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Financial inclusion, saving and borrowing behaviors in the United Arab Emirates and the United States: A comparative Analysis

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Abstract

This paper highlights the impact of financial inclusion on individuals' borrowing and saving decisions in the United States and the United Arab Emirates. It does so, using data from the 2014 Global Financial Inclusion database, and an empirical strategy consisting of first testing the significance of the joint bivariate model over its binary conterparts using the Lagrange multiplier test, followed by a contrast between the fully-parametric and semi-parametric specifications of the saving and borrowing equations.

Based on model performance measures, the semi-parametric bivariate probit specification is identified as a better framework for describing the two processes of saving and borrowing, with a correlation coefficient of 12.3%. Although no significant difference exists between UAE and US residents in borrowing behavior, we find that US residents are 31.4% more likely to save than their UAE counterparts. In addition, and in line with the Permanent Income Hypothesis, the results reveal the absence of an income based saving or borrowing gradient in the two countries. Conversely, we found the prevalence of a gender based saving (12.4%) and borrowing (13.8%) inequality in favor of the male gender. Furthermore, access to a bank account and a debit card, companies policy of direct wage and salary transfer, and government transfer programs with direct deposit options are all financial inclusion strategies that are found to significantly raise the likelihood of saving and borrowing. As such, companies with payroll practices based on cash or physical paycheck issuing, especially in the US, should revise such policy to create more financial inclusion, and thereby more saving potential which in turn would contribute to further borrowing, investment and growth of the national economy.

Keywords: Borrowing, Economic growth, Financial Inclusion, Saving, UAE, USA
JEL: C35, C55, D9, G40, H3, O47

1. Introduction

Economic growth is the common goal of all nations (Barro, 1991). Everyone lives more comfortably, with better standard of living than ever before and holds a better welfare because of the surge in national output growth (Zhang, 2008*a*). Government in every country aims to reduce poverty and increase the level of national income(Landau, 1983; Lewis, 2013). To achieve growth targets, governments may implement various kinds of policies such as encourage saving, promote borrowing and investment for increased national production (Zhang, 2018).

Investment contributes to the growth of aggregate wealth, but is strongly dependent on saving (Modigliani, 1986). It is generally accepted that increasing aggregate savings contribute to higher inventory and capital investments and thus lead to higher rate of economic growth (Arestis and Demetriades, 1997; Zhang, 2008*b*). On the other hand, empirical evidence suggests that with economic growth comes growth in personal income and per-capita consumption expenditure (Mankiw et al., 1992). According to the keynesian theory of consumption, aggregate savings also expand from increasing income (Quartey, 2008; Nurudeen et al., 2010). Based on the controversial perception about the relationship between savings and economic growth (Anoruo and Ahmad, 2001; Oladipo, 2010; Patra et al., 2017), we cannot refute that once aggregate savings increase, perhaps from rising income, it might enhance investment opportunities and generate further national economic growth (Odhiambo, 2009; AbuAl-Foul, 2010; Sothan, 2014).

Financial inclusion, defined as the state whereby individuals and businesses have access to useful and affordable financial products and services that meet their needs, which are delivered in a responsible and sustainable way (Demirguc-Kunt et al., 2018), has the potential to contribute to economic growth(King and Levine, 1993; Levine, 2005; Dev, 2006). In fact, from the definition it is clear that access to a transaction account is a first step toward greater financial inclusion since it facilitates the sending, receiving, and storage of money(en et al., 2012). A transaction account can further facilitate the delivery of other financial services such as credit card, direct loan, salary deposit/transfer, and more, thereby making its access and usage a priority of the utmost importance for economic development (Sarma and Pais, 2011).

The theoretical and empirical economic literature has evidenced the role played by many factors such as interest rate in individuals' saving and borrowing behaviors(Dehejia et al., 2012; Setterfield and Kim, 2016). Although such behaviors can be understood from inter-temporal consumption choices, based on each individual's preference, to this date, little evidence exists about the role of financial inclusion in this process (Laureti, 2018). Financial inclusion is not an end in itself but a means to an end—when people have a safe place to save money as well as access credit when needed, they are better able to build assets through productive investments, and therefore able to smooth out inter-temporal consumption(Kumar, 2013). As such using the 2014 Global Findex Data (van Oudheusden et al., 2015), this paper proposes a comparative analysis of the relative contribution of financial inclusion to individuals' saving and borrowing behaviors in the united

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Arab Emirates (UAE) , and the United States of America (USA).

The rest of the analysis is organized as follows: Section 2 reviews the literature on financial inclusion; section 3 describes our theoretical framework of saving and borrowing; section 4 presents the empirical strategy; section 5 describes the data; section 6 presents the results, while section 7 discusses and concludes the analysis.

2. Literature review

A number of studies have explored the issue of financial inclusion through a variety of lenses. Evidence from the Global Findex data suggests that lack of resources (62%) and the high cost of financial services (35.8%) are the two most significant obstacles to borrowing noted by those without a bank account. In Argentina for example,Tuesta et al. (2015) found that income is the most significant factor for people perceiving lack of money as an obstacle to being banked. The 2012 Global Findex report also noted that only 18.9% of the individuals in the poorest income quintile had a bank account, whereas this percentage rose to 55.5% in the wealthiest quintile. Using the 2014 Global Findex dataset, Ulwodi and Muriu (2017) studied the relationship between financial inclusion and income, age, and whether someone used a debit card in sub-Saharan Africa. They found similar results as Damodaran (2013) in India, namely that individuals with debit or credit cards are more likely to have a bank account. Ulwodi and Muriu (2017) also revealed that a higher income increases the likelihood of having a bank account, as such many lower-income individuals, because of greater distances from bank services, are less likely to open a bank account. These results are similar to those noted by Honohan (2008); Demirguc-Kunt and Klapper (2012); Efobi et al. (2014); Park and MERCADO JR (2018), which report a positive relationship between income and financial inclusion.

Despite these figuresDemirguc-Kunt et al. (2014), using a sample of 65,000 adults from 64 economies, found no relationship between financial inclusion and level of income. Their results indicate however a significant relationship with gender, and place of residence. In investigating financial inclusion vis-a-vis savings, access to credit, and gender, Asli and Klapper Leora (2013) also concluded that women are less likely to have a bank account or access to credit than men. Similarly in Turkey, Davutyan and Öztürkkal (2016) found that gender is a key determinant of financial inclusion, with women who save a portion of their income less likely to borrow money, while older women, especially those married are more likely to save and borrow. A result further confirmed by the evidence from the 2012 Global Findex data report, which shows men to be somewhat more likely to have bank accounts (34.6%) than women (31.8%). Ibrahim and Alqaydi (2013) on the other hand found no significant difference between men and women average level of financial literacy. Similarly for Efobi et al. (2014) , which reports gender to not significantly affect the likelihood of saving in Nigeria, although those with higher levels of education are reported to be more financially literate.

