

COOPERATIVE FINANCIAL PERFORMANCE AND RURAL POVERTY IN INDONESIA: EVIDENCE FROM AN ARDL APPROACH

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Abstract

This study examines the long-run relationship between cooperative financial performance and rural poverty in Indonesia. Drawing on the Vicious Cycle of Poverty framework and the concept of Inclusive Development, the study examines the associations of Business Volume and Net Income or Sisa Hasil Usaha (SHU) with the rural poverty rate. Using annual time-series data from 2006 to 2025, the study applies the Autoregressive Distributed Lag (ARDL) approach to examine short-run dynamics and long-run cointegration among the variables. The ARDL bounds test provides evidence of a long-run relationship between rural poverty, Business Volume, and SHU. The long-run estimation suggests that higher Business Volume is associated with lower rural poverty. In contrast, SHU is positively associated with rural poverty, indicating that higher cooperative surplus has not automatically translated into inclusive welfare gains for poorer rural households. The findings suggest that cooperative business expansion may be linked to lower rural poverty, while the distribution and utilisation of SHU require stronger attention to ensure that cooperative benefits reach economically vulnerable groups. Policy attention should focus on productive cooperative activities, member participation, transparent SHU allocation, and broader access to cooperative services.

Keywords: Rural Poverty, Cooperatives, Inclusive Development, Autoregressive Distributed Lag, Vicious Cycle of Poverty

INTRODUCTION

Poverty remains a central development challenge in many countries, including Indonesia. High poverty rates serve as a critical indicator of inadequate societal welfare, particularly regarding food security, access to healthcare, and the quality of education. Various government efforts have been implemented to alleviate poverty through both fiscal and monetary policies. Over the study period, Indonesia's rural poverty rate declined substantially, although this development occurred alongside broader economic, social, and policy changes, including rural development programmes, social protection interventions, employment dynamics, agricultural performance, and improvements in public services (Badan Pusat Statistik, 2026).

Rural economic development positions cooperatives as a strategic pillar to harness community potential that has previously been underutilized. Through collective economic activity, cooperatives may create opportunities for members to participate in local production, distribution, and market exchange. As a member-based business entity, a cooperative may support inclusive development when its economic activities, membership arrangements, and benefit-sharing mechanisms provide meaningful access to a broad range of members. This orientation is consistent with the cooperative principles of voluntary and open membership contained in Law Number 25 of 1992 concerning Cooperatives (Undang-Undang No 25 Tahun 1992, 1992). The operational activities of cooperatives are reflected through their business turnover and the generated surplus, known as Sisa Hasil Usaha (SHU) or Net Income.

Cooperatives may contribute to inclusive development by facilitating collective business activities, improving market access, and creating economic opportunities for their members. In Indonesia, cooperatives may function as inclusive economic institutions when they expand market access, strengthen member participation, and distribute benefits fairly. Over the study period, cooperative Business Volume generally increased despite several fluctuations, while rural poverty followed a broad downward trend. This pattern suggests a possible relationship between cooperative development and rural poverty dynamics, although descriptive trends alone cannot establish causality.

Recent empirical studies indicate that cooperative membership may improve rural welfare through greater access to productive inputs, technology, markets, and household income. Evidence from Nigeria, India, Mozambique, Zambia, China, and Indonesia shows that cooperative participation may support technology adoption, productive performance, market integration, and household welfare (Bachke, 2019; Blekking et al., 2021; Kumar et al., 2018; Taniu et al., 2024; Toiba et al., 2024; Wossen et al., 2017). However, these benefits are not always distributed equally across rural households because participation, service access, and institutional arrangements may differ by household characteristics (Kehinde et al., 2025; Liu et al., 2023; Shen et al., 2022; Zou & Wang, 2022).

However, limited evidence has examined whether aggregate cooperative financial performance is associated with changes in rural poverty at the national level in Indonesia. This study addresses this gap by examining the long-run relationship between cooperative Business Volume, SHU, and rural poverty in Indonesia from 2006 to 2025. The ARDL approach is used to examine short-run dynamics and long-run cointegration among the variables.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Vicious Circle of Poverty

This study is rooted in the classic problem of economic development, where poverty remains a structural issue within society that is difficult to transform. Fundamentally, this argument is based on the Vicious Cycle of Poverty theory (Nurkse, 1953). Nurkse argued that poverty persists because individuals are trapped in a cycle of interrelated problems: low income prevents individuals from saving, which inherently leads to a lack of capital available for business operations. Without adequate capital, investment stagnates, productivity remains low, and the cycle continues to rotate, making it exceedingly difficult to break.

