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Does Financial Training and Consumption Information via Mobile Application Technology Promote Financial Inclusion?

By Leonard Wantchekon



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Does Financial Training and Consumption Information via Mobile Application Technology Promote Financial Inclusion?

Leonard Wantchekon

Abstract

Policymakers and scholars largely agree that financial inclusion leads to economic growth and better livelihoods (Beck and Demirgüç-Kunt, 2008 ; Demirguc-Kunt et al., 2018). Financial services provide a path for greater inclusive development if used properly. Financial services in developing countries suffer from information asymmetries. Information asymmetries reduce access to credit where individuals do not have assets for collateral (Besley, 1995). The specific objective of this research is to determine the effect that mobile application-based financial training and user consumption information has on financial inclusion, with a special focus on the demand and supply of credit. This research study hypothesizes that mobile application based financial training and consumption information can increase individuals' access to credit.

1 Introduction

Policymakers and scholars largely agree that financial inclusion leads to economic growth and better livelihoods (Beck and Demirgüç-Kunt, 2008 ; Demirguc-Kunt et al., 2018). Financial services provide a path for greater inclusive development if used properly. Financial services provide individual economic security and lead to long-term economic development (Beck and Demirgüç-Kunt, 2008). However, the propensity for exclusion in financial services in Africa limits the benefits of economic growth at the national and individual level (Beck and Demirgüç-Kunt, 2008). African banking systems are less inclusive than other regional financial institutions (Allen et al., 2014 ; Beck and Demirgüç-Kunt, 2008).

The banking sector in Sub Saharan Africa (SSA) has lower depth and coverage than other regions (Mecagni et al., 2015). There is less domestic credit provided by the financial sector in SSA than in other low income and middle-income countries (Mecagni et al., 2015). The asset quality and provision of loans is lower in SSA than in other developing country regions (Mecagni et al., 2015). Poor capacity of the banking sector results in limited credit access and high rates of non-performing loans because it is too costly to efficiently monitor and assess borrowers' credit risks (Amidu, 2014).

The lack of assets among many potential borrowers in Africa creates an enforcement dilemma because banks cannot collateralize loans (Amidu, 2014). Supply and demand of credit could be improved through developing accountability mechanisms that overcome the enforcement challenges of uncollateralized loans (Sacerdoti, 2005). The high interest rates and requirements on small and medium sized loans exclude poor and middle class from accessing credit. Presently, borrowers in developing countries are more likely to borrow from family or friends because they do not have access to formal credit (Demirguc-Kunt et al., 2018).

Financial services in developing countries suffer from information asymmetries. Information asymmetries reduce access to credit where individuals do not have assets for collateral (Besley, 1995). Effective use of mobile technology and consumer data can reduce information asymmetries thereby decreasing credit risk. A reduction in credit risk may incentivize banks to provide loans to a wider population. Concurrently,

information technology could lessen credit risk which may incentivize banks to decrease interest rates to encourage greater borrowing. Information technology could therefore increase both the supply and demand for credit simultaneously through risk reduction strategies.

Financial inclusion is not only lower in Africa than other regions, but poorer people make up a disproportionate share of the unbanked (Demirguc-Kunt et al., 2018). The poor in Africa are thus an excluded category that should be targeted to ensure financial development does not further the inequality gap between rich and poor. Increasing financial inclusion, especially to the most marginalized groups, has the potential to promote individual and national economic wellbeing. Mobile technology could be a promising tool to provide information that can strengthen trust between lenders and borrowers, thus increasing access to credit (Gabor and Brooks, 2017).

Financial information could empower individuals to make better financial decisions which can signal to lenders their reduced risk. Based on this literature, our study is engaged in a quest to understand the causes and determinants of such low financial inclusion in Benin, and assessing the impact of a tool that could solve the problem of difficult access to financial services is the overall objective of this study. We conduct an experiment evidence in Benin which aims to see the causal effect generated by a specific training in financial education and a virtual accompaniment through a mobile application (based on users' consumption information) has on financial inclusion. It should be noted that particular emphasis is placed on the demand and supply of credit.

