Golden Sun-Rise
International Journal of Multidisciplinary on Science and Management
ISSN: 3048-5037/ Volume 2 Issue 3 Jul-Sep 2025/ Page No: 63-74
Paper Id: IJMSM-V2I3P108/ Doi:10.71141/30485037/V2I3P108

Research Article

Impact of Financial Access on Household Expenditures: A Case Study from Benin

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Received: 05 July 2025 Revised: 08 July 2025 Accepted: 10 July 2025 Published: 13 July 2025

Abstract - *This research examines the impact of financial inclusion, specifically access to mobile money and bank services, on household welfare in Benin. Using nationally representative survey data, we discuss how financial access affects household expenditures on key sectors, including education, health, transportation, and fish and meat. Employing matching techniques, Caliper Matching, Kernel Matching, and the Inverse Probability Weighted Regression Adjustment (IPWRA) identification strategy, we identify the causal effects of financial access while addressing selection bias. The results reveal that households with access to financial services spend significantly more on education, health, and transportation, suggesting improved capacity to invest in long-term welfare and human capital. Although effects on food-related expenditures (fish and meat) are minor and generally not statistically significant, the overall findings underscore the potential of financial inclusion to enhance household well-being. Balance checks confirm the robustness of the matching process, strengthening the credibility of the estimates. The study emphasizes the importance of expanding access to financial services as a policy tool to promote inclusive economic development and enhance living standards in low-income settings, such as Benin.*

Keywords - *Financial inclusion, Mobile money, Bank access, Household expenditure, Matching methods, Welfare impact, Benin.*

I. INTRODUCTION

Financial inclusion has been drastically significant in the economic development of many developing countries. Policymakers at the national and international levels have begun to implement financial inclusion as a key development area (Cull et al., 2014). It is anticipated that financial inclusion will be crucial in reducing poverty and protecting the impoverished from various life threats (Demirgüç-Kunt & Klapper, 2012). The World Bank's Development Financial Report (2014) critically argues the difference between financial inclusion and access to finance. The report aptly highlighted that financial inclusion is distinct from access to finance. Financial inclusion is defined as the ratio of institutions and people that utilize financial services. Lack of accessibility does not reflect the usage pattern of financial services. Some individuals have access to financial services at affordable prices but choose not to use them; however, others want to utilize financial services, but access is the primary barrier due to the high transaction costs involved in the process. Over the past ten years, mobile phone technology has rapidly expanded throughout many developing nations (Jenny & Mbiti, 2010). Global Findex data

shows significant differences in financial services usage between high-income and developing countries, as well as within individual countries. In contrast to people in low-income countries, those in countries with high income are more than twice as likely to get an account with an official financial institution (Demirgüç-Kunt & Klapper, 2012). Furthermore, new technologies, including mobile payments, mobile banking, online banking, and biometric identification, have significantly reduced transaction costs and increased financial inclusion over the last decade (World Bank, 2014a).

According to a 2018 GSMA report, mobile services play a crucial role in economic development. Globally, the mobile industry's technological services accounted for 4.5% of GDP, worth $3.6 trillion in 2017. Sub-Saharan Africa remained the fastest-growing region in mobile communication across the world with an almost twofold growth in mobile phone subscribers between 2007 and 2012 (GSMA Intelligence, 2017). Ofori-Abebrese et al. (2020) used the ordinary least squares technique to explore the influence of financial inclusion in 33 Sub-Saharan African nations. The findings of the research were quite interesting, the financial inclusion was very low in the area; 29 of 33 countries were categorized as low financial inclusion with Benin coming in the 15 th position out of 33 countries with the score of 0.151. Although there are studies that spotlight the significance of mobile money relating to the household welfare (Deme et al., 2024; Baffour et al., 2021), there are also those that emphasise how mobile money influences poverty reduction and economic enhancement (Danquah and Iddrisu, 2018; Demirguc-Kunt and Klapper, 2012). This paper is more particular in that it aims at exploring how mobile money may affect diverse welfare determinants, such as education, health, transportation, and access to fish and meat based on the data that has been collected by FinAccess in Benin in 2018. Our paper is divided into the following sections. The first section 1 examines an in-depth literature review by various scholars on financial inclusion. Section 2 highlights the rigorous methodologies. Section 3 evaluates the results used in this study to yield valuable findings with policy implications. The final section 4 concludes and discusses strategies for implementing policies to achieve financial inclusion, specifically in developing countries such as Benin.

