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Modeling the Impact of Financial Literacy and Institutional Trust on Banking Inclusion in Bangladesh

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Abstract: The purpose of this study is to examine the impact of financial literacy and institutional trust on banking inclusion in Bangladesh. It further assesses whether these relationships vary across gender and location. Using a quantitative approach, this study conducted a survey of 305 participants in rural, semi-urban, and urban areas of Bangladesh. The empirical analysis employed ordinary least squares regression with heteroscedasticity-robust standard errors, complemented by diagnostic testing, ordered logistic regression, split-sample validation, and subgroup analyses by gender and residential location. The results indicate that financial literacy is a universal and powerful predictor of banking inclusion across all demographic groups. On the other hand, the effect of institutional trust is heterogeneous, and it is only relevant among male cohorts in urban and semi-urban areas, suggesting that the process of trust-building depends on socioeconomic exposure. Also, the findings show that though trust is a factor, structural barriers remain the main factor to keep marginalized groups out of inclusion. The findings offer practical implications for policymakers and financial institutions in Bangladesh. The paper suggests that to ensure universal banking inclusivity, a two-pronged approach is needed: intensive financial literacy education, combined with institutional changes to address structural friction and re-establish confidence among underserved populations.

Keywords: Bangladesh, Banking Inclusion, Emerging Economies, Financial Inclusion, Financial Literacy, Institutional Trust.
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INTRODUCTION

Financial inclusion guarantees accessibility to relevant, affordable, and timely financial services and products. It is a top priority for policymakers and development agents because an inclusive financial system plays a crucial role in poverty reduction, economic empowerment, and economic growth (Erlando, Riyanto, & Masakazu, 2020). Financial literacy and trust in financial institutions are two important factors that influence financial inclusion. Financial literacy measures people's understanding of financial concepts and their effective use in financial services. A lack of sufficient financial knowledge leads individuals to have less confidence in engaging with banking services. Another factor, trust in financial institutions, describes perceptions of the integrity, competence, and transparency of people regarding banks and related institutions.

In addition to its direct development benefits, financial inclusion is becoming a keystone of sustainable economies, as it increases financial resilience, mitigates exposure to economic shocks, and fosters equitable growth (Demirgüç-Kunt, Klapper, Singer, Ansar, & Hess, 2020). In that regard, the behavioral indicators (financial literacy and institutional trust) play a pivotal role in ensuring that inclusion is not merely realized but also sustained in the long run. Whereas financial literacy enables informed decision-making, institutional trust promotes ongoing use of formal financial systems. The absence of these can render financial inclusion efforts superficial, limiting their effectiveness over the long term and undermining the effectiveness of policy interventions. Thus, it is critical to understand the effect of these behavioral drivers on financial inclusion so that the strategies can support an inclusive and sustainable financial system.

In Bangladesh, several initiatives are taken by the central bank and government, but a significant portion of rural areas remain underbanked. According to the Global Findex database of the World Bank, 50% of adults in Bangladesh are underbanked (Hasan, Le, & Hoque, 2021). Again, people who are financially literate sometimes avoid formal banking channels when financial institutions are perceived as corrupt, unstable, or indifferent to many customers, as institutional trust plays a critical role in banking inclusion (Van Der Cruijsen, De Haan, & Roerink, 2023). This applies to Bangladesh, where numerous historical banking scandals and lax regulatory enforcement are evident. To develop a more effective policy on financial inclusion, it is essential to understand how financial literacy and institutional trust interact to influence individuals' decisions to use formal banking services.

Although the issue of financial literacy has been widely studied with respect to financial inclusion in Bangladesh, very little attention has been paid to institutional trust, whilst the synergistic impact of literacy and trust on banking inclusion is largely unexplored. This paper assesses the impact of financial literacy and institutional trust on banking inclusion in Bangladesh. It first evaluates the respondents' financial literacy and trust in financial institutions, and then examines how these two factors, combined, influence the use of formal banking services. Lastly, the findings, recommendations, and policy implications are intended to assist policymakers and financial institutions in coming up with better strategies. These strategies can enhance public awareness of financial services and their benefits, thereby establishing public confidence in the financial system. In turn, this is expected to improve access to financial services and the participation of underbanked groups. The following research questions aim to respond to the above-mentioned objectives: (i) What is the present level of financial literacy and trust among respondents? (ii) What is the influence of these factors on banking inclusion? (iii) What are the policy interventions that can be used to facilitate more financial inclusion in Bangladesh?

The study begins with an introduction and then provides background to contextualize the research within the broader framework of financial inclusion in Bangladesh. This is followed by the literature review. Next, the methodology section elaborates on the research methodology, including data collection, variable construction, the hypothesis, and the analysis methods. The subsequent section depicts and interprets the results. Finally, the paper concludes with research implications and future research suggestions.

Background of the Study

In Bangladesh, many people, especially in rural areas, are not part of the formal banking system. In this case, the key contributing factor is financial literacy, as most people lack knowledge of basic banking services, such as savings, interest, loans, and internet banking. Conversely, there is also a lack of institutional trust, which discourages people from using banking services. When individuals believe that banks are not user-friendly or transparent, they may turn to the informal financial system, which is not safe at all. Therefore, both financial literacy and institutional trust may play vital roles in banking inclusion in Bangladesh. In this regard, financial literacy can help people make valuable decisions, whereas trust in a financial institution can make them feel secure enough to use these services. The table provided below offers information about the state of banked and unbanked citizens in Bangladesh, as it has been reported in various sources.

