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Financial Inclusion and Economic Empowerment in Rural Areas: Evidence from Bihar, India Self-Help Groups

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ABSTRACT

The literature widely recognizes the significance of financial inclusion for economic development. Even Nevertheless, a sizable portion of the rural populace continues to live outside of the official financial system. The relationship between financial inclusion and rural economic well-being is examined in this study. The study is based on a primary survey of 426 rural women from three districts in rural Bihar, India, who participate in Self-Help Groups (SHGs). Through increased access to and utilization of credit facilities, physical banking services (PBS) are positively correlated with household economic well-being, according to the study, which uses structural equation modeling (SEM). In rural areas, PBS is likewise favorably correlated with both access to and use of insurance services; however, there is no positive correlation between insurance services and economic well-being. One significant route for policy is the National Rural Livelihood Mission (NRLM). PBS access is enhanced by NRLM, which also mediates the relationship between PBS, credit utilization, and rural economic well-being. The study emphasizes the importance of policies that concentrate on the efficient execution of NRLM programs, enhanced insurance scheme awareness and delivery, and focused initiatives to remove supply-side and demand-side obstacles to financial access in order to increase economic well-being.

Keywords: *Banking Services, NRLM, Loan Facilities, Self-Help Groups, Financial Inclusion, Economic Well-Being, and Structural Equation Modeling.*

Introduction

Access to and efficient use of formal financial services, including credit, savings accounts, insurance, and payment methods, are referred to as financial inclusion. Financial inclusion has been a key route for inclusive and sustainable development over the past few decades, according to a growing body of research (Adegbite & Machethe, 2020; Danladi et al., 2023; Xu et al., 2023; Dash & Mohanta, 2024). Wider access to financial services is linked to fewer credit restrictions, better capital allocation, more productive investment, increased productivity, and economic growth, according to a wealth of research in the literature (Beck et al., 2007; Goel & Sharma, 2017). According to Anzoategui et al. (2014) and Demirgüç-Kunt et al. (2017), having access to formal financial services helps low-income households manage economic shocks and financial risks, protect them from loan sharks and exploitative informal lenders, improve access to credit and insurance services, encourage savings through formal channels, and smooth consumption. Burgess and Pande (2005), for example, discovered that greater access to banking in rural India led to a large decrease in rural poverty via increasing deposit mobilization and loan

availability. According to Swamy (2014), financial inclusion programs also help women grow their incomes more than men do, which reduces the gender gap. Furthermore, these households' capacity to spend in health, education, and agriculture is positively correlated with their access to formal credit markets and financial institutions, which enhances their general economic and social well-being (Kuri & Laha, 2011). In summary, financial inclusion is a key driver of equitable and sustainable economic growth rather than merely "banking the unbanked."

The economic status of Self-Help Groups (SHGs) in rural Bihar, India, is examined in this study in relation to financial inclusion. The paper's overarching goal is to comprehend the relationship between rural households' economic well-being and their access to physical banking services, credit, insurance, and government-linked programs.

The emphasis on rural India is due to the fact that 64.6% of Indians still reside in rural areas, which are frequently characterized by less developed financial infrastructure and agrarian economic conditions (World Development Indicators, World Bank, 2024). Even though poverty in India has decreased recently, a disproportionately larger fraction of the rural population still lives in poverty. According to the UNDP study from 2023, just 5.27% of people in urban areas lived below the poverty line in 2019–2021, compared to roughly 19.28% of people in rural regions (UNDP, 2023).

Even though Bihar is one of the most economically developed states in India, many rural areas still experience agrarian stress, economic insecurity, and restricted access to formal banking networks. Between 2019 and 2021, the poverty headcount ratio in rural Bihar was 11.49% as opposed to 3.07% in urban regions (NITI Aayog, 2023).2 In addition, there is still a disconnect between access and actual usage in India, despite significant advancements in recent years in financial inclusion programs and banking access expansion. In India, for example, 78% of adults have a bank account; this percentage hasn't moved since 2017. Nevertheless, approximately 35% of these accounts are dormant. Additionally, just about 30% of people in rural areas use digital devices, compared to 40% in urban areas. In this regard, it is crucial to investigate the relationship between financial inclusion and rural Bihar residents' economic well-being through access to banking services, loans, insurance, and government-related programs.

Lastly, our emphasis on Self-Help Groups (SHGs) is motivated by the fact that these organizations, which are primarily run by women, promote employment by combining funds, expanding credit availability, and promoting small-scale income-generating ventures, particularly in rural areas.

Additionally, SHGs offer their members collective support by guiding them through financial and governmental initiatives. More significantly, SHGs are seen as venues for empowering and supporting rural women (Swamy, 2014; Al-Kubati & Selvaratnam, 2023).

As a result, our work advances both rural women's empowerment and the body of knowledge on financial inclusion and economic well-being.

