THE SOCIOECONOMIC EFFECTS OF FINANCIAL INCLUSION IN INDONESIA

by

SUVEDHA RUPPA

A THESIS

Presented to the Department of Economics
and the Robert D. Clark Honors College
in partial fulfillment of the requirements for the degree of
Bachelor of Science

March 2020

An Abstract of the Thesis of

Suvedha Ruppa for the degree of Bachelor of Science
in the Department of Economics to be taken March 2020

Title: The Socioeconomic Effects of Financial Inclusion In Indonesia

Approved: *Shankha Chakraborty, PhD*
Primary Thesis Advisor

This study looks into the relationship between education for children aged 5-14 and financial inclusion in Indonesia. Using data from the 2014 Indonesian Family Life Survey, I look at enrollment in school for ages 5-14 and standardized test scores for ages 11-14. Because financial inclusion often works through the empowerment of women, I also look at community participation levels for PKK, a government based women's community group. This study finds a positive correlation between financial inclusion and school enrollment, with a greater relationship between financial inclusion and school enrollment for girls. This may work through a greater emphasis on girls' education or through women's empowerment in that mothers may be more likely to send daughters to school than fathers. This study finds no relationship between test scores and financial inclusion. The lack of correlations between test scores and financial inclusion may reflect the quality of education in Indonesia. This study also finds no relationship between PKK participation and financial inclusion which may reflect a lack of organic participation in PKK activities. The overall effects are mixed; while financial inclusion seems to have an effect on school enrollment, particularly for girls, the effects on women's empowerment and test scores are ambiguous.

Acknowledgements

I would like to thank Professor Shankha Chakraborty for taking time to serve as my primary thesis advisor. Thank you for your flexibility, support, insight, and guidance during this thesis process. I would also like to thank Professor David Frank for guiding me through the prospectus and for serving as my CHC thesis advisor and Mike Urbancic for serving as my second reader. Thank you to my thesis committee for being flexible and for providing me with valuable feedback. Finally, I would like to thank my friends and family for supporting me through this thesis process, and my entire undergraduate career.

Table of Contents

List of Tables

Introduction

Financial inclusion is the inclusion of people in financial services and institutions. This can include increasing financial literacy, offering loans with better interest rates, modernizing systems, and increasing access points. Financial inclusion can help individuals, families, and businesses plan for day to day life, long-term goals, and emergency situations. One form of financial inclusion that tries to build the gap between those living in extreme poverty and access to banking is microfinance. Microfinance can encompass normal financial inclusion services like providing savings and checking accounts and financial literacy, but often has a focus on microcredit, small loans that are affordable to even those living in poverty. The goal of microfinance programs is to ultimately empower those living in poverty to become self-sustainable. These programs are directed towards individuals, usually women, and small businesses and can take the shape of small NGOs, branches of more typical financial institutions like private banks, or community operated lending programs. The idea of microfinance runs on the key foundations that it can pay for itself and that microfinance should ultimately aim to integrate the financial needs of the poor within a country's main financial institutions.

The idea of microfinance is not new; most countries have had some form of informal microfinance for many years. The birth of microfinance in Europe, for example, can be traced as far back as the 16th century (Seibel, 2003). In 1720s Ireland, loan funds emerged in the midst of economic downturn that used peer monitoring to enforce repayment. A Loan Fund Board emerged in 1836 and by 1840, 300 self-reliant funds had emerged, generating no collateral loans for poor farmers. At its height, the

Loan Fund System was lending to about 20% of all Irish households (Rahman, 2010). Germany was quick to follow, with Friedrich Raiffeisen developing the concept of the financial cooperative, an institution that is owned and operated by its members and acts on their behalf as a traditional banking service. With the success of microfinance in Germany, the formalized movement quickly spread to other European countries, North America, and eventually, lower income countries.

While the foundations of microfinance are not new, microfinance today is based on the movement that arose in the 1970s. Muhammad Yunus spearheaded this new movement with the development of Grameen Bank in 1976. Grameen Bank, which translates to "Rural Bank" in Bengali, was officially founded in 1983. Inspired by the Bangladesh famine of 1974, Yunus provided credit and banking services to villages near the University of Chittagong. The project proved to be immensely successful, with many organizations, including the World Bank following similar microfinance models.As a measure of Yunus' influence, the 2005 Nobel Peace Prize was awarded to him. As of 2017, Grameen Bank has about 2,600 branches and nine million borrowers with a high repayment rate of 99.6% (Annual Report, 2017). Additionally, Grameen Bank now has branches in eleven U.S. cities.

While the success of Grameen Bank in Bangladesh is laudable, its results have proven difficult to replicate and as MFIs (microfinance institutions) have become more widespread, criticism of this developmental strategy has increased. Firstly, the effectiveness of microfinance from a financial perspective is mixed; depending on how one measures economic growth, some studies find microfinance to be effective while others find almost no change (Duflo et al., 2001; Morduch et al., 2012). Additionally,

studies that look at changes in average income do not necessarily reveal if individuals have escaped poverty traps (Kray and Mckenzie, 2014). Going along the lines of poverty traps, another issue with microfinance lies with its interest rates. On one hand, interest rates are necessary to keep these organizations self-sustainable and are used to cover costs and losses. On the other, even low interest rates can trap those living in extreme poverty. In an extreme example in October of 2010, suicides of microcredit clients in Andhra Pradesh, India highlighted the crippling effect of debt that MFIs can create (Taylor, 2011). The state responded by implementing stricter regulations on MFIs, but determining appropriate interest rates remains a struggle. The global average interest rates for microfinance loans are above 30% and are highly varied from country to country as transaction costs and governmental restrictions vary (CGAP, 2008).