Table 1: Banked vs. Unbanked population in Bangladesh

Source and Year	Banked Definition	Banked (%)	Unbanked (%)	Additional Insights
Bangladesh Bureau of Statistics (BBS) (2023b)	Includes all formal accounts such as Bank, NBFI, Insurance, Microfinance, MFS	47.43%	52.57%	Shows almost half of the population has access to formal finance, and it is the most comprehensive national estimate.
Bangladesh Bureau of Statistics (BBS) (2023a)	Includes bank, NBFI, MFS	51.71%	48.29%	Females have lower access to banks than males
World Bank (2021)	Includes all financial accounts -Bank and mobile money	53%	47%	Financial inclusion reached 53% in 2021 from 32% in 2011, mainly because of mobile money
Raithatha and Storchi (2025)	Access to the formal financial system and focus on mobile money	75%	25%	Over half of the population remains excluded
Rural vs Urban Bangladesh Bank (2023)	Distribution of accounts	Rural: 47.11% bank accounts; 55% MFS accounts	-	Rural residents rely heavily on MFS and agent banking
Gender Gap Bangladesh Bank (2023)	Adults with financial access	Men: 62.86%	Men: 37.14%	Only 43.46% of banked adults are women

Table 1 shows some representative figures of the banked and unbanked population in Bangladesh from various institutional sources using various definitions of financial access. The numbers presented show a widening access to formal financial services, especially via mobile financial services, but also significant gender and household-residence disparities. There are indications that rural people make greater use of mobile financial services and agent banking, while the situation of rural women with regard to formal financial services has been comparatively weak.

LITERATURE REVIEW

Banking inclusion is primarily the process that enables people, institutions, and businesses to start using banking services to conduct their financial dealings. In this case, the basic elements that may reinforce the relationship between a bank and an individual are financial literacy and institutional trust.

Theoretically, this study is based on the Theory of Planned Behavior (TPB), which offers a sound framework for interpreting how individual perceptions and beliefs are translated into behavioral intentions and actual behavior. TPB states that behavior is mainly dictated by three factors: attitude towards the behavior, subjective norm, and perceived behavioral control (Ajzen, 1991). When applied to the framework of financial inclusion, the concept of financial literacy can be planned as a key factor of both attitudes and perceived

behavioral control. Financial literacy is widely recognized as an important factor in individuals' interactions with the formal financial system, as it defines their ability to make informed and rational financial choices. Beyond basic financial knowledge, this also includes the skills to comprehend financial information, assess risks, and choose the right financial products in line with personal needs and long-term goals (Lusardi & Mitchell, 2014). Regarding behavior, financial literacy plays a key role in shaping decision-making by alleviating biases, informational asymmetries, and the uncertainty that financial decisions entail. Thus, it can be conceptualized as an important antecedent of attitudes and perceived behavioral control in accordance with the TPB. In contrast, institutional trust may be viewed as a critical behavioral predictor in the TPB model, especially subjective norms and perceived risk in financial decision making. It describes the perceptions of the reliability, integrity, and competence of financial institutions and, therefore, impacts subjective norms and perceived risks of formal financial involvement (Beck, Demirguc-Kunt, & Levine, 2005; Kim, Yu, & Hassan, 2018). With high levels of trust, people have stronger perceptions of formal financial participation being socially endorsed and valuable, which reinforces positive subjective norms. By contrast, low institutional trust can increase perceived risks, including fear of hidden costs, fraud, or exploitation, which can greatly discourage the use of formal financial services, regardless of financial literacy levels. This is especially applicable in some developing economies, such as Bangladesh, where negative past experiences and inefficient structures strengthen distrust in formal institutions. In this regard, institutional trust not only minimizes psychological and perceived barriers but also boosts people's confidence in interacting with financial systems, which, in turn, makes them more likely to become financialized. Hence, financial literacy and institutional trust are identified as two complementary behavioral factors that work together to shape intentions to use formal financial services and, in turn, the final financial inclusion outcomes. By incorporating these constructs into the TPB framework, this paper offers a theoretically grounded exposition of how cognitive (knowledge-based) and perceptual (trust-based) variables interact to influence financial behavior in an emerging economy such as Bangladesh.

Globally, several studies have shown that financial literacy is positively correlated with financial inclusion. Evidence indicates that financial literacy plays a vital role in encouraging people to open their first bank account. Again, on the supply side of financial markets, financial inclusion improved as banks expanded their branch networks, starting with community banks. While this approach yields the expected outcome, there are still barriers, such as a long distance to the bank and high fees. Due to these factors, some customers decided not to use banking services (Dupas, Karlan, Robinson, & Ubfal, 2018). Mobile financial services can be an effective solution, but they come with various risks. Users should have sufficient knowledge of the security measures and transaction procedures for this digital financial inclusion. When people trust the security, transparency, and reliability of banking services, they are more engaged with these services of the bank (Sadik & Rahman, 2024). In Bangladesh's view, the population of around 166 million people creates various financial and economic problems. Among those, access to financial services and products is a major concern. Low financial literacy is the major reason and barrier to accessing and using financial services. In low-income groups, almost 53% of people lack access to financial services. Though the number of banks increases day by day, it fails to yield fruitful results. A study found that about 60% of rural adults lack knowledge of basic banking concepts. They don't understand the interest and service charges for banking and mobile banking. Though in rural communities there is a 37% increase in formal savings and a 25% increase in the use of microcredit through targeted financial education (Hasan et al., 2021), the results are still insufficient.

