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Claremont McKenna College

**Formal Savings Uptake as a Catalyst for Remittances in
Sub-Saharan Africa**

Submitted to
Professor Dr. Jeffrey A. Flory

By
Jordan Kouassi

For
Senior Thesis
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Abstract

This paper explores the effects of savings account ownership on remittances and payment services in Sub-Saharan Africa through the lens of a field experiment executed in Central Malawi. Remittances are a major form of financial support for SSA and Sub-Saharan Africans. Through the use of a cross section analysis I find a positive significant relationship between account ownership and the likelihood to send and receive a remittance. Specifically, I find account ownership can increase the likelihood of sending a remittance by 8.75 times and increase the likelihood of receiving a remittance by 10.18 times.

Key Words: Remittances, Financial Inclusion, Sub-Saharan Africa

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Introduction

Sub-Saharan Africa (SSA) is a rapidly growing region and is home to just over one billion people, making it one of the largest regions in the world. However, SSA is also one of the most impoverished and financially excluded regions of the world. Thus, questions regarding ways to improve financial well being in the region are very critical to SSA's development. Given the lack of development within the region, one major way money flows into the region is through remittances. Remittances are any payments sent back to families from migrants who have left their communities. Remittances have been proven in many studies to be beneficial to SSA by way of alleviating poverty, improving democratic institutions and education, as well as improving subjective well being. In this thesis, I will explore the effects of increased savings accounts on remittances sent and received in the region through the exploration of a 2010 field experiment in Malawi.

SSA is one of the least banked populations in the world, with around 60% of the population still unbanked to this day, making it underbanked relative to both developed and underdeveloped regions of the world¹. As of 2014, 25.6% of the SSA population has any bank account versus 94% in advanced economies and 40% in non advanced economies². With only 4.5 physical banks per 100,000 adults, SSA trails every other region in the world including the Middle East & North Africa³. This lack of bank presence in the region leads to SSA being a very cash-heavy economy. Given this striking disparity, the literature related to banking in the region is growing and provides insight as to the benefits of increased banking and financial inclusivity in the region.

¹ World Bank, 2018

² As compared to 93.6% in the U.S and 77.7% in Europe and Central Asia, World Bank Global Findex Data 2018

³ World Bank, 2020

Although banking is not very prevalent in the region, access to money is still necessary for the people that live in the region to buy goods and services and to invest in their businesses. One of the major ways money is moved in and out of SSA is by way of remittances. Remittances are monies sent in and out of communities from family or friends. Typically, remittances flow from migrants that have left SSA communities back into the communities they have left. Remittances, as I will discuss later in my literature review, have been proven to have a positive impact on SSA on the micro and macro level. For example, Williams (2017) finds that remittances have a positive impact on democratic institutions in SSA by improving schooling and reducing poverty. While Sambo (2017) finds that increased remittances lead to less undernourishment. Remittances are a relatively easy way to increase development and financial well-being in a country because they do not rely on governments as much as they rely on the strength of community members' familial relationships.

My focus in this paper will be answering the question: What are the effects of savings account ownership on remittances and payment services in Sub-Saharan Africa? I isolate savings account uptake as a catalyst for remittances and test the effects of increased savings accounts on remittances and payment services used within Malawi. Using a Two Stage Least Squares analysis, I find that having a formal savings account increases a household's likelihood to send or receive remittances. Specifically, I find that there is a statistically significant relationship between having a savings account and the likelihood that a household receives and sends a remittance. This finding implies that if banking solutions are more widely available in the region, more remittances will likely flow to and from the region leading to benefits on micro and macro factors such as poverty and health of democratic institutions. I also analyze the relationship

between savings account uptake and use of payment services, where households in the data receive income and salaries. However, I find no significant relationship within the sample between savings account uptake and the use of payment services.

The data I use are taken from a field experiment which took place in central Malawi, a country that is generally in line with the poorer economies of Sub-Saharan Africa. Malawi is a very under-resourced country, with a per capita GDP of \$389.40 in 2018 versus the SSA average of \$1,585.77. Poverty is also much higher in Malawi, as 70.3% of Malawians live on less than \$1.90 a day versus the SSA average of 42.3%. However, Malawi has a slightly less undernourished population (17.5%) relative to the Sub-Saharan Average (21.35%). Under nourishment figures were found by the Food and Agriculture Organization of the United Nations and they represent the prevalence of severe food insecurity. Malawi is fairly average as it relates to life expectancy at 63.28 years, 2.4 years above the SSA average⁴.

Literature Review

In my analysis, I study savings account uptake as a catalyst for stimulating remittances and payment services within Central Malawi. There are a number of studies that explore topics related to formal account uptake in SSA and other underdeveloped regions. For example Dupas et. al (2014) provides insight as to the supply and demand factors that are responsible for the low rate of financial inclusion in SSA. There are also a large number of studies that study the effects of remittances in SSA. For example, Akobeng (2016) finds that poverty levels are lessened on the macro level when remittances increase in SSA. There are not as many studies that explore the

⁴ World Bank, 2020

intersection between formal account uptake and remittances. My analysis will fill that gap and provide insight as to the positive effect that formal savings accounts can have on remittances.

Flory (2018) and Flory (Forthcoming) both leverage the same field experiment as I do in my analysis. Flory (Forthcoming) provides background to my analysis by proving the effectiveness of the field experiment's information treatment in spurring savings account uptake and by exploring what demographic factors lead to higher rates of savings account adoption. Flory (Forthcoming) finds impact heterogeneities between savings account uptake and education level, remoteness of village, and gender of household head. This finding is crucial to my analysis because I use remoteness of village and education levels as restrictions within the regressions given the information treatment was more effective in more remote and more educated households. Flory (Forthcoming) also finds evidence of soft barriers against account uptake in the form of low levels of trust for banks and low level of information about banking services. This leads to the effectiveness of the information treatment because it allows information to flow to the more remote villages and also provides a friendly trustworthy face that softens the trust barrier.

Flory (2018) finds a relationship between increased savings account and crop investment, a sign that increasing savings accounts can stimulate the local economies in SSA. Flory (2018) also finds a relationship between increased savings account uptake and transfer payments to other households during the "hungry" season. This is similar to my analysis given transfer payments and remittances are similar. Both are methods of providing a helping hand to relatives or friends. Remittances are different from transfer payments in the sense that remittances come from family members outside of the immediate community that a household lives in.

Remittances have been found, in multiple studies, to be shown to have a positive effect on poverty, political institutions, and well being metrics in Sub-Saharan Africa. Sambo (2017), using data from 35 Sub-Saharan African countries from 2001-2011, finds that increased remittances into the region reduce the amount of undernourishment on the macro level, with the effects being more pronounced in intermediate income deciles than lower and higher income deciles. Within the study, undernourishment is measured by the undernourishment index of the Food and Agriculture Organization (FAO) of the U.N. This FAO index represents the probability that randomly selected individuals within an area consume less than a minimum calories requirement for a healthy life. The study provides evidence that remittances can be useful in the fight against undernourishment in SSA, a major problem in the region.

Akobeng (2016) uses World Bank data from 41 Sub-Saharan African countries to find that, on the macro level, remittances have a significant positive effect on poverty and inequality. Remittances are critical in the development of Sub-Saharan Africa as increased remittances have a beneficial effect on poverty in the region. Poverty is a major problem in Sub-Saharan Africa and Malawi, as 42.3% (2015) and 70.3% (2016) of the respective populations are impoverished as measured by the poverty headcount ratio at \$1.90 a day⁵. An important point in Akobeng, 2016 is the finding that financial development augments the effects of remittances on poverty and inequality in Sub-Saharan Africa. Those areas with increased financial development receive increased alleviation of poverty from remittances because of increased credit utilization and formal investment. Williams (2016) finds that remittances have a positive effect on financial development, measured by improved utilization of private credit and formal financial

⁵ World Bank, 2016

institutions. This means that remittances can increase financial development which can in turn augment the effects of future remittances into the region.

Beyond objective measures that can oftentimes be removed from the state of people on the ground, Sulemana et al. (2019) find that remittances have a positive effect on subjective wellbeing in Sub-Saharan Africa. Within the study, subjective wellbeing was measured by surveys being given to over 50,000 Sub-Saharan Africans. The surveys asked the question: “In general, how would you describe: Your own present living conditions?” Responses were measured on a 1-5 scale and ranged from 1 for very bad to 5 for very good. When treating remittances as an indicator variable measuring whether or not a household received any remittance, Sulemana et. al (2019) find that respondents reported 0.2945-0.2969 higher subjective wellbeing, on the scale of 5. This change represents a roughly 5.9% improvement of subjective wellbeing. These subjective wellbeing measures are important because they reflect the added value of receiving a remittance that is harder to quantify with most nominal economic data.