Another issue with MFIs is centered on gender discrepancies. In 1998, a popular study found that microfinance was more effective when women were the borrowers (Khandker and Pitt, 1998). From this study, and others that have come after, microfinance has been directed towards women. However, this has become a cause for concern as this can disproportionately trap women in debt and the true extent of the Khandker finding has yet to be fully supported as results are highly varied.

It’s clear that the effectiveness of microfinance isheavily debated. Nonetheless it is still an active component of many developmental and poverty alleviating programs’ goals of achieving financial inclusion, reaching over 130 million clients over the last 15 years (IFC, n.d.). As measurements of microfinance success are difficult to determine,its effects should be evaluated through a wide range of lenses to assess its true worldwide impact.

Project Description

While a lot of research has been done on the effectiveness of financial inclusion and more specifically, microfinance, these evaluations are usually done on a financial basis, looking at measures like changes in income and purchasing power, and do not often examine the more qualitative "side effects" like health and education. In this paper I explore the impact of financial inclusion on education in Indonesia. I look at financial inclusion as a whole rather than just microfinance as components between microfinance programs and general financial inclusion often overlap. Additionally, financial inclusion programs that may not be directed towards those living in poverty may still benefit communities as a whole through strengthening community level economies. As education and upward mobility are intrinsically linked, more knowledge on the relationship between financial inclusion and education is important in evaluating the true impact of financial inclusion programs. Financial inclusion may work through simply increasing one's income so that money is no longer an obstacle towards education or may work through changing attitudes towards education through financial literacy. Additionally, one of the common mechanisms that financial inclusion can work through is through the empowerment of women and so, I also explore the effect of financial inclusion on involvement in women-based community groups. Empowering women can often result in women spending more on health and education and may empower women to have a stronger role in decision making for their children.

Research Question

How does financial inclusion play a role in education and women's empowerment in Indonesia? I predict that financial inclusion will be positively linked with education and women's empowerment.

Background on Financial Inclusion and Education in Indonesia

While Indonesia has made marked improvements to their economy since the late 1990s Asian financial crisis, 25.9 million Indonesians still live below the poverty line (World Bank, 2019). Indonesia has recognized financial inclusion as a potential method in alleviating poverty. Bank Rakyat Indonesia (BRI), which dominates formal macro and micro-lending today, was established in 1895 as Indonesia's first rural bank (KPMG, 2016). In the 1900s, village credit institutions or Badan Kredit Desas (BKD) were promoted as part of an "ethical colonial policy" to provide savings and loans to rice farmers. The 1970s saw the rise of government sponsored village funds and credit institutions and the recognition of licensed rural banks under the title Bank Perkreditan Rakyat (BPR). More recently, in 1992, the "New Banking Law" extended formal recognition to BRPs and in 2015, the "New Branchless Banking Rules and Microfinance Law" was implemented. This 2015 law recognized the need to push and regulate MFIs and increase the attractiveness of microfinance programs for commercial banks.

Whether through standard lending or microlending, BRI is the largest bank in Indonesia with total assets equaling 1097.4 trillion rupiah as of Q2 2018 (Statista, 2020). Indonesia also has a growing number of Islamic banks that operate as non-interest banks that make a profit through equity participation that requires a borrower to give a share of profits. The largest providers of Islamic microfinance are Islamic rural banks (BRPs) and BMTs (Baitil Maal wat Tamwils) (IPE, 2013). Despite Indonesia's push towards financial inclusion of those living in poverty, KPMG estimates in 2016 that only 22% of Indonesians have access to financial services (KPMG, 2016).

Education is currently compulsory and is free at public schools from grades one through nine; the government plans to extend this to grade 12 but is currently restricted by costs (WENR, 2019). Before elementary education, children can attend non-compulsory preschools. Grades 10-12 are currently neither compulsory nor free. The current primary enrollment is around 93%; while this percentage is not alarming, it is still lower than other high-income countries (World Bank, 2018). An enrollment rate of 93% despiteprimary education being compulsory indicates a somewhat lax enforcement on education. If enforcement is not strict, other forces can affect school enrollment, which is why I expect to see some effect on education through financial inclusion even for primary school aged children. The secondary enrollment rate from 2018 is around 78%, a great increase from around 50% in 2000. To continue to increase enrollment rates, Indonesia has implemented many broad education reforms, including decentralizing schooling, additional training for teachers, and increasing education spending. Additionally, gross tertiary enrollment is lower compared to neighboring countries with a GER of 36.3% compared to 42% and 43.9% in Malaysia and Thailand, respectively (WENR, 2019). With the World Bank finding that 55% of Indonesians who completed school are still functionally illiterate, Indonesia still has a long road to achieving the millennium development goal of universal education (Jalal and Sardjunani, 2005).

Literature Review

Evaluations of financial inclusion are mostly done on a purely financial basis. However, recently, developmental organizations are hopeful about the impact of financial inclusion on socioeconomic outcomes. One of the most influential studies evaluating the impacts of microfinance used household survey data from Bangladesh (Pitt and Khandker, 1998). They found that microfinance access increases consumption expenditure, especially by women. A follow up study done in 2005 revealed that microfinance benefits those in extreme poverty as opposed to moderate poverty (Khandker, 2005). The 1998 study specifically found that women use a more substantial part of their income for health and education of their children, and so, women play an important role in overall poverty reduction in addition to specific health/education related outcomes. However, as mentioned earlier, one criticism of relying on targeting women is that they can become targets for debt traps, creating a gender debt disparity.

