

## The Rise of Digital Financial Services and Preference for Cash Transactions

### A Bivariate Probit Analysis using Evidence from Zambia

John Musantu

*Postgraduate Researcher, University of Leeds, UK  
Woodhouse, Leeds LS2 9JT, United Kingdom*

**Abstract:** The recent Covid-19 pandemic that the global economy is faced with has made a strong case for financial system's need of more inclusive and innovative digital financial services, especially in Africa. There is need for economies to substantially switch from cash-based processes to digital services. However, for this switch towards digital financial services to be realised, wider consumer acceptability is a prerequisite. In many African financial systems, use of digital financial systems has been growing but at a slower pace, especially, relative to Kenya which has been leading the global economy in this front. In our work, we investigate the drivers of consumer preference for cash and lack of trust in digital financial services. We employ a bivariate probit model as the unobserved terms of the two variables were established to be positively correlated. Our research concludes by offering project recommendations for financial inclusion stakeholders.

**Keywords:** Cash transaction preference, financial inclusion, bivariate probit, digital financial services

### Introduction

In recent years, financial sector and financial inclusion stakeholders have been advocating for a switch towards use of digital platforms in financial transactions, instead of using cash. This impetus for a switch has been made firm by detrimental negative impact that the global economy has witnessed as a result of the Covid-19 pandemic. With some form of 'social lockdown' that most economies experienced, consumers were left with no choice but to depend on delivery companies and digital platforms for goods and financial transactions respectively. This occurrence can be devastating for most African economies as digital transactions have not been widely accepted by consumers. Therefore, continued efforts to ensure wider acceptability and use of digital financial services is critical, and efforts should continue. Existing literature has established that use of digital financial services is beneficial, in that, it offers a more secure process, reduced cost, ability to cater for low-income segments of the population and many other benefits. The Kenyan financial system has been leading in digital financial services such as mobile money initiatives.

In the Zambian financial system, gains have been realised over the years in digital financial services (DFS), specifically, the mobile money sub-sector. In the 2015 Zambia FinScope survey, it was observed that a total of 1.1 million adults either send or receive money, pay bills or purchase phone credit through the mobile money platform. Nevertheless, the rest of the adult population did not utilise the services as of 2015 (the time of the survey). Further, it was also observed that only a few of the active users of these mobile wallets use them for money saving. Otherwise, these services are mainly for person to person (P2P) transfer of money. This status has been of concern to financial inclusion proponents as these wallets can be cost effective and appropriate if used for savings, especially by low-income households in the economy. And unlike Kenya, these services are also not used for financial transactions in purchase of goods and services.

On the positive side, in comparison to the 2009 survey, a 21.3 percent (1 million adults) was recorded in access to electronic money transfers in the 2015 survey (FinScope, 2015). In terms of mobile money service awareness, only half of the population was aware of it and a quarter of that were established to use the service. In the survey descriptive statistics, lack of information was established to be one of the key barriers to use. It was observed that, 54.2 percent of the adult population that did not use the service attributed it to lack of information (*saying they have never heard of mobile money service*). A general lack of product awareness and knowledge has been attributed to be a major barrier in the use of other financial services such as insurance, which has a low penetration in Zambia and Africa at large. In 2015, it was established that 11 percent of adult individuals in the country had a registered mobile money account but only 4 percent used this service. Further, it was established that mobile money service utilisation is less for women relative to their male counterparts. And that, age and education play a role in service use. The age group 26 – 35 years with an educational attainment of high school (*grade 10 and above*) was established to be more active especially for males (FinScope, 2015).

### **Research Objectives and Contribution**

With the forgoing background, our study investigates the use of digital financial services in the Zambian financial system. We consider two key dependent variables; preference for cash transactions and lack of trust in digital financial platforms. We employ a bivariate probit analysis as their (dependent variables)unobserved factors were established to be positively correlated, hence, conducting separate probits could have resulted in estimation bias and inefficiency. Specifically, our research considers two main objectives:ii) Investigate what influences individual preference for cash transactions and; ii) Explore reasons why certain segments of the population have no trust in digital financial platforms. Exploration of these two objectives is key in the appropriate design of policy and project interventions that will steer wider acceptability and use of digital financial services in the financial system.