India has made significant progress in recent years to increase financial inclusion in an effort to improve the lives of the most disadvantaged members of society by integrating them into the official financial system. For instance, the Pradhan Mantri Jan Dhan Yojana (PMJDY) was introduced in August 2014 with an emphasis on granting everyone access to banking facilities, credit, insurance, and pension services. Over 570 million bank accounts had been opened under PMJDY as of 2025, with rural households accounting for a sizable portion of these accounts (Government of India, PMJDY Dashboard; Nimbrayan et al., 2018).

Launched in 2011, the National Rural Livelihood Mission (NRLM) employs a livelihood-focused strategy by organizing women into Self-Help Groups (SHGs) and connecting them to official funding sources and opportunities for income generation. As of October 2024, over 100 million women had joined more than 9 million Self-Help Groups (SHGs), which encourage women's financial, occupational, and economic empowerment (Nagayya & Rao, 2016). The literature also shows that among rural households, the NRLM has been linked to improvements in financial inclusion and a decrease in social marginalization (Maity, 2023).

Many rural households still have difficulty accessing and utilizing financial services despite these initiatives. Effective participation in the formal financial system is nevertheless hampered by financial illiteracy, a lack of banking options, mistrust of official institutions, and complicated delivery systems (Bongomin et al., 2017; Hasan et al., 2021). Nearly 35% of PMJDY accounts are still dormant, as was

previously mentioned. Six Many rural households do not use bank accounts for productive purposes, even when they are available. Financial access and usage differ significantly, according to Dahiya and Kumar (2020), who point out that only actual utilization promotes economic growth.

In light of this, this study investigates the relationship between the economic and financial circumstances of SHGs in rural Bihar and financial inclusion via physical banking services, involvement in NRLM, access to loan (credit) facilities, and use of insurance. By concentrating on SHGs, the study goes beyond simple account ownership and instead looks at how participation in NRLM and access to financial services are linked to asset development, income and employment creation, and the ability to spend and invest, all of which are related to overall financial and economic well-being. Instead of assessing causal impacts, the study examines the relationship between financial inclusion and economic well-being to derive policy insights due to the cross-sectional nature of the data. The study demonstrates how financial inclusion may be used as a tool for rural economic development and provides policymakers with information about which aspects of financial inclusion are effective locally and where more policy support is required.

This is how the rest of the paper is organized. In Section 2, the research questions and hypotheses are developed after an assessment of the body of current literature. The data and study technique are described in Section 3. The findings and analysis are shown in Section 4.

The results are discussed and the policy implications are outlined in Section 5. The paper is concluded in Section 6.

Literature Review, Research Questions, and Hypotheses

Financial services accessibility and availability are generally considered essential for ending poverty, lowering income inequality, advancing gender equality, and fostering general economic growth (Li, 2018; Inoue, 2019; Ohiomu & Ogbeide-Osaretin, 2019; Kim et al., 2018; Omar & Inaba, 2020; Van et al., 2021; Churchill & Marisetty, 2020; Kling et al., 2022; Demir et al., 2022). However, because banking operations are frequently unprofitable in these areas due to greater operating expenses and poor consumption of banking services, rural communities continue to be more susceptible and financially excluded (Saxena & Misra, 2016). Because of this, financial inclusion for rural areas has always been given top priority in government policy, particularly in emerging and least developed nations.

In the past, a number of legislative attempts have been implemented to provide financial services to India's most rural regions. In order to reach unbanked rural areas and enhance financial access for the rural poor, the Government of India initiated a comprehensive social banking program after nationalizing the 14 biggest commercial banks in 1969. Nearly 30,000 bank branches were opened in rural areas as a result of this campaign, which ran until 1990 (Burgess & Pande, 2005). The Reserve Bank of India (the Central Bank) implemented a branch licensing policy in 1977 that mandated banks open four branches in unbanked areas for each branch opened in an area that was already banked in order to further increase rural outreach (Burgess & Pande, 2005).

Even so, the 1:4 licensing policy is no longer in use in modern India. The Reserve Bank of India now permits domestic scheduled commercial banks to open branches anywhere in the nation without first obtaining permission, provided that at least 25% of the bank's new locations within a fiscal year are found in rural areas without access to banking services.7 Initiatives like the Pradhan Mantri Jan Dhan Yojana (PMJDY), which aims to increase access to banking services and integrate unbanked rural households into the formal financial system, have also been introduced by the Indian government in recent years. The average distance between an unbanked village and a bank in rural India decreased significantly as a result of these efforts, from 43.5 km in 1951 to 4.3 km in 2019 (Garg et al., 2026). In a similar vein, PMJDY has expanded financial access for rural households by opening nearly 570 million bank accounts (Government of India, PMJDY Dashboard).

Using Credit and Insurance Services and Accessing Physical Banking

According to the literature, having access to and using physical banking services—such as ATMs, deposit and withdrawal services, and physical bank branches—can boost credit availability and usage. For instance, state-supported banking expansion into unbanked rural areas led to notable increases in loan disbursement to rural households for long-term productive investments, according to Burgess and Pande (2005). According to a more recent study by Garg et al. (2026), having access to banking facilities greatly boosted credit usage among India's underprivileged castes, which in turn enhanced entrepreneurial activity?