Increased remittances have very positive effects on the macro well being of SSA countries as well, namely the health and efficiencies of SSA democratic institutions. The health, integrity, and success of Sub-Saharan democratic institutions has been an issue for the region since colonizing powers left the region in the mid 20th century. Williams (2017) uses a panel of 45 SSA countries over 1975-2014 to ascertain that remittances improve democratic institutions in the region by increasing schooling and reducing poverty. However, Williams (2016) finds that Sub-Saharan democratic institutions in the region are not effectively mediating the effects of remittances on financial development, given the governments in place are not properly

incentivizing formal investment in the region. Structural improvements and improved efficiencies in democratic institutions can lead to better legislation regarding financial development which can then better mediate the positive economic effects of remittances.

Given the documented positive effects that remittances have on Sub-Saharan Africa on the individual and macro level, my analysis will establish that increased savings accounts can help generate increased remittance activity to take advantage of remittances' positive effects on SSA economies and political institutions.

The only study that I am aware of that establishes a relationship between bank account uptake and remittance behavior is Chin, Wilcox, and Karkoviata (2010). They find that Mexican immigrants to the U.S allocate funds sent back to Mexico in a different fashion after obtaining a bank account depending on the level of autonomy those immigrants have over their remittance allocations decisions. My analysis will present the impact of increased bank account uptake in Central Malawi on remittances and payment services in the region.

My analysis is most similar to Aga and Peria (2014), as they use World Bank survey data from five Sub-Saharan countries to find that increased remittances increase the probability that a household will open a formal bank account. I will establish a relationship of the inverse: that increased formal bank accounts lead to increased remittances. However if true, Aga and Peria (2014) implies that my OLS regressions will likely be endogenous because of a reverse causal effect of remittances on bank account uptake. My analysis leverages the experiment's information treatment to remove endogeneities associated with increased account uptake and increased remittances.

Empirical Analysis:

This thesis utilizes a cross section analysis of data collected in 2010 at the end of a two year experiment conducted in Malawi.

Data & Methodology:

I leverage a field experiment that took place in Central Malawi in the period from 2007-2010.

The baseline data were collected from February-April 2008 and the second batch of data were collected during the same months in 2010. In 2007, A mobile bus-bank was created in Malawi to give more remote households in Central Malawi access to banking services. This “mobile bank on wheels” drove out to around 325 villages, covering 2,052 households. The mobile bank offered rural Malawians access to savings accounts that featured negative real but positive nominal interest rates. The data were collected before and after an “information intervention”.

Although there was blanket promotion for the bus-bank throughout the region, an information intervention was implemented on half of the sample and consisted of a bank representative coming to the communities to explain the procedures, benefits, fees and general information of the bus-bank. This representative was put in place to break the soft barriers of trust and information by way of having a relationship with the community members and serving as a friendly/familiar face that represents the bank. The 2008 questionnaire results indicate that 9.60% of households had a member who had any formal savings account, while that number increased to 11.41% in the 2010 sampling, or a 18.9% increase from 2008 to 2010.

Table 1: Descriptive Statistics (Demographic)

Demographic Characteristics	Sample Mean(Std. Dev.)	Coefficient (std errors) on Treatment Dummy	Observations
Household Size, 2008	5.103 (1.970)	0.178** (0.0871)	2,051
Food Secure, 2008	0.082 (0.274)	0.0141 (0.0121)	2,051
Number of Household Members Who Are Salaried, 2008	0.172 (0.425)	0.0183 (0.0188)	2,051
Number of Household Members Who Are Literate in Chichewa, 2008	2.196 (1.636)	0.245*** (0.0721)	2,051
Number of Household Members Who Are Literate in English, 2008	0.918 (1.233)	0.254*** (0.0542)	2,051
Household Member Literate in English, 2008	0.303 (0.460)	0.0481** (0.0203)	2,051
Total Crop Income, 2008 (Kwacha)	33,542.81 (65864.87)	4,250 (4,132)	2,051
Total Value of Assets, 2008	1107.229 (2771.168)	149.8 (137.7)	1,622
Someone in Household Has a Cellphone, 2008	0.140 (0.347)	0.0327 (0.0307)	2,051
Household Grows Tobacco (Cash Crop), 2008	0.167 (0.373)	-0.0296 (0.0481)	1,622
Distance from Nearest Bank Stop (km)	7.906 (3.349)	-0.0850 (0.148)	2,051
Any Formal Savings Account, 2008	0.0960 (0.295)	0.0418*** (0.0130)	2,052
Attrition	0.166 (0.372)	0.00599 (0.0165)	2,051

Table 1 displays demographic characteristics of the sample. The average distance from a household to the nearest bank stop was about 8 kilometers. The average household size (5.103) is typical of an SSA household which are, on average, larger than those of the United States or Europe⁶. In regards to education: 30.3% of household heads were literate in English, while households had, on average, 2.196 members who were literate in Chichewa, a Bantu language prominent in Malawi and other Southern African countries such as Zambia and Mozambique. Food security was poor in the sample as less than 10% of households were identified as being food secure. From a financial perspective: the average net worth (total value of assets) of the households within the sample is roughly \$13.89 (1,944.15 Kwacha). Roughly 26% of the households grow Malawi's cash crop, tobacco. In 2008, 9.60% of households had a member with a formal savings account compared to 11.41% in 2010 after the information intervention. The information intervention caused a greater increase in savings uptake in the treated group, as the control group saw a 0.56 percentage point rise in account uptake versus a 3.20 percentage point rise for the treated group.

⁶ The average household size in the U.S is 2.6, per U.N Department of Economics and Social Affairs

Table 2: Remittance and Payment Characteristics

Payment Characteristics	Sample Mean(Std. Dev.)	Observations	Median (Non-zero)*	Observations (Non-zero)*
Amount of Remittance Received (Kwacha)	1285.526 (10525.54)	1,996	4,750	186
Quantity of Remittance Received	0.252 (1.390)	1,996	1	186
Any Remittance Received	0.093 (0.291)	1,996		
International Remittance Received	0.012 (0.106)	1,996		
Formal Bank Remittance Received	0.015 (0.116)	1,993		
Non-Bank Remittance Received	0.077 (0.266)	1,993		
Amount of Remittance Sent (Kwacha)	642.900 (11252.84)	1,962	2,000	95
Quantity of Remittance Sent	0.126 (1.356)	1,962	1	95
Any Remittance Sent	0.048 (0.215)	1,962		
Formal Bank Remittance Sent	0.006 (0.076)	1,878		
Non-Bank Remittance Sent	0.044 (0.205)	1,953		
Any Remittance Sent or Received	0.128 (0.334)	2,017		
Total Amount of Remittances Sent and Received (Kwacha)	1454.229 (16,480.42)	1,941	4,000	183
Total Quantity of Remittances Sent and Received	0.259 (1.705)	1,941	1	183
Amount of Payment Services Used (Kwacha)	11888.94 (74842.98)	1,978	39,000	271
Quantity of Payment Services Transactions	0.376 (3.423)	1,978	1	271
Any Payment Service Transaction	0.139 (0.346)	1,978		
Any Transaction	0.237 (0.426)	2,052		
Total Amount of Transactions (Kwacha)	11106.84 (69,793)	1,933	20,000	369
Total Quantity of Transactions	0.531 (3.565)	1,941	1	369

*(Non-Zero) represents restricting the data to non-zero remittances or payment services

Table 2 displays the descriptive statistics for remittances and payment services throughout the sample. As seen in Table 2, 23.7% of the sample made any remittance or payment services transaction, while 12.8% sent or received a remittance. Of those that did send or receive a remittance, the average remittance received was 13,795.21 Kwacha (\$98.54) and the average remittance sent was 13,277.58 Kwacha (\$94.84). Given there were a few very large remittances sent and received, the medians are also useful to note. The median of non-zero remittances sent is 2000 Kwacha (\$14.29) while the median of non-zero remittances received is 4,750 Kwacha (\$33.93). Remittances can serve as a lifeline from international relatives or support for relatives that live in other countries. Of remittances received, 12.54% were from an international relative. Remittances were largely received as cash (60.50%) while only 21% of remittances were received via a direct deposit to a bank. This high use of cash is typical in many SSA economies, as bank presence is low.

Variables

The questionnaire given to the households featured over 200 questions, ranging from the material of a household's floor to credit utilization. However, the variables I focus on fall into four main categories: remittance sent, remittances received, payment services used (usually accepting income), and savings account uptake. The first three categories make up the outcome variables of the regressions, while savings account uptake is used as the regressor in the regressions. Certain demographic characteristics are used as controls in the regression models. I control for income, wealth and household size. Controls are needed to help limit endogeneity related to wealth given household wealth plays a big role in a household's capacity to send remittances and the amount they receive in payment services transactions.

Within remittances sent, I analyze the effects of account ownership on frequency and monetary value of remittances sent as well as an indicator representing if any remittance was sent from a given household. Remittances sent serve as a lifeline from the households in the sample to a relative outside of the community yet in the country, for the large part. Of the 248 remittances sent, only two of them went to a relative who lives outside of Malawi. Given households within the sample are typically poorer, remittances sent are found to be smaller, on average, than remittances received. The average remittance sent was 10255.04 Kwacha (\$73.25), however this includes a very large remittance of 230,000 Kwacha (\$1,642.86). The median remittance sent of the sample was only 2000 Kwacha (\$14.29).