Poverty within society is not merely a repetitive process but also a form of accumulation that causes conditions to deteriorate progressively. This aligns with the theory of Circular Cumulative Causation (Myrdal, 1957). According to Myrdal, poverty operates like a snowball effect: one problem triggers another, even larger problem. In rural areas, the difficulty in accessing capital and technology is not only a consequence of being poor, but it is precisely these barriers that exacerbate poverty and make it harder to alleviate.

To weaken the cycle of poverty, development theory emphasises the importance of investment, productive activity, and institutional coordination. Rosenstein-Rodan's Big Push Theory argues that fragmented and small-scale economic activity may be insufficient to overcome structural development constraints, particularly in settings characterised by low productivity and limited capital accumulation (Rosenstein-Rodan, 1943).

Within this framework, cooperatives can be understood as collective institutions that may help address rural market failures by pooling member resources, strengthening bargaining power, and reducing transaction costs (Ostrom, 1990). Business Volume represents the scale of cooperative economic activity and may indicate broader market participation, stronger commercial networks, and potential economies of scale. Net Income or SHU represents the financial surplus generated by cooperative activities. Its welfare implications depend on how the surplus is allocated among reserves, members, business expansion, and social programmes. Therefore, a higher SHU

does not automatically imply an increase in welfare among poorer rural households. Together, these perspectives provide a theoretical basis for examining the relationship between cooperative financial performance and rural poverty.

Inclusive Development

This study adopts the Inclusive Development paradigm as an evaluative framework for assessing the effectiveness of cooperative performance in poverty alleviation. In contrast to conventional economic growth approaches that focus solely on increasing aggregate output, inclusive development emphasizes creating broader opportunities and ensuring the equitable distribution of development benefits, particularly for groups facing welfare barriers.

Fundamentally, this theory is rooted in the concept of "Development as Freedom" put forward (Sen, 1999). Sen argues that development should be understood as a process of expanding the real freedoms enjoyed by individuals. From this perspective, poverty is viewed as "capability deprivation" that prevents individuals from functioning fully within the economy. Inclusive development, therefore, demands instruments capable of enhancing the basic capabilities of rural communities so they can participate fairly in the market.

Furthermore, this research integrates the thoughts of Acemoglu & Robinson from their work *Why Nations Fail*, which distinguishes between Inclusive Institutions and Extractive Institutions (Acemoglu & Robinson, 2011). Inclusive institutions are entities that create incentives, enable mass participation, and distribute resources equitably. Conversely, extractive institutions tend to siphon wealth from one group of society for the benefit of the elite. In this context, cooperatives represent a tangible manifestation of inclusive economic institutions. Cooperatives may support a broader distribution of economic benefits when their governance arrangements promote transparent participation and fair allocation of surplus among members (Zou & Wang, 2022).

Additionally, referring to the Asian Development Bank framework Asian Development Bank (2019), inclusive development requires connectivity between macro growth and micro welfare. Cooperatives may improve market access and economic opportunities for rural members, although the extent of this role depends on their business capacity and institutional governance. Using Business Volume and SHU, this study examines whether cooperative financial performance is associated with rural poverty in Indonesia.

Cooperatives

Cooperatives are positioned as a manifestation of Collective Action designed to correct market failures in rural areas. Theoretically, market failures in the rural sector are often caused by asymmetric information, the monopoly of middlemen, and high transaction costs for small-scale producers. The governance of Common Pool Resources, asserts that self-organizing communities through collective institutions are often more efficient and sustainable than rigid state interventions or pure private market exploitation (Ostrom, 1990).

Business Volume reflects the scale of cooperative operations. Higher Business Volume may indicate wider market participation, stronger commercial networks, and a greater capacity to aggregate members' economic activities. Through these mechanisms, cooperatives may strengthen bargaining power, reduce transaction costs, and improve market access for small-scale producers (Bachke, 2019; Ostrom, 1990).

SHU reflects the financial surplus generated by cooperative operations. In principle, SHU may support member welfare through allocation based on participation, capital contribution, and cooperative rules. However, its welfare effect depends on the transparency of the allocation process, the composition of cooperative membership, and the extent to which economically vulnerable members can participate in cooperative activities (Zou & Wang, 2022).