Nevertheless, increased credit consumption is not always correlated with having access to banks and the actual banking system. For example, research indicates that in order to boost credit usage in India, more focus should be placed on removing demand-side obstacles (A. K. Mishra & Bhardwaj, 2022) as opposed to the physical accessibility of financial services, which frequently serves a small portion of the population (Dupas et al., 2014). Credit usage can be decreased by demand-side obstacles such low financial literacy (Cole et al., 2011), production risk and income volatility that raise default fears (Gine X & Yang, 2009), and the risk of losing collateral (Dupas et al., 2014). In light of the explanation above, we ask the following research question:

RQ1: Are credit availability and utilization in rural areas correlated with access to and use of physical banking services?

A substantial amount of empirical research in the Indian setting reveals a positive correlation between the growth of physical banking services and credit utilization, despite conflicting data in the literature (Burgess & Pande, 2005; Garg et al., 2026). This evidence leads us to the following hypothesis:

H_1: Credit availability and utilization in rural areas are positively correlated with access to and use of physical banking services.

Because rural households typically have more faith in banks than in insurance brokers, banks are also essential to the provision of insurance services in rural areas. For rural households, having access to insurance is especially crucial for managing the risks associated with crop failure and financial loss from a household member's death. In India, insurance penetration is still low despite these demands; for instance, just 22% of rural residents have access to life insurance. The banking network is often cited in the literature as a key means of increasing insurance penetration in rural areas, especially through the bancassurance model, in which banks serve as middlemen in the provision of insurance services (Benoist, 2002; Paige Fields et al., 2007; Bansal & Anil, 20

In order to provide insurance services in rural areas, government-sponsored insurance programs like the Pradhan Mantri Fasal Bima Yojana (PMFBY) for crop insurance and the Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) and Pradhan Mantri Suraksha Bima Yojana (PMSBY) for life and accident insurance also mainly rely on the current banking network (Dua et al., 2019).10 As of 2025, over 230 million individuals were enrolled in PMJJBY, with rural areas accounting for over 74% of beneficiaries.11 In a similar vein, PMFBY has insured over 780 million applications.

Due to a lack of sufficient collateral and susceptibility to covariate agricultural risks resulting from weather-related shocks, rural households frequently encounter difficulties obtaining credit (K. Mishra et al., 2021). Increased access to insurance services can lessen vulnerability, boost food security by balancing income and consumption, and improve creditworthiness by increasing their capacity to absorb risks like crop failure, accidents, or death (Zeller & Sharma, 2000). For example, K. Mishra et al. (2021) demonstrate that combining agricultural loans with insurance that ensures repayment, safeguards lenders, and ultimately improves loan approval and farmers' access to credit in rural Ghana. All things considered, the literature points to a favorable correlation between higher credit usage and insurance availability.

However, it is important to recognize that rural households are frequently deterred from buying insurance due to a lack of faith in insurance products, a lack of knowledge about insurance plans, and financial limitations (Cole et al., 2013). Additionally, banks in India face significant challenges in providing insurance services due to staff knowledge and training shortages regarding insurance products (Bansal & Anil, 2018). Because of this, it is difficult to determine if banking services are linked to more insurance and, thus, larger credit consumption in the Indian setting.

Motivated by the discussion above, we present the two research questions and hypotheses that follow.

RQ2: Does the availability and use of insurance services in rural areas correlate with access to and use of physical banking services?

RQ3: Are credit availability and usage in rural areas correlated with the availability and use of insurance services?

H_2: In rural areas, the availability and use of insurance services are positively correlated with access to and use of physical banking services.

H_3: In rural locations, credit availability and usage are positively correlated with insurance service availability and utilization.

NRLM, Economic Status, and Financial Inclusion

As we have noted, many rural households either do not use banking and financial services effectively or stay outside of the formal financial system despite major efforts to increase banking access in rural areas. Low financial literacy, a lack of faith in formal institutions, a lack of banking options, and complicated service delivery systems are the key causes of this (Bongomin et al., 2017; Hasan et al., 2021). The National Rural Livelihoods Mission (NRLM), officially known as the Deendayal Antyodaya Yojana-National Rural Livelihoods Mission (DAY-NRLM), was established by the Indian government in 2011 to address these issues. By organizing women into Self-Help Groups (SHGs) and connecting them to official funding sources and opportunities for self-employment, NRLM employs a livelihood-focused strategy.

The program's lead district bank is essential to the provision of financial services and government initiatives in rural areas (Nagayya & Rao, 2016; Gupta & Singh, 2018; Shylendra, 2022; Maity, 2023). In order to increase financial inclusion and credit availability, NRLM strongly emphasizes the SHG-bank connection (Nagayya & Rao, 2016). Therefore, the availability and accessibility of Physical Banking Services (PBS) are intimately linked to the efficacy of NRLM.

