Bankarization among Households in the Dominican Republic

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Abstract

This research studies the determinants of the probability that a Dominican family is banked. Data is used from the Encuesta de Cultura Económica y Financiera 2014 (Financial and Economic Culture Survey 2014) of the Banco Central de la República Dominicana. Results show a significant role of variables related to financial attitudes, as financial issues oversight and previous payment capacity verification, and work status.

Keywords: bankarization, probability models, financial inclusion, financial attitudes, financial education

JEL classification: C21, D14, G21, G28.

1. INTRODUCTION

During recent years, different public and private sectors initiatives have been implemented in the Dominican Republic targeted at promoting bankarization (defined in this paper as ownership by any member of a Dominican household of at least one banking product). Such initiatives are related to regulatory policies or the application of financial education programs.

These initiatives have been motivated by the low bankarization rates estimated for the Dominican Republic. In this regard, the Encuesta de Cultura Económica y Financiera 2014 (Financial and Economic Culture Survey 2014) conducted by the Banco Central de la República Dominicana showed that approximately 62% of Dominican households own at least one banking sector instrument, which under the most conservative scenario would imply per capita bankarization rates of around 31%.

According to data from the World Bank`s 2014 Global Findex Survey, 54% of adults in the Dominican Republic reported having applied for some type of credit in the prior 12 months. Of this group, 18.2% performed this type of operation through formal financial institutions, while 20.9% (13.5% in 2011) accessed them through so-called informal lenders. This figure is above the world average (4.6%), as well as that for the group of Latin American and Caribbean countries (4.7%). A similar phenomenon can be seen on the side of deposit instruments, with 57% of adults reporting having saved, 26.5% of which used formal financial institutions for such purposes.

In this setting of low bankarization in the Dominican Republic and the existence of initiatives implemented to promote it, there remains an absence of academic research to serve as a basis for establishing guidelines for designing larger scale more coordinated efforts, such as financial education and inclusion strategies. The objective of this paper is therefore to provide an initial analytical framework for public policy dialogue on bankarization to build upon, studying what factors are determining bankarization rates.

To this end, we use data from the abovementioned Financial and Economic Culture Survey 2014 to estimate binary response models that allow for answers on factors that influence the likelihood that a Dominican household owns at least one banking product. We start with a base estimation that is gradually made more robust through the application of techniques that evaluate the presence of heteroscedasticity, endogeneity, and selection bias.

The paper is divided into four sections besides this introduction. Section 2 presents the literature related to the benefits of financial development and subsequently addresses the determinants of it. Section 3 provides a description of the data and the context in which it is employed. Section 4 contains the results of the probability estimates, an analysis of the results obtained and their implications in terms of public policies. Finally. section 5 summarizes the

findings, recommends policy actions, and makes suggestions for future research.

2. PREVIOUS STUDIES

There is a body of literature describing the advantages of financial development–of which bankarization forms part–for promoting economic wellbeing through different means. This literature includes the theoretical works of Banerjee and Newman (1993), Lloyd-Ellis and Bernhardt (2000), Cagetti and De Nardi (2006), Buera et al. (2011, 2012), Moll (2014) and Dabla-Norris et al. (2015), establishing the links between financial development, productivity and labor income, as well as financial development and aggregate economic growth.

Meanwhile, empirical research exists that emphasizes the importance of financial development for long-term economic expansion, such as the papers of Levine (2005), Beck et al. (2000), and King and Levine (1993). Moreover, with respect to the topic of deposit predictability and resilience to consumption are the works of Han and Melecky (2013), and Mehrotra and Yetman (2015).

Empirical literature has also focused efforts on the use of surveys and more detailed data to research the determinants underpinning the processes for accessing financial services. In this regard, we can cite the research papers of Devlin (2005) and Hogarth et al. (2005), which conclude that financial exclusion is associated to employment status, income levels, housing tenure, net worth, marital status, education, race, and age. Likewise, Fungáĉová and Weill (2014), Weill and Zins (2016), and Rodríguez-Raga and Riaño-Rodríguez (2016) found that, for the case of China, Africa and Colombia, access to financial products is linked to income levels, education, job stability, age, and sex. Furthermore, the work of Allen et al. (2016) provides evidence that access to bank accounts is determined by lower account costs, greater proximity to financial intermediaries, a framework protecting legal rights, and a stable political environment.

In the case of financial education as a factor determining access to banking products, there are the contributions of Lusardi and Mitchell (2007, 2009), Alessie et al. (2011), and Klapper et al. (2013), providing evidence that participation in financial markets increases with levels of financial literacy. The latter is in contrast

to the findings of Xu and Zia (2012) that there is no clear relation between financial education and having a bank account, although the authors refer to several papers in which such education encourages saving among low income individuals and minority groups. More recently, meta-analysis of 188 research papers conducted by Miller et al. (2014) suggests that interventions targeted at improving financial education can have a positive impact on savings generation, although not on other aspects, such as credit delinquency. In a similar way, Fernandes et al. (2014) performed a meta-analysis for 168 research papers on the link between financial education and financial behavior, and concluded that financial education interventions explain just 0.1% of changes in financial decision-making.

Research work has also undergone a change with regard to the estimation techniques employed. In the beginning, the authors' concerns concentrated on aggregate measures of saving and credit and their interaction with other similar metrics. They therefore mainly employed time series methods, later shifting towards more appropriate techniques for working with panel data structures. However, the emergence of surveys related to financial inclusion and financial literacy has led to a shift in the balance of research towards favoring microeconomic-type studies with an emphasis on sociodemographic aspects as determinants for banking products. In this process, the use of microeconometrics, reflected in the application of probability models for binary variables, has intensified with them being frequently employed together with techniques for addressing bias selection, as well as endogeneity. Subsequently, the increase in surveys on financial inclusion has made it possible to construct panel data, which has led to the use of dichotomous response probability models with panel data structures. Moreover, the use of control experiments with an approach from the behavioral branch of economics has become more common, while sampling and design techniques for surveys concerning access to financial services have become gradually more specialized in response to the difficulties of consistently estimating the causality of access to financial services.

3. DATA

The data used in this study correspond to those obtained by the Banco Central de la República Dominicana through application of

Table 1

DESCRIPTIVE STATISTICS FOR AGE AND MONTHLY HOUSEHOLD INCOME

Variable	Banked	Unbanked	Percentile 25	Median	Percentile 75
Age (years)	43	47	32	42	53
Monthly household income, in USD	511.9	241.7	179.1	271.0	436.3

Source: Own calculations based on data from the Financial and Economic Culture Survey.

the Financial and Economic Culture Survey 2014, the main characteristics of which are summarized in Annex 1.