Another factor found to significantly affect bank account ownership is religion (Demirguc-Kunt et al., 2014; Davutyan and Öztürkkal, 2016), with Muslim adults less likely to have a bank account or savings at a financial institution than their non-Muslim counterparts. Demirguc-Kunt et al. (2014) found significant differences in borrowing rates between Muslim and non-Muslim adults, although between country variations exist vis-a-vis borrowing methods, with Muslims less likely than non-Muslims to borrow from institutions. Davutyan and Öztürkkal (2016) also found that being devout, as distinct from being religious, associates negatively with utilizing formal bank loans. Both studies revealed the availability of Sharia-compliant products to affect individuals' decision-making more than does the cost of borrowing.

In the UAE,Ibrahim and Alqaydi (2013) in examining financial literacy using personal debt data of 412 residents, found that UAE nationals are more likely to borrow and to not use credit cards than are non-nationals. They also found no relationship between an individual's financial attitudes and the decision to borrow (from a bank, friend, or family member); however, a negative relationship was found between an individual's financial attitudes and their likelihood of using a credit card. In Turkey, Davutyan and Öztürkkal (2016) found a strong relationship between the level of university education and the likelihood of saving and borrowing. Similarly Peña et al. (2014); Izquierdo and Tuesta (2015) noted a relationship between financial inclusion and an individual's level of education. In Argentina Tuesta et al. (2015) report a significant relationship between the cost of maintaining a bank account and age, with older individuals relatively less willing to pay to open an account, while younger individuals are more likely to share a bank account with a family member. A result further confirmed by Izquierdo and Tuesta (2015), which found that older individuals are not encouraged to open a bank account due to less awareness of the advantages of having one.

Financial inter-mediation also plays an important role in promoting financial inclusion by directing funds from savers to borrowers. Indeed Poghosyan (2013) showed a negative effect of interest rate margins on credit supply, which was used as proxy for inter-mediation costs. Finally Zins and Weill (2016) also investigated the determinants of financial inclusion for 37 African countries using the World Bank's Global Findex Data on saving and credit. The authors linked the data to individual characteristics such as gender, age, income, and education, and concluded that an individual's likelihood of saving is not affected by these variables. Level of income is, however, negatively associated with credit, illustrating the fact that low income individuals are less likely to save for any reason. Women in Africa are also more likely to turn to the informal financial sector than are men, men are more likely to borrow money than are women, and low income individuals are more likely to seek loans to pay for medical expenses and educational costs, but less likely to secure loans for business ventures.

3. Theoretical Model of Saving and Borrowing

Our model relies on the theory of inter-temporal choice Browning and Crossley (2001); Modigliani and Johnson (1980); Thaler and Shefrin (1981), for this imagine a consumer who lives for two periods (t and t+1), and denote her disposable income (or total income net of all taxes) as Y^d, such that Y_t^d and Y_{t+1}^d represent each period respectively, and her consumption as C_t such that C_t and C_{t+1} represent periods t and $t+1$ consumptions respectively. Furthermore, we assume the consumer can borrow or save at an interest rate r, and define the accounting variable:

$$S_t = Y_t^d - C_t$$

and allow S_t to be either positive or negative:

- if $S_t > 0$ then the individual is *Saving* in the credit market
- if $S_t < 0$ then the individual is *Borrowing* in the credit market (negative savings)

Now to get the individual's inter-temporal budget constraint (IBC) consider the consumption levels at period t and $t+1$ as given by the following:

$$\begin{aligned} C_t &= Y_t^d - S_t \\ C_{t+1} &= Y_{t+1}^d + (1+r)S_t \end{aligned} \tag{1}$$

Combining the above two equations we get:

$$C_{t+1} = Y_{t+1}^d + (1+r)(Y_t^d - C_t) \tag{2}$$

rearranging equation (2) we can express the individual's IBC as:

$$C_t + \frac{1}{1+r}C_{t+1} = Y_t^d + \frac{1}{1+r}Y_{t+1}^d \tag{3}$$

some important aspects of the individual's IBC presented in equation (3) are:

- From the point of view of the individual, $Y_t^d + \frac{1}{1+r}Y_{t+1}^d$ is just a number, let's say M in monetary terms. The choice variables are C_t and C_{t+1}, and together they define the size and sign of S_t as $S_t > 0$ for saving or $S_t < 0$ for borrowing. In other words the individual's saving and borrowing behaviors are derived from the individual's inter-temporal consumption choices.
- $C_t + \frac{1}{1+r}C_{t+1}$ is called the discounted (or present) value of the consumption plan (C_t, C_{t+1}) and $Y_t^d + \frac{1}{1+r}Y_{t+1}^d$ the discounted (or present) value of the income of the individual given periodic earnings Y_t^d, Y_{t+1}^d at time t and $t+1$.

- Finally it can be noted that $1+r = \frac{1}{\frac{1}{1+r}} = \frac{Normalized\ price\ of\ consumption\ in\ period\ t}{price\ of\ consumption\ in\ period\ t+1} = \frac{P_t}{P_{t+1}}$ such that the inter-temporal budget constraint $P_tC_t + P_{t+1}C_{t+1} = M$ holds that the total value of inter-temporal consumption equals the total discounted value of all periods' income.

We assume that the individual has preferences over the two period consumptions C_t and C_{t+1}, described by indifference curves, with three fundamental characteristics:

1. Non-satiation: individuals' prefer more consumption to less (in other words welfare increases towards the north-east);
2. Negatively sloped: individuals' are ready to trade-off present consumption for future consumption;
3. Convex: Individuals' prefer to smooth consumption overtime.

The slope of an indifference curve denotes the inter-temporal marginal rate of substitution (IMRS) between period t and $t+1$ consumption. the IMRS indicates how many units of period $t+1$ consumption one is willing to give up in order to increase period t consumption by one unit. The convexity of the indifference curve implies that the IMRS is high when C_t/C_{t+1} is small, that is when consumption in period $t+1$ is high in relation to period t consumption, then the individual is willing to give up a lot of period $t+1$ consumption in order to increase period t consumption. In this case, the individual will be inclined to borrow more against her future income and S_t will be negative. Conversely, the IMRS is low when C_t/C_{t+1} is large, that is when consumption in period $t+1$ is low in relation to period t consumption. In this latter case, the individual in unwilling to give up much of period $t+1$ consumption in order to increase consumption in period t by one unit. Therefore the algebraic representation of the individual's preference can be expressed as:

$$U(C_t, C_{t+1}) = u(C_t) + \delta u(C_{t+1})$$

where δ is called the *discount factor* and $u(C)$ is some "instantaneous" *concave utility function*, which simply means the slope $u^{'}(C)$ is decreasing in C, or that $u(C)$ exhibits diminishing marginal utility. Further making the usual assumption that the consumer is impatient or $\delta < 1$, then for a reasonably low and fixed interest rate r the individual wants to consume more today than tomorrow. The choice problem is therefore:

$$\begin{aligned} \max_{C_t, C_{t+1}} \quad & u(C_t) + \delta u(C_{t+1}) \\ \text{subject to} \quad & C_t + \frac{1}{1+r}C_{t+1} = Y_t^d + \frac{1}{1+r}Y_{t+1}^d \equiv M, \\ & C_t \geq 0, \\ & C_t \leq M. \end{aligned} \tag{4}$$

