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Does Financial Inclusion Influence Financial Resilience of Marine Fishermen?

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Keywords

Financial inclusion, Financial resilience, Marine fishermen, Vulnerable communities, Credit access

JEL Classification G53, H50, I31, I38 Abstract: Financial inclusion is critical in enhancing the financial resilience of vulnerable communities, particularly marine fishermen, who are often exposed to economic and environmental uncertainties. This study investigates the influence of financial inclusion on the financial resilience of marine fishermen in the Balasore district of Odisha, a coastal region with a significant dependence on fisheries for livelihood. By examining access to banking services, microfinance, and insurance coverage, the study evaluates how these factors contribute to economic stability and risk management among fishermen. The data is collected from 271 fishermen through scheduled interviews, focusing on their financial behaviours, savings patterns, and credit access. The study employs SPSS AMOS to determine the relationship between financial inclusion and financial resilience. The result depicts that financial inclusion significantly influences the financial resilience of marine fishermen in the Balasore district of Odisha. This study adds to the existing literature by offering a deeper understanding of the association between financial inclusion and financial resilience. It also provides valuable insights to policymakers, financial institutions, and development practitioners.

1. Introduction

Economic activities are the key to the survival and sustenance of every entity. As far as individuals and households are concerned, people pursue some economic activities to earn their livelihood. However, when the economic activities on which the livelihood depends are subject to risk and uncertainties, the livelihood becomes vulnerable. However, the ability to withstand such risks and uncertainties brings resilience and ensures long-run survival and sustenance of the individuals or households. A recent survey by the Organisation for Economic Cooperation and Development (OECD) on 1,25,787 adults in 26 economies reveals that 1/3rd of the respondents have savings that can maintain their livelihood for a week only and are concerned about maintaining their daily living expenses. It means that many individuals from many economies don't have the ability to confront financial difficulties. This lack of financial resilience affects individuals and the entire economy.

In pursuit of earning a livelihood, people engage themselves in many economic activities with varied profiles of economic outcomes. The urban population has better economic, educational, and social opportunities as compared to the rural population (Porru et al., 2020). However, the rural population and, more specifically, the fishermen of coastal areas are deprived of better economic opportunities and primarily adopt fishing as the primary source of livelihood. Further, fishing constitutes a larger proportion of income, employment, and food security for the poor and is crucial for households with poor-quality farming land (Martin et al., 2013). However, fishing is a capricious occupation, and small fishers in developing economies are the most economically vulnerable community with the utmost poverty rate (Bene & Friend, 2011). They are susceptible to both short-term uncertainties (as they are subject to many difficulties on the day of fishing, like weather, availability of fish population, etc.)

and long-term uncertainties (like storm damage, loss of boats, injury, etc.), which badly affect their livelihood. The persistence of such uncertainties forces them to rely upon informal moneylenders from localities, which aggravates their economic condition and livelihood.

With a long coastline of 480 KM, representing 8% of the coastline and 6% of the total fish production in India, Odisha is the 6th largest fish-producing state of the country, having six coastal districts. In Odisha, 1,15,228 fishermen families with 5,17,623 marine fishermen make their livelihood from the open sea (CMFRI Census 2016). Among six coastal districts in Odisha, a large quantum of marine fish landings is shared by Balasore and Jagatsinghpur districts. At this juncture, financial inclusion among the fishermen can empower them to mitigate their vulnerability by accessing the financial services offered by the formal financial institutions and can serve as a means of resilience. However, it is often a challenge to access financial services like savings, credit, and insurance due to barriers like minimum balance requirements, minimum amount of loan, fees, documentation, processing times, and remoteness of the people. Further, digital inclusive finance can provide effective financial services to people who are excluded from traditional finance, thereby enhancing economic vitality and resilience (Du et al., 2023).

In the above backdrop, the present study assess the role of financial inclusion among marine fishing communities in building resilience to economic shocks. The remainder of the paper is organised as follows: the "Review of Literature" contains the prior literature. The data and econometric model used in the study are presented in the "Research Methodology" section. The "Results and Discussion" section discusses the results. Finally, the "Conclusion" section reveals the conclusion, implications, limitations, and future research direction of the study.

