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The impact of Microfinance on Women Empowerment in the Egyptian Society

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Abstract

This paper demonstrates results from a sample of 1168 randomly picked women from one of the leading microfinance institutions in Egypt: Tasaheel. This study tests whether microfinance helped women empowerment through increasing their income levels. The results show that loans increase women's income on average. The sample shows that microfinance's impact is unequal, helping the poor increase their revenue more. Socio-economic conditions affect the extent to which women benefit from the loans through their effect on the cost of debt. The cost of debt has a negative impact on the change in income.

Keywords: Microfinance, Microcredit, Egypt, Women Empowerment

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Chapter 1: Introduction

John Rawls once said “*In all sectors of society there should be roughly equal prospects of culture and achievement for everyone similarly motivated and endowed. The expectations of those with the same abilities and aspirations should not be affected by their social class.*” In reality, not everyone gets to have the same opportunities, which limits some of the most passionate and hardworking individuals from achieving success. Microfinance is a way to narrow this gap and help underprivileged individuals have access to financial services. Microfinance is a type of banking service offered to low-income, underserved individuals. It provides an opportunity for these entrepreneurs to have access to financial services since otherwise they would not be able to take loans (Deutsche bank Research, 2007). It is regarded by the United Nations as an important factor for Millennium Development Goals and decreasing poverty, famine and gender inequality by 2015 (INAFI (2015), Hermes & Lensink, 2007). Microfinance has been introduced to the Egyptian market in the 1980s, since then, the microfinance industry has seen tremendous growth in Egypt. The number of microfinance institutions (MFIs) and NGOs is growing exponentially to meet the demand (FRA reports, check appendix 2, graph 1). In the current socio-economic conditions, women’s roles are often marginalized, and it is believed that their job is limited to their household. The opportunity that the microfinance industry provides encourages women to pursue their dreams and gain independence in a society that praises men. In this context, microfinance is a way to offer more opportunities to women and empower them. Women empowerment is the idea of women being able to challenge the society and culture they are living in (Swaina & Wallentin, 2009). This thesis will analyze *the impact of microfinance on women empowerment in the Egyptian society*. The analysis will be made through a case study of Tasaheel; an Egyptian microfinance company

with more than 70% of its borrowers being women. This paper conducts an empirical research on the impact of such an important source of income in a country where poverty is very high (32.5% in 2018, according to the World Bank).

The second chapter of this thesis starts by explaining what microfinance is. The chapter also gives a more elaborate perspective of women empowerment in Egypt. The second chapter also covers an overview of the literature on this topic and the theoretical framework. The third chapter explains the variables and describes the data. The last chapter illustrates the results and contains the conclusion that will summarize the main concepts and findings of this paper.

Chapter 2: Theoretical Framework and Literature Review

2.1. Microfinance

In Egypt, the microfinance landscape is regulated by the Financial Regulatory Authority (FRA). According to the FRA, microfinance helps increase economic productivity, reduce unemployment, improve income for the poorer tranche of society, encourage micro-entrepreneurs and decrease the financial gap in the sector (FRA website). According to the Egyptian law, microfinance companies cannot act as commercial banks and accept deposits, it only helps entrepreneurs whether it is through lending, leasing, Murabaha (islamic finance) or trading. The size of lending is capped at EGP100,000 (€ c.5,600) by the FRA. The funds are used in various activities in all sectors: manufacturing, agricultural, tertiary and commercial. There are two main types of lending: individual lending and group lending. The group is typically composed of up to five women with different and independent projects. Default rates are typically low for MFIs (Banerjee, 2013), which indicates that borrowers are willing and able to pay (Buckley, 1997) and that the screening process is efficient (For Tasaheel default rates are lower than 2%).

2.1.1. Difference between Microfinance and Commercial Loans

Unlike commercial banks, MFIs do not ask for a physical collateral since their target market cannot provide it in most cases. To compensate for the high risk that they face, MFIs tend to charge high interest rates (Tasaheel was charging an effective interest rate between 40% and 52% on average in 2019, depending on the type of loan and the case). Interest rates reach over 100% per annum in some countries like Mexico (Banerjee, 2013). These interest rates also cover the high costs of investigating the borrower's status, reputation and ability to pay (Banerjee, 2013). For borrowers, this is not their biggest concern since they get money that otherwise they wouldn't have access to, and their return outweighs their cost of debt. Due to the high risk they face, MFIs give only short-term loans (for Tasaheel in 2019 the average tenor was 14 months for individual loans and 19 months for Group loans). On the other hand, commercial banks give long term loans and offer bigger amounts. Borrowers focus on the speed with which they get their money from the MFI (in Tasaheel's case it is up to 72 hours) rather than traditional banks that can take months to decide on their due diligence process. The due diligence process is costly, which makes lending small amounts to the unbanked population unprofitable to financial institutions. By law, MFIs in Egypt only lend to microentrepreneurs whereas financial institutions can give out loans for personal consumption or to bigger and more established entrepreneurs and companies. This also underlines the difference in amounts typically lent by a bank as opposed to MFIs.