A study looking at the impact of microfinance on child education outcomes in South India found that acombined financial and social group intermediation led to higher education inputs and outputs for children (Holvoet, 2005). They also found no significant difference if the borrower was a woman for microfinance institutions, but differences occurred when women borrowed through women's groups. Another study focusing on microcredit in north-west rural China shows that formal microcredit improves education in schooling years in the longer term compared to the short term, which may help reduce educational poverty traps (You and Annim, 2014).A study done in Uganda shows that clients of a microfinance program invest more in education than non-client household (Barnes et al, 2001). While positive correlations between financial

inclusion and education exist, not all studies reveal these results. For example, a study that looked at the impact of rural microenterprise in the Philippines found no significant impact on human capital investments like health and education. While findings lean more towards a positive relationship, the current relationship is not fully clear and may vary significantly from situation to situation as there are many factors affecting education.

Additional education and microfinance research analyzes microfinance programs that integrate education with their financial services. One paper looked into selected BMTs, a type of Islamic bank, and found that these organizations run short-term curriculum that includes basics to financial management, religious financial education, and how to build a strong household economy (Hadi et al., 2015). These topics help participants learn how to pay off a loan, and what to not waste income on. While this type of education does not fall within our standard ideas of education, providing financial literacy can obviously have an important impact on financial wellbeing and in choosing to send children to school. Similarily, other MFI programs combine health related education. Dunford describes a variety of health linked microfinance programs around the world that offerhealth education on issues like HIV/ AIDS, contraceptive use, and family planning (Dunford, 2001). One study looking at one of these combined programs looked at the mental health effects of microfinance in the Rakai district of Uganda; the study revealed that a comprehensive microfinance program education led to a decrease in depression in AIDS-orphaned children (Ssewamala et al., 2012). Children received matched savings accounts, financial management workshops, and mentorships and found that there was a significant change

in depression between the treatment and control groups. Another study done in India evaluated combining a health program with microfinance and found that health behaviors increased when the two programs were combined (Saha et al., 2015). Health, education, and access to financial systems are all intrinsically linked to poverty; improving one of these outcomes usually helps the others and so, developing health or financial literacy will most likely end up affecting poverty levels and education in some shape.

While not necessarily unanimous in findings, financial inclusion does seem to have a positive effect on socioeconomic outcomes. More research on these outcomes will undoubtedly be a useful tool in evaluating financial inclusion programs and in aiding the creation and adjustment of new and current programs.

Methods

I used data from the Indonesian Family Life Survey from 2014. The IFLS collects comprehensive community and household data from 13 Indonesian provinces and has 5 waves: 1993, 1997, 2000, 2007, and 2014. I chose to look at data from 2014 as it included Islamic banks, pawn shops, and insurance companies as categories of financial inclusion; while pawn shops and insurance companies were negligible, Islamic banks were relatively prevalent and so, it was important to include them. Financial inclusion data was collected by asking communities if certain types of financial institutions were located in their village. I looked at whether there was at least one financial institution in a particular community, and I looked at the total number of FIs in each community. As measures of education, I looked at whether or not a child aged 5-14was in school and Bahasa, English, and Math standardized test scores for 11-14 year-olds. From this sample, 6.09% of children 5-14 were not in school. This age range includes students just below the compulsory education threshold so I expect to see variability from this and from compulsory education not being strictly enforced as the national primary enrollment in 2018 was 93% (World Bank, 2018). Additionally, as financial inclusion often impacts and works through women's empowerment, I also looked at the percent of community involvement in a subsection of PKK (PembinaanKesejahteraanKeluarga), a government-based women's family and welfare community group. This group encompasses a wide number of programs that include programs centered around religion, health, youth groups, neighborhood watch programs, etc. I chose to look specifically at the P2KP/PPK/PNPM programs which focus on developing community infrastructure. Other subsections of PKK like health programs may have their own

effect on education based on the success of their program rather than through women' empowerment alone; the infrastructure development programs may represent women's empowerment more clearly as it is not directly linked to an educational outcome. As mentioned earlier, women often tend to spend more on health and education, and so, by empowering women through loans or financial education, women may be more likely to send their children to school.

Models

School Enrollment and Financial Inclusion:

To look into the relationship between financial inclusion and whether a child is in school, I used a logistic regression. A logistic regression must be used because the outcome is binary (child is either in school=1 or not in school=0).A linear regression would violate OLS assumptions of heteroscedasticity, linearity, and normally distributed error terms. The regression equation follows:

$$\ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 \text{FIpresence} + \beta_2 \text{FItotal} + \beta_3 \text{IncomeperHHM} + \beta_4 \text{Urban} + \beta_5 \text{Totalhealth} + \beta_6 \text{Totalschools} + \beta_7 \text{Female} \beta_8 \text{Age} + \beta_9 \text{PKKpercent} + \beta_{10} \text{SouthKalimantan} \beta_{11} \text{SouthSulawesi} \beta_{12} \text{WestNusaT} \beta_{13} \text{Bali} \beta_{14} \text{EastJava} \beta_{15} \text{Yogyakarta} \beta_{16} \text{CentralJava} \beta_{17} \text{WestJava} \beta_{18} \text{Jakarta} \beta_{19} \text{Lampung} \beta_{20} \text{SouthSumatra} \beta_{21} \text{WestSumatra} \beta_{22} \text{NorthSumatra}$$

As mentioned earlier, I looked at if there was at least one financial institution present (FIpresence) and the total number of financial institutions (FItotal) in each community from community level data. As controls I included total household income per householdmember; despite majority of children falling within the compulsory age

range, additional costs and opportunity costs may still be an obstacle for those within the compulsory range.I expect to see a positive relationship between income and school enrollment. I also included dummy variables for gender (Female where 1=female) and whether or not a community was in an urban or rural area (Urban where 1=urban) from household and community data, respectively. Totalschools and Totalhealth represent the total number of schools and health facilities available to community members in each community, respectively. Totalhealth includes posyandus (community health posts specifically for children and sometimes elderly), puskemas (community health centers), private health facilities, hospitals, and pharmacies. This data was collected at the community level. I expect to see a positive relationship between the total number of schools and school enrollment as more schools may mean easier access. I also expect to see a positive relationship between school enrollment and health facilities since easier access to healthcare might prevent children from being too sick to go to school. Additionally, these two variables also act as a measure of community infrastructure. The age of child is included because older children may be more likely to drop out to support their families. This data was collected at the household level. PKKpercent represents the percentage of a community involved in the infrastructure program of the women's group where 1=<25%, 2=25-75%, and 3=>75% of the community participates. This data was collected at the community level. Finally, I've included the 13 surveyed provinces to account for any provincial fixed effects.