I also analyze the effects of formal savings account ownership on frequency and monetary value of remittances received by households as well as an indicator representing if any remittance was received. The receiving of remittances serves a very different purpose than the sending of remittances. Those who receive remittances are receiving money from relatives to help support themselves or their businesses. Immigrants who have left the sampling region typically have access to higher paying jobs in more developed regions of SSA or the world which allows them the capacity to send money back to their relatives. Receiving remittances is also a more international phenomenon than sending remittances. While the large part of remittances received were still from Malawi, 12.54% of remittances received were sent from outside of Malawi. The average remittance received was 9196.81 Kwacha (\$65.69) and the median was 4500 Kwacha (\$32.14), over double the median of remittances sent.

Lastly, I analyze the effects of savings account ownership on frequency and monetary value of payment services used by each household, as well as an indicator representing if any

payment service was used by a household. The payment services used in the sample were mostly used to receive crop income at the auction house. Of the payment services used, 83.95% were direct deposits received from an auction house payment, 7.10% were salary received as a direct deposit, 4.01% were the payment of utility bills, and 4.94% were “other”. The large part of payment service transactions were tobacco growers receiving crop income at the auction house. The mean of all payment services transactions was 73259.59 Kwacha (\$523.28) and the median was 36000 Kwacha (\$257.14). The mean of auction house payments was 76254.91 Kwacha (\$544.68), the mean of salary deposits was 116613.26 (\$832.95) and the mean of utility payments was 9123.08 Kwacha (\$65.16).

My main regressor of interest is an indicator variable representing whether or not any individual within a household had a formal savings account as of 2010.

Endogeneity

Endogeneity is likely present within the data because of omitted variable bias and reverse causality. Possible omitted variables can include: wealth and income factors, level of education, cost of account, proximity to banking services and level of trust for institutions such as banks⁷. I control for some of these variables in my analysis, but did not for others. Wealth is a major factor in whether a household has the capacity to send a remittance or receive higher amounts of auction house payments. Wealth is also positively correlated with savings account status, so a regression of remittances sent on savings accounts may be biased upward because both remittances sent and savings account uptake rise with wealth. Higher wealth also decreases a household’s need for receiving remittances. I use education as a restriction of the data, thus I do

⁷ Osei-Assibey, Eric. *Financial Exclusion: What Drives Supply and Demand For Basic Financial Services in Ghana? Savings and Development*, Centre for Socio-economic Dynamics and Cooperation of the University of Bergamo

not control for education levels. However, education is likely a cause for endogeneity as higher levels of education: correlate with higher formal account levels as well as increase the effect of the information treatment. Cost of account could not be controlled for because there were not varying levels of interest rates offered in the products provided by the bus bank. The cost of an account likely has an effect on the likelihood someone will take up an account. Another upward bias issue can come from payment services relationship with the indicator for whether a household grows tobacco. Over 80% of payment service transactions were auction house payments where tobacco growers accepted payments for their crops. A regression involving payment services and savings accounts will be biased by the fact that tobacco growing is more relevant to payment service use than savings account ownership status. However, I control for whether or not a household grows tobacco in order to remove this form of endogeneity.

A household's proximity to the nearest banking solution is also likely to have an effect on whether or not they take up an account. The farther they are: the more of a hassle it is to get to a bank and the less information they likely have about the bank. I do not control for distance in my regression models, but I do restrict the sample to those farther than 1 kilometer away from the nearest stop as less information, outside of the treatment, will flow to the more remote areas. Trust for banks is a variable that is controlled for by way of the information treatment by providing a trustworthy familiar face to represent the bank and provide information. However, it is hard to perfectly measure and control for this soft barrier.

Reverse causality is another issue within the sample that may drive endogeneity. As shown by Aga and Peria (2014), increased remittances can actually drive increased savings accounts. This relationship could lead to endogeneity and an upward bias in the regression

results. If increasing remittances actually increases savings account ownership then both will rise together, but the relationship will be driven by increased remittances not by increased savings accounts.

Regression Models:

Both Ordinary Least Squares (OLS) and Two Stage Least Squares (IV-2SLS) regression models are used to examine the significance of the effect of savings uptake on remittance and payment service behavior. First, an OLS regression model is used to estimate the raw effects of savings uptake on remittances and payment services. However as discussed above, these estimates are likely biased due to multiple sources of endogeneity. Next, a reduced form regression is used. The reduced form regression regresses the outcome variables on the information treatment in order to isolate endogeneity. Further, I use the information treatment as an instrument in a IV-2SLS regression to gauge the effects (less endogeneity) of savings uptake on outcome variables. Cluster-robust standard errors are used, clustering at the village-cluster level.

This process is repeated for remittances received, remittances sent, and finally payment service transactions. Each table presents the regressions in an uncontrolled and controlled form. To control for income and household size I use demographic characteristics such as: food security, income measures, and household size.

The models were all restricted to a subset of the data: those households that were greater than 1 kilometer from the nearest bus-bank stop and those households with a person that is literate in English. The logic behind restricting the data as such is that this subset of the data takes greater advantage of the information assignment, as can be seen from an analysis of the impacts of the information intervention on savings uptake in Table 3.

Table 3: Effect of Information Treatment when Restricted by Literacy and Distance

VARIABLES	(1) AnyInd	(2) AnyInd, Restricted to Distance>1km	(3) AnyInd, Restricted to Literate Member	(4) AnyInd, Restricted to Non-Literate	(5) AnyInd, Restricted by Distance & Literate Member
Information Treatment	0.0682*** (0.0212)	0.0743*** (0.0211)	0.138*** (0.0411)	0.0267** (0.0131)	0.168*** (0.0420)
Constant	0.0817*** (0.0120)	0.0730*** (0.0112)	0.156*** (0.0258)	0.0529*** (0.00886)	0.128*** (0.0246)
Observations	2,051	1,958	622	1,428	557
R-squared	0.011	0.014	0.027	0.003	0.041

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1,

In Table 3, AnyInd represents whether any household member has a formal bank account and literacy was measured by whether or not a household member was literate in English.

Table 3 shows OLS regressions of the information treatment on individual savings account uptake. As the data are restricted by literacy and distance the effect of the information treatment grows. The data show that, on average, 8.17% of households in the control group have a member who has an individual savings account. This same figure grows to 15% for those households that received the information treatment. This represents a 6.82 percentage point increase which equates to a 83.48% rise in account ownership attributed to the information treatment. When restricting the data by literacy, the information treatment's effect is augmented even more, as there is a 13.8 percentage point increase in savings accounts for households with a literate member, or an 88% increase. When restricted by distance, the information treatment group sees a 7.43 percentage point increase over the control group, which amounts to a 101.8% increase. When the data are restricted by both distance and literacy the effect of the information treatment is a 16.8 percentage point increase or a 131.3% rise in individual account uptake.

As Table 3 shows, the information treatment has a significant effect on account uptake. Given the information treatment was a random assignment, it can be used as an instrument to remove endogeneity from the first OLS regressions.

The regression models are listed below. The first two models regress the outcome variables on ‘Any Formal Savings Account’, restricted to those households that are farther than 1 kilometer from the nearest bank stop and households with an English literate member. The first model features no controls while the second model controls for factors such as wealth and household size. Models 1 and 2 are estimated in Tables 4, 5, and 6.

Model 1:

$$Y = \beta_1 + \beta_2 \textit{Formal Savings Account Dummy} + \varepsilon$$

Model 2:

$$Y = \beta_1 + \beta_2 \textit{Formal Savings Account Dummy} + \beta_3 \textit{Food Secure in 2008} + \beta_4 \textit{Crop Income 2010} + \beta_5 \textit{Total Value of Assets 2010} + \beta_6 \textit{Tobacco Grower 2010} + \beta_7 \textit{Household Size} + \varepsilon$$

The third and fourth model regress the outcome variables on the information intervention assignment, with the same distance and literacy restriction. The third features no controls while the fourth features the controls. Models 3 and 4 are estimated in Tables 7,8, and 9.

Model 3:

$$Y = \beta_1 + \beta_2 \textit{Information Treatment} + \varepsilon$$

Model 4:

$$Y = \beta_1 + \beta_2 \textit{Information Treatment} + \beta_3 \textit{Food Secure in 2008} + \beta_4 \textit{Crop Income 2010} + \beta_5 \textit{Total Value of Assets 2010} + \beta_6 \textit{Tobacco Grower 2010} + \beta_7 \textit{Household Size} + \varepsilon$$

The fifth and sixth model regress the outcome variables, instrumenting the information intervention assignment for ‘Any Formal Savings Account.’ The fifth model features no controls while the sixth features controls. Models 5 and 6 are estimated in Tables 10, 11, and 12.