2.1.1.1 Benefits of Group Lending

Group lending is another aspect that differentiates MFIs from traditional banks. It is important to understand the benefits of it in order to understand the reason MFIs offer such a service. In Egypt, 21.37% of the money disbursed by MFIs goes to group lending (FRA, 2Q19). In group lending, the loan is given to all the group members, which makes them all jointly liable. In the case of default by one of the group members, other members are responsible for paying the whole amount

(Banerjee, 2013). It is necessary that each member of the group has their own project to avoid collusion and decrease the risk of default, which is an important condition for Tasaheel's group lending and was also the case in Banerjee et al. (1994). According to Hermes and Lensink (2007), the main benefit of the joint liability is the reduction of information asymmetries since the fear of default will push group members to screen each other thoroughly to reduce the risk of having to pay for them and monitor each other after taking the loan. The group, therefore, plays an insurance role decreasing agency costs for the lender and controlling for moral hazard. This will push members to work hard to be able to pay back their loan (Arnott & Stiglitz, 1990).

2.1.2. Growth of Microfinance in Egypt

In the third quarter of 2019 (3Q19), the microfinance industry in Egypt was serving more than 3 million individuals compared to 1.9 million in 3Q16. This means that the client base increases by a CAGR of 16.3%. (FRA report, 2Q19). Nearly half of the microfinance market are women [49.2% in 3Q19] seeking to grow their businesses, paving their way to independence.

2.2. Women empowerment in Egypt

“Egypt ranks low in gender equity compared to other countries worldwide.” (USAID, 2019). Women empowerment has been an issue in Egypt for decades. Several NGOs and institutions are raising awareness however, the problem does not seem to disappear. The Egyptian society still praises men and gender equality is not yet established. According to USAID (2019), women have lower participation rates than men in the labor force (26% vs 79%) and a lower literacy rates (65% literacy for women vs 82% of males). Women empowerment's definition is a subjective matter. According to the European institute for gender equality, women empowerment can be broken into five components: self-worth, the right to make their own choices, access to opportunities and resources ability to take control of their own lives and social and financial independence.

2.3. Previous studies

2.3.1. Microfinance Empowering Women

Several studies established that microfinance strengthened women's position socially and financially. The Indian market has been the focus of many authors in this field since it is one of the emerging markets where microfinance is growing exponentially. Swaina and Wallentin (2009), studied a sample of 1000 households, amongst which is a control group. The purpose of the research was to examine the contribution of the microfinance institution SHG to women empowerment. The paper measured women empowerment through qualitative metrics by surveying women about their status, their participation in the labor market, domestic abuse and other questions concerning the challenges women go through to fight the norms they live in. By comparing the results of the treatment group to the control group, they found a significant effect of microfinance in empowering women, however, women experienced different degrees of change. The authors added that the difference in the degree of change comes from other factors than microfinance, which should be considered when testing for women empowerment.

A study conducted by Khan & Noreen (2011) on the Pakistani district Bahawalpur showed that microfinance had a bigger impact on women than men. The paper states that microfinance opportunities provide women with a chance to escape gender inequality and domestic abuse.

2.3.2. Microfinance is not Enough on its Own

A research done on South Asia shows that microfinance does contribute to empowering women's financial positions. However, the authors believe that there is more to women empowerment than financial independence, that the core change must be in the patriarchal power. The paper does not deny that financial independence can help women move towards a more powerful position in society. Nevertheless, it states that even if microfinance contributes to women's development, it is

not the “magic bullet” to empower them and that there are other political and social necessities for women to have a better position in the society (Kabeer, 2005).

2.3.3. Microfinance, a Two-Sided Sword

A study on the Tanzanian market, where poverty, women empowerment and inequality are big issues, showed that women who take loans from MFIs tend to have higher self-esteem, better in decision making and have greater self-efficacy. The study shows that MFIs focus on women and their empowerment through financial stability. However, the research underlines that microfinance can also have a negative impact on women. The paper highlights that high interest rates that can affect the borrower’s income and lead to women running away from their villages to escape from repayment or their assets being taken away. They also state that some of these loans are controlled by a man (husband for instance) leading to domestic violence (Kato & Kratzer, 2013).

2.3.4. Microfinance, a Trap?

A study on the Bangladeshi market states that as poverty was arising, microfinance was considered the only way to survive and the only coping mechanism (Shillabeer, 2008). MFIs helped poorer individuals to work in non-seasonal fields with stable incomes, such as poultry or cow rearing. This sort of income helped people increase their revenue, savings and access to education or healthcare. The author states that due to natural disasters that Bangladesh is continuously exposed to, every business and household gets affected. MFIs created an even bigger issue; over-indebtedness, which could lead to a poverty trap (Shillabeer, 2008). This example shows that microfinance is not necessarily the perfect fit to every market and its effect is not the same on every population.

2.3.5 Microfinance has No Significant Effect on Borrowers

Banerjee, Duflo, Glennerster and Kinnan (2014) examine the effect of group lending on borrowers through their consumption, business creation, income and other sources during a 3-year study in India. The results suggest that microfinance did not significantly increase consumption or

businesses profitability, however, it impacted households' consumption choices (giving up "temptation goods" and investing in durable goods instead) and encouraged households to work harder on their projects. The research concludes that microfinance did not prove to be a miracle to escape poverty and has no effect on women empowerment or social outcomes.