Test Scores and Financial Inclusion:

In order to see if there is a relationship between the presence of a financial institution and test scores, I conducted linear regressions for Bahasa, English, and Math test scores for Ujian Nasional (UN), the national standardized test in Indonesia for 11-14 year-olds. The regression equation follows:

$$\text{Test Scores} \text{¿} \beta_0 + \beta_1 \text{FIpresence} + \beta_2 \text{FItotal} + \beta_3 \text{IncomeperHHM} \beta_4 \text{Urban} + \beta_5 \text{Totalhealth} + \beta_6 \text{Totalschools} + \beta_7 \text{Female} \beta_8 \text{Age} + \beta_9 \text{PKKpercent} + \beta_{10} \text{SouthKalimantan} \beta_{11} \text{SouthSulawesi} \beta_{12} \text{WestNusaT} \beta_{13} \text{Bali} \beta_{14} \text{EastJava} \beta_{15} \text{Yogyakarta} \beta_{16} \text{CentralJava} \beta_{17} \text{WestJava} \beta_{18} \text{Jakarta} \beta_{19} \text{Lampung} \beta_{20} \text{SouthSumatra} \beta_{21} \text{WestSumatra} \beta_{22} \text{NorthSumatra}$$

All the same variables as the regression on school enrollment were used for the linear regressions on test scores.

Women's Empowerment and Financial Inclusion:

In order to look into the relationship between women's empowerment via participating in a women-based community group and financial inclusion, an ordinal logistic regression was used. An ordinal logistic regression was used because outcomes are categorical but follow an order. The outcomes are 1=<25%, 2=25-75%, and 3=>75% of the community participates. The regression equation follows:

$$\ln\left(\frac{P1}{1-P1}\right) = \beta_0 + \beta_1 FIpresence + \beta_2 FItotal + \beta_3 IncomeperHHM + \beta_4 Urban + \beta_5 Totalhealth + \beta_6 Totalschools + \beta_7 SouthKalimantan + \beta_8 SouthSulawesi + \beta_9 WestNusaT + \beta_{10} Bali + \beta_{11} EastJava + \beta_{12} Yogyakarta + \beta_{13} CentralJava + \beta_{14} WestJava + \beta_{15} Jakarta + \beta_{16} Lampung + \beta_{17} SouthSumatra + \beta_{18} WestSumatra + \beta_{19} NorthSumatra$$

All the same variables as the previous regressions were used with the exception of child age, child gender, and PKKpercent being taken out.

Table 1. Summary Statistics for Dummy Variables: FI Presence, School Enrollment, Gender, and Urban

Variable	Yes/Male %	No/Female %
Financial Institution Presence	73.48	26.52
School Enrollment	93.91	6.09
Gender	50.81	49.19
Urban	46.75	53.25

Table 2. Summary Statistics for Continuous Variables: Household Income per Household Member, Financial Institution Total, TotalHealth, Facilities TotalSchools, TestScores, and Age

Variable	Mean	Min	Max	Std. Dev.
Household Income per Household Member (IDR)	7,438,494	0	750,000,000	16,500,000
Financial Institution Total	1.934	0	9	2.05
TotalHealth Facilities	27.753	9	88	13.13
TotalSchools	21.18	4	87	12.87

Math Score	7.438	0.75	10	1.541
English Score	6.569	0	9.5	2.461
Bahasa Score	7.796	2.8	9.99	0.991
Age	9.93	5	14	2.98

Table 3. Summary Statistics for Community PKK Participation

	<25%	25-75%	>75%
PKKpercent	31.22	35.76	33.02

Results and Discussion

School Enrollment

A logistic regression on school enrollment reveals a 1.46 odds ratio for the presence of a financial institution; this means that there is a 1.46 probability that the presence of an FI leads to an outcome where a child is still in school. In terms of gender, there is a 1.375 chance that being female leads to a child staying in school; this seems to go against the typical gender inequalities in education of girls being left out of education. From this result, I ran a regression on school enrollment for just girls and found a significant odds ratio of 1.79 for financial institution presence (Table 5). This indicates that financial institution presence affects girls more than boys. Perhaps this is due to an emphasis on the education of girls through financial literacy programs. This could also represent empowerment of women in that mothers may be more likely to send their daughters to school than fathers. However, because this data only includes children under 15, the end results of education may be skewed in terms of gender. Perhaps the inequalities aren't as stark in primary education, but may be clearer in terms of completing high school for example. The participation in the infrastructure component of PKK has a significant odds ratio of 1.28. This could represent education being affected through the empowerment of women. However, due to the nature of this measure, the effect we see could also be due to the impacts of the infrastructure program alone. Additionally, it is surprising that household income per household member does not have an effect on school enrollment. Income has an odds ratio of 1, indicating that either outcome of a child being enrolled in school or not is equally likely.