In the survey, 54% of respondents were women and 46% men. As for work status, approximately 33% of respondents reported being self-employed, 25% reported being employed in the private sector, 12.9% were homemakers, and 12.1% were public sector employees. As a result of these economic activities, households received an average monthly income of 271 dollars (see Table 1).[1]

With respect to marital status, 34% of respondents answered being co-habiting with a partner, 21.5% said they had been married, while 21.1% were separated. Finally, 13.6% said they were single.

As for bankarization rates, 62.3% of households owned at least one banking product. In terms of adults per household –the average is 2.3 adults–, if all of them own banking products it would mean that the bankarization level was indeed 62.3%. That is, 62.3% of adults in the sample were banked. Nevertheless, under a different scenario

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[1] Dominican pesos (DOP) were converted into United States dollars (USD) at the exchange rate of 43.55 DOP/USD in August 2014. This value of 271 USD can be compared to the figures reported according to World Bank data by Costa Rica (1,980 USD), Panamá (1,863 USD), El Salvador (900 USD), Honduras (702 USD), and Nicaragua (855 USD) as their average per capita income or consumption, according to surveys. To do this, data reported on a monthly basis is multiplied by three, which is the average number of Dominican household members according to the Financial and Economic Culture Survey.

Table 2

LIST OF BANKING PRODUCTS BY OWNERSHIP AND USE

Banking product	Households owning them	Household using them
Savings account	967	891
Accounts at cooperatives	267	256
Current account	96	85
Foreign currency account	31	29
Payroll account	680	664
Fixed-term deposit		54
Consumer loan		76
Cooperative loan		156
Mortgage loan		48
Line of credit		51
Payday loan		106
Personal loan		246
Car loan		45
Small- and medium-sized business loan from a private bank		56
Small- and medium-sized business loan from an nongovernment organization		21
Small- and medium-sized business loan from an ethical bank		63
Credit card	478	458
Prepaid card	159	148

Source: Own calculations based on data from the Financial and Economic Culture Survey.

where only one adult in the household owned banking products, the actual level of bankarization would decrease to 31.2%.

It is important to point out that the most commonly owned products were savings accounts, payroll accounts, and credit cards, as illustrated in Table 2.

The survey also captures data on the reasons why households do not own banking products. Such information is used to determine whether the specifications are missing variables that could be

important for explaining bankarization. Thus, 68.1% of unbanked individuals reported that a lack of income prevented them from owning formal banking products, 42.7% mentioned not having a regular income as the reason preventing them from being banked, while 20% said they prefer to deal with informal entities. To a lesser extent, 16.4% argued that a large amount of requirements and documents prevent them from being banked, 12.7% expressed their distrust in formal institutions, while 11.5% mentioned high banking commissions as a disincentive. Finally, 6.4% stated that transportation difficulties and distances from banking facilities were some of the reasons for not owning financial products.

4. ECONOMETRIC STRATEGY AND RESULTS

The aim of this paper is to study the factors determining the likelihood of a Dominican household being banked. To this end, a household is considered banked when the respondent reports there being at least one member who owns some type of banking product. Thus, the bankarization variable is a binary variable that takes the value one when it fulfills the aforementioned condition, and zero if not.

In such cases where the variable of interest is dichotomous, the traditional practice is to use probability models for binary response variables. To write this type of model we turn to a latent variable interpretation. Being that y^* is a latent unobservable variable determined by:

1
$$y^* = x'\beta + v \ .$$

It can be seen, however, that there is another variable z, allowing the following to be identified:

2
$$z = \begin{cases} 1, y^* > 0 \\ 0, y^* \leq 0 \end{cases} \ .$$

Therefore,

3
$$\Pr(z = 1) = \Pr(x'\beta + v > 0) = \Pr(x'\beta > -v) = F(x'\beta) \ .$$

Hence, $F(x'\beta)$ is the cumulative distribution function of $-v$, and is estimated according to a probit model by assuming that v is

distributed according to a normal standard distribution. The problem of identifying $x'\beta$ implies restricting the variance of v to one. Estimation of this specification is performed via the maximum likelihood method.

In our case, the variable z represents the binary variable for bankarization. To estimate the probability of being banked it is necessary to define the variables to be included in the vector of explanatory variables x'. These variables are obtained from observations in the empirical literature and the obstacles to bankarization reported in the survey. Table 3 provides a summary of the variables included.

4.1 Base Estimation

The results of the base estimation, following the methodological criteria described in the first part of section 4, are summarized in Table 4.

First, it stands out that the coefficients estimated are statistically significant at the 1% level, except the indicative variable for the East Rural geographic area that exhibits statistical significance at the 95% confidence level. The coefficients also present signs consistent with a priori expectations.

The estimation was submitted to the comparison proposed by Stukel (1988), verifying whether this rejects the null hypothesis that the model does not need to be generalized to include nonlinear items, with a probability value of 62.2%. In addition, the Hosmer and Lemesbow (1980) statistics test was also used to assess the goodness of fit in the model, and found that there is no evidence to reject the null hypothesis of correct specification at a 5% significance level in any case from group specifications 3 to 15.

In goodness of fit terms, the model correctly classifies 1,461 households out of a total of 2,227, equivalent to 79.4%. In particular, the probability of predicting that a household is banked when it is indeed banked is 86.0%, while the probability of classifying a household as unbanked when it is not is 68.2%. This implies a false positive rate of 31.8% and a false negative rate of 14.0%.

4.2 Heteroscedastic Estimation

Specification of binary probabilistic models assumes that error variance is constant in the underlying or latent variable model, which is

Table 3

DESCRIPTION OF EXPLANATORY VARIABLES

Variable	Description
Final year of educational attainment	The final year of educational attainment is used as a proxy for formal education. It is included in the model assigning a separate category to each education level, with a value of one when this category represents the final academic year attained, and zero if not. We expect levels of formal education to have a positive effect on bankarization probability given that formal education levels build people's capacities for understanding the importance and advantages of using banking products.
Age	The age reported by the respondent. We expect a positive sign because older age implies a longer amount of time for an individual to accumulate the experience necessary to establish the incentives eventually leading them to being banked. Furthermore, Xu and Zia (2012) point out that there is a relation between age and financial education, meaning that financial education not measured by this survey is possibly channeled into age.
Work status	Included in the model by assigning a separate category to each work status, with the value of one when said category represents the corresponding employment status, and zero if not. We generally expect a work status that implies a certain amount of job security and stability to be positively linked to the probability of being banked, particularly because payroll and saving accounts are often used to pay wages. For instance, the case of public employees is particularly interesting given the formality of the public sector and the fact that wages are usually paid through banks. This is also the case for retirees or pensioners.
Monthly household income	Monthly household income is included as a Napierian logarithm. We expect positive sign coefficient given that higher levels of monthly income allow a household to finance the costs of accessing and using financial products. Apart from this, the literature assigns recurring importance to this variable for explaining bankarization.
Contributes to the household budget	A dichotomous variable that takes the value one when a respondent answers yes to the question on whether they contribute to the household budget, and zero if not. We expect that contributing to the family budget raises the probability of being banked because it implies the existence of excess income for budgeting and assumes an organization of family resources that reflects a certain level of diligence.