2.3.6 Microfinance and Asymmetry of Information

Moral hazard and adverse selection are two obstacles arising from the asymmetry of information between the lender and the borrower. The borrower tends to know more than the lender about his own risk appetite and ability to repay. In an ideal scenario, lenders would charge each borrower according to their risk type, the riskier the borrower, the higher the interest rate. However, not all information is disclosed and can be hidden. High risk individuals will pretend to be low risk (Banerjee, 2013), especially that MFIs tend to have a very quick screening process. To mitigate the problem, MFIs would want to avoid the risk of mis-judgement and charge one interest rate for all. In this case, they would choose to charge high interest rates since lower rates would result in a loss (Stiglitz & Weiss (1981), Akerlof (1970)). Consequently, as a result of adverse selection, risk averse borrowers find the cost of debt very high. Risk averse borrowers expose their businesses to minimal risk, which tends to result in lower revenues. By charging all borrowers high interest rates, MFIs increase the difficulty for these borrowers to fully repay their debt. Therefore, this could potentially decrease the overall collection rate (Banerjee, 2013).

Asymmetry of information also arises as a result of hidden actions. In some cases, moral hazard could push the borrower to change his actions after guaranteeing to take the loan or voluntarily default on the loan (Banerjee, 2013).

Behavioral biases can stop women from efficiently using the money they get from MFIs. These limitations can influence the extent to which microfinance can impact women's lives.

2.3.7. Microfinance's Impact in Egypt

There is a range of literature focusing on the different aspects of the impact of microfinance in Egypt. Barsoum (2006) underlined the gender biased approach in the microfinance sector by showing the interest of MFIs in lending Egyptian women more than men. An analysis by Nisser and Ayedh (2017) explained the need of microfinance to focus on women since it can lead to their empowerment. Through a literature review, Nisser and Ayedh (2017) demonstrated the impact of microfinance lending in other countries (India, Pakistan, Oman, Nigeria and Malaysia) and concluded that it would have a similar impact on Egyptian women.

Nader (2008) and Drolet (2010) conducted research studying the impact of microfinance on Egyptian women's socio-economic conditions. The authors found a positive impact of microcredits on income and self-confidence. Nevertheless, due to the limited resources, both papers conducted the research on samples where the treatment group was of less than 100 women.

This thesis will add to the literature by analyzing a bigger sample from one of the leading MFIs in the market and provide a new perspective and an updated view on the impact of microfinance on women empowerment in Egypt.

2.4. This Paper

The aforementioned studies argue that microfinance on its own is not enough to empower women. The social, cultural and financial conditions are crucial for women's status change in society. Nevertheless, financial stability is a step closer to independence and empowerment. If women use their funds in an efficient way, it can help them escape poverty and the loans will help their businesses and revenue increase even after they stop taking credits (Banerjee, Breza, Duflo, Kinnam, 2019). This thesis will test the following hypotheses:

H1: Microfinance opportunities increase women's income in Egypt

This hypothesis will serve to test the extent to which microfinance ameliorates a woman's financial position.

H2: Microfinance benefits women unequally depending on personal characteristics

This hypothesis helps see which type of women benefit most from microfinance when considering different cultural and social effects.

Chapter 3: Data and Methodology

3.1. Sample

The hypotheses will be tested through a sample of 1168 women randomly picked from Tasaheel's database. Tasaheel is the second biggest microfinance company in Egypt with a market share of 17% (in 2Q19). The sample is composed of women who took several individual loans. In this study, mainly quantitative metrics are going to be used. All data is obtained through Tasaheel's database. Any qualitative information given and used in this paper is admitted by the woman in question and is trusted to be true. The reason why a survey format is believed not to be suitable for this study is that some women could refrain from admitting a lot of their issues, which would bias results.

3.2. Data & Methodology

3.2.1. Regression Model

In order to test for the hypothesis mentioned above a cross-sectional regression model is built on the Stata statistical tool. In this paper, a significance of 5% is used to decide on coefficients' statistical significance, 5% is considered the conventional significance indicator (Brooks, 2014).

3.2.2 Variables

Since women empowerment cannot be measured through one variable and is a debatable and subjective topic, for the purpose of this paper income will be taken as a proxy for a woman's power and autonomy.

The variable of interest is the logarithmic scale of the change in income. In this research, the income is taken from an indicator that the loan officers provide during their investigations and field visits to the project she has. The change in average income is calculated by dividing the income indicator of the women before her last loan by the income indicator before her first loan. The logarithmic scale helps interpreting the coefficients easier: as a percentage change and showing a linear relationship between the independent and dependent variables (Brooks, 2014). We are interested in the percentage change in income not the monetary value.

There are several variables that can affect a woman's income. First variable is the loan cycle, which indicates how many loans each woman has taken from the company. This variable illustrates whether taking more loans help women grow their income. One of the other indicators of the contribution of microfinance is the loan size. The average loan size is calculated by taking the average of all loans that a woman took. This variable shows whether the size of the loan affects the growth in women's income. The logarithmic scale of the average loan size is taken to observe the change and not the absolute monetary value. Additionally, the logarithmic scale of the indicator of the initial level of income is added to put things into perspective since different women start from different income levels and project maturities. The average interest rate that each woman has been charged is used in this regression to see whether it cancels out the positive effect of microfinance on income, such as Shillabeer (2008) suggested.

