

Discriminant Analysis of Demand-Side Roadblocks to Financial Inclusion in Northern Ghana

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Abstract

Northern Ghana has been described as the most poverty-stricken spot in Ghana. Given the link between financial inclusion and poverty reduction, this paper aims at estimating a discriminant function model to analyse demand-side roadblocks to financial inclusion in Northern Ghana. The study is mainly based on primary data elicited through survey questionnaires. Even though the minimum sample size was determined to be 385 households, a total of 400 households were selected systematically, out of which 395 households returned their questionnaires for analysis. The estimated discriminant function model was found to be significant at the 1% level of significance. It was also found that, the demand-side roadblocks that are very crucial to financial inclusion in Northern Ghana (in order of importance) are “Culture”, “Cost”, “Capability”, and “Trust”. Overall, 77.2% of the cases were correctly classified by the estimated model. This paper therefore concludes that most vulnerable groups in Northern Ghana still find it difficult to access formal financial services due to barriers such as culture, cost, capability and trust. Government policies should therefore be directed at addressing these barriers so as to enhance financial inclusion in the area which eventually will lead to poverty reduction.

Keywords

Financial Inclusion, Discriminant Analysis, Demand-Side Roadblocks, Northern Ghana

1. Introduction

Financial inclusion has gained growing attention among policy makers, re-

searchers, and other stakeholders in development circles. This is mainly due to the causal link between financial depth and growth [1]. There are extensive costs to little and poor entrepreneurs for the market defects in a poorly developed financial system including educational asymmetries, transaction costs, and contract authorization costs which are exacerbated by absence of collateral, credit histories, and contacts [2]. Financial inclusion is normally defined as the proportion of people and firms that utilize financial services [3]. It is the state in which all individuals who can utilize financial services have access to a full suite of quality financial services, provided at reasonable costs, in an advantageous way, and with dignity for the clients [4].

The advantages of financial inclusion are conceivably colossal both at the small scale and large scale levels. It enables people to adapt better to poverty, provide assets to setting up and expanding smaller scale endeavors and for enhancing risk management, support economic growth on a full scale by assembling savings, draw more firms into the formal division, raising expense revenues and making workers eligible for better protection and benefits [5]. Similarly, financial exclusion which is the inability, difficulty or hesitance to access appropriate formal financial services, has tremendous effects both at the small scale and large scale levels which can prompt to social exclusion [6]. Being financially excluded means individuals, families, smaller scale and little ventures bargain totally in cash and are helpless to irregular cash streams [7]. Also, absence of financial planning and security without access to bank accounts and other savings opportunities for individuals in the informal confine their choices for accommodating themselves for their maturity [7].

Financial inclusion is influenced not just by great financial decision-making (demand-side) but also access to appropriate products and services (supply-side). More than 2.5 billion adults, which is about half of the worlds adult population do not have a bank account [3]. While some of these individuals show no interest for accounts, most are excluded as a result of obstructions such as cost, travel distance, and amount of paper work [3]. Product designs and business models of financial institutions especially those in the developing world are often criticized, on the grounds that they are not demand driven, albeit some financial service providers have developed business models and products that are specifically targeted at low-income people. A few individuals may be exclude voluntarily (that is, have access to financial services at reasonable costs, but choose not to utilize certain financial services), while numerous others might be excluded involuntarily (that is, lack access because the costs of these services are restrictively high or essentially inaccessible in view of regulatory barriers, legal hurdles, or an assortment of market and cultural phenomena). The key issue in this study is the degree to which the lack of inclusion derives from a lack of demand for financial services or from obstacles that impede people and firms from accessing the services. The debate on expanding financial inclusion has frequently centered on supply-side issues, such as the creation of financial services that are appropriate for low-income consumers [3]. Less attention has been paid

to the demand-side and to understanding why apparently appealing services, such as affordable basic bank accounts, have produced only limited take-up [3]. It is for this reason this paper concentrates on the demand-side roadblocks to financial inclusion.