2. Review of Literature

The concept of financial resilience in the public debate amid volatile, uncertain, complex, and ambiguous socio-economic life is gaining increasing importance and has attracted the researchers' attention. Financial resilience is one of the dimensions of resilience that has been explored in the literature. The prior studies of Lusardi et al., (2011) have narrated resilience as someone's ability to arrange funds from different avenues in an emergency. The doctrine of resilience is drawn from the life cycle hypothesis, where individuals adopt a precautionary motive to smooth their consumption and savings over their lifetime. Modigliani & Brumberg, (1954) state that savings enable an individual to mitigate exigencies arising from temporary escalation of expenses or reduction in income. In tandem, OECD (2020) perceives financial resilience as the product of internal factors such as controlling of money, careful expenditures, financial buffer, handling financial deficits or pressure, financial planning, and being aware of financial fraud.

On the other hand, Muir et al., (2016) and Salignac et al., (2019) connote resilience as an individual's ability to rely on internal (savings and reduction of expenditure) as well as external sources of funds (funds from friends, family, and other social connections) at the time of financial crunch. Further, Salignac et al., (2019) argue that an individual's resilience not only depends upon the ability to access funds from the above-mentioned sources but also depends upon access to formal financial sources, which is referred to as financial inclusion. So, the framework of resilience by Salignac et al., (2019) comprises of four interrelated forces, such as economic resources, financial products and services, financial knowledge and behaviour, and social capital. Kass-Hanna et al., (2022) and Lusardi et al., (2021) have studied the effect of financial literacy on financial inclusion on financial resilience. Kass-Hanna et al., (2022) reveal that financial literacy leads to higher savings, higher borrowings, superior risk management through life and health insurance, and improved crisis preparedness. Lusardi et al., (2021) document that high financial literacy encourages better crisis management, lesser debt constraints, superior planning for the future, and a greater propensity to save and plan for the future.

Studies have also assessed the importance of financial inclusion in promoting financial resilience. Though there is no consensus on the definition of financial inclusion, the majority of the studies considered financial inclusion in terms of holding financial products and services. In line with this, Salignac et al., (2022) postulate that financial inclusion leads to individuals' access to financial products or services, and financially excluded individuals rely upon costly informal sources of funds (Lamb, 2019). The economy with more savings-related financial products, credit, and insurance experiences the economic well-being of individuals against financial turbulence. In line with this, a low financial inclusion rate is associated with higher poverty, more income inequality, and sluggish economic growth (Hussain et al., 2019). Higher financial inclusion reduces poverty (Saha & Qin, 2023). Hussain et al., (2019) demonstrate a better resilience of bank account holders than non-account holders, and Lyons et al., (2020) document superior financial inclusion results in lesser financial vulnerability. The above section clarifies that financial inclusion plays a significant role in ensuring individuals' financial resilience. However, financial innovation and financial technology have changed the realm of financial inclusion. The massive penetration of technology into the financial system has urged access to financial products and services through digital devices to garner the full benefits of financial inclusion, which is referred to as digital financial inclusion. So, digital financial inclusion has a greater role in bringing financial resilience. In this regard, Davis & Braunholtz-Speight (2016) reveal that financial innovation leads to economic resilience. Hao & Qu, (2023) document that Information technology drives economic resilience. Zhu et al., (2023) and Yu et al., (2024) find a positive effect of digital financial agglomeration on economic resilience.