Another factor that is believed to affect a woman's income is her family size, it will help see whether the size of the family that the woman takes care of affects her motives and encourages her to try to increase her income. The marital status of a woman is also believed to affect her needs and ability to expand her business. Marital status will be presented through a dummy variable. In poorer areas of Egypt, if a woman is married it is less likely that her husband will let her work (Hendy, 2015). In such a culture normally, the man is the head of the house and the women takes care of

household duties (EgyptIndependent, Cultural Atlas). Literacy is also an important variable since it influences efficiency and a person’s ability to work in certain fields or fulfill certain tasks on their own. Literacy will be presented as a dummy variable. A literate woman is normally more likely to be able to generate a higher income and have better economic and management skills, which could increase her productivity (UNICEF, 2006). Additionally, another variable used is urbanization, it will also be presented by a dummy variable. Urban areas tend to be more developed, hence, more open to the idea of a working woman. Robaa & Hafez (2002) talked about the constantly increasing urbanization in Cairo as opposed to other cities. For the purpose of this study, we will consider Cairo as the urban area and other areas will be considered as non-urban. The last variable is a dummy to show whether the woman of interest is the main earner of the house. If she is, she is more likely to work hard for better living conditions.

3.2.3 Descriptive Statistics

This section will serve to describe the data before running any tests. It is important to note the number of observations can vary from one variable to the other since some women did not disclose all the information needed when asked. Firstly, the population characteristics are described:

Table 1: Descriptive Statistics for the Socio-economic Characteristics of the Sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Urban	1168	0.485	0.500	0	1
Marital Status	1168	0.729	0.445	0	1
Main Earner	1168	0.419	0.494	0	1
Literate	967	0.394	0.489	0	1
Family Size	1039	3.638	1.392	0	9

For all dummy variables the mean shows whether the majority has a variable of 0 or 1. The table above shows that 48.5% of the women in the sample are urban, 72.9% are married, 39.4% are literate and 41.9% are main earners. These statistics show that the sample is representative of the

Egyptian culture, where women are mostly perceived as dependent. The average family size is 3 to 4 people, which is considered high and makes it harder to maintain a good social standard or to make sure that children get a good quality education. These numbers show that it is a vicious circle, that it is hard to get out of poverty and illiteracy in such a culture. The culture on the one hand encourages big families, on the other hand discourages women from being independent and helping their children getting educated and have better lives (UNFPA Egypt, 2016)

Secondly, the table below illustrates some statistics to see the women's status in the company.

Table 2: Descriptive Statistics for Women Status in Tasaheel

Variable	Obs	Mean	Std. Dev.	Min	Max
Loan Cycle	1168	3.02	0.97	2	6
Years Difference	1164	2.00	0.92	0.6	4.1
Average Loan Size	1164	4017.83	776.90	1250	8000
Average Interest	1163	52.76%	1.40%	48.67%	54.00%

All the women in the sample are at least in their second loan cycle (have taken a minimum of two loans from Tasaheel). Table 2 shows that on average, women are in their third loan cycle, with a maximum of 6 loans. The time interval between one loan and another can differ from one woman to another, the variable years difference shows how many years have passed between the first and last loan. The average is 2 years, with a minimum of 0.6 year and a maximum of 4 years. The average loan size is EGP4,018 (equivalent to € c.225), which is equivalent to 2 times the minimum wage in Egypt. Today the minimum wage is EGP2,000 (equivalent to € c.112) (Reuters, 2019). Borrowers are charged an average interest rate of 52.76% (effective rate), which translates into an average yearly flat rate of 30.93%.

Chapter 4: Results and Conclusion

In order to test the first hypothesis, different regressions are run to see whether women's incomes increase with the help of microfinance. By testing the correlation between the average loan size and the change in income, the regression shows that when the average loan size increases by 1%, the income level increases by 1.01% (See Appendix 1, regression 1.1). This suggests that a bigger loan helps women grow their income more since it provides them with more resources.

$$(1) \text{ Log Change in Income Indicator} = \alpha + \beta_1 \text{ Log Average Loan Size} + \beta_2 \text{ Average Interest Rate} + \varepsilon$$

Number of Obs	1157
F(2, 1154)	538.81
Prob > F	0.0000
R-Squared	0.4981
Root MSE	0.24869
Adjusted R-Squared	0.49723

Log Change In Income Indicator	Coeff	Robust Std Err	t	P > t 	[95% Conf. Interval]	
Log Average Loan Size	0.8901	0.0409	21.75	0.000	0.8098	0.9704
Average Interest Rate	-11.2104	0.6064	-18.49	0.000	-12.4000	-10.0207
Constant	-0.7478	0.5206	-1.44	0.151	-1.7690	0.2736

When interest rate is added to this regression, table 1 shows that the effect of average loan size decreases to 0.89%. This shows that an increase of 1% in the amount given as a loan is reflected in an increase of 0.89% in income levels. The regression also illustrates that interest rates impact change in income negatively. Keeping the loan size constant, when the interest rate increases by 1%, the change in income decreases by 11.21%. These results confirm that higher interest rates decrease the effect that microfinance has on income. Therefore, high interest rates could potentially

defeat microfinance's purpose of helping women (which underlines Kato & Kratzer (2013)'s conclusion) and can possibly make repayment less likely (Banerjee, 2013).