This research study hypothesizes that mobile application based financial training and consumption information can increase individuals' access to credit according to two dimensions: First, by reshaping individual financial decisions that make the user more financially sound, thereby reducing risk of default. Secondly, by reducing information asymmetries to signal to lenders the users' credibility to receive loans, thereby increasing trust between lender and borrower. It is hypothesized that financial training through mobile technology will induce users to participate in a greater range of financial services such as savings accounts, financial transactions between friends, families or employers, purchase of insurance policies etc. As users become more financially included, they will increase their demand for credit.

At the same time, the user will signal to lenders his/her likelihood of defaulting. The increase in demand for credit will be met with an increase in the supply of credit as a result of a reduction in information asymmetries between borrower and lender. Thereby, this research tackles the empirical research question of how does Financial Training and Consumption Information via Mobile Application Technology Promote Financial Inclusion? To answer to this question, we are particularly interested in the following questions:

- Does financial inclusion lead to a consumption smoothing?
- Does individual access to information (financial literacy) lead to consumption smoothing?
- Does financial inclusion lead to an improvement in credit monitoring?

Benin is a developing country with a financial service sector that does not yet satisfy the 11 million habitants of the country. Benin's financial system is made up of two major poles: the banking sector and the micro-finance sector. These two poles aim to create an offer accessible to all segments of the population. Although Benin has 15 banking companies and 100 microfinance companies (Service Financier Décentralisé; SDF), only 08 % of the population has a bank account and about 35% used microfinance services (FinScope, 2018). Our paper provides several contributions to the literature. First, it contributes to the expanding literature on the determinants of financial inclusion with focus on specific countries worldwide and in Africa. Second, our analysis contributes to the literature on key current finance issues for African countries: importance of FinTech for financial inclusion. Our analysis is of prime interest, considering for instance the success of mobile phone-based payments system and the potential of mobile banking among the continent, because it can highlight how FinTech can be strengthened to improve access to credit. Understanding the causes and determinant of such low financial inclusion in Benin, and assess the impact of a tool that could solve

the problem of difficulty of accessing financial services is the general objective of this study. The paper is organized as follows. Section 2 is dedicated to the related literature. Section 3 provides descriptive statistics on our sample. Section 4 presents the main estimations. Section 5 provides additional estimations to dig deeper what shapes financial inclusion. Section 6 concludes.

2 Literature review

Financial inclusion can be defined as the “process that ensures the ease of access, availability and usage of the formal financial system for all members of an economy” (Sarma, 2008). Financial inclusion leads to economic benefits through the use of financial services to more efficiently save and borrow money (Zins and Weill, 2016). Studies have reported the positive effects of financial inclusion on entrepreneurship, investments in education, financial stability, and women’s empowerment (Demirgüç-Kunt and Klapper, 2012; Swamy, 2014, Han and Melecky, 2013). Developing countries fall behind developed countries in measures of formal financial inclusion (Demirguc-Kunt et al., 2018). 94 percent of adults in developed countries have a bank account compared to 63 percent in developing countries (Demirguc-Kunt et al., 2018). There is a notable gender gap worldwide in account ownership (72 % male account ownership versus 65 percent female account ownership) (Demirguc-Kunt et al., 2018). A gap exists between rich and poor account ownership: adults in the wealthiest 60 percent are 13 % more likely to have an account than the poorest 40 percent (Demirguc-Kunt et al., 2018). 1.7 billion adults remain unbanked globally and the developing world makes up a larger proportion of the unbanked (Demirguc-Kunt et al., 2018). Poorer people disproportionately represent the unbanked population (Demirguc-Kunt et al., 2018). The unbanked are correlated with low educational attainment and unstable or informal employment (Demirguc-Kunt et al., 2018). Women are statistically more restricted in access to financial services due to systemic gendered barriers. Women are less likely to be able to present collateral due to systemic gendered barriers and are therefore more limited in their ability to access credit (Alterido et al., 2013).