With the current financial system risks that have been demonstrated through the current global pandemic, the case for a substantial switch towards use of digital financial services can never be stronger. To the best of our knowledge, such a research has not been conducted in the existent literature on financial inclusion in Zambia. Therefore, we contribute to the current literature on this topic. We consider the following three major categories of explanatory variables: proximity to financial services, exposure or experience with financial services and household characteristics. The type of explanatory variables considered is another contribution of our work to the current literature. As a further contribution to literature, we consider informal financial services that are utilised in the Zambian financial system to understand their influence on the phenomena under consideration.

### **Literature review**

There is limited published literature on the determinants of preference for cash transactions and perceived mistrust in digital financial platforms in Zambia and the African continent at large. With the current challenging times the continent's financial systems are facing through the Covid-19 pandemic, continued emphasis on importance of financial service digitisation is key. The Zambian economy like many African countries has been on the path of financial service digitisation for some time now. In this study, we seek to understand the factors that influence consumer preference for cash transactions and perceived lack of trust in digital financial platforms.

We build on the Zambia 2015 FinScope which offers mere descriptive statistics on how many people use services such as mobile money, prefer cash transactions and lack trust in digital financial platforms in the economy. We seek to offer a statistical estimation to understand what drives the aforementioned scenarios.

As stated above, there is limited published literature on this topic, therefore, we consider studies below to gain some insights.

In the Kosse (2010) literature, it was established that people's willingness to use cashless financial platforms was mainly driven by their confidence in financial institutions and fraud risk or data theft. This study was done using consumers owning payment cards in the financial system. A similar research was implemented in Germany which experiences less cashless turnover with consumers relatively exhibiting mistrust in financial institutions despite the financial infrastructure being technologically advanced.

Goczek and Witkowski (2015) argue that, financial sector development (at a general level), for example, total number of financial transactions, have a positive effect on cashless turnover. Nevertheless, there is a delayed effect that can be attributed to existing consumers' habits.

The Ardizzi and Iachini (2013) literature on determinants of cashless turnover supports the above observation. This research assesses differences in consumer habits when it comes to payment channels. The work established that, among others, safety, speed, comfort/ease and cost influence choice of payment platform and increased the share of the cashless turnover.

The literature above considers developed financial systems that are substantially different from the system we consider in our empirical analysis. For example, in the system we focus on, there is a wide use of informal financial services, prevalence of financial exclusion, disparities in financial infrastructure distribution (between rural and urban) and many other differences. Therefore, there is value in investigating this phenomenon from the Zambian financial system's perspective, in order to broaden and enhance the depth of existent literature on this topic.

### **Empirical analysis**

#### **Data**

We benefit from the Zambia 2015 National FinScope Household Survey. This survey is conducted every five years and is cross sectional (different individuals are considered in each survey) in approach. There have been three surveys, 2005, 2009 and 2015 thus far. Its main aim is to capture financial dynamics such as how individuals manage their financial lives in the financial system. It focusses on both the demand and supply

side of the market but is skewed more to the demand side. Therefore, the sample size under consideration is nationally representative and provides strong inference of our estimation results. Questionnaires were used in face to face interviews in the sampled areas. Further, only adults (individuals 16 years or older) were considered as respondents (to represent a household) in the sample. The survey only considered adult respondents, that is, individuals 16 years or older (FinScope, 2015).

### Model specification

In our research, we investigate the drivers of cash preference and lack of trust in digital financial channels using a bivariate probit technique. The section below discusses the model in detail.

### Bivariate Model

In the survey, it was established that individuals could prefer cash transactions and have no trust in digital services at the same time. In this regard, we employ a bivariate probit model in our work as we investigate the factors that influence cash preference and lack of trust in digital financial services. The two variables under consideration are binary in nature (yes or no). With the overlap in the two variables, the presence of common unobserved factors that can affect an individual's choice (of cash preference or lack of trust in digital services) makes individual probit (logit) estimations unsuitable for our empirical analysis. The common unobserved factors indicate correlation in the disturbance terms of cash preference and lack of trust in digital services equations. The bivariate probit technique is appropriate because it helps us control for this occurrence thereby, prevent estimation biases and inefficiency in our results.

We can express the bivariate probit model as follows:

$$y_{1i}^* = \beta_1 X_{1i} + \varepsilon_{1i}$$

$$y_{2i}^* = \beta_2 X_{2i} + \varepsilon_{2i}$$

Where the latent dependent variables are  $y_{1i}^*$ ,  $y_{2i}^*$ ,  $X_1$  and  $X_2$  represent vectors of explanatory factors, and disturbance terms  $\varepsilon_{1i}$  and  $\varepsilon_{2i}$  which are assumed as normally distributed (0 mean, variance of 1 and correlation  $\rho$ ).