Model 5:

$$Y = \beta_1 + \beta_2 \widehat{AnyAct} + \varepsilon$$

Model 6:

$$Y = \beta_1 + \beta_2 \widehat{AnyAct} + \beta_3 Food\ Secure\ 2008 + \beta_4 Crop\ Income\ 2010 + \beta_5 Total\ Value\ of\ Assets\ 2010 + \beta_6 Tobacco\ Grower\ 2010 + \beta_7 Household\ Size + \varepsilon$$

*Where *AnyAct* = Any Formal Savings Account Dummy

Where *Y* = Quantity/amount of remittance and payment Service Transactions, as well as indicators for any remittance sent/received or payment service used

Results

Table 4: Impact of Savings on Remittances Received (OLS)

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount (Kwacha)	(4) Amount (Kwacha)	(5) Any	(6) Any
Any Individual Has Account	1.098** (0.440)	1.111** (0.510)	7,669** (3,295)	7,657** (3,584)	0.161*** (0.0408)	0.141*** (0.0446)
Food Secure		0.111 (0.319)		106.3 (2,004)		0.108 (0.0683)
Crop Income, 2010		5.07e-07 (1.30e-06)		0.00206 (0.00984)		3.19e-08 (1.82e-07)
Total Value of Assets, 2010		6.00e-06 (1.24e-05)		0.0642 (0.0991)		7.45e-07 (2.37e-06)
Tobacco Grower, 2010		-0.494* (0.261)		-2,158 (2,401)		-0.108** (0.0426)
Household Size, 2008		-0.0206 (0.0988)		115.7 (892.2)		0.0103 (0.00943)
Constant	0.249*** (0.0569)	0.492 (0.498)	1,049** (478.4)	1,028 (4,193)	0.108*** (0.0158)	0.0991* (0.0528)
Observations	540	434	540	434	540	434
R-squared	0.038	0.045	0.030	0.034	0.036	0.058

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4 displays the results of the uncontrolled and controlled OLS regressions (Models 1 & 2) involving the indicator for an individual being an account holder and remittance received behavior. These regression results estimate the effect of an individual having a savings account on the frequency (Quantity) and monetary value (Amount) of remittances received within the sampling period as well as the likelihood that a household will receive any remittance. These regression models are likely to contain endogeneity, as previously discussed, and thus the estimations are not completely representative of the true relationships between savings and remittances received.

Having a savings account is estimated to have a significant relationship with quantity ($p=0.014$ for uncontrolled and $p=0.032$ for controlled) and amount ($p=0.022$ for uncontrolled and $p=0.035$ for controlled) of remittances received at the 95% confidence level. Furthermore, having a savings account is estimated to have a significant relationship with the likelihood ($P=0.000$ for uncontrolled and $P=0.002$ for controlled) to receive any remittance at the 99% confidence level. These results suggest a positive relationship between an individual having a savings account and the receiving of remittances. The results estimate that, on average, an individual without a savings account is likely to receive 0.25 remittances while an individual with an account is likely to receive 1.35 remittances. This is a difference of 1.10 remittances. However, endogeneity is likely present, which affects the accuracy of these results. The results estimate an even larger increase in the total value of remittances received in those with an account over those without. The OLS regression models estimate account holders to receive 7,657-7,669 Kwacha (roughly \$55) more than those without accounts. Since those without accounts were estimated to receive 1,049 Kwacha (Roughly \$7), this amounts to a 731% increase

in remittances received when an individual has a formal savings account. The last two columns within Table 4 relate to the indicator variable representing whether a household received any remittances. These results suggest that 10.8% of those without a formal savings account receive a remittance versus 26.9% for those with a formal savings account. This suggests that those with a formal savings account are 149% more likely to receive a remittance than those without an account.

The reduced form regression serves to leverage the information treatment to isolate and remove endogeneity that exists in the OLS regression regarding savings account ownership. The information treatment is an independent driver of savings account uptake. The only effect of the information treatment is an increase in savings account uptake, which allows it to be used as an instrument to remove the endogeneity present in the regression. As shown in Table 3, the information treatment had a significant relationship (at the 99% confidence level) with a rise in savings account uptake of up to 131%.

Table 5: Reduced Form Effects of Information Treatment on Remittances Received (OLS)

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount (Kwacha)	(4) Amount (Kwacha)	(5) Any	(6) Any
Information Treatment	0.245 (0.217)	0.240 (0.270)	1,374 (1,637)	1,285 (1,784)	0.0793** (0.0356)	0.0743 (0.0457)
Food Secure		0.136 (0.308)		314.4 (1,872)		0.107 (0.0672)
Crop Income, 2010		1.28e-06 (1.21e-06)		0.00739 (0.00895)		1.28e-07 (1.79e-07)
Total Value of Assets, 2010		7.99e-06 (1.38e-05)		0.0780 (0.108)		9.90e-07 (2.53e-06)
Tobacco Grower, 2010		-0.443* (0.251)		-1,847 (2,250)		-0.0974** (0.0435)
Household Size, 2008		-0.000488 (0.102)		264.4 (921.9)		0.0117 (0.00988)
Constant	0.352*** (0.130)	0.425 (0.514)	1,944* (995.0)	717.5 (4,486)	0.1000*** (0.0233)	0.0726 (0.0561)
Observations	540	434	540	434	540	434
R-squared	0.003	0.015	0.001	0.010	0.013	0.044

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5 displays the reduced form effect regressions for remittances received. The results show no significance with quantity ($p=0.403$ for uncontrolled and $p=0.473$ for controlled) and amount ($p=0.262$ for uncontrolled and $p=0.377$ for controlled). The only significance that is found, which is at the 95% confidence level, is with the indicator representing any remittance received ($p=0.028$ for uncontrolled and $p=0.107$ for controlled). This implies that endogeneity (likely omitted variable bias and reverse causality) existed with the quantity and amount of remittances received that caused the significant relationship in the previous OLS regression. This follows logically because: the fact that a person has a savings account has likely little to no effect on their relatives' financial capacity to send more valuable and more frequent remittances. The fact that there is significance with the indicator representing any remittance received also follows logically: the savings account allows a person the ability to receive a remittance. In summation, having a savings account is likely to increase the chances a person receives a remittance, but likely does not cause them to receive more money more often.

Table 6: Impact of Savings on Remittances Received (IV-2SLS)

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount (Kwacha)	(4) Amount (Kwacha)	(5) Any	(6) Any
Any Individual Has Account	1.413 (1.219)	1.366 (1.472)	7,937 (9,193)	7,322 (9,717)	0.458** (0.217)	0.424* (0.256)
Food Secure		0.1000 (0.315)		121.4 (1,954)		0.0954 (0.0695)
Crop Income, 2010		3.28e-07 (1.55e-06)		0.00230 (0.0118)		-1.67e-07 (2.54e-07)
Total Value of Assets, 2010		5.54e-06 (1.24e-05)		0.0648 (0.0985)		2.29e-07 (1.90e-06)
Tobacco Grower, 2010		-0.500* (0.267)		-2,150 (2,485)		-0.115** (0.0461)
Household Size, 2008		-0.0267 (0.103)		123.7 (846.4)		0.00351 (0.0117)
Constant	0.182 (0.240)	0.484 (0.493)	991.5 (1,859)	1,037 (4,211)	0.0450 (0.0443)	0.0911* (0.0524)
Observations	540	434	540	434	540	434
R-squared	0.035	0.044	0.030	0.034		

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6 displays the IV-2SLS regression results involving remittance received variables utilizing the information treatment as an instrument to remove endogeneity. As with the reduced form regression, an individual having a savings account did not have a significant relationship with quantity ($p=0.247$ for uncontrolled and $p=0.353$ for controlled) or amount ($p=0.388$ for uncontrolled and $p=-0.451$ for controlled) of remittances received. This follows from the logic explained in the previous section: the financial capacity of a household's relatives will not grow because of the fact that the receiver now has a bank account. Endogeneity could have existed in the form of omitted variable bias and reverse causality. A potential omitted variable could be the level of education of a household. For example, a household with higher levels of education is likely to open an account and potentially have more connections with successful relatives that allow them to receive larger remittances. Reverse causality is also a

likely form of endogeneity because a household that receives larger and more frequent remittances might be more inclined to open an account and receive those remittances through a formal account.

The regression results do estimate a significant positive relationship between having a formal savings account and the likelihood that a household will receive any remittance ($p=0.035$ for uncontrolled and $p=0.097$ for controlled). The estimated magnitude of the effect of a savings account is also very large. Those without formal accounts are 4.5% likely to receive a remittance while those with an account are 50.3%-51.51% likely to receive a remittance. This means that those with an account are roughly 11 times more likely to receive a remittance. Given remittances are often a key lifeline and source of means for Sub-Saharan Africans, this means that increasing formal account uptake could be a key factor in providing financial relief to more remote Sub-Saharan Africans.