Empirical studies have shown the positive impact of mobile money on household welfare. Numerous research studies have been conducted in developing countries, particularly in Africa, where mobile money services have recently been integrated. Demirgüç-Kunt & Klapper (2012) in their report demonstrated that countries as Ghana and Benin have a GDP of around $560.5. However, Ghana has 29% of adults with a formal account, while Benin records only 10%. Research has been conducted over the years to facilitate the establishment of formal accounts, as this enhances financial inclusion in many countries. Baffour et al. (2021) found that mobile money improves and positively impacts the welfare of households, particularly those from underprivileged backgrounds, through remittances and increased per capita expenditure. The average treatment effect outputs indicate that mobile money holders receive significantly higher remittances, resulting in increased spending compared to non-mobile money users. Furthermore, the results of Kikulwe et al. (2014) illustrated similar findings on the positive impact of mobile money, highlighting that such remittances promote commercial agriculture and help mitigate risk and liquidity challenges. Munyegera and Matsumoto (2015) demonstrated in their study in rural Uganda that the proportion of households receiving remittances is relatively higher than those without access, primarily due to the costs associated with mobile phone usage. From the same perspective, a study in Cameroon by Ondoa et al. (2022) also concluded that there is a positive relationship between mobile money and welfare.

Mas and Kumar (2008) highlighted the transaction costs associated with accessing mobile money, showing a positive impact that resulted in decreased costs in finance, credit, and transportation. Diniz et al. (2012) highlighted the positive impact of financial inclusion on economic improvement; however, significant drawbacks include excessive debt among low-income individuals, the perpetuation of socially exclusionary behaviors, and the reinforcement of power disparities. Danquah and Iddrisu (2018) argue in their findings that accessing mobile phones enhances users' chances of not being poor. Their interest centered on how nonfarm enterprises using mobile money can generate higher sales revenue. Their findings further revealed that the positive effect of mobile money is only noticeable in non-farm rural enterprises, whereas urban ones do not rely heavily on mobile phones. In Kenya, Jack and Suri (2014) explored how lower mobile money transaction costs can affect risk sharing. They discovered that M-Pesa users can withstand significant adverse financial shocks without a drop in household consumption. Conversely, a significant shock led to an average fall in consumption

of 7 percent among the households lacking access to M-Pesa. An increasing research base is pointing to the complex effects of financial inclusion on households welfare in various regions. In Lesotho, Deme and Mangani (2025) turn to propensity score matching to estimate the effect of access to credit on household welfare and positively conclude that access to loans improves household welfare especially in terms of consumption. The same happens in Burkina Faso, where Ndri et al. (2020) implement the same method, and the result is that financial inclusion decreases poverty among the households. Similar conclusions are also made by Koomson et al. (2020) in Ghana, in which poverty and vulnerability are reduced through financial access.