We observe  $y_{1i}$  and  $y_{2i}$ , the dependent variables in the event that the latent variable  $y_{1i}^*$  and  $y_{2i}^*$  are greater than zero.

$$\begin{aligned} y_{1i} &= 1 \text{ if } y_{1i}^* > 0, 0 \text{ otherwise} \\ y_{2i} &= 1 \text{ if } y_{2i}^* > 0, 0 \text{ otherwise} \end{aligned}$$

(Wooldridge, 2012; Greene, 2012)

### Functional and estimable model

Our functional and estimable versions of our bivariate probit model is highlighted in equations 7 and 8 below:

$$\text{Use Fin.channel} = f(\text{HHXeristics}, \text{Prox2FIs}, \text{Exposre2FSs})$$

$$PC_i = HHXeristics_i + Prox2FIs_i + Exposre2FSs_i + \varepsilon \quad (7)$$

(8)

$$NTD_i = HHXeristics_i + Prox2FIs_i + Exposre2FSs_i + \varepsilon$$

Where:

PC: Prefer cash transactions

NTD: No trust in digital financial services

*HHXeristics*: Household characteristics<sup>1</sup>; *Prox2FIs*: proximity to financial services; *Exposre2FSs*: exposure and experience with financial services

$\varepsilon$  : error term

### Variables

#### Dependent variables

In the bivariate probit estimation, we consider two dependent variables, 'prefer cash transactions' and 'lack of trust in digital financial services'. The variable lack of trust in digital services was generated from a proxy 'prefer people to machines in financial transactions' that was captured in the survey question<sup>2</sup> (FinScope, 2015). Both dependent variables are binary in nature (yes or no).

<sup>1</sup> Full list of explanatory variables is detailed in section below

<sup>2</sup> Question Q7\_20\_3 - I prefer people to machines (FinScope, 2015)

### Explanatory variables

For the explanatory variables, we group these factors into the following three main categories: i) Household characteristics ii) Proximity to financial institutions and; iv) Exposure/experience with financial services. Table below summarises these variables.

Factor or Variable	Variable/Proxy in Regression	Definition/Source/Notes
Household characteristics	Household size Gender of household head ( <i>dummy for female</i> ) Age Marital status ( <i>dummy for married</i> ) Economic status ( <i>dummy poor</i> ) Employment status ( <i>dummy employed</i> ) Education (base category=no education, Primary, Secondary and Tertiary) Location ( <i>dummy for rural</i> )	In this category of variables, we generate dummy variables for each factor accept age, income and household size which are taken as continuous variables
Proximity to financial institution	Time to financial institution – 15 or less Time to financial institution – 15 to 30 minutes Time to financial institution – 30 minutes – 1 hour 1 hour and above	Here we consider proxies of an individual's proximity to financial service points/facilities
Exposure and Experience with financial services	Uses formal financial services Uses informal services Uses MFI services Uses Chilimba <sup>3</sup> and other similar groups Uses mobile money Uses bank services Saver and financial literacy (proxy used using keeps money for unexpected events)	This category of variables looks at an individual's experience and exposure to financial services.

Source: Author's own work

### Test for Multicollinearity – VIF

Table 2: Test for Multi-collinearity – VIF

Variable	VIF	1/VIF		VIF	1/VIF
Use formal services	2.62	0.38	Household size	1.27	0.79
Use bank services	2.20	0.45	15 minutes to 30 minutes	1.23	0.81
Female household head	2.10	0.48	Employed	1.15	0.87
Marital status - married	2.09	0.48	30 minutes to 1 hour	1.15	0.87
Tertiary education	1.57	0.64	Use other informal groups	1.13	0.88
Economic status - poor	1.55	0.64	1 hour and above	1.12	0.89
Use mobile money services	1.52	0.66	Use informal services	1.10	0.91
Secondary education	1.51	0.66	High fin. Literacy (proxy saving	1.07	0.94
Location - rural	1.48	0.68	Use MFI services	1.02	0.98
Primary education	1.44	0.69	Prefer cash transactions	1.01	0.99
15 minutes or less	1.41	0.71	Age	1.01	0.99
Use chilimba (Merry-go-round)	1.27	0.79	Use saving services	1.01	0.99
<b>Mean VIF</b>				<b>1.42</b>	