Research indicates that the SHG-bank connections established under NRLM are linked to greater credit availability and women's empowerment in these areas by enhancing financial literacy and streamlining loan approvals (Pandey & Gupta, 2022; Rizvi, 2023; Ningombam & Bordoloi, 2024). According to data from Bihar, India, Datta (2015) shows that under these initiatives, a sizable portion of households decreased their expensive debt and started using credit for profitable endeavors. Further data from Bihar, India, is presented by Hoffmann et al. (2021), who demonstrate that government-led SHG initiatives considerably raised SHG membership, enhanced access to formal credit, and decreased the usage of informal credit.

A substantial body of research has been done on how SHG-based initiatives affect the financial security of the underprivileged. There is conflicting evidence from developing nations; a number of randomized controlled studies of SHG and microfinance programs found little to no effect on economic well-being (Angelucci et al., 2015; Banerjee et al., 2015; Meager, 2019). There is conflicting evidence from NRLM in India as well. For instance, Hoffmann et al. (2021) discover that SHG programs have a large beneficial influence on formal credit; however, the short-term impact on economic well-being, as assessed by women's economic empowerment, asset ownership, and material well-being, is negligible. According to Raghunathan et al. (2023), household spending on food and livestock ownership increases as a result of NRLM participation, but there are no similar effects on other expenditures or asset accumulation.

However, Pandey and Gupta (2022) discover that NRLM membership is linked to improvements in women's labor force participation and livelihoods, mostly through better access to formal financing and the creation of productive assets. Similarly, Ningombam and Bordoloi (2024) discover that involvement in NRLM is linked to increased household income and financial stability, particularly for women.

Access to Physical Banking, Use of Credit and Insurance, and Economic Status

We highlighted NRLM's importance in promoting financial inclusion and its contribution to uplifting the rural poor in the previous subsection. Building on the conversation from Section 2. we investigate in this section if having access to banking is linked to improvements in one's financial and economic standing through the usage of credit and insurance services.

One of the main ways that rural families are incorporated into the formal financial system is through physical banking access. Physical banks make lending more accessible, allowing for profitable investments in small businesses, education, and agriculture, which encourages revenue production and economic diversification. According to earlier research, having access to credit can greatly improve rural households' financial circumstances by promoting long-term investments in human capital, boosting their capacity to withstand shocks, and stimulating productive investments (Allen, 2006; Akoijam, 2012).

According to Burgess and Pande (2005), state-led banking development resulted in significant increases in deposit mobilization and credit disbursement in previously unbanked rural areas. For rural households, this led to increased output per capita, especially in small-scale manufacturing and services. Additionally, Garg et al. (2026) discover that marginalized caste households in areas nearer physical banks had better loan uptake, which resulted in increased entrepreneurship and the creation of jobs in non-agricultural sectors.

We emphasized the complementarity of loan and insurance access in Section 2. Access to insurance improves creditworthiness and credit availability by lowering income volatility and increasing rural households' capacity to withstand shocks (Zeller & Sharma, 2000). According to existing research, insurance services enhance rural economic outcomes by lowering the risks of natural catastrophes and medical emergencies, allowing investment in higher-yielding ventures, and boosting household resilience (Jutting, 2001; Sun et al., 2009). In a similar vein, Habib et al. (2016) discover that micro health insurance lowers poverty for households by cutting out-of-pocket medical costs and health-related borrowing. Additionally, this type of insurance protects household assets, savings, and consumption, which enhances financial and economic well-being.

There is disagreement over the relationship between improvements in rural households' financial and economic well-being and access to banking, credit usage, and insurance services, despite the fact that a sizable portion of the literature emphasizes this connection. As we previously noted, having access to banking does not always result in increased credit usage because of demand-side barriers (A. K. Mishra & Bhardwaj, 2022; Cole et al., 2011) or increased use of insurance services because of a lack of confidence and knowledge about insurance products (Cole et al., 2013). It appears that PMJDY has a significant percentage of dormant bank accounts (Markose et al., 2022). Additionally, data from field studies conducted in poor nations indicates that having access to banking has very little impact on welfare, especially when it comes to assets and income (Prina, 2015). Similarly, data indicates that households in India do not benefit economically from having access to health insurance (Azam, 2018).

Data and Research Methodology

Data for this cross-sectional study was gathered using a questionnaire. A practical sampling technique was used to gather the data. The target population consisted of rural Self-Help Groups (SHGs) that were chosen at random from 12 villages spread over three districts in Bihar, India: Darbhanga, Madhubani, and Samstipur. 426 SHG home respondents were given a standardized questionnaire. In order to measure financial inclusion, the questionnaire asked about the availability, use, and accessibility of financial services. It also asked about financial and economic position in order to gauge economic well-being. A five-point Likert scale was used to collect responses regarding issues impacting financial inclusion and economic well-being. The study evaluated respondents' levels of financial inclusion and economic well-being using data from 55 indicators (see Appendix A).

Thirteen indicators of the financial services offered in rural Bihar were found in the study.