Adding the loan cycle variable to the regression will help us show whether the number of loans taken affect the increase in income.

$$(2) \text{ Log Change in Income Indicator} = \alpha + \beta_1 \text{ Log Average Loan Size} + \beta_2 \text{ Average Interest Rate} + \beta_3 \text{ Loan Cycle} + \varepsilon$$

Number of Obs	1157
F(3, 1153)	452.14
Prob > F	0.000
R-Squared	0.5559
Root MSE	0.23404
Adjusted R-Squared	0.5547

Log Change In Income Indicator	Coeff	Robust Std Err	t	P > t 	[95% Conf. Interval]	
Log Average Loan Size	0.5939	0.0521	11.39	0.000	0.4916	0.6963
Average Interest	-5.4205	0.7231	-7.50	0.000	-6.8391	-4.0018
Loan Cycle	0.1392	0.0140	9.97	0.000	0.1118	0.1666
Constant	-1.7700	0.4330	-4.09	0.000	-2.6196	-0.9204

Adding the variable loan cycle to the model decreases the coefficients for both: average loan size and average interest. This model has a bigger adjusted R^2 (0.55 versus 0.50 for the last model) suggesting that it explains more of the variation in change in income. When the loan cycle is controlled for, its effect is no longer omitted or biasing other coefficients. The coefficient of average loan size decreases due to the positive correlation between loan cycle and average loan size that was previously presented as a coefficient for average loan size only (See Appendix 1, Table A1). In this model, the increase in 1% in the average loan increases the income levels by 0.59%. On the other hand, keeping constant the loan size and interest, each additional loan the woman takes increases her change in income by 13.92%. This suggests that when a woman takes

more loans, her ability to learn and use the funds efficiently increases, which leads her to increase her revenue. The model, therefore, shows that the loan cycle has a more significant effect than the loan size on income, *ceteris paribus*. The effect of the loan cycle could be due to a selection bias; only women with good projects would be able to renew and take more loans, therefore, increase their income further. The women whose businesses fail are not observed in the sample since they would not be able to take more loans, therefore the sample is biased towards women whose businesses succeed, enabling them to have a higher number of loans. Nevertheless, all the borrowers in the sample are still active and the sample contains businesses of different types and stages. All projects in the sample could potentially succeed or fail.

Controlling for the loan cycle decreased the effect of interest rates on change in income. This changed from the last model since when the loan cycle variable is not controlled for, the model considered that all loan cycles are pooled. The change in coefficient is a result of the negative correlation between loan cycle and the interest rate charged. A first-time borrower is considered by the MFI as riskier than a woman who is taking her 6th loan for instance. The asymmetry of information is higher for a first-time borrower. Therefore, this would be reflected on the interest rate charged. The model shows that when interest rate increases by 1%, the change in income decreases by 5.42%. Two borrowers in the same loan cycle can be charged different interests based on the riskiness of their project, paying higher interest rates decreases the change in income levels. Another angle to test the change in income would be by looking into the effect the initial level of income of the individual has on their growth in revenue

$$(3) \text{ Log Change in Income Indicator} = \alpha + \beta_1 \text{ Log Initial Level of Income Indicator} + \varepsilon$$

Number of Obs	1162
F(1, 1160)	766.35
Prob > F	0.0000
R-Squared	0.3865

Root MSE	0.27462
Adjusted R-Squared	0.38602

Log Change in Income Level	Coeff	Robust Std Err	t	P > t 	[95% Conf. Interval]	
Log Initial Level of Income Indicator	-0.8692	0.0314	-27.68	0.000	-0.9308	-0.8076
Constant	5.0150	0.1568	31.99	0.000	4.7074	5.3226

Regression (3) shows that when the initial income increases by 1%, the change in income decreases by 0.86%, which means that income still increases but by a lower rate. In this context, income increases unequally; those who started off with a lower income see a higher increase in their revenues. The results indicate that microfinance reduces inequality, in the sample microfinance helps poor women more than richer ones. This suggests that the impact of microfinance does not lie on a woman's income before taking the loan but on the effort and efficiency invested to increase revenue. Nonetheless, the initial revenue level could still affect the borrower through the amount she is guaranteed by the MFI. Regression (4) shows that when the initial income level increases by 1%, the average loan size increases by 0.19%. The higher revenue gives the MFI more security that the woman will be able to repay her debt. This suggests that initial income could still affect the change in income through its effect on loan size.

$$(4) \text{ Log Average Loan Size} = \alpha + \beta_1 \text{ Log Initial Level of Income Indicator} + \varepsilon$$

Number of Obs	1164
F(1, 1162)	71.26
Prob > F	0.0000
R-Squared	0.0578
Root MSE	0.19086
Adjusted R-Squared	0.057034

Log Average Loan Size	Coeff	Robust Std Err	t	P > t 	[95% Conf. Interval]	
Log Initial Level of Income Indicator	0.1887	0.0224	8.44	0.000	0.1448	0.2326

Constant	7.3541	0.1118	65.68	0.000	7.1257	7.5645
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When contrasting the regressions (3) and (4), it seems that in this sample poor women get smaller loans, but they make better use of funds resulting in a bigger change in income than women starting with higher incomes.