Substituting away C_t, and ignoring the boundary constraints we get:

$$\max_{C_{t+1}} \quad u\left(M - \frac{1}{1+r}C_{t+1}\right) + \delta u(C_{t+1}) \tag{5}$$

The first order condition (FOC) is

$$u^{'}\left(M - \frac{1}{1+r}\right)\left(-\frac{1}{1+r}\right) + \delta u^{'}(C_{t+1}) = 0 \tag{6}$$

or

$$\frac{u^{'}(C_t)}{\delta u^{'}(C_{t+1})} = 1 + r \tag{7}$$

The condition in equation (7) has the usual interpretation: it stipulates that the IMRS = the slope of IBC (- $\frac{P_t}{P_{t+1}}$), and holds for any concave function $u(.)$ depending on the relationship between r and δ since

$$\begin{gathered} u^{'}(C_t) > u^{'}(C_{t+1}) \Longleftrightarrow C_t < C_{t+1} \; or \\ \frac{u^{'}(C_t)}{u^{'}(C_{t+1})} > 1 \Longleftrightarrow \frac{C_t}{C_{t+1}} > 1 \end{gathered} \tag{8}$$

If we reorganize further the FOC in equation(7) we get the expression:

$$\frac{u^{'}(C_t)}{u^{'}(C_{t+1})} = \delta(1 + r) \tag{9}$$

for more concreteness, let $u(C) = ln(C)$ then $u^{'}(C) = \frac{1}{C}$, such that the FOC simplify to

$$\frac{C_{t+1}}{C_t} = \delta(1 + r), \tag{10}$$

which combined with the condition in equation(8) suggests that

(i) $C_t > C_{t+1}$ if $\delta < \frac{1}{1+r} \Rightarrow \mathrm{S}_t < 0$, and the individual borrows in the credit market

(ii) $C_t = C_{t+1}$ if $\delta = \frac{1}{1+r} \Rightarrow \mathrm{S}_t = 0$, and the individual neither saves nor borrows

(iii) $C_t < C_{t+1}$ if $\delta > \frac{1}{1+r} \Rightarrow \mathrm{S}_t > 0$, and the individual saves in the credit market

We can also see that the claims about the above relations between r and δ hold in terms of a simple graphical analysis as shown in figure (1). The optimal inter-temporal consumption choices C_t^* and C_{t+1}^*, are defined graphically in terms of the point of tangency between the highest achievable indifference curve and the inter-temporal budget constraint (IBC). The subjective discount factor δ can be though of as measuring how the consumer values consumption in period t relative to consumption in period $t+1$. If δ is high, the individual is said to be patient, and if δ is low she is said to be impatient. Therefore it makes sense as shown in result (i) above and also in panel (c) of figure (1) that if an individual is less patient than the market, she will tend to consume more than current period income Y_t^d, by borrowing against future income Y_{t+1}^d. Conversely, as shown in result (iii) above and also in panel (a) of figure (1), if an individual is more patient than the market, she will tend to consume less than current period income Y_t^d, thereby acting as a saver in the credit market. Finally, as shown in result (ii) above and panel (b) of figure (1), if the individual values the two period consumptions equally, then she will neither borrow nor save, but instead use all of period t income Y_t^d to cover consumption in that period C_t^*, and subsequently use all of period t+1 income Y_{t+1}^d to cover its corresponding consumption C_{t+1}^*.

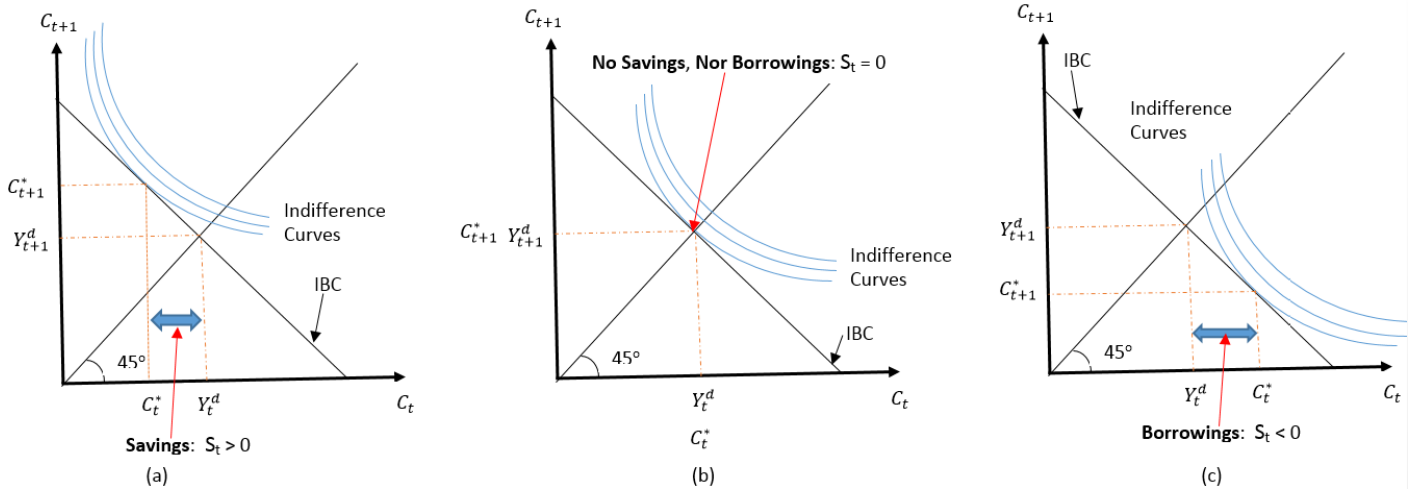

Figure 1: Optimal Consumption, Saving, and Borrowing

4. Empirical Model of Borrowing and Saving

Our empirical strategy is grounded on Random Utility modeling Marshak (1959); Manski and McFadden (1981); Train (2009); Niankara (2018*c*,*b*). It is assumed that each individual is faced with two choice situations i (with $i = 1$ if choice of saving, and $i = 2$ if choice of borrowing, where (s)he must choose between two alternatives indexed respectively with zero (0) and one (1),

according to which one provides the greatest utility (or well-being). In the first situation the choice is between 1-"Save", and 0-" Not Save". In the second situation, the choice is between 1-"Borrow", and 0 -" Not-Borrow". In each choice situation the individual chooses the alternative with the highest utility. Therefore in the first choice situation, the discrete outcome variable $y_1 = 1$ borrowing provides the individual with the greatest utility, otherwise $y_1 = 0$. Similarly in the second choice situation, the discrete outcome variable $y_2 = 1$ if saving provides the individual with the greatest utility, otherwise $y_2 = 0$. The utility formulation for alternatives 0 and 1 in each choice situation i for $i = 1, 2$ can be presented as:

$$\begin{aligned} U_{i0} &= V_{i0} + \epsilon_{i0}, \\ U_{i1} &= V_{i1} + \epsilon_{i1}, \end{aligned} \tag{11}$$

where V_{i0} and V_{i1} are deterministic components of utility with ϵ_{i0} and ϵ_{i1} representing the random components. We observe the event "Saving and Borrowing", $y_i = 1$ iff $U_{i1} > U_{i0}$, that is if and only if alternative 1 in choice situation i has the highest utility of the two. Because of the presence of the random components in the utility functions, this event is also random with probability given as:

$$\begin{aligned} Pr[y_i = 1] &= Pr[U_{i1} > U_{i0}] \\ &= Pr[V_{i1} + \epsilon_{i1} > V_{i0} + \epsilon_{i0}] \\ &= Pr[\epsilon_{i0} - \epsilon_{i1} < -(V_{i0} - V_{i1})] \\ &= F(V_{i0} - V_{i1}), \end{aligned} \tag{12}$$

with $F(.)$ representing the cumulative distribution function of the error differences $(\epsilon_{i0} - \epsilon_{i1})$, such that:

$$Pr[y_i = 1] = F(X^{'}\beta_i) \; if \; V_{i0} - V_{i1} = X^{'}\beta_i \tag{13}$$