Even though primary education is free, one might expect that income would be a determining factor in education in terms of additional costs and opportunity costs of not having your child work. However, of 140 students who listed they stopped schooling (the total number of children not in school in this sample is 655 so this does not account for every child not in school in this study), only around 3% listed financial burden as a reason for stopping (Table 8). Public schools are mostly free however, so, perhaps other factors such as attitude towards education may be a leading factor; 17% of children who dropped out also listed that they just didn't want to go to school anymore. Additionally 32.6% of children who stopped schooling listed "other" as a reason, which could potentially still include financial burdens and educational attitudes. As mentioned earlier, financial inclusion can sometimes involve education on how to best improve your financial situation, and so, the odds ratio of FIpresence may reflect a changing of attitudes through education and community groups. Certain provinces reveal significant relationships between enrolment and province, which may be indicative of stricter enforcement or better educational policies in these areas.

Test Scores

Linear regressions on Bahasa, English, and Math test scores show no significant correlations between test scores and financial institution presence. Additionally, other statistically significant correlations do not occur for all categories. Income, PKK participation and gender are significant for Math scores. The total number of schools, gender, and age are significant for Bahasa scores. It is difficult to make any claims over these correlations as they are inconsistent across the board. One possible explanation for a lack of clear correlations may be that despite being in school, the actual education

received was inadequate. While the literacy rate is around 95%, many Indonesians still remain functionally illiterate (Jalal and Sardjunani, 2005). A common policy towards improving education is through the certification of teachers. Studies have found that while this policy has a positive effect on teachers, there is no effect on test scores (De Ree et al., (2017); Fahmi et al., (2011). While the Indonesian government is working on providing access to education, the quality of education also needs to be improved. Additionally, considering income per household also has an insignificant effect on Bahasa and English test scores, financial inclusion in terms of financial means may not mean much for test scores. Perhaps we would see a relationship higher up in income range where the ability to choose which school you attend and the ability to afford services like tutoring come into play. Provinces mostly seem to have no correlation with test scores; this is probably due to educational policies differing at the district level rather than a provincial level. Provinces that do have significant results may coordinate their district education efforts, may have stricter enforcement, or may have some other factor connecting their province.

PKK

An ordinal logistic regression on PKK participation reveals no significant correlation between PKK participation in the infrastructure programs and the presence of a financial institution. This might be due to PKK being a government sponsored program; efforts by the government may play a greater role than any push towards women's empowerment that financial inclusion can provide. This is reflected in the statistically significant results in almost all provinces. It would make sense for provinces that have a greater governmental push for PKK to have a higher correlation.

Another measure of women's empowerment may be able to shed more light on if and how financial inclusion can empower women. Being in an urban area has a negative correlation with PKK participation; this makes sense as community involvement often seems to be pushed in more rural communities as way to form a community structure where there might not be otherwise. The number of financial institutions also has a negative correlation with PKK participation; this could be due to a higher number of financial institutions in urban areas than rural ones. It is once again surprising that household income per household member does not play a significant effect.

Limitations

One of the limitations of this study is that it only looks at children ages 5-14. Children over the age of 15 are not included in the children part of the survey. Adult education information is in a different portion of the survey, so in the future, looking into the impact of education on all children ages 5-18 could be valuable as it is most likely older children who drop out to support their families. However, looking at younger children is still useful as even elementary education is still not universal in Indonesia. Furthermore, younger children are more under the control of their parents and differences in education can reflect parental choices rather than their own. Younger children may benefit from the benefits of financial inclusion more than their older counterparts; for example, if financial inclusion leads to better understanding that education leads to economic mobility, parents may be more inclined to make their younger children stay in school. Additionally, results may be skewed because this study includes children just below the compulsory age range and those in the compulsory age range. However, primary education starting age can sometimes vary and as Indonesia is

pushing for education before and after its compulsory range, it is still important to look at this wider age range.

Another limitation is that I did not control for each district. There are over 7,000 districts in Indonesia so it would not make sense to try to control all of these in my study. However, since the Indonesian education system is decentralized, educational policies are updated at a district level and so, I am not able to control for education policy changes. Perhaps in a smaller study, one could look at the impact of neighboring districts with and without financial institutions.

This study is also limited in that I chose participation in PKK as a measure of empowerment. PKK is a government sponsored program so it may be affected more by governmental pushes than other variables like financial institution presence. However, just because there is no relationship between PKK and financial institution presence does not mean that that there is no relationship between financial inclusion and women's empowerment. Additionally, because PKK programs have their own benefits, the relationship between PKK and education may represent the benefits of the program rather than women's empowerment alone. In this case, improving infrastructure may have an effect on education on its own. Additionally participating in one PKK program may be correlated to participating in another, and so the result we see in Table 4. may reflect benefits of the other PKK programs as well. It can be difficult to measure something qualitative like empowerment, so using just this one measure of community participation may not be sufficient to make claims about empowerment. Additional variables should be assessed in the future.

Conclusion

All in all, the relationship between education and financial inclusion is mixed. The logistic regression reveals some positive associations, but the test scores do not follow the same pattern. Additionally, the pathway through which financial inclusion may affect education is unclear. Potentially, there may be an emphasis on girls' education in the form of financial literacy. Using PKK participation in this study as a measure of women's empowerment does not specifically reveal that financial inclusion could be working through empowerment. However, because women's empowerment is difficult to measure, financial inclusion may still be working through women's empowerment even if we do not see it through this regression on PKK participation. Because we still see some positive results, more research on the relationship between education and financial inclusion should be conducted; if a new wave of the study is conducted, a first differences test could be done to reveal the impact of adding a financial institution to an area that previously did not have access. Additionally, Indonesia pushed financial inclusion further in 2015 with the "New Branchless Banking Rules and Microfinance Law" mentioned earlier; it will be interesting to follow up on to see the impact of the new law. Assessing the impact of financial inclusion is always going to be challenging as it is hard to collect data on financial activities that occur on a small scale. However, as improving access to financial services is a part of many countries' economic development plans, it is essential to continue trying to assess their socioeconomic impacts.