There are, though a few studies that focused on the relationship between trust in financial institutions and banking inclusion. First, bank trust increases savings account balances, not the use of bank services. Second, the probability of account ownership and the tendency to save in a bank is high when the bank trust increases (Koomson, Koomson, & Abdul-Mumuni, 2023). For instance, in economic growth, trust in institutions plays an important role. If the government is perceived as trustworthy, people in those countries invest heavily and engage in various economic development-related activities. According to Kaasa and Andriani (2022), institutional trust is mainly explained by an institution's performance and its social trust approach. For various reasons, mistrust in banks may arise, ultimately influencing banking inclusion. In Bangladesh, mistrust of banks is especially prevalent among rural and low-income people who experience bureaucratic barriers, complex documentation, hidden charges, rude staff, and poor customer service. According to a report, only 32% of low-

income respondents expressed full trust in banks, compared to 71% middle-income urban users (Bangladesh Bank, 2023).

To sum up, banking inclusion is affected differently by financial literacy and institutional trust. Individuals who have a high level of financial literacy but little trust will tend not to use formal banking, whereas those who trust banks but lack financial literacy will tend to abuse it, possibly by taking loans at excessive rates. A combination of literacy and trust, however, supports each other and contributes to inclusion to a considerable extent. This is supported by a study showing that respondents with a low level of literacy but positive trust in bank personnel accessed almost half as many banking services as those relying solely on literacy (Kabir, Dey, Hossen, & Islam, 2025). Again, the interaction between financial literacy and institutional trust is essential to the long-term sustainability and inclusiveness of financial systems. Low literacy rates in a financial ecosystem can contribute to poor financial decision-making, excessive debts, and susceptibility to financial shocks, hence compromising individual and systemic resilience (Lusardi & Mitchell, 2014). Equally, the lack of trust in financial institutions can deter engagement with formal financial institutions, leading individuals to rely on informal, less secure arrangements, which in turn may increase financial exclusion and inequality (Beck et al., 2005). These conditions have the potential to diminish the efficacy of financial intermediation, lower the mobilization of savings, and restrict access to productive investment opportunities, thereby diminishing the ability of economies to grow sustainably over time. Thus, building financial literacy and institutional trust is vital not only to enhance financial inclusion in the short run but also to make the financial system more resilient, inclusive, and sustainable in the long term.

While earlier research has examined financial literacy and trust separately, few studies have examined how their interplay affects banking behavior, especially in Bangladesh. Once again, the majority of available literature has focused on general trust as applied to financial inclusion, whereas institutional trust has been relatively sidelined. Furthermore, qualitative information that explains why people mistrust institutions or their interpretations of financial information is rarely factored into quantitative studies. To address these gaps, this paper investigates the individual and joint effects of financial literacy and institutional trust on banking inclusion.

DATA AND METHODS

Sample Selection

This research adopts a quantitative method to ascertain the impact of financial literacy and institutional trust on banking inclusion. It is based on primary data collected using a structured questionnaire administered via convenience sampling. The sample consisted of adults who were selected from rural, semi-urban, and urban regions of Bangladesh. Overall, 305 responses were collected, providing a variety of samples across geographic and demographic mixes.

This sample size is adequate due to both statistical and methodological reasons. According to existing rules, a sample of about 300 respondents is typically considered a good sample size for a survey-based study in the social sciences (Kotrlik & Higgins, 2001; Rahi, Alnaser, & Abd Ghani, 2019). Past studies also note that 200-400 are typical sample sizes in behavioral and financial research, adequate to ensure statistical power and representativeness (Anthoine, Moret, Regnault, Sébille, & Hardouin, 2014; Hill, 1998). Also, regression analyses often demand at least 10-15 observations per predictor variable to produce meaningful estimates (Sapnas & Zeller, 2002). In this study, there are three core predictors (financial literacy, institutional trust, and the selected control variables), and with 305 responses, this exceeds the threshold needed to demonstrate the soundness of multivariate regression. Again, following Green (1991) rule-of-thumb for multiple regression, the minimum required sample size for testing the overall model fit is:

$N \geq 50 + 8m$

Here, m is the number of predictors. With 7 predictors (2 independent variables and 5 control variables), the required sample size is:

$N \geq 50 + 8(7) = 50 + 56 = 106$

Again, for testing the significance of individual predictors, the more conservative rule is:

$N \geq 104 + m$

And here, $N \geq 104 + 7 = 111$. Since the actual sample size of 305 exceeds both 106 and 111, the study has adequate statistical power for reliable estimation and hypothesis testing.

Variables

Table 2 outlines the variables and their measurements. Here, scores for financial literacy, institutional trust, and banking inclusion were constructed from related survey items.