The Post-Washington Consensus has placed a growing emphasis on social and financial inclusion to promote development (Gabor and Brooks 2017). In 2011, policymakers and regulators from ninety developing countries organized the Alliance for Financial Inclusion (AFI) with funding from the Bill and Melinda Gates Foundation and endorsement from the G20 with the aim of improving financial inclusion in their nations (Gabor and Brooks 2017). The AFI agreed on the Maya Declaration, a commitment to ‘reach the world’s 2.5 billion unbanked’. The Maya Declaration committed to financial literacy, promotion of digital financial services for the poor, financial sector regulations that facilitate pro-poor inclusion, and an increased focus on financial inclusion data (Gabor and Brooks 2017). The World Bank has placed a growing emphasis on pro-poor economic growth through financial inclusion strategies that take a market-based approach (Gabor and Brooks 2017). There are concerns that there has been little focus on the role that financial inclusion strategies can have on increasing indebtedness and financial instability among the poor (Gabor and Brooks 2017). However, the growing belief that financial inclusion strategies lead to positive outcomes for individual wellbeing cannot be denied. There is a common understanding that the poor must be included in the financial system so as not to become further disenfranchised while the rich continue to benefit from their greater inclusion with the financial sector.

Financial innovation and technology can increase financial inclusion because it can by-pass existing structural and infrastructural barriers to reach the poor (see Ouma et al., 2017; Al-Mudimigh et al., 2020; Beck et al., 2016; Chinoda and Kwenda, 2019). Financial innovation is the process of creating new financial instruments, technologies, products and services to improve the delivery of financial services. In a recent study, Ouma et al. (2017) show that financial innovations like the availability and usage of mobile phones were used to offer financial services that promote savings at the household level and improved the amounts saved, while Chinoda and Kwenda (2019) show that mobile phone innovation improved financial inclusion in 49 countries. Given the widespread use of mobile phones, mobile technology provides opportunities for greater financial inclusion through the digitization of financial services (Gabor and Brooks 2017). 1.1 billion people and two-thirds of all unbanked adults have access to mobile phones (Demirguc-Kunt et al., 2018). In fact,

the ten economies worldwide where more adults have a mobile money account than a financial institution account are all in Sub Saharan Africa. In Cote d'Ivoire, 33 percent of adults have a mobile money account. There is reason to believe that tapping into mobile technology can play a massive role in financial inclusion beyond the current emphasis on mobile money as the main driver in the financial technology sector. [Abor et al. \(2018\)](#) argues that “mobile phones enhance users’ access to information, enables information sharing, facilitates learning, opens up opportunities for variety of choices, and increases access to a range of financial services and products” (p 444). Mobile phone technology can be used to provide the user with information about personal consumption patterns, which may lead the individual to make better financial decisions ([Zins and Weill 2016](#)).

Mobile technology can play a role in increasing the breadth of information provided to the banking sector on individual consumption patterns to better inform the types of products offered to clients. There is a growing emphasis on using data to determine individual credit and default risk. In fact, the application of consumer data to inform credit ratings has become coined “Revolution Credit” ([Gabor and Brooks 2017](#), p. 429). The banking sector has started to commodify data to determine credit potential. For example, Cignifi partnered with Oi Telecom in Brazil in 2010 to test a credit scoring platform. Cignifi scored mobile phone users without a credit history by reviewing phone use data to measure risk and determine the individuals propensity towards various financial services ([Gabor and Brooks 2017](#)). Bankable Frontier Associates uses digital information to create a credit history to offer consumers more appropriate products ([Gabor and Brooks 2017](#)). Digital technologies provide opportunities to “de-risk people who would otherwise be too risky to lend to” ([Kaminska, 2015](#), p 1 as cited in [Gabor and Brooks 2017](#)). Mobile technology applications provide increasing opportunities for data collection of consumer choices which can reduce information asymmetries that negatively affect financial inclusion. Information can be used to increase the banks confidence in borrowers who do not have more traditional means of determining risk, such as assets for collateral. As a result, this information can potentially increase access to credit to those who fail to meet the traditional requirements for borrowing in the formal banking sector. Data from financial technology (fintech) companies can “inform behaviour change strategies” and “inform risk management strategies” ([Gabor and Brooks 2017](#), p. 430). Fintech companies can design more effective ways of improving individual behaviours and provide more information to financial institutions on behaviour patterns, both of which reduce risk and potentially increase access to credit. The use of data to inform product design has great potential to make financial services more inclusive to a wider population, especially the most marginalized. However, it is worth mentioning that there are of course concerns regarding access to private data history in the effort to promote financial inclusion ([Gabor and Brooks 2017](#)). This area is outside of the purview of our current research study but must be considered.