Table 7: Impact of Savings on Remittances Sent (OLS)

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount (Kwacha)	(4) Amount (Kwacha)	(5) Any	(6) Any
Any Individual Has Account	0.621 (0.379)	0.614 (0.423)	3,906* (2,338)	3,366 (2,577)	0.144*** (0.0392)	0.0897** (0.0424)
Food Secure		0.885 (0.818)		4,629 (3,745)		0.146** (0.0609)
Crop Income, 2010		-1.39e-06 (1.48e-06)		-0.00245 (0.00806)		2.72e-07 (1.74e-07)
Total Value of Assets, 2010		1.27e-07 (6.44e-06)		0.0141 (0.0933)		-2.63e-06* (1.50e-06)
Tobacco Grower, 2010		-0.204 (0.127)		-1,045 (1,245)		-0.0110 (0.0332)
Household Size, 2008		0.109 (0.0695)		912.5 (662.2)		0.00852 (0.00939)
Constant	0.113*** (0.0338)	-0.321 (0.280)	404.2 (244.4)	-4,108 (2,755)	0.0673*** (0.0143)	0.0159 (0.0488)
Observations	525	419	525	419	525	419
R-squared	0.018	0.046	0.017	0.046	0.039	0.059

Cluster-robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 7 displays the results of the uncontrolled and controlled OLS regressions involving individual account ownership and remittances sent. Whether a household has an individual savings account or not is not a significant predictor of the quantity of remittances sent ($p=0.104$ for uncontrolled and $p=0.151$ for controlled). Account ownership was also insignificant in relation to the total value of remittances sent in the controlled regression ($p=0.195$), however it was significant at the 90% confidence level in the uncontrolled OLS regression ($p=0.098$). The indicator for any remittance sent was significant at the 99% and the 95% confidence level respectively ($p=0.000$ for uncontrolled and $p=0.37$ for controlled).

The significance in sending any remittance, and the lack thereof in quantity and amount, can be explained logically. Remittances sent from these households are from households that can afford to send money to relatives in other parts of the country or the continent. The financial capacity to send remittances is likely not to be affected as much by a person taking up a savings account. However, the opportunity and ease of sending a remittance could potentially be improved by taking up a savings account. This could be an explanation for the difference in significance in these behaviors. The uncontrolled regression suggests that, on average, account owners see a 3,906 Kwacha (\$27.90) increase in the amount of remittances sent over those without, who send 404.2 Kwacha (\$2.89) on average. The OLS regressions also suggest that, on average, those without a formal savings account have a likelihood of sending a remittance of 6.73% versus 10.56%-21.13% for account holders, or a 56.9%-214% increase in likelihood

Table 8 : Reduced Form Effects of Information Treatment on Remittances Sent (OLS)

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount (Kwacha)	(4) Amount (Kwacha)	(5) Any	(6) Any
Information Treatment	0.222 (0.164)	0.190 (0.155)	1,888* (1,001)	1,756* (930.2)	0.0542** (0.0273)	0.0587* (0.0331)
Food Secure		0.928 (0.854)		4,799 (3,744)		0.149** (0.0633)
Crop Income, 2010		-9.01e-07 (1.15e-06)		0.000229 (0.00614)		3.44e-07** (1.66e-07)
Total Value of Assets, 2010		1.78e-07 (6.56e-06)		0.0140 (0.0942)		-2.63e-06* (1.48e-06)
Tobacco Grower, 2010		-0.164 (0.111)		-776.2 (1,131)		-0.00301 (0.0338)
Household Size, 2008		0.114 (0.0735)		917.6 (685.1)		0.00832 (0.00955)
Constant	0.125** (0.0504)	-0.366 (0.314)	219.4** (86.39)	-4,631 (2,995)	0.0685*** (0.0191)	-0.00268 (0.0498)
Observations	525	419	525	419	525	419
R-squared	0.003	0.034	0.006	0.039	0.008	0.054

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8 displays the reduced form regressions involving remittance sent behavior. Again, quantity was insignificant ($p=0.176$ for uncontrolled and $p=0.222$ for controlled), while amount was significant at the 90% confidence level ($p=0.062$ for uncontrolled and $p=0.071$ for controlled). A potential explanation for this result could be that a person has a higher capacity to save money with a savings account leading them to be capable of sending larger remittances when they send them. However, there could be barriers to the number of times someone sends a remittance such as: proximity to the nearest place to send a remittance or a one time remittance fee that creates an incentive to send a fewer number of remittances. The indicator for any remittance sent was significant at the 95% and 90% level ($p=0.032$ for uncontrolled and $p=0.068$ for controlled). This means that there is likely a relationship between having a formal savings account and one's likelihood to send a remittance. It makes sense that when controlling for

income factors the relationship becomes less significant because those with higher amounts of wealth are more likely to send remittances regardless of account ownership status given they have higher financial capacity.

Table 9: Impact of Savings on Remittances Sent (IV-2SLS)

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount (Kwacha)	(4) Amount (Kwacha)	(5) Any	(6) Any
Any Individual Has Account	1.234 (0.912)	1.003 (0.821)	10,514* (5,645)	9,258* (5,121)	0.302** (0.141)	0.310* (0.170)
Food Secure		0.847 (0.778)		4,048 (3,504)		0.124** (0.0593)
Crop Income, 2010		-1.69e-06 (1.72e-06)		-0.00705 (0.00905)		1.01e-07 (2.41e-07)
Total Value of Assets, 2010		3.60e-08 (6.47e-06)		0.0127 (0.0900)		-2.68e-06** (1.28e-06)
Tobacco Grower, 2010		-0.221 (0.138)		-1,297 (1,242)		-0.0204 (0.0344)
Household Size, 2008		0.103 (0.0650)		815.6 (623.9)		0.00490 (0.0102)
Constant	-0.0144 (0.134)	-0.340 (0.287)	-967.8 (742.7)	-4,389 (2,789)	0.0345 (0.0331)	0.00543 (0.0515)
Observations	525	419	525	419	525	419
R-squared	0.000	0.041		0.014		

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9 displays the IV-2SLS regression results involving remittances sent. I find that having a savings account does not significantly affect the number of remittances a household sends ($p=0.176$ for uncontrolled and $p=0.222$ for controlled). The quantity of remittances sent was very low throughout the sample, as only 4.8% of the sample (95 of 1,962) sent at least one remittance. The capacity to send a remittance means that a household is more privileged than most in their community. I also find that having a savings account does have a significant effect on monetary value of remittances sent ($p=0.062$ for uncontrolled and $p=0.071$ for controlled) and whether or not a household is likely to send a remittance ($p=0.032$ for uncontrolled and $p=0.068$ for controlled). Of those without an account, an average of 3.5% are expected to send a

remittance while that same figure rises to 31.5%-33.7% for those with an account. That is a roughly 875% rise in likelihood to send a remittance. This means that those who have the financial capacity to send a remittance are roughly 8 times more likely to do so if they have a formal savings account. Furthermore, those who do send remittances are likely to send larger amounts if they do have a bank account. On average, those without a bank account do not send any remittances while those that do have an account, on average, send between 4,869 and 9,546 Kwacha (\$34.78-\$68.18). In summation, remittances sent have a lot to do with a person's economic status and wealth, but I find that having a bank account increases the likelihood that someone will send a remittance.

Table 10: Impact of Savings on Payment Services (OLS)

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount (Kwacha)	(4) Amount (Kwacha)	(5) Any	(6) Any
Any Individual Has Account	0.529 (0.461)	-0.0991 (0.751)	43,132*** (13,322)	21,115* (10,972)	0.226*** (0.0562)	0.119*** (0.0438)
Food Secure		3.101 (2.514)		15,848 (18,250)		0.0256 (0.0612)
Crop Income, 2010		3.54e-06 (2.53e-06)		0.128* (0.0695)		2.19e-07 (2.12e-07)
Total Value of Assets, 2010		-2.29e-05 (1.87e-05)		-0.628 (0.409)		-1.34e-07 (1.37e-06)
Tobacco Grower, 2010		-0.226 (0.501)		31,476*** (7,267)		0.484*** (0.0481)
Household Size, 2008		0.0301 (0.0608)		1,549 (1,294)		0.00159 (0.00882)
Constant	0.680** (0.342)	0.232 (0.335)	7,538*** (1,762)	-18,495** (8,130)	0.128*** (0.0232)	-0.00565 (0.0473)
Observations	523	417	523	417	523	417
R-squared	0.001	0.024	0.068	0.172	0.059	0.368

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10 displays the results of the controlled and uncontrolled OLS regressions involving individual savings account uptake and use of payment services, such as receiving auction house payments. The effect of account ownership is found to be insignificant for the

quantity of payment service transactions($p=0.254$ for uncontrolled and $p=0.895$ for controlled), which follows logically. Payment services are used to receive auction house payments, receive salary, or pay bills. The frequency of these transactions does not change with account ownership (ie. bills have to be paid at the same frequency regardless of if you have a bank account).