Table 2. Measurement of Variables

Variable Type	Indicator / Dimension	Measurement Approach
Dependent Variable	Banking Inclusion Score	Based on eight items: ownership of a bank account; use of a savings account, current account, mobile banking apps, and ATM/debit cards; sending or receiving remittances; receiving government subsidies through a bank account or mobile wallet; and access to loan services from banks or microfinance institutions. Each item coded as *Yes = 1, No = 0*.
Independent Variables	Financial Literacy Score	Includes: (a) money management methods (written budget, mobile apps, consulting family, savings groups, and traditional practices); (b) understanding banking documents (bank statement, passbook, chequebook, ATM card, loan agreement, fixed deposit certificate, KYC). These were coded as Yes = 1, No = 0. Two additional items, which included comparison of financial services prior to decision making and knowledge of differences among saving, investing, and borrowing, were rated on a 3-point Likert scale (1 = Disagree, 2 = Moderate, 3 = Agree).
	Institutional Trust Score	Addresses three aspects: (a) distrust in banks (hidden charges, vague information, poor reputation) coded as *Yes = 1, No = 0*; (b) trust towards banks (saves money, treats customers fairly, helps them in time of need), measured on a 3-point Likert scale (1 = Disagree, 2 = Moderate, 3 = Agree); and (c) difficulties in accessing services, measured on a 3-point Likert scale (1 = Disagree, 2 = Moderate, 3 = Agree)
Control Variables	Demographic and socio-economic factors	Age, gender, education level, location, and monthly income. Gender, education, location, and income coded as categorical, while age was treated as continuous variables.

Analytical Approach

In order to determine the effects of financial literacy and institutional trust on banking inclusion, a multiple linear regression model is expressed as follows:

$$BankingInclusion_i = \beta_0 + \beta_1 FinancialLiteracy + \beta_2 InstitutionalTrust + \beta_3 X_i + \varepsilon_i \quad (1)$$

Within this model, the inclusion score for respondent *i* is referred to as *BankingInclusion*. The literacy score and trust score are represented by *FinancialLiteracy* and *InstitutionalTrust,* respectively. X_i is a set of control variables (gender, age, education, income, and location) added to reduce the potential omitted variable bias. The study hypothesis is as follows, guided by the study objectives:

H1: Financial literacy and trust have an impact on banking inclusion.

To enhance the reliability and validity of the analysis, a number of robustness and diagnostic tests were conducted. Also, this research was conducted professionally, in accordance with ethical principles, as all respondents were informed about the survey beforehand. The study observed confidentiality and anonymity of the respondents.

Results and Discussion

The analysis was conducted with accuracy and reliability after data cleaning and preparation. The composite variables were formed with financial literacy, institutional trust, and banking inclusion, and their internal consistency was assessed.

Variable Construction and Reliability

The analysis below shows the most important continuous variables to be utilized in this paper, including the way each one was measured, reliability statistics, and interpretation.

Table 3: Summary of Key Variables, Measurement, and Reliability

Variables	Measurement Method	Scale/Range	Cronbach's α	Reliability Interpretation
Financial Literacy Score	12 dichotomous items (1 = Yes, 0 = No) and 2 Likert-scale items (1 = Disagree, 2 = Neutral, 3 = Agree)	2–20	0.8139	Very good reliability
Institutional Trust Score	3 items on a 3-point Likert scale (trust in banks, security, fairness)	3–15	0.5334	Poor consistency (multidimensional)
Banking Inclusion Score	8 binary items (1 = Yes, 0 = No), covering banking use, digital banking, loans, ATM/cards, subsidy, account ownership	0–8	0.6615	Moderate reliability

Note: Cronbach's alpha (α) is reported as the measure of internal consistency reliability.

The results in Table 3 indicate that the financial literacy score was highly reliable (0.8139), and there is no doubt that it reflects respondents' financial knowledge accurately. The institutional trust score, on the other hand, was less consistent (0.5334), likely because trust is influenced by various factors, including fairness, safety, and bank trust. The banking inclusion score was moderately reliable (0.6615), thus suitable for exploratory work, but more refined measures can be used.

Descriptive Analysis

In descriptive statistics, percentages were calculated, as well as the frequencies of categorical variables such as gender, level of education, monthly earnings, and the place of residence of the respondents.

Demographic Information

Table 4 summarizes the demographic characteristics of the respondents. The sample size is appropriately distributed across gender, level of education, income status, and geographical area, providing a representative picture of the population under study.

Table 4: Descriptive Analysis of Categorical Variable

Variables (Categorical)	Categories	Frequency	Percentage (%)
Gender	Male	149	48.85
	Female	156	51.15
Level of education	No formal education	24	7.87
	Primary	29	9.51
	Secondary	36	11.80
	Higher Secondary	103	33.77
	Graduate or above	113	37.05
Monthly income	No income	54	17.70

Variables (Categorical)	Categories	Frequency	Percentage (%)
	Less than 5,000 BDT	76	24.92
	5,001–10,000 BDT	53	17.38
	10,001–20,000 BDT	64	20.98
	More than 20,000 BDT	58	19.02
Living location	Urban	151	49.51
	Semi-urban	58	19.02
	Rural	96	31.48

The number of respondents aligned with studies conducted in the same field previously. The study by Koomson et al. (2023) in Ghana also targeted the same types of population to examine the relationship between trust in banks and financial inclusion, as well as the mediating role of borrower discouragement. Also, OECD (2016) showed how a wide range of income can influence financial inclusion and trust in the banking services in developing countries like Bangladesh. Moreover, including respondents from diverse regions and areas ensures compliance with the Bangladesh Bank's guidelines on financial inclusion. The financial inclusion report published by the central bank of Bangladesh (Bangladesh Bank, 2023) suggested that any research on financial literacy or financial inclusion should include respondents from both urban and rural areas to ensure effective and efficient outcomes.