All of these studies show a significant outcome of financial inclusion in enhancing household well-being in Sub-Saharan Africa. In South Asia, Bari et al. (2024) discuss the financial inclusion of slum residents in Bangladesh and determine that creating affluence positively influences investment into educational spending and ultimately human capital. Similarly, Chowdhury et al. (2024) compare the impacts of financial inclusion in Bangladesh, India, and Pakistan, and their studies prove the positive outcomes related to income levels, life expectancy, and education levels. Omar et al. (2020) also confirm these findings by the use of cross country analysis which demonstrates that financial inclusion diminishes poverty and income inequality. In Latin America, the attention of Álvarez-Gamboa et al. (2021) targets Ecuador, where they detected that financial inclusion is a significant factor in diminishing multidimensional poverty. Similar findings in Asia are provided by Chinnakum (2023) who concludes that financial inclusion plays a significant role in reducing being the key mitigating phenomenon of both poverty and inequality in the range of countries. This is because, in the Middle East and North Africa (MENA) region, Emara and El Said (2021) note the positive relationship between financial inclusion and the GDP per capita as well as better accessibility of firms to finance. Erlando et al. (2020) in Southeast Asia, report data on Indonesia reflecting that financial inclusion will enhance economic growth, poverty reduction and minimized income inequality. There is also an increasing interest toward digital financial inclusion.

Peng et al. (2023) in China run a probit model, a mediating effect model, and an instrumental variable to show that digital financial inclusion, indeed, decreases relative poverty and increases the level of income. On the same note, Kumari et al. (2025), analyze use cases in Asian countries and discover that digital financial services are correlated with poverty reduction. Adjacent themes have been researched in other studies. As an example, Monwanou et al. (2025) show that the remittances at the time of the COVID-19 pandemic allowed mitigating food security challenges in Benin because household income improved due to the remittances. In West Africa, Lankoande (2025) employs Poisson pseudo-maximum likelihood and propensity score matching to show that mobile money enhances intra-African trade. Lastly, Byanjankar et al. (2025) reveal that in Nepal, financial inclusion contributes to improved living standards through enhanced investment in education, agriculture, and durable assets. Researchers in Nepal have investigated the impact of remittances on household spending, employing an instrumental variable regression technique. Their findings suggest that remittances from abroad have a substantial impact on overall household expenses (Thapa-Parajuli et al., 2025).

II. MATERIALS AND METHODS

A. Materials

This study utilizes cross-sectional, nationwide data from Benin's 2018 FinAccess Household Survey, which comprises 6,948 households. Of these, 5,038 have access to financial services, and 1,910 do not. Additionally, we have demographic and socioeconomic characteristics for each household, including age, gender, mobile phone use, primary level of education, use of identification documents, marital status, and area of residence.

Table 1. Summarizes the Variables Used in this Study

Variables	Description
Outcome variables	
Education Expenditure	Amount for education expenses
Health Expenditure	Amount for health expenses
Transport Expenditure	Amount for transport expenses

Fish Expenditure	Amount for fish expenses
Meat Expenditure	Amount for meat expenses
Treatment variable	
Financia Access	=1 if access to financial services, and =0 if not access
Matching Covariates	
Identification document	Dummy (=1 if have and =0 if not have)
Female	Dummy (=1 if household head is female and 0 =male)
Use phone	Dummy (=1 if use mobile phone and =0 does not use)
Secondary	Dummy (1= if household head has education of secondary school and =0 if otherwise
Household age	Respondents' years
Rural	Dummy for the area (=1 household resides in rural area and =0 urban area)

The dataset contains variables designed to assess the impact of financial access on household welfare by analyzing various expenditure categories. The outcome variables include education, health, transport, fish, and meat expenditures, each representing the amount spent by households on essential services and food items, providing insight into investments in human capital, access to services, and nutritional choices. The primary treatment variable is financial access, coded as a dummy variable equal to 1 if the household has access to financial services (such as banks or mobile money), and 0 otherwise. To control for confounding factors, the dataset includes several matching covariates. These are binary indicators for whether the household head has an identification document, is female, uses a mobile phone, has attained secondary education, and whether the household resides in a rural area. Additionally, it includes the age of the household head as a continuous variable, which may influence financial behavior and household decision-making. Together, these variables support robust empirical strategies, such as matching or regression analysis, to evaluate how access to financial services influences household expenditure patterns.