Table 3 (cont.)

Variable	Description
Time household can subsist if it loses its main source of income	This variable is included identifying each category with a specific dichotomous variable that takes the value one if the respondent answers in the category, and zero if not. This variable measures a household's saving capacity and its capacity to diversify sources of income. In general, low subsistence should be associated with a reduced likelihood of using banking products because it reflects nonexistence of excess income for households to finance themselves during emergencies, and consequently limits their capacity to acquire banking products.
Trust in financial information	A dichotomous variable that takes the value one when some respondent answers yes to the question on whether they trust in the available financial information, and zero if not. We expect a positive sign given that the perception of reliable financial information suggests a greater willingness to consume banking products. In fact, the survey demonstrates that distrust in the formal banking sector and the preference for informality are obstacles to being banked.
Money is for spending	A dichotomous variable that takes the value one when the respondent answers yes to the question on whether money is for spending, and zero if not. In this way, it seeks to measure a respondent's willingness to save or their attitude towards it. We expect a negative association with the probability of being banked, particularly in a context of informality, given that a predisposition to this attitude reduces the probability of saving and thereby the incentive for having savings accounts.
Assesses if they can pay before making a purchase	This variable is included identifying each category with a specific dichotomous variable that takes the value one if the respondent answers in the category, and zero if not. The variable registers the answer of the respondent to the question on whether before making a purchase they carefully consider if they can pay for it. It therefore measures a precautionary attitude when making purchases. We expect an attitude of constant assessment is positively associated to a greater probability of owning financial products in a similar way to the predisposition to spend money.

Monitors financial affairs	This variable is included identifying each category with a specific dichotomous variable that takes the value one if the respondent gives an answer in the category, and zero if not. The variable registers the respondent's answer to the question on whether they personally monitor their financial affairs. It therefore measures their level of diligence regarding financial affairs, which is interpreted as a precondition for banking products to be used for financial management and to encourage behavior that makes the respondent a candidate for accessing credit products. A vigilant attitude is expected to have a positive influence on the probability of being banked.
Marital status	This variable is included identifying each category with a specific dichotomous variable that takes the value one if a respondent gives an answer in the category, and zero if not. This variable registers a respondent's answer to the question on their marital status. We expect a marital status that implies cohabiting with a partner to increase the probability of being banked due to the scale effect of a united effort. Likewise, a marital status that implies separation or loss of a partner reduces the probability of owning financial products.
Financial education	This variable is included identifying each category with a specific dichotomous variable that takes the value one if a respondent answers the question on financial education correctly, and zero if not. This variable registers a respondent's answer to the financial education questions. As stated in some of the previously mentioned literature, we expect correct answers to be associated with higher levels of banking given how it indicates an individual can understand the advantages of acquiring banking products.
Geographic areas	We incorporate this group of dichotomous variables, which take the value one when a household is located in the referred area and 0 if it is not. Inclusion of this type of variable responds to the need to control for the effects on banking of a particular region having few bank branches or agencies, or that a large population density can be reflected in a higher number of unbanked individuals.

Note: Descriptive statistics for these variables are presented in the Annex (tables A.1 to A.13).
Source: Own elaboration based on the Financial and Economic Culture Survey.

Table 4

BASE MODEL

Dependent Variable	Household owns at least one banking instrument: Yes = 1; No = 0
Model | Method	Probit model | Maximum likelihood
Observations	2,227 Households

Variable	Coefficient	Marginal effect (on the mean)	Probability (coefficient = 0)[1]	Mean coefficient
Constant	–6.26		0.00%	
Final year of educational attainment				
University degree	0.67	0.20	0.00%	0.12
Incomplete university degree	0.69	0.20	0.00%	0.11
Completed secondary education	0.34	0.11	0.00%	0.15
Work status				
Public employee	1.52	0.34	0.00%	0.12
Private employee	0.87	0.26	0.00%	0.25
Retired or pensioned	1.46	0.29	0.00%	0.03
Household income				
Logarithm	0.56	0.20	0.00%	9.44
Time household can subsist if it loses its main source of income				
One week	–0.26	–0.10	0.00%	0.28

Trust in financial information

Yes	0.24	0.09	0.00%	0.51
Money is for spending				
Strongly agree	−0.30	−0.11	0.00%	0.21
Assesses if they can pay before making a purchase				
Almost never	−1.82	−0.60	0.00%	0.01
Monitors financial affairs				
Never	−0.71	−0.27	0.00%	0.05
Does not know	−1.64	−0.57	0.00%	0.03
Contributes to the household budget				
Yes	0.29	0.11	0.10%	0.91
Age				
Age	0.04	0.01	1.00%	44.25
Age squared	−0.0004	−0.0001	0.00%	2,185
Geographic areas				
Urban Santo Domingo	−0.35	−0.13	0.00%	0.22
Rural East	−0.48	−0.18	2.80%	0.02
Urban East	−0.23	−0.08	0.50%	0.21
Pseudo R^2	34.6%			

Note: [1]Calculated using robust standard errors. This becomes unnecessary if the model is correctly specified.

commonly understood as the assumption of error homoscedasticity. Considering that during the use of robust errors some differences were revealed with respect to the ordinary errors, we therefore test the assumption of homoscedasticity.

Given that in a binary model the underlying variable follows a binomial process and variance is determined by the mean, there is a possibility that the variables employed to estimate variance are, alternatively, ones that have been omitted from the conditional mean estimation. Such omission is addressed following Cameron and Trivedi (2010) by estimating a heteroscedastic probit model in which variance is modeled according to the variables correlated with the squared residual. A summary of the estimation results is presented in Table 5.

The results from the heteroscedastic model estimation reveal that the contrast for testing if the log variance is equal to zero –variance is unitary and constant– gives a χ^2 statistic with two degrees of freedom of 8.4, with a statistical significance of less than 5% probability of being below its critical value. With this, we reject the null hypothesis and conclude that there are advantages for estimating a probit model that includes a specification for variance.