Descriptive Statistics for Continuous Variables

The Table presents the descriptive statistics for the continuous variables used in this study: age, financial literacy score, trust score, and banking inclusion score.

Table 5: Descriptive Statistics of the Continuous Variable

Variables (Continuous)	Observations	Mean	Std. Dev.	Min.	Max.
Age	305	32.31	11.69	18	65
Financial literacy score	305	10.85	3.14	4	17
Trust score	305	10.97	2.26	6	15
Banking inclusion score	305	2.90	1.74	0	6

The descriptive statistics (Table 5) show that the financial literacy and institutional trust are moderate, with a relatively low banking inclusion. The trend is similar to that observed in previous research in Bangladesh and other developing economies. Currently, there is evidence that more financially literate people tend to use formal banking services, as higher literacy helps them gain deeper insights into financial products and reduce risk (Grohmann, Klühs, & Menkhoff, 2018; Xu & Zia, 2012). Nevertheless, a number of studies claim that financial literacy may not guarantee complete inclusion, especially when structural barriers to exposure, costs, and digital constraints persist (Demirgüç-Kunt et al., 2020). Again, the observed moderate institutional trust aligns with the finding that trust in banks and financial institutions positively affects engagement in formal finance (Guiso, Sapienza, & Zingales, 2008). Furthermore, trust boosts account ownership and service use, though its influence diminishes when service availability/affordability is low (Allen, Demirguc-Kunt, Klapper, & Peria, 2016). This argument is supported by the comparatively low average banking inclusion score in this study, which shows that trust is required, although not sufficient, in itself. Thus, the results indicate that increasing banking inclusion in Bangladesh involves more than just higher levels of financial literacy and institutional trust; it also involves access-related and infrastructural obstacles, as highlighted in the literature.

Regression Modeling and Analysis

Table 6 (regression output) indicates the overall effect of financial literacy and trust on banking inclusion, controlling for age, gender, monthly income, education level, and place of residence. To address possible heteroscedasticity, robust standard errors were applied, which guarantee more reliable statistical inference.

Table 6: Regression Analysis of Factors Affecting Banking Inclusion

Variables	Coefficient (β)	Robust Std. Error	t-value	p-value
Financial Literacy Score	0.2876	0.0351	8.18	0.000***
Trust score	0.0507	0.0300	1.69	0.092*
Age	0.0149	0.0088	1.70	0.090*
Gender	-0.1917	0.1869	-1.03	0.306
Education level	0.0627	0.0925	0.68	0.498
Monthly Income	0.2894	0.0716	4.04	0.000***
Living Location	-0.1000	0.1269	-0.79	0.431
Intercept	-10.899	0.6948	-2.73	0.007***
Model Summary: Number of Observations = 305; F(7, 297) = 37.67; Prob > F= 0.0000; R-squared = 0.4703				

Note: ***p<0.01, *p<0.10. No estimates in this table are significant at the 5% level.

The Financial Literacy Score shows a positive, highly significant effect (β = 0.2876, p < 0.001), indicating that higher financial literacy significantly increases banking inclusion. Trust score has a positive (significant) but weak effect (β = 0.0507, p = 0.092). This implies that institutional trust may have some influence, but the proof is not very strong. Age is also significant (β = 0.0149, p = 0.090), but it implies a small positive contribution and is not statistically strong. Gender, education level, and living location are statistically insignificant, suggesting no meaningful effect in this model. Monthly income emerges as a strong predictor (β = 0.2894, p < 0.001), meaning higher income significantly contributes to the outcome variable. According to the summary output, the model as a whole is statistically significant (F (7, 297) = 37.67, p < 0.001). Here, R^2 = 0.4703 indicates that approximately 47% of the variation in the banking inclusion is explained by the financial literacy and institutional trust included in the model.

The regression findings align with empirical evidence in developing countries, where financial literacy and income are strong predictors of banking inclusion. The positive and exceptionally high impact of financial literacy confirms the conclusions of low- and middle-income economies that low financial literacy is a fundamental barrier to formal access to banking (Grohmann et al., 2018; Klapper, Lusardi, & van Oudheusden, 2015). Financial products are commonly complex in terms of end-user usability in developing contexts, and therefore literacy is not an additional consideration in any given case, but a prerequisite for effective inclusion. Again, monthly income emerges as an equally powerful predictor, highlighting the constraints of affordability prevalent in developing economies.

Existing research in Asia and Africa has shown that people at the lower end of the income distribution are less inclined to open bank accounts due to minimum balance requirements, transaction costs, and unpredictable income (Demirgüç-Kunt et al., 2020; Zins & Weill, 2016). Therefore, the importance of income and literacy highlights a dual-constraint model, according to which inclusion depends on both economic capacity and financial capability. On the other hand, institutional trust has a positive but less significant impact, consistent with evidence from developing countries. Trust is important in weak financial systems, but it becomes less relevant as access broadens through digital finance and agent banking (Allen et al., 2016). For instance, the high rate of adoption of mobile financial services in Bangladesh and other countries with similar economies can help reduce trust in conventional banking institutions.

Subgroup Analysis

Individual subgroup regressions were conducted to assess the effects of financial literacy and institutional trust on banking inclusion by location (rural, semi-urban, urban) and gender (male, female). This method of operation helped establish whether the effects of financial literacy and trust differ across socio-demographic groups.