Theoretically, the amount of these transactions would remain fairly constant as well. The difference in significance from uncontrolled to controlled in regards to amount ($p=0.002$ for uncontrolled and $p=0.057$ for controlled) can be explained by the fact that the relationship is heavily driven by whether or not a household grows tobacco. Whether or not someone grows tobacco is likely the driver in increased auction house payments and thus payment services use. When controlling for the indicator representing if someone grows tobacco, the effect of savings accounts were less significant on the amount of payment services transactions. The regression results show that the indicator for whether a person grows tobacco (Malawi's cash crop) had a significant relationship, at the 99% level ($p=.000$), with the amount of payment services transactions. Of payment service transactions, 84% were auction house payments. Of these auction house payments, 88% of them were made by tobacco growers as tobacco is the cash crop sold at auction houses. It is possible that having a savings account helps tobacco growers invest more in their crops and thus receive more at the auction house. The regressions suggest a significant and positive relationship between formal savings account ownership and the indicator for whether or not a household used payment services at all($p=0.000$ for uncontrolled and $p=0.008$ for controlled). This is important because the results suggest that those who grow tobacco can potentially participate more heavily in the tobacco economy and make more money as a result.

Table 11: Reduced Form Effects of Information Treatment on Payment Services Activity (OLS)

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount (Kwacha)	(4) Amount (Kwacha)	(5) Any	(6) Any
Information Treatment	0.558 (0.516)	0.501 (0.504)	588.2 (6,575)	-3,263 (6,165)	-0.0133 (0.0491)	0.00336 (0.0366)
Food Secure		3.040 (2.427)		17,272 (18,200)		0.0312 (0.0610)
Crop Income, 2010		3.49e-06 (2.23e-06)		0.145** (0.0708)		3.15e-07 (2.09e-07)
Total Value of Assets, 2010		-2.31e-05 (1.80e-05)		-0.618 (0.425)		-8.63e-08 (1.37e-06)
Tobacco Grower, 2010		-0.193 (0.501)		32,389*** (7,531)		0.491*** (0.0478)
Household Size, 2008		0.0126 (0.0613)		2,002 (1,357)		0.00346 (0.00918)
Constant	0.496*** (0.122)	0.0364 (0.292)	16,298*** (4,995)	-16,234* (8,370)	0.183*** (0.0323)	-0.00116 (0.0519)
Observations	523	417	523	417	523	417
R-squared	0.002	0.025	0.000	0.156	0.000	0.353

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11 displays the reduced form regressions involving payment services activity.

Quantity (p=0.282 for uncontrolled and p=0.323 for controlled), Amount (p=0.929 for uncontrolled and p=0.598 for controlled) and the indicator for any payment service used (p=0.788 for uncontrolled and p=0.927 for controlled) all were found to be insignificantly affected by account ownership. As expected, there was no significance within the payment services activity. This is because there was a high level of endogeneity within payment services activity because tobacco growers make up such a large part of the payment services transactions. Whether or not you grow tobacco has a lot more to do with whether you will use the auction house (the bulk of payment services transactions) than whether you have a savings account.

Table 12: Impact of Savings on Payment Services (IV-2SLS)

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount (Kwacha)	(4) Amount (Kwacha)	(5) Any	(6) Any
Any Individual Has Account	3.345 (3.166)	2.841 (2.959)	3,525 (38,959)	-18,504 (35,704)	-0.0794 (0.296)	0.0191 (0.205)
Food Secure		2.953 (2.348)		17,842 (17,638)		0.0307 (0.0602)
Crop Income, 2010		1.18e-06 (2.98e-06)		0.160* (0.0891)		3.00e-07 (2.78e-07)
Total Value of Assets, 2010		-2.41e-05 (1.81e-05)		-0.611 (0.426)		-9.30e-08 (1.34e-06)
Tobacco Grower, 2010		-0.388 (0.689)		33,659*** (8,936)		0.490*** (0.0468)
Household Size, 2008		-0.0187 (0.0750)		2,206 (1,415)		0.00325 (0.00921)
Constant	0.0880 (0.418)	0.0892 (0.290)	15,868* (9,082)	-16,577** (8,457)	0.193*** (0.0625)	-0.000806 (0.0495)
Observations	523	417	523	417	523	417
R-squared			0.011	0.114		0.358

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12 displays the IV regressions involving payment services behavior. When removing endogeneity, I find little significance between having a financial savings account and utilizing payment services. The significance that I do find relates to whether or not a person grows tobacco. Holding all else fixed, tobacco growers are roughly 5x more likely to use payment services than non tobacco growers. This follows because the large majority of payment services were tobacco growers accepting auction house payments for tobacco sales. Tobacco growers need to use the auction house to receive income, so whether or not one grows tobacco is a bigger driver for payment service utilization than bank account ownership.

Conclusion

Identifying and leveraging proven methods to increase remittances in SSA is a very key element to SSA's economic development, with potential benefits trickling down to political institutions and societal elements such as improved education. My analysis provides a unique

look into the effects of account ownership on remittances in SSA given I use data from an effective field experiment. My analysis allows for a deeper understanding of this relationship beyond typically used survey data that can have less homogeneous samples. Leveraging the information treatment in this Malawi field experiment, I find that increasing savings accounts in the region increases the likelihood that a household will both receive and send a remittance. The estimated magnitude of the effects are very large, up to 10.18x more likely to receive a remittance and 8.75x more likely to send. This means that bank expansion into more remote areas of SSA is critical in the stimulation of remittance activity and thus economic development of the region.

Barriers exist to this expansion on the supply and the demand side of things. On the supply side, banks expanding into rural parts of Africa might be very expensive and not very cost effective. On the demand side, barriers such as education and mistrust for banks can prevent Sub-Saharanans from engaging in formal finance. The same regression models I ran in my analysis were run when the data were restricted to the non-english-literate portion of the sample and there was no significance of having a bank account on any of the remittance or payment service transactions. This means that information and financial inclusivity dispersion into these areas is far less likely to be effective when education levels are lower. So education is likely to play a major role in the expansion of financial inclusivity and thus the expansion of remittances into the region.

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Appendix A: Tangential Research

Effects of Savings Account Uptake on Remittances in Non-English-Literate

Tables 13-21 display regression results of regression results of the OLS, Reduced Form, and IV-2SLS regressions when restricting to the non-english-literate portion of the sample. I find no significance in the relationship between savings account uptake and remittances or payment services. This means that the overwhelmingly positive effects of account ownership are muted to the point of insignificance in less educated people. This is critical information because it reveals financial inclusivity's limited effects when education levels are lower. In order for account ownership to have a positive impact on remittances in SSA, education must be a heavily considered component. Education levels rising will augment the effects of account ownership on remittances.

Effects of Savings Account Uptake on Form of Remittance

A tangential hypothesis I explored but did not include in my main analysis was the effect of account ownership on what forms of remittance was sent or received, either from non-bank (typically cash) or formal bank remittance. As SSA is a very cash heavy society, a lot of remittances are still handled in cash. However, there are many drawbacks of cash remittances: sending cash over a long journey is risky as it can get lost or stolen. Increasing formal bank remittances has the benefit of allowing the receiver to more easily receive and save the remittance. I was curious to see what effects, if any, account ownership had on what form of remittance was sent or received.

Tables 22-27 display the regression results of savings account uptake on indicators for the different forms/types of remittances. Tables 24 and 27 display the results of the IV-2SLS regressions. I find a significant relationship, at the 90% confidence level, with account ownership and the sending and receiving of formal bank remittances. This means that increasing account ownership increases the use of formal bank remittances to send or receive a remittance. Receiving or sending a remittance from a formal bank allows a household to leverage the benefits of a formal bank account in the remittance process. Monies can be more easily saved when receiving a remittance directly to a bank account and a household can potentially accrue interest when using a formal bank account.

I also analyzed the effects of account ownership on the indicator for whether a received remittance was from an international or domestic relative. Receiving international remittances can potentially offer more benefits as those who have had the ability to migrate to a different country often have access to higher paying jobs. I was curious to see if account ownership

would have a significant effect on the receiving of international remittances. As can be seen in table 24, I find no significant relationship between account ownership and the receiving of an international remittance.