In Benin, the economic and social crisis of the 1980s has particularly given rise to informal financial practices. Since this is a very personalized finance in which the economic and the social are strongly intertwined, all the Beninese population, or almost all, participate ([Lelart et al., 2007](#)). It can take the forms of help (donations, interest-free loans), deposits (from family proximity or social networks) or tontine. Tontines exist in various forms that cannot be exhaustively inventoried because they vary both by the socio-economic characteristics of their members and by their modes of operation ([Servet, 1996](#)). However, the most common classification opposes i) the mutual tontine in which each participant receives as much as he pays; (ii) the commercial tontine in which the organizer (the tontler, the guard) is remunerated either in the form of retention of the first payment made at each cycle of the tontine or as a percentage of the lot periodically given to each beneficiary member tontine and (iii) the financial tontine in which the lot is auctioned (*ibid* .: 30).

Money Transfers, Mobile Banking and Digital Finance are the new products that are gradually entering the financial services offer in Benin and aim to facilitate the inclusion of the poorest in financial systems. The financial inclusion rate went from 2% in 2014 to 38% at the end of 2017, with the development of digital finance. Despite this remarkable quantum leap, the opportunities offered by digital financial services for the well-being of populations remain less exploited. Today, four Beninese over ten use digital financial services that were virtually unknown to the public five years ago. The financial inclusion rate was 38% at the end of 2017 (35% in rural areas), while it was only 2% in 2014, according to figures from Global Findex, Gsma 2017.

The Central Bank of West African States (Bceao) indicates that nearly 2 million of customers' accounts are active among 6,5 million registered for the digital financial services. Overall, 8.8 million transactions are made for an amount of 156.5 billion FCFA per month. This implies that more than 5 billion FCFA of operations are made in Benin on a daily basis. Benin as the fifth country in the UEMOA space hold 11.9% of account receivable share. This quantum leap is made despite the high illiteracy rate of the population thanks to, among others, the UN Investment Agency, Uncdf, which launched in 2015 the program Mobile money for the poor (Mm4p) to support banks, operators and mobile network regulators to reach the millions of customers excluded from the mainstream banking system. In partnership with MasterCard Foundation, the program collaborates with the entire digital financial services ecosystem (Sfn) to strengthen the technical capabilities of stakeholders and improve the market through the development of distance banking and financial services as well as the various channels to access them. With a high rate of penetration of mobile phones (78%), digital has proved to be a real tool to access financial services and thus stimulate economic development.

Following this, and due to the lack of information, ASE has created an application to help population on their general finance and including: type of expenses, revenues, forecasts, budget planning, and including reminder components according to the pre-set budget limit.

3 Descriptive statistics

3.1 Methodology

Based on the objectives we aim to attend; we choose to apply the “Randomized Control Trial (RCT)” which is an impact evaluation method. This method allows us to more rigorously measure the effect of financial education coupled with the use of a mobile application allowing individuals to better budget their incomes and expenditures and providing individualized information on the consumption habits of consumers. The treatment group had completed financial literacy lessons two times per week for a month and have had access to personal financial decision data throughout the training period. In addition, this group received a mobile application (like a virtual portfolio manager, named “Personal Financial Management”, created by the ASE) to enable them to better budget and plan their finance. The control group received neither the mobile technology application nor the financial education training.

In order to have a representative sample from the sampling frame, the first step of sampling is the determination of sample size according to the Randomize Control Trial methodology. Thus, we obtained a minimum of 36 participants in order to have a statistical power of 80 to detect a treatment effect of 35% increase. The second stage of the sampling plan was the identification of the primary sampling units. These units are stratified by socio-professional category. With information on the initial population based on the baseline survey, the selection is based on a simple random sampling method. Thus, our sample size of 70 corresponds as closely as possible to the various characteristics of the initial population (Graph 1). The treatment consists mainly of 08 (eight) sessions that allowed us to provide as much information and knowledge as possible about financial education. It is subdivided into 03 modules that are:

- Notions on Financial education
- Mobile application for budgeting
- Financial services and products in Benin.

One of the advantages of this treatment is the course named financial services and products in Benin. The opportunity is given to several financial institutions operating in Benin (banks, insurance, management, Intermediation Company, and telecommunication Company) to come on the one hand to explain their actions in order to contribute to better financial inclusion and to present their products and services. This exchange session aims to give participants more clarity for a better use of financial services and products.