Table 7: Sub-group (Based on location) Regression Analysis

Predictors		Rural	Semi-Urban	Urban
Financial literacy score	Coefficient(β)	0.4355	0.4197	0.2461
	p- value	0.00***	0.000***	0.000***
Institutional trust score	Coefficient(β)	0.1077	0.2485	0.1133
	p-value	0.300	0.007***	0.000***

Note: ***p<0.01. No estimates in this table are significant at the 5% or 10% levels.

The subgroup analysis reveals clear spatial differences in the effects of financial literacy and institutional trust on banking inclusion (Table 7). Here, the impact of financial literacy is strong and statistically significant across all locations. This finding aligns with extant evidence in Bangladesh, where limited financial literacy is a key barrier to inclusion in rural areas, as evidenced by lower rates of exposure to formal banking services (Bangladesh Bank, 2023; World Bank, 2019). The relatively small coefficient in urban settings implies diminishing marginal returns, since baseline literacy and accessibility levels are already relatively high. However, institutional trust has an opposite relationship. In rural settings, trust is statistically insignificant, but it depicts a strong significant effect in semi-urban and urban settings. This trend is consistent with the literature, which shows that rural communities in Bangladesh depend more on informal finance and personal networks than on institutional credibility (Morshed & Maharjan, 2023). Combining all these results, it can be argued that literacy-based interventions are more often recommended in rural areas, while more trust-based actions are required in increasingly urban areas.

Table 8: Sub-group (Based on Gender) Regression Analysis

Predictors		Female	Male
Financial literacy score	Coefficient(β)	0.3388	0.3406
	p- value	0.000***	0.000***
Trust score	Coefficient(β)	0.0226	0.2136
	p- value	0.691	0.000***

Note: ***p<0.01. No estimates in this table are significant at the 5% or 10% levels.

The gender-specific analysis shows that financial literacy has a positive, nearly identical impact on banking inclusion for both genders (Table 8), as evidenced by nearly equal coefficient values and high levels of statistical significance. The mentioned symmetry supports evidence from Bangladesh showing that when women achieve the same financial knowledge as men, they join formal financial systems at equal rates (World Bank, 2019). However, when it comes to institutional trust, there is a stark gender divide. This deviation reflects that women usually turn to community networks and microfinance, where personal trust rather than institutional trust is the driving force behind engagement. Conversely, the financial behavior of men is more closely tied to formal and perceived credibility, which, in turn, affects the use of an account and saving behavior (Hasan & Alam, 2025). Lastly, these findings indicate that the approaches to building institutional trust may need gender-specific interventions. For women, strengthening trust systems within a community can be more effective.

Robustness Tests

A series of robustness checks was conducted to ensure the findings were reliable and stable. These checks included alternative model specifications, estimation of average marginal effects, split-sample validation, subgroup regression and outlier analysis.

Alternative Model Specifications

As shown in Table 9, the results of two alternative model specifications, which estimate the determinants of banking inclusion, include (1) a baseline Ordinary Least Squares (OLS) regression and (2) an Ordered Logistic

Regression (Ordered Logit) model. The alternative model specifications ensure that the demographic and socioeconomic variables are consistent across Ordinary Least Squares (OLS) and Ordered Logistic Regression.

Table 9: Alternative Model Specifications (OLS and Ordered Logistic Regression)

(Dependent variable: Banking Inclusion; robust SE in parentheses)		
	(1)	**(2)**
Variables	**OLS Coefficient (SE)**	**Ordered Logit (SE)**
Financial Literacy	0.288***	0.462***
	(0.035)	(0.058)
Institutional Trust	0.051*	0.055
	(0.03)	(0.047)
Age	0.015*	0.029**
	(0.008)	(0.013)
Gender	-0.188	-0.303
	(0.186)	(0.260)
Level of education	0.063	0.032
	(0.093)	(0.136)
Monthly income	0.289***	0.434***
	(0.072)	(0.104)
Living location of the respondent	-0.100	-0.135
	(0.127)	(0.187)
Observations	305	305
R square	0.4703	0.1852

Note: ***p<0.01, **p<0.05, *p<0.10.

The alternative models, estimated using OLS and ordered logistic regression, yield similar and strong results on the determinants of banking inclusion. Financial literacy and monthly income are strong and highly significant predictors in both models. Such reliability aligns with widespread evidence that income constraints are core to inclusion in emerging economies (Demirgüç-Kunt et al., 2020; Suri & Jack, 2016). The positive, statistically significant effect is also observed for age. However, the significance of age in the two models is inconsistent, a tendency also observed in other developing settings in Asia. Age occasionally forecasts the adoption of formal financial services in such settings, but the correlation decreases when other factors (financial literacy and income) are included (Zins & Weill, 2016). Older respondents in Bangladesh are generally more exposed to informal finance, thereby reducing the predictive significance of age after adjustments for literacy and income (World Bank, 2019). Furthermore, educational level is of little importance, as education alone does not ensure formal inclusion. Similar studies in Africa and Asia suggest that general education becomes less relevant once financial literacy is factored into the model (Grohmann et al., 2018; Guérineau & Jacolin, 2014). Moreover, there are weak and inconsistent effects of the living location. This result aligns with the literature, revealing that location is no longer predictive of inclusion when there is a reduction in access barriers (e.g., mobile money agent-mediated) (Bangladesh Bank, 2023; Jack & Suri, 2014). Nevertheless, rural locations continue to experience deficiencies in infrastructure, which may reduce the relevance of the models. Furthermore, in both models, gender is statistically insignificant, but the sign is consistent. In Bangladesh, nowadays, women are increasingly involved in microfinance and mobile money, similar to men, thus minimizing the explanatory influence of gender (Bangladesh Bank, 2023).