The results of the heteroscedastic model presented in Table 5 include a binary variable for *internet services* that takes the value one when a household has said services, and zero if not[2]. This variable, statistically significant at 1%, exhibits a marginal effect on the probability of being banked of 0.14 points. The significance of this variable for explaining the likelihood of a household being banked is indicative of the lower transportation costs made possible by being able to use financial services remotely.

With these inclusions, the conditional mean model shown in Table 5 correctly classifies 79.4% of households between banked and unbanked, meaning that in terms of predicting inside the sample, a similar situation is observed as with the base model. However, Hosmer and Lemesbow (1980) test statistics more broadly reiterate the null hypothesis of correct specification by verifying that a less than 20% probability for rejecting the null hypothesis was observed in any of the group specifications–from 3 to 15 groups.

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[2] Out of the group of variables selected for estimating variance, this variable was the only one statistically significant for estimating the conditional mean. The rest are presented in the annexes.

4.3 Estimation with Endogenous Regressor

In the estimations performed previously, the possibility persists of a regressor being endogenous. That is, it is determined by a common factor with the independent variable, and consequently the value estimated for the coefficient associated with said endogenous regressor is biased and inconsistent.

Out of the explicative variables included in the previous estimations, there is a well-founded suspicion that the household income variable might be endogenous. The reason for this is that while income allows for financing the costs of accessing and using financial instruments, thereby fostering bankarization, the use of them could also favor higher household income by generating yields on their investments. This overlap can bias the coefficient associated with the logarithm of household income, and will mainly depend on whether the investment instruments really do generate sufficient returns to be statistically important.

We therefore re-estimate the probabilistic model including instrumental variables correlated with household income, but not directly associated with the probability of being banked. The instrumental variables we use are listed in Table 6 along with their respective levels of correlation regarding log of household income. It is important to point out that the reported correlations are statistically different from zero at a significance level of 5 per cent.

We perform the estimations of the endogenous model based on a structural specification, which is an estimate of the probability of a household being banked. We simultaneously estimate an equation for identifying the log of household income that includes structural model variables and the instruments described in Table 6 above as regressors. The correlation between the residuals of both models allows for testing the exogeneity of household income: if this correlation is statistically different from zero, both equations therefore have unexplained factors in common, leading to the conclusion that household income is endogenous.

The results of the endogenous model are presented in Table 7. The coefficients and marginal effects estimated do not exhibit important differences from those obtained using the heteroscedastic model. The most important result in this regard consists of the exogeneity test: the estimated correlation between structural and identification equation residuals is 0.07, with a 62% likelihood of being

Table 5

HETEROSCEDASTIC PROBIT MODEL

Dependent variable	Household owns at least one banking instrument: Yes = 1; No = 0
Model | Method	Probit model with variance estimate | Maximum likelihood
Observations	2,227 households

Variable	Coefficient	Marginal effect (on the mean)	Probability (coefficient = 0)
Constant	–5.48		0.00%
Final year of educational attainment			
University degree	0.56	0.20	0.00%
Incomplete university degree	0.62	0.22	0.00%
Completed secondary education	0.29	0.11	0.20%
Work status			
Public employee	1.47	0.53	0.00%
Private employee	0.86	0.31	0.00%
Retired or pensioned	1.43	0.51	0.00%
Household income			
Logarithm	0.48	0.17	0.00%
Time household can subsist if it loses its main source of income			
One week	–0.26	–0.09	0.00%

Trust in financial information

Yes	0.24	0.08	0.00%
Money is for spending			
Strongly agree	−0.30	−0.11	0.00%
Assesses if they can pay before making a purchase			
Almost never	−1.83	−0.66	1.10%
Monitors financial affairs			
Never	−0.68	−0.24	0.00%
Do not know	−1.62	−0.58	0.00%
Contributes to household budget			
Yes	0.29	0.11	0.10%
Age			
Age	0.04	0.01	0.20%
Age squared	−0.0004	−0.0002	0.00%
Geographical areas			
Urban Santo Domingo	−0.32	−0.11	0.00%
Rural East	−0.45	−0.16	5.50%
Urban East	−0.24	−0.08	0.40%
Has internet services			
Yes	0.39	0.14	0.00%

Table 6

DESCRIPTION OF INSTRUMENTAL VARIABLES

Variable (correlation with income logarithm)	Description
Number of adults living in the househol (income correlation: 0.25)	Family income increases with the number of adults living in the household as their presence increases the probability of employment or performing economic activities that increase a household's sources of income. For this reason, the number of adults is not a direct predictor of being banked, given that they can only become banked if they are able to obtain a job and generate financial resources. In other words, the number of adults only benefits banking through pre-existing conditions.
Think they will finance their old age with family help (income correlation: −0.16)	This variable takes the value one when the respondent reports thinking they will finance consumption in their old age with family help. This assumes the existence of an incapacity to generate their own income in the future, putting into perspective the need to be financed by their close relatives. Thus, this variable is not directly linked to being banked, given that it originated in a context of low income, a variable that is a powerful predictor for bankarization. From another point of view, this type of attitude within a setting of high household income is probably not an obstacle to the household being banked. Moreover, these types of forward-looking statements by an individual are not necessarily determinants of current ownership of financial products.
Think they will finance their old age with nonfinancial assets (income correlation: 0.17)	This variable takes the value one when the respondent reports thinking they will finance consumption in their old age with nonfinancial assets. We assume the individual reporting this has had time to accumulate these assets, meaning such expectations should be associated to a current and future capacity to generate income. That is, they refer to a pre-existing condition. If this is not the case, it is interpreted as just an aspiration, and is therefore not a direct predictor for being banked.

| Transferred or loaned dwelling (income correlation: −0.08) | This variable takes the value one when a respondent reports living in a transferred or loaned dwelling. Reporting this variable suggests low income, which is also a predictor of low bankarization rates. By being a reflection of income, this variable does not directly determine bankarization rates. Intuitively for instance, for a high-income household, living in a transferred or loaned dwelling would not prevent it from having a savings account. |

Source: Own elaboration based on the Financial and Economic Culture Survey.

equal to zero, therefore not rejecting the null hypothesis of exogeneity for household income.

Given the distribution assumptions of the procedure employed in the probability model for endogeneity, that is the joint normality and homoescadicity of residuals from the equations, it is advantageous to test the results obtained using a linear probability model estimated with two-stage least squares.

We proceed in this way, performing exogeneity tests using the score diagnostics proposed by Wooldridge (1995). For both tests, score statistics exhibit a χ^2 value with 1 degree of freedom of 1.15, and a F of 1 and 2,205 degrees of freedom of 1.15, with associated probabilities of 69.6% and 69.7% respectively, meaning the null hypothesis of exogeneity is not rejected. Meanwhile, testing for instrument noncorrelation with the error using the specification of Wooldridge with three degrees of freedom gives a χ^2 value of 6.06 associated to a p-value of 10.9%, meaning the null hypothesis on the value of the instruments used is not rejected.