3.2 The mobile application

African School of Economics has created a mobile application to help population on their general finance: type of expenses, revenue, and so on. The software allows user to:

- View expenses and revenues, sorted by categories by day, week, month and year;
- Manage personal or professional finances;
- Manage business expenses and revenues;
- Plan, control and monitor expenditures by category;
- Visualize through graphs the distribution of expenses;
- Notify the user on the categories of major expenses and revenues.

The software call “Gestion des Finances Personnelles” is an android app which help user to budget expenses such as: Food and drink; Health, Transport, Education, Ceremony Family assistance, Travel Skillfully, Entertainment, Savings, etc. It helps him to be align with his planification and avoid non useful expenses. By sending notification to user to inform about the percentage of planification made, this app helps him to better manage finance. The mobile app has the personal finance section and a business finance section. In order to carry out this project, we have collected base line data to know the level of financial inclusion of the individuals before this training. The treatment is the training and the provision of the application, we have launched during 02 (two) months a communication campaign to allow those interested to sign up for a totally free training in financial education. At the end of these 02 (two) months, there were 180 registrants. On the 180 applicants constituting the parent population for this study, a survey of basic data collection was conducted among registrants to know the level of financial inclusion of individuals before the training. This collection which lasted 02 (two) weeks was carried out through individual interviews in Cotonou and Abomey-Calavi and surroundings. After this period, 171 people interested to participate in the training have been surveyed

4 Descriptive analysis

RCT methodology, requires to check for the internal validity in other to detect the causal effect. This implies to verify if the control and treated groups have the same characteristics, i.e. almost perfect homogeneity before the implementation of the study treatment. In our case, treatment and control groups were similar at the baseline in terms of sociodemographic and financials variables (see table 1). The demographics variables such as gender, education, employment status and age have no statistical differences. The same is observed for the financial variables as their p-values are greater than the 5% level of significance. Both groups appeared statistically identical.

In this study, we considered an individual with an account in a financial institution as any individual who has an account in a bank, or microcredit, or at the post office or other formal financial institution, or a mobile money account or multiple of them. Our study was conducted in an urban area (Cotonou, Calavi and surroundings) thus; there was a strong chance to get more people with a financial account. Data from [Lay\(2018\)](#) shows the high proportion of people with financial accounts in urban areas (53%, [Lay, 2018](#)) versus those in rural areas (34%, [Lay, 2018](#)). As we can excepted, we found that approximately 97% of those interested in training have an account at a financial institution. Though employment and age influence a person to have an account, as shown in table 2, being educated and having an account are strongly correlated.

Base on common sense, we can presume that a person age matter in having a financial account or not. Among several new financial services that appear during the last decade, parents can create a financial account for

a newly borne baby and even yet the baby is not borne. The diversification of services leads us to find if there is a link between age and having a financial account. We have observed a positive and significant link between the age of the individual and whether or not they have an account in a financial institution. This implies the more aged an individual is, the more likely he is to have an account.

Also, the level of education is strongly correlated to the fact that the individual has a financial account. Generally, the most educated are those who have a strong propensity to have a financial account. This reinforces the findings of the World Bank in the Global Findex database Report (2017) that ownership of an account is lower among less educated adults.

Working status is strongly related to the fact that our sample individual can easily get a loan. Employers are thus more likely to obtain a loan. This can imply that workers are then more likely to have an account. As a matter of fact, Benin’s government implemented a policy which oblige firms to pays salaries through financial institutions. Not only employment represents a guarantee to get a loan; as shown in table 2, individuals’ age also has to a certain degree an impact to the access of loan.

The demographic variable, gender, also expresses in general a certain level of significance. The use of the mobile application for budgeting as well as saving and loan are positively correlated even though it is not statistically significant. On the other hand, we noticed a negative correlation between having a bank account and the gender of a person. Our database revealed that men are more likely to have an account.