Source: Author's own analysis

In investigating the potential occurrence of multicollinearity among our explanatory variables, we conducted a test using the variance inflation factor (VIF) technique. Presence of multicollinearity in a model

<sup>3</sup>Merry-go-round - usually women and workmates contribute an agreed amount to a colleague every month

usually affects size of standard errors which in turn influences which of our variables are significant. Therefore, presence of multicollinearity might lead to biases in results. In the VIF process, we first conduct a regression of our model explanatory variables after which we generate the VIF and its inverse values (tolerance). According to Menard (2002), variance increases in estimated coefficients are recorded and a comparison made to a state where correlation is absent in our explanatory factors. The general rule of thumb in existent literature (Allison, 2012; Menard, 2002 and 2010) concerning interpretation of the VIF is that, VIF scores of 5 or higher (alternatively, tolerance scores of 5 or less) should raise concerns of potential multicollinearity in the model.

Table 3: Summary Statistics

Explanatory variable	No. of observations	Mean	Std. Deviation	Min	Max	Explanatory variable	No. of observations	Mean	Std. Deviation	Min	Max
<i>Household characteristics</i>											
Use mobile money platforms	4,019	0.15	0.358	0	1	No confidence in digital services	4,019	0.520	0.500	0	1
Household size	4,019	5.20	2.672	1	20	Prefer use of cash	4,019	0.650	0.477	0	1
Female household head	4,019	0.08	0.279	0	1	Use MFI services	4,019	0.005	0.070	0	1
Age	4,019	41.00	13.230	16	85	Use chilimba (Merry-go-round)	4,019	0.132	0.338	0	1
Marital status - married	4,019	0.82	0.385	0	1	Use other informal groups	4,019	0.239	0.426	0	1
Economic status - poor	4,019	0.19	0.389	0	1	Use bank services	4,019	0.260	0.439	0	1
Employed	4,019	0.18	0.381	0	1	Use saving services	4,019	0.690	0.463	0	1
<i>Education</i>											
Primary education	4,019	0.27	0.441	0	1	<i>Proxy for proximity to service</i>			4,019	0.310	0.462
Secondary education	4,019	0.52	0.880	0	2	15 minutes or less	4,019	0.161	0.367	0	1
Tertiary education	4,019	0.18	0.383	0	1	15 minutes to 30 minutes	4,019	0.091	0.288	0	1
Location - rural	4,019	0.42	0.494	0	1	30 minutes to 1 hour	4,019	0.094	0.292	0	1
<i>Exposure/Experience with services</i>											
Use formal services	4,019	0.40	0.491	0	1	1 hour and above	4,019	0.150	0.357	0	1
Use informal services	4,019	0.16	0.369	0	1						

Source: Author's own analysis

In the summary statistics, we observe that in terms of our dependent variables, 52 percent did not have trust in digital services and that 65 percent prefer use of cash. This sets out an interesting outlook in investigating the drivers to this occurrence. Other key variables are observed as follows: formal service use scored 40 percent, informal 16 percent, 18 percent of individuals had a tertiary education, 53 secondary education and 27 primary education. Other variable details are as indicated in the table.