B. Identification Strategy

Access to financial services is non-random, meaning that comparisons between those with access and those without access could be influenced by self-selection. To minimize this potential selection bias, we use a matching method that pairs treated individuals (those with access to financial services) with untreated individuals (those without access) who share similar pre-treatment characteristics (Bari et al., 2024; West et al., 2014). This approach assumes conditional independence (CIA), meaning that, after controlling for pre-treatment covariates (i.e., X), the treatment assignment (financial services access) is as good as random. This assumption allows us to estimate treatment effects by comparing outcomes between matched individuals who have similar characteristics, regardless of whether they have access to financial services.

The equation for the Average Treatment Effect on the Treated (ATET) is as follows:

$$ATET(x)=E\,[Y_1\,|D=1, X=x] - E\,[Y_0\,|D=0, X=x] \quad (1)$$

In the given scenario, Y denotes four expenditures: education, health, transportation, fish, and meat expenses (results). X represents the set of pretreatment covariates, and D is the treatment dummy variable that characterizes a household's use of financial services. D=1 means that a household has access to financial services, and D=0 implies that it does not have access. $E\,[Y_1\,|D=1, X=x]$ refers to the expenditure of treated households, whereas $E\,[Y_0\,|D=0, X=x]$ refers to the expected spending for the best untreated match.

The equation used to estimate the ATET under the propensity score P(x) is as follows:

$$ATET=E[Y_1 \mid D=1,P(x)]-E[Y_0 \mid D=0,P(x)] \quad (2)$$

Table 1 summarises the variables used in this study. The outcome variables are education, health, transportation, fish, and meat expenditures, while the treatment variable is the use of financial inclusion services.

III. RESULTS AND DISCUSSION

A. Summary Statistics

Table 2. Summary Statistics

Variables	Treatment Group	Control Group	Difference
Treatment variable			
Mobile Money	1	0	
Outcomes Variable			
Education Expenditure	70334.7	22427.5	47907.1***
Transportation Expenditure	3656.5	1474.2	2182.2***
Health Expenditure	20857.4	11517.3	9340.1***
Fish Expenditure	1052.3	815.7	236.5
Meat Expenditure	2189.4	1976.6	212.8
Covariates			
Female	.53	.59	-0.06
Secondary	.16	.10	0.06***
Use phone	.72	.43	0.29***
Rural	.51	.65	-0.14***
Household Age	36.9	38.1	-1.2*
Identification Document	.28	.07	0,21***
Observations	5038	1910	6948

Note ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively

Summary Table 2 compares key characteristics and expenditure outcomes between households with access to financial inclusion (the treatment group) and those without (the control group) in Benin. Households with access to financial services report significantly higher average education expenditures (70,334.7 CFA) compared to the control group (22,427.5 CFA), with a notable difference of 47,907.2 CFA (***$p < 0.01$). Similarly, transportation and health expenditures are substantially higher in the treatment group, with differences of 2,182.2 CFA and 9,340.1 CFA, respectively, both of which are statistically significant at the 1% level. While expenditures on fish and meat are also higher in the treatment group, the differences (236.5 CFA and 212.8 CFA, respectively) are not statistically significant. In terms of covariates, treatment households are more likely to have a household head with a secondary education (16% vs. 10%), use a phone (72% vs. 43%), and possess an identification document (28% vs. 7%), with all differences significant at the 1% level. The treatment group is less likely to live in rural regions (51% compared to 65%) and is slightly younger on average (36.9 years versus 38.1 years), with the latter difference being weakly significant (*$p<0.1$). For females (.53 vs .59), these trends suggest that users of financial services tend to possess better socio-demographic characteristics and higher household spending, particularly in education and health, highlighting the potential welfare-enhancing benefits of financial inclusion.