5 Main estimation

In this section we run analysis to capture the effect of the treatment on saving and access to credit. The estimating equation is:

$$Y_{ij} = \beta_0 + \beta_1 G_{ij} + \beta_2 X_{ij} + \epsilon_{ij} \quad (1)$$

where Y_{ij} is the posttest score of person i in group j (e.g. $j = 1$ for control, $j = 2$ for treated), G_{ij} is a treatment indicator ($G_{i1} = 0$ for controls, $G_{i2} = 1$ for treated), X_{ij} is the covariate, e.g. the pretest score, and ϵ_{ij} is normally distributed with zero mean and constant variance. Then β_1 measure the overall treatment effect. Analysis was conducted on an Average Treatment Effect (ATE). Considering the internal validity of the random assignment shown in the balance table (table 1), we know that the two groups (control and treatment) are statistically the same, and any difference that occurs is due to the treatment. The main analysis considered the differences between the outcome measures within treatment and control group. The differences obtained from it were compared using unpaired-tests for data that were acceptably close to a normal distribution. In order to analyze the effect in terms of percentage, we run our analysis after making the logarithm transformation. As table 3 shows, 100% of the treatment group make use of the Fin tech application. This is very encouraging as financial institutions can decide to rely on the information appearing in the Fintech application to make a judicious decision as to provide a loan. Also, through the use of the mobile application, individual can better manage their finances. As result, receiving the treatment increase by around 86% the saving behavior of an individual (table 3).

Likewise, 75% of the treatment group increased their saving patterns compare to only 50% in the control group (table 4). Based on the difference and difference approach we realize in the table 5 that women have more improvement than men in term of saving. The highest improvement was notable among the young (25-34 years old). A part of the private sector workers, we realize that all other workers categories has saving amount improvement (table 5). The result suggests that individual who received the treatment are more likely to have access to credit. 39% of the treatment group was able to obtain loan and this can be explained by the fact that the use of the mobile application has a significant impact on saving behavior (table 3). Being a participant of the training significantly increase the usage of a Fintech app for financial management

(table 3). Table 6 shows how important are the usage of fintech using for budgeting in the treatment group (around 30% increase) compare to the decrease (around 17% decrease) in control group. Only Fintech using for budget was statistically significant, although it is acknowledged that the power to detect the effect is relatively low for these outcome measures.

Multiple linear regression was used to determine whether there were significant center effects between the two groups after controlling for potential confounding variables. Predictor variables were entered as continuous variables in some cases, and in other cases as categorical (dummy) variables. In this section we run analysis to capture the effect of treatment on saving, access to credit and Fintech usage.

6 Additional estimation

In order to check for robustness, we perform an ANCOVA analysis. Multiple linear regression (ANCOVA) was used to determine whether there were significant center effects between the two groups after controlling for potential confounding variables. This regression approach helps us to realize, there was a significantly greater mean improvement among all participants to the training for the saving outcomes (table 7). After controlling for age, sex, having mobile money account, financial inclusion index, and financial inclusion year, we realize that a treated person increases by 191% his saving amount. The regression coefficients are given in Table 8, together with 95% CIs. The ANCOVA model goes in the same direction as the preview analysis and help us to deduce that the treatment has around 45% in the amount of credit received (table 9).

7 Conclusion

Financial inclusion has always remained a major topic. Many authors through their papers showed how a desirable level of inclusion could be attained. Still in the same optic, this paper was conducted to find the determinants that can boost financial inclusion. For that, we applied a treatment to a group of people. Overall, we noticed an impact on the treatment group due to a behavioral change that leads them to more save and even to make use of the mobile application. Future works will be done at the level of people leaving in rural areas. Since few of them use mobile phone with the latest technologies, it will be great to see how this study can be enlarged to them so as to see a transparency in their finances; and how this can help avoid social pressure.

8 Appendix

8.1 Tables

8.1.1 Table 1: Balance table

Variables	Control		Treatment		t-test Difference	P-value
	N	Mean/SE	N	Mean/SE	(1)-(2)	
Demographics variables						
Gender	30	0.167 [0.069]	40	0.150 [0.057]	0.017	0.852
Working Statut	30	0.500 [0.093]	40	0.400 [0.078]	0.100	0.412
Age	30	25.933 [0.851]	40	27.875 [1.175]	-1.942	0.213
Income	30	2.467 [0.190]	40	2.775 [0.194]	-0.308	0
Financial variables						
Bank account	30	0.767 [0.079]	40	0.900 [0.048]	-0.133	0.133
Saving	30	0.867 [0.063]	40	0.900 [0.048]	-0.033	0.670
Loan	30	0.100 [0.056]	40	0.100 [0.048]	0.000	1.000
Fintech app using for buget	30	0.400 [0.091]	40	0.475 [0.080]	-0.075	0.539
Financial knowledge	30	3.800 [0.074]	40	3.925 [0.042]	-0.125	0.126
F-test of joint significance (p-value)					0.170	
F-test, number of observations					70	
Source: database collected in 2019						