## Results and discussions

Table 4: Bivariate probit estimation

Probit and bivariate probit results, marginal effects											
Explanatory Variable	Probit		Biprobit 1 (1,1)		Biprobit 2 (1,0)		Biprobit 3 (0,1)		Biprobit 4 (0,0)		
	Prefer use of cash (PC)	No trust in digital services (NTD)	PC=1, NTD=1	PC=1, NTD=0	PC=0, NTD=1	PC=0, NTD=0					
<i>Household characteristics</i>											
Household size	-0.005(0.003)	0.003(0.003)	0.001(0.003)	0.003(0.002)*	-0.004(0.002)*	0.002(0.002)					
Female household head	0.009(0.028)	-0.19(0.029)	-0.009(0.025)	-0.011(0.013)	0.019(0.022)	0.001(0.021)					
Age	0.001(0.001)	0.001(0.001)**	0.001(0.001)	0.001(0.001)**	-0.001(0.001)**	-0.001(0.001)					
Marital status - married	0.017(0.028)	-0.004(0.029)	0.005(0.026)	-0.009(0.014)	0.012(0.021)	-0.008(0.021)					
Economic status - poor	-0.037(0.023)	-0.031(0.024)	-0.037(0.021)*	0.005(0.012)	0.001(0.018)	0.031(0.018)*					
Employed	0.11(0.024)	-0.028(0.025)	-0.014(0.022)	-0.015(0.011)	0.026(0.019)	0.003(0.018)					
Location - rural	-0.024(0.018)	0.071(0.019)***	0.037(0.017)**	0.036(0.010)***	-0.060(0.014)***	-0.012(0.014)					
<i>Educational status (base=e= no education)</i>											
Primary education	0.014(0.020)	0.039(0.021)*	0.033(0.019)*	0.007(0.010)	-0.019(0.015)	-0.021(0.015)					
Secondary education	-0.16(0.010)	-0.001(0.011)	-0.008(0.010)	0.007(0.005)	-0.009(0.008)	0.009(0.008)					
Tertiary education	0.104(0.024)***	-0.042(0.025)*	-0.074(0.021)***	0.032(0.013)**	-0.033(0.017)*	0.075(0.020)***					
<i>Proximity to financial institutions (proxy using time)</i>											
15 minutes or less	-0.011(0.024)	-0.067(0.025)***	-0.050(0.022)**	0.018(0.011)*	0.039(0.019)**	0.029(90.019)					
15 minutes to 30 minutes	0.026(0.028)	-0.009(0.029)	0.005(0.026)	-0.014(0.013)	0.021(0.022)	-0.012(0.020)					
30 minutes to 1 hour	0.022(0.028)	0.001(0.029)	0.009(0.026)	-0.010(0.013)	0.012(0.022)	-0.012(0.021)					
1 hour and above	0.024(0.023)	-0.020(0.024)	-0.004(0.026)	-0.017(0.011)	0.027(0.018)	-0.006(0.017)					
<i>Exposure/experience with financial services</i>											
Use formal services	-0.026(0.025)	0.007(0.026)	-0.007(0.028)	0.014(0.012)	-0.019(0.020)	0.012(0.019)					
Use informal services	0.012(0.021)	0.019(0.022)	0.018(0.019)	0.001(0.010)	-0.006(0.016)	-0.013(0.015)					
Use MFI services	0.011(0.162)	-0.243(0.186)	-0.164(0.137)	-0.072(0.042)*	0.184(0.161)	0.051(0.142)					
Use chilimba (Merry-go-round)	0.047(0.023)**	0.035(0.024)	0.043(0.022)**	-0.009(0.011)	0.002(0.018)	-0.036(0.016)**					
Use other informal groups	-0.008(0.019)	-0.033(0.020)*	-0.027(0.017)	-0.007(0.009)	0.016(0.015)	0.017(0.014)					
Use mobile money services	0.034(0.026)	-0.047(0.028)*	-0.018(0.025)	-0.029(0.011)***	0.052(0.022)**	-0.005(0.020)					
Use bank services	0.012(0.026)	-0.024(0.028)	-0.011(0.025)	-0.013(0.012)	0.023(0.021)	0.002(0.020)					
Use saving services	0.010(0.016)	0.005(0.016)	0.015(0.015)	-0.002(0.008)	0.002(0.012)	-0.007(0.012)					
High fin. Literacy (proxy saving for unexpected)	0.036(0.017)**	0.32(0.018)*	0.038(0.016)**	0.005(0.008)	-0.002(0.013)	-0.031(0.012)**					
Number of observations	4,019										
Rho( $\square$ )	0.4395**										
Wald chi-square $\chi^2$ (46)	129.84										
Prob > chi-square	0.000										

\*\*\*Significance to 1%; \*\*Significance to 5%; \*Significance to 10%

Note: robust standard error figures in parenthesis with marginal effects in front

Source: Author's own analysis

Table 4 above details our bivariate probit estimations. In the first two columns, we highlight the two univariate probits for 'prefer use of cash' (PC) and 'no trust in digital services' (NTD). The rest of the columns detail a combined simulation of the two variables in the bivariate probit model. The following scenarios are considered in the simulation: when an individual prefer use of cash in financial transactions and has no trust in digital services (Biprobit 1); individual prefer use of cash and does not demonstrate lack of trust in digital services (Biprobit 2); individual has no trust in digital platforms but does not demonstrate preference of use of cash (Biprobit 3); and finally, when individuals neither prefer use of cash nor lack trust in digital financial services (Biprobit 4). Our explanatory variables are grouped into the following three categories: i) Household characteristics; ii) exposure and experience with financial services and; iii) proximity to financial services. The full details of the variables are highlighted in above section.