Appendix I: Regression Tables

Table 4. Logistic Regression on School Enrollment

Variable	Odds Ratio	Standard Error	P- value
FIpresence	**1.46**	**0.261**	**0.035**
FItotal	0.985	0.0432	0.728
Income/HHM	**1**	**1.24e-08**	**0.013**
Urban	1.03	0.160	0.865
TotalHealth	0.996	0.007	0.959
TotalSchools	1.07	0.008	0.397
Female	**1.375**	**0.170**	**0.010**
Age	**1.59**	**0.041**	**0.00**
PKKpercent	**1.28**	**0.111**	**0.004**
SouthKalimantan	0.282	0.188	0.057
SouthSulawesi	**0.266**	**0.174**	**0.043**
WestNusaT	0.341	0.222	0.098
Bali	0.214	0.143	0.021
EastJava	0.565	0.372	0.386
Yogyakarta	0.884	0.766	0.887
CentralJava	0.824	0.547	0.771
WestJava	**0.194**	**0.121**	**0.008**
Jakarta	**0.160**	**0.107**	**0.006**
Lampung	0.523	0.362	0.350
SouthSumatra	0.384	0.263	0.162
WestSumatra	0.390	0.263	0.165
NorthSumatra	0.356	0.227	0.105
Constant	0.223	0.157	0.033

Age, gender, and PKK community participation, income, and the presence of a financial institution all have statistically significant odds ratios of 1.59, 1.375, 1.28, 1,and 1.46, respectively. Provinces South Sulawesi, West Java, and Jakarta also have significant correlations.

Table 5. Logistic Regression on School Enrollment for Girls

Variable	Odds Ratio	Standard Error	P- value
FIpresence	**1.79**	**0.497**	**0.035**
FItotal	**0.873**	**0.0557**	**0.033**
Income/HHM	1	1.29e-08	0.250
Urban	0.956	0.229	0.850
TotalHealth	0.999	0.0117	0.969
TotalSchools	1.01	0.0124	0.423
Age	**1.689**	**0.0752**	**0.00**
PKKpercent	1.242	0.163	0.099
SouthKalimantan	0.207	0.226	0.150
SouthSulawesi	0.161	0.173	0.089
WestNusaT	0.296	0.318	0.257
Bali	0.268	0.297	0.234
EastJava	0.661	0.742	0.712
Yogyakarta	1.186	1.739	0.908
CentralJava	0.775	0.857	0.817
WestJava	0.237	0.248	0.170
Jakarta	0.185	0.205	0.127
Lampung	0.488	0.561	0.533
SouthSumatra	0.227	0.253	0.183
WestSumatra	0.433	0.493	0.462
NorthSumatra	0.298	0.317	0.255
Constant	0.253	0.297	0.242

The presence of a financial institution and age are positively correlated with school enrollment for girls with odds ratios of 1.79 and 1.689, respectively. The odds ratio of the total number of financial institutions is 0.873, indicating a negative relationship with school enrollment for girls.

Table 6. Linear regression on Bahasa Test Scores

Variable	Coefficient	Standard Error	P- value

FIpresence	-0.110	0.968	0.254
FItotal	0.040	0.023	0.083
Income/HHM	4.09e-09	2.55e-09	0.109
Urban	0.084	0.079	0.286
TotalHealth	-0.006	0.004	0.158
TotalSchools	**0.008**	**0.004**	**0.030**
PKKpercent	0.030	0.044	0.492
Female	**0.272**	**0.064**	**0.000**
Age	**-0.118**	**0.038**	**0.002**
SouthKalimantan	0.086	0.284	0.761
SouthSulawesi	0.099	0.251	0.691
WestNusaT	-0.172	0.250	0.490
Bali	0.417	0.255	0.103
EastJava	0.302	0.250	0.228
Yogyakarta	**0.803**	**0.295**	**0.007**
CentralJava	**0.668**	**0.239**	**0.005**
WestJava	0.318	0.235	0.176
Jakarta	-0.107	0.267	0.689
Lampung	-0.414	0.273	0.129
SouthSumatra	-0.036	0.305	0.905
WestSumatra	**0.580**	**0.267**	**0.030**
NorthSumatra	0.378	0.246	0.125
Constant	8.743	0.573	0.000

The number of schools used by community members, being female, and age are statistically significant. Provinces Yogyakarta, Central Java, and West Sumatra are also significant.

Table 7. Linear Regression on English Test Scores

Variable	Coefficient	Standard Error	P- value
FIpresence	-0.532	0.910	0.561

FItotal	-0.0357	0.275	0.897
Income/HHM	-3.29 -08	6.86e-08	0.633
Urban	-0.327	0.889	0.714
TotalHealth	0.0321	0.037	0.387
TotalSchools	-0.0430	0.3091	0.275
PKKpercent	0.327	0.414	0.432
Female	0.0674	0.659	0.919
Age	-0.152	0.384	0.694
SouthKalimantan	0 (omitted)		
SouthSulawesi	0.495	1.996	0.805
WestNusaT	0.324	2.119	0.879
Bali	-0.181	1.641	0.913
EastJava	0.937	1.929	0.629
Yogyakarta	0 (omitted)		
CentralJava	1.0298	1.507	0.497
WestJava	-0.573	1.522	0.708
Jakarta	2.825	1.949	0.152
Lampung	0.744	1.824	0.684
SouthSumatra	-3.202	2.309	0.170
WestSumatra	-0.231	2.170	0.915
NorthSumatra	1.283	1.750	0.466
Constant	7.837	5.643	0.170

No variables are statistically significant. SouthKalimantan and Yogyakarta omitted because of collinearity.