In order to gauge the degree of financial inclusion, these metrics concentrated on the accessibility, utilization, and availability of financial services and NRLM in rural areas (Sarma & Pais, 2011).

Measures of the respondents' financial well-being were created using responses to sixteen economic circumstances indicators (Survase & Inumula, 2019; Rajesh et al., 2018; Serrao et al., 2021). The relationship between financial inclusion and the respondents' economic well-being was then investigated using the notions of financial inclusion and economic well-being.

Structural Equation Modeling (SEM) was used to analyze the data. Through measurement and structural models, SEM offers a two-step graphical depiction of the study's relationships (Mures et al., 2021; Asif et al., 2023). Survey data that looks at intricate correlations between latent and observable variables is frequently analyzed using SEM. To investigate the associations between the study variables, the research employed confirmatory factor analysis (CFA) using AMOS 24.0 and exploratory factor analysis (EFA) using SPSS 27.0. The constructs' validity and reliability were evaluated using squared correlations, convergent values, and Average Variance Extracted (AVE). To determine whether common technique bias existed among the study constructs, Harman's single-factor test was performed using exploratory factor analysis.

Results and Analysis

Descriptive analysis, exploratory factor analysis, confirmatory factor analysis (measurement model), construct validity, common-method bias test, structural equation modeling with hypothesis testing, descriptive group comparison, and multi-group structural equation modeling are the subsections that present the findings.

- **Analysis of Descriptive Data**

The respondents' demographic details are shown in this subsection. The demographic profile of the 426 SHG participants in the study is displayed in Table 1. One important feature of SHGs is that all of the respondents were female. Approximately 87% of those surveyed were under 45. Of the respondents, 28% belonged to Other Backward Castes (OBCs), while around 56% belonged to disadvantaged castes (Scheduled Castes and Scheduled Tribes). The general caste categories accounted for the remaining 16.5%.

Table 1: Demographic Characteristics

Demographic Variable	Category	Frequency (n)	Percentage (%)
Age	Less than 25 years	55	13.0
	25–35 years	167	39.4
	36–45 years	148	34.9
	More than 45 years	54	12.7
Caste	SC category	123	22.1
	ST category	186	33.5
	OBC category	155	27.9
	General category	92	16.5
Education	Illiterate	37	8.7
	Below secondary	205	48.3
	Secondary & Higher Secondary	156	36.8
	Graduation & Diploma	16	3.8
	Post-graduation & above	10	2.4
Occupation	Self-employed	59	13.9
	Private Sector Employee	79	18.6
	Unemployed	10	2.4
	Farmer	199	46.9
	Daily Laborer	64	15.1
	Public Sector Employee	13	3.1
District	Darbhanga	154	36.2
	Madhubani	129	30.3
	Samastipur	143	33.5

With 36.8% of respondents having finished secondary or higher secondary education and 48% having less education than the secondary level, the sample demonstrates low levels of educational achievement. Merely 6% had completed graduate, diploma, or postgraduate coursework. The agrarian character of rural India is reflected in the fact that the majority of respondents (46.9%) were farmers. 18.6% of people worked in the private sector, 15% were daily workers, and over 14% were independent contractors.

Respondents were distributed about evenly throughout the three districts.

- **Exploratory Factor Analysis (EFA)**

The pertinent observed items for the latent constructs included in the SEM were found using a factor analysis (Hair et al., 2010). The factor analysis results are shown in Table 2. Six characteristics emerged, according to the results: Economic Condition of the Respondents (ECR), a latent construct that represents improvements in respondents' economic well-being;

Physical Banking Services (PBS) is a latent construct that reflects the availability, access, and use of physical banking services; Insurance Service (IS) is a latent construct that reflects the availability, access, and use of insurance services; Loan Facility (LF) is a latent construct that reflects the availability, access, and use of credit; National Rural Livelihoods Mission (NRLM) schemes is a latent construct that reflects the availability, access, and use of bank correspondents (BC) and bank facilitators (BF).76% of the variation can be explained by these six factors taken together. The data are appropriate for factor analysis since the Kaiser-Meyer-Olkin (KMO) value is 0.926, which is higher than the necessary threshold of 0.6 (Hair et al., 2010).

Improvements in electronic good ownership, vehicle ownership, propensity to save, propensity to invest, access to credit facilities, wealth building, present and future financial stability, and overall economic development are among the eight items that make up the ECR construct, which was created using the factor analysis shown in Table 2. The availability of a bank branch, ATMs, deposit/withdrawal facilities, accessibility of ATMs, check book facilities, and cash deposit/withdrawal facilities, as well as the use of a bank branch, ATMs, overdraft facilities, and cash deposit/withdrawal facilities, are among the ten items that make up the PBS construct. Three components make up the IS construct: the respondent's use of insurance services, the availability of insurance plans, and the accessibility of insurance services.