Average Marginal Effects

The average marginal effects furnish a more nuanced understanding of how salient determinants shape the probability of remaining financially excluded (Table 10). It is found that, when other covariates are held constant, the probability of low financial inclusion is significantly reduced with higher financial literacy.

Table 10: Average Marginal Effects on the Probability of Low Financial Inclusion

Variables	dy/dx	Std. Error	Z	p-value	95% Confidence Interval
Financial Literacy Score	-0.0470***	0.0062	-7.61	0.000	[-0.0591, -0.0349]
Trust Score	-0.0056	0.0045	-1.24	0.216	[-0.0144, 0.0033]
Age	-0.0030**	0.0014	-2.17	0.030	[-0.0057, -0.0003]
Gender (1 = Male)	0.0309	0.0266	1.16	0.246	[-0.0212, 0.0830]
Level of Education	-0.0033	0.0131	-0.25	0.804	[-0.0289, 0.0224]
Monthly Income	-0.0442***	0.0115	-3.84	0.000	[-0.0668, -0.0217]
Living Location (1 = Urban)	0.0137	0.0180	0.76	0.446	[-0.0216, 0.0490]

Note: ***p<0.01, **p<0.05. No estimates in this table are significant at the 10% level.

The result is consistent with available evidence in Bangladesh, where lack of financial literacy increases exposure to exclusion by both traditional banking and digital financial solutions (Bangladesh Bank, 2023; World Bank, 2019). Monthly income also has a significant adverse marginal effect on low inclusion, indicating that higher-income people are less likely to remain excluded. Global Findex statistics confirm this observation, such that the affordability is a major cause of exclusion in low-income environments (Demirgüç-Kunt et al., 2020). Empirical evidence from Kenya, India, and Pakistan shows that income stability significantly reduces the risk of exclusion, even in the presence of mobile financial services (Suri & Jack, 2016). By contrast, institutional trust displays a marginally low and unstable marginal impact. This finding reinforces evidence from Bangladesh and similar developing contexts, where trust drives the extent of implementation more than the core shifts out of exclusion (Hasan & Alam, 2025). Additionally, the demographic variables such as age, gender, education, and location have a low marginal effect, indicating that they impact indirectly via literacy and income.

Sample Validation and Sub-group Regression

The split-sample validation provides strong information on the stability and internal consistency of the regression model (Table 11). The analysis supports the results of a specific analysis of a given data sample by estimating identical specifications in two randomly selected subsamples and proves that the key findings were not an artifact of a specific data sample. The structural importance of financial literacy as an effective predictor of outcomes in both groups provides significance to its continued role as a predictor in banking inclusion.

Table 11: Split Sample Validation and Sub-group Regression

Variables	Group 1 Coef. (Robust SE)	Group 2 Coef. (Robust SE)
Financial Literacy Score	0.231*** (0.046)	0.357*** (0.053)
Trust Score	0.018 (0.048)	0.059 (0.038)
Age	0.035*** (0.013)	-0.009 (0.012)
Gender	-0.248 (0.299)	-0.080 (0.253)
Level of Education	0.175 (0.131)	-0.114 (0.129)
Monthly Income	0.268** (0.107)	0.338*** (0.095)
Living Location	-0.325* (0.180)	0.196 (0.168)
Constant	-1.474 (1.101)	-2.086** (0.904)

Note: Robust standard errors are reported in parentheses. ***p<0.01, **p<0.05, *p<0.10.

The highly significant coefficient for Group 2 may indicate that the influence of financial literacy is not uniform and depends on a range of situational factors, including variations in digital access or financial consciousness. Similar resilience has been reported in the developing world in Asia and Africa, where financial literacy remains a leading force of formal financial inclusion (Grohmann et al., 2018; Zins & Weill, 2016). Additionally, the positive, statistically significant effect of age in Group 1, but not in Group 2, is reminiscent of the inconsistent results reported in the literature. However, in Bangladesh, it is possible to show how age

effects are weakened in the context of mobile financial services and agent banking, which expand opportunities for younger generations (Bangladesh Bank, 2023). Moreover, monthly income is a constant and high predictor in both subsamples. This finding is consistent with the broader cross-country evidence that income constraints remain a key impediment to financial inclusion in low- and middle-income economies. In Kenya, India, and Bangladesh, it has been verified that the proportion of those who own and use accounts rises with income stability, even with financial literacy explicitly controlled (Suri & Jack, 2016; World Bank, 2019). However, trust, gender, and education are not found to be significant in either group and are captured in the literature. Demographic characteristics often become uninformative once financial literacy and income are included in the model (Allen et al., 2016). In Bangladesh, education is not always translated into economic strength due to the lack of fiscal substance in curricula, and even gender inequalities have narrowed as a result of the spread of microfinance and mobile money programs (Morshed & Maharjan, 2023). Overall, the split-sample findings support the idea that financial literacy and income are the best and policy-relevant predictors of banking inclusion, whereas demographic factors become secondary variables when the core constraints are well tackled.

Outlier Analysis

The statistics presented in Table 12 show that there are no influential outliers that would distort the regression model. Though nine observations showed slightly higher leverage values, their effects on model estimates were not significant. Removing these cases did not significantly decrease the adjusted R^2 (0.458 to 0.441), indicating that the regression results are not driven by extreme cases.