4.4 Selection Bias

The Financial and Economic Culture Survey is designed in such way that when the questions start household members have to say who would be the best person to answer for them. This mechanism makes it impossible to observe the specific variables of every household member, such as their financial attitudes, financial literacy, and references, among others, as well as the connection to whether the individual owns banking instruments or not.

Table 7

PROBIT MODEL WITH ENDOGENOUS REGRESSOR

Dependent variable	Household owns at least one banking instrument: Yes =1; No =0
Model | Method	Probit nodel with endogenous regressor | Maximum likelihood
Observations	2,227 households

Variable	Coefficient	Probability (coefficient = 0)[1]
Constant	−4.77	1.70%
Final year of educational attainment		
University degree	0.62	0.10%
Incomplete university degree	0.64	0.00%
Completed secondary education	0.34	0.10%
Work status		
Public employee	1.55	0.00%
Private employee	0.89	0.00%
Retired or pensioner	1.45	0.00%
Household Income		
Logarithm	0.39	7.70%
Time household can subsist if it loses its main source of income		
One week	−0.28	0.20%
Trust in financial information		
Yes	0.26	0.00%
Money is for spending		
Strongly agree	−0.31	0.00%
Assesses if they can pay before making a purchase		
Almost never	−1.85	1.10%
Monitors financial affairs		
Never	−0.71	0.00%
Does not know	−1.65	0.00%
Contributes to household budget		
Yes	0.30	0.60%
Age		
Age	0.04	0.10%

Age squared	−0.0005	0.00%
Geographic areas		
Urban Santo Domingo	−0.33	0.00%
Rural East	−0.46	3.40%
Urban East	−0.24	0.50%
Has internet services		
Yes	0.50	0.40%

Note: [1]Probability calculation based on robust standard errors.

This is different from the classic selection bias problem because the study question we are concerned with in this paper whether a household owns at least one banking instrument or not includes the ownership of banking products by household members who were not chosen to answer. Nonetheless, there could be a bias in the estimations given that ownership of banking products might not be related to a respondent's own variables, but to other members who were not surveyed and whose characteristics go unobserved.

One way to establish the size of this bias is by including dichotomous interaction variables in the heteroscedastic model that we codify as *adults_1*, and that take the value one when the household consists of just one adult, and zero if not. These variables are introduced as multipliers of household variables that might be biased. Thus, if they are statistically significant, the magnitude of the coefficient of the interacted variables will reveal the size of the bias as compared to households composed of just one adult, while statistical nonsignificance implies the referred selection bias will not affect the coefficients estimated.

The results of the estimations can be seen in Table 8. They indicate that there is no statistically significant difference between the coefficients estimated for all the households and those corresponding to households with only one adult living in them, implying that bias for the unobserved characteristics of household members that did not answer the survey is not a concern. The results can therefore be discussed with the estimates contained in the heteroscedastic model shown in Table 5.

Table 8

HETEROSCEDASTIC PROBIT MODEL WITH INTERACTION VARIABLES

Dependent variable instrument:	Household owns at least 1 banking
	Yes = 1; No = 0
Model | Method	Probit model with variance estimation | Maximum likelihood
Observations	2,156 households

Variable	Coefficient	Probability (coefficient = 0), percentage
Constant	−5.60	0.00
Final year of educational attainment		
University degree	0.55	0.10
University degree*adults_1	0.10	80.7
Incomplete university degree	0.58	0.00
Incomplete university degree *adults_1	0.15	64.8
Completed secondary education	0.32	0.20
Completed secondary education *adults_1	−0.13	57.1
Work status		
Public employee	1.31	0.00
Private employee	0.86	0.00
Private employee*adults_1	0.02	90.7
Retired or pensioned	1.37	0.00
Retired or pensioned*adults_1	0.40	51.0
Household income		
Logarithm	0.48	0.00
Logarithm*adults_1	0.07	34.4
Time household can subsist if it loses its main source of income		
One week	−0.23	0.40
One week*adults_1	−0.05	78.1

Trusts in financial information		
Yes	0.27	0.00
Yes*adults_1	−0.16	32.4
Money is for spending		
Strongly agree	−0.29	0.10
Strongly agree*adults_1	−0.08	69.6
Assesses if they can pay before making a purchase		
Almost never	−1.56	4.50
Monitors financial affairs		
Never	−0.73	0.00
Never*adults_1	0.25	43.4
Does not know	−1.63	0.00
Contributes to household budget		
Yes	0.25	2.30
Yes*adults_1	0.37	34.7
Age		
Age	0.05	0.00
Age*adults_1	−0.04	14.9
Age squared	−0.0005	0.00
Age squared*adults_1	0.0004	18.4
Geographic areas		
Urban Santo Domingo	−0.33	0.00
Rural East	−0.46	3.40
Urban East	−0.24	0.50
Has internet service		
Yes	0.37	0.00
Yes*adults_1	0.06	85.5

Note: Perfectly colinear variables are excluded from the table.

4.5 Discussion of Results

The proposed methodological process began with a base estimation, which was made more robust by including an estimation for variance in the heteroscedastic model. At this point, it became necessary to test whether the model should be revised due to endogeneity in the regressors or selection bias stemming from the unobserved characteristics of household members who did not answer the survey. In the former case, we confirmed the exogeneity of household income, while in the latter we found the referred selection bias was not statistically significant. Hence, the coefficients obtained from the heteroscedastic model are valid and we can proceed to summarize the results.

4.5.1 Attitude Matters

First, the strongest marginal effects were observed in the attitude variables for whether a respondent assesses whether they can pay before making a purchase (−0.66) and if a respondent monitors their financial affairs (−0.58). As mentioned, not having these attitudes can eliminate the positive influence of being employed on the probability of being banked. Meanwhile, including these variables in the specification led to the variables related to financial education not being statistically significant.

This highlights how financial education policies should be aimed towards programs for developing good financial habits such as planning and monitoring income and expenditure, as well as budgeting. This is similar to the recommendations arrived at in Fernandes et al. (2014) with respect to the benefits to be gained from financial literature addressing poor financial skills.

In addition, the variable indicating that the respondent believes money is for spending is associated to a marginal effect that reduces the probability of a household being banked by −0.11. This value is fully offset by the effect of an increase of 0.11 implied by the respondent contributing to the household budget.