B. Main Results

Table 3. Caliper and Kernel Matching Estimation

Outcomes Variable	Caliper Matching	Kernel Matching
Education Expenditure	47949.7 ***	48624.97***
Transportation Expenditure	2189.16***	2132.02***
Health Expenditure	9369.9***	9659.05***
Fish Expenditure	238.75*	176.86
Meat Expenditure	215.49	118.51

Table 3 presents the estimated average treatment effects of access to financial services on household expenditures in Benin, using both Caliper Matching and Kernel Matching methods, with all values expressed in CFA francs. The results consistently show that access to financial services is associated with significantly higher spending on key household needs. Education expenditure increases by approximately 47,950 CFA under Caliper Matching and 48,625 CFA under Kernel Matching, statistically significant at the 1% level. Similarly, transportation expenditures rise by approximately 2,189 CFA and 2,132 CFA, respectively, while health expenditures increase by 9,370 CFA and 9,659 CFA across the two matching methods, all of which are highly significant (***p < 0.01). Although the estimated impacts on fish and meat expenditures are minor, the effect on meat expenditure is weakly significant under Caliper Matching, with an increase of 239 CFA (*p<0.1). Overall, these findings suggest that access to financial services has a positive influence on household investments in education, health, and mobility, supporting the role of financial inclusion in enhancing welfare.

Table 4. Inverse Probability Weighting Regression Adjustment (IPWRA) Estimation

Outcomes Variable	IPWRA Estimation
Education Expenditure	32940.76 ***
Transportation Expenditure	1960.70***
Health Expenditure	6637.79 **
Fish Expenditure	135.5
Meat Expenditure	388.67

Note ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively

Table 4 presents the results of the Inverse Probability Weighted Regression Adjustment (IPWRA) estimation, assessing the effect of using financial services on household expenditures in Benin, with all monetary values expressed in CFA francs. The findings reveal that financial access is significantly associated with increased household spending in key areas. On average, households with access to financial services spend 32,940.76 CFA more on education and 1,960.70 CFA more on transportation, statistically significant at the 1% level. Health expenditure also rises significantly by 6,637.79 CFA (**p<0.05), indicating improved investment in well-being. Although the effects on fish (135.5 CFA) and meat (388.67 CFA) expenditures are positive, they are not statistically significant. Overall, the IPWRA results support the view that financial inclusion contributes meaningfully to greater household spending on essential services, particularly education, health, and transportation.