In recent years, the resilience talk has gained plausible academic success among regional scientists and beyond (Martin et al., 2013), and much literature concerning resilience phenomena has been published. Economic resilience has been empirically investigated in different localities (Bergeijk et al. 2017). Further, resilience papers have emphasised different levels of analysis, such as country, region, province, city, local labour market, neighbourhood, etc. (Modica & Reggiani, 2015). Also, methodologically, the papers are fairly diverse, from case studies (Evans & Karecha, 2014; Simmie & Martin, 2010) to studies involving indicators, to studies applying models (Capello et al., 2015), and to studies involving long-run time series (Di Caro, 2017; Fingleton et al., 2012). From a policy viewpoint, the concept is also notable across the world. However, in the context of assessing the role of financial inclusion in bringing economic resilience among the people dependent on fishing is very scant. From review studies, Pomeroy et al., (2020) document the barriers to financial inclusion and the importance of financial inclusion in building financial resilience. However, the existing literature lacks empirical evidence. Though the contribution of the fishermen of Odisha to national fish production is highly significant, and they contribute about 2.19% to the state's GDP, they live with many economic plights. The prior works have unheeded these phenomena. Hence, this proposed work attempts to investigate this missing evidence from among the marine fishermen of the Balasore district of Odisha.

3. Research Methodology

3.1 Research Design

This study employs a quantitative research approach to examine the influence of financial inclusion on financial resilience among marine fishermen in the Balasore district of Odisha. The research framework incorporates an interview schedule to collect primary data, and statistical tools are applied to analyse the relationships between the key variables.

3.2 Target Respondents

The target respondents consist of marine fishermen in the Balasore district of Odisha. To maintain ethical research standards, participants are informed that their involvement in the study is entirely voluntary. Additionally, measures are taken to ensure that all responses remain anonymous and confidential, fostering a sense of trust and openness during data collection.

3.3 Questionnaire Design

A customised questionnaire is designed and administered for the collection of data. The questionnaire comprises of items measured on a 5-point Likert scale to capture nuanced responses. To ensure its

validity and comprehensiveness, rigorous validation techniques, including expert reviews and pilot testing, have been conducted before deployment.

3.4 Tools Used

Data analysis has been performed using SPSS and SPSS AMOS, leveraging their complementary capabilities. SPSS is utilised for descriptive and preliminary data analysis, offering a clear overview of the dataset's characteristics. Further, SPSS AMOS is employed for advanced structural equation modelling (SEM), enabling a robust evaluation of complex relationships between constructs. Specifically, SPSS facilitates descriptive analyses, while SPSS AMOS is instrumental in testing the structural relationship between financial inclusion and financial resilience. The measurement model is assessed for validity, and the structural model is analysed using path coefficients to determine the significance of the relationships.

3.5 Survey Process

The survey involves scheduling and conducting interviews with 282 fishermen in the Balasore district of Odisha. These interviews are guided by a structured questionnaire designed to capture relevant data. Each response is carefully reviewed to ensure the representativeness and quality of the data. Upon examination, 7 responses are excluded due to incomplete information. Additionally, 4 responses are removed because of inconsistent answer patterns. Ultimately, 271 valid responses are included in the final analysis, ensuring a robust dataset for the study.

Table 1: Items for measurement	of financial	inclusion and	financial resilience
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Financial Inclusion	(1) Access(2) Usage(3) Quality
Financial Resilience	 (1) Keeping control of money (2) Taking care of expenditure (3) Having financial cushion (4) Having financial shortfall/stress (5) Having financial planning

Source: Authors' compilation

4. Results and Discussion

A significant majority of the respondents, 78.2%, are aged 30 years and above. A smaller proportion, 0.7%, and 21.1%, are between 18-25 years and 26-30 years, respectively. In terms of education, 68.2% of the respondents are illiterate. A substantial portion, 30%, have primary education, while only 1.8% have secondary education. Regarding family size, 8.2% of the fishermen have more than four dependents. A smaller proportion of 0.3% has one dependent, while 8.2%, 45.1%, and 38.2% have two, three, and four dependents, respectively. Most respondents, 92.6%, are professional fishermen, while 7.4% are occasional fishermen. In terms of income distribution, a significant proportion, 57.4%, have a monthly income ranging from ₹10,000 to ₹15,000. A smaller proportion, 20.4% and 22.2%, have a monthly income between ₹5,000 to ₹10,000 and above ₹15,000, respectively. These results are provided in Table 2.