In the US and most European nations, more than 60% of adults have a credit and/or debit card and over half of the populace have savings at a financial institution [5]. The story is however different in Africa and Ghana in particular. In Egypt and other North African nations, [5] revealed in their study that less than 1% of the adult populace had reserved funds at a financial institution while just around 5% possessed a debit or credit card mainly because of religious reasons. In these regions, developing financial products compatible with religious convictions (Islamic finance) could pay off by conceivably expanding the share of adults with a formal account by up to 10 percentage points [8]. Other African countries including Nigeria, Uganda, and Ghana are the least financially inclusive countries in the universe [5]. A study conducted by [4] uncovered that restricted financial literacy and financial education was a noteworthy hindrance to financial inclusion in Africa, since dominant part of the rural populace are either ignorant or are of humble educational backgrounds. Mobile money has made the broadest progress in Sub-Saharan Africa, where 16% of adults report having utilized a cell phone in the previous 12 months to pay charges or send or receive money [8]. In Ghana, just 29% of adults report having a formal bank account [8]. [9] offered a random group of customers at a bank in eastern Ghana the chance to open separate savings accounts named by particular objectives and found that the treatment group that had access to labeled accounts saved 31% more, all things considered, than the control group. Also in Ghana, a study by [10] to figure out what to concentrate on in youth financial literacy training to enhance financial inclusion found that, while the financial education program brought about a little increment in youth savings rates and greater risk avoidance, it had no quantifiable effect on the general level of financial literacy, time inclination, or financial planning behavior of the youth involved. About 29% of Ghanaians are estimated to be poor with an average in Northern Ghana as high as 70.2% [11] as cited in [12]. In this regard, [13] conducted several experiments in Northern Ghana in which farmers were arbitrarily allocated to receive money grants, or chances to buy rainfall index insurance, or a combination of the two and found that demand for index insurance is strong, and insurance leads to significantly larger agricultural investment which can help in reducing poverty. Given the poverty situation in Northern Ghana and the direct link between financial inclusion and poverty reduction, it is important and necessary to further investigate the roadblocks to financial inclusion in Northern Ghana.

Several approaches have been used in the past to study roadblocks and determinants to financial inclusion. Dominant among them are logit and probit models. Examples include [14] [15] [16]. Probit and logit models are binary classification models which are estimated by maximum likelihood methods and are utilized to measure the likelihood of an individual belonging to the group under

study [15]. They are however by all account not the only classification models that have been broadly utilized for econometric analysis. Discriminant analysis is another classification method that has been widely used in the prediction of corporate bankruptcies [17]-[22], identification of conglomerate targets [23], and prediction of bond ratings [24] [25] [26] [27]. Discriminant analysis involves deriving linear combinations of two or more independent variables that will segregate best between a priori defined groups, subject to the decision rule of maximizing the between-group variance, relative to within-group variance [28]. This statistical technique has instinctive interest since majority of the significant information is captured in one composite score after simultaneously dissecting the independent variables [28]. With all this interesting statistical properties, discriminant analysis has been rarely used in studying financial inclusion. This paper therefore analyses demand-side roadblocks to financial inclusion in Northern Ghana using discriminant analysis.

2. Methodology

2.1. Study Area

Northern Ghana (**Figure 1**) comprises the three northernmost administrative regions of Ghana: the Upper West region, Upper East region and Northern region. These lie roughly north of the Lower Black Volta River, which together with its tributaries the White and Red Voltas and the Oti and Daka rivers drain the area that comprises Northern Ghana. Northern Ghana shares international boundaries with Burkina Faso to the North, Togo to the east and Cote d'Ivoire to the lower southwest. To the south, Northern Ghana shares regional boundaries with the Brong Ahafo region and the Volta region [29].

According to the 2010 population and housing census [30], even though Northern Region is the largest of the 10 regions of Ghana in terms of landmass, occupying about 70,384 square kilometres and accounting for 29.5 per cent of the total land area of Ghana, the region has a population of about 2,479,461 with 1,229,887 male and 1,249,574 female; the Upper East region has a population of about 1,046,545 with 506,405 male and 540,140 female; and the Upper West region has a population of about 702,110 with 341,182 male and 360,928 female. Northern Ghana therefore has a total population of about 4,228,116 with 2,077,474 male and 2,150,642 female. The main economic activity of the people of Northern Ghana is Agriculture [31]. The area has been described as the most poverty-stricken and hunger spot in Ghana [11].

2.2. Data

This study is mainly based on primary data elicited through survey questionnaires. The issues raised in the questionnaire focused mainly on demand-side roadblocks to financial inclusion relating to financial capability, attitude, trust and culture. The target population consists of all adults in Northern Ghana. Households in the study area were the sampling units in this study since the study was a household survey. The observation unit was the head of the house-

inclusiveness of a financial system [34].