C. Balance Check

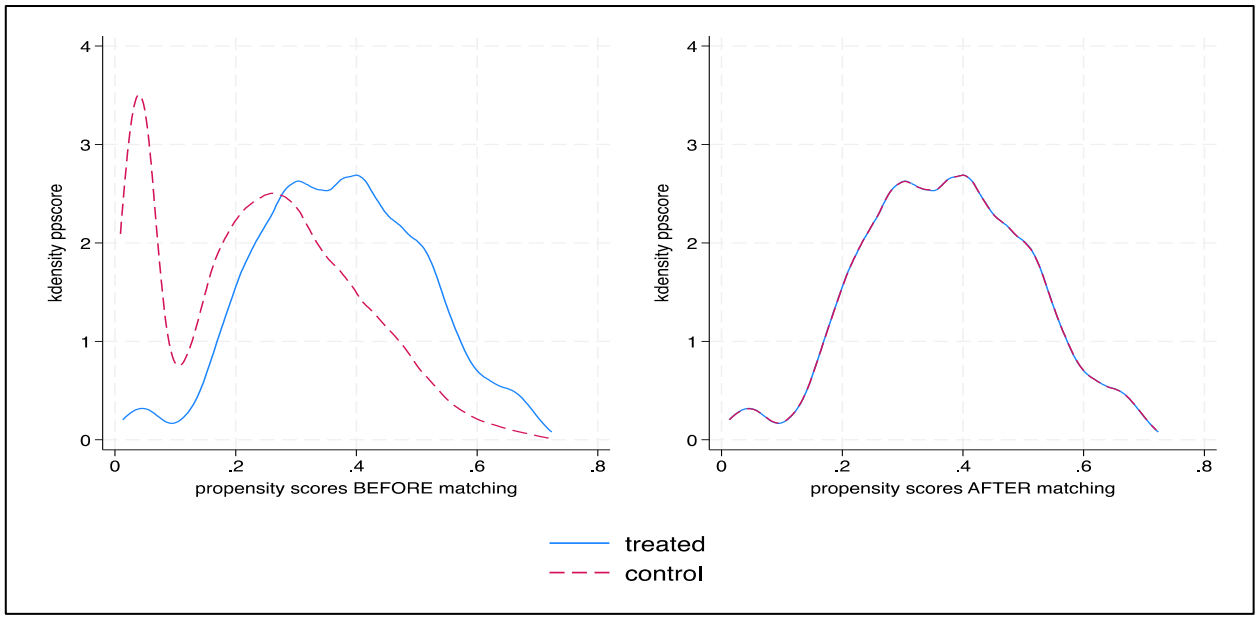

Figure 1. Distribution of Covariates Before and After Matching

Figure 1 shows the propensity score distributions of the covariates. The propensity score indicated a slight overlap between the two groups. Before matching, the graphs showed that the distributions of the covariates were inconsistent between the control and treated groups. However, after the matching process, the distribution became more uniform.

Table 5. Balance Check

	Mean				
	Treated	**Control**		**Bias reduction (%)**	**P-value**
Before Matching					
Identification Document	.28	.07			0.000
Household Age	36.9	38.1			0.005
Rural	.51	.65			0.000
Female	.53	.59			0.000
Secondary	.14	.03			0.000
Use phone	.72	.43			0.000
After matching					
Identification Document	.40	.39		92.6	0.567
Household Age	39.81	42.32		-97.2	0.423
Rural	.49	.44		72.6	0.137
Female	.39	.44		23.8	0.063
Secondary	.15	.15		94.1	0.737
Use phone	.88	.86		93.4	0.288

Table 5 summarizes the results of a balance check conducted before and after matching to access the comparability of the treated and control groups in evaluating the effect of access to financial services in Benin. Before matching, there were significant imbalances across all covariates, with large differences in means and p-values indicating statistically substantial disparities between groups. For example, only 7% of the control group had identification documents compared to 28% in the treated group, and phone usage was 72% among treated households versus 43% in the control group. Similar imbalances were observed in variables such as rural residence, gender, education, and age of the household head. After matching, the differences between groups were substantially reduced, with bias reductions exceeding 90% for most covariates. Variables such as identification document ownership, secondary education, and phone usage achieved strong balance, as reflected by high bias reduction percentages and non-significant p-values (e.g., $p = 0.567$ for ID, $p = 0.737$ for secondary education). This indicates that the matching procedure was effective in creating comparable groups, thereby improving the credibility of causal estimates from the analysis.

D. Discussion

The findings of this study contribute to the growing body of evidence on the positive role of financial inclusion in enhancing household welfare in developing countries, with a specific focus on Benin. The significant increases in education, health, and transportation expenditures among households with access to financial services suggest that financial inclusion can facilitate better allocation of resources toward essential needs. This may be due to improved liquidity, greater access to savings and remittances, or reduced transaction costs associated with mobile financial tools. The relatively minor and less significant effects on food expenditures, such as fish and meat, indicate that financial access may primarily influence investments in long-term welfare (like education and health) rather than immediate consumption. Moreover, the strong balance achieved after matching reinforces the robustness of the estimated effects, minimizing concerns about selection bias. These results underscore the necessity of policies that expand access to financial services and address barriers such as digital literacy, infrastructure, and trust in financial institutions, thereby ensuring that the benefits of financial inclusion are broad-based and sustainable.