4.5.2 After Correcting Attitudes, It Is the Turn of Employment, Wages and Retirement

Being employed in the public sector implies a 0.53-point increase in the probability of being banked, while employment in the private sector would mean an increase of 0.31 points, with part of this

difference explained by levels of informality in the private sector. Although less than the marginal effects of attitudes, the impact of work status should be coupled with the marginal effect of the income (0.17) received by simply moving into the category of employee. Hence, being an employee and receiving income implies a substantial increase in the probability of being banked, particularly at low-income levels, where the marginal effect of income is greater.

With respect to being retired or pensioned, this status implies an increase in the probability of being banked amounting to 0.51 points, similar to the effect of being employed in the public sector. This can be explained by the underlying narrative in this category: it involves a long time with work and income stability that, regardless of the level of income, facilitates banking at some point in a person's life. One matter that merits further study concerns the proportion of the retirement or pensions that corresponds to granting pensions and whether said pension is disbursed through financial institutions.

As for public policy objectives, income levels and work status should be placed within the context of a long-term strategy given the fact that they are variables that cannot be changed in the short term and their significant value for increasing the probability of being banked. The latter, along with promoting employment and income growth, should encourage formality and the creation of instruments, mechanisms, and regulations that allow for leveraging higher income levels.

4.5.3 Education Helps

On another front, the results show that if a respondent has completed a secondary education this has a marginal effect of a 0.1-point increase in the probability of a household being banked. Said effect doubles to 0.22 if a respondent has started university studies, even if they have still not finished them, although it falls slightly to 0.20 if studies have been completed. The latter might be explained by abandoning studies in order to enter the labor market. Thus, university education helps offset the effect of bad financial habits, if only partially. This impact is conditioned by the diversity of university degree courses, as well as the many different circumstances that influence the education of an individual during the university stage. Consequently, there is room for improvement to

include programs on financial literacy and attitudes adapted to the circumstances of secondary and tertiary education in order to increase the importance of the marginal effect of formal education.

4.5.4 The Golden Age

Finally, the estimations show that, given the combined marginal effects of age, its positive impact on the probability of a household being banked reach a maximum level of 0.13 points when a respondent reports being 25 years old, with this positive effect gradually disappearing at 50. This could indicate that incentives for acquiring banking products reach their highest level at 25 years of age, in line with the stage in a person's life associated with growing levels of indebtedness. From a public policy point of view, this shows that bankarization campaigns should be targeted at the 20- to 30-year-old age group, a period during which the positive marginal effect of age remains above 0.12 points.

It is worth pointing out that including the respondent's age resulted in the variables for marital status not being statistically significant.

5. CONCLUSIONS

This paper proposed studying the determinants of bankarization among households in the Dominican Republic, defining it as ownership of at least one product from the banking sector. With this aim in mind, we used data from the Financial and Economic Culture Survey of 2014, conducted by the Banco Central de la República Dominicana to perform probability estimations, including specifications to control for heteroscedasticity of residuals, as well as regressor endogeneity and selection bias stemming from nonobservation of household members who did not answer the survey.

The results indicate that the probability of Dominican households being banked is determined by financial attitudes, work status, education, and age of the respondent, as well as average household income, its geographic location, and time it can subsist when without its main source of income.

To judge from marginal effects, variables related to financial attitudes, labor market participation, income levels, and formal education are the most important. Hence, several lines of public policy actions appear plausible. These include programs that encourage

positive attitudes towards financial mattersin the setting of secondary and university education, among other scenarios, and that encompass diligence and care in financial matters, as well as a culture of saving. Programs should also bolster policies that promote employment and income levels, accompanied by financial policies that leverage said boost and turn it into bank penetration, and focus on a target audience of 20- to 30-year-old.

In terms of research, it is important to delve deeper into financial education measures that better reflect the skills really necessary for guaranteeing access to formal financial products, and similarly carry out further study into possible controls for those types of measures that allow for establishing stronger causal relationships. It is also advisable that future versions of the Financial and Economic Culture Survey include questions and measures that enable higher quality control variables.

ANNEX

Annex 1. Main Data from the Financial and Economic Culture Survey, 2014

Census framework	All areas of census supervision such as geographic clusters or primary sampling units (PSUs) of the VIII National Population and Housing Census conducted in October 2002.
Sampling framework	Sampling framework used as of 2008 to conduct the Encuesta Nacional de Fuerza de Trabajo (National Workforce Survey, ENFT), which has 1,968 census supervision areas or PSUs.
Type of sampling	Three-stage probability: three stages of sample selection.
Sample selection	Out of all census supervision areas or geographic clusters from the 2002 Census, the PSU's with probability proportional to occupied private dwellings were selected. In the second stage, 362 clusters with the same probability were selected as secondary sampling units from a sampling framework of 1,046 clusters based on the ENFT framework. Finally, eigth dwellings with the same probability were chosen as final or tertiary sampling units (PSU's) via random start systematic sampling.
Target population	Individual households living in noncollective occupied dwellings in the main municipal districts of the most important provinces of the country's four largest regions, always including the municipal districts of the province's capital.
Domain estimations or statistical inference	Municipal districts selected from Greater Santo Domingo.
	Municipal districts chosen from the Northern Region or Cibao.
	Municipal districts chosen in the Southern Region.
	Municipal districts selected from the Eastern Region.
	Municipal districts inland urban areas.
	Municipal districts inland rural areas.

Sample confidence level and maximum allowed error	The sample confidence level is 95% in estimates for proportions, percentages, rates, and ratios, and the maximum allowed error was estimated for the total sample also taking into account maximum variance in proportions and the design effect of complex samples equal to two: 2.92% for the total sample; 5.67% for Greater Santo Domingo; 5.42% for the Northern Region or Cibao; 6.13% for the Eastern Region; and 6.25% for the Southern Region.
Effective sample or interviews performed	The total effective sample was 2,313 private individual households.
Implementation periods	August 4 to 10, 2014.
Sampling weight factor	Calculated by strata based on the number of households registered in the National Population and Housing Census 2010, and the number of actual households in the sample.

Source: First Financial and Economic Culture Survey of the Dominican Republic, 2014.