We establish a positive correlation in the error terms of 'preference for cash use' and 'no trust in digital services', the two dependent variables. As indicated in table above, the estimation has a significant rho with a positive coefficient. This established correlation justifies our use of the bivariate probit model instead of two separate probit as the former would have led to estimation bias, inconsistency and inefficiency in our outcomes.

In *Biprobit 1*, being poor is established to be significant and with a negative effect on the likelihood of demonstrating preference for cash use and lack of trust in digital services. This segment of the population is established to be 3.7 percentage points less likely to ascribe to the two notions under study. This result is outside our expectation, as this segment was hypothesised to be more likely to prefer use of cash in financial transactions and have less trust in digital financial services relative to their affluent counterparts. Further, rural dwellers are observed to be more likely perceive the two notions simultaneously by 3.7 percentage points relative to their urban counterparts. This outcome was in line with our hypothesis as financial service infrastructure still remains disproportionate between urban and rural set-up, especially by the time the data was collected in 2015. In this simulation category, education of an individual is established to play a key role. Individuals with a primary education are established to be more likely to prefer use of cash and have not trust in digital financial services by 3.3 percentage points. On the other hand, persons with a tertiary education are less likely to ascribe to these two notions by 7.8 percentage points relative to their counterparts without an education. In terms of proximity to financial services, we establish that individuals that live close to financial services are less likely to perceive the two notions. This is within our research hypothesis and is consistent with the existent financial literature. Our estimations indicate that individuals that live less than 15 minutes to a financial service are 5 percentage points less likely to perceive the two notions compared to their counterparts that live above 15 minutes from a financial facility. When it comes to exposure and experience in the use of financial services, it is observed that individuals that use informal financial services such as merry-go-round are 4.3 percentage points more likely to prefer use of cash and have lack of trust in digital financial services. Lastly on this segment, our proxy<sup>4</sup> for financial literacy was established to be significant and with a positive effect on the preference for cash use and lack of trust in digital financial platforms. This was outside the research expectations and would be interesting to further explore the outcome especially in the next survey were a more robust measure of financial literacy is likely to be included.

In *biprobit 2*, when an individual 'prefers use of cash' but does not perceive 'lack of trust in digital financial services', the following variable are established to be significant: household size, age, identifying as a rural dweller, having tertiary education, being close to a financial service point using MFI services and using mobile money. We observe that individuals that live in rural settings, are 3.6 percentage points more likely to prefer cash but not perceive 'lack of trust in digital financial services'. This is within our research hypothesis and expectation. Further, having tertiary education increases the likelihood of an individual identifying with *biprobit 2* by 3.2 percentage points. In terms of use of financial services, MFI and mobile money services, our simulation indicates that the likelihood of an individual being in the situation of *biprobit 2* reduces by 7.2 and 2.9 percentage points respectively compared to their counterparts who do not use these services. The rest of the significant variables are marginally significant. Refer to above table of those variables.

In *biprobit 3*, when individuals do not prefer use of cash and have lack of trust in digital financial services, we establish significance in same variables as in *biprobit 2* but with the opposite signs and difference in size except for proximity to a financial service point. Results of this simulation are presented in column 5 of table 4. This result indicate consistency in our model results as the two columns represent opposite<sup>5</sup> *biprobit* simulations in our model.

In our last simulation, *biprobit 4*, for individuals who neither prefer cash nor perceive lack of trust in digital financial services, we establish that following variables to be significant: individuals identifying as poor,

<sup>4</sup> Saves for unexpected events

<sup>5</sup> *Biprobit 2* being individuals that prefer cash transactions but do not perceive lack of trust in digital financial platforms while *biprobit 3* has no preference for cash and lack of trust in digital financial platforms

persons with tertiary education, using informal financial services (specifically Merry-go-round) and those who save for unexpected events (the variable we used as a proxy for high financial literacy). Our work establish that poor individuals are more likely to identify with *biprobit 4* scenario than their counterparts who were categorised<sup>6</sup> to be less likely to be poor. They were 3.1 percentage points more likely to identify with this scenario. This result was out of the expectation of our study. The expectation was that poor individuals will have less access to digital services hence have negative perception relative to their counterparts. In terms of education, we establish that those with a tertiary education are 7.5 percentage points more likely to identify with *biprobit 4* simulation. This result was within our research expectation. Those using informal services (specifically Merry-go-round services) are observed to be 3.6 percentage points less likely to identify with *biprobit 4* scenario. This is another result that was within the research expectation as these individuals usually have less access to digital services because of inequality in the destruction of financial infrastructure, hence, more prone to having negative perceptions. Lastly, the proxy for high financial literacy (saving for unexpected events) was established to be 3.1 percentage points more likely to identify with *biprobit 4* scenario.