As mentioned earlier, full financial inclusion is a state in which all people who can use them have access to a suite of quality financial services, provided at affordable prices, in a convenient manner, and with dignity for the clients [4]. Based on this definition, this study measures financial inclusion using demand-side indicators. A household is financially included if it has access to at least one of the following financial services: formal bank account, pension fund, mortgage loan, credit/debit card, insurance, microfinance loan, mobile phone payment account, bonds, stocks and shares. Financial inclusion is therefore a binary variable in this study, which assumes a value of 1 if a household fulfils at least one of the above conditions and 0 otherwise.

The independent variables considered in this study relate to attitude (spending habits), trust (belief that the financial institution has your best interest at heart), distance (closeness to financial institutions or services), cost (affordability of financial services), culture (cultural and religious beliefs), and financial capability (the capacity to manage financial resources effectively based on knowledge, skills, and access). A detailed description of the main independent variables is presented in **Table 1**.

2.4. Data Analysis

In order to analyse the links between financial inclusion and the demand-side roadblocks, discriminant analysis was used in this study. Discriminant analysis is used to predict group membership from a set of predictors (independent variables). It involves deriving a variate, the linear combination of two or more independent variables that will discriminate best between a priori defined groups [35]. Discrimination is achieved by setting the variate's weight for each variable to maximize the between-group variance relative to the within-group variance.

The linear combination for a discriminant analysis, also known as the discriminant function, is derived from an equation that takes the following form:

$$Z_{ik} = \beta_{0i} + \beta_{1i}X_{1k} + \dots + \beta_{ji}X_{jk} \quad (1)$$

where Z_{ik} is the discriminant score of discriminant function i ($i = 1, 2, \dots, G - 1$) for object k , X_{jk} is the independent variable j ($j = 1, 2, \dots, n$) for object k , β_{ji} is the discriminant weight for independent variable j and discriminant function i , and β_{0i} is the constant of discriminant function i [35]. In a two-group discriminant analysis as we have in this study, only one function is estimated since G is the number of categories in the dependent variable.

The stepwise method of variable selection was used to select independent variables into the model. It involves entering the independent variables into the discriminant function one at a time on the basis of their discriminating power. The Wilks lambda [36] is appropriate for stepwise procedure. It is computed in the original space of the predictor variables. The selection rule is to minimize the Wilks lambda. The Wilks procedure performs stepwise discriminant analysis similar to stepwise regression analysis, designed to develop the best one-variable model, followed by the best two-variable model, and so forth. The stepwise dis-

Table 1. Description of the main independent variables considered.

Variable	Description
Attitude	Quantitative variable taking values from 1 to 5 depending on whether the respondent completely agreed, agreed, remained neutral, disagreed, or completely disagreed with the statement that, "I find it more satisfying to spend money than to save it for the long term."
Trust	Dummy variable that takes the value 1 if the respondent believe that financial institutions have the best interest of their clients at heart and 0 otherwise.
Distance	Quantitative variable taking values from 1 to 3 depending on whether the respondent is near to, far away, or very far away from a financial institution.
Cost	Quantitative variable taking values from 1 to 5 depending on whether the respondent completely agreed, agreed, remained neutral, disagreed, or completely disagreed with the statement that, "financial institutions charge very high rates on their products and services."
Culture	Dummy variable that takes the value 1 if the respondent's religion/culture prevent him/her from taking a loan or any other financial product from a financial institution and 0 otherwise.
Capability	Quantitative variable taking values from 1 to 5 depending on whether the respondent completely agreed, agreed, remained neutral, disagreed, or completely disagreed with the statement that, "I have the capacity to keep a close personal watch on my financial affairs."
Documentation	Dummy variable that takes the value 1 if the respondent has personal identification that he/she can use for financial transactions and 0 otherwise.
Family	Quantitative variable taking values from 1 to 5 depending on whether the respondent completely agreed, agreed, remained neutral, disagreed, or completely disagreed with the statement that, "I depend on a relative's bank account for my financial transactions."
Money	Quantitative variable taking values from 1 to 5 depending on whether the respondent completely agreed, agreed, remained neutral, disagreed, or completely disagreed with the statement that, "I don't have enough money to transact with a financial institution."
Literacy	Dummy variable that takes the value 1 if the respondent can read and write and 0 otherwise.

criminant analysis was conducted using IBM SPSS Statistics for windows version 19 [37] installed on a computer with the following system parameters: 32-bit operating system, 1.66 GHz processor, and 1.00 GB RAM.