In order to test the second hypothesis, the following regression is run

$$(5) \text{ Log Change in Income Indicator} = \alpha + \beta_1 \text{ Family Size} + \beta_2 \text{ Literate} + \beta_3 \text{ Main Earner} + \beta_4 \text{ Marital Status} + \beta_5 \text{ Urban} + \varepsilon$$

Number of Obs	875
F(5, 869)	24.75
Prob > F	0.0000
R-Squared	0.1263
Root MSE	0.32166
Adjusted R-Squared	0.1213

Log Change In Income Indicator	Coeff	Robust Std Err	t	P > t 	[95% Conf. Interval]	
Family Size	-0.0127	0.0077	-1.65	0.100	-0.0278	0.0024
Literate	0.0175	0.0245	0.71	0.475	-0.0306	0.0657
Main Earner	0.0351	0.0255	1.37	0.170	-0.0150	0.0851
Marital Status	-0.0206	0.0284	-0.73	0.468	-0.0764	0.0351
Urban	0.2328	0.0251	9.28	0.000	0.1836	0.2820
Constant	0.6380	0.0440	14.50	0.000	0.5516	0.7244

The table illustrates that the only statistically significant variable is urban, the coefficient of 0.23 suggests that when a woman is urban her income level should increase by 23.28% more than a non-urban woman, ceteris paribus. The results reflect the advancement of an urban woman vis a vis non-urban woman. Living in the capital gives more exposure that can help women learn how to grow their business efficiently and it provides women with more opportunities. Therefore, an urban woman can be more ambitious and driven due to her environment. Additionally, urban women have a bigger market to target, which could help in increasing their revenue. On the other hand,

another interpretation would be that the women who choose to live in or migrate to the city are different and more driven. If the latter case is true, it would suggest that there could be a selection bias. The model shows that the family size affects the change in income negatively, that every additional person in the family decreases the change in income by 1.27%. This can be explained by the fact that bigger families require more money, and this gives less space to the borrower to invest back in her business. When the woman is literate the income changes by 1.75% more than an illiterate woman. The increase in growth can come from the difference in efficiency between a literate and an illiterate woman. For instance, a literate woman can be more productive, take less time to acquire certain skills or take on more tasks and require less manpower. The regression suggests that a main earner can increase her income by 3.51% more than a woman who is not in charge of the house expenses alone. This can be explained by the motives of a main earner that drive her to work longer hours, learn more and increase efficiency to be able to sustain her family. On the other hand, a married woman's income changes by 2.06% less than a single woman. This can also be explained by the need of a single woman to sustain herself and her family, whereas a married woman could have her husband's support and choose to spend less time working. It can also be a result of cultural pressure, where the husband is the one who makes use of the money, such as Kato & Kratzer (2013) suggested. Another reason could be that the husband does not encourage her work enough to be able to take care of her household duties, which will not let her increase her income significantly.

It is important to note that the results of this model are only statistically significant for the variable urban. The interpretation of the other coefficient cannot be considered very reliable since they are not statistically significant. The correlation matrix in appendix 1 table A2 confirms the signs of the coefficients in regression 5. This shows that the correlations exist, however, we cannot rely on the coefficients of any of the statistically insignificant variables in the regression.

Appendix 1 illustrates the regression of the logarithmic scale of change in income levels on each of the independent variables in regression (5) individually. All regressions show statistically significant coefficients. Regression (1.2) suggests that when a family increases by one person, the change in income decreases by 2.53%. Regression (1.3) shows that a literate woman's income changes by 9.15% more than an illiterate woman. Regression (1.4) proposes that a main earner grows her income by 8.01% more than a woman who partially participates in household's income or works for other purposes. Regression (1.5) indicates that a married woman's income growth by 1.31% than an unmarried woman, however, the coefficient is statistically insignificant and the adjusted R^2 is negative. This suggests that marital status does not explain the variations in change in income levels. Regression (1.6) shows that an urban woman grows her income by 25.80% more than a rural borrower. These results confirm the signs of the coefficients in regression 5, however, since in these regressions no control variables are included, they are prone to omitted variable biases.

In order to see whether the MFI's pricing changes based on the woman's status, a regression on the interest rate is run.

$$(6) \text{ Average Interest Rate} = \alpha + \beta_1 \text{ Family Size} + \beta_2 \text{ Literate} + \beta_3 \text{ Main Earner} + \beta_4 \text{ Marital Status} + \beta_5 \text{ Urban} + \varepsilon$$

Number of Obs	877
F(5, 871)	36.95
Prob > F	0.0000
R-Squared	0.1548
Root MSE	0.01252
Adjusted R-Squared	0.1500

Average Interest Rate	Coeff	Robust Std Err	t	P > t 	[95% Conf. Interval]	
Family Size	0.0013	0.0003	4.37	0.000	0.0007	0.0019
Literate	-0.0025	0.0010	-2.43	0.015	-0.0045	-0.0005
Main Earner	-0.0048	0.0011	-4.35	0.000	-0.0070	-0.0026

Marital Status	0.0025	0.0012	2.05	0.041	0.0001	0.0050
Urban	-0.0057	0.0010	-5.48	0.000	-0.0077	-0.0036
Constant	0.5265	0.0017	305.88	0.000	0.5231	0.5299