Different Discrete Choice Models (DCM) are obtained from different parametric assumptions about the distribution $F(.)$ of the error differences $(\epsilon_{i0} - \epsilon_{i1})$. For example the Logit model or logistic regression is obtained when we assume that $F(.)$ follows the type 1 extreme value cumulative distribution, in which case $F(X^{'}\beta_i) = \Lambda(X^{'}\beta_i)$. On the other hand the probit model or probit regression is obtained when we assume that $F(.)$ follows the normal cumulative distribution, in which case $F(X^{'}\beta_i) = \Phi(X^{'}\beta_i)$. In the next section we present different specifications of this general behavioral economic model.

4.1. Econometric Specification and Model Identification

Our econometric specification follows a systematic strategy starting with the fully parametric bivariate probit representation of the choice probabilities in equation (13), following Heckman representation, and estimated using Maximum likelihood methods. The second specification adopted

is the more flexible semi-parametric bivariate probit representation of the borrowing and saving decisions. The latter is estimated using penalized maximum likelihood methods as described in Wojtys et al. (2016).

4.1.1. Fully-Parametric Bivariate Probit Specification

This specification allows for correlations between the saving process and borrowing process, such that $\Phi()$ is the bivariate normal distribution, with the joint probability of borrowing and saving given for all dependent i with $i = 1, 2$ as:

$$Pr[y_i = 1] = \Phi(X^{'}\beta_i) = \Phi(\beta_{i0} + \beta_{i1}^{'} FinInclus_i + \beta_{i2}^{'} ContVars_i) \tag{14}$$

Where $FinInclus_i$ represents the vector of indicator variables capturing "Financial Inclusion" as summarized in table (1), and $ContVars_i$ represents the vector of control variables which are also summarized in table (1). The β_{ij} represent the estimated effects of the variables included in the bivariate linear model. The joint distribution of the error terms ϵ_1 and ϵ_2 is given by:

$$\begin{pmatrix} \epsilon_1 \\ \epsilon_2 \end{pmatrix} \sim N \left[\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \sigma_{12} \\ \sigma_{12} & \sigma_2^2 \end{pmatrix} \right] \tag{15}$$

Where the variance of the saving process is set to $\sigma_1^2 = 1$ for identification purposes following Train (2009). And our objective is to investigate the relative influence of financial inclusion; however, in addition to the estimated effects of the indicators of financial inclusion in the model, we also estimate the values of the correlation coefficient $\theta = \sigma_{12}/\sigma_2$, and the variance of the borrowing process $\tau = \sigma_2^2$. Identification of all model parameters is achieved using the two step estimator by Heckman (1979) described in (Cameron and Trivedi, 2005, 547-548).

4.1.2. Semi-Parametric Bivariate Probit Specification

The second specification relaxes the linearity assumption for the numerically entering explanatory variable (Age) which may exhibit non-linearity due to life cycle effect. This is indeed supported by the *life cycle hypothesis*(Modigliani and Johnson, 1980). We achieve this by specifying a general copula function for the variable $g_{i1}(Age)$, which is then estimated along with the remaining parameters as described in the fully-parametric case. Hence the general form of equation (14) becomes:

$$\begin{cases} Pr[y_i = 1] & = \Phi(X^{'}\beta_i) \\ & = \Phi(\beta_{i0} + \beta_{i1}^{'} FinInclus_i + \beta_{i2}^{'} NomContVars_i + g_{i1}(Age)) \end{cases} \tag{16}$$

where $NomContVars_i$ represents the vector of nominal control variables in choice situation i, while $\beta_{i2}^{'}$ captures their effects on borrowing and saving. The model is called partially linear,

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and is estimated in R Statistical Software (R Core Team, 2015) using the penalized maximum likelihood methods presented in Wojtys et al. (2016).

5. Data

The data used in this analysis comes from the 2014 Global Financial Inclusion (Global Findex) database (van Oudheusden et al., 2015), drawn from data survey covering nearly 150,000 people in 143 economies. The 2014 survey was conducted by Gallup, Inc. as part of its Gallup World Poll, which since 2005 has continually conducted surveys of approximately 1000 people in each of more than 160 economies and in over 140 languages, using randomly selected, nationally representative samples. The surveys are conducted face to face in nations with less than 80 percent telephone coverage, with the target population being the entire civilian, non-institutionalized population age 15 and above.

In countries where face to face surveys are conducted, the first stage of sampling concerns the identification of primary sampling units, which are stratified by population size, geography, or both; and clustered through one or more stages of sampling. Samples are drawn based on probabilities proportional to population size where such information is available, otherwise simple random sampling is used. In countries where telephone interviewing is implemented, random digit dialing or a nationally representative list of phone numbers is used. In addition, where cell phone penetration is high, a dual sampling frame is used. Finally data weighting is used to ensure a nationally representative sample for each country. Additional information on the 2014 Global Findex survey methodology and interview procedure can be found in van Oudheusden et al. (2015).

For our current analysis, we selected the data gathered on two high income countries (the United Arab Emirate (UAE) and the United States of America (USA)). The initial sub-sample from the UAE included 1002 interviews conducted between May 21 and June 26 2014, and covering natives of the emirates, Arabs and non-Arabs expatriates who where able to participate in the survey in Arabic or English. The initial sub-sample from the USA on the other hand included 1021 interviews conducted between May 14 and June 8 2014, in both English and Spanish. After data treatment, variables selection, and accounting for missing information, our final analysis is based on a total of 1920 observations, with 963 observations coming from the UAE sub-sample and the remaining 957 observations coming from the USA sub-sample.

The actual UAE currency (dirham) was first introduced in 1973, in replacement of the Qatar and Dubai riyal. Originally, the dirham was pegged to the International Monetary Fund (IMF) Special Drawing Rights (SDR), which is a basket of major world currencies. In 1997, the dirham became officially pegged to the US dollar at a fixed exchange rate of 3.67 AED to 1USD, ensuring therefore that interest rate fluctuations have no real effects on the relative saving and borrowing behavior in the two countries. This happens because the dirham follows the US dollar as it appreciates or depreciates. As such, the role of interest rate in a comparative study of relative saving

and borrowing behavior could be factored out of the equation, and emphasis put on other relevant determinants such as the degree of individuals' financial inclusion as currently implemented.