Appendix B: Other Tables

Table 13: Impact of Savings on Remittances Received (OLS) - Non Literate

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount	(4) Amount	(5) Any	(6) Any
Any Individual Has Account	0.196 (0.122)	0.0950 (0.153)	615.0* (350.4)	191.7 (349.3)	0.0918*** (0.0334)	0.0334 (0.0349)
Food Secure		-0.0357 (0.0386)		298.8 (383.4)		0.00855 (0.0266)
Crop Income, 2010		1.71e-07 (1.95e-07)		0.000992 (0.00130)		7.12e-08 (9.57e-08)
Total Value of Assets, 2010		9.95e-06** (4.78e-06)		0.0455 (0.0285)		9.46e-06** (4.52e-06)
Tobacco Grower, 2010		0.0385 (0.0597)		182.1 (223.5)		0.0302* (0.0161)
Household Size, 2008		0.00700 (0.00733)		54.66 (36.60)		0.00127 (0.00301)
Constant	0.0442*** (0.0140)	-0.0120 (0.0381)	96.42** (39.52)	-332.0* (177.5)	0.0221*** (0.00463)	-0.00465 (0.0167)
Observations	1,346	1,064	1,346	1,064	1,346	1,064
R-squared	0.007	0.011	0.009	0.030	0.017	0.056

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 14: Reduced Form Effects of Information Treatment on Remittances Received (OLS)

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount	(4) Amount	(5) Any	(6) Any
Information Treatment	0.0516 (0.0527)	0.0692 (0.0668)	83.51 (223.7)	75.56 (280.0)	0.0187 (0.0191)	0.0252 (0.0238)
Food Secure		-0.0532 (0.0955)		-60.44 (428.9)		-0.0119 (0.0436)
Crop Income, 2010		5.51e-08 (2.68e-07)		0.000427 (0.00133)		-1.83e-08 (6.70e-08)
Total Value of Assets, 2010		7.46e-06 (8.69e-06)		0.0575 (0.0434)		2.00e-06 (2.69e-06)
Tobacco Grower, 2010		-0.0616 (0.0620)		-286.1 (328.0)		-0.00608 (0.0242)
Household Size, 2008		-0.00991 (0.0146)		89.66 (79.39)		-0.000697 (0.00515)
Constant	0.130*** (0.0368)	0.208** (0.0926)	524.2*** (152.8)	160.8 (450.1)	0.0618*** (0.0123)	0.0775** (0.0319)
Observations	1,365	1,084	1,365	1,084	1,365	1,084
R-squared	0.001	0.004	0.000	0.006	0.001	0.003

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 15: Impact of Savings on Remittances Received (IV-2SLS) - Non Literate

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount	(4) Amount	(5) Any	(6) Any
Any Individual Has Account	2.008 (2.429)	2.608 (2.924)	3,251 (8,705)	2,846 (10,311)	0.728 (0.867)	0.950 (1.047)
Food Secure		-0.252 (0.255)		-277.1 (926.0)		-0.0842 (0.0988)
Crop Income, 2010		-1.62e-06 (1.90e-06)		-0.00141 (0.00708)		-6.30e-07 (6.77e-07)
Total Value of Assets, 2010		-2.04e-05 (3.53e-05)		0.0271 (0.109)		-8.17e-06 (1.25e-05)
Tobacco Grower, 2010		-0.303 (0.262)		-549.5 (950.7)		-0.0940 (0.0947)
Household Size, 2008		-0.0280 (0.0288)		69.88 (93.56)		-0.00730 (0.00929)
Constant	0.0332 (0.147)	0.379** (0.193)	366.9 (534.1)	347.4 (590.3)	0.0266 (0.0511)	0.140** (0.0625)
Observations	1,365	1,084	1,365	1,084	1,365	1,084
R-squared				0.006		

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 16: Impact of Savings on Remittances Sent (OLS) - Non Literate

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount	(4) Amount	(5) Any	(6) Any
Any Individual Has Account	0.187 (0.134)	0.228 (0.158)	1,373 (852.0)	1,461 (1,064)	0.0549 (0.0397)	0.0605 (0.0473)
Food Secure		-0.0734 (0.0872)		-173.3 (413.9)		-0.0176 (0.0422)
Crop Income, 2010		-8.60e-08 (2.95e-07)		-0.000511 (0.00158)		-5.51e-08 (7.09e-08)
Total Value of Assets, 2010		5.50e-06 (7.83e-06)		0.0421 (0.0383)		1.53e-06 (2.50e-06)
Tobacco Grower, 2010		-0.0882 (0.0580)		-424.6 (301.4)		-0.0137 (0.0245)
Household Size, 2008		-0.0109 (0.0147)		79.86 (81.45)		-0.000885 (0.00521)
Constant	0.143*** (0.0259)	0.250*** (0.0899)	479.7*** (103.7)	271.8 (415.0)	0.0670*** (0.00899)	0.0912*** (0.0295)
Observations	1,365	1,084	1,365	1,084	1,365	1,084
R-squared	0.003	0.006	0.009	0.014	0.003	0.003

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 17: Reduced Form Effects of Information Treatment on Remittances Sent (OLS)

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount	(4) Amount	(5) Any	(6) Any
Information Treatment	0.0272 (0.0343)	0.0312 (0.0421)	-19.29 (81.33)	-42.90 (99.73)	0.00678 (0.0104)	0.00292 (0.0116)
Food Secure		-0.0305 (0.0353)		306.9 (395.1)		0.0102 (0.0266)
Crop Income, 2010		2.28e-07 (1.81e-07)		0.00112 (0.00146)		9.20e-08 (1.00e-07)
Total Value of Assets, 2010		1.09e-05* (5.59e-06)		0.0479* (0.0281)		9.83e-06** (4.53e-06)
Tobacco Grower, 2010		0.0487 (0.0521)		194.0 (200.3)		0.0332** (0.0155)
Household Size, 2008		0.00757 (0.00709)		56.78 (35.04)		0.00155 (0.00301)
Constant	0.0434*** (0.0154)	-0.0309 (0.0449)	141.2** (66.52)	-326.3** (162.9)	0.0244*** (0.00648)	-0.00797 (0.0167)
Observations	1,346	1,064	1,346	1,064	1,346	1,064
R-squared	0.001	0.010	0.000	0.030	0.000	0.054

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 18: Impact of Savings on Remittances Sent (IV-2SLS) - Non Literate

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount	(4) Amount	(5) Any	(6) Any
Any Individual Has Account	0.979 (1.218)	1.034 (1.412)	-695.1 (3,108)	-1,419 (3,561)	0.244 (0.360)	0.0965 (0.380)
Food Secure		-0.0802 (0.0896)		375.1 (510.3)		0.00556 (0.0321)
Crop Income, 2010		-4.22e-07 (8.36e-07)		0.00201 (0.00258)		3.12e-08 (2.52e-07)
Total Value of Assets, 2010		-7.92e-07 (1.70e-05)		0.0640 (0.0628)		8.74e-06 (7.02e-06)
Tobacco Grower, 2010		-0.0370 (0.106)		311.7 (392.6)		0.0252 (0.0334)
Household Size, 2008		-0.00141 (0.0135)		69.11 (51.52)		0.000707 (0.00454)
Constant	-0.00177 (0.0665)	0.0472 (0.0860)	173.3 (204.2)	-433.6 (317.8)	0.0132 (0.0208)	-0.000669 (0.0306)
Observations	1,346	1,064	1,346	1,064	1,346	1,064
R-squared						0.049

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 19: Impact of Savings on Payment Services (OLS) - Non Literate

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount	(4) Amount	(5) Any	(6) Any
Any Individual Has Account	1.131*** (0.255)	0.385** (0.150)	70,782*** (18,560)	4,320 (28,120)	0.461*** (0.0653)	0.220*** (0.0534)
Food Secure		0.103 (0.131)		-3,462 (11,466)		0.0678** (0.0323)
Crop Income, 2010		2.36e-06* (1.22e-06)		0.382 (0.239)		2.75e-07** (1.23e-07)
Total Value of Assets, 2010		1.36e-05 (1.29e-05)		1.420 (1.741)		4.78e-06 (3.27e-06)
Tobacco Grower, 2010		0.537*** (0.0754)		15,290** (5,968)		0.454*** (0.0403)
Household Size, 2008		-0.0149** (0.00729)		-1,536 (1,359)		0.00183 (0.00438)
Constant	0.130*** (0.0216)	-0.0732 (0.0534)	5,586*** (1,872)	-15,402** (7,149)	0.0984*** (0.0144)	-0.0299 (0.0228)
Observations	1,364	1,072	1,364	1,072	1,364	1,072
R-squared	0.110	0.337	0.047	0.245	0.111	0.444

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 20: Reduced Form Effects of Information Treatment on Payment Services (OLS)

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount	(4) Amount	(5) Any	(6) Any
Information Treatment	0.00709 (0.0711)	-0.0109 (0.0449)	2,353 (5,185)	-438.7 (4,292)	-0.00418 (0.0352)	0.00633 (0.0189)
Food Secure		0.122 (0.135)		-3,252 (12,568)		0.0793** (0.0336)
Crop Income, 2010		2.62e-06** (1.23e-06)		0.385* (0.223)		4.24e-07*** (1.52e-07)
Total Value of Assets, 2010		1.75e-05 (1.43e-05)		1.466 (1.678)		6.92e-06* (3.88e-06)
Tobacco Grower, 2010		0.570*** (0.0794)		15,640** (7,036)		0.474*** (0.0401)
Household Size, 2008		-0.0108 (0.00768)		-1,487 (1,631)		0.00407 (0.00465)
Constant	0.197*** (0.0397)	-0.0961 (0.0591)	8,864*** (2,289)	-15,528** (6,770)	0.129*** (0.0230)	-0.0482* (0.0282)
Observations	1,365	1,072	1,365	1,072	1,365	1,072
R-squared	0.000	0.322	0.000	0.245	0.000	0.422