The model shows that all variables are significant in the explanation of the pricing for each borrower. The model explains 15% (adjusted R^2) of the variation in interest rates. The family size has a positive coefficient. When the family size increases by 1 person, the interest rate increases by 0.13%. This can be a result of the riskiness of the borrower that increases when the woman has more of expenses that can distract her from growing her income, hence, makes repayment harder. Additionally, a woman with a bigger family is more likely to have less time to work and can be perceived as less committed. When a woman is literate, she is likely charged a 0.25% lower interest rate than an illiterate woman. An illiterate woman can be considered riskier since there is less proof of hard work and skills than a woman who has a certain degree, since these degrees could be used as a signal for hard work. The model shows that a main earner is charged a lower interest rate than a woman who is not responsible for household expenses, she is charged 0.48% less. This can be explained by the pressure a main earner feels to increase her income, which leads her to show more commitment to her job. A married woman is charged 0.25% more than a single woman, an assumption for this pricing can be that in the observed sample are subject to cultural restrictions where a married woman is asked to focus more on the household duties and less on her job, making her a riskier borrower. The model shows that an urban woman is less risky than a non-urban woman and is charged 0.57% less. This can be explained by the advancement of skills of women in urban areas making them less risky.

It is important to note that correlation does not imply causation. These results reflect the case of this sample, but it does not imply that these factors are the real reasons behind the interest rate

pricing. A major factor that affects interest rates is market pricing and competition. This model does not include data on other MFIs, but the interest rates they charge affect Tasaheel's pricing. The average loan size is an indicator that could be used as a proxy to see whether MFIs provide all women with the same opportunities.

$$(7) \text{ Log Average Loan Size} = \alpha + \beta_1 \text{ Family Size} + \beta_2 \text{ Literate} + \beta_3 \text{ Main Earner} + \beta_4 \text{ Marital Status} + \beta_5 \text{ Urban} + \varepsilon$$

Number of Obs	876
F(5, 870)	2.73
Prob > F	0.0188
R-Squared	0.0139
Root MSE	0.19342
Adjusted R-Squared	0.0082

Log Average Loan Size	Coeff	Robust Std Err	t	P > t 	[95% Conf. Interval]	
Family Size	0.0023	0.0047	0.49	0.621	-0.0069	0.0116
Literate	-0.0275	0.0152	-1.81	0.071	-0.0574	0.0024
Main Earner	-0.0124	0.0157	-0.79	0.427	-0.0432	0.0183
Marital Status	0.0110	0.0179	0.62	0.538	-0.2415	0.0463
Urban	-0.0212	0.0156	-1.35	0.176	-0.0519	0.0095
Constant	8.2939	0.0278	298.37	0.000	8.2394	8.3485

The regression shows that the variables are all statistically insignificant, which means that the model is not representative of the variations in the average loan size. The adjusted R^2 suggests that the model explains less than 1% of the variation in the average loan size. This could mean that there are other factors that affect the decision of an MFI to decide the amount given. The loan officers study the woman's business, her current revenue and decide the loan size based on their analysis of the project (Tasaheel, 2019). This does not mean that a woman's social conditions do not affect the size of the loan, however, causation cannot be implied since it is possible for two women with the same conditions to ask for different loan sizes according to their needs.

The analysis conducted shows that for the sample being studied, on average, taking a microfinance loan has a positive impact on a woman's income level. In this sample, microfinance helps poorer women more in growing their income. The results show that efficiency results in bigger change in income. Therefore, we do not reject the first hypothesis.

Socio-economic characteristics of a woman do impact MFIs' pricing but do not impact the average loan size given. In the sample, interest rates increase with the characteristics and conditions which could increase risk or potentially lead a woman to default. These characteristics also affect the extent to which microfinance can help a woman's income since some conditions limit a woman from working efficiently. Therefore, we do not reject the second hypothesis.

4.2 Conclusion

This study aims to test whether microfinance has an impact on women's financial position through a sample from one of the market leading microfinance companies in Egypt: Tasaheel. The results of this sample show that microfinance does impact a woman's income positively through the loan size granted. The number of loans taken by a woman is shown to help her increase her income further. However, there is no conclusion drawn on the effect of the loan cycle since there could be a selection bias reflecting successful businesses only. Women with unsuccessful businesses would not be able to renew their loans and benefit from the suggested increase in income.

The interest rates have a negative impact on income growth since it is a cost for the borrower. The cost of borrowing is likely to decrease with the amount of loans the woman takes. There are socio-economic characteristics that affect the extent to which a woman is able to increase her revenue. Some of these characteristics make the woman a riskier borrower to the company, which increases her cost of debt. In this sample, the personal characteristics do not impact the amount of the loan. To be able to empower women and help them claim their position in the society, MFIs need to offer courses and programs to help their borrowers invest their money efficiently, especially the

uneducated clients. Giving out money is not enough on its own. Incremental services will make the loans more useful, increase productivity and help change the perception of women in the society (Niner, 2018).

It is important to note that theories are not always a perfect fit for every market, there can always be exceptions due to the culture or the market conditions that affect the actual results.