Indeed here financial inclusion is characterized by several indicators such as whether individuals' have access to a bank account, credit card, debit card, emergency fund, salary account for wages and government transfers; but also whether individuals' use their bank account for transfers including utility payments. This is done adjusting for individuals' socio-demographic characteristics (age, education, income), and a country indicator variable. Table (1) provides definitions and summary statistics for all the variables used in the analysis.

6. Results

The results are divided into two major parts. The first part presents the uni-variate descriptive statistics for the variables used in the analysis, followed by the bi-variate descriptive statistics with chi-square tests of independence(for the nominal explanatory variables), and the welch two-sample t-test of difference in group means (for the numerical explanatory variable "age"). The second part presents and discusses the results of the two previously described econometric specifications.

6.1. Uni-variate Descriptive Statistics

The uni-variate descriptive results presented in table (1) show that the average respondent in the whole sample is 44.18 years, with a standard deviation of 18.79 years. The majority of respondents (73.91%) report having saved during the past 12 months, while 48.91% report having borrowed in the same time frame. In addition 90.1% report having a bank account, 77.24% report having a credit card, while 55.36% report having a debit card. With regards to emergency fund access, 50.21% report using savings for emergency funds, 23.02% report family, relative or friends, 10.68% report money from working or loan from employer, while the remaining 16.09% report credit card or borrowing from a formal financial institution. Similarly, 49.01% report having received wages through direct deposit, while 15.68% report having received government transfer during the same time frame, and 65.68% report having used their bank account for utility payments. Female respondents make up 41.72% of the sample, against 58.28% males, with 49.84% of all respondents from the USA, and the remaining 50.16% from the UAE. With respect to education, 47.14% report having a primary education or less, while 52.86% report having a secondary education or more. Finally the income quintile distribution shows that 15.31% of the respondents are in the bottom 20% of income earners, 17.86% are in the second 20%, 20.78% are in the middle 20%, 22.29% are in the fourth 20%, while the remaining 23.75% are in the richest 20%.

6.2. Bi-variate Descriptive Statistics

In the bivariate case, we begin with the description of the link between the two dependent variables (Saved, and Borrowed) and each of the nominal explanatory variables in the model using

conditional frequency distributions with chi-square tests of independence; then we turn to their link with the numerical explanatory variable "age", using welch's two-sample t-test of difference in group means.

6.2.1. The associations with the nominal predictors

In the case of the dependent variable SAVED, as shown by the corresponding p-values less than the 5% significance level in table (2), the chi-square test results suggest that all nominal explanatory variables are significantly linked to saving, except for the variable Government Transfer (GovTransf). A similar observation is made with the dependent variable BORROWED in the last column, however here more of the nominal explanatory variables (including UtBillsPaid, GovTransf, Country, Income, and Education) fail to show a significant linkage.

In terms of the conditional frequency distributions as shown in the first part of table (2), focusing on the first dependent variable SAVED, we note that among the respondents that reported having saved over the past 12 months, 93.7% have a bank account, 79.8% a credit card, 62.8% a debit card. Also, among this group of respondents, 55.7% report having received a directly deposited wage payment into their bank account over the past 12 months, while only 14.3% report having received a directly deposited government transfer, during the same period. Moreover, the greater majority 70.5% of the respondents that saved also report having used their bank account to pay their utility bills. Furthermore, among those that saved, the greatest majority use their savings (59.5%) as emergency fund, followed by 21.8% who use family relatives or friends, 8.9% who use money from work or a loan from employer, and finally 9.7% who use credit card or bank borrowing. Table (2) also shows that among those that saved, 38.6% are females, against 61.4% males; 53.8% come from the United States, against 46.2% from the United Arab Emirates; 41.9% have a primary education or less, against 58.1% with a secondary education or more. Finally in terms of income distribution among those that saved, 13.1% are in the bottom quintile, 16.2% in the second quintile, 20.2% in the middle quintile, 23.3% in the fourth quintile, and the greatest majority (27.2%) in the top income quintile.

Now turning to the second dependent variable BORROWED, we note that among the respondents that reported having borrowed over the past 12 months, 92.9% have a bank account, 82.0% a credit card, 59.3% a debit card. Also, among this group of respondents, 55.0% report having received a directly deposited wage payment into their bank account over the past 12 months, while only 17.1% report having received a directly deposited government transfer, during the same period. Moreover, the greater majority 67.8% of the respondents that borrowed also report having used their bank account to pay their utility bills. Furthermore, among those that borrowed, the greatest majority also use their savings (46.0%) as emergency fund, followed by 24.0% who use family relatives or friends, 11.4% who use money from work or a loan from employer, and finally 18.6% who use credit card or bank borrowing. Table (2) further show that among those that borrowed, 37.5% are females, against 62.5% males; 50.2% come from the United States, against

49.8% from the United Arab Emirates; 47.8% have a primary education or less, against 52.2% with a secondary education or more. Finally in terms of income distribution, 14.4% of those that borrowed are in the bottom quintile, 19.6% in the second quintile, 21.4% in the middle quintile, 21.7% in the fourth quintile, and the greatest majority (22.9%) in the richest income quintile.

6.2.2. The associations with the quantitative predictor Age

In order to describe the relationship between "age" and the two binary dependent variables SAVED and BORROWED, we first implement Levine's test of homogeneity in variances as shown in table (3), followed by Welch two-sample t-test of difference in means as shown in table (4). The F-statistics with corresponding p-values of the Levine's test provide enough evidence to reject the null of equal age variance between individuals who borrowed and those who did not; while failing to reject the null of equal age variance between the individuals who saved, and those who did not. We thus conclude that while the variance in age among the individuals with savings does not differ significantly from that of those without savings, the variance in age among the individuals with borrowing does indeed differ significantly from that of those without borrowing.

The implications of these results are that we can proceed to implement our two samples t-test of difference in group means assuming equal variances in the case of "saving", and unequal variance in the case of "borrowing". The results of such tests are Indeed presented in table (4) for "age", and suggest that the mean age of respondents with savings (44.19 years) is not significantly different from that of respondents without savings (44.17 years), since the 95% confidence interval on the difference in mean (-1.93 ; 1.90) contains zero. On the other hand, the mean age of the respondents with borrowings (41.92 years) is significantly lower than that of respondents without savings (46.35 years), as evidenced by the 95% confidence interval on the difference in mean (2.77 ; 6.10), which is void of zero. The above described numerical results in this section are further confirmed by the graphical box plots representations in figure (2).