Three components make up the NRLM construct: the respondent's utilization of NRLM schemes, the availability of NRLM schemes, and the accessibility of NRLM services. The three components of the LF construct are the respondent's use of the loan (credit), the loan (credit) facility's accessibility, and its availability. Three components make up the BC & BF construct: BC & BF's accessibility and availability, as well as the utilization of financial services via BC & BF. Thirty of the 55 observed indicators in Appendix A were kept for the factor analysis and utilized to create the latent variables; the other indicators were eliminated because of their low factor loadings.

Table 2: Exploratory Factor Analysis Results

Rotated Component Matrix

Constructs	Items	Factor Loading
ECR	EC4 – Improvement in electronic goods ownership	0.620
	EC5 – Improvement in vehicle ownership	0.514
	EC10 – Improvement in propensity to save	0.796
	EC11 – Improvement in propensity for investing	0.851
	EC12 – Improvement in accessibility to credit facility	0.659
	EC13 – Improvement in building of wealth	0.662
	EC15 – Improvement in current and future financial stability	0.739
	EC16 – Improvement in economic development as a whole	0.791
PBS (Primary Banking Services)	AVFS1 – A bank branch is available at your place	0.766
	AVFS3 – ATMs are available at your place	0.797
	AVFS10 – Deposit/withdrawal facility is available to the respondent	0.857
	ACFS3 – ATMs are easily accessible	0.756
	ACFS6 – Cheque book facility is easily accessible to the respondent	0.607
	UFS1 – The respondent used a bank branch to access financial services	0.723
	UFS3 – The respondent used ATM services	0.765
	UFS9 – The respondent used an overdraft facility of a bank	0.501
	ACFS10 – Cash deposit and withdrawal facilities are easily accessible to the respondent	0.805
	UFS10 – The respondent used cash deposit/withdrawal facilities	0.679
IS (Insurance Services)	AVFS8 – Insurance plans are available to the respondent	0.878
	ACFS8 – Insurance services are easily accessible to the respondent	0.865
	UFS8 – The respondent used insurance services	0.879

NRLM	AVFS13 – NRLM schemes are available to the respondent	0.814
	ACFS13 – NRLM services are easily accessible to the respondent	0.833
	UFS13 – The respondent used NRLM schemes	0.707
LF (Loan Facility)	AVFS7 – Loan (credit) facility is available to the respondent	0.742
	ACFS7 – Loan (credit) facility is easily accessible to the respondent	0.742
	UFS7 – The respondent used a loan (credit) facility	0.617
BC & BF (Business Correspondent and Business Facilitator Services)	AVFS2 – Availability of BC & BF	0.687
	ACFS2 – Easy accessibility of BC & BF	0.866
	UFS2 – Financial services were obtained via BC & BF	0.851

Source: Compilation by the authors. Note: KMO is 0.926 and all constructs have Eigen values larger than 1. ECR stands for the respondents' economic status; PBS for the availability, access, and use of physical banking services; IS for the availability, access, and use of insurance services; LF for the availability, access, and use of credit facilities (loan facilities); NRLM for the availability, access, and use of NRLM schemes; BC & BF for the availability, access, and use of bank correspondents (BC) and bank facilitators (BF).

The statistics regarding the constructs' dependability are shown in Table 3. To get statistically significant findings from the suggested model, the scale's reliability was evaluated using factor loadings (≥0.5) and Cronbach's alpha (≥0.6) (Hair et al., 2010). Every construct satisfies these requirements, demonstrating the scale's high degree of internal consistency.

Construct	No. of Items	Cronbach's Alpha (Reliability)
ECR	8	0.94
PBS	10	0.93
IS	3	0.95
NRLM	3	0.95
LF	3	0.90
BC & BF	3	0.94

Source: Compilation by the authors. Note: ECR stands for respondents' economic situation; PBS for the availability, access, and use of physical banking services; IS for the availability, access, and use of insurance services; LF for the availability, access, and use of credit facilities (loan facilities); NRLM for the availability, access, and use of NRLM schemes; BC & BF for the availability, access, and use of bank correspondents (BC) and bank facilitators (BF).

The correlation matrix for the variable constructions is shown in Table 4. At the 5% level, the correlation coefficients between the constructs are statistically significant, offering initial evidence in favor of the hypothesized relationships put forth in Section 2.

Table 4: Correlation Matrix

Construct	ECR	PBS	IS	NRLM	LF
ECR	1				
PBS	0.458 **	1			
IS	0.275 **	0.577 **	1		
NRLM	0.663 **	0.487 **	0.334 **	1	
LF	0.582 **	0.614 **	0.529 **	0.584 **	1
BC & BF	0.463 **	−0.177 **	−0.129 **	0.313 **	0.119 *

Source: Authors' compilation. Note: * $p < 0.05$; ** $p < 0.01$ (2-tailed). ECR = economic condition of respondents; PBS = availability, access, and usage of physical banking services; IS = availability, access, and usage of insurance services; LF = availability, access, and usage of credit facilities (loan facilities); NRLM = availability, access, and usage of NRLM schemes; BC & BF = availability, access and usage of bank correspondents (BC) and bank facilitators (BF).