### **Conclusions and project implications**

In this research we establish the drivers of individual preference for cash transaction and low trust in digital financial service platforms. We employed a bivariate probit model because of the positive correlation that was established between the unobserved term of 'preference for cash transactions' and the 'lack of trust in digital platforms' dependent variables. We perform different simulations as demonstrated in our results and discussion section. In our main scenario, when individuals show lack of trust in digital financial services and prefer use of cash transactions, we establish that an individual's economic status, location (rural/urban), educational status, proximity to financial service facilities, use of informal financial services and financial literacy are significant in influencing this scenario in individuals.

Specifically, we establish that having a tertiary education, being close to a financial institution and surprisingly being poor had a negative impact on an individual's likelihood of showing preference for cash transactions and lack of trust in digital financial platforms. On the other hand, identifying as a rural dweller, using informal services (specifically Merry-go-round) and saving for unexpected events had a positive effect on an individual's likelihood of showing preference for cash transactions and lack of trust in digital financial services in the economy.

With these results, stakeholders in the financial sector should continue with efforts on financial literacy. This helps in raising awareness on the operations and reliability of digital financial service platforms. It helps address myths that are held by some segments of the population thereby, mis trust in use of these platforms. The results also demonstrate the importance of formal education in consolidating the financial education messages as we established that those with tertiary education are less likely to perceive our main scenario that we have highlighted herein. Further, the results also offer a case for ensuring close or availability of financial facilities in neighbourhoods. This was highlighted in the proximity variable which was observed to be negative, therefore, individuals that are close to a financial facility are less likely to show preference for cash transaction and lack of trust in digital platform. Therefore, stakeholders should keep on pushing the expansion of financial infrastructure in the economy. In the past years, there has been a great move on this agenda as the financial sector has seen an increase in service points especially driven by mobile money services.

### **Research limitation**

One major study limitation is year of the dataset used. We employ the 2015 Zambia FinScope survey, the latest publicly available dataset. With this in mind, the data used in this empirical analysis does not incorporate the gains that have been registered in the financial system since its official launch. With this note, a new analysis should be conducted once latest FinScope Survey data is available.

### **Potential research**

- Once 2020 FinScope data is available, conduct a similar empirical analysis to understand the changes gained since the launch of the 2015 survey.
- It would be also interesting to design a study that investigates whether the COVID -19 pandemic has had any potential positive impact on consumer trust in digital financial service platforms.

---

<sup>6</sup> Using the Progress out of Poverty Index (PPI)

### **References**

- [1]. Allison, P. (2012). "When Can You Safely Ignore Multicollinearity?" Statistical Horizons. September 10, 2012. Available at <http://statisticalhorizons.com/multicollinearity>
- [2]. Ardizzi, G., Iachini, E. 2013. Questioni di Economia e Finanza Number 144, Publishing Division of the Bank of Italy, January, 1-49.
- [3]. Goczek, Ł., Witkowski, B. 2015. Determinants of card payments. Applied Economics, 48(16), 1-14.
- [4]. Greene W., 2012, Econometric Analysis.7<sup>th</sup> ed., Upper Saddle River, NJ: Prentice Hall
- [5]. Kosse, A. 2010. The safety of cash and debit cards: a study on the perception and behaviour of Dutch consumers. DNB Working Paper, no. 245, 77-98.
- [6]. Menard, S. (2010). Logistic regression: Introductory to advanced concepts and application. Los Angeles: SAGE
- [7]. Menard, S.W., 2002. Applied Logistic Regression Analysis. London: SAGE.
- [8]. Wooldridge, J. (2010): Econometric Analysis of Cross Section and Panel Data (2<sup>nd</sup> Ed.).MIT Press
- [9]. Zambia FinScope survey (2015), FinAccess National Survey 2015: Profiling Developments in Financial Access and Usage in Zambia. Lusaka: Central Bank of Zambia.