Business Volume and SHU may therefore reflect the financial capacity of cooperatives to support member welfare. Nevertheless, their implications for rural poverty depend on governance quality, member participation, and the distribution of cooperative benefits.

Empirical Evidence on Cooperatives and Rural Welfare

Recent empirical evidence published between 2017 and 2025 generally indicates that cooperative membership may improve rural welfare through technology adoption, access to productive inputs, stronger market participation, and higher household income. Using household-level data from rural Nigeria, Wossen et al. (2017) found that cooperative membership was associated with improved technology adoption, asset ownership, and household welfare. Panel evidence from smallholder dairy farmers in Bihar, India, also examined the welfare implications of cooperative membership (Kumar et al., 2018). In Mozambique, Bachke (2019) found that farmers' organizations may reduce transaction costs while strengthening market integration and agricultural production among smallholders. Similarly, Blekking et al. (2021) reported that cooperative-affiliated households in Zambia used more fertilizer and hybrid seeds and achieved higher maize yields.

Several studies have directly examined the relationship between cooperatives and poverty-related outcomes. Shen et al. (2022) analysed the role of cooperatives in alleviating farmer poverty in rural China. Liu et al. (2023) found that participation in rural cooperatives reduced the poverty vulnerability of smallholder households in western China. However, the poverty-reducing effects were stronger among households with higher income levels, better education, and stronger human capital. In Nigeria, Kehinde et al. (2025) also found a statistically significant relationship between agricultural cooperative membership and the poverty status of smallholder farming households.

The literature further shows that cooperative benefits are not necessarily distributed equally among rural households. Zou and Wang (2022) found that cooperative members in China earned higher household income on average, but the positive effect was not statistically significant among lower-income households. Blekking et al. (2021) similarly noted that poorer households may be excluded from cooperative membership and may therefore miss access to subsidised inputs and collective benefits. These findings suggest that cooperative expansion does not automatically generate inclusive welfare gains for economically vulnerable households when participation, access to services, and benefit-sharing mechanisms remain uneven.

Evidence from Indonesia also supports the relevance of cooperative institutions for rural welfare. Taniu et al. (2024) found that cooperative membership had a positive and significant impact on household income among capture-fishery households in Indonesia. In the dairy sector, Toiba et al. (2024) found that cooperative membership improved household income, net returns, and profits from fresh milk among dairy farmers in East Java. Nevertheless, these Indonesian studies focus on household-level membership effects rather than the aggregate financial performance of cooperatives.

Overall, previous studies mainly assess whether cooperative membership improves household income, welfare, productivity, or poverty vulnerability at the micro level. Limited evidence has examined whether aggregate cooperative financial indicators, particularly Business Volume and SHU, are associated with rural poverty at the national level. This study therefore examines the long-run relationship between cooperative Business Volume, SHU, and rural poverty in Indonesia using an ARDL approach.

Taken together, the perspectives of the vicious cycle of poverty, collective action, and inclusive development provide a basis for examining the relationship between cooperative financial performance and rural poverty (Myrdal, 1957; Nurkse, 1953; Ostrom, 1990; Sen, 1999). Business Volume may represent the scale of cooperative economic activity, whereas SHU reflects the financial surplus available for allocation under cooperative rules. Whether these indicators are associated with lower rural poverty remains an empirical question. Based on this theoretical framework, the hypotheses are formulated as follows:

H1: Business Volume is negatively associated with the rural poverty rate in the long run.

H2: Net Income or SHU is negatively associated with the rural poverty rate in the long run.

RESEARCH METHODS

This study employs a quantitative time-series approach using annual national data for Indonesia from 2006 to 2025. Rural poverty is measured as the percentage of rural residents living below the national poverty line. Business Volume and SHU are obtained from official cooperative statistics, while rural poverty data are obtained from Statistics Indonesia. Since the analysis uses aggregate national data, all available annual observations were included, and the findings should be interpreted as macro-level relationships rather than household-level or regional causal effects. The selected specification is ARDL (1,0,1), determined using the Akaike Information Criterion under a restricted constant and no-trend specification.

