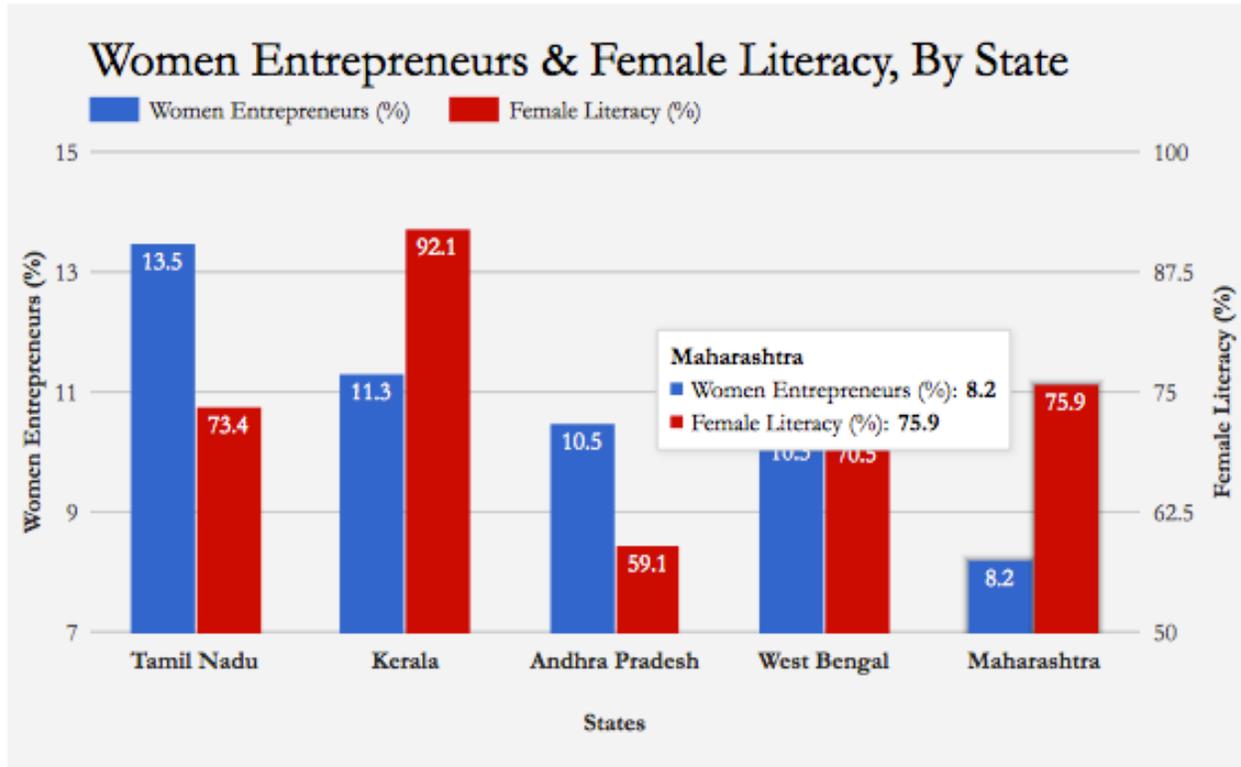
The World Bank. *Implementation Status and Results India: Tamil Nadu Empowerment and Poverty Reduction*. 18 November 2010. Data Report.

Yunus, Muhammad. *Banker to the poor*. N.p.: Public Affairs, 1999. Print.

Appendix II:

Preliminary Research Data:

Women in Tamil Nadu, compared to other states from article in *The Wire*:



Appendix III:

Images from research trip to Tamil Nadu



Appendix IV:

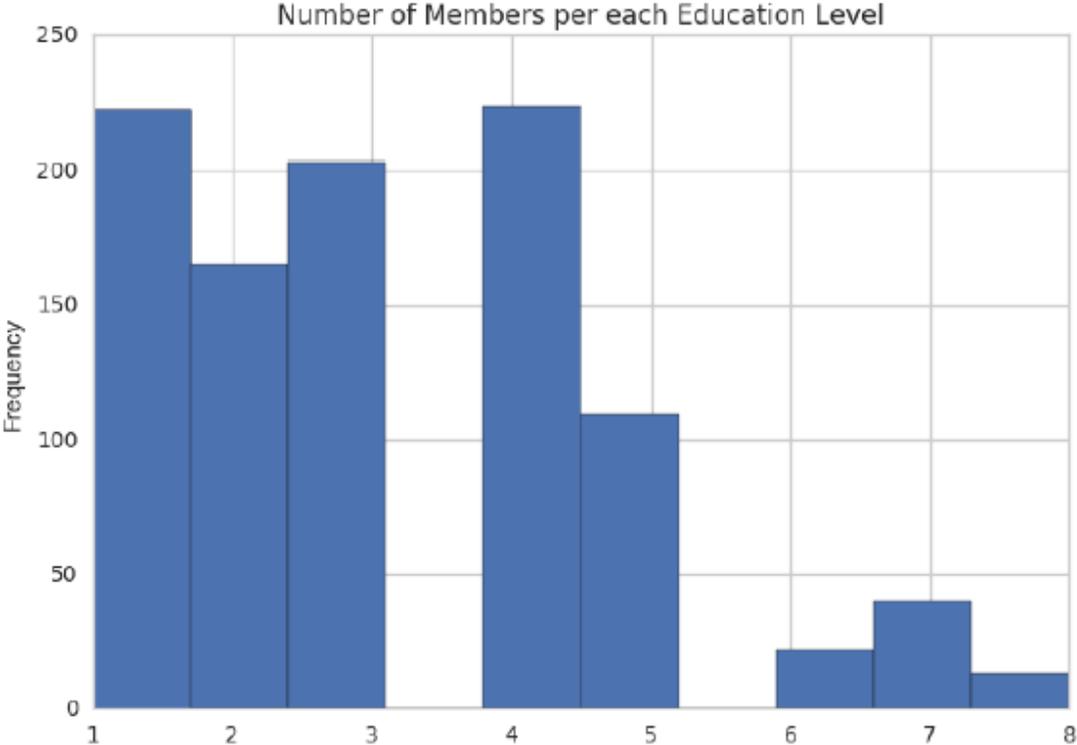
Regression Results and Data Analysis

Summary Statistics (Table 1):

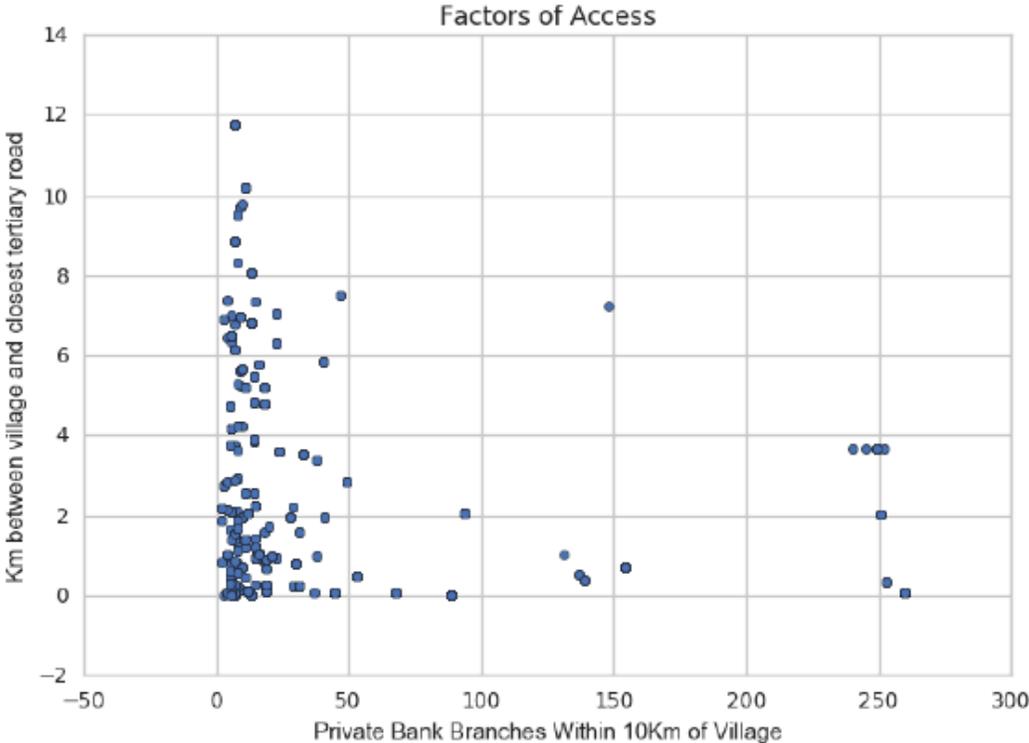
	Member ID	Village Population 2011	literacy rate in village	Percent of Business in Agriculture in Vilalge	Km between village and closest tertiary road	Private Bank Branches Within 10Km of Village	Age of Member	Number of Years of Education for Member	Number of Years of Education for Member's Father
count	997.000000	9.970000e+02	997.000000	997.000000	997.000000	997.000000	997.000000	997.000000	997.000000
mean	499.000000	7.582116e+04	80.064193	0.352728	2.366098	37.278837	36.795386	3.123370	0.543631
std	287.953411	1.988713e+05	8.601502	0.283688	2.628567	61.188369	7.878486	1.694494	1.093680
min	1.000000	1.240000e+02	58.000000	0.010000	0.010000	2.000000	20.000000	1.000000	0.000000
25%	250.000000	3.549000e+03	73.000000	0.080000	0.280000	7.000000	30.000000	2.000000	0.000000
50%	499.000000	8.774000e+03	81.000000	0.330000	1.390000	13.000000	36.000000	3.000000	0.000000
75%	748.000000	2.546900e+04	88.000000	0.610000	3.740000	31.000000	42.000000	4.000000	1.000000
max	997.000000	1.017865e+06	94.000000	0.980000	11.740000	260.000000	64.000000	8.000000	7.000000