Table 8. Linear Regression on Math Test Scores

Variable	Coefficient	Standard Error	P- value

FIpresence	-0.134	0.147	0.360
FItotal	-0.0068	0.035	0.848
Income/HHM	**8.88e-09**	**3.87-09**	**0.022**
Urban	0.092	0.119	0.437
TotalHealth	0.005	0.006	0.412
TotalSchools	0.009	0.006	0.102
PKKpercent	**-0.139**	**0.066**	**0.036**
Female	**0.260**	**0.097**	**0.007**
Age	-0.0757	0.058	0.192
SouthKalimantan	-0.673	0.427	0.116
SouthSulawesi	0.716	0.379	0.060
WestNusaT	0.133	0.379	0.725
Bali	0.601	0.388	0.121
EastJava	0.705	0.379	0.064
Yogyakarta	0.551	0.447	0.218
CentralJava	0.129	0.362	0.720
WestJava	**1.037**	**0.357**	**0.004**
Jakarta	**-0.976**	**0.406**	**0.016**
Lampung	**-1.087**	**0.413**	**0.009**
SouthSumatra	0.242	0.468	0.605
WestSumatra	0.162	0.406	0.691
NorthSumatra	0.697	0.373	0.062
Constant	7.823	0.873	0.000

Income per household member, PKK participation,and being female are statistically significant. Provinces West Java, Jakarta, and Lampung are also significant.

Table 9. Ordinal Logistic Regression on PKK Participation

Variable	Coefficient	Standard Error	P- value

FIpresence	0.023	0.0304	0.436
FItotal	**-0.173**	**0.0072**	**0.000**
Income/HHM	-1.54e-09	8.36e-10	0.066
Urban	**-0.602**	**0.025**	**0.000**
TotalHealth	**-0.009**	**0.001**	**0.000**
TotalSchools	**0.0219**	**0.001**	**0.000**
SouthKalimantan	**-1.646**	**0.872**	**0.000**
SouthSulawesi	**1.07**	**0.086**	**0.000**
WestNusaT	**1.19**	**0.082**	**0.000**
Bali	**1.26**	**0.085**	**0.000**
EastJava	**-0.253**	**0.075**	**0.001**
Yogyakarta	**0.385**	**0.088**	**0.000**
CentralJava	**-0.235**	**0.075**	**0.002**
WestJava	**0.831**	**0.074**	**0.000**
Jakarta	-0.15	0.0825	0.065
Lampung	**-0.989**	**0.083**	**0.000**
SouthSumatra	**-1.66**	**0.0913**	**0.000**
WestSumatra	**-0.467**	**0.079**	**0.000**
NorthSumatra	0.093	0.076	0.222

All variables are statistically significant expect for income per household member, FIpresence, Jakarta, and NorthSumatra. Most provinces were correlated with PKK participation and FItotal, Urban, and TotalSchools are negatively correlated with PKK participation.

Appendix II

Variables

InSchool= dummy variable for school enrolment for children aged 5-14 (1=yes, 0=no). This data is household level data for each individual child.

FIpresence = dummy variable for the presence of a financial institution (1=yes, 0=no). This is community level data.

FItotal = the total number of financial institutions in each community. This is community level data.

TotalSchools = total number of schools that are available to or are used by the community. The relationship between the number of schools and education is expected to be positive as having more schools nearby would make it easier to stay in school. Additionally, this measure also acts as a measure of the development of infrastructure in communities. This is community level data.

TotalHealth= the total number of health facilities that are available to or are used by the community. This includes posyandus (community health posts specifically for children and sometimes elderly), puskemas (community health centers), private health facilities, hospitals, and pharmacies. The relationship is expected to be positive as the

healthier the child, the more likely they will be in school. Additionally, this measure also acts as a measure of the development of infrastructure in communities. This is community level data.

IncomeperHHM= Total household income per number of members in each household. I expect to see a positive relationship between household income and education as money is less of an obstacle towards staying in school and doing well in school. This is household level data.

MathScore = test scores for the math section of the national standardized test. This is household level data for each child aged 11-14 that took the Math test.

EnglishScore = test score for the English section of the national standardized test. This is household level data for each child aged 11-14 that took the English test.

BahasaScore = test score for the Bahasa section of the national standardized test. This is household level data for each child aged 11-14 that took the Bahasa test.

PKKpercent= percent of community participating in the infrastructure program of the main government sponsored women's community group. I expect to see a positive relationship between PKK participation and education outcomes as women are more likely to spend money on health and education and so, empowering women through community groups may empower them to keep their children in school (Pitt and

Khandker, 1998). The outcomes are 1=<25%, 2=25-75%, and 3=>75% of the community participates. This is community level data.

Age= age of child. This variable needs to be included because the probability of not attending school may increase with age, as children may start working instead of going to school. This is household level data for each child.

Female= dummy variable for gender (1= Female, 0=Male). This variable will allow us to see gender inequalities in education. This is household level data for each child.

Urban= dummy variable for type of community(1=urban, 0=rural). This is community level data.

Provinces = dummy variables for each of the 13 provinces surveyed in order to account for provincial fixed effects. This is community level data.