	Frequency	%	Cumulative %	
Age				
>30	212	78.2	78.2	
18-25	2	0.7	78.9	
26-30	57	21.1	100.0	
Total	271	100		
Education				
Illiterate	185	68.2	68.2	

 Table 2: Demographic characteristics of marine fishermen

Primary	81	30.0	98.2
Secondary	5	1.8	100.0
Total	271	100	
Dependent Members			
>4	22	8.2	8.2
1	1	0.3	8.5
2	22	8.2	16.7
3	123	45.1	61.8
4	103	38.2	100.0
Total	271	100	
Types of Fishermen			
Occasional	20	7.4	7.4
Professional	251	92.6	100.0
Total	271	100	
Monthly Income			
>15000	60	22.2	22.2
10000-15000	156	57.4	79.6
5000-10000	55	20.4	100.0
Total	271	100	

Source: Authors' compilation

To reduce the dimensionality of the data and identify underlying constructs, Principal Component Analysis (PCA) has been employed. Following Kaiser's criterion (Kaiser, 1960), components with eigen values greater than 1 are retained. This analysis yields three factors for financial inclusion and five factors for financial resilience, capturing a significant proportion of the total variance.

To further validate the factor structure and assess the measurement model, confirmatory factor analysis (CFA) is conducted (Hair et al., 2010). CFA aims to examine the extent to which the observed variables are associated with their latent constructs. The analysis assessed convergent and discriminant validity, composite reliability (CR), and average variance extracted (AVE), which are described in Table 4 and Table 5.

Convergent validity evaluates how well items within the same construct correlate and represent the underlying concept they are designed to measure. It is deemed achieved when item loadings surpass the 0.70 threshold, demonstrating that the items effectively capture their construct and account for at least 50% of the variance (indicated by an AVE exceeding 50%) (Blunch, 2012). Table 3 outlines the factor loadings for various constructs. Generally, a factor loading greater than 0.70 signifies a strong relationship between the observed variable and the intended construct.

Following the guidelines outlined by Lee (2009), an additional validation step has been conducted to ensure the convergent validity of the constructs. As per Hu and Bentler (1999), this validation requires an AVE value of at least 0.50, signifying that latent variables account for at least 50% of the variance in their corresponding indicator variables. Table 4 provides an assessment of the model constructs' reliability, evaluated through Cronbach's alpha, CR, and AVE. Each construct achieves and exceeds the minimum AVE value of 0.50, further substantiating the validity of the constructs under investigation (Hair et al., 1992; Nunnally & Bernstein, 1994; Wang et al., 2009).

The reliability of the scale is thoroughly assessed for each of the eight primary components in the study using Cronbach's alpha and CR measures. The findings indicate satisfactory convergent validity across all components, with factor loadings exceeding 0.70 in Table 3. CR values are above the acceptable benchmark of 0.60, and all AVEs are greater than 0.50. As Yu (2011) suggested, these results confirm that the items met the required criteria, which is further validated by the composite reliability scores. Additionally, Cronbach's alpha values for all components surpassed 0.50, aligning with the recommendations of Sarstedt et al., (2021) (Table 4).

Model Constructs	Items	Factor Loadings
	FI_ACC1	0.868
A 22222	FI_ACC2	0.789
Access —	FI_ACC3	0.768
(Five Items)	FI_ACC4	0.895
	FI_ACC5	0.795
	FI_USG1	0.786
	FI_USG2	0.832
	FI_USG3	0.812
Usage	FI_USG4	0.793
(Nine Items)	FI_USG5	0.739
· · · ·	 FI_USG6	0.819
	FI USG7	0.898
	FI_USG8	0.712
	FI USG9	0.773
	FI QUA1	0.819
	FI QUA2	0.827
Quality	FI_QUA3	0.704
Six Items)	FI QUA4	0.688
· · · · · · · · · · · · · · · · · · ·	FI QUA5	0.732
	FI_QUA6	0.812
7 1 1 0	FR_KCM1	0.758
Keeping control of money	FR_KCM2	0.831
(Inree Items) —	FR_KCM3	0.796
	FR TCE1	0.914
Laking care of expenditure	FR_TCE2	0.883
(Inree Items)	FR_TCE3	0.730
	FR_HFC1	0.807
Having financial cushion —	FR_HFC2	0.888
(Inree Items)	FR_HFC3	0.839
······	FR_HFS1	0.828
taving financial shortfall/stress	FR_HFS2	0.879
(Inree Items)	FR_HFS3	0.732
	FR_HFP1	0.726
Having financial planning	FR_HFP2	0.856
(Three Items) –	FR HFP3	0.791