- **Analysis of Confirmatory Factors (Measurement Model)**

The latent variables and the observable (measurable) factors are connected by the measurement model derived from the confirmatory factor analysis. where ellipses are used to represent latent variables like ECR, PBS, and LF while rectangles are used to represent measurable variables like UFS1, UFS3, and EC4. Two-headed arrows connecting latent variables show their covariance. It displays the final measurement model with standardized regression weights for each item and illustrates the link between the latent and measured variables.

An iterative procedure was used to estimate the measurement model until the regression weights were greater than 0.5. Because the original model did not fulfill the required fit requirements, it was rejected. Despite being identified as a factor in the exploratory analysis, the BC & BF factor was not taken into consideration for additional investigation because of its poor fit in the confirmatory factor analysis, which led to its exclusion from the final measurement and structural models. The resulting model is statistically significant since all of the indices are within allowable bounds. Overall, the results of the confirmatory factor analysis demonstrate how well the measurement model matches the data.

- **Validity of Construction**

Convergent validity and discriminant validity tests are used to evaluate a construct's validity. The nature of these two forms of validity is diametrically opposed. Discriminant validity demonstrates that two notions represent different qualities since they differ from one another. The square root of the Average Variance Extracted (AVE), which should be greater than the correlations between the related latent constructs, is used to test it (Hair et al., 2010; Jobson, 2012). The findings shown in Tables 4 and 5 meet the criteria for discriminant validity.

Table 5: Construct Validity

Construct	No. of Items	AVE	CR
ECR	8	0.50	0.80
PBS	10	0.67	0.86
IS	3	0.77	0.88
NRLM	3	0.61	0.75
LF	3	0.49	0.59

Source: Authors' compilation. ECR = economic condition of respondents; PBS = availability, access, and usage of physical banking services; IS = availability, access, and usage of insurance services; LF = availability, access, and usage of credit facilities (loan facilities); NRLM = availability, access, and usage of NRLM schemes.

Convergent validity examines the similarity and relationship between the items used to measure a construct. Composite Reliability (CR) is used to test it; each construct's CR rating must be higher than 0.5. Table 5 demonstrates that all latent variables' CR values are greater than 0.5, demonstrating that the convergent validity requirement is satisfied. Consequently, the latent constructs show satisfactory construct validity, according to the AVE and composite reliability scores.

- **Bias Test for Common Methods**

A single survey instrument on a self-reported Likert scale was used to gather data on the observed items for the constructs from each respondent at a specific moment. This may result in common method bias, which raises doubts about the validity of the findings because the apparent associations can be influenced more by the measurement technique than by the true relationships between the constructs (Podsakoff et al., 2003). For each of the 27 items used to measure the constructs, Harman's single-factor test was performed using exploratory factor analysis in SPSS to look for possible common method bias. Table 6 presents the comparable results.

According to the findings, the first factor explains around 47% of the variance overall, which is less than the generally recognized cutoff point of 50% (Fuller et al., 2016). This suggests that since no single factor accounts for the majority of the variance, common technique bias is unlikely to be a significant concern.

Table 6: Harman's Single-Factor Test for Common Method Bias

Total Variance Explained						
	Initial Eigenvalues			Extraction Sums of Square Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.598	46.659	46.659	12.598	46.659	46.659
2	3.728	13.808	60.467			
3	1.666	6.171	66.638			
4	1.203	4.455	71.093			
5	1.025	3.798	74.891			
6	0.842	3.120	78.011			
7	0.767	2.842	80.853			

Discussion

This study looks at the relationship between financial inclusion and economic well-being among rural women in Bihar, India who participate in Self-Help Groups. The goal of the study is to determine the elements that assist rural communities' integration into the formal financial system, promote financial inclusion, and are connected to their economic well-being. It is crucial to emphasize, nonetheless, that our research is based on a cross-sectional survey, which restricts the capacity to determine causal effects. Therefore, rather than being causal effects, our data should be viewed as suggestive of possible postulated linkages and pathways. This section addresses the findings and their consequences for the current public policy discourse after issuing this warning. First, there is a strong correlation between financial inclusion and the accessibility, availability, and use of physical banking services (PBS). According to the study, PBS and rural households' economic well-being are positively and significantly correlated. Additionally, it discovers that PBS has a strong correlation with rural communities' access to, availability of, and use of credit (loan) facilities (H1), which has a favorable correlation with households' economic well-being. In conclusion, PBS's positive correlation with economic well-being is mediated via its correlation with loan utilization.

According to research, rural residents are more likely to have access to basic financial services like credit when physical banking infrastructure is improved. This frequently results in profitable investments in human capital and agriculture, which produce observable economic benefits (Allen, 2006; Akoijam, 2012). According to Burgess and Pande (2005), state-led banking development in unbanked rural areas in India between 1969 and 1990 considerably decreased poverty and raised per capita household income, primarily as a result of greater credit disbursement. Additionally, Garg et al. (2026) discover that financial inclusion through expanded PBS access helped marginal castes in India by improving loan uptake, which led to improved employment creation and entrepreneurial activity.