The assumptions of discriminant function analysis include independence of the cases, multivariate normality of the predictor variables and equality of within-group variance-covariance matrices across groups. Group membership is also assumed to be mutually exclusive [38].

3. Results

3.1. Descriptive Statistics

We observe from the group statistics in **Table 2** that only 169 (44.7%) out of the 378 respondents who responded to all the variables considered are financially

Table 2. Group statistics.

Status		Mean	Std. Deviation	Valid N (listwise)	
				Unweighted	Weighted
Financially included	Money	2.03	0.866	169	169.000
	Cost	2.06	1.171	169	169.000
	Capability	1.35	0.625	169	169.000
	Family	1.75	0.888	169	169.000
	Attitude	2.78	1.334	169	169.000
	Trust	0.40	0.491	169	169.000
	Culture	0.30	0.459	169	169.000
	Literacy	0.93	0.264	169	169.000
	Documentation	0.95	0.222	169	169.000
	Distance	1.71	0.825	169	169.000
Financially excluded	Money	2.44	1.051	209	209.000
	Cost	2.74	1.304	209	209.000
	Capability	1.73	0.793	209	209.000
	Family	2.02	0.901	209	209.000
	Attitude	2.85	1.189	209	209.000
	Trust	0.40	0.490	209	209.000
	Culture	0.33	0.472	209	209.000
	Literacy	0.80	0.397	209	209.000
	Documentation	0.88	0.329	209	209.000
	Distance	2.03	0.819	209	209.000

included while 209 (55.3%) are financially excluded. Also, we see from the group means that those who are financially include recorded slightly lower means in terms of “Money”, “Cost”, “Capability”, “Attitude”, “Culture”, and “Distance” while those who are financially excluded recorded slightly lower means in terms of “Family”, “Literacy”, and “Documentation”. The average for “Trust” was however equal for the two groups.

The test of homogeneity of covariance matrices is presented in **Table 3**. This assumption is tested using Box’s M test which is very sensitive to meeting the assumption of multivariate normality [38]. The log determinants in the Table suggest the covariance matrix for those who are financially included differ more than the covariance matrix for those who are financially excluded. Also, the significance (p -value = 0.000) of the Box’s M test confirms that the two groups do differ in terms of their covariance matrices which violates the assumption of homogeneity. However, the discriminant function analysis is still robust even with the violation of the homogeneity of variance assumption since the data do not contain outliers [38].

Table 3. Test of equality of covariance matrices.

Status	Rank	Log Determinant	Box's M	Approx. F	df1	df2	Sig.
Finacially included	7	28.563	247.054				
Financially excluded	7	26.853		8.647	28	449,868.319	0.000
Pooled within-groups	7	28.274					

The test of equality of group means is presented in **Table 4**. Importance of the independent variables is indicated by the Wilks' Lambda. The smaller the Wilks' Lambda, the more important the independent variable is to the discriminant function. We observe from the table that "Culture" is the most important independent variable (Wilks' Lambda = 0.849, p -value = 0.000) in the discriminant function whilst "Documentation" is the least important independent variable in the discriminant function (Wilks' Lambda = 0.998, p -value = 0.450). "Family" and "Money" were also not significant (p -values of 0.206 and 0.059 respectively).

3.2. Stepwise Statistics

The stepwise method was used to automatically select the best independent variables to be included in the discriminant function model. The Wilks' Lambda method was specifically utilized to select independent variables for entry into the model on the basis of how much they lower Wilks' Lambda. The method starts with a model that does not include any of the independent variables, and at each step, the variable with the largest "F to Enter" value that exceeds the entry criteria (by default, 3.84 in SPSS) is added to the model.

We observe from **Table 5** that, the best independent variables that minimizes the overall Wilks' Lambda and were used in the analysis include "Culture", "Capability", "Cost", "Trust", "Attitude", "Literacy", and "Distance". However, "Money", "Family", and "Documentation" could not meet the entry requirement and were therefore not used in the analysis.