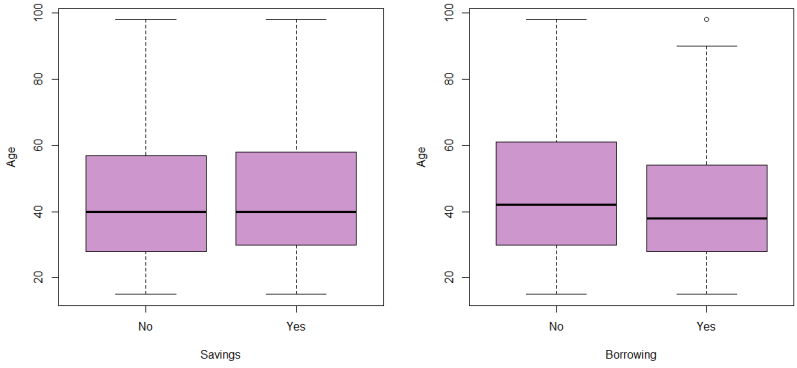

Figure 2: Descriptive Boxplots of Age against the two Binary Dependent Variables

6.3. Fully-parametric v.s. Semi-parametric Bi-variate Probit Models

The fully parametric bivariate probit and semi-parametric bivariate probit specifications both relax the implicit independence assumption in the binary probit equations. The latter further relaxes however the linearity assumption made in the former model, and relies for identification purposes on penalized maximum likelihood methods, as described in Marra and Radice (2013). This estimation procedure deals simultaneously with the dependence between saving and borrowing using a conventional system of two equations, with non-linear covariate effects using spline approach, and also copes with non-normal bivariate distributions using copula functions (McGovern et al., 2015; Niankara, 2018*a*).

Before fitting the two bivariate models, we test the hypothesis of absence of correlation between the two processes of saving and borrowing, using the Lagrange multiplier test (also known as score test) (Marra et al., 2014). Its main advantage is that it does not require an estimate of the model parameter vector under the alternative hypothesis. Asymptotically, it takes a Chi-squared distribution with one degree of freedom, and returns a numeric p-value corresponding to the null hypothesis that the correlation, θ, is equal to 0. In this case the test produced a $p-value = 0.005412805 < \alpha = 0.05$, therefore we rejected the null, and concluded the existence of a significant correlation between the unobserved factors affecting saving and borrowing behaviors in the UAE and the USA. Hence, the joint bivariate specifications are more appropriate than the individual binary models.

The results of these two bivariate specifications are presented in table (5), where the absolute gradient values (1.489e-11 and 1.638e-09, close to zero), and positive definite information matrices, with respective eigenvalue range [22.60903 , 2715529] and [0.3637075 , 10064.64] for the saving and borrowing equations respectively, suggest satisfactory convergence of the trust region iteration algorithm (see (Wojtys et al., 2016)) used to identify the parameters. Furthermore, comparing the models' Akaike Information Criteria (AIC) measures at the bottom of the table, we note that the semi-parametric specification with AIC = 4372.704, performs better than the fully-parametric specification with AIC = 4378.768 . Therefore we choose the semi-parametric model as our preferred specification for describing the impact of financial inclusion on individuals' borrowing and saving decisions in the UAE and the USA, as described in the next section.

6.4. Semi-parametric Bi-variate Probit model results

Focusing on this model, the results suggest that the unobserved factors affecting the likelihood of saving, positively correlate with those affecting the likelihood of borrowing. This is consistent with the results obtained under the fully-parametric specification, and shows a significant correlation coefficient $\theta = 0.123$ with a 95% confidence interval (0.050 ; 0.123).

6.4.1. The Saving Equation Results

Semi-parametric bivariate probit estimation results for the saving equation is shown in the third column of table (5). Focusing first on the effects of the nominal variables, it can be noted that most of the included explanatory factors are significant determinants of saving behavior.

In fact, the results suggest that respondents with bank accounts are 41.8% more likely to save than to those without bank accounts. Also, individuals with debit cards are 28% more likely to save than those without debit cards. Conversely, individuals with credit cards are 18% less likely to save. Furthermore, compared to individuals who use their savings as emergency funds, those that use family relative or friends, those using money from work or loan from employer, and those using credit card or bank borrowing are respectively 50.1%, 66.2%, and over 100% less likely to have saved over the past 12 months.

Although government transfer deposit does not seem to significantly affect saving behavior, the results show that individuals with directly deposited wage payments are 42.9% more likely to save, than those without a salary account. Similarly, the individuals that use their bank account for payments including utility bills are 17.9% more likely to save than those who don't. In terms of gender, females are found to be 12.4% less likely to save than males. While the country indicator variable suggests that US respondents are 31.4% more likely to save than their UAE counterparts. The education level indicator also suggests that an individual with a secondary education or more is 24.2% more likely to save than one with a primary education or less. Conversely however, the results suggest no income based saving gradient, since no significant difference in saving exist between individuals of different income quintile.

Now turning to the smoothed term for the age variable in the saving equation, it can be noted from the third column of table (5) that age is a significant predictor of the likelihood of saving in the UAE and the USA. Indeed the p-values ($= 1.48e-05$) and estimated empirical density functions (edf), along with the respective smooth function estimates and 95% confidence bands in the left panel of figure (3) support the statistical significance of age in explaining the phenomenon of saving in the UAE and the USA. The left panel of figure (3) suggests that below approximately age 50, the effect of age on saving is positive but decreasing; above this threshold of 50 years, the effect of age is negative and still decreasing. All of the above described results for the semi-parametric case are further validated by the fully-parametric specification results, highlighting results' robustness to model specification.

6.4.2. The Borrowing Equation Results

Semi-parametric bivariate probit estimation results for the borrowing equation is shown in the last column of table (5). Focusing first on the effects of the nominal variables, it can be noted that controlling for debit card ownership, a bank account or a credit card ownership has no significant effects on the likelihood of borrowing. Indeed, compared to those without debit cards, individuals with debit cards are 35.4% more likely to borrow. In addition, compared to individuals who use

their savings as emergency funds, those that use family relative or friends, those using money from work or loan from employer, and those using credit card or bank borrowing are respectively 19.9%, 29.5%, and 47.4% more likely to have borrowed over the past 12 months.

Furthermore, the results show that individuals with directly deposited wage payments, and those with direct government transfer deposits are respectively 16.5% and 27.1% more likely to borrow. Similarly, compared to those who don't, the individuals that use their bank account for payments including utility bills are 13.6% more likely to borrow. In terms of gender, females are found to be 13.8% less likely to borrow than males. The country indicator variable suggests no significant difference in borrowing behavior between US respondents and their UAE counterparts. Similarly for education level, which does not seem to significantly affect borrowing behaviors in the two countries. As it was the case for saving, the borrowing equation results suggest no income based borrowing gradient, since no significant difference in borrowing exist between individuals of different income quintile.

Now turning to the smoothed term for the age variable in the borrowing equation, it can be noted from the last column of table (5) that age is a significant predictor of the likelihood of borrowing in the UAE and the USA. Indeed the p-values ($= 1.2e - 08$) and estimated empirical density functions (edf), along with the respective smooth function estimates and 95% confidence bands in the right panel of figure (3) support the statistical significance of age in explaining the phenomenon of borrowing in the UAE and the USA. The right panel of figure (3) suggests that below approximately age 50, the effect of age on saving is positive but decreasing; above this threshold of 50 years, the effect of age is negative and still decreasing. The above described results for the semi-parametric estimation of the borrowing equation are further validated by the fully-parametric specification results, highlighting also its robustness to potential mis-specification.