The primary analytical method is the ARDL approach popularized by Pesaran et al. (2001). This procedure was selected for its ability to handle variables with mixed degrees of integration (I (0) and I (1)). The analysis begins with a unit root test using the Augmented Dickey-Fuller (ADF) method to ensure that no variables are integrated at the second order, or I (2). The main empirical model employed in this study is specified as follows:

$$POV_t = \alpha_0 + \alpha_1 BV_t + \alpha_2 SHU_t + \varepsilon_t \dots \dots \dots (1)$$

where POV_t represents the rural poverty rate, BV_t denotes cooperative business volume, and SHU_t refers to cooperative net income (Sisa Hasil Usaha). The ARDL representation is formulated as follows:

$$\Delta POV_t = \beta_0 + \sum_{i=1}^p \beta_1 \Delta POV_{t-i} + \sum_{i=0}^q \beta_2 \Delta BV_{t-i} + \sum_{i=0}^r \beta_3 \Delta SHU_{t-i} + \lambda_1 POV_{t-1} + \lambda_2 BV_{t-1} + \lambda_3 SHU_{t-1} + u_t \dots \dots \dots (2)$$

where Δ denotes the first-difference operator, while the lagged level variables are used to test the existence of a long-run cointegration relationship through the bounds testing procedure.

The determination of the optimal lag length is conducted using the Akaike Information Criterion (AIC). Subsequently, a cointegration test is performed via the F-Bounds Testing approach. If the F-statistic value exceeds the Upper Bound critical value, a long-term equilibrium relationship is confirmed. EViews 12 is used for estimation, diagnostic tests for serial correlation and heteroskedasticity, and model stability assessment through CUSUM and CUSUM of Squares plots.

RESULTS AND DISCUSSION

Results

Descriptive Analysis and Rural Economic Phenomena

Descriptive trends show a broad decline in rural poverty alongside an overall increase in cooperative Business Volume, although both series experienced fluctuations during the study period. This pattern suggests a possible long-run association, but it does not establish causality because rural poverty is also influenced by labour-market conditions, inflation, social assistance, agricultural performance, and public policy.

Unit Root Test Results (ADF Test)

Table 1. Summary of Unit Root Test Results (ADF)

Variable	Level Test Result	First-Difference Probability	Order of Integration	Decision
Rural Poverty (Y)	Stationary, $p = 0.0008$	–	I(0)	Stationary at level
Business Volume (X1)	Non-stationary	0.0101	I(1)	Stationary at first difference
Net Income / SHU (X2)	Non-stationary	0.0054	I(1)	Stationary at first difference

Source: Data processed, 2026

Table 1 shows that rural poverty is stationary at level, while Business Volume and SHU become stationary after first differencing. Since none of the variables is integrated at the second order, the ARDL approach is appropriate for further estimation.

F-Bounds Cointegration Test Results

The ARDL bounds test indicates a long-run relationship among rural poverty, Business Volume, and SHU. The calculated F-statistic of 23.1688 exceeds the reported upper-bound critical values of 4.428 at the 5% level and 6.265 at the 1% level. Accordingly, the null hypothesis of no levels relationship is rejected. This result supports the existence of a long-run cointegration relationship among the variables. Given the use of aggregate national data and a limited number of annual observations, the result should be interpreted as evidence of a long-run association rather than causal proof.

Table 2. ARDL Bounds Cointegration Test

Test Statistic	Value	Decision
F-statistic	23.1688	Cointegration exists
Upper bound at 5%	4.428	
Upper bound at 1%	6.265	

Source: Data processed, 2026

Long-Run Estimation Analysis

Table 3. Long-Run ARDL Estimation Results

Variable	Coefficient	t-Statistic	Prob.	Significance	Relationship
Business Volume (X1)	-2.87E-08	-1.9859	0.0645	10%	Negative
Net Income / SHU (X2)	5.85E-07	2.5263	0.0225	5%	Positive
Constant	11.9515	4.0033	0.0010	1%	Positive

Source: Data processed, 2026

The long-run estimation suggests that higher Business Volume is associated with lower rural poverty. This finding indicates that stronger cooperative business activity may be linked to broader economic opportunities in rural areas. In contrast, SHU is positively associated with rural

poverty. This result suggests that higher aggregate cooperative surplus has not automatically translated into broad-based welfare gains for poorer rural households. The positive association between SHU and rural poverty should not be interpreted as evidence that SHU causes poverty. Rather, it may indicate that the distribution and utilisation of cooperative surplus have not fully reached economically vulnerable rural households.