4.2.1 Limitations and Recommendations for Future Studies

There is more to women empowerment than financial stability. The results of this paper cannot be taken on their own as an indicator for women empowerment in Egypt. Futures studies can observe how a woman's social status and decision-making power changed after taking a loan to see if it has a bigger contribution to empowerment than economic improvement.

Households are heterogeneous, they differ in productivity and efficiency (Banerjee et al. 2019). This is reflected in their use of funds and will affect their ability to increase their returns, which limits the generalization of the results found.

Another limitation to this study is that it is hard to control for fraud; a borrower can claim to have a project and hide information and use the means for personal consumption. In such a case it would be hard for them to increase their return and payback their loan. Such actions are hard to monitor, especially if it is an individual loan.

Due to the time framework of this study, it was not possible to observe the sample before and after taking the loans from the MFI. Future studies could compare women's status before and after the loans and see whether the financial impact is a result of the loans or other external factors.

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Appendix 1

Table A1: Correlation between Loan Cycle, Average Interest Rate and Average Loan Size

	Loan Cycle	Average Interest Rate	Average Loan Size
Loan Cycle	1.000		
Average Interest Rate	-0.661	1.000	
Average Loan Size	-0.511	-0.161	1.000

Table A2: Correlation between Change in Income and Socio-Economic Characteristics

	Change in Income	Family Size	Literate	Main Earner	Marital Status	Urban
Change in Income	1.000					
Family Size	-0.062	1.000				
Literate	0.149	0.036	1.000			
Main Earner	0.129	-0.300	0.092	1.000		
Marital Status	-0.075	0.163	-0.063	-0.294	1.000	
Urban	0.341	0.046	0.374	-0.146	-0.074	1.000

$$1.1. \text{Log Change in Income Indicator} = \alpha + \beta_1 \text{Log Average Loan Size} + \varepsilon$$

Number of Obs	1162
F(1, 1160)	479.49
Prob > F	0.0000
R-Squared	0.3034
Root MSE	0.29265
Adjusted R-Squared	0.3028

Log Change In Income Indicator	Coeff	Robust Std Err	t	P > t	[95% Conf. Interval]	
Log Average Loan Size	1.0116	0.0462	21.90	0.000	0.9209	1.1022
Constant	-7.6671	0.3806	-20.14	0.000	-8.4139	-6.9203

$$1.2. \text{Log Change in Income Indicator} = \alpha + \beta_1 \text{Family Size} + \varepsilon$$

Number of Obs	1034
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F(1, 1032)	10.64
Prob > F	0.0011
R-Squared	0.0099
Root MSE	0.35229
Adjusted R-Squared	0.0089

Log Change In Income Indicator	Coeff	Robust Std Err	t	P > t 	[95% Conf. Interval]	
Family Size	-0.0253	0.0078	-3.26	0.001	-0.0405	-0.0101
Constant	0.8091	0.0311	25.98	0.000	0.7480	0.8702

$$1.3. \text{Log Change in Income Indicator} = \alpha + \beta_1 \text{Literate} + \varepsilon$$

Number of Obs	962
F(1, 960)	16.79
Prob > F	0.0000
R-Squared	0.0171
Root MSE	0.33984
Adjusted R-Squared	0.0160

Log Change In Income Indicator	Coeff	Robust Std Err	t	P > t 	[95% Conf. Interval]	
Literate	0.0915	0.0223	4.10	0.000	0.0477	0.1354
Constant	0.6403	0.0142	45.16	0.000	0.6125	0.6681

$$1.4. \text{Log Change in Income Indicator} = \alpha + \beta_1 \text{Main Earner} + \varepsilon$$

Number of Obs	1113
F(1, 1111)	14.13
Prob > F	0.0002
R-Squared	0.0127
Root MSE	0.34967
Adjusted R-Squared	0.0118

Log Change In Income Indicator	Coeff	Robust Std Err	t	P > t 	[95% Conf. Interval]	
Main Earner	0.0801	0.0213	3.76	0.000	0.3830	0.1219
Constant	0.6764	0.0136	49.60	0.000	0.6496	0.7031

$$1.5. \text{Log Change in Income Indicator} = \alpha + \beta_1 \text{Marital Status} + \varepsilon$$

Number of Obs	1162
F(1, 1160)	0.31
Prob > F	0.5753
R-Squared	0.0003
Root MSE	0.35058

Adjusted R-Squared	-0.0005
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Log Change In Income Indicator	Coeff	Robust Std Err	t	P > t	[95% Conf. Interval]	
Marital Status	-0.01306	0.0233	-0.56	0.575	-0.5878	0.0327
Constant	0.7199	0.0200	36.04	0.000	0.6807	0.7591

$$1.6. \text{Log Change in Income Indicator} = \alpha + \beta_1 \text{Urban} + \varepsilon$$

Number of Obs	1162
F(1, 1160)	181.12
Prob > F	0.0000
R-Squared	0.1355
Root MSE	0.32601
Adjusted R-Squared	0.1348

Log Change In Income Indicator	Coeff	Robust Std Err	t	P > t	[95% Conf. Interval]	
Urban	0.2580	0.0192	13.46	0.000	0.2204	0.2957
Constant	0.5851	0.0129	45.43	0.000	0.5599	0.6104

Appendix 2

Graph 1: The Outstanding Portfolio and the Number of Clients Constantly Increasing in the Egyptian Market