8.1.2 Table 2: Correlation table

Financial Variables	Demographic Variables			
	Gender	Education	Employment	Age
Bank Account	-0.1674	0.2868***	0.2182*	0.2043*
Saving	0.0751	0.2818**	-0.0279	-0.1437
Loans	0.0807	0.0398	0.2215**	0.2946***
Apps for budgeting	0.0807	0.1484	0.1418	0.2156 *
Source: database collected in 2019				

8.1.3 Table 3: Difference in %

	Mean1 (control)	Mean2 (treatment)	dif	St_Err	t_value	p_value
log Saving Amount	9.855	10.719	-0.864	1.006	-0.85	0.394
log Credit Amount	1.032	1.421	-0.39	1.012	-0.4	0.702
FinTech using for Budget	1.586	2.732	-1.145	0.255	-4.5	0

Source: database collected in 2019

8.1.4 Table 4: Difference in amount

Amount Saving Diff	N	diff mean	diff median	25th centile	75th centile
Control	29	101000	0	-135000	150000
Treatment	41	-146000	-30000	-100000	0

Source: database collected in 2019

8.1.5 Table 5: descriptive statistics

Amount Saving Diff	Variables	diff	diff	25th	75th	Amount	diff	diff	25th	75th
		mean	median	centile	centile	Saving Diff	mean	median	centile	centile
		Control				Treatment				
Gender	Mal	147360.4	42500	-90000	241500	101000	-25000	-80000	0	
	Femal	-123000	-135000	-145000	-35000	-193167.5	-136500	-350000	-65000	
Age	18-24	170555.6	-35000	-80000	35000	-28416.67	-4000	-45000	23500	
	25-34	68802.94	50000	-145000	150000	-198488	-45000	-136500	0	
	35-44	72333.33	-35000	-148000	400000	-131666.7	-30000	-350000	-15000	
Profession	STUDENT	5166.667	-17500	-141500	125000	-184735	-32850	-95000	5500	
	ENTREPRENEUR	568333.3	50000	-145000	1800000	-35000	-15000	-75000	0	
	PRIVATE WORKER	37787.5	-25925	-65925	141500	31398.6	0	-30000	49993	
	PUBLIC OFFICER	-37100	-35000	-150000	400000	-371666.7	-500000	-600000	-15000	
	UNEMPLOYMENT	611000	611000	-100000	1322000	-80000	-80000	-80000	-80000	
	INTERNSHIP	-11000	35000	-168000	100000	-239000	-239000	-453000	-25000	
School level	Finished Secondary Education	-92500	-92500	-135000	-50000	2333.333	0	-8000	15000	
	University	-8750	-17500	-57500	40000	-87000	-5000	-350000	94000	
	License	251597.1	50000	-100000	400000	-231485.3	-40000	-261500	-7500	
	Master	-189250	-92500	-300000	100000	-40154.38	-30000	-80000	11000	

Source : database collected in 2019

8.1.6 Table 6: Percentage of FinTech app using for budget

Percentage of FinTech app using for budget				
	Control		Treatment	
	Before	After	Before	After
Never	58.62	68.96	53.65	17.07
Rarely	6.89	13.79	7.31	21.95
Sometimes	17.24	6.89	19.51	31.7
Almost always	17.24	10.34	19.51	29.26

Source: database collected in 2019

8.1.7 Table 7 : saving regression

Saving_Amount follow-up	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
experience_end	124000.000	26036.617	4.78	0.003	60773.200	188000.000	*
S05Q01_A_1	0.214	0.047	4.56	0.004	0.099	0.329	*
Constant	117000.000	37147.845	3.14	0.020	25872.051	208000.000	**
Mean dependent var		229345.886	SD dependent var			355180.288	
R-squared		0.060	Number of obs			70.000	
F-test		52.768	Prob >F			0.000	
Akaike crit. (AIC)		1988.554	Bayesian crit. (BIC)			1995.299	