Table 4. Error-Correction Representation of the ARDL (1,0,1) Model

Variable	Coefficient	t-Statistic	Probability	Interpretation
Y(-1)	-0.180802	-3.128716	0.0074	Negative adjustment coefficient
X1	-5.20E-09	-1.343141	0.2006	Contemporaneous level term
X2(-1)	1.06E-07	2.227954	0.0428	Lagged level term
D(X2)	4.62E-08	1.251290	0.2313	Short-run change term
Constant	2.160861	1.792279	0.0947	Constant

Source: Data processed, 2026

Note: X1 is included as a zero-lag variable in the selected ARDL (1,0,1) model. Therefore, the model does not estimate a separate first-difference short-run effect for Business Volume. The reported probability for Y (-1) should be interpreted cautiously because the EViews output notes that conventional p-values are incompatible with the t-bounds distribution.

Short-Run Dynamics and Error-Correction Representation

The negative adjustment coefficient is consistent with an adjustment process toward the long-run relationship identified by the ARDL bounds test. The selected model includes a short-run change term for SHU, but this term does not provide evidence of a short-run association with rural poverty. Business Volume enters the selected model as a contemporaneous level term. Therefore, the model does not estimate a separate first-difference short-run effect for Business Volume.

Table 5. Residual Diagnostic Tests of the ARDL (1,0,1) Model

Test	Null Hypothesis	Test Statistic	Probability	Decision
Breusch-Godfrey Serial Correlation LM Test	No serial correlation	Obs*R-squared = 0.8257	0.6618	Fail to reject the null hypothesis
White Heteroskedasticity Test	Homoskedastic residuals	Obs*R-squared = 14.1545	0.4383	Fail to reject the null hypothesis

Source: Data processed, 2026

Diagnostic Tests and Model Stability

Table 5 reports the diagnostic test results for the estimated ARDL model. The Breusch-Godfrey Serial Correlation LM Test does not reject the null hypothesis of no serial correlation, with an ObsR-squared probability of 0.6618. The White Heteroskedasticity Test also does not reject the null hypothesis of homoskedastic residuals, with an ObsR-squared probability of 0.4383. Therefore, the diagnostic tests do not indicate evidence of serial correlation or heteroskedasticity in the estimated model. Nevertheless, these results should be interpreted cautiously because the

analysis is based on a limited number of annual observations. The CUSUM and CUSUM of Squares plots further suggest that the estimated parameters remain stable over the study period.

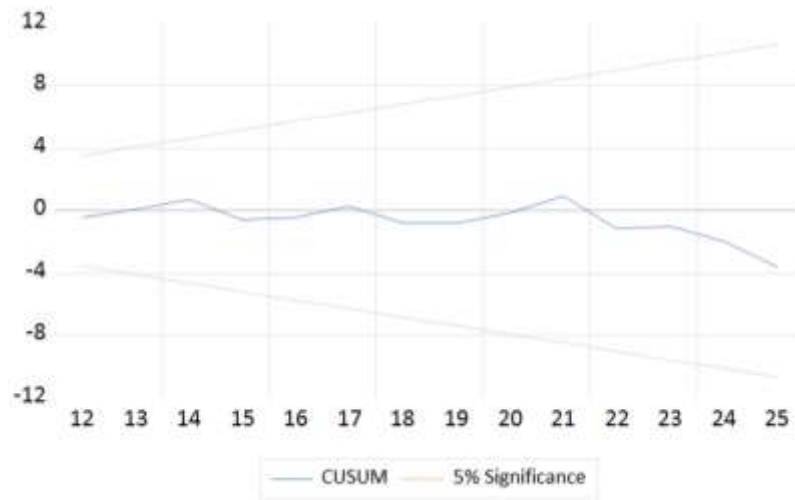


Figure 1. CUSUM Stability Test

Figure 1 shows that the CUSUM line remains within the 5% significance bounds during the observation period. This result suggests that the estimated model coefficients are stable over time.