Second, the study supports the bancassurance model, in which banks serve as middlemen in the provision of insurance services, by finding a positive correlation between financial inclusion through PBS and the availability and use of insurance services in rural areas (H2).

It is crucial to emphasize that the Government of India's latest initiatives, such PMFBY, PMJJBY, and PMSBY, which offer insurance products at reduced prices, are bank account connected plans and so primarily rely on PBS. Furthermore, Giri and Chatterjee (2021) discover that whereas financial inclusion as defined by banking relationships is linked to higher insurance coverage in rural India, the termination of these relationships was linked to a reduction in insurance coverage.

Our discovery that NRLM involvement has a mediation role in the relationship between PBS, loan consumption, and rural economic well-being is a significant policy finding. It emphasizes how development program support, like NRLM, could enhance the effectiveness of financial inclusion initiatives. Dupas et al. (2018), for instance, present experimental data from Uganda, Malawi, and Chile demonstrating that policies aimed at increasing access to subsidized bank accounts led to limited utilization, which in turn did not produce appreciable welfare impacts.

Conclusion

This study looks at the relationship between financial inclusion and economic well-being among rural women in Bihar, India who participate in Self-Help Groups. The study's goal is to pinpoint the elements that support financial inclusion, aid in integrating rural communities into the formal financial system, and are linked to improvements in their economic well-being. A primary survey of 426 Self-Help Group (SHG) members from three districts in rural Bihar, India, served as the study's foundation. Structural Equation Modeling (SEM) is used to examine the relationship between financial inclusion and economic well-being as well as the variables mediating these associations.

According to the study, physical banking services—a crucial part of financial inclusion—have a favorable correlation with household economic well-being due to their correlation with credit consumption. In rural locations, access to and use of insurance services are favorably correlated with physical banking services; however, the study does not establish a positive correlation between insurance services and economic well-being. Financial inclusion in rural areas is favorably correlated with the NRLM, which emerges as a significant policy intervention and mediating element. Higher involvement in NRLM programs is linked to access to and use of physical banking services. In response, NRLM membership is favorably correlated with rural SHG-participating women's economic well-being and higher loan uptake.

It is crucial to remember that not all SHG members have the same degree of financial inclusion, even if the study indicates a generally positive correlation between financial inclusion and economic well-being. Variations in the sample's economic well-being can be explained by differences in SHG members' access to physical banking services, credit consumption, and NRLM involvement. In order to promote economic well-being, the study emphasizes the importance of policies aiming at the efficient implementation of NRLM programs, better knowledge and delivery of insurance schemes, and focused efforts to eliminate both supply-side and demand-side barriers to financial access.

Limitations and Future Scope

The paper contains a number of limitations that allow for further investigation, despite its strengths and policy importance. First, because the study uses a cross-sectional survey, it is unable to determine the casual effects of financial inclusion and NRLM program participation on economic well-being through before-and-after comparisons or the creation of treatment and counterfactual control groups. The study examines contemporaneous relationships between financial inclusion and economic well-being constructs among rural Self-Help Group (SHG) members using a Structural Equation Modeling (SEM) methodology. The study specifically examines the relationships between economic well-being and the availability of physical banking services, involvement in NRLM, and the use of credit and insurance.

Second, it is crucial to emphasize that SHG-participating rural women in three districts in Bihar, India—Darbhanga, Madhubani, and Samastipur—are the subject of this cross-sectional study. Therefore, this fraction of SHG-participating households can directly benefit from the findings and policy implications. This may limit the findings' applicability to the larger rural community, which includes both male members and rural women who do not participate in SHGs.

Third, our dataset lacks comprehensive data on the features of insurance and credit products, including premium amounts, contract complexity, insurance policy kinds, insurance payouts and claims, interest rates, and collateral requirements for credit products. This makes it more difficult for us to explain how insurance use and economic results are related. As a result, our study, which is based on earlier research rather than any empirical investigation, can only be presented at an exploratory level.

Appendix A

Availability of Banking Services A

- **VFS1—**A bank branch is available at your place.
- **AVFS2—**Business Facilitators (BF) and Business Correspondents (BC) are available at your place.
- **AVFS3—**Automated Teller Services (ATMs) are available at your place.
- **AVFS4—**Mobile banking is available to the respondent.
- **AVFS5—**Internet banking is available to the respondent. AVFS6—Cheque book facility is available to the respondent.
- **AVFS7—**Loan (credit) facility is available to the respondent.
- **AVFS8—**Insurance plans are available to the respondent.
- **AVFS9—**Overdraft facility is available to the respondent.
- **AVFS10—**Deposit/withdrawing facility is available to the respondent.
- **AVFS11—**Mortgage facility available to the respondent.
- **AVFS12—**A financial advisor is available to the respondent.
- **AVFS13—**NRLM schemes are available to the respondent.

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