IV. CONCLUSION

The results of this study provide strong evidence that access to financial services has a positive influence on household welfare in Benin. Households with access to financial services consistently spend significantly more on essential needs, such as education, health, and transportation, as demonstrated across multiple estimation methods, including matching techniques and IPWRA. These findings suggest that financial inclusion has a positive impact on household expenditure in Benin. Furthermore, the balance checks confirm that the treatment and control groups are statistically comparable after matching, strengthening the reliability of the causal interpretation. While the effects on food-related expenditures (fish and meat) are less pronounced, the overall pattern highlights the transformative potential of financial access in improving household living standards. These results underscore the importance of expanding financial services as a policy tool for promoting inclusive development and poverty reduction in low-income settings.

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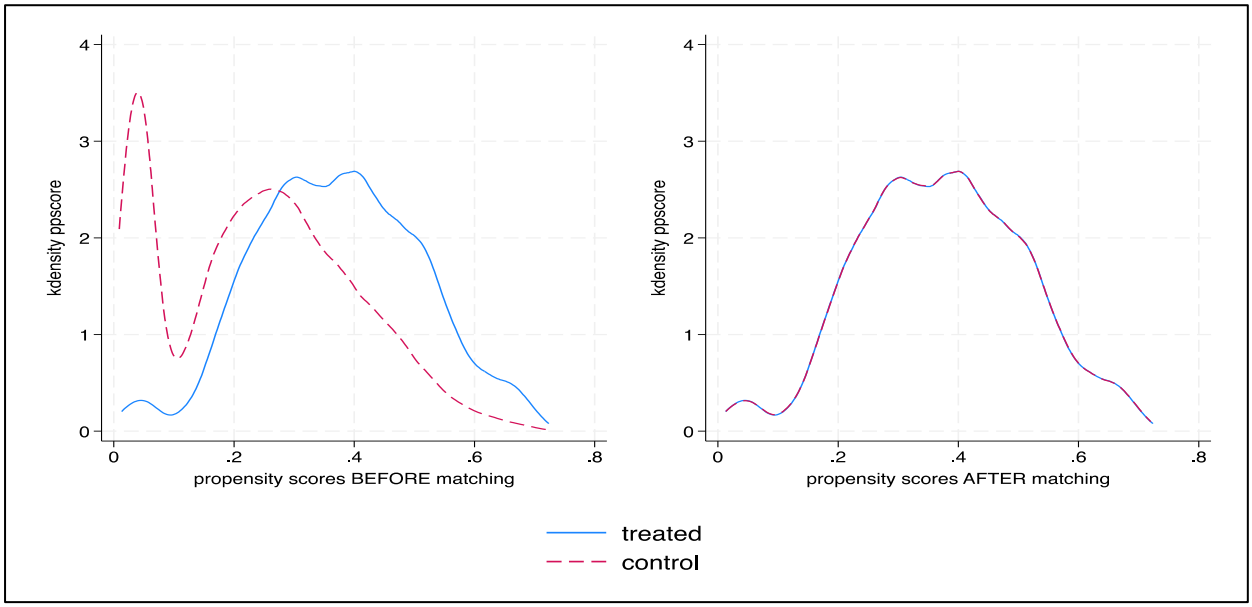
Appendix 5 Balance Check



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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Funding Statement

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. All work was conducted independently by the authors as part of their academic and professional contributions.

Aknowledgement

The authors would like to express their sincere gratitude to the National Institute of Statistics and Economic Analysis of Benin for providing access to the FinAccess 2018 Household Survey data, which served as the foundation for this research. We are also thankful to the academic and research community at Hiroshima University for their valuable feedback and support throughout the development of this study. Special appreciation goes to our colleagues and mentors for their insightful comments and encouragement, particularly during the methodological refinement phase. While no external funding was received for this research, the collaboration among the co-authors and the shared commitment to advancing knowledge on financial inclusion and household welfare made this work possible. Finally, we are grateful to our families and institutions for their moral support and understanding during the completion of this paper.

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