3.3. Summary of Canonical Discriminant Functions

The significance of the estimated discriminant function is presented in **Table 6**. Wilks' Lambda in the table indicates how well the function separates cases (respondents) into the two groups (Financially included and financially excluded). Smaller values of Wilks' Lambda indicate greater discriminatory ability of the function [39]. We observe from the table that estimating the discriminant function is significant (Wilks' Lambda = 0.698, p -value = 0.000).

Table 7 shows the correlations of the independent variables with the discriminant function which are known as factor loadings. The variation in the dependent variable which the independent variable can explain is determined by squaring the factor loading. The factor loadings in **Table 7** are arranged in descending order, where the most important variable is the variable with the largest loading and the least important is the variable with the smallest loading. Variables with factor loadings that are less than 0.30 may not be very important in

Table 4. Tests of equality of group means.

Variables	Wilks' Lambda	F	df1	df2	Sig.
Money	0.991	3.587	1	376	0.059
Cost	0.932	27.633	1	376	0.000
Capability	0.934	26.748	1	376	0.000
Family	0.996	1.603	1	376	0.206
Attitude	0.980	7.598	1	376	0.006
Trust	0.959	16.270	1	376	0.000
Culture	0.849	66.772	1	376	0.000
Literacy	0.960	15.578	1	376	0.000
Documentation	0.998	.573	1	376	0.450
Distance	0.984	5.974	1	376	0.015

Table 5. Variables in the analysis/variables not in the analysis.

Variables in the Analysis				Variables Not in the Analysis				
Variable	Tolerance	F to Remove	Wilks' Lambda	Variable	Tolerance	Min. Tolerance	F to Enter	Wilks' Lambda
Culture	0.905	52.491	0.798	Money	0.811	0.781	1.813	0.695
Capability	0.869	20.454	0.737	Family	0.646	0.646	2.905	0.693
Cost	0.890	20.524	0.737	Documentation	0.948	0.868	2.005	0.695
Trust	0.885	11.457	0.720					
Attitude	0.952	6.948	0.712					
Literacy	0.957	6.268	0.710					
Distance	0.885	5.797	0.709					

Table 6. Significance of the discriminant function.

Test of Function (s)	Wilks' Lambda	Chi-square	Df	Sig.
1	0.698	133.687	7	0.000

Table 7. Structure matrix.

Variables	Function
	1
Culture	0.641
Cost	0.413
Capability	0.406
Trust	0.317
Literacy	0.195
Distance	0.192
Attitude	-0.149
Family ^a	0.086
Money ^a	0.059
Documentation ^a	0.031

^aThis variable not used in the analysis.

the model and may be removed from the model [38]. Hence we observe from the table that, the demand-side roadblocks that are very important to financial inclusion in Northern Ghana (in order of importance) are “Culture”, “Cost”, “Capability”, and “Trust”. “Literacy”, “Distance”, and “Attitude” are also important but may be removed from the model since their factor loadings are less than 0.30. However, “Family”, “Money”, and “Documentation” are not important and are therefore not used in the analysis.

Table 8 contains the unstandardized discriminant function coefficients which are used to construct the actual prediction equation used to classify new cases. Based on the coefficients in the table, the model developed in this study is given in Equation (2).

$$Z = -1.926 + 0.353\text{Cost} + 0.613\text{Capability} + 0.202\text{Attitude} + 0.009\text{Trust} + 0.020\text{Culture} - 0.007\text{Literacy} + 0.007\text{Distance} \quad (2)$$

Functions at group centroids are presented in **Table 9**. The centroids are the mean discriminant scores for each group which are used to establish the cut-off point for classifying cases. The centroid for those who are financially included is -0.729 while that of those who are financially excluded is 0.589 . What this means is that, if the score for a new case based on Equation (2) is negative, such a case will be classified among those who are financially included and if it is positive, it will be classified among those who are financially excluded.

3.4. Classification Statistics

The classification results in **Table 10** are used to assess how well the discrimi-

Table 8. Canonical discriminant function coefficients.

Variables	Function
	1
Cost	0.353
Capability	0.613
Attitude	0.202
Trust	0.009
Culture	0.020
Literacy	-0.007
Distance	0.007
(Constant)	-1.926

Unstandardized coefficients.

Table 9. Functions at group centroids.