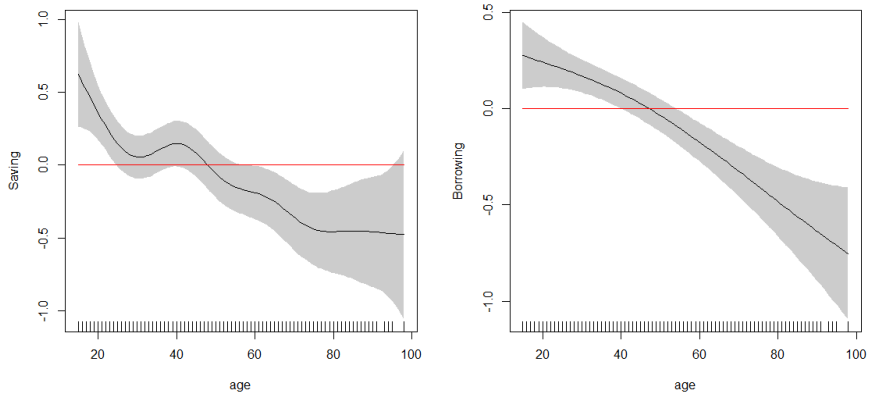

Figure 3: Smooth function estimates and 95% confidence bands for the Age variable in both equations

7. Discussion and Conclusion

This paper has concerned itself with analyzing the impact of financial inclusion on individuals' saving and borrowing decisions in the UAE and the USA, using data from the 2014 Global Financial Inclusion (Global Findex) database. The study was motivated by a model of saving and borrowing based on the theory of inter-temporal consumption choice. The adopted empirical strategy consisted of first testing the significance of the joint bivariate model over its uni-variate/binary counterparts using the Lagrange multiplier test (also known as score test), followed by a contrast between the fully-parametric and semi-parametric specifications of the saving and borrowing equations. Based on model performance measures, the semi-parametric bivariate probit specification was identified as the best framework for describing the two processes of saving and borrowing in the two countries.

Financial inclusion was characterized by a set of indicators (bank account ownership, debit card and credit card ownership, access to emergency funds, government transfer and salary transfer account ownership, and bank account usage for utility bill payment), while controlling for other relevant socio-demographic factors (gender, age, education, income) and a country indicator variable.

Our study revealed no significant difference in borrowing behavior between US residents and UAE residents, however, this figure was not the same for saving behaviors. Seemingly, US residents have a greater likelihood to save than their UAE counterparts. Given the impact of saving on investment and economic growth, and the fact that the UAE currency is pegged to the US dollar, the higher growth potential in the US due to relatively higher saving, imply that the UAE would need alternative sources of funds to finance the needed investment and growth required to keep their exchange rate parity position with the US. Luckily, as a major oil exporting country, the UAE has been able to generate enough resources to sustain its growth targets. However, with the worldwide dips in oil prices in recent years, this strategy has been revisited for more sustainability. Indeed in recent years, the UAE government has been able to implement with success many policies aiming at a structural diversification of the national economy, and a more stable and sustainable growth.

Our study also reveled the absence of a significant income based saving or borrowing gradient, suggesting that marginal changes in income have no significant effects on saving nor borrowing behavior in the UAE or USA. This result is not only consistent withDemirguc-Kunt et al. (2014), which using a sample of 65,000 adults from 64 economies, found no relationship between financial inclusion and level of income; but also seems consistent with the Permanent Income Hypothesis (PIH)(Friedman, 1957). Indeed, according to the PIH the expected long-term average income, is determined by the amount of assets; both physical (shares, bonds, property) and human (education and experience), which is the real determinant of consumption and savings, but not current income. The consumption smoothing element of the PIH predicts that transitory changes in income have

only negligible effects on consumption, while longer-lasting changes in income significantly affect spending behavior. Therefore an individual will only change saving and borrowing behaviors if she expects long-term average income, i.e. permanent income, to be different than current income.

In addition, as part of financial inclusion, access to a bank account and a debit card, were found to significantly stimulate saving and borrowing behaviors, although credit card ownership did not seem to matter significantly. Furthermore, companies and governments direct deposit policy for respectively wage/salary and government transfers are all financial inclusion strategies that seem to significantly influence saving and borrowing decisions. As such, companies with payroll practices still based on cash or physical paycheck issuing, especially in the US, should revise such policy to create more financial inclusion, and thereby more saving potential which in turn would contribute to further borrowing, investment and growth of the national economy. Finally, the results also pointed out the prevalence of a gender based saving and borrowing inequality in disfavor of the female gender, which might be a reflection of the low rate of female financial inclusion therefore, further policies should be considered in this regard to reduce the observed inequality.

Efforts to increase the level of financial inclusion are meant to ensure that all households and businesses, regardless of income level, have access to and can effectively use the appropriate financial services they need to improve their lives. An estimated two billion working-age adults around the world (i.e., half the world's adult population) do not have a bank account in a financial institution. Although most people have limited incomes, they still need to manage their day-to-day expenses. This means that they need to save and borrow through banks and other financial institutions. Without access to financial products many people will be forced to resort to other options, such as borrowing from friends and family members, potentially jeopardizing both relationships and their own financial situations.

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Table 01: Descriptive Statistics for the variables used in the analysis

Numeric Control Variables	**Units**	**Full Sample (N = 1920)**	
		Mean	**S.D.**
AGE	(in years)	44.18	18.79
	Modalities/levels	**Rel. Freq. (%)**	
SAVED	1: Yes	73.91	
In past 12 months	0: No	26.09	
BORROWED	1: Yes	48.91	
In past 12 months	0: No	51.09	
ACCOUNT	1: Yes	90.1	
	0: No	9.9	
CREDITCARD	1: Yes	77.24	
	0: No	22.76	
DEBITCARD	1: Yes	55.36	
	0: No	44.64	
EmerFundAcess	1: Savings	50.21	
	2: FamRelFriends	23.02	
	3: MoWokLoanEmplyr	10.68	
	4: CredCardBankBorwg	16.09	
UtBillsPaid	1: Yes	65.68	
In past 12 months	0: No	34.32	
WagPaiRec	1: Yes	49.01	
In past 12 months	0: No	50.99	
GovTransf	1: Yes	15.68	
In past 12 months	0: No	84.32	
FEMALE	1: Yes	41.72	
	0: No	58.28	
COUNTRY	1: USA	49.84	
	0: UAE	50.16	
INCOME_QUINTILE	1: Poorest 20%	15.31	
	2: Second 20%	17.86	
	3: Middle 20%	20.78	
	4: Fourth 20%	22.29	
	5: Richest 20%	23.75	
EDUCATION	1: Primary or Less	47.14	
	2: Secondary or More	52.86	

Source: Authors' construction based on the 2014 Global Financial Inclusion (Global Findex) database

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Table 02: Conditional Frequency Distribution and Chi-square test of Independence for the nominal explanatory variables