Table 12: Outlier Treatment

Diagnostic Metric	Criterion Applied	Observation / Result
Standardized Residuals	|Residual| > 3.0	None detected
Leverage Values	> 2× mean leverage	9 mild, non-influential cases
Cook's Distance	> 1.0	All below threshold
Adjusted R^2 (after removal)	—	0.441 (vs. 0.458 baseline)

Additional Diagnostic Tests

To ensure the reliability and validity of the regression results, we conducted a comprehensive set of diagnostic tests (shown in Table 13) covering multicollinearity, heteroscedasticity, autocorrelation, residual normality, and model specification. These tests are essential to confirm that key OLS assumptions are met and that parameter estimates are unbiased and efficient (Wooldridge, 2020).

Table 13: Diagnostic Test Results

Diagnostic Test	Statistic / Indicator	Threshold / Benchmark	Inference
Multicollinearity (Mean VIF)	2.01	< 5	No multicollinearity detected
Heteroscedasticity (Breusch–Pagan χ^2)	5.48 (p = 0.0193)	$p < 0.05 \Rightarrow$ Reject H_0	Heteroscedasticity present → robust SE applied
Autocorrelation (Durbin–Watson)	1.868	≈ 2.0	No autocorrelation
Normality (Shapiro–Wilk)	0.07445	> 0.05	Residuals approximately normal
Model Specification (Ramsey RESET)	0.2538	> 0.05	Model correctly specified

Multicollinearity was measured in terms of variance inflation factors (VIFs), and here, VIF values of all the predictors are much less than the critical value of 5, which means that there is no multicollinearity threat to the coefficient stability (O'Brien, 2007). This guarantees that the individual effects, especially on financial literacy and income, are accurately estimated. The value of Durbin-Watson is also near 2, indicating that there is no

evidence of a first-order autocorrelation in residuals. Even though autocorrelation is much more prevalent in panel and time-series data, its non-appearance here makes cross-section estimates more reliable (Greene, 2022). Furthermore, the Shapiro-Wilk test (p = 0.07445) shows that the residuals follow a normal distribution. This makes t-statistics suitable for making inferences and is consistent with the assumption of regression regarding inference in large surveys (Diez, Barr, & Çetinkaya-Rundel, 2019). In addition, as stated in the Ramsey RESET test (p = 0.2538), the null hypothesis was not rejected, which means that the model is specified correctly. Finally, the Breusch-Pagan test revealed heteroscedasticity (p = 0.0193); nevertheless, to eliminate the issue, we used robust standard errors. Taken together, these diagnostic results ensure the statistical rigor of our regression model and contribute to the credibility of our substantive inferences.

CONCLUSION WITH POLICY IMPLICATIONS

This paper aimed to investigate the impact of financial literacy and institutional trust on banking inclusion in Bangladesh. The results make it apparent that both issues have profound effects. While literacy provides the initial door to participation, particularly among low-income households (Ahmed & Hasan, 2021), the assurance to navigate financial products, take risks, and make choices that promote financial stability is what keeps people around and develops enduring relationships with banks. In combination, these two forces not only broaden access but also make inclusion sustainable, paving the way to curb inequality and empower citizens throughout the nation.

According to the findings of the study, the problem of banking inclusion in Bangladesh is multifactorial and demands both evidence-based initiatives with respect to the capability and structural obstacles. Firstly, the strong and consistent effect of financial literacy on any of the models indicates that financial education is a critical policy issue. Ensuring the reinforcement of financial literacy is thus essential, not as an isolated campaign but as part of schools, vocational education, and community venues. Additionally, the responsible use of financial services may be broadened by working with women, low-income families, and families in rural areas, as well as the establishment of digital literacy (Hasan et al., 2021). Second, the less dominant, yet heterogeneous impact of institutional trust implies that context-specific trust-building initiatives should be implemented. In this regard, financial institutions in urban and semi-urban regions where trust plays a key role in banking behavior must focus on transparency, simplified financial products, and enhanced consumer protection features (Bangladesh Bank, 2021). This is especially crucial in the digital age, when the threat of fraud and abuse remains high. In particular, for rural populations and women, where trust in formal institutions is less influential, policies must leverage community-based financial networks and agent banking to fill gaps between informal and formal systems. Third, the strong association with income underscores the importance of affordability for financial inclusion. Hence, some policies to consider include minimizing account maintenance costs, reducing transaction fees, and increasing the availability of low-cost or zero-balance accounts. Moreover, the infrastructure for digital financial services and mobile banking can be expanded to address geographical and cost-related barriers. Finally, the results underline that financial inclusion is not merely a behavioral, but also a structural problem. Therefore, regulators, financial institutions, and development organizations need to be aligned in a concerted effort to promote financial capability and accessibility simultaneously and to build institutional credibility to develop a sustainable and inclusive financial system.

Even though this study provides strong evidence on the combination of their roles, the relationship between trust and financial inclusion in Bangladesh remains a poorly researched topic. It has been suggested that future researchers should take a closer look at the role that various types of trust (felt toward people, institutions, or technology) play in shaping banking behavior both in rural and urban contexts. This may assist policymakers in crafting policies that increase access to finance and make it meaningful and sustainable for beneficiaries.

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TRANSPARENCY: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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