## Appendix

Appendix 1: Correlation table

	No trust in digital services	Prefer cash transactions	Household size	Female household head	Age	Marital status - married	Marital status - poor	Employed	Primary education	Secondary education	Tertiary education	Location - rural	Location - formal services
No trust in digital services	1.000												
Pref cash transactions	0.280	1.000											
Household size	0.023	-0.032	1.000										
Female household head	-0.020	-0.005	-0.022	1.000									
Age	0.036	-0.009	0.042	0.053	1.000								
Marital status - married	0.019	0.009	0.103	-0.714	-0.054	1.000							
Economic status - poor	0.039	-0.030	0.435	-0.008	0.012	0.048	1.000						
Employed	-0.040	0.011	-0.037	-0.019	-0.010	0.013	-0.119	1.000					
Primary education	0.071	0.024	0.120	0.056	0.026	-0.011	0.273	-0.115	1.000				
Secondary education	-0.019	0.006	-0.089	-0.096	-0.006	0.043	-0.183	0.023	-0.358	1.000			
Tertiary education	-0.071	-0.062	-0.058	0.013	-0.020	-0.021	-0.211	0.144	-0.280	-0.278	1.000		
Location - rural	0.094	-0.020	0.133	-0.053	-0.002	0.072	0.395	-0.124	0.276	-0.208	-0.177	1.000	
Use formal services	-0.065	-0.010	-0.041	0.028	-0.010	-0.044	-0.224	0.234	-0.220	0.105	0.297	-0.242	1.000
Use informal services	-0.007	0.006	-0.027	-0.045	-0.004	0.052	-0.071	0.051	-0.071	0.069	0.020	-0.155	0.101
Use MFI services	-0.028	0.001	0.003	-0.008	-0.009	0.022	-0.023	0.062	-0.028	-0.004	0.060	-0.015	0.062
Use chilimba (Merry-go-round)	-0.010	0.036	-0.047	-0.090	-0.031	0.072	-0.148	0.126	-0.107	0.074	0.055	-0.157	0.138
Use other informal groups	-0.022	0.000	0.035	-0.058	0.003	0.039	-0.012	0.023	-0.020	0.003	0.028	0.030	0.059
Use mobile money platform	-0.069	0.010	-0.043	0.025	-0.004	-0.045	-0.154	0.118	-0.137	0.081	0.210	-0.188	0.529
Use bank services	-0.060	-0.007	-0.031	-0.009	-0.007	-0.012	-0.185	0.325	-0.190	0.055	0.328	-0.177	0.699
Use saving services	0.005	0.011	-0.003	-0.022	0.002	0.006	0.000	0.039	-0.001	0.009	0.014	0.015	0.046
High fin. Literacy (proxy s	0.020	0.032	0.035	-0.075	-0.025	0.064	-0.006	0.147	-0.030	0.011	0.075	0.013	0.153
15 minutes or less	-0.087	-0.015	-0.055	0.065	-0.012	-0.079	-0.174	0.099	-0.158	0.084	0.181	-0.286	0.261
15 minutes to 30 minutes	-0.019	0.015	-0.029	0.047	0.002	-0.037	-0.126	0.048	-0.104	0.062	0.106	-0.175	0.159
30 minutes to 1 hour	-0.003	0.012	0.004	-0.008	-0.018	-0.004	-0.091	0.038	-0.065	0.064	0.035	-0.120	0.081
1 hour and above	0.015	0.011	0.054	-0.015	-0.021	0.027	0.109	-0.030	0.087	-0.042	-0.068	0.238	-0.023
Informal services		MFI services	Chilimba (Merry-go-round)	Other informal groups	Mobile money	Bank services	Saving services	High fin. Literacy	15 minutes or less	15 to 30 minutes	30 minutes to 1 hour	1 Hr and above	
Use informal services													
Use MFI services	1.000												
Use chilimba (Merry-go-round)	0.038	1.000											
Use other informal groups	0.012	0.320	1.000										
Use mobile money platforms	0.072	0.100	0.016	1.000									
Use bank services	0.089	0.129	0.050	0.294	1.000								
Use saving services	0.021	0.043	0.013	0.028	0.044	1.000							
High fin. Literacy (proxy saving for unexpected)	0.040	0.088	0.015	0.069	0.183	0.061	1.000						
15 minutes or less	0.022	0.098	0.030	0.281	0.211	0.009	0.019	1.000					
15 minutes to 30 minutes	0.002	0.037	0.014	0.170	0.114	-0.005	0.043	-0.144	1.000				
30 minutes to 1 hour	0.004	0.015	-0.012	0.082	0.039	0.006	0.030	-0.134	-0.100	1.000			
1 hour and above	0.029	-0.034	0.029	-0.039	-0.029	0.008	0.023	-0.167	-0.125	-0.116	1.000		