	Modalities/levels	Full Sample (N = 1920)					
		SAVED		BORROWED		Chi² Test	
						SAVED	BORROWED
		No	Yes	No	Yes	X-stat p-value	X-stat p-value
ACCOUNT	1: Yes	80.0	93.7	87.5	92.9	75.486***	15.107***
	0: No	20.0	6.3	12.5	7.1	< 2.2e-16	0.0001016
CREDITCARD	1: Yes	69.9	79.8	72.7	82.0	20.433***	23.184***
	0: No	30.1	20.2	27.3	18.0	6.174e-06	1.472e-06
DEBITCARD	1: Yes	34.3	62.8	51.6	59.3	120.210***	11.315***
	0: No	65.7	37.2	48.4	40.7	< 2.2e-16	0.0007689
EmerFundAcess	1: Savings	23.8	59.5	54.2	46.0	253.050***	15.442***
	2: FamRelFriends	26.3	21.8	22.1	24.0	< 2.2e-16	0.001475
	3: MoWokLoanEmplyr	15.6	8.9	10.0	11.4		
	4: CredCardBankBorwg	34.3	9.7	13.7	18.6		
UtBillsPaid In past 12 months	1: Yes	51.9	70.5	63.6	67.8	56.286***	3.6221
	0: No	48.1	29.5	36.4	32.2	6.267e-14	0.05702
WagPaiRec In past 12 months	1: Yes	30.1	55.7	43.3	55.0	95.578***	25.499***
	0: No	69.9	44.3	56.7	45.0	< 2.2e-16	4.426e-07
GovTransf In past 12 months	1: Yes	14.4	16.1	14.3	17.1	0.74586	2.7858
	0: No	85.6	83.9	85.7	82.9	0.3878	0.0951
FEMALE	1: Yes	50.5	38.6	45.8	37.5	21.008***	13.199***
	0: No	49.5	61.4	54.2	62.5	4.574e-06	0.0002801
COUNTRY	1: USA	38.5	53.8	49.5	50.2	34.142***	0.05075
	0: UAE	61.5	46.2	50.5	49.8	5.124e-09	0.8218
INCOME_QUINTILE	1: Poorest 20%	21.6	13.1	16.2	14.4	56.536*** 1.548e-11	5.3047 0.2574
	2: Second 20%	22.6	16.2	16.2	19.6		
	3: Middle 20%	22.6	20.2	20.2	21.4		
	4: Fourth 20%	19.4	23.3	22.8	21.7		
	5: Richest 20%	14.0	27.2	24.6	22.9		
EDUCATION	1: Primary or Less	61.9	41.9	46.5	47.8	58.316***	0.29102
	2: Secondary or More	38.1	58.1	53.5	52.2	2.232e-14	0.5896

* indicates significance at alpha of 0.05; ** significance at 0.01; and *** significance at 0.001 for the chi-square tests

Source: Authors' construction based on the 2014 Global Financial Inclusion (Global Findex) database

Table 03: Levine's Test for homogeneity in groups' of variances

	SAVED			BORROWED		
	Degree of freedom	F-statistic	P-value	Degree of freedom	F-statistic	P-value
AGE	1	1.1937	0.2747	1	36.974	1.441e-09

H_O: Equal Age variance between individuals who saved and those who did not, V.S. Ha: Unequal variance

H_O: Equal Age variance between individuals who borrowed and those who did not, V.S. Ha: Unequal variance

Source: Authors' construction based on the 2014 Global Financial Inclusion (Global Findex) database

Table 04: Welch two-sample t-test of difference in groups' means, with corresponding 95% confidence interval

	SAVED			BORROWED		
	Group Mean Values		Confidence Interval on the Difference in group means	Group Mean Values		Confidence Interval on the Difference in group means
	No	Yes		No	Yes	
AGE	44.17	44.19	(-1.93 ; 1.90)	46.35	41.92	(2.77 ; 6.10)

Source: Authors' construction based on the 2014 Global Financial Inclusion (Global Findex) database

Table 05: Fully Parametric Bivariate Probit (FPBP) V.S. Semi-Parametric Bivariate Probit (SPBP) models

		FPBP - SAVED	FPBP - BOROWD	SPBP – SAVED	SPBP - BOROWD
(INTERCEPT)		0.718***	-0.246	0.136	-0.759***
		(0.155)	(0.146)	(0.146)	(0.137)
ACCOUNT	Yes	0.377**	0.174	0.418**	0.184
		(0.139)	(0.133)	(0.141)	(0.133)
CREDITCARD	Yes	-0.187	0.135	-0.180	0.116
		(0.103)	(0.089)	(0.106)	(0.090)
DEBITCARD	Yes	0.282***	0.361***	0.280***	0.354***
		(0.081)	(0.072)	(0.081)	(0.073)
EmerFundAcess	FamRelFriends	-0.506***	0.202**	-0.501***	0.199**
		(0.088)	(0.077)	(0.088)	(0.077)
	MoWokLoanEmplyr	-0.666***	0.298**	-0.662***	0.295**
		(0.112)	(0.104)	(0.112)	(0.104)
	CredCardBankBorwg	-1.059***	0.487***	-1.041***	0.474***
		(0.099)	(0.093)	(0.100)	(0.094)
UtBillsPaid	Yes	0.167*	0.149*	0.179*	0.136*
		(0.082)	(0.074)	(0.084)	(0.074)
WagPaiRec	Yes	0.428***	0.175**	0.429***	0.165*
		(0.075)	(0.065)	(0.077)	(0.065)
GovTransf	Yes	0.145	0.256**	0.144	0.271**
		(0.103)	(0.087)	(0.104)	(0.088)
FEMALE	Yes	-0.132*	-0.138*	-0.124*	-0.138*
		(0.071)	(0.062)	(0.072)	(0.062)
COUNTRY	USA	0.313***	0.017	0.314**	0.024
		(0.088)	(0.074)	(0.097)	(0.075)
INCOME QUINTILE	Second 20%	-0.084	0.054	-0.081	0.050
		(0.112)	(0.103)	(0.113)	(0.103)
	Middle 20%	0.033	0.033	0.051	0.034
		(0.109)	(0.100)	(0.110)	(0.100)
	Fourth 20%	-0.039	0.027	-0.014	-0.027
		(0.112)	(0.101)	(0.113)	(0.102)
	Richest 20%	0.133	0.002	0.145	0.004
		(0.117)	(0.102)	(0.118)	(0.102)
EDUCATION	Secondary or More	0.209**	-0.090	0.242**	-0.102
		(0.073)	(0.064)	(0.075)	(0.065)
AGE		-0.011***	-0.012***	p-val = 1.48e-05	p-val = 1.2e-08
		(0.002)	(0.002)	(edf = 5.845)	(edf = 1.959)
N		1920		1920	
Tau		0.077*		0.078*	
		(0.023, 0.125)		(0.032 , 0.123)	
Theta		0.120*		0.123*	
		(0.037, 0.195)		(0.050, 0.192)	
AIC		4378.768		4372.704	
Largest Absolute Gradient		1.489e-11		1.638e-09	
Eigenvalue Range		[22.60903, 2715529]		[0.3637075, 10064.64]	

Numbers in parenthesis are respectively: the standard error (s.e.) of the coefficients, and the 95% Confidence Intervals (C.I.) on Tau and Theta. * indicates significance at alpha of 0.05; ** significance at 0.01; and *** significance at 0.001.

Source: Author's estimations based on the 2014 Global Financial Inclusion (Global Findex) database