Source: Authors' calculation

Table 4: Reliability of constructs

Items	Cronbach's Alpha	Composite	Average Variance	
		Reliability (CR)	Extracted (AVE)	
Financial Inclusion	0.732			
FIA		0.914	0.680	
FIU		0.940	0.636	
FIQ		0.894	0.586	
Financial Resilience	0.865			
FRKCM		0.808	0.586	
FRTCE		0.882	0.716	
FRHFC		0.882	0.715	
FRHFS		0.855	0.665	
FRHFP		0.804	0.579	

Source: Authors' calculation

Discriminant validity is evaluated by comparing the square root of the AVE for each construct with the correlation values between that construct and others in the model, following the method outlined by Henseler et al. (2015). This approach ensures that the constructs exhibit acceptable discriminant validity. Table 5 illustrates the results, calculated using the Fornell-Larcker criterion, to verify that the constructs are distinct and represent different concepts. The analysis reveals that all items satisfied the criterion, as presented in Table 5, indicating robust discriminant validity. Both the Fornell-Larcker criterion and cross-loadings are employed to analyse discriminant validity. The assessment confirmed that each item loaded more strongly on its intended construct than any other construct in the model which is consistent with Fornell and Larcker (1981). In Table 5, the diagonal elements represent the square root of the AVE, while the off-diagonal elements reflect the correlations between constructs. Each diagonal value exceeds the off-diagonal values in the corresponding rows and columns, supporting the validity of the constructs (Fatayah et al., 2022).

Tuble of Di	501 mmun	e vanaity						
	FIA	FIU	FIQ	FRKCM	FRTCE	FRHFC	FRHFS	FRHFP
FIA	0.825							
FIU	0.746	0.797						
FIQ	0.526	0.595	0.766					
FRKCM	0.689	0.718	0.525	0.766				
FRTCE	0.661	0.522	0.592	0.556	0.846			
FRHFC	0.569	0.560	0.569	0.542	0.621	0.846		
FRHFS	0.718	0.688	0.621	0.653	0.756	0.674	0.815	
FRHFP	0.762	0.636	0.599	0.509	0.724	0.625	0.684	0.761

Table 5: Discriminant validity

Source: Authors' calculation

The CFA results for financial inclusion indicate that the model is fit. The chi-square (χ^2) statistic is non-significant (P>0.05), and the fit indices exceed the recommended thresholds: IFI>0.95, TLI>0.95, CFI>0.90, and RMSEA<0.08. These findings suggest that the measurement model for financial inclusion is robust and adequately represents the underlying constructs. The findings confirm the convergent validity of the manifest and latent for financial resilience with excellent model fit statistics between the model and the observed data. The chi-square (x²), i.e., (CMIN/DF)=1.089 (degree of freedom=67, probability level=0.118), and the incremental fit index (IFI) = 0.927, where the recommended value is 0.95. Further, the Tucker Lewis index (TLI)=0.963, is above the recommended value of 0.95. Furthermore, the comparative fit index (CFI)=0.971 is above the recommended value of 0.90, with the Root Mean Square Error of Approximation (RMSEA) of 0.056 as depicted in Table 6.