Annex 2. Descriptive Statistics for Selected Variables, Constructed Based on Data from the Financial and Economic Culture Survey of the Dominican Republic

Table A.1

OWNS FINANCIAL PRODUCTS (DEPENDENT VARIABLE)

Value	Number	Percentage
0	871	37.66
1 (owns)	1,442	62.34
Total	2,313	100.00
Mean	0.62	
Median	1.00	
Maximum	1.00	
Minimum	0.00	
Standard deviation	0.48	

Table A.2

FINAL YEAR OF ACADEMIC ATTAINMENT

Value	Number	Percentage
1 (PhD)	15	0.70
2 (Master's)	15	0.70
3 (University degree)	269	12.51
4 (Incomplete university degree)	249	11.58
5 (Technical university education)	6	0.28
6 ((Incomplete technical university education)	12	0.56
7 (Nonuniversity technical education)	6	0.28
8 (Completed secondary school)	350	16.28
9 (Incomplete secondary school)	431	20.05
10 (Completed primary school)	168	7.81
11 (Incomplete primary school)	619	28.79
12 (None)	10	0.47
Total	2,150	100.00
Mean	8.03	
Median	9.00	
Maximum	12.00	
Minimum	1.00	
Standard deviation	2.97	

Table A.3

AGE

Value	Number	Percentage
[0-20)	34	1.47
[20-40)	924	39.95
[40-60)	946	40.90
[60-80)	367	15.87
[80-100)	42	1.82
Total	2,313	100.00
Mean	44.50	
Median	43.00	
Maximum	99.0	
Minimum	1.00	
Standard deviation	15.34	

Table A.4

WORK STATUS

Value	Number	Percentage
1 (public employee)	279	12.06
2 (private employee)	577	24.95
3 (domestic service)	113	4.89
4 (employer)	29	1.25
5 (self-employed)	780	33.72
6 (seeking work)	63	2.72
7 (homemaker)	299	12.93
8 (disabled)	17	0.73
9 (unable to work due to health)	30	1.30
10 (retired or pensioned)	77	3.33
11 (student)	23	0.99
12 (not looking for work)	8	0.35
13 (apprentice)	1	0.04
14 (other)	15	0.65
97 (does not know, does not answer)	2	0.09
Total	2,313	100.00
Mean	4.41	
Median	5.00	
Maximum	97.00	
Minimum	1.00	
Standard deviation	3.75	

Table A.5

MONTHLY HOUSEHOLD INCOME

Value	Number	Percentage
[0, 50,000)	2,111	94.66
[50,000-100,000)	96	4.30
[100,000-150,000)	12	0.54
[150,000-200,000)	5	0.22
[200,000-250,000)	4	0.18
[250,000-300,000)	0	0.00
[300,000-350,000)	1	0.04
[450,000-500,000)	1	0.04
Total	2,230	100.00
Mean	17,913.00	
Median	12,000.00	
Maximum	460,000.00	
Minimum	500.00	
Standard deviation	21,451.79	

Table A.6

TIME HOUSEHOLD CAN SUBSIST IF IT LOSES ITS MAIN SOURCE OF INCOME

Value	Number	Percentage
1 (7 days)	644	27.84
2 (8 to 30 days)	641	27.71
3 (31 to 90 days)	436	18.85
4 (91 to 180 days)	226	9.77
5 (over 180 days)	180	7.78
97 (does not know)	172	7.44
98 (does not answer)	14	0.61
Total	2,313	100.00
Mean	9.98	
Median	2.00	
Maximum	98.00	
Minimum	1.00	
Standard deviation	25.79	

Table A.7

TRUST IN FINANCIAL INFORMATION

Value	Number	Percentage
1 (Trusts)	1,157	50.02
2 (Partly)	568	24.56
3 (Does not trust)	299	12.93
97 (does not know)	274	11.85
98 (does not answer)	15	0.65
Total	2,313	100.00
Mean		13.51
Median		1.00
Maximum		98.00
Minimum		1.00
Standard deviation		31.58

Table A.8

MONEY IS FOR SPENDING

Value	Number	Percentage
1 (strongly agree)	482	20.84
2	155	6.70
3	276	11.93
4	207	8.95
5 (strongly disagree)	1,151	49.76
97 (does not know)	35	1.51
98 (does not answer)	7	0.30
Total	2,313	100.00
Mean		5.31
Median		5.00
Maximum		98.00
Minimum		1.00
Standard deviation		12.60

Table A.9

ASSESSES IF CAN PAY BEFORE MAKING A PURCHASE

Value	Number	Percentage
1 (always)	2,010	86.90
2 (almost always)	172	7.44
3 (sometimes)	84	3.63
4 (almost never)	15	0.65
5 (never)	10	0.43
97 (does not know)	14	0.61
98 (does not answer)	8	0.35
Total	2,313	100.00
Mean		2.10
Median		1.00
Maximum		98.00
Minimum		1.00
Standard deviation		9.35

Table A.10

MONITORS FINANCIAL AFFAIRS

Value	Number	Percentage
1 (always)	1,658	71.68
2 (almost always)	211	9.12
3 (sometimes)	151	6.53
4 (almost never)	60	2.59
5 (never)	127	5.49
97 (does not know)	66	2.85
98 (does not answer)	40	1.73
Total	2,313	100.00
Mean		5.94
Median		1.00
Maximum		98.00
Minimum		1.00
Standard deviation		20.07

Table A.11

CONTRIBUTES TO THE BUDGET

Value	Number	Percentage
0 (does not contribute)	225	9.73
1 (contribute)	2,088	90.27
Total	2,313	100.00
Mean	0.90	
Median	1.00	
Maximum	1.00	
Minimum	0.00	
Standard deviation	0.30	

Table A.12

GEOGRAPHICAL AREAS

Value	Number	Percentage
Rural South	464	20.06
Urban South	478	20.67
Rural East	94	4.06
Urban East	47	2.03
Rural North	152	6.57
Urban North	536	23.17
Greater Rural Santo Domingo	34	1.47
Greater Urban Santo Domingo	508	21.96
Total	2,313	100.00

Table A.13

ADULTS PER HOUSEHOLD

Value	Number	Percentage
0	1	0.04
1	506	21.88
2	1,030	44.53
3	467	20.19
4	209	9.04
5	72	3.11
6	19	0.82
7	4	0.17
8	3	0.13
9	2	0.09
Total	2,313	100.00
Mean	2.31	
Median	2.00	
Maximum	9.00	
Minimum	0.00	
Standard deviation	1.11	

References

Alessie, R., A. Lusardi, and M. van Rooij (2011), "Financial Literacy and Stock Market Participation," *Journal of Financial Economics,* Vol. 101, No. 2, pp. 449-472.

Allen, F., A. Demirgüç-Kunt, L. Klapper, and M. S. Martínez (2012), *The Foundations of Financial Inclusion: Understanding Ownership and Use of Formal Accounts*, Policy Research Working Paper, No. 6290, World Bank, Washington D. C., <http://documents.worldbank.org/curated/en/348241468329061640/pdf/wps6290.pdf>.

Banerjee, A., and A. Newman (1993), "Occupational Choice and the Process of Development," *Journal of Political Economy*, Vol. 101, No. 2, pp. 274-298.