Status	Function
	1
Financially included	-0.729
Financially excluded	0.589

Unstandardized canonical discriminant functions evaluated at group means.

Table 10. Classification results.

		Status	Predicted Group Membership		Total
			Financially included	Financially excluded	
Original	Count	Financially included	112	57	169
		Financially excluded	29	180	209
	%	Financially included	66.3	33.7	100.0
		Financially excluded	13.9	86.1	100.0
Cross-validated	Count	Financially included	111	58	169
		Financially excluded	29	180	209
	%	Financially included	65.7	34.3	100.0
		Financially excluded	13.9	86.1	100.0

nant function model works. We observe from the table that 112 (66.3%) of the 169 original cases who are financially included are correctly classified as financially included by the estimated model whereas 180 (86.1%) of the 209 Original cases who are financially excluded are correctly classified as financially excluded by the model. Overall, 77.2% of the original cases are correctly classified by the model while 76.9% of the cross-validated cases are correctly classified. This indicates that the estimated model is quite good in predicting financial inclusion in Northern Ghana.

4. Discussion

The findings in this study suggests clearly that most vulnerable groups in Northern Ghana still find it difficult to access formal financial services. Even though measurement of financial inclusion was expanded to include access to at least one of several financial products including formal bank account, pension fund, mortgage loan, credit/debit card, insurance, microfinance loan, mobile phone payment account, bonds, stocks and shares, the results show that only 169 (44.7%) out of the 378 respondents who responded to all the variables considered are financially included while 209 (55.3%) are financially excluded. This is consistent with the findings of [5] who reported that many emerging countries still lag far behind on most indicators of financial inclusion; with Nigeria, Uganda, Pakistan, Ghana and Egypt at the bottom of the 30-country universe. A similar finding was obtained by [40] who used data from 1000 individual adults across Ghana and reported that the formal financial market of Ghana has been able to cover only 40% of the population while 60% of the population is still unbanked. Also, a study conducted by [8] revealed that only 29 percent of adults in Ghana report having a formal bank account while 71% do not have formal bank accounts.

Regarding the demand-side roadblocks to financial including in Northern Ghana, the findings in this study placed “Culture” on top of the list. This is not surprising, since Islam is the dominant religion in Northern Ghana and frowns

upon interest thereby preventing the people from taking bank loans and other financial products that charges interest. Religious reasons for not having a formal account are most commonly cited in the Middle East, North Africa and South Asia which also have very large Muslim populations [8].

“Cost”, “Capability”, “Trust”, “Literacy”, “Distance”, and “Attitude” were also found to be very serious roadblocks to financial inclusion in Northern Ghana. This finding is corroborated by [15] who found in their study that, the costs involved in having an account in a formal financial institution, lack of trust in financial institutions, and distance from the closest bank stand out as major reasons for not participating in the formal financial system in Argentina. [41] also found low literacy levels, lack of awareness and understanding of financial products, irregular income, frequent micro transactions, lack of trust in formal banking institutions, and cultural values as major demand-side barriers to financial inclusion in their study.

“Money”, “Documentation”, and “Family” were however found not to be significant demand-side roadblocks to financial inclusion in Northern Ghana. This finding contradicts the findings of [15] who found in Argentina that, Not having the right documents, lack of money or high fees for financial services, and having a shared account with a relative are serious demand-side barriers to financial inclusion.

5. Conclusion

This study estimates a two-group discriminant function model in order to determine and analyse demand-side roadblocks to financial inclusion in Northern Ghana, which will have policy implications towards enhancing financial inclusion in the area, and consequently boost economic growth on a macro scale. The estimated discriminant function model was significant at the 1% level of significance. The structure matrix in **Table 7** shows that, the demand-side roadblocks that are very crucial to financial inclusion in Northern Ghana (in order of importance) are “Culture”, “Cost”, “Capability”, and “Trust”. “Literacy”, “Distance”, and “Attitude” are also important but may be removed from the model since their factor loadings are less than 0.30. However, “Family”, “Money”, and “Documentation” are not important and are therefore not used in the analysis. The estimated model was also able to classify 77.2% of the original cases and 76.9% of the cross-validated cases correctly. Although the classification accuracy in this study was quite good, future research may explore more potential demand-side roadblocks to financial inclusion so as to increase the classification accuracy of the model.

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