Statistics

Table 10. Number of Financial Institutions in Each Community

Number of Financial Institutions	Percent of Communities
0	26.52
1	27.90
2	16.38
3	7.87
4	7.82
5	4.70
6	4.09
7	2.77
8	1.76
9	0.19

Table 11. Reasons Why Children Left School

Reason why child left school	Percent (%)
To help parents earn money and no school/too far	0.71
Could not afford	2.31
No school/too far	1.42
Not able to study	2.13
Sick or disabled	41.13
Sick or disabled and does not want to go	0.71
Sick or disabled and other	0.71
Doesn’t want to go	17.73
Other	32.62

Out of 140 children who left school

Bibliography

Ang, B. (2013). Indonesia makes progress in Islamic finance. *IPE* .

Annual Report [1983 – 2018] | Grameen Bank. (n.d.). Retrieved from http://www.grameen.com/annual-report-1983-2016/

Barnes C, Gaile G, Kibombo R. (2001) Impact of three microfinance programs in Uganda. *Washington, DC: US Agency for International Development*; Retrieved from: http://pdf.usaid.gov/pdf_docs/PNACL035.pdf

Deloach, S. B., & Lamanna, E. (2011). Measuring the Impact of Microfinance on Child Health Outcomes in Indonesia. *SSRN Electronic Journal*. doi: 10.2139/ssrn.1803289

Duflo, E., Banerjee, A., Glennerster, R., &Kinnan, C. (2013). The Miracle of Microfinance? Evidence from a Randomized Evaluation. doi: 10.3386/w18950

De Ree, Joppe, Karthik Muralidharan, Menno Pradhan, and Halsey Rogers (2017) 'Double for Nothing? Experimental Evidence on an Unconditional Teacher Salary Increase in Indonesia.' Quarterly Journal of Economics [online] <https:// doi.org/10.1093/qje/qjx040>.

Fahmi, Mohamad, Achmad Maulana, and AriefAnshory Yusuf (2011) 'Teacher Certification in Indonesia: A Confusion of Means and Ends.' Working Paper in Economics and Development Studies No. 201107. Bandung: Padjadjaran University.

IFC. "Microfinance." (n.d.) https://www.ifc.org/wps/wcm/connect/Industry_EXT_Content/IFC_External_Corporate_Site/Industries/ Financial+Markets/MSME+Finance/Microfinance/

Jalal, F., &Sardunani, N. (2005). Increasing literacy in Indonesia. Retrieved from Research on Poverty Alleviation website: https://unesdoc.unesco.org/ark:/48223/pf0000146011

Khandker, S. R. (2005). Microfinance and Poverty: Evidence Using Panel Data fromBangladesh. *The World Bank Economic Review*, *19*(2), 263–286. doi: 10.1093/wber/lhi008

Kraay, A., &Mckenzie, D. (2014). Do Poverty Traps Exist? *Policy Research Working Papers*. doi: 10.1596/1813-9450-6835

KPMG. (2015). New Indonesian 'Branchless Banking' and Microfinance Laws - a catalyst for microfinance growth?*KPMG*

Mtamakaya, C., Jeremia D., Msuya, &Stray-Pederson B. (2018). The Impact of Microfinance Programmes on Access to Health Care, Knowledge to Health Indicators and Health Status among Women in Moshi, Tanzania.*Tanzania Journal of Health Research.* Vol. 6, No. 3 pp. 66-73. doi:10.11648/j.sjbm.20180603.11

Pitt, M. M., &Khandker, S. R. (1998). The impact of Group Based Credit Programs on Poor Households in Bangladesh: Does the Gender of Participants Matter? *Journal of Political Economy*, *106*(5), 958–996. doi: 10.1086/250037

Rai, A., & Ravi, S. (2011). Do Spouses Make Claims? Empowerment and Microfinance in India. *World Development*, *39*(6), 913–921. doi: 10.1016/j.worlddev.2009.10.019.

Rahman, W. A. A. (2010). An overview of microfinance: history and evolution, definition and practice. *Ahfad Journal*, *27*(2).

Saha, S., Kermode, M., & Annear, P. (2015). Effect of combining a health program with a microfinance-based self-help group on health behaviors and outcomes. *Public Health*, *129*(11), 1510–1518. doi: 10.1016/j.puhe.2015.07.010.

Seibel, Hans Dieter (2003) : History matters in microfinance, Working Paper, No. 2003,5, UniversitätzuKöln, ArbeitsstellefürEntwicklungsländerforschung (AEF), Köln

Ssewamala, F. M., Neilands, T. B., Waldfogel, J., & Ismayilova, L. (2012). The Impact of a Comprehensive Microfinance Intervention on Depression Levels of AIDS-Orphaned Children in Uganda. *Journal of Adolescent Health*, *50*(4), 346–352. doi: 10.1016/j.jadohealth.2011.08.008.

Statista Research Department. (2020, February 13). Indonesia: largest banks by total assets 2018. Retrieved from https://www.statista.com/statistics/830681/indonesia-top-banks-by-total-assets/

Taylor, M. (2011). 'Freedom from Poverty is Not for Free': Rural Development and the Microfinance Crisis in Andhra Pradesh, India. *Journal of Agrarian Change*, *11*(4), 484–504. doi: 10.1111/j.1471-0366.2011.00330.

Taylor, M. (2012). The Antinomies of 'Financial Inclusion': Debt, Distress and the Workings of Indian Microfinance. *Journal of Agrarian Change*, *12*(4), 601–610. doi: 10.1111/j.1471-0366.2012.00377.

Variations in Microcredit Interest Rates - CGAP. (n.d.). Retrieved from https://www.cgap.org/research/publication/variations-microcredit-interest-rates

World Bank, Education Statistics. (2018). School enrollment, primary (% gross) [Data file]. Retrieved from https://data.worldbank.org/indicator/SE.PRM.ENRR?locations=ID

World Education News and Reviews (WENR), (2019). Asia Pacific, Education in Indonesia. http://wenr.wes.org/2014/04/education-in-indonesia