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Statistics	Value
Financial Inclusion — Financial Resilience	0.298***
CMIN	72.935
Degree of Freedom (DF)	67
Probability (P)	0.118
Goodness of Fit Index (GFI)	0.938
Incremental Fit Index (IFI)	0.927
Tucker-Lewis Index (TLI)	0.963
Comparative Fit Index (CFI)	0.971
Normed Fit Index (NFI)	0.925
Root Mean Square Error of Approximation (RMSEA)	0.056
Squared Multiple Correlations (R^2)	0.217

Source: Authors' calculation

Note: N-271, ***P<0.001, **P<0.01, *P<0.05

Table 6 depicts that financial inclusion significantly impacts marine fishermen's financial resilience (β =0.298, P<0.001) in the Balasore district of Odisha. This finding is consistent with our hypothesis (H₁), which states that there is a significant relationship between financial inclusion and financial resilience. So, it can be concluded that financial inclusion explains a 29.8% variation in financial resilience.

5. Conclusion

This study examines the influence of financial inclusion on financial resilience of marine fishermen in the Balasore district of Odisha. A quantitative research methodology has been employed, and data are collected from a sample of 271 fishermen. Structural Equation Modeling (SEM) using SPSS and SPSS AMOS has been conducted to analyse the data. The findings of the study provide empirical evidence that financial inclusion positively influences the financial resilience of marine fishermen. The analysis reveals a significant positive relationship between dimensions of financial inclusion, such as access to financial services, usage of financial services, and quality of financial services, and dimensions of financial resilience, including keeping control of money, taking care of expenditure, having financial cushion, having financial shortfall/stress, and having financial planning. These results imply that enhancing access, encouraging the usage, and enhancing the quality of financial services can broaden the scope of financial inclusion and empower marine fishermen to manage financial risks better. This can help the marine fishermen cope with shocks and build financial resilience, thereby improving economic well-being.

6. Implications of the Study

The study on the influence of financial inclusion on the financial resilience of marine fishermen in the Balasore district of Odisha holds significant implications for policymakers, financial institutions, and development practitioners. Financial inclusion, encompassing access to affordable credit, savings accounts, and insurance, is critical in enhancing the financial security of fishermen who face precarious livelihood due to fluctuating incomes and natural calamities. The research underscores that inclusive financial systems enable fishermen to improve savings, access emergency funds, and recover more effectively from economic shocks.

Policymakers can leverage these findings to design targeted financial inclusion programs and promote accessible banking services tailored to the unique needs of fishing communities. Introducing microinsurance schemes and affordable asset-acquisition credit facilities can mitigate income uncertainties and foster long-term resilience. For financial institutions, this study emphasises the business potential in extending services to underserved segments, ensuring mutual benefits.

Furthermore, the research advocates integrating financial inclusion initiatives with broader developmental programs, such as skill enhancement and alternative livelihoods. This holistic approach can sustainably uplift fishermen's socio-economic conditions. By addressing the vulnerabilities highlighted in this study, stakeholders can contribute to achieve financial resilience and inclusive growth of Odisha's coastal communities.

7. Limitations and Future Research Direction

While the study provides valuable insights into how financial inclusion influences financial resilience, there are certain drawbacks to consider. Firstly, the research primarily focuses on marine fishermen of a specific geographical area, which may limit the generalisability of the findings to other coastal areas or communities with different socio-economic dynamics. Secondly, the study relies on cross-sectional data, which restricts the ability to observe long-term trends or causal relationships between financial inclusion and financial resilience. The sample size, though representative, may not capture the full diversity of experiences within the fishing community, such as gender-specific challenges or varying levels of access to financial services. External factors like climate change, policy shifts, and market volatility significantly affect fishermen's livelihood and have not been thoroughly explored.

Future research could address these limitations by employing longitudinal data to better understand the temporal effects of financial inclusion on financial resilience. Expanding the study to include other coastal regions or states would provide comparative insights and enhance generalisability.

Incorporating qualitative methods could also shed light on nuanced aspects of financial resilience, such as social capital and community support. Furthermore, analysing the role of digital financial inclusion and innovative financial tools could offer an added perspective, especially given the growing penetration of technology in rural areas.

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