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 21: Impact of Savings on Payment Services (IV-2SLS) - Non Literate

VARIABLES	(1) Quantity	(2) Quantity	(3) Amount	(4) Amount	(5) Any	(6) Any
Any Individual Has Account	0.289 (2.673)	-0.409 (1.797)	92,259 (191,571)	-16,459 (160,744)	-0.217 (1.434)	0.237 (0.659)
Food Secure		0.144 (0.183)		-2,391 (18,610)		0.0669 (0.0430)
Crop Income, 2010		2.90e-06 (1.78e-06)		0.396** (0.176)		2.63e-07 (4.50e-07)
Total Value of Assets, 2010		2.15e-05 (2.31e-05)		1.626 (2.274)		4.61e-06 (7.66e-06)
Tobacco Grower, 2010		0.607*** (0.187)		17,133 (18,688)		0.453*** (0.0830)
Household Size, 2008		-0.00664 (0.0191)		-1,320 (2,943)		0.00166 (0.00728)
Constant	0.182 (0.158)	-0.130 (0.136)	4,263 (10,362)	-16,882* (10,219)	0.140 (0.0891)	-0.0287 (0.0471)
Observations	1,364	1,072	1,364	1,072	1,364	1,072
R-squared	0.049	0.270	0.043	0.242		0.444

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 22: Impact of Savings on Type of Remittance Received Indicators (OLS)

VARIABLES	(1) Formal Bank	(2) Formal Bank	(3) Non-Bank	(4) Non-Bank	(5) Any International	(6) Any International
Any Individual Has Account	0.112*** (0.0291)	0.120*** (0.0302)	0.0430 (0.0362)	0.0145 (0.0420)	0.0102 (0.0143)	0.000910 (0.0164)
Food Secure		0.0459 (0.0332)		0.0653 (0.0612)		0.0449 (0.0349)
Crop Income, 2010		-1.87e-08 (7.59e-08)		3.63e-08 (1.64e-07)		1.80e-08 (5.26e-08)
Total Value of Assets, 2010		3.23e-07 (1.03e-06)		5.38e-07 (2.19e-06)		-6.77e-07* (3.91e-07)
Tobacco Grower, 2010		-0.0424** (0.0169)		-0.0624 (0.0378)		-0.00971 (0.0135)
Household Size, 2008		0.00440 (0.00579)		0.00624 (0.00839)		0.00856** (0.00377)
Constant	0.00588* (0.00344)	-0.0101 (0.0259)	0.102*** (0.0157)	0.107** (0.0489)	0.0141** (0.00565)	-0.0273* (0.0156)
Observations	539	433	539	433	540	434
R-squared	0.078	0.110	0.003	0.013	0.001	0.025

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 23: Reduced Form Effect of Information Treatment on Type of Remittance Received Indicators (OLS)

VARIABLES	(1) Formal Bank	(2) Formal Bank	(3) Non-Bank	(4) Non-Bank	(5) Any International	(6) Any International
Information Treatment	0.0253* (0.0152)	0.0182 (0.0176)	0.0512 (0.0318)	0.0529 (0.0398)	-0.0129 (0.0118)	-0.0225 (0.0156)
Food Secure		0.0496 (0.0335)		0.0603 (0.0609)		0.0473 (0.0347)
Crop Income, 2010		6.26e-08 (7.43e-08)		4.44e-08 (1.51e-07)		1.97e-08 (4.85e-08)
Total Value of Assets, 2010		5.49e-07 (1.17e-06)		5.54e-07 (2.15e-06)		-6.71e-07* (3.97e-07)
Tobacco Grower, 2010		-0.0374** (0.0165)		-0.0568 (0.0382)		-0.0120 (0.0134)
Household Size, 2008		0.00679 (0.00636)		0.00517 (0.00865)		0.00918** (0.00399)
Constant	0.0160* (0.00921)	-0.0145 (0.0300)	0.0840*** (0.0212)	0.0860* (0.0500)	0.0232** (0.0103)	-0.0181 (0.0149)
Observations	539	433	539	433	540	434
R-squared	0.006	0.035	0.007	0.019	0.003	0.031

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 24: Impact of Savings on Type of Remittance Received Indicators (IV-2SLS)

VARIABLES	(1) Formal Bank	(2) Formal Bank	(3) Non-Bank	(4) Non-Bank	(5) Any International	(6) Any International
Any Individual Has Account	0.148* (0.0837)	0.105 (0.0918)	0.300 (0.200)	0.306 (0.238)	-0.0743 (0.0708)	-0.128 (0.101)
Food Secure		0.0465 (0.0320)		0.0514 (0.0626)		0.0507 (0.0356)
Crop Income, 2010		-8.97e-09 (9.78e-08)		-1.64e-07 (2.39e-07)		1.09e-07 (8.91e-08)
Total Value of Assets, 2010		3.50e-07 (1.03e-06)		-2.37e-08 (1.75e-06)		-4.41e-07 (4.15e-07)
Tobacco Grower, 2010		-0.0421** (0.0172)		-0.0702* (0.0408)		-0.00665 (0.0143)
Household Size, 2008		0.00474 (0.00594)		-0.000790 (0.0112)		0.0116** (0.00580)
Constant	-0.00177 (0.0167)	-0.00976 (0.0262)	0.0480 (0.0411)	0.0996** (0.0504)	0.0321* (0.0188)	-0.0237 (0.0157)
Observations	539	433	539	433	540	434
R-squared	0.070	0.109				

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 25: Impact of Savings on Type of Remittance Sent Indicators (OLS)

VARIABLES	(1) Formal Bank	(2) Formal Bank	(3) Non-Bank	(4) Non-Bank
Any Individual Has Account	0.0825*** (0.0247)	0.0477** (0.0203)	0.0918** (0.0381)	0.0674 (0.0421)
Food Secure		0.0913** (0.0413)		0.109* (0.0598)
Crop Income, 2010		2.50e-07* (1.50e-07)		4.56e-08 (1.34e-07)
Total Value of Assets, 2010		-1.16e-06 (1.36e-06)		-1.86e-06** (8.74e-07)
Tobacco Grower, 2010		-0.0290** (0.0127)		0.00852 (0.0314)
Household Size, 2008		0.0108 (0.00727)		0.00103 (0.00920)
Constant	0.00257 (0.00260)	-0.0703** (0.0338)	0.0651*** (0.0134)	0.0671 (0.0492)
Observations	483	378	517	412
R-squared	0.058	0.164	0.018	0.024

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 26: Reduced Form Effects of Information Treatment on Type of Remittance Sent Indicators (OLS)

VARIABLES	(1) Formal Bank	(2) Formal Bank	(3) Non-Bank	(4) Non-Bank
Information Treatment	0.0194* (0.0110)	0.0196* (0.0117)	0.0423 (0.0257)	0.0482 (0.0308)
Food Secure		0.0914** (0.0419)		0.110* (0.0624)
Crop Income, 2010		2.92e-07* (1.50e-07)		1.01e-07 (1.24e-07)
Total Value of Assets, 2010		-1.18e-06 (1.39e-06)		-1.88e-06** (8.40e-07)
Tobacco Grower, 2010		-0.0264** (0.0132)		0.0152 (0.0318)
Household Size, 2008		0.0110 (0.00737)		0.000640 (0.00919)
Constant	0.00858 (0.00600)	-0.0757** (0.0336)	0.0610*** (0.0172)	0.0519 (0.0512)
Observations	483	378	517	412
R-squared	0.005	0.151	0.006	0.022

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 27: Impact of Savings on Type of Remittance Sent Indicators (IV-2SLS)

VARIABLES	(1) Formal Bank	(2) Formal Bank	(3) Non-Bank	(4) Non-Bank
Any Individual Has Account	0.115* (0.0607)	0.107* (0.0611)	0.254* (0.145)	0.267 (0.165)
Food Secure		0.0889** (0.0399)		0.0954* (0.0578)
Crop Income, 2010		1.96e-07 (1.41e-07)		-8.98e-08 (2.09e-07)
Total Value of Assets, 2010		-1.14e-06 (1.25e-06)		-1.94e-06** (9.81e-07)
Tobacco Grower, 2010		-0.0296** (0.0125)		-0.00155 (0.0331)
Household Size, 2008		0.00991 (0.00758)		-0.00238 (0.00944)
Constant	-0.00377 (0.0116)	-0.0733** (0.0327)	0.0331 (0.0306)	0.0570 (0.0539)
Observations	483	378	517	412
R-squared	0.049	0.137		

Cluster-robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1