Banco Central de la República Dominicana (2014), *Primera Encuesta de Cultura Económica y Financiera de la República Dominicana*, Banco Central de la República Dominicana, <http://www.bancentral.gov.do/publicaciones_economicas/otros/Encuesta20141119.pdf>.

Beck, T., R. Levine, and N. Loayza (2000), "Finance and the Sources of Growth," *Journal of Financial Economics*, Vol. 58, No. 1, pp. 261-300.

Buera, F., J. Kaboski, and Y. Shin (2011), "Finance and Development: A Tale of Two Sectors," *American Economic Review*, Vol. 101, No. 5, pp. 1964-2002.

Buera, F., J. Kaboski, and Y. Shin (2012), *The Macroeconomics of Microfinance*, NBER Working Paper Series, No. 17905, National Bureau of Economic Research, Cambridge, Massachusetts, <http://www.nber.org/papers/w17905.pdf>.

Cagetti, M., and M. De Nardi (2006), "Entrepreneurship, Frictions, and Wealth," *Journal of Political Economy*, Vol. 114, No. 5, pp. 835-870.

Colin, C., and P. Trivedi (2010), *Microeconometrics Using Stata*, Stata Press, 677 pages.

Dabla-Norris, E., Y. Deng, A. Ivanova, I. Karpowicz, F. Unsal, E. Van Leemput, and J. Wong (2015), *Financial Inclusion: Zooming in on Latin America*, IMF Working Papers, No. 15/206, September, International Monetary Fund, Washington D. C., <https://www.imf.org/external/pubs/cat/longres.aspx?sk=43312.0>.

Devlin, J. (2005), "A Detailed Study of Financial Exclusion in the UK," *Journal of Consumer Policy*, Vol. 28, No. 1, pp. 75-108.

Fernandes, D., L. John Jr., and R. Netemeyer (2014), "Financial Literacy, Financial Education, and Downstream Financial Behaviors," *Management Science*, Vol. 60, No. 8, pp. 1861-1883, <https://doi.org/10.1287/mnsc.2013.1849>.

Fungáĉová, Z., and L. Weill (2015), "Understanding Financial Inclusion in China," *China Economic Review*, Vol. 34, July, pp. 196-206, <http://dx.doi.org/10.2139/ssrn.2428151>.

Han, R., and M. Melecky (2013), *Financial Inclusion for Financial Stability: Access to Bank Deposits and the Growth of Deposits in the Global Financial Crisis,* Policy Research Working Paper, No. 6577, World Bank, Washington D. C., <http://documents.worldbank.org/curated/en/850681468325448388/pdf/WPS6577.pdf>.

Hogarth, J., C. Anguelov, and J. Lee (2005), "Who Has a Bank Account? Exploring Changes Overt Time, 1989-2001," *Journal of Family and Economic Issues*, Vol. 26, No. 1, March, pp. 7-30.

Hosmer, D., and S. Lemesbow (1980), "Goodness-of-Fit Tests for the Multiple Logarithmistic Regression Model," *Communications in Statistics: Theory and Methods*, Vol. 9, No. 10, pp. 1043-1069.

King, R., and R. Levine (1993), "Finance and Growth: Schumpeter Might Be Right," *The Quarterly Journal of Economics*, Vol. 108, No. 3, pp. 717-737.

Klapper, L., A. Lusardi, and G. Panos (2013), "Financial Literacy and its Consequences: Evidence from Russia During the Financial Crisis," *Journal of Banking and Finance*, Vol. 37, No. 10, pp. 3904-3923.

Levine, R. (2005), "Finance and Growth: Theory and Evidence," en P. Aghion, and S. Durlauf (eds.), *Handbook of Economic Growth,* chapter 12, Elsevier, pp. 865-934, <https://doi.org/10.1016/S1574-0684(05)01012-9>.

Lloyd-Ellis, H., and D. Bernhardt (2000), "Enterprise, Inequality and Economic Development". *The Review of Economic Studies*, Vol. 67, No. 1, pp. 147-168.

Lusardi, A., and O. Mitchell (2007), *Financial Literacy and Retirement Planning: New Evidence from the Rand American Life Panel*, Michigan Retirement Research Center, No. WP 157, University of Michigan, <https://deepblue.lib.umich.edu/bitstream/handle/2027.42/57569/wp157.pdf?sequence=1&isAllowed=y>.

Lusardi, A., and O. Mitchell (2009), *How Ordinary Consumers Make Complex Economic Decisions: Financial Literacy and Retirement Readiness*, National Bureau of Economic Research Working Paper Series, No. 15350, <http://www.nber.org/papers/w15350.pdf>.

Mehrotra, A., and J. Yetman (2015), "Financial Inclusion – Issues for Central Banks," *BIS Quarterly Review,* Bank for International Settlements.

Miller, M., J. Reichelstein, C. Salas, and B. Zia (2014), *Can You Help Someone Become Financially Capable? A Meta-Analysis of the Literature,* Policy Research Working Paper, No. 6745, World Bank, Washington D. C., <http://documents.worldbank.org/curated/en/297931468327387954/Can-you-help-someone-become-financially-capable-a-meta-analysis-of-the-literature>.

Moll, B. (2014), "Productivity Losses from Financial Frictions: Can Self-Financing Undo Capital Misallocation?," *American Economic Review*, Vol. 104, No. 10, pp. 3186-3221, <DOI: 10.1257/aer.104.10.3186>.

Rodríguez-Raga, S., and F. Riaño-Rodríguez (2016), "Determinantes del acceso a los productos financieros en los hogares colombianos," *Estudios Gerenciales*, Vol. 32, No. 138, pp. 14-24, <http://www.sciencedirect.com/science/article/pii/S0123592315000807>.

Stukel, T. (1988), "Generalized Logistic Models," *Journal of the American Statistical Association*, Vol. 83, No. 402, pp. 426-431.

Weill, L., and A. Zins (2016), "The Determinants of Financial Inclusion in Africa," *Review of Development Finance*, Vol. 6, No. 1, pp. 46-57, < https://doi.org/10.1016/j.rdf.2016.05.001>.

Wooldridge, J. M. (1995), "Score Diagnostics for Linear Models Estimated by Two Stage Least Squares," en G. S. Maddala, P. C. B. Phillips y T. N. Srinivasan (eds.), *Advances in Econometrics and Quantitative Economics: Essays in Honor of Professor C. R. Rao*, Oxford: Blackwell, pp. 66-87.

Xu, L. y B. Zia (2012). *Financial Literacy Around the World. An Overview of the Evidence with Practical Suggestions for the Way Forward.* World Bank Policy Research, No. 6107. World Bank, <http://documents.worldbank.org/curated/en/264001468340889422/pdf/WPS6107.pdf>.