Number of Years of Education for Members in Study (Chart 1):

[X axis displays each level of education which is noted in years and the Y axis displays how many members applied to each category]



Comparing Member Access to Banks and Major Roads (Chart 2):



Key P Values and Pseudo R² from Regressions Run (Table 2):

	A	B	C	D
1	P-VALUE	DEFAULT STATUS(1) [R ² = .09]	DEFAULT STATUS(2) [R ² = - .15]	DEFAULT STATUS(3) [R ² = .05]
2	LITERACY RATE IN VILLAGE	0.003	X	0.000
3	YEARS OF EDUCATION	0.019	0.000	0.013
4	BANKS WITHIN 10 KM	0.256	0.015	X
5	AGE	0.841	0.000	X

Logistic Regression Results Summary (Table 3-6):

Logit Regression Results						
Dep. Variable:	Default Status of Member Loans at Madura	No. Observations:	997			
Model:	Logit	Df Residuals:	989			
Method:	MLE	Df Model:	7			
Date:	Wed, 26 Apr 2017	Pseudo R-squ.:	0.09285			
Time:	20:12:37	Log-Likelihood:	-213.13			
converged:	True	LL-Null:	-234.95			
		LLR p-value:	2.521e-07			
	coef	std err	z	P> z	[95.0% Conf. Int.]	
Village Population 2011	3.124e-06	4.55e-06	0.687	0.492	-5.79e-06	1.2e-05
literacy rate in village	0.0283	0.009	3.023	0.003	0.010	0.047
Percent of Business in Agriculture in Vilalge	-0.8310	0.517	-1.609	0.108	-1.843	0.181
Km between village and closest tertiary road	-0.0695	0.046	-1.509	0.131	-0.160	0.021
Private Bank Branches Within 10Km of Village	0.0097	0.009	1.136	0.256	-0.007	0.026
Age of Member	0.0034	0.017	0.201	0.841	-0.029	0.036
Number of Years of Education for Member	0.2238	0.095	2.351	0.019	0.037	0.410
Number of Years of Education for Member's Father	0.1155	0.177	0.653	0.513	-0.231	0.462

Logit Regression Results						
Dep. Variable:	Default Status of Member Loans at Madura	No. Observations:	997			
Model:	Logit	Df Residuals:	994			
Method:	MLE	Df Model:	2			
Date:	Thu, 04 May 2017	Pseudo R-squ.:	0.05397			
Time:	16:26:21	Log-Likelihood:	-222.27			
converged:	True	LL-Null:	-234.95			
		LLR p-value:	3.109e-06			
	coef	std err	z	P> z	[95.0% Conf. Int.]	
literacy rate in village	0.0255	0.004	7.251	0.000	0.019	0.032
Number of Years of Education for Member	0.2265	0.091	2.498	0.013	0.049	0.404
Number of Years of Education for Member's Father	0.1843	0.168	1.096	0.273	-0.145	0.514

Logit Regression Results						
Dep. Variable:	Default Status of Member Loans at Madura	No. Observations:	997			
Model:	Logit	Df Residuals:	994			
Method:	MLE	Df Model:	2			
Date:	Thu, 04 May 2017	Pseudo R-squ.:	-0.1514			
Time:	22:26:06	Log-Likelihood:	-270.53			
converged:	True	LL-Null:	-234.95			
		LLR p-value:	1.000			
	coef	std err	z	P> z	[95.0% Conf. Int.]	
Percent of Business in Agriculture in Village	1.6023	0.371	4.317	0.000	0.875	2.330
Km between village and closest tertiary road	0.0853	0.045	1.900	0.057	-0.003	0.173
Private Bank Branches Within 10Km of Village	0.1076	0.015	7.408	0.000	0.079	0.136

Possibly complete quasi-separation: A fraction 0.15 of observations can be perfectly predicted. This might indicate that there is complete quasi-separation. In this case some parameters will not be identified.

Logit Regression Results						
Dep. Variable:	Default Status of Member Loans at Madura	No. Observations:	997			
Model:	Logit	Df Residuals:	993			
Method:	MLE	Df Model:	3			
Date:	Thu, 04 May 2017	Pseudo R-squ.:	0.05671			
Time:	16:20:58	Log-Likelihood:	-221.62			
converged:	True	LL-Null:	-234.95			
		LLR p-value:	6.981e-06			
	coef	std err	z	P> z	[95.0% Conf. Int.]	
Private Bank Branches Within 10Km of Village	0.0217	0.009	2.435	0.015	0.004	0.039
Age of Member	0.0352	0.007	5.302	0.000	0.022	0.048
Number of Years of Education for Member	0.3357	0.081	4.162	0.000	0.178	0.494
Number of Years of Education for Member's Father	0.0858	0.177	0.485	0.628	-0.261	0.433