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

Source: database collected in 2019

8.1.8 Table 8 : log saving regression

ln_ Saving_Amount follow-up	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
experience	1.918	1.068	1.79	0.079	-0.232	4.068	*
ln_Saving_Amount baseline	0.752	0.424	1.77	0.083	-0.102	1.606	*
Age	2.079	0.970	2.14	0.037	0.127	4.031	**
Sex	1.538	1.514	1.02	0.315	-1.509	4.586	
Fin Account Year	0.186	0.161	1.16	0.253	-0.137	0.509	
Having mobile money account	2.606	2.136	1.22	0.229	-1.692	6.905	
Financial Inclusion Index	8.130	9.158	0.89	0.379	-10.304	26.564	
Constant	-385.148	327.706	-1.18	0.246	-1044.787	274.490	
Mean dependent var		10.733	SD dependent var			3.949	
R-squared		0.215	Number of obs			54.000	
F-test		1.795	Prob >F			0.111	
Akaike crit. (AIC)		303.524	Bayesian crit. (BIC)			319.436	

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

Source: database collected in 2019

8.1.9 Table 9: log loan regression

Ln credit amount follow up	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	
experience_end	0.448	0.413	1.08	0.282	-0.377	1.273	
Ln credit amount base line	0.833	0.045	18.48	0.000	0.743	0.923	***
Constant	-0.255	0.324	-0.79	0.434	-0.901	0.391	
Mean dependent var		1.260	SD dependent var			4.147	
R-squared		0.836	Number of obs			70.000	
F-test		171.148	Prob >F			0.000	
Akaike crit. (AIC)		276.112	Bayesian crit. (BIC)			282.857	

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

Source : database collected in 2019

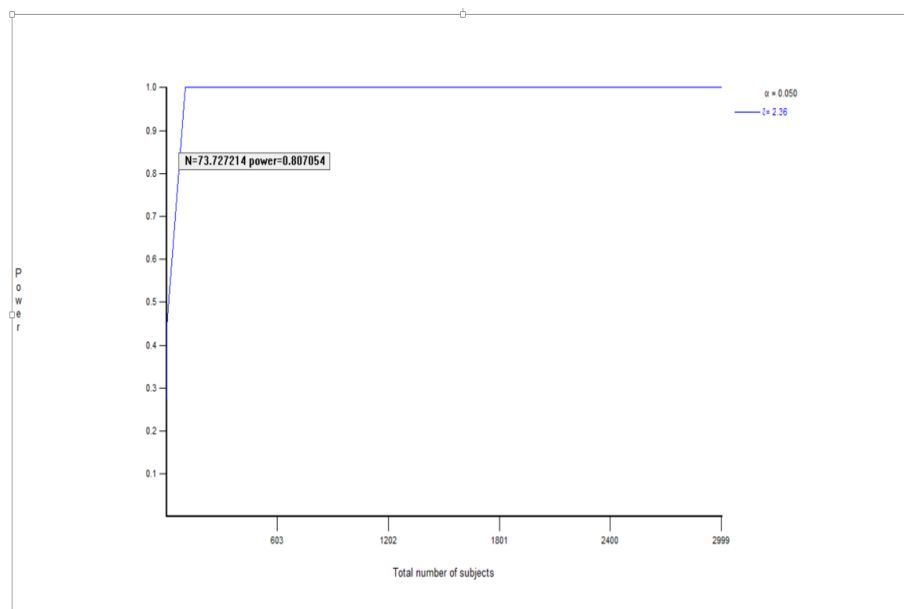
8.1.10 Table 10: Fintech app using for budget

Fintech for budget follow up	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
experience_end	1.137	0.256	4.44	0.000	0.625	1.648	***
Fintech for budget base line	0.074	0.104	0.72	0.475	-0.132	0.281	
Constant	1.443	0.280	5.16	0.000	0.884	2.001	***
Mean dependent var		2.257	SD dependent var			1.188	
R-squared		0.235	Number of obs			70.000	
F-test		10.278	Prob >F			0.000	
Akaike crit. (AIC)		209.023	Bayesian crit. (BIC)			215.768	

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

Source : database collected in 2019

8.1.11 Graph 1: Power calculation and sample size



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