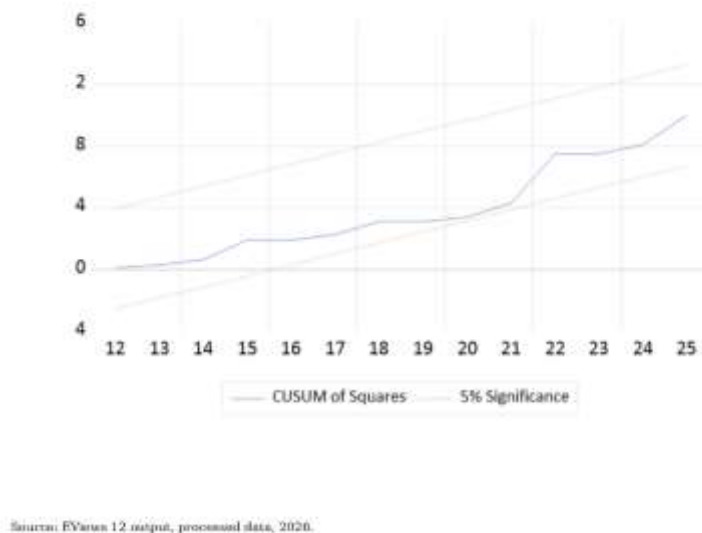


Figure 2. CUSUM of Squares Stability Test

Figure 2 shows that the CUSUM of Squares line remains within the 5% significance bounds throughout the observation period. This result indicates that there is no evidence of substantial instability in the variance of the estimated model coefficients. Taken together, the CUSUM and CUSUM of Squares tests suggest that the ARDL model is stable over the study period.

Discussion

The findings indicate a long-run association between cooperative financial performance and rural poverty in Indonesia. At the national level, higher Business Volume is associated with

lower rural poverty. This pattern is consistent with the possibility that cooperative activity may support collective capital formation, market participation, and local economic resilience. However, the present study does not directly observe these mechanisms at the household level.

The negative association between Business Volume and rural poverty is broadly consistent with the vicious cycle of poverty perspective proposed by Nurkse (1953). Larger cooperative activities may improve market access, reduce transaction costs, strengthen bargaining power, and expand productive opportunities for cooperative members. This interpretation is aligned with recent empirical evidence showing that cooperative participation may improve technology adoption, productive performance, market access, and household welfare among rural producers (Bachke, 2019; Blekking et al., 2021; Taniu et al., 2024; Toiba et al., 2024; Wossen et al., 2017).

The long-run relationship identified through the ARDL framework indicates that cooperative financial performance and rural poverty move together over time. However, this study does not directly measure structural inequality, spatial disadvantage, or the participation of poor households in cooperative activities. Therefore, the relationship should be interpreted as a macro-level association rather than direct evidence of a household-level poverty-reduction mechanism.

The positive association between SHU and rural poverty should be interpreted cautiously. The aggregate national data do not observe how SHU is allocated across members, the composition of cooperative membership, capital contributions, service utilisation, or governance quality. Therefore, the present analysis does not demonstrate elite capture directly. Rather, the result is consistent with a possible distributional mechanism in which cooperative surplus may be concentrated among members with greater capital contributions, higher transaction volumes, or stronger influence over cooperative governance, while poorer households may have more limited access to membership, services, and surplus allocation.

This interpretation is consistent with evidence that the welfare effects of collective institutions may depend on participation, local governance, and the distribution of benefits. Indonesian evidence on community-driven development also highlights that local power and participation can shape how collective benefits are allocated (Dasgupta & Beard, 2007). Future micro-level research should examine whether SHU allocation, cooperative governance, and member participation generate unequal welfare outcomes across rural households.

From a policy perspective, the findings suggest that cooperative development should not focus solely on increasing business turnover or generating higher surplus. Policy efforts should also strengthen transparent governance, member participation, equitable SHU allocation, and access for economically vulnerable households to benefit from cooperative activities.

CONCLUSION

This study examines the long-run association between cooperative financial performance and rural poverty in Indonesia. The ARDL bounds test provides evidence of a long-run cointegration relationship among rural poverty, Business Volume, and SHU. The long-run estimation suggests that higher Business Volume is associated with lower rural poverty. In contrast, SHU is positively associated with rural poverty, indicating that higher cooperative surplus has not automatically translated into inclusive welfare gains for poorer rural households.

The error-correction representation is consistent with an adjustment process toward the long-run relationship. The selected model does not provide evidence that short-run changes in SHU are associated with rural poverty, while it does not estimate a separate first-difference short-run effect for Business Volume. Policy efforts should focus on expanding productive cooperative activities while strengthening member participation, transparent SHU allocation, and access for poorer rural households to benefit from cooperative services. Given the use of aggregate national data and a limited number of observations, the findings should be interpreted as long-run associations rather than causal effects.

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